

2010
2011



Chemistry Beyond the Ordinary

- BioSciences
- Monomers & Polymers
- Microspheres & Particles
- High Performance/
Electronic Materials





Ordering In the U.S. & Canada

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400 Valley Rd. Warrington, PA 18976

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(800) 523-2575

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(outside U.S. /Canada (215) 343-6484)

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24 hours a day, 7 days/week
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Online:

www.polysciences.com

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(Safe, Easy and Secure ordering)

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www.polysciences.com

Please also visit our affiliate



Bangs Laboratories, Inc.

9025 Technology Drive, Fishers, IN 46038

Phone: (800) 387-0672
(317) 570-7020

Fax: (317) 570-7034

www.bangslabs.com

Customer Account #:

Dear Colleague,

Thank you for reading Polysciences, Inc.'s 2010-2011 Catalog of Products. With each new catalog we strive to add more information, more products, and more effective communication with you. Our Catalog of Products is the culmination of thousands of hours of effort all aimed at describing to you, in the most efficient way, what we have prepared and put in stock that might be useful to you. I hope you find what you are looking for but if you don't, please call us and ask for one of our hand-crafted chemical products made specifically for your needs. The engineers and chemists at Polysciences are focused and enthusiastic about manufacturing chemical products that customers need for university research, the medical device industry, histology, the diagnostics industry, biotech, the pharmaceutical industry, microscopy, electronics and in general all (poly) sciences.



Polysciences was founded in 1961 by B. David Halpern, Ph.D. I succeeded Dr. Halpern as the next owner of Polysciences in 1993. 2011 will make 50 years of existence for Polysciences and I am very happy to say that we are still here after all of these years. With thousands of products sold to thousands of customers around the world, I am very fortunate indeed, to have the privilege to provide "*Chemistry Beyond the Ordinary*" for each of our customers.

We have added over 200 new products to this edition of the catalog and I hope you will think of Polysciences, Inc. when you need supplies manufactured under FDA, GMP or ISO 9000 conditions in the many industries of science.

Sincerely,

Michael H. Ott
Owner and President

Easy Ordering

Call Polysciences and your call is answered by our friendly customer service staff. No automated menus to navigate through.

Free Technical Support

We have knowledgeable, professional technical support specialists on staff ready to assist you with any questions you have about our products.

Bulk Quantity Quotes

Looking for larger quantities than we list in this catalog? We can provide you with no-obligation quotes for any of our products purchased in bulk.

Custom Synthesis

Our experienced staff of Ph.D. production and synthesis chemists can assist you in developing materials to meet your particular needs and specifications.

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Using This Catalog

For most of the chemicals listed in this catalog we provide hazard, handling, and storage codes as well as technical data. The information provided is believed to be current at time of printing, but is provided without warranty of any kind. We do not warrant that chemicals listed without codes are necessarily hazard free or that all codes are listed for each chemical.

A typical catalog entry can be read as follows:

	1	2	3	4	5	6	7	8	9	10
	Acrylic acid min. 99.5%	[79-10-7]	BEHJ7g	MW 72.1	mp 13°	bp 139°		00020-250	250g	25.50
11	n_D^{20} 1.420	200 ppm MEHQ inhibitor	Tg 106°	TSCA						
	Copolymerizes with many other monomers to introduce acid groups which are important in crosslinking, adhesion promotion, and stabilization of emulsion polymers. Homopolymers are water-soluble.									
		12	13	14	15					
	Poly(methyl methacrylate)	[9011-14-7]	A2g	d 1.20	n_D^{20} 1.49	Tg 105°	TSCA			
	i.v. 0.18	MW 25,000	atactic beads, 200µm		Polydispersity ~3.0			04554-500	500g	
16	i.v. 0.40	MW 75,000	atactic beads, 200µm		Polydispersity ~2.8			04553-500	500g	
		MW 100,000	atactic pellets					17913-500	500g	
	i.v. 1.25	MW 350,000	atactic beads		Polydispersity 2.7			04552-500	500g	
	For MW Standards, see page 218									
	Hard, stable, non-yellowing polymer used in coating and in molded clear plastic objects.									
	Soluble in: acetone, toluene, chloroform, MEK, THF.									
	18						17			

- Product Name
- Purity: min; minimum, > greater than; ~ around
- Chemical Abstracts Service (CAS) Registry Number
- Hazard, Storage and Handling Codes (see next page)
- MW - Molecular weight or average molecular weight in the case of polymers.
Mw - Weight Average Molecular Weight
Mn - Number Average Molecular Weight
- mp: melting point in ° centigrade.
dec: with decomposition
- bp: boiling point in ° centigrade at atmospheric pressure unless pressure is specified in millimeter (mm) of mercury
- Polysciences, Inc. catalog number
- Quantity of pack
- Price (in U.S. dollars)
- Refractive index at 20° C on D-line. Abbreviated also as R.I.
- Inhibitor level in parts per million unless specified otherwise.
HQ - Hydroquinone
MEHQ - methyl ether of hydroquinone
BHT - butylated hydroxy toluene
PTZ - Phenothiazine
- Glass transition of polymer in ° centigrade
- Listed in TSCA inventory
- Density in gram/cc at 20° C
- i.v. - inherent viscosity as dl/g at 20° C
Rel. vis. - dimensionless ratio at 20° C

- 17.** Ratio of Mw/Mn where available
- 18.** Soluble in: MEK - methyl ethyl ketone
MDC - dichloromethane
DMF - dimethyl formamide
THF - tetrahydrofuran
DMSO - dimethyl sulfoxide
NMP - N-methylpyrrolidinone
- 19.** Emiss max: Emission maximum in nm
Exc max: Excitation maximum in nm
 λ max: Absorption maximum in nm
- 20.** WPE: weight per epoxide
- 21.** FP: flash point in °C
- 22.** pH: negative logarithm of hydrogen ion concentration
pK: negative logarithm of dissociation constant
- 23.** Viscosity Units:
CPS - centipoise at 25° C
unless specified otherwise
AQ - aqueous
CST - centistokes
- 24.** Conductivity Units: Siemens/centimeter
- 25.** TLC: thin layer chromatography
- 26.** HLB: Hydrophilic lipophilic balance
- 27.** C.I.: Color index number

Hazard Codes

A Harmless—use normal precautions	I Lachrymator	R Poison (Absorption)
B Corrosive	J Monomer	S Poison (Inhalation)
C Flammable liquid	K Hygroscopic	T Gas, inert
D Flammable solid	L Pyrophoric	U Unknown
E Combustible	M Suspected carcinogen	V Toxic (Ingestion)
F Organic peroxide	N Vesicant	W Toxic (Absorption)
G Oxidizer	O Skin sensitizer	X Toxic (Inhalation)
H Irritant	P Poison (Ingestion)	Y Special

International Icon / Equivalent Polysciences Code



Handling Codes

2 Exercise normal care in handling	5 Gloves & fume hood	7 Gloves, chemical goggles & chemical mask or hood
3 Gloves	6 Gloves, chemical goggles & fume hood—no chemical mask	
4 Gloves & chemical goggles		

Storage Codes

a Protect from light	h Nuisance dust	s Long term storage at 4° C
b Protect from moisture	k Stench	w Refrigerate on arrival; do not freeze
c Handle under dry nitrogen	m Do not permit to freeze	x Cold pack shipment
d Store at 4°C	n Allow to come to room temperature before opening	z Dry ice shipment
e Store below 0°C	p Explosive when dry	
f Store below -20°C	r Store at -70° C	
g Store at room temperature		

Ordering Information

Through Polysciences, Inc. in the United States

Purchase orders for shipment should be directed via US Mail or courier service to:
Polysciences, Inc., 400 Valley Road, Warrington, PA 18976
or via email to: info@polysciences.com

Please call: (800) 523-2575 or (215) 343-6484 from 8:00 am to 6:00 pm EST to place phone orders. Fax orders are received automatically 24 hours a day at: (800) 343-3291 or (215) 343-0214

When ordering, please use catalog number, name of item, and quantity. Package sizes larger than listed may be available at reduced per unit prices. *For large package or more than 20 units of any single item, price quotations are available by fax or phone.*

Confirming purchase orders are not required but if sent must be clearly marked **confirming**. Duplicate shipments cannot be returned for full credit.

Credit Cards

We accept VISA and MasterCard, American Express and Discover



Minimum Order Policy

Orders placed in U.S. Dollars and shipped through Polysciences, Inc.: \$35.00

Special Handling Charges

For orders shipped from Polysciences, Inc., in the United States, a special handling fee of \$20.00 may be added to your order for special hazardous material packaging, dry ice and/or cold pack requirements of specific products. In addition, an international order processing fee of \$50.00 will be added to all orders shipped outside of the United States, to defray the added costs associated with such orders.

Return Policy

(a) Please examine your shipments upon receipt for damage or discrepancies. If a problem arises with your shipment, please contact our Customer Service Department within fifteen (15) days. We will work with you to quickly resolve any problems.

Before returning any items, all returns must be authorized by Polysciences to insure proper credit. A Return Material Authorization (RMA) must be obtained by contacting our Customer Service Department. Not all items will be authorized for return due to temperature and packing requirements. To be accepted for consideration by Polysciences, Inc. as a return for restocking, the product must be a currently listed product. Hazardous materials must be packed and labeled in accordance with the current D.O.T., I.A.T.A. or I.M.D.G. regulations and practices applying to the transportation of hazardous materials. Shipping documents must also meet D.O.T. regulations. Non-compliant shipments will not qualify for credit. Shipping charges are the customer's/distributor's responsibility. Items returned without a RMA may not be accepted. To ensure proper credit, each Product return must include the following information: Customer Name and Address, purchase order number, Polysciences Shipping Order Number, Date of Invoice, catalog number of returned Item(s), Polysciences Return Authorization Number, reason for return.

Authorized returns should be made within 30 days of issuance of a RMA. A 25% restocking charge will be levied on materials returned because of error on the part of the buyer. The seller shall be under no obligation to replace goods that have been lost or damaged by the carrier.

(b) Products not authorized for return: products purchased as custom orders, products not purchased from Polysciences, Inc., products with an expired shelf life, discontinued products, products missing labels or parts.

Method of Shipment

Unless specifically advised, we will ship by United Parcel Service, parcel post, common carrier or air freight. Rapid and reliable delivery of microspheres, particles and beads is ensured by Next Day Air for orders shipped from Polysciences, Inc., in the United States to domestic addresses. All materials requiring dry ice packaging must be shipped air express. All cold pack materials must be shipped via United Parcel's next day air service. For those hazardous chemicals covered by Department of Transportation and/or International Air Transport Association (IATA) regulations for flammable (red label) or hazardous items, we reserve the right to elect the most appropriate shipping method in order to comply with those regulations.

Certificates of Origin: \$35.00

Polysciences, Inc., supplies Certificates of Origin documents to those customers that specifically request them. The Certificate of Origin document is not required to ship products, and is used exclusively to enable International Customers to receive a discount on import custom fees. The document is a value added service we provide to our customers.

Through Polysciences Europe GmbH in Germany

Orders shipped to European countries will be processed through Polysciences Europe GmbH and billed in Euros.

Purchase orders for shipment should be directed via International mail or courier service to: **Polysciences Europe GmbH, Handelsstrasse 3, D-69214 Eppelheim, Germany** or via email to: info@polysciences.de

Please call: +49-6221-765767 from 8:00 am to 5:00 pm MET to place phone orders. Fax orders are received 24 hours a day at: +49-6221-764620

When ordering, please use catalog number, name of item, and quantity. Package sizes larger than listed may be available at reduced per unit prices. *For large package or more than 20 units of any single item, price quotations are available by fax or phone.*

Confirming purchase orders are not required but if sent must be clearly marked **confirming**. Duplicate shipments cannot be returned for full credit.

Credit Cards

Polysciences Europe GmbH **ONLY** accepts VISA.



Minimum Order Policy

For orders placed in Euros and shipped to European countries through Polysciences Europe GmbH: On orders less than 250.00 Euro, a small order fee of 20.00 Euro will be applied to shipments.

Special Handling Charges

For orders shipped from Polysciences Europe GmbH, a special handling fee of 10.00 Euro may be added to your order for special hazardous material packaging or cold pack requirements of specific products. In addition, a 10.00 Euro fee will be added to all shipments requiring customs declarations. A 100.00 Euro Veterinary Customs Processing Fee will be added to certain antibodies.

Return Policy

Please examine your shipments upon receipt for damage or discrepancies. If a problem arises with your shipment, please contact our Customer Service Department within fifteen (15) days. We will work with you to quickly resolve any problems.

Before returning any items, all returns must be authorized by Polysciences to insure proper credit. A Return Material Authorization (RMA) must be obtained by contacting our Customer Service Department. Not all items will be authorized for return due to temperature and packing requirements. To be accepted for consideration by Polysciences Europe GmbH as a return for restocking, the product must be a currently listed product. Hazardous materials must be packed and labeled in accordance with the current A.D.R., I.A.T.A. or I.M.D.G. regulations and practices applying to the transportation of hazardous materials. Shipping documents must also meet A.D.R. regulations. Non-compliant shipments will not qualify for credit. Shipping charges are the customer's/distributor's responsibility. Items returned without a RMA may not be accepted. To ensure proper credit, each Product return must include the following information: Customer Name and Address, purchase order number, Polysciences Shipping Order Number, Date of Invoice, catalog number of returned Item(s), Polysciences Return Authorization Number, reason for return.

Authorized returns should be made within 30 days of issuance of a RMA. A 25% restocking charge will be levied on materials returned because of error on the part of the buyer. The seller shall be under no obligation to replace goods that have been lost or damaged by the carrier.

Method of Shipment

Orders placed through the web site for shipment to European countries will be processed through Polysciences Europe GmbH. We cannot guarantee these shipments for overnight delivery. If you require expedited service, please contact Polysciences Europe GmbH directly at +49 6221-765767.

Certificates of Origin: 30.00 Euro

Polysciences Europe GmbH, supplies Certificates of Origin documents to those customers that specifically request them. The Certificate of Origin document is not required to ship products, and is used exclusively to enable International Customers to receive a discount on import custom fees. The document is a value added service we provide to our customers.

Terms and Conditions

Please refer to page 312 of catalog for a full description of our terms and conditions.

BioSciences



Electron Microscopy Products

Electrophoresis Products

Fluorescent Dyes

Grossing & Frozen Section Products

Histology Processing

Histology Embedding

Immunohistochemistry & In Situ Products

Microtomy

Plastic & Hard Tissue Embedding Media

Special Stains

Specimen Transport

Staining, Histology, Cytology

New Products



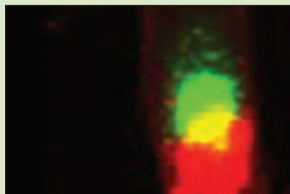
Decalcification Solutions

New block solutions for enhanced ribbon cutting and prolonging blade life. From delicate to heavy duty formulas. **30**



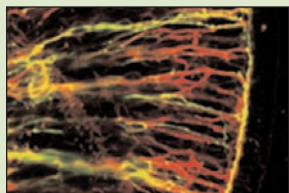
Neat Stain Kits

Three new kits available; Gram Stain, 3-step differential Hematology Stain and Trichrome Stain kits. **45, 52, 106**



CellVue® - Membrane Labeling Dyes

Sensitive probes for detecting rapid uniform membrane changes in any cell or bioparticle with a membrane. **71**



NeuroVue® - Dye Filters for Neuronal Tract Tracing

Convenient, ready-to-use coated filter format with more precise control of dye insertion point. **72**



Fluorescence Microscopes

High quality fluorescence microscopes. Upright and Inverted models available. Great complement to our full line of fluorescent stain kits and reagents. **6-7**



Picrosirius Red Stain

Binds specifically to collagen fibrils of varying diameter that is used to distinguish collagen type I from collagen type III. **89**

BioSciences

We are pleased to offer hundreds of products useful for histology, microscopy and life sciences applications. Product quality at Polysciences, Inc. is complemented by strong technical and customer support to answer questions quickly and accurately. We strive to provide the advanced technology, manufacturing competence and technical support to help our customers meet their goals. Polysciences' long history of producing high quality chemicals has allowed us to hear and answer the needs of our customers.

BioSciences Selection Guide At-A-Glance

Electron Microscopy Products & Accessories

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L.R. Gold® Embedding Media	59
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Methyl Methacrylate Embedding Kit	63
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CTC, Cyanoditoly tetrazolium chloride	29
DAPI	33
Ethidium Bromide	37
Fast Blue	37
FITC, Fluorescein isothiocyanate	39
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Fungi-Fluor® Kit for Fungal Detection	40
Fungi-Fluor® Pneumocystis Kit	41
Fungi-White	41
Propidium Iodide	94
Rhodamine B isothiocyanate	96
TB Fluorostain Kit	102

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PolyTransport Buffer	94

Histology Grossing and Frozen Section Products

Aqua-Poly/Mount Coverslipping Medium	14
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Fast Fix	38
Fast Frozen Stain Kit	38
Gold Standard: Super Decal I - Delicate Decal	30
Gold Standard: Super Decal II - Heavy Duty Decal	30
PolyFreeze	92
Poly-NoCal Decalcifying Products	93
Terry's Polychrome Methylene Blue	103
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Tissue-Tack™ Adhesive	106
Tissue Marking Dye	105

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Hartmann's Fixative	52
Hollandes Fixative	53
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Poly/LEM Fixative	92
Xylene	112
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BioSciences Selection Guide At-A-Glance *continued*

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Deli-Cal Block Solution	31
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Mowiol 4-88® Fluorescent Mounting Media	79
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Xylene Based Mounting, Poly-Mount®	93
Xylene & Toluene Mounting Media, PolyGlass	92

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Araldite® resins	90
Batson's Anatomical Corrosion Kit	17
Embed-It™ Low Viscosity Epoxy Kit	36
Immuno-Bed Kit	56
JB-4® Embedding Kit	57
JB-4 Plus® Embedding Kit	58
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Osteo-Bed Plus Bone Embedding Kit	82
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Ammonium Blue	12
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Stains-all	100
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Wright Stain	111
Wright Stain Solution	111

Special Stains / Histology / Animal Research

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Fungi-Fluor® Kits	40-41
Fungi-White	41
Gill's Modified EA	43
Gill's Modified OG-6	43
Gram's Stain Kit with Iodine	69
Gram's Stain Kit with Stabilized Iodine	69

Gomori's Trichrome Stain Kit	45
Iron Stain Kit, Prussian Blue	57
Multiple Stain Solution	80
PAS Stain Kit	87
PCP Control Slides	89
Peel-A-Way® Microscope Slide Grip	76
Picrosirius Red Stain	89
Protargol S™	94
Rapid Mucin Stain Kit	96
TB Fluorostain Kit	102
Villanueva Bone Stain	83
Von Kossa Method for Calcium Kit	110
Wright-Giemsa Stain Solution	110

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DAB (Chromogen)	33
EDTA Buffers	23
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Hanker-Yates reagent	51
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NBT (Chromogen)	81
Peroxidase-anti-peroxidase (PAP) (Rabbit)	88
Propidium Iodide (Counterstain)	94
Streptavidin Reagents	101

Microbiology

Flash Dip - FNA/H. Pylori Stain Kit	38
Rapid Bacterial Test Strips	64-65
Microring® Bacterial Detectors	66-67
Microbiology Dyes, Stains & Stain Kits	67-69
Microloops®	70
Neat Stain Gram Stain Kit	45
Parisitology Fixatives	70

Ready-to-Use Stains

Product	Use(s)	Catalog #	Pkg. Size(s)	Page
0.4% Safranin	Gram Staining - Microbiology	24672	1 Gal	69
2% Acridine Orange	RNA Stain	24603	10ml	8
AFB Auramine-Rhodamine Kit-Fluorescent	Mycobacteria - Microbiology	24666	Kit	10
AFB Kinyoun Kit	Mycobacteria - Microbiology	24670	Kit	10
AFB Ziehl-Neelson Kit	Mycobacteria - Microbiology	24669	Kit	10
Amyloid Stain	Lipids	24614	Kit	12
Auramine O Stain Kit	Mycobacteria / Microbiology	24665	Kit	16
Biebrich Scarlet-Acid Fuchsin Solution	Masson Trichrome stain procedure	24602	100ml	18
Coomassie® Blue G250	Protein electrophoresis staining	24609	500ml	28
Coomassie® Blue R250	Protein electrophoresis staining	24608	500ml	28
Crystal Violet	Gram Staining - Microbiology	24686	1 Gal	29
Eosin Y, 0.5% Alcoholic Solution	Histology counterstain, contains acetic acid	09859	500ml, 1000ml, 3.75L	36
Eosin Y, 1% Alcoholic Solution	Histology counterstain, no acetic acid	17269	500ml, 1000ml	36
FNA / H. Pylori Stain Kit	Histology / Cytology	24606	Kit	38
Fast Frozen Stain Kit	Frozen sections	24604	Kit	38
Fungi-Fluor® Kit for Fungal Detection	Fungal stain	17442	Kit	40
Fungi-Fluor® Kit for PCP	PCP stain	22363	Kit	41
Fungi-White	Fluorescent fungal and Trichomonas detection	24692	Kit	41
Gill's Hematoxylin #1	Cytology stain	24242	500ml, 1000ml	42
Gill's Hematoxylin #2	IHC stain - Cytology	24243	500ml, 1000ml	43
Gill's Hematoxylin #3	Histology	24244	500ml, 1000ml	43
Gill's OG-6	Pap stains - Cytology	09782	500ml, 1000ml, 3.8L	43
Gill's EA	Pap stains - Cytology	09783	500ml, 1000ml, 3.8L	43
Gomori's Trichrome Stain Kit	Histology	24205	Kit	45
Gram's Decolorizer (75/25)	Microbiology	24682	1 Gal	68
Gram's Decolorizer (50/50)	Microbiology	24683	1 Gal	68
Gram's Iodine	Gram Staining - Microbiology	24684	1 Gal	69
Gram's Iodine - Stabilized	Gram Staining - Microbiology	24685	1 Gal	69
Gram's Stain Kit with Iodine	Microbiology	24668	Kit	69
Gram's Stain Kit with Stabilized Iodine	Microbiology	24667	Kit	69
Harris Hematoxylin	Histology	24245	500ml, 1000ml	51
Luxol Fast Blue	Myelin	24611	500ml	62
May-Grunwald Stain Solution	Histology / Hematology	24981	1L, 4L	62
Mayer's Hematoxylin	Histology	24821	500ml, L	62
Metanil Yellow	Muci & H.Pylori counterstain	24610	250ml	63
Multiple Stain Solution	Tzanck / EM / Frozen sections	08824	50ml, 100ml	80
Periodic Acid Schiff's (PAS)	Glycogen - Histology	24200	Kit	87
Picrosirius Red Stain	Collagen - Histology	24901	250ml, 500ml Kit	89
Prussian Blue (Iron Stain)	Iron - Histology	24199	Kit	95
Rapid Mucin Stain Kit (Mucicarmine)	Mucin - Histology	24208	Kit	96
TB Fluorostain Kit	Mycobacteria - Histology / Microbiology	22422	Kit	102
Terry's Polychrome	Stat one step - Frozen or Fixed tissue	09978	500ml	103
Villanueva Bone Stain	Histology	16280	450ml	83
Von Kossa Method for Calcium Kit	Calcium - Histology	24633	Kit	110
Wheatley's Trichrome Blue	Microbiology	24691	16oz	69
Wright Giemsa Stain Solution	Histology / Hematology / Microbiology	08711	470ml, 1L, 10L	110
Wright Stain Solution	Histology / Hematology / Microbiology	24986	1L, 4L, 20L	111

Certified Dyes

See individual page numbers for detailed product descriptions of certified dyes in this table.

Product	C.I. Number	Catalog #	Pkg. Size(s)	Page
Acid Fuchsin	42685	24991	25g, 100g	8
Acridine Orange	46005	04539	500mg, 5g	8
Alcian Blue	74240	19175	10g	11
Azure A	52005	24992	25g, 50g	16
Biebrich Scarlet	26905	03336	100g	18
Brilliant Cresyl Blue	51010	24993	25g, 50g	21
Brilliant Green	42040	24994	25g, 50g	21
Carmine	75470	02729	25g	25
Chlorazole black E	30235	02730	25g	26
Cibacron blue F3GA	61211	04352	25g	26
Congo red	22120	02736	25g	27
Coomassie® Blue G250	42655	03707	10g, 50g, 100g	28
Coomassie® Blue R250	42660	00352	10g, 50g, 100g	28
Cresyl violet acetate		21063	10g	29
Crystal Violet	42555	00022	25g, 100g	29
Direct red 81	28160	16799	25g	34
Eosin Y	45380	02740	50g	37
Fast green FCF	42053	02745	25g, 100g	38
Fluorescein isothiocyanate, isomer 1 (FITC)		00373	1g	39
Fuchsin, Basic (Pararosanine)	42500	06342	25g	40
Fuchsin, Basic (Rosanine)	42510	00635	25g	40
Gallamine blue	51045	05587	1g	41
Giemsa Stain Powder		24998	25g	42
Gentian violet 3	42555	00022	100g	42
Hematein	75290	01005	25g	52
Hematoxylin	75290	02749	25g, 100g	52
Light green SF, yellowish	42095	02753	25g	60
Malachite Green Oxalate	42000	25002	25g	62
Methyl green	42590	02760	25g	63
Methylene blue chloride	52015	04220	50g	64
Neutral red	50040	00915	25g	81
Nuclear fast red	60760	09773	5g	81
Oil red O	26125	06317	25g, 100g	81
Orange G	16230	00968	100g	81
Protargol S™		01070	5g, 25g	94
Pyronin Y	45005	18614	5g, 25g	95
Rose Bengal	45440	25005	25g	96
Safranin O (Basic Red 2)	50240	02782	25g	97
Sirius red	35780	09400	10g, 25g	99
Sudan Black B	26150	25008	25g	101
Tetrachrome stain (MacNeal)		02783	5g	103
Thionin	52000	01220	10g	103
Toluidine blue O	52040	01234	25g	106
Toluidine blue O (purified)	52040	15931	10g	106
Trypan blue	23850	01294	100g	107
Wright Stain		02785	25g, 100g	111

Powdered Dyes

Bromophenol Blue, ACS		24995	5g, 25g	21
Bromothymol Blue		25009	25g, 50g	21
Bromothymol Blue, Sodium Salt, ACS		24996	25g	21
Fluorescein, Sodium Salt		24997	100g, 500g	39
Gentian Violet	42555	24999	25g	42
Hydroxynaphthol Blue		25000	25g	54
Leishman Stain		25001	25g	60
Phenol Red, ACS		25003	25g	88
Rhodamine 6G	45160	25004	25g, 50g	96
Rosolic Acid	43800	25006	25g	96
Saffron		25007	25g	97

Embedding Media Selection Guide

Paraffins

Product Name	Data Sheet #	Medium Type	Application	Viscosity	Miscible	Polymerization Temp.	Time	Catalog #	Pkg Size	Page
GemCut® Colored Paraffins	691	Paraffin	Histology	Low	Solvent	0° to -5°C		24361 thru 24366	1 case (8x1kg)	42, 83
			(Sapphire, Aquamarine, Citrine, Emerald, Opal, Amethyst)							
Micro-Cut Paraffins	525A	Paraffin	Histology	Low	Solvent	0° to -5°C		24201, 24198, 24202	1 case (4x2.5kg)	75, 84
			(Multiple melting points; 52-54°C, 56-58°C, 62-64°C)							
PolyFin®	429	Paraffin	Histology	Med.	Solvent	0° to -5°C		19562-1 19562-15	1 case 15 kg	84 84

Plastics

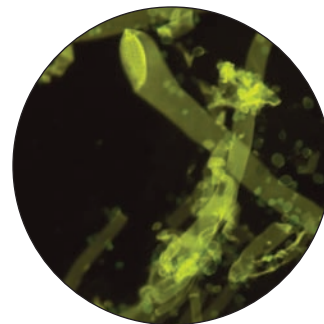
Araldite® 502 Kit Luft's Formula	128	Epoxy PO*	EM/Histo	Med.	solvent	60°C	12-24 hrs	02600-1	1 kit	15
Araldite® 502/ Poly/Bed® 812 Kit	128	Epoxy	EM/Histo	Med.	PO*	60°C	12-24 hrs	02595-1	1 kit	15, 90
Batson's #17 Anatomical Corrosion Kit	105	Methacrylate	Histology	Med./ High	Solvent	RT	24 hrs	07349-1	1 kit	17
Embed-It™ Low Viscosity Epoxy Kit	622	Epoxy	EM	Low	Solvent	60°C	12-24 hrs	24300-1	1 kit	36
Immuno-Bed Kit	302	Glycol Methacrylate	Histology	Low	H ₂ O	RT	60 min	17324-1	1 kit	56
JB-4® Embedding Kit	123	Glycol Methacrylate	Histology	Low	H ₂ O	RT	45 min	00226-1	1 kit	57
Lowicryl® K4M, Polar Kit	248	Acrylic	EM/Histo	Low	H ₂ O, EtOH	-35°C	24 hrs	15923-1	1 kit	61
Lowicryl® HM20, Non-polar, hydrophobic	248	Acrylic	EM/Histo	Low	Solvent	-70°C	24 hrs	15924-1	1 kit	61
L.R. White	305A 305	Acrylic	EM/Histo	Very low	H ₂ O	60°C	12-20 hrs	17411-500	500g	59
JB-4 Plus® Embedding Kit	393	Glycol Methacrylate	Histology	Low	H ₂ O	RT	60 min	8570-1	1 kit	58
Methyl Methacrylate/Butyl Methacrylate	408	Methacrylates	EM/Histo	Med.	Solvent	4°C 60°C	12-24 h 12 hrs	03573-1	1 kit	64
Osteo-Bed Bone Embedding Kit	355	Methyl Methacrylate	Histology	Med.	Solvent	35°C	12-48 hrs	17734-1	1 kit	82
Osteo-Bed Plus Embedding Kit	785	Methyl Methacrylate	Histology	Med.	Solvent	35°C	12-48 hrs	24889-1	1 kit	82
Poly/Bed® 812 – BDMA (Glauert Version)	471	Epoxy	EM/Histo	Low/Med.	Solvent	60°C	24 hrs	21844-1	1 kit	90
Poly/Bed® 812 - DMP-30 (Luft Formulation)	233	Epoxy	EM/Histo	Med.	Solvent	60°C	24 hrs	08792-1	1 kit	90
PolyFreeze		Polyol	Histology	Low	H ₂ O	Cryo section		19636-1	6x120ml	92

Log on to: www.polysciences.com anytime to download Technical Data Sheets

EM - Electron Microscopy, Histo - Histology *PO – propylene oxide clearing agent, improves penetration; RT – room temperature; UV – ultraviolet light.

New! Fluorescence Microscopes

Polysciences, Inc. has formed a partnership with IntraCellular Imaging to bring you new fluorescence microscope packages. These microscopes ship complete with our self aligning metal halide light source and filter sets. Everything necessary to start doing fluorescent work today! An optional CMOS 5.0 mega-pixel camera with imaging software is also available. Use with any of Polysciences' fluorescent staining kits and reagents for optimum results every time!



Upright Fluorescence Microscope

- EWF10x focusing eyepieces with eyeguards, 22mm field of view
- Siedentopf trinocular viewing head with photo tube; inclined 30°, rotatable 360°
- 48-75mm interpupillary distance settings
- AIS Infinity Corrected 10X, 20X, 40X, 100X plan phase contrast and 20X and 40X Plan Fluor objectives
- 0/100 split to photoport or eyepieces
- Right hand controls, low position, scratch resistant mechanical stage, 185mm x 142mm, movement range 75mm x 55mm
- Turret phase condensor; N/A=1.25
- Variable Koehler 6 volt 30 watt illumination

Catalog #: 25039



Inverted Fluorescence Microscope

- EWF10x focusing eyepieces with eyeguards, 22mm field of view
- Siedentopf trinocular viewing head with photo tube; inclined 30°, rotatable 360°
- 48-75mm interpupillary distance settings
- AIS Infinity Corrected 4X Plan (not phase) and 10X, 20X Plan phase and 20X and 40X Plan Fluor objectives
- 0/100 split to photoport or eyepieces
- Fixed plain stage 160mm x 250mm with glass insert and mechanical stage with lower right control
- ULWD condenser, N.A. 0.3, working distance 72mm
- Variable Koehler 6 volt 30 watt illumination

Catalog #: 25040

Light Source Features

- 200w metal halide lamp with 1500 hour life
- Self aligning lamp is easy to replace
- Reduced heat transfer giving greater stability
- Higher output than traditional light sources
- Unsurpassed spectral output stability DC powered lamp
- 5 position manual light attenuator

Included Filter Sets

- FITC / GFP Set - eGFP (FITC), Alexa Fluor® 488, Cy2®, DiO, Fluo-4
- DAPI with LP emission Set - DAPI, Hoechst 33342 & 33258, AMCA/AMCA-x, Cascade Blue, Spectrum Red

For additional filter sets, please see **Appendix A**, page 309

Optional CMOS Digital Camera & Imaging Software

Camera Specifications

Image Sensor	1/2.5" 5.0 Megapixel CMOS
Imaging Area	5.70mm x 4.28mm
Resolution	2592 H x 1944 V
Pixel Size	2.2µm x 2.2µm
Signal/Noise Ratio	41dB
Responsivity	1.2 V/Lux-Second @ 550nm
Exposure Range	10µs to 500ms
Frame Rate	Max 6 fps, 3 fps at full resolution Max 21 fps, 12 fps at half resolution
Shutter	Electronic Rolling
ADC	10-bit RGB RAW Data
Dynamic	61dB
Color	Bayer RGB Mosaic, 24-bit uncompressed 3 x 8 bit output



Image

Preview live video and instantly capture images without interrupting the live preview screen. Show full screen real time live images. Store captured images in over 10 different file formats, including JPG, TIFF and BMP.

Image Processing

Color image composition allows images captured with different filters to be combined to form a single color image. Interactive adjustment of hue, saturation, intensity, sharpness, white balance, exposure time and gamma on the live image. Flat field correction, auto pencil sketch, darkfield, unsharp mask filtering, noise suppression and removal of bad pixel can be performed with just a single mouse click!

Additional Features

Micrometrics SE application contains a fully functional TWAIN interface that can be used with many 3rd party software applications. USB 2.0 digital interface guarantees a simple plug and play installation. Multi-language user interface.

Minimum System Requirements

Windows 2000 or above, USB 2.0, Pentium III or higher recommended, 256MB system RAM, video card with 24 or 32 bit true color graphics, 8 MB of video memory.

Catalog #: 25041

Featured Fluorescent Stain Kits from Polysciences, Inc.

Fungi-White Cat. #: 24692

For identification of fluorescent fungal elements and trichomonas detection. Rapid chemo-fluorescent method is useful for the detection of Microsporidia and *Acanthamoeba spp.* The Fungi-White dye fluoresces when exposed to ultraviolet light (below 400nm wavelength). Useful on fecal smears, cell cultures or other sample materials. *See page 41*

Fungi-Fluor® Pneumocystis Kit Cat. #: 22363 (U.S. & outside Europe) Cat. #: 22363E (European orders only)

Fungi-Fluor® Pneumocystis Kit offers a fast, fluorescent staining procedure for *Pneumocystis carinii* in bronchial specimens. *Pneumocystis carinii* is an organism that can cause *Pneumocystis carinii* pneumonia (PCP) in severely immune compromised patients. *See page 41*

Pneumocystis carinii control slides Cat. #: 22251

Designed to be used with our Fungi-Fluor® Pneumocystis Kit. Slides are unstained. 10 slides per box. *See page 41*

Fungi-Fluor® Kit for Fungal Detection Cat. #: 17442 (U.S. & outside Europe) Cat. #: 17442E (European orders only)

Fungi-Fluor® Kit for Fungal Detection offers a quick fluorescent stain/counterstain procedure for various fungal organisms. Kit can be used to screen a variety of specimen types from sputum to skin scrapings for fungal detection. *See page 40*

TB Fluorostain Kit Cat. #: 22422

TB Fluorostain Kit offers a fast, fluorescent, microwaveable staining method for mycobacteria. Fluorochrome staining of mycobacteria in an acid-fast smear offers several advantages over traditional carbol-fuchsin methods. Lower magnification is required; fluorescent mycobacteria stand out brightly on a darkened background. Smaller numbers of mycobacteria are easily identified with a fluorescent stain. *See page 102*

Please visit www.polysciences.com for complete listing of fluorescent staining kits.

Alphabetical Listing of Products

NEW! Acetic Acid Formalin for Bone Marrow and Lymph Node Fixative, Gold Standard Series

Acetic Acid Formalin for Bone Marrow and Lymph Node Fixative is designed to fix lymphoreticular myeloid, lymph nodes and bone marrow tissues. Mercury free. Substitute B-S, Mercuric.

Acetone [67-64-1] CH₆O



Useful for defatting and dehydrating tissues and as a fixative for tissue and blood smears and cell preps. Can be used as an extraction solvent on animal and plant substances. Formula: CH₃COCH₃

EM and Histology grade, 99.5% minimum

Glass distilled, 99.7% minimum

Merck Index 11, 58

NEW! Acid Fuchsin, C.I. 42685, certified [989-38-8]

(Acid Magenta, Acid Violet 19, Fuchsin acid, Fuchsin S, Rubine S)

MW 585.24 Formula: C₂₀H₁₇N₃Na₂O₉S₃ Certified Biological Stain

Acid Fuchsin is one of the dyes used in the Masson's Trichrome Staining technique. This method is commonly used to stain tissue sections in the Histology and Cytology Laboratory in order to distinguish muscle from collagen. The muscle stains red with the acid fuchsin and the collagen is stained green or blue with light green SF yellowish or methyl blue.

Jocelyn H. Bruce-Gregorios, M.D.: *Histopathologic Techniques*, JMC Press Inc., Quezon City, Philippines, 1974.

Acridine mutagen ICR 191 [17070-45-0] Hu6bg

([6-Chloro-9-[3-(2-chloroethylamino)propylamino]-2-methoxyacridine) dihydrochloride;

ICR 191 Acridine mutagen; Ames mutagen 191) MW 451.2

Frameshift mutagenic standard for Ames test in *Salmonella* and *E. coli*.

Science, 176, 47 (1972); *Ann. N.Y. Acad. Sci.*, 269, 21 (1975);

J. Med. Chem., 15, 739 (1972); *Proc. Natl. Acad. Sci., USA*, 72, 5135 (1975)

Acridine Orange, C. I. 46005, very high purity, min. 95% [65-61-2] UH5d

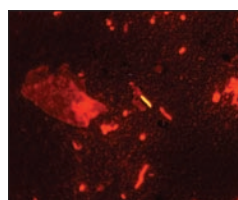
(3,6-Bis[dimethyl-amino]acridine hydrochloride hydrate)

MW 301.83 λ max: 494 ± 4nm

DNA intercalating dye. This grade of acridine orange is of exceptionally high purity, suitable for quantitative work. Free of inorganic salts.

J. Histochem. Cytochem., 22, 495 (1974); 31, 737 (1983); 44, 393 (1996);

49, 921 (2001); *J. Lab Med.*, 15(3), 180 (1984)



Mycobacterium tuberculosis in a sputum smear is stained using fluorescent auramine with acridine orange counterstain. Image courtesy of CDC Public Health Library, Ronald W. Smithwick

2% Acridine Orange, Ready-to-Use UH5d

Ready-to-use and free of inorganic salts. A specific stain for RNA, used as a 2% solution containing 1% lanthanum acetate in 15% acetic acid. Exceptionally high purity, suitable for quantitative work. DNA intercalating dye. Our ready-to-use format eliminates the exposure to potentially irritating powdered dyes.

J. Histochem. Cytochem., 22, 495 (1974); 31, 737 (1983); 44, 393 (1996); 49, 921 (2001)

J. Lab Med., 15(3), 180 (1984)

Catalog # Size

24910-500 500ml
24910-1 1 liter

01921-1 1 liter
01921-6 6 pints
01921-4 4x1 liter
08523-4 4x1 liter

24991-25 25g
24991-100 100g

08704-100 100mg

Available in larger quantities,
Please call for quote.

04539-500 500mg
04539-5 5g

24603-10 10ml

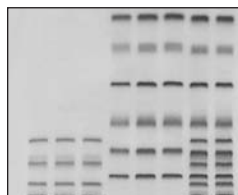
Acrolein, distilled, 99% EM grade, 2 Propenal [107-02-8] *BCOPR6acg*



MW 56.1 bp 52-53°C n_D^{20} 1.4025 d 0.839
1000 ppm HQ inhibitor Formula: $\text{CH}_2=\text{CHCHO}$
Used in combination with other aldehydes such as formaldehyde or glutaraldehyde to fix very dense specimens since acrolein penetrates and reacts faster than other fixatives. Distilled and packaged in serum vials for easy handling. *Special packaging charge, For Sale in United States Only. Shipped by truck only. J. Histochem. Cytochem., 30, 1307 (1982)*

Acrylamide, Chemzymes Ultra Pure®, Acrylic Acid Amide [79-06-1] *HMO6d*

MW 71.08 >99.9% mp 84-85° Formula: $\text{CH}_2=\text{CHCONH}_2$
Our very best ultra pure acrylamide used for preparation of fluorescence-free low noise baseline gels. Our unique process produces exceptionally pure material which we offer here in crystalline form. We use this material in all of our pre-made solutions and kits. Technical Data Sheet #155



Conductivity 35% w/v, 20-25°C <2.0 $\mu\text{S}/\text{cm}=\mu\text{mho}$
Free Acrylic Acid <.001%
Absorbance 7.0 mM at 252nm <1.2 a.u.
Absorbance 7.0 mM at 280 nm <.04 a.u.
Absorbance 35% w/v, at 410nm <.02 a.u.

Acrylamide/N,N'-methylenebisacrylamide premixed powder *HMO6d*

For convenience and safety we provide our Acrylamide (Cat. #00019) and N,N'-methylene bisacrylamide (Cat. #00719) combined in a readily soluble form in exact proportions. Each batch is pretested. Each unit (bottle) contains 30 grams of solids. Add deionized water to the graduated bottle to make 100ml of 30% stock solution stable for 1 month at 4°C. Technical Data Sheet #479

30% (wt./vol.) acrylamide/bisacrylamide 19:1 powder

30% (wt./vol.) acrylamide/bisacrylamide 29:1 powder

30% (wt./vol.) acrylamide/bisacrylamide 37.5:1 powder

Acrylamide/N,N'-methylenebisacrylamide

PolyPAGE-40 liquid solutions: 3 years of stability

By varying the monomer (acrylamide) and crosslinker (bisacrylamide) concentrations in a polyacrylamide gel, one can optimize the pore size of the gel to give the best separation and resolution for your specific molecule. We offer the following convenient ready to use liquid formulations. Each PolyPAGE-40 product is specially produced to ensure maximum stability and shelf life and is guaranteed for 3 years.

40% (wt./vol.) acrylamide/bisacrylamide 19:1 solution *HMO6d*

40% (wt./vol.) acrylamide/bisacrylamide 29:1 solution *HMO6d*

40% (wt./vol.) acrylamide/bisacrylamide 37.5:1 solution *HMO6d*

Catalog #	Size
00016-5	5x10ml
00019-100	100g
00019-500	500g
PolyPointer ⚡ <i>Additional Electrophoresis Products</i> Acridine Orange 8 Agarose 11 Coomassie® Blue 28 Cuprolinic Blue 29 Electrophoresis Buffers 22-23 Pyronin Y, C.I. 45005, certified . . .95 Silver Stain Kit 99	
17452-6	6x30g
19847-30	30g
19847-6	6x30g
17451-30	30g
17451-6	6x30g
24170-100	100ml
24170-6	6x100ml
24169-100	100ml
24169-6	6x100ml
24165-100	100ml
24165-6	6x100ml

N,N'-Methylenebisacrylamide, Chemzymes Ultra Pure® BIS [110-26-9] V4d
 MW 154.17 >99% mp >300° Formula: (CH₂CHCONH)₂CH₂
 Purified to exceptional levels using the same special procedures we use for our Ultra Pure
 Acrylamide. Conductivity, 2% w/v, 20-25°C <5.0 µS/cm = µmho

Adhesive, Tissue-Tack™ H5gm
 For adhering tissue sections to slides during immunostaining and routine histology staining
 procedures. Used primarily with GMA & MMA sections. Technical Data Sheet #289
Stain Technol., 6, 358 (1982)

AFB Auramine-Rhodamine Kit - Fluorescent
 The identification of Mycobacteria with rhodamine-auramine is due to the affinity of the mycolic
 acid in the cell walls for the fluorochromes. These dyes will bind to the Mycobacteria, which
 appear bright yellow or orange against a greenish background. The potassium permanganate
 helps prevent non-specific fluorescence. All acid-fast organisms will be stained by rhodamine-
 auramine, including the sporozoan parasites. Slides stained with rhodamine-auramine may be
 restained with Ziehl-Neelson or Kinyoun stain directly, as long as the oil has been removed.
 This provides a convenient method of confirming and differentiating morphology of positive
 slides with the traditional stains. Technical Data Sheet #748

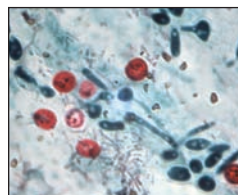
Kit contains one 8oz. bottle each of the following:
 Auramine-Rhodamine, Fluorescent Decolorizer, Potassium-Permanganate

AFB Kinyoun Kit
 Carbol fuchsin is used to stain the slide. Acid alcohol is used to
 decolorize the slide. It has been suggested that the dye
 replacement power of the counterstain could be used to
 decolorize and counterstain at the same time. It has been shown
 that acid alcohol increases the differentiation obtained, giving
 superior results. After decolorization, the slide may be counter
 stained with methylene blue or brilliant green. The acid fast
 organisms will appear red while non-acid fast organisms will
 stain blue or green. Technical Data Sheet #747

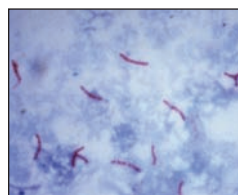
Kit contains one 8oz. bottle each of the following:
 Carbol Fuchsin (Kinyoun), Acid Alcohol, Methylene Blue

AFB Ziehl-Neelson Kit
 Carbol fuchsin is used to stain the slide. Acid alcohol is used to
 decolorize the slide. It has been suggested that the dye
 replacement power of the counterstain could be used to
 decolorize and counterstain at the same time. It has been shown
 that acid alcohol increases the differentiation obtained and gives
 superior results. After decolorization, the slide may be counter
 stained with methylene blue or brilliant green. The acid fast
 organisms will appear red while non acid fast organisms will stain
 blue or green. Technical Data Sheet #746

Kit contains one 8oz. bottle each of the following:
 Carbol Fuchsin (Ziehl Neelson), Acid Alcohol, Methylene Blue



Direct fecal smear is stained to
 detect *Cryptosporidium* sp., an
 intracellular protozoan parasite
 using a modified cold Kinyoun acid-
 fast staining technique.
 Image courtesy of CDC Public
 Health Library / J. of Inf. Dis., Vol.
 137, #5, pp. 824-828, May 1983,
 and Dr. Pearl Ma, Dir., Microbiology,
 St. Vincent's Hosp., N.Y.



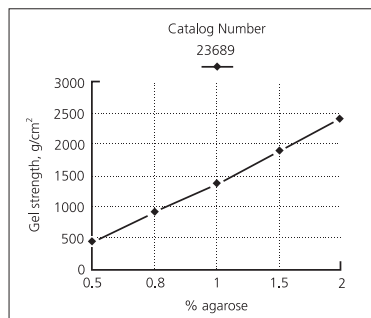
Mycobacterium tuberculosis
 bacteria revealed using acid-fast
 Ziehl-Neelson stain; 1000X.
 Image courtesy of CDC Public
 Health Library / Dr. George P.
 Kubica.

Catalog #	Size
00719-25	25g
00719-100	100g
16672-100	100ml
16672-500	500ml
24666-1	1 kit
24670-1	1 kit
24669-1	1 kit

Agarose, Molecular Biology Grade [9012-36-6] *A2g*
 Agarose is a natural complex polysaccharide isolated from agar or agar-bearing marine algae. Agarose forms a clear gel matrix that is very useful for electrophoresis, immunoelectrophoresis and immunodiffusion. Ideally suited for electrophoretic separation of proteins and nucleic acids and for PCR product analysis.

Applications

- DNA restriction fragment separation
- PCR product separation
- Southern and Northern blotting
- Pulsed field electrophoresis
- Immunoelectrophoresis
- Laurell rocket
- Immunodiffusion
- Protein electrophoresis



Gel strength of agarose concentration.

Specifications

Gel strength (g/cm ² , 1%)	EEO (-mr)	Gelling temp. (°C)	Melting temp. (°C)	Sulfate content (%)
≥800	≤0.22	35-40	86-90	≤0.30

Agarose Concentration (%)	The functional range of linear DNA (kb) separation
0.3	60.0 - 5.0
0.6	20.0 - 1.0
0.7	10.0 - 0.8
0.9	7.0 - 0.5
1.2	6.0 - 0.4
1.5	4.0 - 0.2
2.0	3.0 - 0.1

Albumin, Bovine serum

(fraction V, protease-free), lyophilized; BSA [9048-46-8] *H4d*
 MW ~66k Da. Purity 98% minimum

Alcian Blue 8GX, C.I. 74240

[33864-99-2]
 Used primarily for demonstrating acid mucopolysaccharides with Scott's method and Mowry's staining methods. Used in electrophoresis for detecting glycoproteins.

Alcohol Reagent (100%), histology grade

C5g
 Composed of 90 parts ethyl alcohol, 5 parts methyl alcohol and 5 parts isopropyl alcohol, v/v blend. Suitable for most histological procedures.

Alumina, Activated. Chromatography Grade. Aluminum Oxide

[1344-28-1] *H5g* ...
 MW 102.1 TSCA 100µm pH of Aq suspension 9.5±0.5
 Formula: Al₂O₃
 Used for column chromatography.



5-Amino-1,10-phenanthroline

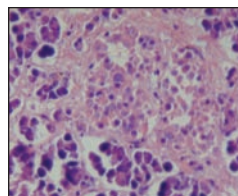
[54258-41-2] *U7g*
 MW 195.19 mp 259-260° (dec.)
 Used for forming metal complexes to catalyze biological reactions. Also useful for protein adsorption when coupled to CM-cellulose.

Inorg. Chim. Acta, 50, 21 (1981); *Toxicon*, 15, 447 (1977)

Catalog #	Size
23689-50	50g
23689-100	100g
23854-10	10g
19175-10	10g
09860-1	1gal
23678-250	250g
09117-1	1g

3-Aminopropyltriethoxysilane [919-30-2] *B7bd*
 MW 221.4 d 0.951 n_D²⁰ 1.423 bp 122°/30mm
 Silane modifier for glass surfaces. Reacts with glass and other silaceous surfaces creating aminopropyl substituents. Surfaces modified have enhanced adhesion properties and can adsorb anionic matter.

Ammonium Blue *H4g*
 Ammonium Blue is a very rapid formulation of bluing hematoxylins in only 3 minutes. Ammonium Blue is buffered at an alkalinity of (pH = 10.0). Our premixed and ready to use Ammonium Blue provides crisp nuclear detail obtained with Hematoxylin and Eosin stains. For use in both Cytology and Histology.



Human Pancreas, 20X
 Harris Hematoxylin, Eosin Y

Amyloid Stain Kit (Congo Red)
 A complete kit to aid in the staining of tissue for Amyloidosis.

Antibodies

Anti-Albumin (bovine serum) in rabbit, IgG fraction *H4d*
 This polyclonal antibody reacts with all forms of bovine serum albumin and will cross-react with most mammalian albumins. This antibody efficiently precipitates protein and can be used in a variety of detection and capture techniques. Suitable for ELISA, Western Blotting or Immunoprecipitation. In convenient, stable lyophilized form, ready to use.

Anti-Albumin (human serum) in rabbit, IgG fraction *H4d*
 This polyclonal antibody reacts with all forms of human serum albumin and will cross-react with most mammalian albumins. This antibody efficiently precipitates protein and can be used in a variety of detection and capture techniques. Suitable for ELISA, Western Blotting or Immunoprecipitation. In convenient, stable lyophilized form, ready to use.

Anti-Alkaline phosphatase (*E. coli*) in rabbit, IgG fraction *H4d*
 Antibody reacts with alkaline phosphatase from *E. coli* and is suitable for all immunological techniques. No cross-reactivity is observed against the mammalian enzyme. Some reactivity may occur with other bacterial sources. Suitable for ELISA, Western Blotting or Immunoprecipitation. In convenient, stable lyophilized form, ready to use.

Catalog #	Size
01983-250	250g
24819-1	1 Gal
24614-1	1 kit
23715-5	5mg
23716-5	5mg
23721-5	5mg

Anti-Apolipoprotein

Our apolipoproteins are derived from human plasma by density gradient ultracentrifugation and HPLC. Goats are used to generate apolipoprotein antibodies which are purified by immunoaffinity chromatography and then extensively cross-adsorbed to generate precise specificities.

Apolipoprotein antibodies have been used to determine that atherosclerotic lesions in the human aorta contain considerable amounts of lipoproteins. These lipoproteins were observed to be complexed with components of the extracellular matrix (especially LDL and proteoglycans). The role of these matrix-lipoprotein complexes is not entirely clear. However, animal models of atherosclerosis have shown that increased cellular proliferation and increased production of extracellular matrix components occur following injury to the intimal layer of the aorta.

All anti-apolipoprotein antibodies are affinity purified and extensively cross-adsorbed to remove any unwanted reactivities. Less than 1% cross-reactivity is typically seen when assayed by ELISA against a panel of human and mouse apolipoproteins and related serum proteins. All apolipoprotein antibodies are supplied in liquid form.

Anti-apoLipoprotein B in goat** *A2dx* 23700-1 1ml
Specificity: Antibody will react with human type B apolipoprotein.
Liquid form, concentration 1mg per ml.

Anti-Avidin (egg white) in rabbit, IgG fraction, lyophilized *H4d* 23865-5 5mg
In convenient, stable lyophilized form, ready to use.

Anti-Biotin in rabbit, IgG fraction, lyophilized *H4d* 23867-5 5mg
In convenient, stable lyophilized form, ready to use.

Anti-Fructose-6-phosphate kinase (rabbit muscle) in goat, IgG fraction *H4d* 23735-5 5mg
Antibody reacts with fructose-6-phosphate kinase from rabbit muscle. The high degree of sequence conservation of this glycolytic enzyme suggests that broad species and tissue reactivity will occur. Suitable for ELISA, Western Blotting. In convenient stable lyophilized form, ready to use.

Anti-Lactate dehydrogenase (rabbit muscle) in goat, IgG fraction *H4d* 23740-5 5mg
Antibody reacts with lactate dehydrogenase from rabbit muscle. All tetrameric isozymes of LDH react with this antibody. Cross-reactivity will occur against all mammalian forms of this enzyme. Suitable for ELISA, Western Blotting. In convenient stable lyophilized form, ready to use.

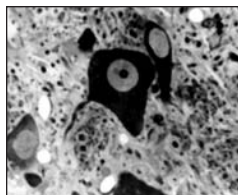
* Cold pack charge required.

† Dilutions: Western Blot 1:5,000 to 1:10,000 ELISA 1:4,000 to 1:8,000 IHC 1:50 to 1:200

Anti-Neuron Specific Enolase (NSE)

Both antisera are very specific and are the reagents of choice for the visualization of neurons and peptide secreting neuroendocrine cells by immunocytochemistry. The anti-human NSE can be used for immunocytochemical staining at dilutions of 1:3,000 to 1:5,000. The anti-rat NSE can be used at dilutions of 1:2,000 to 1:4,000. These antisera are also useful for the quantification of neurons and peptide secreting neuroendocrine cells by Radioimmuno Assay (RIA). The anti-human NSE and anti-rat NSE can be used in conjunction with pure human NSE (Cat. #17436, page 80) and pure rat NSE (Cat. #17435A, page 80) to formulate an RIA to measure NSE levels in tissue, serum or spinal fluid. Technical Data Sheets #266 and #314

Brain Res., 181, 391 (1980); 190, 195 (1981); *J. Neurochem.*, 36, 1093 (1981)



Staining of rat cerebral cortical neurons with anti-rat NSE.

Anti-human NSE in rabbit, serum, lyophilized A3d

Catalog #	Size
17437-100	100µl
17437-200	200µl

Anti-rat NSE in rabbit, serum, lyophilized A3d

16625-150	150µl
16625-350	350µl

Anti-Ovalbumin (egg white) in rabbit, IgG fraction H4d

Antibody reacts with ovalbumin from hen egg white showing a 45 kDa band under non-reducing and reducing conditions of SDS-PAGE. Suitable for ELISA, Western Blotting or Immunoprecipitation studies. In convenient, stable lyophilized form, ready to use.

23744-5	5mg

Anti-Pyruvate kinase (rabbit muscle) in goat, IgG fraction H4d

Antibody reacts with pyruvate kinase from rabbit muscle showing a 237 kDa band (tetramer) under non-reducing conditions of SDS-PAGE and a 57 kDa band under reducing conditions. Cross-reactivity will occur with most mammalian forms of this enzyme. Suitable for ELISA, Western Blotting or Immunoprecipitation studies. In convenient, stable lyophilized form, ready to use.

23750-5	5mg

Anti-Transferrin (human) in rabbit, IgG fraction H4d

Antibody reacts with transferrin from human serum. Strong cross-reactivity will occur with mammalian forms of this protein. Suitable for ELISA, Western Blotting or Immunoprecipitation studies. In convenient, stable lyophilized form, ready to use. Suggested Dilution: 1/500 - 1/2000

23753-5	5mg

Rabbit Anti-Green Fluorescent Protein Antibody — See page 95

Aqua-Poly/Mount Coversliping Media, Non-Permanent Aqueous A2d



A water-soluble, non-fluorescing mounting medium. Formulated for mounting sections from aqueous solutions. Useful for immunofluorescent techniques as it enhances and retains fluorescent stains. Aqua-Poly/Mount can also be used for frozen sections, fat stains and immuno-stains when aqueous mounting medium is required. Supplied in convenient 20ml squeeze bottles, it can be removed from slides by soaking in water or buffer. Technical Data Sheets #432 and #521

- Refractive index 1.454-1.460
- Viscosity: 390 CPS

18606-20	20ml
18606-100	100ml
18606-5	5x20ml

PolyPointer

Aqua-Poly/Mount prevents cover slips from moving and contains an efficient biocide that deters fungus growth.

Araldite® 502 Kit, Luft's Formula (for histology and electron microscopy) *EHJO7g*



Luft's method overcomes penetration difficulties by using propylene oxide as an additional clearing agent. Permits embedding of tissue from fixation to sectioning in about 24 hours. Technical Data Sheet #128 *J. Biophys. Biochem. Cytol.*, 9, 409 (1961)

Kit Contains: 500g Araldite 502, 450g DDSA, 100g DMP-30
Instructions included.

Araldite® 502/PolyBed® 812 Kit (for histology and electron microscopy) *EHJO7g*

Mollenhauer suggested that hardness variation and penetration enhancement could be obtained by mixing Araldite® and Epon® resins. We offer Araldite® 502 and PolyBed® 812 for researchers to utilize Mollenhauer's findings. PolyBed® 812 is an exact chemical match for Epon® 812. Both Araldite® 502 and PolyBed® 812 are useful as an embedding medium with acetone or alcohol dehydration. Technical Data Sheet #128 *Stain Tech.*, 39, 111 (1963)

Kit Contains: 500g PolyBed® 812, 500g Araldite® 502, 450g DDSA, 100g DMP-30
Instructions included.

Araldite® Resins (modified epoxy resins)



Grade 502, WPE 233-250 [84-74-2] *HO5g*

Grade 6005, WPE 182-189 [3101-60-8] *HO5g*

WPE is Weight Per Epoxy equivalent. From this value, one determines the optimum amount of DDSA or NMA in grams to combine with 100 grams of resin for stoichiometric balance. This minimizes unreacted starting materials and produces reproducible sections and stains from the polymerized blocks. The exact WPE value for each lot of Araldite resin is put on the label of each container purchased from Polysciences.

Catalog #	Size
02600-1	1 kit
02595-1	1 kit
00552-500	500g
02116-500	500g

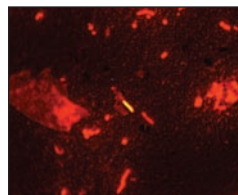
Mixing Chart for Araldite® Resins, DDSA and NMA

Per 100g of epoxy as supplied at WPE	Mix this many grams of (soft mix) DDSA	Mix this many grams of (hard mix) NMA
170	85	78
175	83	76
180	81	74
185	78	72
190	76	70
195	74	68
200	73	66
205	71	65
210	69	63
215	67	62
220	66	60
225	64	59
230	63	58
235	62	57
240	60	55
245	59	54
250	58	53

The hard mix and the soft mix are then blended according to the desired hardness of the particular embedment procedure.

Auramine O Stain Kit

Acid-fast mycobacteria resist decolorization by acid-alcohol after primary staining owing to the high lipid (mycolic acid) content in their cell walls. The identification of mycobacteria with Auramine O is due to the affinity of the mycolic acid in the cell walls for the fluorochromes. The dye will bind to the mycobacteria, which appear as bright yellow luminous rods against a dark background. The potassium permanganate helps prevent non-specific fluorescence. All acid-fast organisms will be stained by Auramine O, including some parasites. Slides stained with Auramine O may be restained with Ziehl-Neelsen or Kinyoun stain directly, as long as the oil has been removed. This provides a convenient method of confirming and differentiating morphology of positive slides with the traditional stains. Technical Data Sheet #751



M. tuberculosis in a sputum smear is stained using fluorescent auramine with acridine orange counterstain; 950x. Courtesy of CDC Public Health Library.

NEW! Azure A, C.I. 52005, certified [531-53-3]

MW 291.8 Certified Biological Stain

Certified for use in Lillie's modified Nocht's method for paraffin sections and the NCCLS method for blood smears.

IR-Spectra (3), 1486:G / RegBook 1 (2), 2815:E / Stains and Dyes Ref, 109 / Structure Index 1, 447:B:6, Penny, DP et al, Analysis and testing of biological stains - The Biological Stain Commission Procedures Biotech. Histochem. 77(5&6), 237-275, (2002)

BactiStop® Antiseptic Hand Gel



BactiStop® Hand Gel is a unique anti-bacterial gel, designed for waterless hand washing. BactiStop® Hand Gel contains Vitamin E and Aloe and does not have a harsh alcohol odor. It leaves your hands silky smooth.

BactiStop® Hand Soap



This is the antibacterial handsoap to use in your laboratory or in your home. This pleasant smelling, non-drying liquid handsoap is great for multiple washings of your hands on a daily basis. This is what we use on our hands in our laboratories. We supply this in a convenient pump dispenser that is easy to use. Technical Data Sheet #519

Balsam, Canada, filtered [8007-47-4] C4bg



A natural resin used as mounting medium for microscopy.

Catalog # Size

24665-1 1 Kit

24992-25 25g
24992-50 50g

24116-1 1case
(6x4oz)

24008-1 1L
24008-6 6x16oz
24008-12 12x1L

01648-100 100g
01648-500 500g

Batson's #17 Anatomical Corrosion Kit CFM7dw



For ambient temperature preparation of exact anatomical corrosion specimens by injection of liquid plastic. After hardening, the tissue is corroded away by a caustic solution, yielding a durable, scientifically exact model for anatomical study. Technical Data Sheet #105



Multi-colored models of the circulatory system are easily made

Kit contains: 940ml monomer base solution, 100ml catalyst, 50ml promotor, 10g red pigment, 10g pigment blue.

Additional kit components:

Monomer base solution	CHO5g	02599-940	940ml
Catalyst	CH6g	02608-100	100ml
Promoter	HO6g	02610-50	50ml
Maceration solution	B5g	07359-940	940ml
Red pigment	H3g	07350-100	100g
White pigment	H3g	07351-100	100g
Yellow pigment	H3g	07354-100	100g
Blue pigment	HM4g	07352-100	100g
Green pigment	HM5g	07353-100	100g

Fahrenbach, W.H., et al., *J. Elec Microsc. Tech.*, 10, 15 (1988); Pollitt, C.C. & Molyneux, G.S., *Equine Vet. J.*, 22(2), 79 (1990); Redmond H. P. et al., *Brit. J. Surgery*, 76(2), 198 (1989)

Beakers, Disposable

Package of 100 graduated polypropylene beakers designed for dripless pouring.



50ml and 250ml sizes

50ml	07450-1	1 box
100ml	07451-1	1 box
250ml	07452-1	1 box

Benzil (Photopolymerization catalyst) [134-81-6] HU5g

MW 210.2 Formula: $C_6H_5COCOC_6H_5$

Diphenylethanedione; Dibenzoyl. Used for room temperature polymerization with UV light.

01946-25 25g

Benzoin ethyl ether [574-09-4] H2g

MW 240.3 mp 60° Formula: $C_6H_5COCH(OC_2H_5)C_6H_5$

Photopolymerization catalyst, used for room temperature polymerization with UV light.

01359-50 50g

Benzoin methyl ether (UV catalyst) [3524-62-7] H6g

MW 226.3 mp 48° Formula: $C_6H_5CH(OCH_3)COC_6H_5$

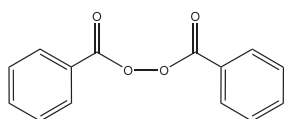
Photopolymerization catalyst, used for room temperature polymerization with UV light.

00425-10 10g



Benzoin iso-propyl ether [6652-28-4] *H5g* MW 254.3 mp 79°
 Formula: $C_6H_5CH(OCHCH_3CH_3)COC_6H_5$
 Photopolymerization catalyst, used for room temperature polymerization with UV light.

Benzoyl peroxide [94-36-0] *HF4gp*
 MW 242.2 Formula: $(C_6H_5CO)_2O_2$



70% active, (water wet) 21446-100 100g

50% active, dicyclohexyl phthalate modified 24232-100 100g
 Thermal polymerization catalyst.

Benzyl dimethylamine [103-83-3] *BEH6g* 00141-100 100g
 MW 135.21 mp 75° Formula: $C_6H_5CH_2N(CH_3)_2$ 00141-500 500g
 N,N-Dimethyl benzyl amine; BDMA. Low viscosity epoxy accelerator.

Biebrich scarlet, C.I. 26905 (Acid red 66; Ponceau BS) [4196-99-0] *U4g* 03336-100 100g
 MW 556.49 λ max: 505nm Formula: $C_{22}H_{14}N_4Na_2O_7S_2$
 Widely used as a counterstain, as well as a plasma stain.

Biebrich scarlet - Acid Fuchsin Solution - Ready-to-Use *U4g* 24602-100 100ml
 (1% Acetic Acid, .9% Biebrich scarlet, .1% Fuchsin)
 For use in Masson Trichrome stain procedure. Our ready-to-use format eliminates the exposure to potentially irritating powdered dyes.

Bisbenzimidazole (Hoechst 33258), ~99% [23491-45-4] *H4abd* 09460-100 100mg
 (2'-[4-Hydroxyphenyl]-5-[4-methyl-1-piperazinyl]-2,5'-bi-1H-benzimidazole trihydrochloride pentahydrate); Hoechst 33258)
 MW 623.97 Exc max: 358nm Emiss max: 540nm
 Formula: $C_{27}H_{37}Cl_3N_6O_4$
 Fluorescent chromosome stain. Binds to Adenine-Thymine base pairs.
Science, 220, 620 (1983), *Anal. Biochem.*, 179, 401 (1989)

2,4-Bis(N,N'-di[carboxymethyl]aminomethyl)fluorescein; Calcein [1461-15-0] *U5f* 03321-1 1g
 (DCAF) MW 622.5
 Fluorescent bone stain. Used in EDTA chelated titration of calcium with magnesium present and in calcium fluorometric studies. *Stain Technology*, 62, 247, (1987)

3,7'-Bis(dimethylamino)-1,9-dimethyldiphenothiazin-5-ium chloride [23481-50-7] *H2g* .. 03610-1 1g
 (Taylor's blue; 1,9-Dimethylmethylen blue chloride)
 MW 416.0 mp 250° (dec.) λ max: 649nm Dye content ~80% rest=water
 Used in dye binding assays for glycosaminoglycans. *Anal. Biochem.*, 170, 293 (1988)

Black Marking Dye for Tissue *H6gm* 24113-2 2oz btl
 For a complete description of our Tissue Marking Dye Kits and individual tissue marking dyes, 24113-8 8oz btl
 see page 105.

Blades

Diamond Knives — See page 31-32

Microtome Blades, Knives and Accessories

Use steel knives (disposable or resharpenable) for cutting soft paraffin, tungsten carbide knives for plastics and diamond knives for cutting epoxy blocks.

Glass, Ultra Microtome

High quality, clean glass strips cut to close size requirements to ensure that they will fit all knifemakers. The glass is precleaned and individually wrapped so that it remains clean until use. Glass strips are available in a variety of sizes and thicknesses for both ultramicrotomy and histology as well as Ralph knife making.

380mm x 25mm x 6mm thick	08421-10	10 strips
	08421-30	30 strips
380mm x 38mm x 6mm thick	16844-20	20 strips
100mm x 50mm x 12mm thick	19748-1	20/pk

Microtome Blades, Disposable, High Profile

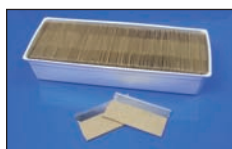


Shur/Sharp blades represent the ultimate in technology. Chatterless & compression-free ribbons will become routine for all types of tissue. For use with AO or other high profile blade holders. There is a choice of three types of disposable blades to meet all the sectioning needs.

AO or Reichert (50 blades per pack)	22080-1	1 pkg
Heavy Duty (35 blades per pack)	22380-1	1 pkg
Regular (60 blades per pack)	22381-1	1 pkg

Razor Blades

Single Edge Razor blades, individually wrapped (see, 1 below)	08410-1	100/pk
Disposable blade Injector, including 20 blades, uncoated carbon (see, 2 below)	22206-1	1 unit
Disposable Injector blades for Vibratome, uncoated carbon (see, 3 below)	22370-1	1000/pk
Disposable Microtome blades, AO/Reichert (see, 4 below)	22080-1	50/pk
Disposable Microtome blades, heavy duty (0.020" x 0.489" x 3")	22380-1	35/pk
Disposable Microtome blades, regular (0.012" x 0.489" x 3")	22381-1	60/pk



1



2

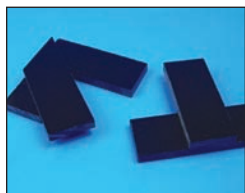


3



4

Glass Scoring Jig



An aid for producing 25.4mm glass knives by hand method. When the edge of the T square is placed against the edge of the glass strip the subsequent score will be 25.4mm long. After breaking, the square of the glass can be scored at 45° using the other jig.

23274-1	1 jig

Tungsten Carbide Blades & Holder

Disposable Tungsten Carbide Blades with Holder

Blade holders are machined from non-corrosive nickel silver and provided with a satin finish. Any internal components are made from stainless steel. The blade support ledge covers the full length of the holder providing constant blade height. The blade clamp is spring loaded simplifying blade movement and replacement. Two carbide clamp pads eliminate damage to the holder body when clamping in the microtome. A minimum number of parts makes these holders easy to disassemble for cleaning and decontamination. Starter Kit #24235 is equipped with all tools and hardware needed for installation.

STARTER KIT



This Starter Kit includes a blade holder, blade box with two blades, (Cat. #24234, see below) and hex key for disassembly and adjustment. The components are supplied in a fitted case. The #24235 kit fits most models of knife stages for rotary microtomes and cryostats. Holder Dimensions: 140mm x 37mm x 9mm with blade.

Disposable Tungsten Carbide Blades

100% solid high grade tungsten carbide. Recommended for hard tissue, bone or material embedded in MMA or GMA, frozen.

Blades, Vibratome Injector

1000 blades per package.



Blades and Dispenser, Vibratome Injector

20 blades per dispenser.



Blue Marking Dye for Tissue

For a complete description of our Tissue Marking Dye Kits and individual tissue marking dyes, see page 105.

Bouin's fixative (Bouin's fluid)

n_D^{20} 1.376 d 1.09



Bouin's fixative is excellent for maintaining nuclear morphology. The formula is saturated picric acid in water with formaldehyde and acetic acid. The picric acid can cause some shrinkage of tissue or specimen, which is offset to an extent by swelling from the acetic acid in solution. The formaldehyde will begin to convert to formic acid due to the low pH of the solution. Bouin's fixative is not a buffered solution. Use Bouin's fixative when shorter fixation times are required. Long exposure may cause the tissue to become brittle and overly hard. It can damage or distort the cytoplasm during fixation.

Catalog # Size

24235-1 1 kit

24234-1 1 pkg

22370-1 1 pkg

22206-1 1 unit

24111-2 2oz btl
24111-8 8oz btl

16045-1 1L
16045-G 1gal

Bovine serum albumin

(fraction V, protease-free), lyophilized; BSA [9048-46-8] *H4d*
MW 66k Da. Purity 98% minimum.

NEW! Brilliant Cresyl Blue, C.I. 51010, certified [81029-05-2]

(Brilliant Blue C, Brilliant Cresyl blue)
MW 385.96 Formula: $C_{17}H_{20}N_3OCl \cdot 1/2 ZnCl_2$ Certified Biological Stain
Brilliant Cresyl Blue, certified is used for a supravital stain for reticulocytes.

*Penny, DP et al, Analysis and testing of biological stains - The Biological Stain Commission Procedures
Biotech. Histochem. 77(5&6), 237-275, (2002)*

NEW! Brilliant Green, C.I. 42040, certified [633-03-4]

(Malachite Green G, Basic Green 1, Emerald Green)
MW 482.63 Formula: $C_{27}H_{34}N_2NO_4S$ Certified Biological Stain
Brilliant Green, certified is used as a bacteriostatic agent for the selective enrichment and enumeration of *E. coli* and other fecal coliform organisms in water, milk and food.

*Penny, DP et al, Analysis and testing of biological stains - The Biological Stain Commission Procedures
Biotech. Histochem. 77(5&6), 237-275, (2002)*

5-Bromo-4-chloro-3-indolyl β -D-galactopyranoside (X-gal) [7240-90-6] *U5f*

MW 408.64 mp 230° (dec.) Purity by HPLC $\geq 99\%$
Histochemical chromagenic substrate for β -galactosidase. Yielding an easily detectable color.
This material is widely used to detect β -galactosidase in DNA.

J. Med. Chem., 7, 574 (1964); Histochemie, 37, 375, (1973); Hum. Gene Thor., 8, 1545 (1997)

NEW! Bromophenol Blue, ACS [115-39-9]

(Bromphenol Blue Sultone Form, 3',3'',5',5''-Tetrabromophenolsulfonphthalein)
MW 669.96 λ max: 422nm Formula: $C_{19}H_{10}Br_4O_5S$ ACS reagent
Bromophenol blue is useful as an acid-base indicator, a color marker and a dye. As an acid-base indicator its range lies between pH 3.0 and 4.6. Suitable as a color marker in agarose gel electrophoresis and polyacrylamide gel electrophoresis and commonly used as a dye to stain proteins in slides.

Merck 13, 1429, Beilstein 19, V, 3, 458

NEW! Bromothymol Blue, ACS [76-59-5]

(3',3''-Dibromothymolsulfonphthalein)
MW 624.38 λ max: 420nm Melting Point: 200-202°C Formula: $C_{27}H_{28}Br_2O_5S$
Bromothymol blue is a chemical indicator for weak acids and bases, useful for observing photosynthetic activities or respiratory indicators (turns green then yellow as CO_2 is added).

Merck 13, 1430, Beilstein 19, V, 3, 461

NEW! Bromothymol Blue, Sodium Salt, ACS [34722-90-2]

(3',3''-Dibromothymolsulfonphthalein sodium salt)
MW 646.36 λ max: 420nm Formula: $C_{27}H_{27}Br_2NaO_5S$
Bromothymol blue is a chemical indicator for weak acids and bases, mostly used in measuring substances that would have relatively low acidic or basic levels (near a neutral pH). Suitable for use in the laboratory as a biological slide stain.

Merck 13, 1430, Beilstein 19, V, 3, 461

Brush, Size 00000, Red Sable

This fine brush is one of our most popular items. This brush has many different uses such as manipulating samples, frozen section manipulation or cleaning delicate items. Brush tip is 1cm long by 2cm thick and is made of natural fibers.

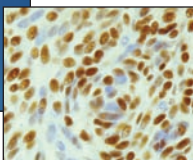
Brush is 17.50cm in length.



Catalog #	Size
23854-10	10g
24993-25	25g
24993-50	50g
24994-25	25g
24994-50	50g
17316-100	100mg
17316-1	1g
24995-5	5g
24995-25	25g
25009-25	25g
25009-50	50g
24996-25	25g
08411-1	1 brush

Buffers

L.A.B. Buffer Solution for Liberating Antibody Binding *H4g*



L.A.B. Solution liberates your antibody binding sites for improved immunohistochemical (IHC) staining. Incubate your slides in L.A.B. Solution for 5 to 20 minutes at room temperature, rinse with buffer and stain. It is that simple, no high temperature or special equipment required. Incubating at room temperature makes L.A.B. Solution compatible with Automated Stainers. Technical Data Sheet #630

1M Glycine-HCl Buffer, pH 2.7±0.1, 10X Concentrate *A2d*

Dilute 1→10 with deionized water to get buffer at working concentration.

0.05M Citrate-Citric Acid Buffer, pH 4.6±0.2, 1X Powdered Blend *H4g*

Dissolve the contents of each pouch in a liter of deionized water, for a ready to use formulation.

0.05M Phosphate-Citrate Buffer, pH 5.0±0.2, 1X Powdered Blend *H4g*

Dissolve the contents of each pouch in a liter of deionized water, for a ready to use formulation.

0.5M Borate Buffer, pH 8.5±0.2, 5X Concentrate *A2d*



Dilute 1→5 with deionized water to get buffer at working concentration. Suitable for use in protocols for coupling proteins to polystyrene microspheres.

0.5M Acetate Buffer, pH 4.6±0.2, 10X Concentrate *A2d*

Dilute 1→10 with deionized water to get buffer at working concentration.

0.5M Citrate-Citric Acid Buffer, pH 4.6±0.2, 10X Concentrate *A2d*

Dilute 1→10 with deionized water to get buffer at working concentration.

Tris Buffered Saline (TBS), pH 8.0±0.2, 10X Concentrate *A2d*



Composition: 1M Tris-HCl, 3M Sodium chloride.

Dilute 1→10 with deionized water to get buffer at working concentration.

1M Sodium Bicarbonate-Sodium Carbonate Buffer, pH 9.6±0.2, 10X Concentrate *A2d* ..

Dilute 1→10 with deionized water to get buffer at working concentration. Suitable for use in protocols for covalent coupling of proteins to carboxylate microspheres.

Catalog # Size

24310-500 500ml

24074-500 500ml
24074-1 1L

24077-5 5/pk
24077-10 10/pk

24079-5 5/pk
24079-10 10/pk

24092-500 500ml
24092-1 1L

24075-500 500ml
24075-1 1L

24076-500 500ml
24076-1 1L

24082-500 500ml
24082-1 1L

24095-500 500ml
24095-1 1L

Tris-Glycine-SDS Buffer (TGS Buffer), pH 8.3±0.2, 10X Concentrate A2d

Composition: 0.25M Tris base, 1.92M Glycine, 1% SDS.

Dilute 1→10 with deionized water to get buffer at working concentration. Suitable for use in SDS-Polyacrylamide gel electrophoresis. *U.K. Laemmli., Nature, 227: 680 (1970).*

Tris-Borate-EDTA Buffer (TBE Buffer), pH 8.3±0.2, 10X Concentrate A2d

Composition: 0.445M Tris-Borate, 0.01M Disodium EDTA.

Dilute 1→10 with deionized water to get buffer at working concentration. Suitable for use in gel electrophoresis for nucleic acid analysis.

J. Sambrook et al., Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory (1989), p. 6.7, B.23.

Tris-Borate-EDTA Buffer (TBE Buffer), pH 8.3±0.2, 1X Powdered Blend H4g

Dissolve the contents of each pouch in a liter of deionized water to get 0.089M Tris-Borate, 0.002M Disodium EDTA. Can be used as antigen detection buffer in microwave procedures.

Tris-Glycine Buffer (TG Buffer), pH 8.3±0.2, 1X Powdered Blend H4g

Dissolve the contents of each pouch in a liter of deionized water to get 0.025M Tris base, 0.192M Glycine.

Phosphate Buffered Saline (PBS), pH 7.4±0.2, 1X Powdered Blend H4g

Dissolve the contents of each pouch in a liter of deionized water to get 0.01M Sodium phosphate, 0.15M Sodium chloride. Used as a common wash buffer.

Tris Buffered Saline (TBS), pH 8.0±0.2, 1X Powdered Blend H4g

Dissolve the contents of each pouch in a liter of deionized water to make 0.05M Tris-HCl, 0.15M Sodium chloride.

0.1M Sodium Bicarbonate-Sodium Carbonate Buffer, pH 9.6±0.2, 1X Powdered Blend H4g . .

Dissolve the contents of each pouch in a liter of deionized water to make 0.1M Sodium Bicarbonate - Sodium Carbonate buffer.



Cacodylic acid, sodium salt, solution, 0.2M, pH 7.4* H4d

Buffer for electron microscopy; e.g., osmium tetroxide, formaldehyde, glutaraldehyde, Karnovsky's fixative.



Cacodylic acid, sodium salt trihydrate*, min. 97% [6131-99-3] MV7g

(Sodium cacodylate) MW 214.03

Dissolve in distilled or deionized water heated to 60°C, under a hood.

Calcein, 2,4-Bis(N,N'-di[carboxymethyl]aminomethyl)fluorescein [1461-15-0] U5f . .

(DCAF) MW 622.5

Fluorescent bone stain. Used in EDTA chelated titration of calcium with magnesium present and in calcium fluorometric studies. *Stain Technology, 62, 247, (1987)*

Catalog #	Size
24090-500	500ml
24090-1	1L
24086-1	1L
24087-5	5/pk
24087-10	10/pk
24089-5	5/pk
24089-10	10/pk
24081-5	5/pk
24081-10	10/pk
24083-5	5/pk
24083-10	10/pk
24094-5	5/pk
24094-10	10/pk
18661-100	100ml
18661-500	500ml
01131-25	25g
01131-100	100g
01131-500	500g
03321-1	1g

*Poison pack charge required.

Capsules, Embedding, BEEM®



Polyethylene BEEM® capsules are the most commonly used embedding capsules for all types of resins. The embedding block requires little or no trimming. The closed capsules are UV transparent for polymerization of acrylic resins. In addition to the two standard 3 and 00 sizes, we have the conical and bottle-necked 00 sized designs for centrifuged material embedding. These capsules can withstand up to 600 G. Be sure to use our capsule holders (page 25) for convenient use of these versatile capsules.

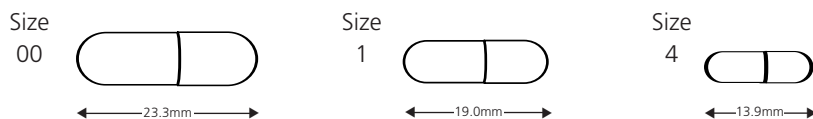
Size 3 capsules	
Size 00 conical capsules	
Size 00 capsules	
Size 00 bottle necked	

Catalog #	Size
00336-100	1 pk/100
00294-100	1 pk/100
00224-100	1 pk/100
00224-500	1 pk/ 500
00224-1000	1 pk/1000
00295-100	1 pk/100

Capsules, Embedding, Gelatin

An economical and convenient method for producing resin blocks. Gelatin capsules are UV transparent and are therefore ideal for UV polymerization of acrylic resins. They can be used with most resins. The capsules have snap-shut lids which cannot slide off accidentally. These capsules are also useful for storing grids and TEM calibration specimens.

Size 00 (23.3mm long x 8.18mm wide; 0.95ml volume) – Package of 1000	
Size 1 (19.0mm long x 6.63mm wide; 0.50ml volume) – Package of 1000	
Size 4 (13.9mm long x 5.05mm wide; 0.21ml volume) – Package of 1000	



00225-1000	1 pkg
07347-1000	1 pkg
07348-1000	1 pkg

Capsule, Micron Micromolds



A self-supporting unit of 10 size 00 conical end capsules in numbered positions for economical embedding. The capsules are self supporting and do not require additional holders. The mold is made from polyethylene and gives pre-shaped blocks with 1mm square tips similar to BEEM® capsules. The blocks are easy to remove and require little or no final trimming. 50 units of 10 capsules each per package.

08408-50	1 pkg

BEEM®, Flat, Transparent



Manufactured from transparent polyethylene. The transparency of the mold permits accurate specimen orientation when illuminated from below. The molds are flexible and reusable. Each mold is supplied in a protective plastic case.

23257-1	1 mold

Capsule Holders (BEEM®)

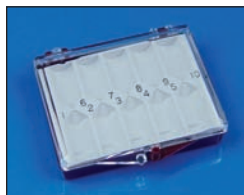
Used to hold capsules upright during polymerization. Two sizes of holders, 00 and 3, for conveniently holding 22 capsules in numbered cavities. Embedding media do not stick to these holders which are made from an epoxy resistant material. Capsule removal from the holder is facilitated by relief holes. The holders are also suitable for gelatin capsules. The cavities may be illuminated from below to facilitate specimen orientation. Holders may be stacked.



Regular (heat curing) for Size 00 capsules

Regular (heat curing) for Size 3 capsules

Capsule (BEEM®) Block Storage Box



Holds up to 10 polymerized size 00 blocks in numbered compartments. Blocks are contained in a protective hinged case to avoid dust contamination.

Carbon, graphitized A2g

.027-.030µm used as a size standard for Electron Microscopy. The primary particle size is 27-30 micron but there are also large secondary aggregate modes.

Carmine, C.I. 75470, certified [1390-65-4] U5g

(Natural red 4; Cochineal) λ max: 531(563)nm

Natural dye used with alkali metals in mucicarmine stain. Stains for glycogen, mucin, nuclei and chromosomes.

Clark, G., *Staining Procedures*, 4th ed., Williams and Wilkins, 1981; p 111, 195, 212, 342

Catalysts

Benzil (Photopolymerization catalyst) [134-81-6] HU5g

MW 210.2 Formula: C₆H₅COCOC₆H₅

Diphenylethanedione; Dibenzoyl. Used for room temperature polymerization with UV light.

Benzoin ethyl ether [574-09-4] H2g

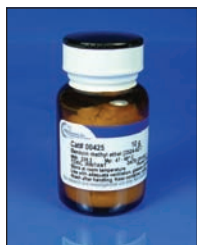
MW 240.3 mp 60° Formula: C₆H₅COCH(OC₂H₅)C₆H₅

Photopolymerization catalyst, used for room temperature polymerization with UV light.

Benzoin methyl ether (UV catalyst) [3524-62-7] H6g

MW 226.3 Formula: C₆H₅CH(OCH₃)COC₆H₅

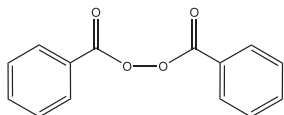
Photopolymerization catalyst, used for room temperature polymerization with UV light.



Catalog #	Size
0256A-3	3 holders
0256A-12	12 holders
0256B-3	3 holders
0256B-12	12 holders
03604-10	10 boxes
08441-1	1g
02729-25	25g
01946-25	25g
01359-50	50g
00425-10	10g

Benzoin iso-propyl ether [6652-28-4] *H5g*
 MW 254.3 mp 79° Formula: $C_6H_5CH(OCHCH_3CH_3)COC_6H_5$
 Photopolymerization catalyst, used for room temperature polymerization with UV light.

Benzoyl peroxide [94-36-0] *HF4gp*
 MW 242.2 Formula: $(C_6H_5CO)_2O_2$



70% active, (water wet)
50% active, dicyclohexyl phthalate modified
 Thermal polymerization catalyst.

Cedarwood oil [8000-27-9] *EH2ag* n_D^{20} approx.1.519 d 0.952
 Used as immersion oil for light microscopy and for clearing histology specimens.
 Refractive index 1.5010-1.5070



Chlorazole black E, C.I. 30235, certified [1937-37-7] *M6g* MW 781.7
 (Direct black 38)
 A valuable stain in general histology and cytology. Gives sharp, clear-cut pictures of both nuclei and cytoplasmic structures. Also useful for differentiation of fungi.
Nature, 139, 549 (1937); *Stain Technol.*, 39, 81 (1964)

Chlorauric acid [16961-25-4] *H5bd*
 (Gold trichloride acid trihydrate; Hydrochlorauric acid trihydrate)
 MW 393.8 d 3.90
 Used for production of colloidal gold solutions.

Cibacron blue F3GA, C.I. 61211 (Reactive blue 2) [12236-82-7] *U5g*
 MW 840.11 λ max: 607nm
 A sulfonated triazine dye that can be immobilized on a support matrix and used for affinity chromatography of proteins. Also used for probing nucleotide binding sites in proteins.
Methods Enzymol., 80, 754 (1981); *Biochem. Biophys. Res. Commun.*, 72, 816 (1976)

CitraMount® Medium *CH5g*
 This butyl acetate and acrylic mixture is the first mounting medium developed that allows coverslipping directly from d-limonene based clearants. Superior results are also obtained with xylene. CitraMount® Medium is recommended for manual coverslipping only as it may cause damage to the valves of automated coverslippers. Get a clear seal and decrease your drying time to less than 24 hours with CitraMount® Medium! **Refractive index is 1.42 Viscosity: 90 CPS**
 Technical Data Sheet #603



Catalog #	Size
00932-25	25g
21446-100	100g
24232-100	100g
04851-4	4x100g
02730-25	25g
00395-1	1g
04352-25	25g
24214-100	100ml
24214-500	500ml

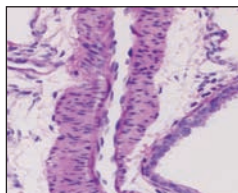
Clear-Advantage Xylene Substitute CH7g



Clear-Advantage is a specific fraction of petrochemical derivatives that creates a safer xylene substitute for processing, staining and coverslipping. There are several types of xylene substitutes in the market today including both standard hydrocarbon and citrus limonene types that contain overpowering odors. Clear-Advantage is virtually odorless and offers improved clearing performance compared to these types. Achieve consistent results with excellent tissue morphology, nuclear detail and cell structure definition!

Get the "Clear-Advantage"

- Slides dry 3 times faster than with xylene
- Slides clear faster and crisper
- Paraffin dissolves 50% faster than with xylene
- Virtually odorless, low toxicity and stable
- Recycling is faster in conventional recycling units
- Decreases "tissue hardening"
- Compatible with automated processing units manufactured by TBS®, Leica, Sakura, Surgipath® and others
- Tissue morphology & cell structure definition is exceptional!



Rat lung bronchi section, cleared with Clear-Advantage.

CMCP macroinvertebrate mounting media BHX6g

CMCP is a colorless non-resinous, water miscible mounting medium for permanent transparent mounts. It can be used like Canada Balsam, but CMCP resin has the advantage of allowing live or preserved specimens to be mounted directly from water or alcohol. It is useful in mounting free living nematodes and live parasitic worms. Technical Data Sheet #259

Refractive index is 1.41



CMCP-9 Low viscosity mountant

CMCP-10 High viscosity mountant

Colchicine [64-86-8] BHX6g

MW 399.4 mp 155-157°

An antimicrotubular effector. Interferes with microtubule organization by binding specifically with tubulin. Used for research in plant genetics. *Microtubules 11 (1978), Springer-Verlag, Berlin*

Congo red, C.I. 22120, certified [573-58-0] U4g

(Direct red 28) MW 696.67 λ max: 497nm

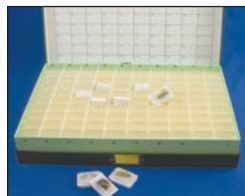
Anionic metachromatic dye. Good contrast stain or counterstain. Used for visual detection of amyloid in muscle and nerve in patients with amyloidosis.

Contrad 70, soak cleaner from Decon Laboratories H4g

A top quality soak cleaner for high grade cleaning of all labware. Alkaline and Phosphate free. Recommended for analytical techniques, tissue culture, RIA, electrophoresis—any application where total cleanliness is essential. Safe replacement for chromic acid.

Catalog #	Size
24770-1	1 Gal
24770-4	4x1 Gal
16299-100	100ml
16299-500	500ml
16300-250	250ml
16300-500	500ml
00345-500	500mg
02736-25	25g
18417-5	5L
18417-4	4x5L

Control Block File Holder



Medical laboratories, research laboratories and hospitals will find the Control Block File Holder excellent for the storage of histological control blocks. Separate compartments allow blocks to be organized by researcher or tissue type. Includes lid chart for rapid retrieval of control blocks. Requires little space for storing a hundred items. 100 compartments; each 1.5" x 1" x 2 1/4" d
Outside dimensions 15.25" x 10.5" x 2.375"

Coomassie® blue G250, C.I. 42655 [6104-58-1] H2g
(Brilliant blue G, Brilliant blue G250, Acid blue 90)
MW 854.03 λ max: 610nm
Protein stain for SDS gels. Used in dye binding techniques for protein quantification.
Anal. Biochem., 177, 100 (1989)

(Coomassie® blue G250), Poly G Blue, Ready-to-Use Stain CH4ag
Ready-to-use Coomassie® G250 blue stain solution for protein electrophoresis staining applications. Convenient 500ml size saves time and preparation costs. Our ready-to-use format eliminates the exposure to potentially irritating powdered dyes.

Coomassie® blue R250, C.I. 42660 [6104-59-2] H3g
(Brilliant blue R, Brilliant blue R250, Acid blue 83)
MW 825.98 λ max: 588nm
Rapid acting and sensitive dye for SDS gels. *Electrophoresis*, 8, 545 (1987)

(Coomassie® blue R250), Poly R Blue, Ready-to-Use Stain CH4ag
Ready-to-use Coomassie® R250 blue stain solution for protein electrophoresis staining applications. Convenient 500ml size saves time and preparation costs. Our ready-to-use format eliminates the exposure to potentially irritating powdered dyes.



Coplin Jar, Polyjar (Microscope Slide Staining Jar)
Polyjars are microwavable when uncapped. Unbreakable plastic, stain resistant and chemically inert. They hold 10 slides for staining. Our Peel-A-Way® Microscope Slide Grip, (Cat. #19801A) fits into these jars for convenient retrieval and movement of slides during staining. Great for special stains, antigen recovery and frozen section staining. Use with Peel-A-Way® Microscope Slide Grips (Cat. #19801A, page 76)



Coumarin 1 [91-44-1] A2g
(7-Diethylamino-4-methylcoumarin; 7-Diethylamino-4-methyl-1-benzo-pyran-2-one)
MW 231.3 Exc max: 373nm Emiss max: 460nm
Fluorescent dye, miscible in ethanol or neutral buffer.

Coumarin 6, laser grade [38215-36-0] U7g
(3-[2'-Benzothiazolyl]-7-diethylaminocoumarin)
MW 350.44 Absorption λ max (in ethanol): 458nm
Optimum lasing λ (in ethanol): 540nm Fluorescence λ max (in ethanol): 505nm
For pulsed and CW operation in the green-blue spectral region. Tunable from 515-585nm.

Catalog #	Size
17317-1	1each
03707-10	10g
03707-50	50g
03707-100	100g
24609-500	500ml
00352-10	10g
00352-50	50g
00352-100	100g
24608-500	500ml
08415-3	set of 3
24185-250	250g
8037L-100	100mg

C-Reactive protein, human (CRP), >99% purity HU5dm
CRP is isolated from pleural and ascites fluids and sera. Abnormally high levels of serum CRP indicate acute phase disease states. Polysciences' CRP is suitable for iodination and for preparation of serum control standards. For research use only. Not for diagnostic or human drug use. Technical Data Sheet #625

Cresyl violet acetate, certified (9-Amino-5-imino-5H-benzo[a]phenoxazine acetate salt)
[10510-54-0] U5g MW 321.34 mp 140-143° λ max: 596nm
Useful for staining Nissl substances in nerve cells and for En Bloc staining of nerve tissue.

Crystal Violet AH4g
Used in the Gram's Staining method for the difference of Gram Positive & Gram Negative bacteria.

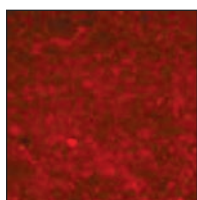


Crystal Violet, C.I. 42555, certified [548-62-9] BHM6ag
(Crystal violet; Basic violet 3) MW 407.99 λ max: 588nm
Differential gram stain.



Cuprolinic blue (Quinolinic phthalocyanine) [41276-95-3] U7ad MW 1084.54
An intensely blue cationic dye used for the visualization of RNA and other polynucleotides. Tracking dye for electrophoresis of low MW proteins. λ max: 630nm
Histochem. J., 15, 801 (1983); 15, 1113 (1983); *Biotechniques*, 7, 692 (1989)

Cyanoditolyt tetrazolium chloride (CTC) [102568-47-8] HU6ad
MW 311.8 mp 230° λ max (in ethanol): 300nm Formazan fluoresces in solid state.
Exc max: 450nm Emiss max: 630nm Solubility: ~100mg in 6.6cc water.



Cyanoditolyt tetrazolium chloride has been used to measure the redox activity of tumor cells. It has also been employed for direct epifluorescent microscopic enumeration of respiring bacteria in food samples and environmental samples, especially water samples. Reveals a quantitative methodology for measuring marine bacteria. These methods yield 80% activity in 2 to 10 minutes. Cell samples mixed with CTC can be stored refrigerated or frozen in liquid nitrogen for at least 4 weeks without a significant loss of cells. Technical Data Sheet #486

Histochem. J. 19, 21 (1987); *Appl. Environ. Microbiol.*, 58, 1801 (1992); *Appl. Environ. Microbiol.*, 65(5), 1966 (1999); *Appl. Environ. Microbiol.*, 69(4), 2166 (2003); *Flow Cytometric Analysis: Appl. Environ. Micro.* June 1999, p. 2409-2417 Vol. 65 (6)

Catalog #	Size
21074-1	1mg
21063-10	10g
24686-1	1Gal
00022-25	25g
00022-100	100g
17052-100	100mg
17052-500	500mg
19292-100	100mg
19292-1	1g

Available in bulk quantities
for OEM users at significant
savings. Please call for quote.

Decalcification

NEW! De-Calcify Decal Block Solution

Soaking Enhances Ribbon Cutting and Saves Knives! The original decal thoroughness and the condition of the specimen is dependent on the original decal solution. Use De-Calcify Decal Block Solution as a fast microtome soak that saves you time and money by allowing you to salvage problem blocks right at your cutting station. **Biodegradable**



Benefits:

- Saves knives and saves money
- Enhances ribbon cutting
- Useful for H&E and routine staining
- Fast soaking procedure
- Ready-to-use formulation

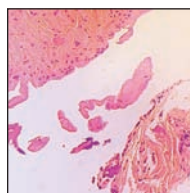
NEW! Gold Standard Series: Super Decal I - Delicate Decal

Gold Standard Series: Super Decal I - Delicate Decal is recommended for use with delicate specimens and specimens (such as bone marrow biopsies (core) that are to be submitted to IHC, cytochemistry and special stain procedures. **Biodegradable**



Benefits:

- Save Time - Decalcify in as little as 3 hours!
- Ready-to-use decalcifier for human and animal tissues
- Recommended for IHC, special stains and routine stains
- Enhanced nuclear detail



Human Degenerative Joint Disease, decalcified with Super Decal I Delicate Decal, stained with H & E, 10X

NEW! Gold Standard Series: Super Decal II - Heavy Duty Decal

Super Decal II - Heavy Duty Decal is used for hard compact bone, (i.e., femur heads, above-the-knee amputation (AKA) and below-the-knee amputation (BKA).



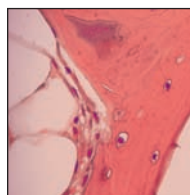
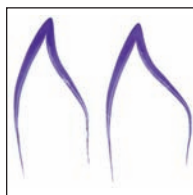
Gold Standard Series: Super Decal II - Heavy Duty Decal is an extremely effective and versatile decalcifier that can be used in specific lab routines. As with most acids, nucleic acids in the cell can become subject to ribonuclease digestion, resulting in a loss of basophilic properties. Careful monitoring should be used with Super Decal II - Heavy Duty Decal to avoid over decalcification. Most decalcification occurs in approximately 4-6 hours or less, depending on the thickness and density of the specimens. Overnight decalcification should be avoided. Super Decal II - Heavy Duty Decal is not recommended for IHC.

Biodegradable

Benefits:

- Save Time - Decalcify in as little as 3 hours!
- Ready-to-use decalcifier for human and animal tissues
- Enhanced nuclear detail

Bottlenose dolphin calf teeth, decalcified using Super Decal II - Heavy Duty Decal. Stained with Methylene Blue



Human Degenerative Joint Disease, decalcified with Super Decal II - Heavy Duty Decal, stained with H & E, 10X

Catalog # Size

24903-250 250ml
24903-500 500ml

24888-500 500ml
24888-1 1 L
24888-6 6x1 liter

24887-500 500ml
24887-1 1 L
24887-6 6x1 liter

PolyPointer

Suggested Soak Times

Bone Sample Type

Bone Marrow Biopsies - 15-30 Mins.
Small Cancellous Bone - 2-4 Hours
Femur Wedge - 3-5 Hours
Mature Bone (1cm) - 4-6 Hours
Whole Femur or Teeth - Overnight

NEW! Deli-Cal Block Solution for Bone Marrow Biopsies and Clots

Deli-Cal Block Solution enhances ribbon cutting for bone marrow biopsies and clots.



Using our microtome soak, Deli-Cal Block Solution saves you time and money by allowing you to salvage problem blocks right at your cutting station. The quality and thoroughness of Deli-Cal Block Solution is dependent upon the original decal procedure and condition of the specimen. Try Deli-Cal Block Solution on the next block that gives you problems. **Biodegradable**

Benefits:

- Saves knives and saves money
- Useful for Bone Marrows, Special Stains and IHC
- Enhances ribbon cutting
- Salvages undecalcified and under processed bone marrow biopsies at the cutting station
- Fast soaking procedure

NEW! Delicate Melanin Bleach Kit for Special Stains and IHC — See page 63

Dental Wax



Low melting point wax, used for sealing boats onto glass knives. Also used as a contamination free surface for tissue dissection. Sheet size: 6in x 3in x 1/16in (150mm x 75mm x 1.5mm) 36 sheets per lb.

Dextran, FITC [60842-46-8] A2g
MW 150,000

Fluorescein labeled Dextrans are valuable materials for studying permeability and microcirculation in vivo. These are used to trace neuronal projections and active transport in live and unfixed tissue and as neuronal tracers in a variety of species.

J. Jonsson et al, 6th Europ. Conf. Microcirculation, Aalborg 1970, 214. Microvascular Res., 3, 440, (1971); Trends Nerosci, 13, 14 (1990); Proc. Natl. Acad. Sci. USA 92, 11500 (1995); Acla Neuropath. 59, 63, (1983). Cole, L., et al., J. Cell. Sci., v. 96, 721 (1990) [Internalisation of FITC and FITC-dextran by suspension cultured plant cells], Oliver, J.M., et al., Meths. Enzymol., v. 108, 336 (1984) [Study of fluid pinocytosis in leukocytes]

Diamond Knives

Polysciences has been selling diamond knives to satisfied users for over 20 years. We guarantee your satisfaction. These are the highest quality diamond knives available and can be repeatedly resharpened. We offer a simple 4 step system for selecting your diamond knife. *(Please note: all our knives are supplied at 45° angle unless otherwise specified).* Technical Data Sheet #261



1) Choose the usable edge:

- Standard 2.0mm edge length
- Standard 2.5mm edge length
- Standard 3.0mm edge length
- Standard 3.5mm edge length
- Standard 4.0mm edge length

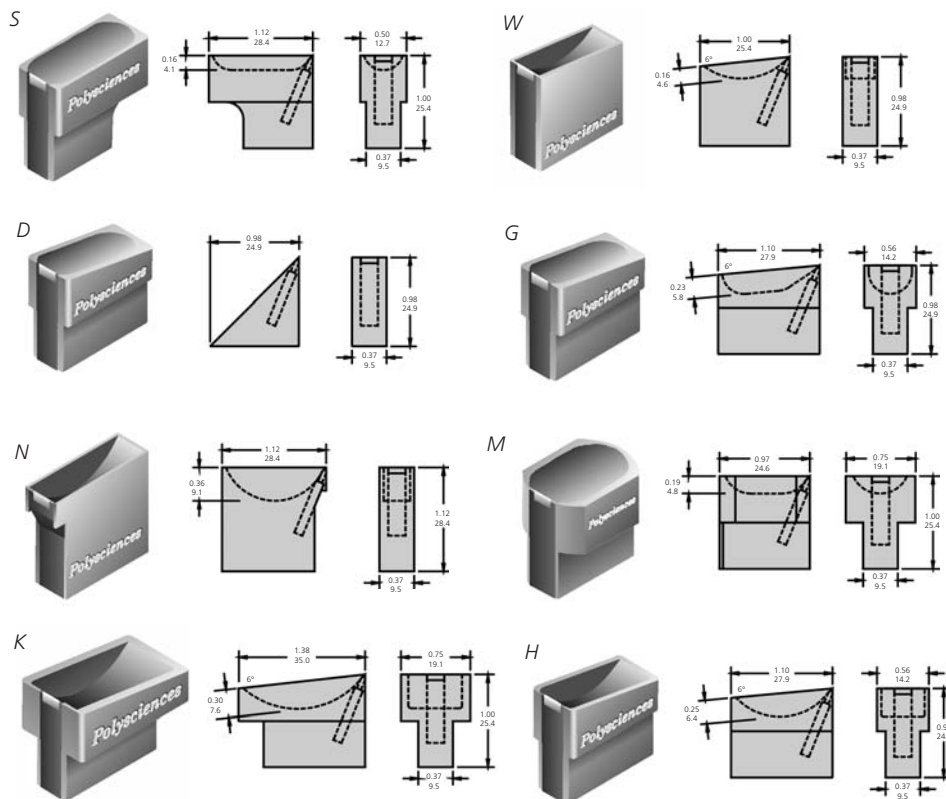
Catalog #	Size
24900-250	250ml
24900-500	500ml
PolyPointer ⚡ <i>For additional decalcification products, see page 93</i>	
00403-1	1lb
00403-5	5lb
15759-500	500mg
08452-1	1 knife
08453-1	1 knife
08454-1	1 knife
08455-1	1 knife
18383-1	1 knife

2) Choose the knife type:

- SU Standard ultramicrotomy sectioning of biological specimens and materials
- CW Frozen specimens sectioned wet with liquids like ethylene glycol
- CD Frozen specimens sectioned dry
- TS Thick sections or alternating thick and thin sections
- MT Industrial materials sectioning
- LC Frozen specimens to be examined at light microscopy magnifications
- LH Sections to be examined at light microscopy magnifications.

Continue on by choosing your boat type below.

3) Choose the boat:



4) To Order Diamond Knives Call Polysciences:

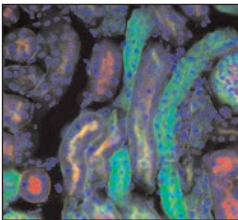
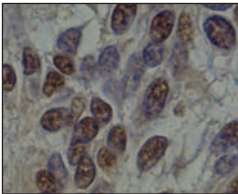
Specify the catalog number (which indicates the edge you want), the letter designation for the knife type, and the boat. The price will be verified to you by the customer service representative along with the delivery date.

Resharpener of Diamond Knives

Any brand of diamond knife is accepted for resharpener with the following guarantee:

- The quality of the edge will be equal to or better than the original
- The edge length will be the same as the original or a new knife will be supplied
- The knife can be resharpener as many times as required

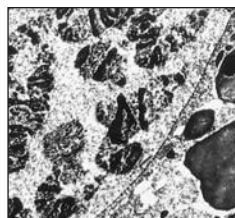
The cost of resharpener is 55% of the cost of a new knife. When sending a knife for resharpener it is important to state on the order the edge length. The edge length will be verified upon receipt of the knife. If a discrepancy exists, we will notify you.

- 4',6-Diamidino-2-phenylindole dihydrochloride (DAPI), 97%** [28718-90-3]
U3acf MW 350.25 λ max: 342nm
 A cationic fluorescent dye which specifically binds to adenine-thymine-rich DNA. Applications include detection of nanogram quantities of DNA in cellular homogenates and cytofluorometric determination of the DNA base content in human chromosomes. Useful as a stain for Fluorescent In-situ Hybridization (FISH) techniques. Technical Data Sheet #315 & #444
Nature, 253, 461 (1975); *Anal. Biochem.*, 92, 497 (1979); *Stain Technol.*, 60, 7 (1985); *Eur. J. Biochem.*, 182, 437 (1989)
- 
- Mouse Kidney cells were stained with DAPI, Alexa Fluor® 488 wheat germ agglutinin, Alexa Fluor® 568phalloidin. Contributed by Walt Metcalfe, Molecular Probes, Inc.; photographed by Gregg Jarvis, Omega Optical, Inc.
- 3-3'-Diaminobenzidine tetrahydrochloride, immunochemical grade, (DAB-4HCl)** [7411-49-6] *HMVW7bg*
 MW 360.1 Packaged in convenient serum vials to avoid contact with powdered materials and to avoid agents used in making tablets. Chromogen of choice for immunoperoxidase techniques. The brown reaction product is highly insoluble and will not diffuse from the site of localization. The color does not fade, therefore slides can be saved as a permanent record. The reaction product also chelates with osmium tetroxide and becomes electron dense for use in electron microscopy.
- 
- Human breast tissue stained with DAB in Peel-A-Way® Micro-Cut Paraffin, 100X
- Reconstitute by adding buffer directly to the DAB serum vial with a hypodermic syringe, contact with the solid DAB is avoided. Our DAB-4HCl is prepared to the highest purity standards. It is fully water soluble and may be used without further purification for IHC and for endogenous oxidases and peroxidase. Technical Data Sheet #164
Manual of Immunoperoxidase Techniques, 2nd Edition, ASCP Press, Chicago, 1987
- Diatrizoate sodium, >99%** [737-31-5] *U7abg*
 (Sodium diatrizoate; 3,5-Diacetamido-2,4,6-triiodobenzoic acid, sodium salt; Hypaque sodium) MW 671.95
 Forms solutions of low viscosity and high density and can be used along with an aggregating agent like Ficoll 400 for qualitative *in vitro* isolation of pure lymphocytes from whole blood by gradient centrifugation. *Scand. J. Clin. Lab. Invest.*, 21, suppl. 97 (1968)
- 1,4-Diazabicyclo(2,2,2)octane, min. 99%, (DABCO®)** [280-57-9] *H4g*
 MW 112.18 mp 160° Stabilizer of dye solutions which have not been oxygen degassed.
J. Cellular Physiol., 149, 160 (1991)
- Dibutyl phthalate** [84-74-2] *H7g*
 MW 278.4 bp 340° d 1.043 n_D^{20} 1.492 TSCA
 $C_6H_4-1,2-[CO_2(CH_2)_3CH_3]_2$
 Plasticizer for polymers such as poly(vinyl chloride), poly(methyl methacrylate) and poly(vinyl acetate).
- Dibutyltin dilaurate** [77-58-7] *BHV7g*
 MW 631.6 bp 205° mp 24° d 1.066 n_D^{20} 1.470 min Tin 15% TSCA
 $[CH_3(CH_2)_{10}CO_2]_2Sn[(CH_2)_3CH_3]_2$
 Catalyst for polymerizing lactide and glycolide, and isocyanate reactions. Yellowish liquid.
- 2',7'-Dichlorofluorescein, min. 97%** [76-54-0] *H4g*
 MW 401.21 λ max: 509nm
 0.2% solution in ethanol can be used for the detection of saturated and unsaturated lipids.

Catalog #	Size
09224-10	10mg
09224-50	50mg
Available in bulk quantities for OEM users at significant savings. Please call for quote.	
04001-2	2x25mg in 60ml vials
04001-5	5x25mg in 60ml vials
04008-5	5x10mg in 5x30ml serum vials
18152-100	100g
15154-25	25g
00434-450	450g
01862-50	50g
05134-10	10g

Diethylene glycol distearate (DGD) [9005-08-7] A2g
MW 639.07 A removable embedding medium for light microscopy sections. In thicker sections the exterior surface of mitochondria can be observed whereas in resin-embedded thin sections the mitochondria are most frequently observed in a cross section. DGD is used to prepare tissue for immunofluorescent localization of cytoskeletal components. It is also used for tissue preparation for In situ Hybridization (ISH) with nucleic acid probes. Technical Data Sheet #426

Biochem. Cell Biol., 67, 242 (1989); *Nature*, 337, 454 (1989); *J. Cell Biol.*, 98, 1878 (1984); 102, 1654 (1986)



Salivary Gland Cell from a *Drosophila* larva showing polytene chromosomes in the nucleus.

NEW! Diluent C 24902-6 6 vials



An iso-osmotic aqueous solution which contains no physiologic salts or buffers, detergents or organic solvents and is designed to maintain cell viability while maximizing dye solubility and staining efficiency. Six vials containing 10 mL of Diluent C for membrane labeling with CellVue® dyes. (See page 71) Sold under sublicense from PTI Research, Inc. to MTTI.

1,9-Dimethylmethylene blue chloride — See page 18

Direct red 81, C.I. 28160 [2610-11-9] A2g 16799-25 25g

MW 675.61 mp 240° λ max: 508 (397) nm

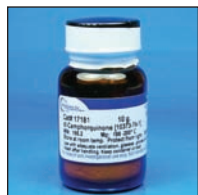
Contrast stain substitute for eosin Y with hematoxylin.

Clark, G., Staining Procedures, 4th ed., Williams and Wilkins, 1981

dl-Camphorquinone [10373-78-1] U6g 17181-10 10g

MW 166.22 mp 198-200°

Blue light (visible) catalyst for polymerization.



DMP-30 [90-72-2] BH6g 00553-100 100g

2,4,6-Tri(Dimethylaminomethyl) Phenol

MW 265.4 bp 316° n_D²⁰ 1.515 Viscosity ~200 cps TSCA

[(CH₃)₂NCH₂]₃C₆H₂OH

Curing catalyst for epoxy resins. Straw to yellow liquid.



Dodecenylsuccinic anhydride (DDSA) [26544-38-7] H2g 00563-450 450g

MW 266.4

Epoxy hardener, suitable for use in embedding procedures.

Embedding Capsules - BEEM®, Gelatin — See page 24

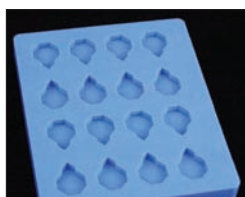
Embedding Molds

BEEM® Flat, Transparent



Manufactured from transparent polyethylene. The transparency of the mold permits accurate specimen orientation when illuminated from below. The molds are flexible and reusable. Each mold is supplied in a protective plastic case.

Chien, Universal



The design of this mold allows up to 16 tissue samples to be sectioned both on lateral and transverse planes without re-embedding. A sample is placed with longitudinal and cross plane edges into the special mold tip end. When embedding is complete, the microtome chuck is rotated to allow sectioning on either sample plane. This mold can also be used as a general flat embedding mold.

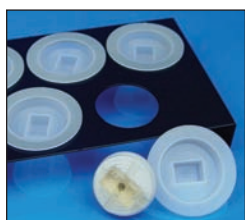
Casts made from this mold can be used on Leica/Reichert, LKB and most EM Microtomes with flat embedment chucks.

Multispecimen, Flat, Opaque



This mold has 20 shaped cavities plus 8 oblong cavities, 3.5mm wide in three different lengths. Mold size 113mm x 17mm.

Polyethylene Molds



These molds will not melt or deteriorate. For JB-4®, JB-4 Plus®, Immuno-Bed, L.R.-White, L.R.-Gold or Paraffin embedding. This is an embedding system of reusable molds and trays with colored stubs.

12mm x 8mm, package of 100 individual molds	23184-1	1 pkg
16mm x 8mm, package of 100 individual molds	23185-1	1 pkg
19mm x 13mm, package of 100 individual molds	23186-1	1 pkg
Embedding Mold Tray, package of 10 holds 6 molds	23188-1	1 pkg
4mm thin Embedding stubs - white, package of 100	23189-1	1 pkg
10mm thick Embedding stubs - mixed, package of 100	23197-1	1 pkg

Silicone, Flat, Polysciences



This is our most popular mold for epoxy resins. A flexible silicon rubber mold which releases up to 21 blocks by flexing. It is reusable and can be used to store material prior to sectioning. The 21 cavities are 5mm x 12mm x 4mm deep.

Catalog # Size

23257-1 1 mold

19440-1 1 mold

23261-1 1 mold

02615-1 1 mold

Silicone, Flat, Numbered Cavities (Opaque)



This mold is produced from opaque silicone rubber. Mold is durable and flexible and has 21 consecutively numbered shaped cavities. Molds have high thermal and chemical resistance. The 21 cavities are 5mm x 12mm x 4mm. The mold size is 69mm x 90mm.

Silicone, Round



For use with Epoxy Resins for large or odd shaped specimens. The embedded blocks are 14mm in diameter. Up to six blocks per mold.

Embedding Mold Release Spray C5g

A particularly effective anti-stick spray that dries on contact and leaves no oily film, allowing quick release of specimens from molds. It is unaffected by water, oil or solvents. 10oz. spray can.

Embedding stubs, 4mm thin - white, package of 100 - pages 35 & 91

Embedding stubs, 10mm thick - mixed, package of 100 - pages 35 & 91

Embed-It™ Low Viscosity Epoxy Kit [64-86-8] g



(for histology and electron microscopy)

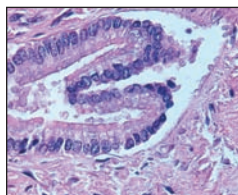
A modification of the Spurr's formulation, the *Embed-It™* Low Viscosity Epoxy Kit can be used for embedding biological material and mineralogical samples. This kit is composed of two very low viscosity components packaged in easy to dispense squeeze top bottles. The components are mixed in equal parts by weight to make the infiltration and embedding resin. The resin readily penetrates the specimen and cures to a clear hard block overnight at 60°C. Technical Data Sheet #622

Benefits

- **Easy To Use** - Mix only 2 components in equal proportions
- **Save Time** - Eliminate multiple weighing steps with convenient squeeze bottle format
- **Convenient** - Mix only the amount you need
- **Less Hazardous** - Components shipped together as non-hazardous materials

Eosin Y, 0.5% Alcoholic Solution, Acidic C5g

Used as counterstain with hematoxylin; contains acetic acid; **does not contain isopropanol or methanol**. Ready to use with any automated stainer.



Human kidney tissue
stained with Harris
Hematoxylin and Eosin Y.

Eosin Y, 1% Alcoholic Solution, Non-Acidic CH5g

Contains no acetic acid. Used as a counterstain for hematoxylin. Ready to use with any automated stainer.

Catalog # Size

23258-1 1 mold

23260-1 1 mold

03928-1 1 can

24300-1 1 kit

09859-500 500ml

09859-1000 1000ml

09859-3.75 3.75L

17269-500 500ml

17269-1000 1000ml

Eosin Y, C.I. 45380, certified [17372-87-1] U5g
(Eosin yellowish; Acid red 87; 2',4',5',7'-Tetrabromo-fluorescein, disodium salt)
MW 691.9 λ max: 517nm
Cytoplasmic counterstain used with Hematoxylin for H&E staining. Component of Wright stain and Tetrachrome stain.

Epoxy Resin Removal kit



Removes epoxy resin from thin (2 μ or less) sections in five minutes under mild conditions preserving delicate immunogenicity of specimens. Technical Data Sheet #440

Kit Contains: 100ml of solution A and 3ml of solution B
Stain Tech. 65, 205 (1990); *Mikroskopie*, 42, 315 (1985)

NEW! ERL-4221 (VCD Substitute in Spurr's Low Viscosity Kit) [2386-87-0] HO4g
(3,4 Epoxy Cyclohexyl Methyl 3,4 epoxy Cyclohexyl Carboxylate)
MW 252.3 bp > 250°C Freezing Point: -35°C sp. gr.: (20°C) ~ 1.17
C₁₄H₂₀O₄ Solubility in Water: (weight % at 20k° C) < 0.06%
ERL-4221 is a cycloaliphatic, diepoxy functional organic compound that is a useful building block in the production of semi-hard to hard cured epoxy resins. It is incompatible with amines, acids and strong bases and will cure to form a resinous product. ERL-4221 is often used in manufacture of plastic embedding kits for electron microscopy. Appearance is a transparent, low color viscous liquid.



Ethidium Bromide [1239-45-8] H5g
(Homidium bromide; 3,8-Diamino-5-ethyl-6-phenylphenanthridium bromide; 2,7-diamino-10-ethyl-9-phenylphenanthridium bromide) MW 394.32 mp 260-262° (dec.) λ max: 506nm
Intercalates double-stranded nucleic acids; frameshift mutagen; fluorescent stain for nucleic acids in electrophoresis; used for DNA quantitation.
J. Mol. Biol., 47, 419 (1970); *Ann. Rev. Biochem.*, 44, 273 (1975); *Dev. Biol.*, 108, 325 (1985)

Ethylene glycol diglycidyl ether (Quetol 651) [2224-15-9] H5g
MW 174.2 bp 112°/4.5mm
Crosslinker for carboxyl-, amine- and hydroxyl- functional polymers. Crosslinking additive to epoxy resins. Used as an embedding medium.
Histochemical Journal, 20, 222 (1988)



Fast Blue [74749-42-1] U7g
 λ max: 382nm
Fast Blue fluorescent dye is commonly used as a neuronal tracer and is sometimes referred to as a Hydrophilic Retrograde Tracer. It can be injected into laboratory animals at a concentration of 2.5% in isotonic saline. Common protocols recommend injecting 0.01-0.2 microliters of a 2.5% concentration into the desired area of the laboratory animal. Euthanasia then occurs 2-3 days post-injection. Soluble in: water, lower alcohols.



Excitation wavelength: 365nm **Emission wavelength:** 420nm
Adv. Cell. Neurobiol., 5, 307 (1984); *J. Anat. Soc. India* 48(2) 67-72-1999

Catalog #	Size
02740-50	50g
21487-1	1 kit
24738-250	250g
04033-5	5g
01479-100	100g
17740-1	1mg
17740-5	5mg

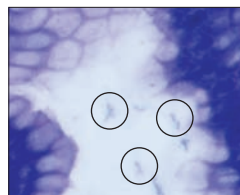
Flash Dip FNA/Helicobacter Pylori Stain Kit

Rapid stain method for Fine Needle Aspirations, bone marrows, smears and multiple microorganisms such as *H. Pylori*. Fast alternative to Wright-Giemsa staining procedures. Use with *Metanil Yellow*, page 63. Technical Data Sheet #715

Kit Contains: Fixative, Eosin and Methylene Blue.

Benefits

- Excellent cytology stain
- Clear nuclear staining of bacteria and fungus in deep shades of blue
- Save Time - Fast alternative to Wright-Giemsa staining procedures.



Helix shaped Helicobacter Pylori bacteria in human colon tissue.

Fast Fix CHM7g

A one-step rapid fixative for frozen section tissue. Fixes tissue to slide to allow for staining procedures. Safe for all tissue types.

Fast Frozen Stain Kit



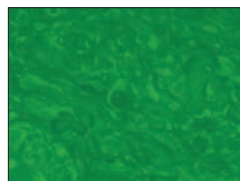
Rapid staining method for frozen sections. Process is suitable for Laser Capture Microdissection (LCM). Use with *Eosin 1%*, *alcoholic solution*, page 36. Technical Data Sheet #716

Kit Contains: Fast Fix (Frozen Fixative), Gill's Hematoxylin #3, Eosin Y 0.5%, Scott's Bluing Reagent and CitraMount™ Mounting Media.

Fast green FCF, C.I. 42053, certified (Food green 3) [2353-45-9] A2g

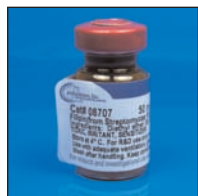
MW 808.85 mp 290° (dec.) λ max: 622-626nm
Sensitive stain for proteins in polyacrylamide gels. Especially suitable in isoelectric focusing. Also suitable for use as a cytological counterstain and mammalian tissue stain for muscle and collagen.

Anal. Biochem., 96, 263 (1979); 104, 494 (1980); Clark, G., *Staining Procedures*, 4th ed., Williams and Wilkins 1981; p114, 120, 125, 197, 262, 301, 319, 324, 336, 355, 368, 415



Breast tissue, no nuclear staining, stains support structures.

Filipin (from Streptomyces filipinensis), min. 65% [11078-21-0] HO6g



Polyene antibiotic fluorochrome for cholesterol determination. Used as an antifungal agent. Soluble in: DMF, pyridine, lower alcohols.

Cytometry, 8, 146 (1987)

Fluorescein Diacetate (Diacylfluorescein; 3,6-Diacetoxyfluoran) [596-09-8] A2f

MW 416.39 mp 198-201° λ max: 498nm TLC: single spot

A fluorescent substrate in studies on membrane permeability and intracellular interactions.

Anal. Chem., 36, 409 (1964); *J. Biol. Chem.*, 258, 6380 (1983)

Catalog # Size

24606-250 250ml/kit
24606-500 500ml/kit

24607-100 100ml
24607-500 500ml

24604-100 100ml

02745-25 25g
02745-100 100g

08707-50 50mg
08707-100 100mg

00615-5 5g

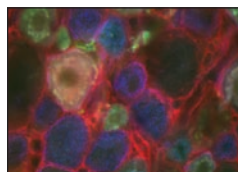
Fluorescein Isothiocyanate, Certified, (FITC) [3326-32-7] *HPR55e*

(Fluorescein 5-isothiocyanate)

MW 389.4 mp >360° λ max: 499nm

Moisture sensitive isomer I, 90% minimum, laser grade. Reagent widely used for fluorescent labeling of proteins. Also used in the fluorescent antibody technique for identification of pathogens. Used in Fluorescent In-situ Hybridization (FISH) procedures.

Am. J. Pathol., 34, 1081 (1958); *Methods in Enzymology*, 26, 28 (1972); *Anal. Biochem.*, 57, 227 (1974)



Rat dorsal ganglion, triple-labeled with FITC (CGRP) secondary antibodies, Texas Red® (extracellular matrix) and avidin-Pacific Blue (biotinylated isolectin GS-I-B4). Photo: Jeffrey C. Petruska, Dept. of Neuroscience, and Richard D. Johnson, PhD, Dept. of Physiological Science and Neuroscience, University of Florida Brain Institute.

NEW! Fluorescein, Sodium Salt, C.I. 42685 [518-47-8]

(Acid Yellow, Uranine) MW 376.27 Formula: C₂₀H₁₀Na₂O₅

Fluorescein sodium is used extensively as a diagnostic tool in the field of ophthalmology and optometry. Topical fluorescein is used for the diagnosis of corneal abrasions, ulcers and herpetic corneal infections.

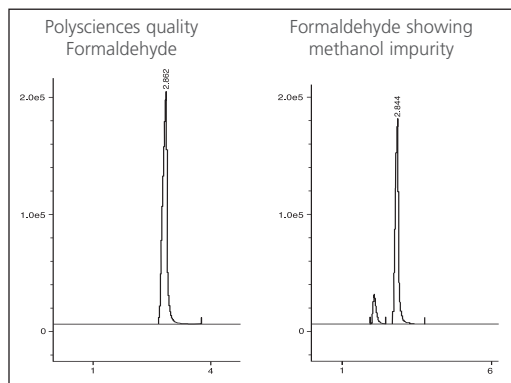
Merck 13, 4185, *Beilstein* 19, IV, 2904

Formaldehyde, 37%, U.S.P. (Formalin 100%) [50-00-0] *BHM6g*

Special handling charge & carrier surcharges.

Formaldehyde, Ultra Pure, Methanol Free, EM grade [50-00-0]

Suitable for both electron and light microscopy. Easily penetrates large blocks of tissue. When used in combination with glutaraldehyde, it fixes delicate tissues such as brain in vascular perfusion. Avoids the problem of having to depolymerize paraformaldehyde. Used in Karnovsky's fixative in conjunction with your own buffer system. Source of the formaldehyde is paraformaldehyde.



Formaldehyde, 10%, methanol free, Ultra Pure

BHM6g

Formaldehyde, 16%, methanol free, Ultra Pure

BHM6g

Formalin, 10%, Neutral, Phosphate Buffer (Formaldehyde 3.7%) NBF *BHM6g*

Formvar 15/95* (Poly[vinyl formal]) [9003-33-2] *H4g*

MW 24,000-40,000 Tg 108°

Solution of poly(vinyl formal) used to make support films on EM grids for fragile samples. Polymer contains cyclic acetal units and some residual hydroxyl groups.

0.5% soln. in ethylene dichloride* *CHWX6g*

*Poison pack charge required.

Catalog #	Size
00373-1	1g
24997-100	100g
24997-500	500g
00625-1	1gal
04018-1	1L
04018-4	4x1L
18814-20	20x10ml
08379-3.75	3.75L
08379-20	20L
00631-100	100g
04672-100	100g

Frosted, Microscope Slides



Frosted on one end to be thumb detectable when working in a dark room. 72 slides per box.

Fuchsin, Basic, Certified, C.I. 42500 [569-61-9] *HM4g*
(Pararosaniline hydrochloride; Basic red 9) MW 323.83 λ max: 542-548nm
For staining bacilli in tissue, for Schiff's Reagent, and Feulgen's stain for DNA. Coupling agent for ultrastructural localization of esterases. Used in special stains for mucin.
Stain Technol., 19, 45 (1944); J. Cell Biol., 29, 361 (1966)

Fuchsin, Basic, Certified, C.I. 42510 [632-99-5] *HM4g*
(Basic fuchsin; Basic violet 14; Rosaniline) MW 337.86 λ max: 545-550nm
For staining glycoproteins and glycosaminoglycans in electrophoresis gels. More permanent bands are produced by post-staining with naphthol blue black. Naphthol blue black is a tracking dye for proteins in acidic gel systems. Certified for use in staining bacterial flagella.
Anal. Biochem., 51, 152; 56, 361 (1973)

Fungi-Fluor® Kit for Fungal Detection *HM2agm* 500 tests



Many opportunistic infections develop in the immunosuppressed patient suffering from Acquired Immunodeficiency Syndrome (AIDS). A number of these are caused by various fungal species including *Candida*, *Aspergillus*, *Histoplasma*, and *Coccidioides*. The Fungi-Fluor® kit for Fungal Detection offers a quick fluorescent stain and counterstain procedure for various fungal organisms. The kit can be used to screen a variety of specimen types from sputum to skin scrapings for fungal infection. The color of fluorescence will vary with wavelength of excitation—bright blue for 340-380nm excitation, apple-green for 400-490nm excitation. Numerous references are also provided for various applications of the kit. Technical Data Sheet #316

Kit Contains: 75ml of staining solution A and 75ml of counterstaining solution B.

Advantages:

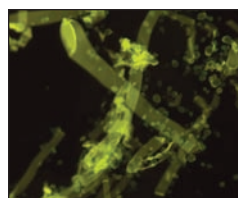
- More accurate than KOH preps
- Rapidly offers greater morphologic detail than PAS or silver stains
- Counterstain greatly reduces background fluorescence

Specimen types:

- Fresh or frozen clinical specimens
- Paraffin or GMA-embedded tissues

Positive Result:

- *Candida albicans*: 2-5 μ diameter blastoconidia or budding yeast cells, pseudohyphae, and true septate hyphae all fluoresce brightly.
- *Histoplasma capsulatum*: 2-5 μ ovoid yeast cells stain brightly, small oval to spherical budding cells often seen inside mononuclear cells.
- *Coccidioides immitis*: distinctive 30-60 μ diameter spherules containing hundreds of 2-5 μ endospores stain brightly.
- *Aspergillus fumigatus*: septate hyphae 5-10 μ in diameter in a Y-shaped branching pattern stain brightly.



Aspergillus culture stained with Fungi-Fluor®, no counterstain, 40X, FITC filter.

Catalog # Size

21911-1 1 box

06342-25 25g

00635-25 25g

17442-1 1 kit
500 tests

Fungi-Fluor® Pneumocystis Kit HU2agm 100 tests

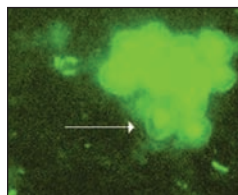
Pneumocystis carinii is an organism that causes *Pneumocystis carinii* pneumonia (PCP) in severely immune compromised patients. Early detection allows the introduction of appropriate treatment and may improve chances of patient survival. The Fungi-Fluor® Pneumocystis kit offers a fast, fluorescent staining procedure for *Pneumocystis carinii* in bronchial specimens. The kit consists of 10ml of Fungi-Fluor® staining solution and 10 positive unstained control slides (smears).

Advantages:

- Direct fluorescent stain for *Pneumocystis carinii* cyst
- Unique fluorescent morphology ("double parenthesis" structure) is easy to identify
- **3 minutes to stain and read**
- Permanent slides - slides can be re-activated if fluorescence dims
- Minimal prep and clean-up
- Faster, better results than methenamine silver staining
- Less costly and time-consuming than immunofluorescent assays
- FDA approved for *in vitro* diagnostic use

Specimen Types:

- Bronchoalveolar lavage (BAL)
- Bronchial brush or wash
- Touch prep of fresh tissue
- Paraffin sections and frozen sections

**Positive Result:**

Pneumocystis carinii cysts will stain bright apple-green with highly characteristic staining of an internal "double parenthesis" structure. Cysts are generally 5-7 μ in diameter, round and fairly uniform in size. Cysts will often appear in large clusters but can be detected individually.

The full staining procedure is outlined in both Data Sheet #482 and the Fungi-Fluor® Pneumocystis package insert. The package insert also includes specific performance characteristics versus silver methenamine staining, Toluidine blue O staining, Giemsa staining and immunofluorescent assays.

***Pneumocystis carinii* control slides (10 slides per box)**

Full description, see page 89.

Fungi-White

Suitable to use in identification of fluorescent fungal elements and trichomonas detection. Rapid chemo-fluorescent method useful for the detection of Microsporidia and *Acanthamoeba spp.* The Fungi-White dye fluoresces when exposed to ultraviolet light (below 400nm wavelength). The procedure is useful on fecal smears, cell cultures, or other sample materials. To use this method on plastic sections requires modifications to the standard protocol.

Kit Contains: 6 x 5ml Fungi-White Reagent A, 6 x 5ml Stain Reagent B

B. Mori & L. M. Bellani Biotech. Histochem., 1996, 71:71-72

Gallamine blue, C.I. 51045 (Mordant blue 45) [1563-02-6] U5g

MW 335.73 Used as a nuclear stain and used for detecting calcium in tissues.

Stain Technol., 3, 28 (1928); J.R. Microsc. Soc., 69, 20 (1944)

Catalog #**Size**

22363-1

1 kit

22251-1

1 box

24692-1

1 kit

05587-1

1g

NEW! Giemsa Stain Powder, certified [51811-82-6]
(Hematology Stain) MW 291.80 Formula: $C_{14}H_{14}ClN_3S$ Certified Biological Stain
Giemsa stain is a classical blood film stain for peripheral blood smears and bone marrow specimens, used to visualize chromosomes, stains fungus histoplasma and identifies mast cells. **Results:** Erythrocytes stain pink, Platelets show a light pale pink, Lymphocyte cytoplasm stains sky blue, Monocyte cytoplasm stains pale blue, Leukocyte nuclear chromatin stains magenta.

Gelatin [9000-70-8] A2g
Used for slide preparation for light microscope autoradiography and histochemistry. To make gelatin solution: to 500ml of D.I. water at 60°C add 0.5g gelatin and stir to dissolve. After the gelatin is dissolved add 0.05g of chromium potassium sulfate and let mixture cool to 40°C. Dip nitric acid cleaned slides into warm gelatin mixture, stand vertical and dry in clean environment. Store prepared slides in clean slide box.

GemCut® Paraffin A2g
GemCut Paraffin, which melts at a range from 56-58°C, is a high polymer paraffin formulation for routine embedding and cutting. This paraffin is specially formulated to exhibit superior cutting performance in high humidity environments, with low compression. The paraffin is available in multiple colors to assist the histologic technician in visualizing small biopsies easily, even while using eosin, methylene blue or tissue marking dyes. Multiple colors organize samples by technician or tissue type. The coloring agents and polymer content do not interfere with the staining protocols or IHC. Technical Data Sheet #691



GemCut® Pink Sapphire Paraffin
GemCut® Aquamarine Paraffin
GemCut® Citrine Paraffin
GemCut® Emerald Paraffin
GemCut® Opal Paraffin (standard white)
GemCut® Amethyst Paraffin

Catalog #	Size
24998-25	25g
00639-100	100g
	case = 4x2.0kg
24361-1	1 case
24362-1	1 case
24363-1	1 case
24364-1	1 case
24365-1	1 case
24366-1	1 case

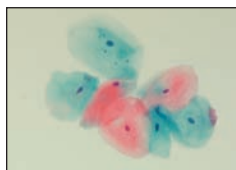
Gentian violet 3, C.I. 42555, USP [548-62-9]
(Crystal violet; Basic violet 3) MW 407.98 Formula: $C_{25}H_{30}N_3Cl$ Differential Gram Stain

24999-25 25g

Gill's Hematoxylin

Polysciences, Inc. Gold Standard Series Hematoxylin and Eosin Products offer you the highest quality for routine staining. Strict quality control for all Gold Standard Series Routine Stains ensures lot-to-lot consistency. Stains are packaged in convenient plastic recyclable containers. Our Gold Standard Series Gill's Hematoxylin are available in three strengths. Choose from Gold Standard Series Gill's Hematoxylin #1, #2 or #3 for optimal nuclear staining of your Cytology and Histology samples.

Gill's Hematoxylin #1 for Cytology A2g
Gold Standard Gill's #1 is ideal for routine cytology staining. This single strength formulation optimally stains gynecological and non-gynecological specimens. Technical Data Sheet #192



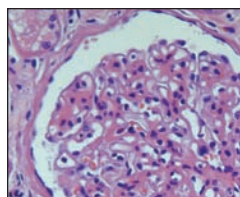
Human cheek cells, Gill's #1, Gill's Modified EA, Gill's Modified OG-6

24242-500 500ml
24242-1000 1000ml

Gill's Hematoxylin #2, double strength for Histology & Cytology, (mercury free) A2g . . .
Gold Standard Gill's #2 should be used when a stronger or darker nuclear stain is required for cytology samples. Preferred for immunohistochemical counterstaining of the nucleus. General purpose nuclear stain, progressive type. Used with hematoxylin and eosin staining. Technical Data Sheet #192



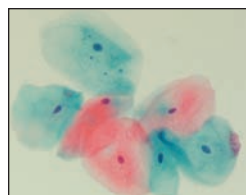
Gill's Hematoxylin #3, triple strength for Histology A2g
Gold Standard Gill's #3 is the formulation of choice for routine histological staining when a darker nuclear stain is desired. General purpose nuclear stain, progressive type. Used with hematoxylin and eosin staining. Technical Data Sheet #192



Kidney stained with Gill's Hematoxylin #3, Eosin Y, 20X, 4µ

Gill's modified OG-6 & EA for Papanicolaou Staining/Cytology

Orange-6 and EA are the two cytoplasmic counterstain solutions that are used sequentially in the Papanicolaou staining method for clinical cytology. Gill's modified OG-6 and EA are stable in solution and give predictable high quality staining results not previously possible with other formulations. Technical Data Sheet #196



Human cheek cells, Gill's #1, Gill's Modified EA, Gill's Modified OG-6

Gill's modified OG-6 C5g

Gill's modified EA CH5g

Glass Knife Storage Box



A useful way of storing triangular glass knives. The silicone rubber insert in the plastic box will hold ten 25mm (1 inch) knives firmly in position. For use with Glass Knives - See *Blades*, page 99-20.

Glass Scribe, Diamond

A Natural Diamond held at 90° angle in a metal mounting. It is fitted with a protective cover and pocket clasp. Useful for scoring glass strips prior to hand breaking glass knives, marking slides and property identification.



Glass Tubes with Plastic Snap Caps (specimen bottles)



3.7ml capacity. 44mm in height. Excellent for manual processing of small specimens.

Catalog #	Size
24243-500	500ml
24243-1000	1000ml
24244-500	500ml
24244-1000	1000ml
09782-500	500ml
09782-1000	1000ml
09782-3.75	3.75L
09783-500	500ml
09783-1000	1000ml
09783-3.75	3.75L
16659-1	1 box
03636-1	1 scribe
02707-50	50 tubes

Gloves, Nitrile, powder free

Hypoallergenic; they are 100% Nitrile, a special polymer that does not contain rubber allergens. They are more puncture resistant than natural latex with excellent tactile sensitivity. Available in size medium. Packaged in boxes of 100.

Gloves, Nylon, lint free

Finest quality nylon, anti-static, for clean room work. Also useful when handling microscope lenses, slides or photos. Absorbs perspiration; washable and reusable. Mens large size.

Glutaraldehyde [111-30-8]

MW 100.1

Polysciences was the first to develop a superior grade of glutaraldehyde. Each batch of vacuum distilled glutaraldehyde manufactured by Polysciences is analyzed to maintain consistent high quality and freedom from contaminants. Each ampoule is fitted with an ampoule cracker for added safety. Polysciences offers both Biological and EM (vacuum distilled) grades of Glutaraldehyde. Technical Data Sheet #124

Biological Grade glutaraldehyde has been purified to minimize by-product formation and maximize shelf life. It should be suitable for most morphological studies.

Glutaraldehyde, Biological grade, 25% HOV6g

Glutaraldehyde, Biological grade, 50% BOV6g

EM Grade (vacuum distilled). EM grade is recommended for histological or immunological techniques demanding purity and longer stability.

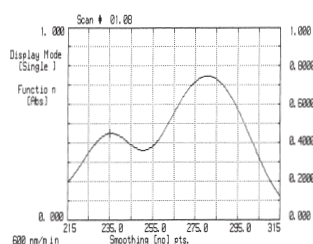


Glutaraldehyde, EM grade, 8% HOV6d

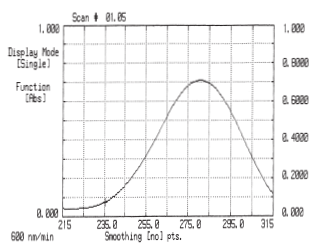
Glutaraldehyde, EM grade, 25% HOV6d
 n_D^{20} 1.375 d 1.062

Glutaraldehyde, EM grade, 50% BOV6d n_D^{20} 1.420 d 1.106

Glutaraldehyde, EM grade, 70% BOV6d



Poor Quality glutaraldehyde UV trace showing 235 peak due to polymerization.



Polysciences' Quality glutaraldehyde UV trace.

Catalog #	Size
24023-1	1 box
24020-1	1 box
00376-500	500ml
00376-4	4x500ml
00376-1	1gal
00377-500	500ml
00377-1	1L
00377-4	4x1L
07710-100	100ml
07710-5	5x100ml
00216A-10	10x10ml
00216-30	30x10ml
01909-100	100ml
01909-10	10x10ml
01909-5	5x100ml
18428-100	100ml
18428-10	10x10ml
18428-5	5x100ml
01201-2	10x2ml
01201-5	5x10ml

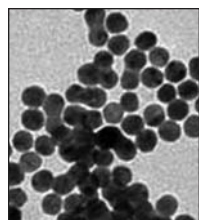
Glycerol, USP (Glycerine) [56-81-5] A2g



MW 92.09 n_D^{20} 1.474 d 1.26 bp 182°/20mm
Used as cryoprotectant to help prevent ice crystal damage to specimens. Substrate for the assay of glycerol dehydrogenase, glycerol oxidase and glycerokinase.

Gold Nanoparticles

Mercaptyalkyl PEG Gold Nanoparticles



Nanoparticle conjugate.

Naked Gold Nanoparticles

Gold nanoparticles in toluene.

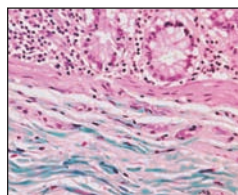
Thiol Capped Gold Nanoparticles (2-5nm)

Gold nanoparticles.

NEW! PEGylated Gold Nanoparticles - see page 86

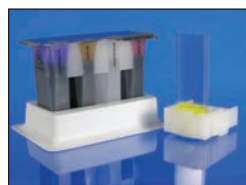
Gomori's Trichrome Stain Kit

Gomori's One Step Trichrome refers to the multiple stain action of this reagent only. The mordant is Bouin's Fixative (Cat. #16045, page 20). All components and counterstains are included in kit. Technical Data Sheet #389



Human colon tissue stained with
Gomori's Trichrome Stain Kit.

NEW! Gram Stain Kit, Neat Stain



For staining bacteria from cultures or specimens by the differential Gram stain method. Neat Stain offers the flexibility of a three dip staining sequence in both the stain and counter-stain solution. Specifically designed for stat procedures and/or laboratories using manual staining methods. Purchase the Neat Stain Slide Holder separately, (Cat. #25033, page 99) **Kit Contains:** 6 Reagent Packs, Plastic Stand, 6 Reclosure Foils. Performs 150 tests. Technical Data Sheet #803

Grid Coating Plate

Useful in preparing Carbon and Formvar support films on grids. Up to 50 grids can be located on the Nickel plate and the liquid level lowered onto the grids.

Grid Storage Units

Specimen grid box for holding 100 grids in numbered positions. The transparent sliding cover has a slot for accessing the grid positions. Grids can be removed with a fine pointed pair of tweezers. (For storing larger quantities, a 50 grid unit is available, in multi-packs. As with the larger unit, all grid positions are numbered.)



Grid Storage Unit for 50 grids, 5 pack

Grid Storage Unit for 50 grids, 25 pack

Grid Storage Units for 100 grids

Grid Storage Units for 100 grids, 10 pack

Catalog #	Size
00084-1	1000g
24688-5	5ml
24689-5	5ml
24690-5	5ml
24205-1	1 kit
25036-1	1 kit
25033-1	1 holder
08511-1	1 plate
23146-5	5/pk
23147-25	25/pk
03606-1	1 unit
03606-10	10/pk

NEW! Grids for TEM

High quality specimen grids known for their beam stability and useful for supporting thin specimen sections. Samples for transmission electron microscopy must be "supported" on thin transparent film grids to hold the specimen in place while in the lens of the TEM. Manufactured with a "shiny" side for easy identification. The general range of grids are available in copper, nickel and gold. Grids vary in thickness from 7 mils (178 µm) to 5 mils (12.7 µm) depending on mesh size, the highest mesh size having the thinnest grids.

Grids – Carbon Only Coated

Carbon Coated Grids - Copper	200 mesh	24918-25	25 grids
		24918-50	50 grids
		24918-100	100 grids
Carbon Coated Grids - Copper	300 mesh	24933-25	25 grids
		24933-50	50 grids
		24933-100	100 grids
Carbon Coated Grids - Copper	400 mesh	24948-25	25 grids
		24948-50	50 grids
		24948-100	100 grids
Carbon Coated Grids - Gold	200 mesh	24920-25	25 grids
		24920-50	50 grids
		24920-100	100 grids
Carbon Coated Grids - Gold	300 mesh	24935-25	25 grids
		24935-50	50 grids
		24935-100	100 grids
Carbon Coated Grids - Gold	400 mesh	24950-25	25 grids
		24950-50	50 grids
		24950-100	100 grids
Carbon Coated Grids - Nickel	200 mesh	24919-25	25 grids
		24919-50	50 grids
		24919-100	100 grids
Carbon Coated Grids - Nickel	300 mesh	24934-25	25 grids
		24934-50	50 grids
		24934-100	100 grids
Carbon Coated Grids - Nickel	400 mesh	24949-25	25 grids
		24949-50	50 grids
		24949-100	100 grids

Grids – Formvar Only Coated

Formvar Coated Grids - Copper	200 mesh	24912-25	25 grids
		24912-50	50 grids
		24912-100	100 grids
Formvar Coated Grids - Copper	300 mesh	24927-25	25 grids
		24927-50	50 grids
		24927-100	100 grids
Formvar Coated Grids - Copper	400 mesh	24942-25	25 grids
		24942-50	50 grids
		24942-100	100 grids
Formvar Coated Grids - Gold	200 mesh	24914-25	25 grids
		24914-50	50 grids
		24914-100	100 grids
Formvar Coated Grids - Gold	300 mesh	24929-25	25 grids
		24929-50	50 grids
		24929-100	100 grids

Grids – Formvar Only Coated - cont.

		Catalog #	Size
Formvar Coated Grids - Gold	400 mesh	24944-25	25 grids
		24944-50	50 grids
		24944-100	100 grids
Formvar Coated Grids - Nickel	200 mesh	24913-25	25 grids
		24913-50	50 grids
		24913-100	100 grids
Formvar Coated Grids - Nickel	300 mesh	24928-25	25 grids
		24928-50	50 grids
		24928-100	100 grids
Formvar Coated Grids - Nickel	400 mesh	24943-25	25 grids
		24943-50	50 grids
		24943-100	100 grids

Grids – Formvar/Carbon Coated

Formvar/Carbon Coated Grids - Copper	200 mesh	24915-25	25 grids
		24915-50	50 grids
		24915-100	100 grids
Formvar/Carbon Coated Grids - Copper	300 mesh	24930-25	25 grids
		24930-50	50 grids
		24930-100	100 grids
Formvar/Carbon Coated Grids - Copper	400 mesh	24945-25	25 grids
		24945-50	50 grids
		24945-100	100 grids
Formvar/Carbon Coated Grids - Gold	200 mesh	24917-25	25 grids
		24917-50	50 grids
		24917-100	100 grids
Formvar/Carbon Coated Grids - Gold	300 mesh	24932-25	25 grids
		24932-50	50 grids
		24932-100	100 grids
Formvar/Carbon Coated Grids - Gold	400 mesh	24947-25	25 grids
		24947-50	50 grids
		24947-100	100 grids
Formvar/Carbon Coated Grids - Nickel	200 mesh	24916-25	25 grids
		24916-50	50 grids
		24916-100	100 grids
Formvar/Carbon Coated Grids - Nickel	300 mesh	24931-25	25 grids
		24931-50	50 grids
		24931-100	100 grids
Formvar/Carbon Coated Grids - Nickel	400 mesh	24946-25	25 grids
		24946-50	50 grids
		24946-100	100 grids

Grids – Holey Carbon Coated

Holey Carbon Coated Grids - Copper	200 mesh	24921-25	25 grids
		24921-50	50 grids
		24921-100	100 grids
Holey Carbon Coated Grids - Copper	300 mesh	24936-25	25 grids
		24936-50	50 grids
		24936-100	100 grids
Holey Carbon Coated Grids - Copper	400 mesh	24951-25	25 grids
		24951-50	50 grids
		24951-100	100 grids

Grids – Holey Carbon Coated - cont.

	Catalog #	Size	
Holey Carbon Coated Grids - Gold 200 mesh	24923-25	25 grids	
	24923-50	50 grids	
	24923-100	100 grids	
Holey Carbon Coated Grids - Gold 300 mesh	24938-25	25 grids	
	24938-50	50 grids	
	24938-100	100 grids	
Holey Carbon Coated Grids - Gold 400 mesh	24953-25	25 grids	
	24953-50	50 grids	
	24953-100	100 grids	
Holey Carbon Coated Grids - Nickel 200 mesh	24922-25	25 grids	
	24922-50	50 grids	
	24922-100	100 grids	
Holey Carbon Coated Grids - Nickel 300 mesh	24937-25	25 grids	
	24937-50	50 grids	
	24937-100	100 grids	
Holey Carbon Coated Grids - Nickel 400 mesh	24952-25	25 grids	
	24952-50	50 grids	
	24952-100	100 grids	

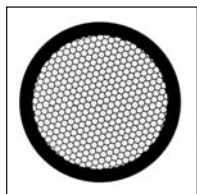
Grids – Lacey Carbon Coated

Lacey Carbon Coated Grids - Copper 200 mesh	24924-25	25 grids	
	24924-50	50 grids	
	24924-100	100 grids	
Lacey Carbon Coated Grids - Copper 300 mesh	24939-25	25 grids	
	24939-50	50 grids	
	24939-100	100 grids	
Lacey Carbon Coated Grids - Copper 400 mesh	24954-25	25 grids	
	24954-50	50 grids	
	24954-100	100 grids	
Lacey Carbon Coated Grids - Gold 200 mesh	24926-25	25 grids	
	24926-50	50 grids	
	24926-100	100 grids	
Lacey Carbon Coated Grids - Gold 300 mesh	24941-25	25 grids	
	24941-50	50 grids	
	24941-100	100 grids	
Lacey Carbon Coated Grids - Gold 400 mesh	24956-25	25 grids	
	24956-50	50 grids	
	24956-100	100 grids	
Lacey Carbon Coated Grids - Nickel 200 mesh	24925-25	25 grids	
	24925-50	50 grids	
	24925-100	100 grids	
Lacey Carbon Coated Grids - Nickel 300 mesh	24940-25	25 grids	
	24940-50	50 grids	
	24940-100	100 grids	
Lacey Carbon Coated Grids - Nickel 400 mesh	24955-25	25 grids	
	24955-50	50 grids	
	24955-100	100 grids	

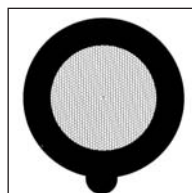
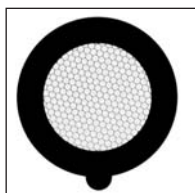
Grids, Specimen Support for TEM

A high quality range of specimen grids available with well defined bar geometry and manufactured with one side matte, the other shiny for easy identification. The general range of grid patterns is available in copper and nickel with many of these patterns also available in gold. Special grid materials are available for defined applications; for example: Be, C, Al, Mo, Ti, and stainless steel can be supplied in a few basic patterns. All grids are packaged in antistatic tubes of 100 grids with the exception of the 1000 mesh patterns, which are packaged in quantities of 20 grids. All grids are 3.05mm in diameter.

Grids – Hexagonal Mesh

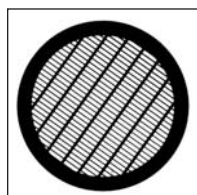
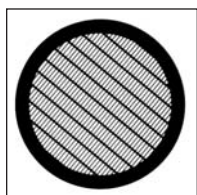


Hexagonal Mesh Thin Bar, High Definition



		Open Area %	Bar Width μm	Catalog #	Size
Hexagonal Grids Copper	100mesh	250	35	18946C-1	100 grids
Hexagonal Grids Nickel	100mesh	250	35	18946N-1	100 grids
Hexagonal Grids Copper	150mesh	165	35	18947C-1	100 grids
Hexagonal Grids Copper	200mesh	125	25	18948C-1	100 grids
Hexagonal Grids Nickel	200mesh	125	25	18948N-1	100 grids
Hexagonal Grids Copper	300mesh	83	25	18949C-1	100 grids
Hexagonal Grids Nickel	300mesh	83	25	18949N-1	100 grids
Hexagonal Grids Copper	400mesh	62	25	18950C-1	100 grids
Hexagonal Grids Nickel	400mesh	62	25	18950N-1	100 grids
Hexagonal Grids Gold	400mesh	62	25	18950G-1	100 grids
Hexagonal Grids Copper	200mesh	125	12	7801C-1	100 grids
Hexagonal Grids Nickel	400mesh	57	8	7805N-1	100 grids
Hexagonal Grids Copper	600mesh	57	8	7806C-1	100 grids

Grids – Parallel Bar Pattern

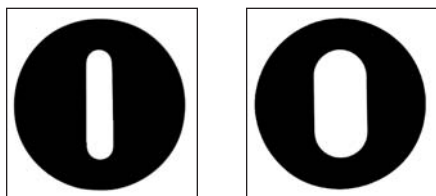


Parallel Bar Copper	75/300 mesh	8424C-1	100 grids
Parallel Bar Nickel	75/300 mesh	8424N-1	100 grids
Parallel Bar Copper	100/400 mesh	8425C-1	100 grids

PolyPointer ⚡

Rinse grids prior to use in absolute alcohol to increase adherence to grid surface. Collect section on matte side for better specimen contact and visibility. Handle only with very fine No. 5 tweezers (page 108). A slight bend at the very edge of the grid will aid picking up sections.

Grids – Slot



Slot Grids Copper	2 x 0.5mm slot
Slot Grids Nickel	2 x 0.5mm slot
Slot Grids Copper	2 x 1.0mm slot
Slot Grids Nickel	2 x 1.0mm slot

Catalog # Size

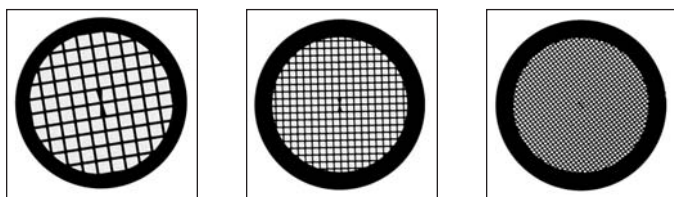
7565C-1	100 grids
7565N-1	100 grids
7563C-1	100 grids
7563N-1	100 grids

Other Grid Materials (for special applications)

Aluminum Grids	200 mesh
Nylon Grids, Carbon Coated	150 mesh

22896-1	25 grids
22894-1	25 grids

Grids – Square Mesh – Standard



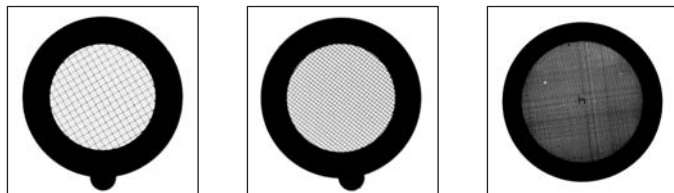
		Open Area %	Bar Width μm		
Square Mesh Grids Copper	50mesh	77	62	7548C-1	100 grids
Square Mesh Grids Nickel	75mesh	73	48	7549N-1	100 grids
Square Mesh Grids Copper	100mesh	69	42	7550C-1	100 grids
Square Mesh Grids Nickel	100mesh	69	42	7550N-1	100 grids
Square Mesh Grids Gold	100mesh	69	42	7550G-1	100 grids
Square Mesh Grids Copper	150mesh	64	33	7551C-1	100 grids

Square Mesh Grids Copper	200mesh	60	28	7552C-1	100 grids
Square Mesh Grids Cu/Pd	200mesh	60	28	7552P-1	100 grids
Square Mesh Grids Nickel	200mesh	60	28	7552N-1	100 grids
Square Mesh Grids Gold	200mesh	60	28	7552G-1	100 grids

Grids – Square Mesh – Standard

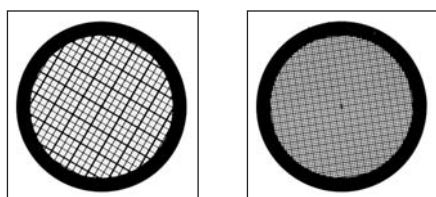
		Open Area %	Bar Width μm		
Square Mesh Grids Copper	300mesh	57	30	7553C-1	100 grids
Square Mesh Grids Nickel	300mesh	57	20	7553N-1	100 grids
Square Mesh Grids Nickel	400mesh	46	20	7554N-1	100 grids
Square Mesh Grids Gold	400mesh	46	20	7554G-1	100 grids

Grids - Square Mesh - Thin Bar, High Definition



		Open Area %	Bar Width μm	Catalog #	Size
Square Mesh Grids Copper	200mesh	81	12	7800C-1	100 grids
Square Mesh Grids Nickel	200mesh	81	12	7800N-1	100 grids
Square Mesh Grids Gold	200mesh	81	12	7800G-1	100 grids
Square Mesh Grids Copper	300mesh	77	10	7802C-1	100 grids
Square Mesh Grids Copper	1000mesh	58	6	7556C-1	20 grids
Square Mesh Grids Nickel	1000mesh	58	6	7556N-1	20 grids

Grids - Square Mesh - ThickThin Pattern



Square Mesh Grids Copper	200mesh			7779C-1	100 grids
Square Mesh Grids Copper	600mesh			7780C-1	100 grids
Square Mesh Grids Nickel	600mesh			7780N-1	100 grids

Gum mastic [61789-92-2] A2g mp 80-83°

Used in staining technique for Steiner or Dieterle's spirochete stain.

Histotechnology A Self Instructional Text, 2nd ed., ASCP Press, Chicago, 1997 p. 200-202.

Hanker-Yates reagent HVWX7d

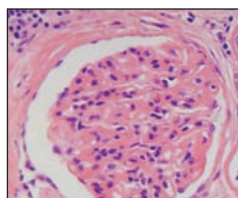
A specific, sensitive and non-carcinogenic chromogen for immunoperoxidase and In-situ Hybridization (ISH) techniques. Contains p-phenylenediamine and pyrocatechol. Gives a blue reaction product. Technical Data Sheet #204

Histochem. J., 9, 789 (1977); Am. J. Clin. Path., 75, 367 (1981)

Harris Hematoxylin, Acidified (mercury free) H2g

Polysciences, Inc. Gold Standard Series Hematoxylin and Eosin products offer you the highest quality for routine staining. Strict quality control for all Gold Standard Series Routine Stains ensures lot-to-lot consistency. Stains are packaged in convenient plastic recyclable containers. General purpose nuclear stain, regressive type. Used with hematoxylin and eosin staining. Use Gold Standard Harris Hematoxylin for routine histology and cytology. Similar results can be achieved to those of Gill's Hematoxylin #1, #2 and #3 formulations by varying staining times.

Technical Data Sheet #70013



Human Kidney, 20X
Harris Hematoxylin, Eosin Y

19329-100	100g
08661-5	5x1g amp
24245-500	500ml
24245-1000	1000ml

Hartmann's Fixative (modified Davidson's fixative) BCHM7g



An overnight fixative for the visualization of lymph nodes in radical dissection specimens. Helpful with both breast and colon specimens by turning lymph nodes white.

Hematein, C.I. 75290 (Hydroxybrasilein) [475-25-2] **U4g**

MW 300.26 mp above 200° C

An indicator like hematoxylin; used for staining animal tissue, particularly cell nuclei.

Merck Index 11, 4553.

NEW! Hematology Stain Kit, Neat Stain



Three-step procedure for differentiation of morphological cell types in peripheral blood smears. Useful in andrology labs staining microorganisms and spermatozoa. Characteristics are similar to the traditional Wright's and Wright-Giemsa stains. Offers the flexibility of a three dip staining sequence in both the stain and counter-stain solution. Specifically designed for stat procedures and/or laboratories using manual staining methods. Purchase the Neat

Stain Slide Holder separately, (Cat. #25033, page 99) **Kit Contains:** 6 Reagent Packs, Plastic Stand, 6 Reclosure Foils. Performs 150 tests. Technical Data Sheet #804

Hematoxylin, C.I. 75290, certified [517-28-2] **A2g**

(Natural black 1) MW 302.3 λ max: 292nm

Nuclear protein, glycogen and general tissue stain for histology with Eosin Y for standard H&E protocol. Also as a general tissue stain for human, animal and VIR histology.

Stain Technol., 14, 47 (1930); 62, 181 (1987)

Heparin benzalkonium chloride complex, 1.5% in isopropanol **CH6g**

(700-900 USP Heparin units/ml) An effective antithrombogenic coating when applied to a variety of materials used to make catheters and tubing. For most materials a simple immersion of the device to be coated, air drying, and sterilization are sufficient to provide an antithrombogenic surface that will resist clot formation.

Heparin, fluorescent **U2d**

Exc max: 491nm Emiss max: 516nm

Fluorescent Heparin- A Sodium Heparin from Porcine Intestinal Mucosa with a molecular weight that ranges from 3,000 to 30,000 daltons. The strength, quality and purity meet pharmaceutical specifications. Porcine raw materials test negative for Prion agents due to an approved method of purification that removes TSE and viral agents. The activity of Sodium heparin averages 179-181u/mg. This Sodium heparin is bound to Fluorescein Isothiocyanate. Used in studies on metabolic fate of exogenously administered heparin.

Heparin, sodium salt [9041-08-1] **U4d**



(Sodium heparin, from porcine intestinal mucosa) Minimum activity: 140-150 USP units/mg Anticoagulant. Heparin binds and activates the plasma protein antithrombin III which inhibits several enzymes in the blood coagulation cascade. Please note packaging size: 100M is equal to 100,000 USP Units.

Fed. Proc., 36, 10 (1977); Brit. J. Haematol., 41, 573 (1979)

Catalog # Size

24355-500 500ml
24355-1 1gal

01005-25 25g

25034-1 1 kit
25033-1 1 holder

02749-25 25g
02749-100 100g

18332-50 50ml

16092-10 10mg
16092-100 100mg

01491-100 100M
USP units

01491-5 5x100M
USP units

Hexamethyldisilazane (HMDS) [999-97-3] *BCH6g*
 MW 161.4 bp 125° n_D²⁰ 1.407 d 0.765 Formula: C₆H₁₉NSi₂
 Used in place of critical point drying for preparation of soft tissues for SEM observation.
 Procedure takes 5 minutes as compared to 90 minutes for critical point drying.
 Technical Data Sheet #342

Stain Technology, 58 (6), 347 (1983); *Biotechnic and Histochemistry*, 69 (4), 192 (1994)

Hiraoka Staining Unit



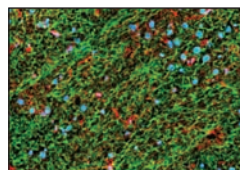
The Hiraoka unit allows simultaneous staining of up to 40 grids while minimizing contamination and damage to the section. The kit consists of 5 flexible plastic plates each with 40 precision incisions for gripping a grid on its edge, a plate holder and staining dish. When the loading plate is removed from the plate holder it reverts to a flat position firmly gripping the grids at their edges. Technical Data Sheet #169

Kit Contains: 5 plates, 1 plate holder, 1 staining dish.

Spare Staining Dish

Spare Supporting Plate

(Hoechst 33258), Bisbenzimidazole ~99% [23491-45-4] *H4abd*
 (2'-[4-Hydroxyphenyl]-5-[4-methyl-1-piperazinyl]-2,5'-bi-1H-benzimidazole trihydrochloride pentahydrate); Hoechst 33258)
 MW 623.97 Exc max: 358nm Emiss max: 540nm
 Formula: C₂₇H₃₇Cl₃N₆O₄
 Fluorescent chromosome stain. Binds to Adenine-Thymine base pairs. *Science*, 220, 620 (1983), *Anal. Biochem.*, 179, 401 (1989)

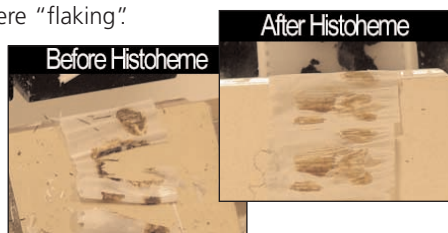


Rat Brain Sagittal, 8 micrometer section, stained with Hoechst 33342, Alexa Fluor 568-6FAP (Rb) and Alexa Fluor 488-NF-P (Ms). Photo: Mike Davidson of Florida State University

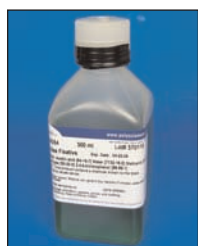
HistoHEME A2g



Ammonia based emollient for use with difficult to cut specimens such as placenta, bone marrow biopsies, liver or spleen. HistoHEME permits full, clean sections and allows for better morphological staining without "chatter" or severe "flaking"



Hollandes Fixative HM7gp



Excellent for large and small gastric tissue or any tissues that contain large amounts of inflammatory and mucinous cells. This solution is one of the best fixatives for certain kinds of protozoa. Hollandes' solution is a preferred fixative for flagellates and ciliates which are demonstrated with silver stains. It is also a good fixative for routine surgical specimens. GI, Prostate

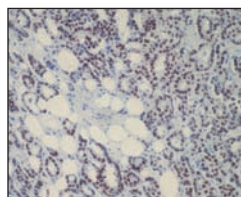
After fixation, transfer the specimens to 70% alcohol and leave them in this until the picric acid and cupric acetate have been thoroughly washed out (approximately 2 hours).

Catalog #	Size
00692-250	250g
04635-1	1 kit
07344-1	1 dish
07346-1	1 plate
09460-100	100mg
24774-250	250ml
24354-500	500ml
24354-1	1gal

HOPE® Fixation System

Reveal Fascinating Morphology using the HOPE®-Fixation Technique

Achieve multiple applications including immunohistochemistry without antigen unmasking on paraffin embedded tissue. HOPE® = HEPES-glutamic acid buffer mediated Organic solvent Protection Effect. HOPE® is a combination of amino acids and glucose blended together with an organic buffer. Dehydration by acetone as the single dehydrating agent and pure paraffin denature proteins and preserve nucleic acids and antigenic-structures allowing clearly visible molecular level results. HOPE® is a two part system, both are required for application.



Detection of estrogen receptor in human breast carcinoma tissue via IHC without any antigen retrieval. Photo Courtesy of DCS - Innovative Diagnostik-Systeme.

HOPE® Fixation System I

24823-500 500ml
24823-2500 2500ml

HOPE® Fixation System II

24824-1 1ml

NEW! HOPE® Fixative Starter Kit



Kit Contains: 10 transportation vials of 5 ml HOPE® I with protection vials, 1 x 1 ml HOPE® II, 200 grams of low mp paraffin

24884-1 1 kit

HOPE® is a registered trade mark of DCS, Innovative Diagnostik Systeme, Germany. HOPE® is manufactured by DCS, Germany.

Hydroethidine™ [104821-25-2] *HU5cd*

MW 315.5 Exc max: 365nm Emiss max: 420nm mp 202-206° TLC: single spot



Reduced ethidium bromide. A vital stain. Enters and stains living cells without cellular trauma. Double staining system. Stains cytoplasm blue and chromatin red. Excellent cellular retention. Remains incorporated in chromatin with virtually no leakage. Essentially non-toxic. Shows no toxicity at levels useful for visualizing chromatin. Technical Data Sheet #351

Biotechnology, 3, 4 (1985)

17084-50 50mg

NEW! Hydroxynaphthol Blue, ACS [63451-35-4]

(1-(2-Hydroxy-4-sulfo-1-naphthylazo)-2-naphthol-3,6-disulfonic acid trisodium salt)

MW 620.47 Formula: $C_{28}H_{31}N_2Na_3O_{11}S_3$

Hydroxynaphthol Blue is suitable for calcium determinations.

25000-25 25g

Identification Tabs

These specimen identification tabs can be placed in any paraffin or plastic embedding mold, but they were specially designed for our Peel-A-Way® mold system. Each book contains 8000 tabs.

19800A-1 1 book

Ilford photographic chemical products

Polysciences, Inc. is a select dealer of Ilford, Ltd. photographic emulsions used in electron and light microscopy scientific research. The superiority of these British products has long been acknowledged. Regular deliveries from England assures fresh stock of all products.

Ilford nuclear research emulsions for autoradiography

Ilford nuclear research emulsions are well known for their uniform particle size, low background, long time stability, and their consistent grain size. The useful life of the emulsion is determined by the ambient exposure it receives through cosmic radiation, local radioactivity, and the amount of background that can be tolerated. Technical Data Sheet #15

Product Name

K5* Mean Crystal Diameter 0.20µm H2ad

K5D, prediluted, easy to use* Mean Crystal Diameter 0.20µm H2ad

L4* Mean Crystal Diameter 0.13µm H2ad

K2* Mean Crystal Diameter 0.20µm H2ad

Ilford Nuclear Emulsion Plates H2ad

Ilford Nuclear Emulsion Plates find wide application in medical and biological research using radioactive tracers, in mineralogical research, in subatomic nuclear physics and in specialized astronomical studies. Package contains 10 plates.

L4 Emulsion, 25µm, 1" x 3"

L4 Emulsion, 50µm, 1" x 3"

L4 Emulsion, 25µm, 3" x 3"

Ilford Rapid Fixer H4g

A fast acting, non-hardening ammonium thiosulfate fixer that assures complete fixing of all Ilford papers in as little as 30 seconds and can be used to fix film. It is ideal for fiber base and resin coated papers. It can be used for archival processing and is recommended for Ilford emulsions. The fixer can be used in a 1 to 3 dilution.

Ilford Universal Stop Bath BH6g

This economical, highly active solution is designed to immediately terminate the action of both black and white films and paper. It prevents fog or stains while maintaining the conditions of the fixer. Recommended for use with Ilford emulsions and films and both resin coated and fiber based papers. The economical liquid is concentrated and normally used in a 1 to 9 dilution.

Immersion Oils by Cargill

Polysciences' PCB-free immersion oils are available for your specific application.

Light microscopy

Type A viscosity 150 centistokes (for short focus objectives) A2g

Type B viscosity 1250 centistokes (for greater gap dimension) A2g

Type VH viscosity 21000 centistokes (for horizontal, inverted, or inclined instruments) A3g

Fluorescent microscopy

Type DF has highest resolution, slight green range background fluorescence A3g

Type FF has virtually no background fluorescence A3g

*Cold pack charge required.

Catalog # Size



An x-ray topograph of a man made high-temperature/high-pressure diamond single crystal. Image courtesy of The Electrochemical Society, Inc.

02746-50 50cc
02746-100 100cc

17537-100 100cc

02747-50 50cc

02757-50 50cc

02757-100 100cc

7717PC-12 1pkg

7717PB-12 1pkg

7717PA-12 1pkg

21953-500 500ml

21956-473 473ml

08582-120 120cc

08583-120 120cc

23991-120 120cc

23992-1 1oz

23992-4 4oz

23993-1 1oz

23993-4 4oz

Immuno-Bed Kit (for histology) *FHGO6g*



Immuno-Bed has been designed for use with immunohistochemistry (IHC) studies. The system allows adequate penetration of small molecular weight antibodies and chromagens, such as aminoethylcarbazole (AEC). Large molecular weight molecules may not stain well, even after etching the plastic from the section. Sections should be completed and stained as soon as possible after polymerization is complete, within 2 to 3 days. Immuno-Bed is a glycol methacrylate based embedding kit with performance similar to JB-4® and JB-4 Plus® in tissue infiltrations, embedding and cutting procedures. The embedded blocks are clear for

excellent tissue visibility. Polymerization at 0-4°C is recommended to reduce the heat generated by the exothermic reaction. Technical Data Sheet #302

Kit Contains: 800ml Solution A, 30ml Solution B, and 12g Benzoyl Peroxide Plasticized.

Additional Kit Components:

Immuno-Bed Solution A	<i>HO4g</i>
Immuno-Bed Solution B	<i>A2g</i>
Immuno-Bed Benzoyl Peroxide Plasticized (Catalyst)	<i>FHG5g</i>

ImmunoGold labeling reagents for transmission electron microscopy (TEM) and scanning electron microscopy (SEM) *A2dmw*



PolyGold reagents are of the highest quality and can be relied upon to give reproducible results. For TEM studies, the most convenient sizes of gold particles are 5nm, 10nm and 15nm. The long shelf life (12 months when stored at 4°C) makes the use of these reagents economical.

Resolution of most SEMs is such that immunolabeling studies require either the use of larger sized gold particles or enhancement of smaller gold particles using silver enhancement (deposition) technology. Accordingly, the gold colloids listed below include 20nm, 30nm and 40nm particles for direct visualization in the SEM.

PolyGold reagents have:

- High specificity
- Low clustering – agglomeration of gold particles is minimal, with over 85% of particles being singlets
- Discrete particle sizing – narrow particle size distribution allows double labeling to be achieved
- High concentration – permits high degree of dilution

Unconjugated gold colloid (GC), 5nm	<i>A2dmw</i>
Unconjugated gold colloid (GC), 10nm	<i>A2dmw</i>
Unconjugated gold colloid (GC), 15nm	<i>A2dmw</i>
Unconjugated gold colloid (GC), 20nm	<i>A2dmw</i>
Unconjugated gold colloid (GC), 40nm	<i>A2dmw</i>
Unconjugated gold colloid (GC), 60nm	<i>A2dmw</i>

Colloidal Gold Solution, 0.005%, 15-25nm	
Contains .01% Gold Chloride per ml	

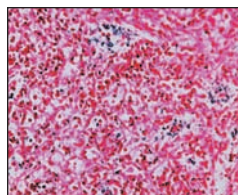
Catalog #	Size
17324-1	1 kit
17325A-800	800ml
17325B-30	30ml
17325C-12	12g
22716-100	100ml
22717-100	100ml
22718-100	100ml
22719-100	100ml
22720-100	100ml
22703-100	100ml
09285-50	50ml

Indocyanine green (Cardiogreen; Fox green) [3599-32-4] *HK3g*
 MW 774.99
 λ max 775nm
 Dye for hemodynamic studies.
Invest. Ophthalmol., 13, 77 (1974)



Iodonitrotetrazolium chloride (Iodonitrotetrazolium violet; INT) [146-68-9] *U6d*
 MW 505.71 mp 240-245° (dec.) λ max: 249nm
 Used for assay of dehydrogenases. Also used for staining hemopoietic colonies.
Anal. Biochem., 1, 317 (1960); 16, 427 (1966); *Methods Enzymol.*, 9, 683 (1966); 22, 130 (1971);
Clin. Chem., 19, 766 (1973); *Exp. Hemat.*, 5, 551 (1977); *Toxic Assess.*, 3, 41 (1988)

Iron Stain Kit, Prussian Blue *H4g*
 Prussian Blue or Perls' reaction is used to demonstrate ferric iron and ferritin. This is not a true staining technique, it is a histochemical reaction. The protein is split off by the hydrochloric acid, allowing the potassium ferrocyanide to combine with the ferric iron. This forms the ferric ferrocyanide or Prussian Blue color for which the stain is named.



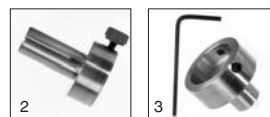
Human Liver stained with Prussian Blue Iron Stain Kit

JB-4® Embedding, Chucks for JB-4 and other Microtomes

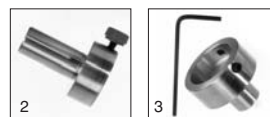
Resuable chucks which are designed to be used with Polysciences' Plastic Block Holders (Cat.# 15899) and molding trays. They are available for a range of microtomes.



1. JB-4® Aluminum Chucks
 11mm x 11mm shaft for Hacker, A/O Reichert rotary and Autocut, JB-4 & JB-4A, LKB microtomes, Shandon Hypercut & Finesse



2. LKB Huxley Chuck



3. JBA Chuck, 11 x 11mm shaft
 For Reichert Super-cut in addition to microtomes listed under Cat.# 15901. Three point recessed block holder attachment.

JB-4® Embedding Kit (for light microscopy) *HGO6g*
 Polysciences' JB-4® is the leading water-soluble, glycol methacrylate based, plastic resin kit for use in the preparation of embedded samples for high resolution light microscopy. JB-4® yields semi-thin sections (0.5μ-2μ) with excellent morphological preservation. Clear to amber casts are obtained in 90 minutes or less at room temperature. Polymerization at 0-4°C is recommended to reduce the heat generated by the exothermic reaction. It has been successfully used in enzyme histochemistry, limited immunohistochemistry and autoradiography. Glycol methacrylate based plastic cannot be removed from sections.
 Technical Data Sheet #123

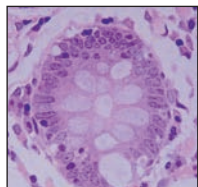


Kit Contains: 800ml Embedding Solution A, 30ml Embedding Solution B and 12g Benzoyl Peroxide Plasticized.

Am. J. Clin. Path., 73, 121 (1980); 76, 5 (1981); *Stain Technol.*, 54, 5 (1979); *J. Histochem., Cytochem.*, 31, 417 (1983); *J. Histotech.*, 4, 59 (1981)

Catalog #	Size
08263-50	50mg
00630-1	1g
24199-1	1 kit
15901-1	1 unit
16207-1	1 unit
16828-1	1 unit
00226-1	1 kit

Additional JB-4® Embedding Kit Components:



Colon tissue embedded in JB-4®, stained with H&E, 40X, 2µm

JB-4® Embedding Solution A HO5g	0226A-800	800ml
JB-4® Embedding Solution B HO5g	0226B-30	30ml
JB-4® Benzoyl Peroxide Plasticized (Catalyst) HG5g	02618-12	12g

JB-4® Embedding, Plastic Block Holders



Easy to store plastic block holders for resins attach to Polysciences' reusable chucks designed for commonly used microtomes. Block holders also mount in vise style V block holders used on many microtomes. The holders have a matte surface for easy marking and a large center hole to prevent bubble formation. Block Holders fit securely onto molding cup tray cavities. Not for use with MMA. Available in bags of 50.

JB-4® Mini Embedding Kit HGO6g



A premeasured and ready to use version of the JB-4 Kit. Allows the novice to experiment and test the ease of JB-4 without a huge expense. Technical Data Sheet #494

Kit Contains: 2 x 40ml embedding solution A, 2ml embedding solution B and 0.50g Benzoyl Peroxide Plasticized in small bottles.

JB-4 Plus® Embedding Kit (for light microscopy) EFHV7g



JB-4 Plus offers all the benefits of JB-4, plus some added features: cooler acting accelerator system for greater protection of tissue components; yields crystal clear non-yellowing blocks; the blocks resulting from JB-4 Plus are ideal for processing dense material such as bone. GMA based plastic cannot be removed from sections and is not recommended for IHC. Technical Data Sheet #393

Kit Contains: 500ml Monomer Solution A, 15ml Accelerator Solution B and 8g Benzoyl Peroxide Plasticized.

Additional JB-4 Plus® Components:

JB-4 Plus® Monomer Solution A HO4g	18570A-500	500ml
JB-4 Plus® Accelerator Solution B A2g	18570B-15	15ml
JB-4 Plus® Benzoyl Peroxide Plasticized (Catalyst) HG5g	18570C-8	8g

JB-4® Embedding, Polyethylene Molding Trays for Resins

Light-weight, durable plastic trays which are ideal for resin molding specimen blocks with JB-4 and other resins. Used in conjunction with Polysciences' popular and inexpensive Plastic Block Holders (page 58) and Chucks (page 57). The trays are re-useable.



6 x 12 x 5mm	(20 cavities)	16643A-1	1 unit
12 x 16 x 5mm	(20 cavities)	16643B-1	1 unit
6 x 8 x 5mm hexagonal	(9 cavities)	17177A-3	pkg of 3
2 x 15 x 5mm	(9 cavities)	17177B-3	pkg of 3
13 x 19 x 5mm	(9 cavities)	17177C-3	pkg of 3

Karnovsky's Fixative BHOM6g

A Formaldehyde/Glutaraldehyde fixative commonly used in EM for excellent ultra structural preservation. Pre-measured in ampoules for 1-step preparation.

Kit Contains:

10ml 50% Glutaraldehyde, 2 x 10ml 16% Formaldehyde, 50ml 0.2M Phosphate Buffer.

NEW! Kimwipes®, Push-Up Box



Kimwipes dispenser. Made of durable, high-impact polystyrene. Dispenses tissues one at a time to help reduce waste from pulling out more than needed. *Kimwipes® not included.*

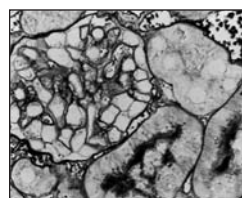
- Reduce waste in the lab or work area
- Accessible and portable - fits anywhere
- Unique design prevents tissues from falling back into box

London Resin Products (for histology and electron microscopy)

London Resin (L.R.) Products, L.R. White® and L.R. Gold®, are made in London, England and are available to you from fresh stock held at Polysciences' warehouses in Pennsylvania and Germany. L.R. resins are a blend of hydrophilic monomers which exhibit low viscosity for rapid and thorough penetration. Sections may be cut at 1-5µ or ultra thin for EM work. Stable for one year when stored at 4°C, these very low viscosity (8 cps) embedding media rapidly penetrate tissue due to their hydrophilic nature.

L.R. Gold® Embedding Media* EH4d

L.R. Gold® is a specialized material designed for cold processing of unfixed or lightly fixed tissue. The product enables the researcher to study fixation sensitive, temperature labile antigens and enzymes in resin sections using light and electron microscopy. London Resin recommends the use of Poly(N-vinylpyrrolidone) as a tissue protectant and either Benzil or Benzoin methyl ether as a catalyst depending on the method of polymerization selected by the researcher. Technical Data Sheet #641 *Journal of Pathology, 151, 231 (1987)*

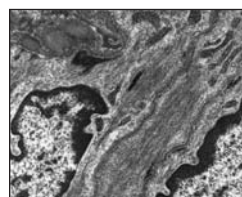


L.R. Gold® Embedded
Mouse Kidney.

L.R. White® Embedding Media* H2g

L.R. White® was the first low viscosity acrylic embedding medium made by London Resin Company. Used for routine light and electron microscopy, histochemistry and immunohistochemistry, L.R. White can be polymerized cold or thermally cured. An accelerator for room temperature curing of the resin is available for those applications where simple heat catalysts are inappropriate. Technical Data Sheet #305

A. Am. J. of Anatomy, 175, 267 (1986)



L.R. White® Embedded
Hamster Intestine.

Accelerator for L.R. White® HO6g

LabPro™ Nail & Cuticle Balm



Experience our professionally formulated 100% Natural Nail & Cuticle Balm, developed to soothe and restore your hardworking hands and nails. Our nail & cuticle balm will bring restorative relief from the harsh effects experienced in today's work environment. Relentless exposure to soaps, chemicals, water and paper take their toll on your hands. Restore moisture to your nails and cuticles with our 100% natural, nourishing, lightweight formula. Almond Fragrance, 100% Natural (8.5g)

*Cold pack charge required.

Catalog #	Size
22872-5	5 kits
25030-1	1 each
17412-500	500ml
17411-500	500g
17413-10	10ml
24401-1	1 pkg.

LabPro™ Lens Cleaning Towelettes



The "clear choice for plastic and glass lens cleaning." Professionally formulated with a unique anti-static solution that leaves lenses clean and clear. Eliminates the problem of impaired vision from dirt, fog and oily residue that does not come off with regular wiping. Easy to use dispensing box allows for quick and easy access. Towelettes are small enough to fit in your pocket to clean lenses anytime, anywhere. LabPro™ professional lens cleaning towelettes are safe, effective and ready when you need them. Each box contains 100 pre-moistened lens-cleaning towelettes packaged in a 2"X 2.25" foil packet.

LabPro™ Lip Balm



A concentrated blend of antioxidant vitamin E, shea butter and beeswax delivers silky smooth moisture to your lips. Apply a quick protective coating of our professionally formulated almond lip balm to nourish, protect and soothe your lips throughout the day. Experience the tingling, uplifting sensation from our specially blended lip balm. Contains no petroleum chemicals. Almond Flavor, 100% Natural (.15oz)

Lead Citrate Trihydrate [512-26-5] *HM5g*

MW 1053.8 Carbonate free material. The most popular lead stain for EM applications. Can be used with Uranyl Acetate (Cat. #21447)

J. Cell Biol., 17, 208 (1963); J. Cell Biol., 25, 407 (1965)

Lead (II) Nitrate, 99%* (ACS Reagent) [10099-74-8] *BHV7g*

MW 331.20 d 4.53 Used by Reynolds to make Lead Citrate, carbonate free.

Stains and Cytochemical Methods, Plenum Press, 223 (1993)

NEW! Leishman Stain [12627-53-1]

(Eosin-polychrome methylene blue)

Leishman stain is used for staining bone marrow and blood smears to identify leucocytes, malarial parasites and trypanosomas.

Lens Tissue, Ross

Each box contains 1000 sheets of non-linting, fiberless, non-abrasive lens tissue. This specially prepared lens tissue is for EM and LM applications, but will also work quite well for your own personal eye glasses.

Light Green SF Yellowish, C.I. 42095, Certified [5141-20-8] *A5g*

(Acid green 5; Lissamine green SF) MW 792.85 λ max: 630 (422)nm

Used as a dye and as a biological stain. Certified for use as a counterstain in cytology. An important contrast stain for plasma as a component of Papanicolaou (PAP) stains. Stains collagen fibers when substituted for aniline blue in Masson's trichrome modification of Mallory's method.

Merck Index, 11, 5361; Stain Technol., 6, 13 (1931); 14, 1 (1939); J. Technol. Methods, 25, 1 (1945), Churchill Livingstone, Theory and Practice of Histo. Tech., Bancroft & Stevens, p 466

*Poison pack charge required.

Catalog # Size

24400-1 1 pkg

24402-1 1 pkg

00378-100 100g

00785-100 100g

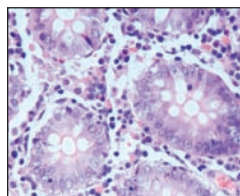
25001-25 25g

00791-1 1 box
00791-5 5 boxes

02753-25 25g

Lissamine® Rhodamine B Sulfonyl Chloride, ~99% Purity [62796-29-6] H3g
MW 577.1 λ max: 565nm
Fluorescent protein stain with bright orange fluorescence. Used to visualize actin filaments in living amoebas. Useful for waste water testing and various microbiological applications.
J. Cell. Biol. 86, 590 (1980)

Lithium Blue H4g
Lithium Blue is a gentle yet rapid formulation of bluing hematoxylin in only 5 minutes. Lithium Blue is buffered at an alkalinity of pH = 8.0 Our premixed and ready to use Lithium Blue provides crisp nuclear detail obtained with Gills, Mayers and Harris Hematoxylin stains. For use in both Cytology and Histology.



Human Colon, 20X
Harris Hematoxylin, Eosin Y

Lowicryl® Embedding Kits (for light microscopy & electron microscopy)
Manufactured by Polysciences, these kits were developed in cooperation with the University of Basel, Switzerland. MonoStep™ K4M and MonoStep HM20 offer a convenient single bottle of material for Polar -35°C and Non-polar -70°C applications. Photopolymerization is by long wavelength (360nm) UV. Polymerization can take place at -70°C or at room temperature with UV light. Lowicryl gives enhanced preservation of protein molecules and membrane structures. It is a methacrylate based, UV curing resin. All kits are useful for freeze-substituted samples. Resins should be used at maximum temperature of -20°C to minimize disruption of proteins. Lowicryl embeddings have been reported to have rougher surfaces than epoxy embeddings yielding more antigen at the section surface. Metal stains with Lowicryl are superior to uranyl and lead combinations. Technical Data Sheet #248

J. EM Techniques, 11, 1099 (1989); 18, 172 (1991); *J. Histochem.* 40, (1), 123 (1992)

Lowicryl® HM Kits

Lowicryl® HM Kits are non-polar and hydrophobic. They are used to produce high contrast images of completely unstained thin sections by Z-contrast. Also these HM kits are particularly suitable for dark field observation because of their relatively low density. Instructions included with each kit.



HM20 Non-polar, hydrophobic, -70°C embedding kit HIR7ag
Kit Contains: 3 x 225gm of monomer E, 1 x 130gm of crosslinker D and 1 x 4.8gm of initiator C.

HM23 Non-polar, hydrophobic, -80°C embedding kit CHIR7g
Kit Contains: 3 x 225gm of monomer G, 1 x 40gm of crosslinker F, 1 x 3.7gm of initiator C and 1 x 5.5gm of initiator J.

Lowicryl® K Kits

Lowicryl® K Kits are polar and therefore hydrophilic. During dehydration and infiltration specimens may be kept partially hydrated. Polymerization can occur with up to 5% water. Immunolabeling with polar kits results in better preservation of structure and antigenicity with lower background labeling. Technical Data Sheet #248



K4M Polar Kit, hydrophilic, -35°C embedding kit HIR7ag
Kit Contains: 3 x 250gm of monomer B, 1 x 130gm of crosslinker A and 1 x 4.8gm of initiator C.

K11M Polar Kit, hydrophilic, -60°C embedding kit HIR7ag
Kit Contains: 3 x 250gm of monomer I, 1 x 40gm of crosslinker H and 1 x 4.3gm of initiator C.

Catalog #	Size
08074-100	100mg
24820-1	1 Gal
15924-1	1 kit
18162-1	1 kit
15923-1	1 kit
18163-1	1 kit

Lowicryl® Kits continued

Lowicryl® Single Component Embedding Media

Pre-mixed, ready to use MonoStep Lowicryl Embedding Media saves time and minimizes chemical contact. These products are ideal for use in Immunohistochemistry. They are based on our popular Lowicryl K4M and HM20 formulations for **low temperature embedding or freeze substitution**. MonoStep products are especially appropriate for **immunolabeling, resulting in better preservation of antigenicity and lower background labeling**. Store at 4°C. Technical Data Sheet #248

MonoStep™ Lowicryl® K4M Polar Embedding Media BHO6d

23646-225 225g

MonoStep™ Lowicryl® HM20 Non-polar Embedding Media CHO6d

23994-225 225g

Luxol Fast Blue ARN (Solvent Blue 37) [12226-74-3] U2g

00805-25 25g

Used to stain myelin and phospholipids. *Salthouse, Stain Technology, 37, 313 (1962)*

Luxol Fast Blue, Ready-to-Use CH4ag

24611-500 500ml

Myelin stain in convenient, ready to use formulation. Our ready to use format eliminates the exposure to potentially irritating powdered dyes.

NEW! Malachite Green Oxalate, C.I. 42000, certified [2437-29-8]

25002-25 25g

(Green 4; N,N,N',N'-Tetramethyl-4,4'-diaminotriphenylcarbenium oxalate)

MW 463.50 $C_{23}H_{25}N_2 \cdot C_2HO_4 \cdot \frac{1}{2} C_2H_2O_4$ Certified Biological Stain

Malachite Green Oxalate is used as a counterstain for paraffin embedded botanical material and staining bacterial polysaccharides and spores. Also used as a contrast stain in the Ziehl-Neelsen procedure.

Penny, DP et al, Analysis and testing of biological stains - The Biological Stain Commission Procedures.

Biotech. Histochem. 77(5&6), 237-275, (2002)

NEW! May-Grunwald Stain Solution

24981-1 1 L

24981-4 4 L

May-Grunwald Stain Solution is a classic hematology stain that produces dense coloration in the staining of peripheral blood smears and bone marrows. **Results: Nuclei, Bacteria-Blue and Cytoplasm-Pink-Rose.**

Mayer's Hematoxylin H4g

24821-500 500ml

24821-1 1 L

General purpose nuclear stain, progressive type. Used with hematoxylin and eosin staining. For use in both cytology and histology. Used as a counterstain for immunohistochemistry procedures.

3-Methacryloxypropyltrimethoxysilane [2530-85-0] EH5g

02476-250 250g

MW 248.4 d 1.045 n_D^{20} 1.429 bp 80°/1mm

Silane modifier for glass surfaces. Polymerizable silica-reactive monomer. Provides adhesion to silaceous surfaces.

PolyPointer

Additional Electrophoresis Products

Agarose 11

Coomassie® Blue 28

Electrophoresis Buffers 22-23

Silver Stain Kit 99

NEW! Melanin Bleach Kit

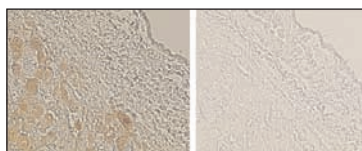
Remove melanin pigment in cells of malignant melanomas and reveal cellular detail!

Accumulation of heavy melanin pigment in the cells of malignant melanoma can obscure cellular morphology and hinder special staining, IHC or histochemical staining. Melanins are pale brown to dark brown and even black pigments that are found intracellular in the cytoplasm. Melanins are found in hair, skin, retina and the substantia nigra of the brain.

Removing melanin from tissue sections allows for positive staining to be interpreted correctly especially if DAB is used when performing immunohistochemistry. Our Melanin Bleaching Kit saves time, by removing melanin pigment prior to incubation with primary antibody.

Benefits:

- Reveal cellular morphology obscured by melanin pigment
- Save time, no mixing required
- Easy to visualize results
- Convenient kit format



Human skin sample before and after using Melanin Bleach Kit, magnified 40X.

Kit Contains: 250ml Pretreatment Solution A, 250ml Pretreatment Solution B

NEW! Delicate Melanin Bleach Kit for Special Stains and IHC

Delicate formula for removing melanin pigment in cells of malignant melanomas. Created specially for Special Stains and IHC.

0.25%, Metanil yellow, Ready-to-Use A2g

Counterstain for use with Mucicarmine and *Helicobacter pylori* stain. Our ready to use format eliminates the exposure to potentially irritating powdered dyes.

Methanol (Methyl alcohol), 99.5%, E.M. grade [67-56-1] CH6g

Used as dehydrating agent of tissue as preparation for embedding. Methanol can be used as a fixative for smears and cell preps.

N,N'-Methylenbisacrylamide, Chemzymes Ultra Pure® BIS [110-26-9] V4d

MW 154.17 >99% mp >300° Formula: $(CH_2CHCONH)_2CH_2$

Purified to exceptional levels using the same special procedures we use for our Ultra Pure®

Acrylamide. Conductivity, 2% w/v, 20-25°C <5.0 µS/cm = mmho

Methyl green, C.I. 42590, certified [7114-03-6] U5g

MW 472.5 λ max: 629 (423)nm mp 233° (dec.)

Used with Pyronin Y to stain nuclei and nucleoli differentially. Can be used for enzyme precipitates and as an alternative to Hematoxylin.

Stain Technol, 26, 205 (1951); Mori & Lennert, *Electron Microscopic Atlas of Lymph Node Cytology*, Springer, 1969

Methyl Methacrylate Embedding and Casting Kit CHOV7g



Resin cures thermally (preferably under pressure) under anaerobic conditions and is capable of producing the highest quality hard, clear, colorless castings. Technical Data Sheet #517

Kit Contains: 3kg methyl methacrylate, 1kg poly(methyl methacrylate) powder, 30g catalyst and 250g activated alumina for inhibitor removal.

Catalog #	Size
24883-1	1 kit
24909-1	1 kit
24610-250	250ml
08032-6	6x1pt
00719-25	25g
00719-100	100g
02760-25	25g
23679-1	1 kit

Methyl Methacrylate-Butyl Methacrylate Embedding Kit (for electron microscopy) *HU7g* . . .



Can be used to embed tissue for thin or thick sectioning. By varying butyl methacrylate amounts in the embedding mix, block hardness can be adjusted. Polymerization can be UV activated.
Technical Data Sheet #408

Kit Contains: 2 x 500gm of methyl methacrylate, 500gm of butyl methacrylate, 12gm benzoyl peroxide plasticized, 10gm benzoin methyl ether, Instructions included.

Methyl purple indicator, aqueous solution [1340-02-9] *A2g*
pH 4.8 (purple) to pH 5.4 (green). For water analysis with ASTM Std. D1067.

Methyl salicylate (Methyl 2-hydroxybenzoate; Wintergreen oil) [119-36-8] *HO5g*
MW 152.15 bp 220-222° n_D^{20} 1.536 d 1.174
Safe tissue clearing agent. Can be used as a Xylene substitute.
J. Histotech., 9, 27 (1986)

Methylene blue chloride, C.I. 52015, certified [61-73-4] *H5g*
MW 373.9 λ max: 685nm
Sensitive stain for RNA, very good nuclear stain, used in many *in vitro* diagnostic applications.
Clark, G., Staining Procedures, 4th ed., Williams and Wilkins: Baltimore, 1981

Michel's Fixative *A2g*



Holding medium for tissue undergoing immunofluorescent studies. Not to be used for tissues used in Fluorescent In situ Hybridization (FISH).

Microbiology

Rapid Bacterial Test Strips

Bacti Strips*

Bacti Strips provide a convenient method for the detection of urinary tract infections. Sterile strips of filter paper (60mm x 5mm) with score 15mm from one end.



Features:

- Cost effective, simple test for quantification of bacteria in urine
- Small contact area allows many specimens to be tested on one petri dish

*CE-marked and conforms to: European In Vitro Devices Directive, In Vitro Diagnostic Medical Devices Directive (98/79/EC), 1998, Official Journal of European Communities, L331/1

Catalog #	Size
03573-1	1 kit
15040-1	1L
05943-1	1kg
05943-4	4kg
04220-50	50g
24353-500	500ml
24353-1	1gal
24642-1	1 pkg (1000) strips

Beta Strips*

Rapid diagnostic test for penicillin resistant bacteria. Paper strip impregnated with benzylpenicillin and indicator, ready for immediate use. Changes color on contact with material containing β -lactamase. 12 month shelf life.



Features:

- Rapid test - result within 5 minutes
- Paper strip ready for immediate use
- Very clear reaction

E. Coli Strips*

Rapid diagnostic test for tryptophan hydrolysis by *E. coli*. Paper strip impregnated with p-dimethylamino-cinnamaldehyde (DMACA), ready for immediate use. 12 month shelf life.



Features:

- Rapid identification of *E. coli* - result within one minute
- Can be performed directly on primary isolates from urine on blood agar
- Very clear reaction

Gram Negative Strips*

Rapid diagnostic test for aminopeptidase enzyme present in the cell membrane of Gram negative bacteria. Paper strip impregnated with L-alanine-4-nitroanilide, ready for immediate use.



Features:

- Rapid test - result within one minute
- Safer than Gram stain – no handling of hazardous reagents
- Cleaner than Gram stain – no mess
- Very clear reaction

MRSA Strips*

MRSA Strips are a traditional strip based sensitivity test for simple identification of Methicillin Resistant Staphylococcus Aureus (MRSA) bacteria.

Features:

- Convenient single strip instead of discs
- Easy to set up and read
- Up to 6 test organisms per plate

Oxidase Strips*



Rapid diagnostic test for cytochrome oxidase enzyme present in Pseudomonas, Neisseria and Campylobacter, as well as other bacteria. Paper strip impregnated with tetramethyl-p-phenylenediamine dihydrochloride. 12 month shelf life.

Features:

- Rapid test - result within seconds
- Paper strip ready for immediate use
- Very clear reaction

Catalog #	Size
24641-1	1 pkg (25 strips)
24638-1	1 pkg (25 strips)
24640-1	1 pkg (25 strips)
24643-1	1 pkg (50 strips)
24637-1	1 pkg (25 strips)

*CE-marked and conforms to: European In Vitro Devices Directive, In Vitro Diagnostic Medical Devices Directive (98/79/EC), 1998, Official Journal of European Communities, L331/1

Strep D Strips*



Rapid diagnostic test for Group D streptococci based on aesculin hydrolysis. Paper strip impregnated with aesculin and indicator, ready for immediate use. 12 month shelf life.

Features:

- Rapid test - result within 4 hours
- Very clear reaction

Urease Strips*



Rapid diagnostic test for urease enzyme in *Helicobacter* or *Proteus*. Paper strip impregnated with urea and indicator, ready for immediate use. 12 month shelf life.

Features:

- Rapid test - result within 4 hours
- Very clear reaction

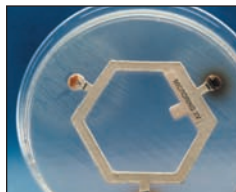
Microring® Bacterial Detectors

Microring® XV (for detection of *Haemophilus* species)*

For identification of *Haemophilus* species. Paper ring with individual printed tips containing X (Haemin), V (NAD), or X+V Factors. *Haemophilus* species vary in their requirement for X and V factors and can be identified by their growth patterns close to the tips. V-tip also contains δ -aminolaevulinic acid (ALA) for Porphyrin Test. 50 rings per package. 2 year shelf life.

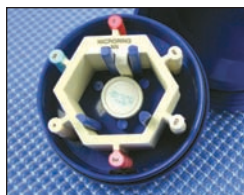
Features:

- Ready to use
- More convenient than individual discs
- Porphyrin test allows early identification



Microring® AN (for detection of non-sporing anaerobes)*

For identification of Non-Sporing Anaerobes. Paper ring with 6 individual printed tips containing various antimicrobial reagents. The resistance or sensitivity patterns can be used to help identify non-sporing anaerobic bacteria. 50 rings per package. 12 month shelf life.



Features:

- Ready to use
- More convenient than individual discs

Catalog # Size

24636-1 1 pkg
(25 strips)

24639-1 1 pkg
(25 strips)

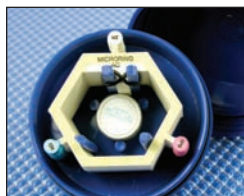
24644-1 1 pkg

24645-1 1 pkg

*CE-marked and conforms to: European In Vitro Devices Directive, In Vitro Diagnostic Medical Devices Directive (98/79/EC), 1998, Official Journal of European Communities, L331/1

Microring® AC (for detection of anaerobic cocci)*

For identification of Anaerobic Cocci. Paper ring with 3 individual printed tips containing various antimicrobial reagents. The resistance or sensitivity patterns can be used to help identify anaerobic cocci. 50 rings per package. 12 month shelf life.

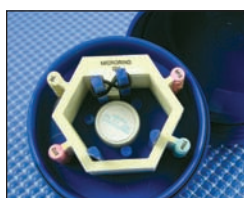


Features:

- Ready to use
- More convenient than individual discs

Microring® GV (for detection of Gardnerella vaginalis)*

For identification of Gardnerella vaginalis. Paper ring with 4 individual printed tips containing various antimicrobial reagents. On blood agar Gardnerella is identified by sensitivity to 3 designated tips and resistance to 1 tip. 50 rings per package. 12 month shelf life.



Features:

- Ready to use
- More convenient than individual discs

Microbiology Dyes, Stains and Stain Kits

AFB Auramine-Rhodamine Kit

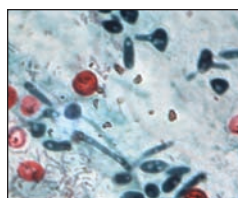
The identification of Mycobacteria with rhodamine-auramine is due to the affinity of the mycolic acid in the cell walls for the fluorochromes. These dyes will bind to the Mycobacteria, which appear bright yellow or orange against a greenish background. The potassium permanganate helps prevent non-specific fluorescence. Slides stained with rhodamine-auramine may be restained with Ziehl-Neelsen or Kinyoun stain directly, as long as the oil has been removed.

Kit Contains: 8 oz. each of; Auramine-Rhodamine, Fluorescent Decolorizer, Potassium-Permanganate

AFB Kinyoun Kit

Although no definitive evidence has been presented, the high lipid content (especially the mycolic acid component) of mycobacteria is thought to be related to the mechanism of acid fastness. It has long been known that even light mechanical injury to the cell wall will cause them to lose the acid fast characteristic, suggesting that permeation through cell membranes might be an important part of the mechanism. Carbol fuchsin is used to stain the slide. Acid alcohol is used to decolorize the slide. The acid fast organisms will appear red while non-acid fast organisms will stain blue or green.

Kit Contains: 8 oz. each of; Carbol Fuchsin (Kinyoun), Acid Alcohol, Methylene Blue



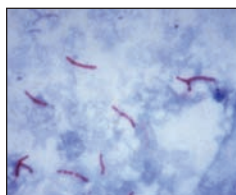
Direct fecal smear is stained to detect *Cryptosporidium* sp., an intracellular protozoan parasite using a modified cold Kinyoun acid-fast staining technique. Image courtesy of CDC Public Health Library

Catalog #	Size
24654-1	1 pkg
24655-1	1 pkg
24666-1	1 kit
24670-1	1 kit

*CE-marked and conforms to: European In Vitro Devices Directive, In Vitro Diagnostic Medical Devices Directive (98/79/EC), 1998, Official Journal of European Communities, L331/1

AFB Ziehl Neelson Kit

Although no definitive evidence has been presented, the high lipid content (especially the mycolic acid component) of mycobacteria is thought to be related to the mechanism of acid fastness. It has long been known that even light mechanical injury to the cell wall will cause them to lose the acid fast characteristic, suggesting that permeation through cell membranes might be an important part of the mechanism. Carbol fuchsin is used to stain the slide. Acid alcohol is used to decolorize the slide. It has been suggested that the dye replacement power of the counter stain could be used to decolorize and counter stain at the same time. It has been shown that acid alcohol increases the differentiation obtained and gives superior results. After decolorization, the slide may be counter stained with methylene blue or brilliant green. The acid fast organisms will appear red while non acid fast organisms will stain blue or green.



Mycobacterium tuberculosis bacteria revealed using acid-fast Ziehl-Neelson stain; Magnified 1000X. Image courtesy of CDC Public Health Library/Dr. George P. Kubica.

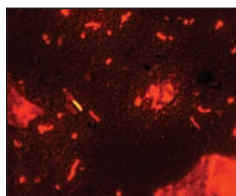
Kit Contains: 8 oz. each of; Carbol Fuchsin (Ziehl Neelson), Acid Alcohol, Methylene Blue

Auramine O Stain Kit

Acid-fast mycobacteria resist decolorization by acid-alcohol after primary staining owing to the high lipid (mycolic acid) content in their cell walls. The identification of mycobacteria with Auramine O is due to the affinity of the mycolic acid in the cell walls for the fluorochromes.

The dye will bind to the mycobacteria, which appear as bright yellow luminous rods against a dark background. The potassium permanganate helps prevent non-specific fluorescence. All acid-fast organisms will be stained by Auramine O, including some parasites.

Slides stained with Auramine O may be restained with Ziehl-Neelsen or Kinyoun stain directly, as long as the oil has been removed. This provides a convenient method of confirming and differentiating morphology of positive slides with the traditional stains. The fluorochromes stains are recommended for specimen examination because of their increased sensitivity and speed.



M. tuberculosis in sputum smear, stained using fluorescent auramine with acridine orange counterstain; Mag.-950x. Image courtesy of CDC Public Health Library.

Fungi-White

Suitable to use in identification of fluorescent fungal elements and trichomonas detection. Rapid chemo-fluorescent method useful for the detection of Microsporidia and *Acanthamoeba* spp. The Fungi-White dye fluoresces when exposed to ultraviolet light (below 400nm wavelength). The procedure is useful on fecal smears, cell cultures, or other sample materials. To use this method on plastic sections requires modifications to the standard protocol.

Kit Contains: 6 x 5ml potassium hydroxide and 6 x 5ml Fungi-White solution.

Gram's Decolorizer

Used in Gram Staining protocols. The Gram stain is used to classify bacteria on the basis of their forms, sizes, cellular morphologies and Gram reactions.

(75/25)

(50/50)

Catalog # Size

24669-1 1 kit

24665-1 1 kit

24692-1 1 kit

24682-1 1Gal

24683-1 1Gal

Gram's Iodine

Used in Gram Staining protocols. The Gram stain is used to classify bacteria on the basis of their forms, sizes, cellular morphologies and Gram reactions.

Gram's Iodine - Stabilized

Gram's Iodine-Stabilized is a component of the Gram Stain. The Gram stain is used to classify bacteria on the basis of their forms, sizes, cellular morphologies and Gram reactions.

Gram's Stain Kit with Iodine

The gram stain permits the separation of all bacterial species into two large groups, those which retain the primary dye (gram-positive, purple), and those which lose the primary dye and take the color of the secondary dye (gram-negative, pink). The mechanism of gram stain is based on the distinctive chemistry and physical properties of the cell wall, possibly the lipid content. However, the exact mechanism of gram stain is still unknown.

Technical Data Sheet #749

Kit Contains: One 8 oz. each of the following: Crystal Violet,
Gram's Iodine, Decolorizer, Safranin

Gram's Stain Kit with Stabilized Iodine

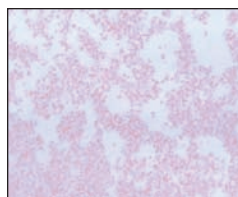
The gram stain permits the separation of all bacterial species into two large groups, those which retain the primary dye (gram-positive), and those which lose the primary dye and take the color of the secondary dye (gram-negative). The mechanism of gram stain is based on the distinctive chemistry and physical properties of the cell wall, possibly the lipid content. However, the exact mechanism of gram stain is still unknown.

Kit Contains: One 8 oz. bottle each of the following: Crystal Violet, Gram's Iodine,
Decolorizer, Safranin

0.4% Safranin, Ready-to-Use

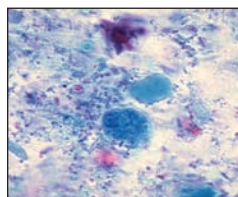
Ready to use 0.4% Safranin is the classic counterstain in a Gram stain. Our ready to use format eliminates the exposure to potentially irritating powdered dyes. Used to mark small biopsies for embedding visualization.

Francisella tularensis using a
Safranin stain, Magnified 1000X.
Courtesy of CDC Public Health
Library / Dr. P. B. Smith.



Wheatley's Trichrome Blue

This multi-chromatic method yields rapid staining and excellent definition on amoebae and flagellates. PVA fixed stool specimens should be allowed to dry overnight. Blood cells and bacteria stain red, while yeast and vegetable fibers stain green. In tissue sections connective tissue is green, muscle and cytoplasm red and nuclei blue.



Entamoeba histolytica trophozoite.
Wheatley's trichrome stain (blue filter). Image courtesy of CDC Public
Health Library/Dr. Lanny Dykes.

Catalog #	Size
24684-1	1Gal
24685-1	1Gal
24668-1	1 kit
24667-1	1 kit
24672-1	1Gal
24691-16	16oz

Plastic Inoculation Microloops®

Sterile disposable plastic inoculating loops for precise volumetric sampling and transfer of material for accurate analysis. Individually packed in peel pouch. 1000 loops.

Features:

- Accurate sampling
- Consistent and reproducible results
- Precision moulded – no gouging of media
- No need for Bunsen
- No aerosols
- Color coded for size
- Individually packed



Plastic Inoculation Microloop®, 1µl - individually packed

Plastic Inoculation Microloop®, 10µl - individually packed

Catalog #

Size

24649-1

1 pkg

24648-1

1 pkg

Nichrome® Wire Inoculation Microloop®, 2.5mm, 2.5µl*

Nichrome® 5 nickel-chromium wire inoculating loop for precise volumetric sampling and transfer of material for accurate analysis. 25 loops per package.

Features:

- Accurate sampling
- Consistent and reproducible results
- Rapid cooling
- Nichrome® 5 is most durable alloy for repeated heating/cooling
- Outstanding performance at temperatures up to (1200°C)



24658-1

1 pkg

Nichrome® Straight Wire Inoculation Microloop®, 5mm, 10µl*

Nichrome® 5 nickel-chromium straight wire needle for picking colonies from agar plates. 25 loops per package.

Features:

- Accurate sampling
- Rapid cooling
- Consistent and reproducible results
- Nichrome 5 is most durable alloy for repeated heating /cooling
- Outstanding performance at temperatures up to 1200 °C



24661-1

1 pkg

Microloop® Holder, 205mm (8" long)

Microloop® Insulated Brass Holders.

Features: Durable, Insulated handle



24664-1

1 holder

Parisitology Fixatives

PVA "Gold Standard" Fixative (*permanent staining*)

Copper sulfate PVA used for permanent staining. The copper sulfate replaces mercuric chloride.

Features: Saves Time, Mercury Free Alternative, Easier and Less Expensive Disposal

24680-16

16oz

Z-PVA® Fixative (*mercury free*)

(Zinc Sulfate PVA) Mercury free fixative developed as an excellent alternative to mercuric chloride PVA for permanent staining. Mercury Free Alternative.

Features: Saves Time, Mercury Free Alternative, Easier and Less Expensive Disposal

24679-16

16oz

*CE-marked and conforms to: European In Vitro Devices Directive, In Vitro Diagnostic Medical Devices Directive (98/79/EC), 1998, Official Journal of European Communities, L331/1

Molecular Biology

Cell Labeling Dyes

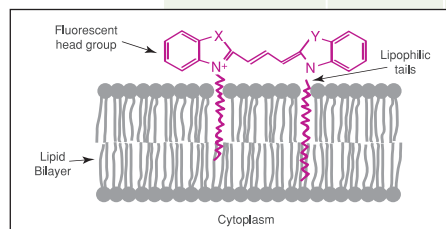
NEW! CellVue® - Membrane Labeling Dyes



Sensitive probes for detecting rapid uniform membrane changes in any cell or bioparticle with a membrane. Suitable for cell tracking and proliferation studies and compatible with flow cytometers, confocal and *in vivo* imaging equipment. CellVue® labeled cells are brightly fluorescent, emitting in the long wavelength UV, the far red or the near infrared region of the spectrum and display potential shifts in their excitation and emission. This shift makes it possible to provide sensitive, quantitative methods for monitoring the fate of labeled cells at both macro and micro levels.

What do CellVue® Kits for Cell Membrane Labeling Offer?

- Versatility – use with any cell type or bioparticle with a membrane
- Provides stable labeling with minimal transfer from cell to cell
- Provides rapid, uniform membrane labeling
- Combine with fluorescent antibodies or markers of cell function
- Suitable for cell tracking and proliferation studies
- Several colors (UV to NIR) for multi-parameter studies (use with existing fluorochromes for more colors)
- Far-Red and NIR versions can provide greater signal to noise due to reduced background autofluorescence
- Compatible with flow cytometers, confocal and *in vivo* imaging equipment
- Convenient, easy-to-use kit format



Mini Kit (small) Contains: 1 vial containing: 0.1ml, 1×10^{-3} M in ethanol fluorochrome dye stock and 1 vial containing 10ml of diluent.

Midi Kits (medium) Contains: 2 vials containing: 0.1ml, 1×10^{-3} M in ethanol fluorochrome dye stock and 6 vials containing 10ml of diluent.

CellVue® Burgundy - Midi Kit	24850-1	1 kit
CellVue® Burgundy - Mini Kit	24843-1	1 kit
CellVue® Claret - Midi Kit	24849-1	1 kit
CellVue® Claret - Mini Kit	24844-1	1 kit
CellVue® Jade - Midi Kit	24905-1	1 kit
CellVue® Jade - Mini Kit	24904-1	1 kit
CellVue® Lavender - Midi Kit	24851-1	1 kit
CellVue® Lavender - Mini Kit	24841-1	1 kit
CellVue® Maroon - Midi Kit	24847-1	1 kit
CellVue® Maroon - Mini Kit	24840-1	1 kit
CellVue® NIR780 - Midi Kit	24852-1	1 kit
CellVue® NIR780 - Mini Kit	24845-1	1 kit
CellVue® NIR815 - Midi Kit	24853-1	1 kit
CellVue® NIR815 - Mini Kit	24846-1	1 kit
CellVue® Plum - Midi Kit	24848-1	1 kit
CellVue® Plum - Mini Kit	24842-1	1 kit
Diluent C – See page 34 for full description	24902-6	6 vials

Sold under sublicense from PTI Research, Inc. to MTTI. CellVue® is a trademark of PTI Research, Inc. U.S. Patent #5,665,328

NEW! NeuroVue® - Dye Filters for Neuronal Tract Tracing

NeuroVue® Dye Filters are useful tools in several different areas of research including neuronal tract tracing studies up to 3-4 weeks and spectrally compatible with most fluorescent light-absorbing tags.

What do NeuroVue® Dye Filters Offer?

- Convenient, ready-to-use coated filter format
- More precise control of dye insertion point
- No messy oils, pastes or hard-to-position crystals
- Diffusion properties comparable to or better than other commercially available neurotracing dyes
- More focal results (e.g. labeling of small sets of axons within pathway)
- Available in multiple colors, including far red, for multi-tract tracing and improved results even in tissues with high myelin expression



Monitoring diffusion distance using NeuroVue® dye absorbance in murine head (lateral view) embryonic day 12.5

NeuroVue® Maroon	Ex. Max. 647nm / Em. Max. 667nm	24834-1	1 filter
NeuroVue® Red	Ex. Max. 567nm / Em. Max. 588nm	24835-1	1 filter
NeuroVue® Red Plus	Ex. Max. 567nm / Em. Max. 588nm	24906-1	1 filter
NeuroVue® Red Solid	Ex. Max. 567nm / Em. Max. 588nm	24907-1	1 filter
NeuroVue® Orange	Ex. Max. 550nm / Em. Max. 570nm	24836-1	1 filter
NeuroVue® Jade	Ex. Max. 494nm / Em. Max. 507nm	24837-1	1 filter
NeuroVue® Burgundy	Ex. Max. 683nm / Em. Max. 707nm	24838-1	1 filter

NEW! SRfluor™ Dyes

SRfluor™ dyes belong to the family of squaraine rotaxane dyes which exhibit absorption and emission properties in the far-red region of the spectrum. Squaraine rotaxane analog that emits in the far-red region of the spectrum and is functionalized with a hydroxysuccinimide ester group that can readily undergo conjugation with amino groups of biomolecules to provide fluorescent conjugates for use in multiple applications. Provided in crystalline powder form.

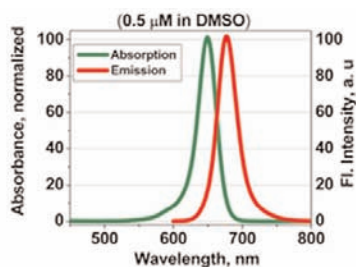
Spectral properties:

abs. max.=650nm & em. max.=678nm in DMSO.

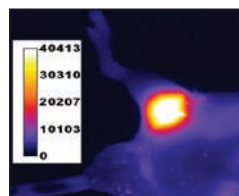
Please see website for individual spectra.

What SRfluor™ Dyes Offer

- 5-20 times brighter compared to Cy5, Alexa® and Atto dyes
- More photostable compared to Cy5, Alexa® and Atto dyes
- Sharp absorption and fluorescence emission profiles
- Available with a range of functionalities to allow conjugation with biomolecules for *in-vitro* and *in-vivo* imaging
- Other analogs with ability to label the intracellular lipid regions of cells or bind to metal ions also available



SRfluor™ 680 Phenyl	24862-1	1mg
SRfluor™ 680 Carboxylate	24863-1	1mg
SRfluor™ 680 Crown	24864-1	1mg
SRfluor™ 680 Maleimide	24865-1	1mg
SRfluor™ 680 NHS Ester	24866-1	1mg



Optical image of a live mouse with subcutaneous injections of *S. aureus* and *E. coli* that were pre-labeled with SRfluor probe. The entire animal was irradiated with filtered light at $\lambda = 625 \pm 40$ nm and an image with emission intensity at $\lambda = 670 \pm 20$ nm was collected by a CCD camera during a 5 second acquisition period. Image courtesy of Professor Bradley Smith, University of Notre Dame, Indiana, USA.

NeuroVue® is a trademark of PTI Research, Inc. U.S. Patent #5,665,328. Sold under sublicense from PTI Research, Inc. to MTTI. SRfluor™ is a trademark of Molecular Targeting Technologies, Inc., Distributed by Polysciences, Inc. under agreement from MTTI.

DNA / RNA / Protein Dyes

Acridine mutagen ICR 191

[6-Chloro-9-(3-[2-chloroethylamino]propylamino)-2-methoxyacridine] dihydrochloride; ICR 191 Acridine mutagen; Ames mutagen 191 MW 451.2

Frameshift mutagenic standard for Ames test in Salmonella and E. Coli.

Science, 176, 47 (1972); *Ann. N.Y. Acad. Sci.*, 269, 21 (1975); *J. Med. Chem.*, 15, 739 (1972);

Proc. Nat'l. Acad. Sci., USA, 72 5135 (1975)

Cibacron blue F3GA, C.I. 61211 [12236-82-7] *U5g*
MW 840.11

(Reactive blue 2) A sulfonated triazine dye that can be immobilized on a support matrix and used for affinity chromatography of proteins. Also used for probing nucleotide binding sites in proteins. *Methods Enzymol.*, 80, 754 (1981); *Biochem. Biophys. Res.*

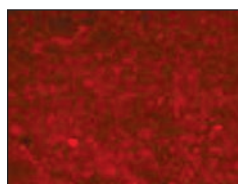
Cyanoditotyl tetrazolium chloride (CTC) [102568-47-8] *HU6ad*
MW 311.8 mp 230° λ max (in ethanol): 300nm

Formazan fluoresces in solid state.

Solubility: ~100mg in 6.6cc water

Exc max: 450nm Emiss max: 630nm

See full description - page 29



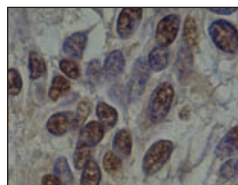
E. coli bacteria in CTC

DAB·4HCl [7411-49-6] *HMVW7bg*
3-3'-Diaminobenzidine tetrahydrochloride.

MW 360.1

Immunochemical grade.

See full description - page 33



Human breast tissue stained with
DAB in Peel-A-Way® Micro-Cut
Paraffin, 100X

Fast Blue [74749-42-1] *U7g*
λ max: 382nm Ex. wavelength: 365nm Em. wavelength: 420nm

Fast Blue fluorescent dye is commonly used as a neuronal tracer

and is sometimes referred to as a Hydrophilic Retrograde Tracer. It can be injected into laboratory animals at a concentration of 2.5% in isotonic saline. Common protocols recommend injecting 0.01-0.2 microliters of a 2.5% concentration into the desired area of the laboratory animal. Euthanasia then occurs 2-3 days post-injection. Soluble in: water, lower alcohols.

Adv. Cell. Neurobiol., 5, 307 (1984); *J. Anat. Soc. India* 48(2) 67-72-1999



Hydroethidine™ [104821-25-2] *HU5cd*
MW 315.5 Exc max: 365nm Emiss max: 420nm mp 202-206° TLC: single spot

Reduced ethidium bromide. A vital stain. Enters and stains living

cells without cellular trauma. Double staining system. Stains cytoplasm blue and chromatin red. Excellent cellular retention. Remains incorporated in chromatin with virtually no leakage. Essentially non-toxic. Shows no toxicity at levels useful for visualizing chromatin. Technical Data Sheet #351

Biotechnology, 3, 4 (1985)



Catalog #	Size
08704-100	100mg
04352-25	25mg
19292-100	100mg
19292-1	1g
04001-2	2x25mg 60ml vials
17740-1	1mg
17740-5	5mg
17084-50	50mg

DNA Purification

See, *SNARE™ DNA Purification Systems in Microspheres Section* - page 263.

NEW! Immobilized Steroid Beads

What are they?

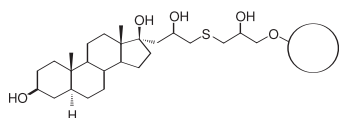
Sepharose® 6B affinity chromatography beads covalently modified with steroids or other ligands such that ligand binding to receptors is not compromised resulting in high receptor-binding specificity.

What can they be used for?

- Efficient isolation and purification of receptor proteins (nuclear and others)
- Ligand binding affinity studies
- Preparation of receptor-ligand complexes for crystallography studies
- Assisting in the structure-based design of receptor selective ligands (e.g. see *Manas et al*)

How do they work?

Beads can be added “batchwise” to the crude protein extract and then packed into a glass column and unbound material eluted away by gravity flow. Alternatively, the beads can be pre-packed into a column and the crude receptor protein mixture applied to the column for purification. After elution of unbound material, the bound receptor is eluted by treating the beads with a solution of a ligand with comparable or greater affinity for the receptor. The final step is usually size exclusion chromatography to remove excess ligand from the protein.

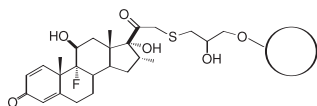


Androstan Sepharose® 6B

Immobilized Steroid Beads* CH7d
Typical ligand loading 10-14 μmoles/ml bead.

24858-1

1ml

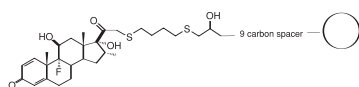


Dexamethasone Sepharose® 6B

Immobilized Steroid Beads* CH7d
Typical ligand loading 10-14 μmoles/ml bead.

24859-1

1ml

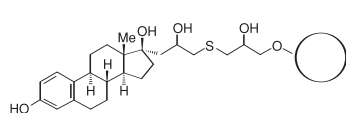


Dexamethasone Sepharose® 6B, (Long Spacer

Arm) Immobilized Steroid Beads* CHU4d
Typical ligand loading 10-14 μmoles/ml bead.

24869-1

1ml

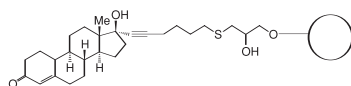


Estradiol Sepharose® 6B

Immobilized Steroid Beads* CH7d
Typical ligand loading 10-14 μmoles/ml bead.

24861-1

1ml

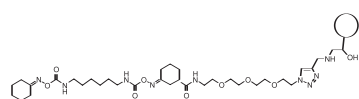


Nortestosterone Sepharose® 6B

Immobilized Steroid Beads* CH7d
Typical ligand loading 10-14 μmoles/ml bead.

24860-1

1ml



RHC-80267 (U-57908) Sepharose® 6B

Immobilized Steroid Beads* CHU4d
Typical ligand loading 12-15 μmoles/ml bead. Use to purify diacylglycerol (DAG) lipases.

24868-1

1ml

Sold under license from PTI Research, Inc. to MTTI and distributed by Polysciences, Inc. Sepharose is a trademark of GE Healthcare.

*Cold pack charge required.

Scissors for Molecular Biology - See page 97

Micro-Cut Paraffin, Gold Standard Series Peel-A-Way® A2g



Micro-Cut paraffin is a low polymer formulation in our Peel-A-Way® paraffin line. This low polymer paraffin gives improved viscosity, infiltration and embedding. The translucent appearance of the paraffin allows excellent tissue visibility and easier paraffin removal with all types of clearing agents. Available in a larger, more convenient 10kg (22lb) case size containing four 2.5kg stand alone bags. One case will fill most tissue processors. Available in 3 melting temperatures, for a variety of tissue types.

Technical Data Sheet #525A

Micro-Cut Paraffin 52° - 54°C	24201-1	1 case
Micro-Cut Paraffin 56° - 58°C	24198-1	1 case
Micro-Cut Paraffin 62° - 64°C	24202-1	1 case

Micro-Cut Preferred (DMF) Paraffin 56° - 58°C, Peel-A-Way® A2g

Peel-A-Way® Micro-Cut Preferred (DMF) Paraffin is a formulation with DMF (dimethyl formamide) added to increase infiltration of tissue. This low polymer content formulation gives improved viscosity, infiltration and embedding. Available in a convenient 10kg case size (4 x 2.5kg bags) One case will fill most tissue processors. Technical Data Sheet #525A

Microprobes and Picks



Set of 4 stainless steel probes for use in inaccessible areas.

07397-1	1 set

Microscope, Fluorescence - See pages 6-7

Microscope Slide Cover Slips, Glass

Rectangular 11mm x 22mm x 0.13-0.17mm thick, one ounce	03929-1	1 box
Square 22mm x 22mm x 0.13-0.17mm thick, one ounce	21913-1	1 box
Rectangular 22mm x 30mm x 0.13-0.17mm thick, one ounce	23999-1	1 box
24mm x 40mm thickness #1	24070-1	1 box
24mm x 50mm thickness #1	24071-1	1 box
24mm x 60mm thickness #1	24072-1	1 box

Microscope Slide Cover Slips, Plastic

Square 22mm x 22mm x 0.157mm thick

16601-1	1 box

NEW! Microscope Slide Cover Slips, Quartz

Quartz cover slips are made from GE 124 quartz.

Round 1.0" (25.4mm) diameter Thickness #2 (0.2mm)	24964-1	1 each
Round 1.300" (33.02mm) diameter . . Thickness #2 (0.2mm)	24965-1	1 each
Square 1.0" (25.4mm x 25.4mm) Thickness #2 (0.2mm)	24966-1	1 each
Round 0.984" (25mm) diameter Thickness #1 (0.15 to 0.18mm)	24967-1	1 each
Square 1.0" (25.4mm) Thickness #1 (0.15 to 0.18mm)	24968-1	1 each
Square 0.984" (25mm) Thickness #0 (0.075 to 0.125mm)	24969-1	1 each

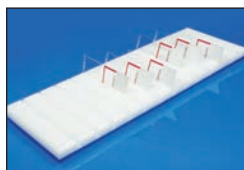
Microscope Slide Grip, Peel-A-Way®



Microscope slide holders constructed of durable plastic. These grips fit any Coplin jar or our Polyjar (Cat. #08415) Carton contains 6 grips. Technical Data Sheet #433

- Chemical and solvent resistant
- Capable of withstanding temperatures up to 80° C

Microscope Slide Holder Block



Our durable, chemically resistant polyethylene Microscope Slide Holder Block will accommodate up to 40 separate 3" x 1" microscope slides. The angled slide holder slots permit ease of access to individual slides and rapid viewing of slide labels. The polymer composition of the block resists staining and washes clean with ethanol or isopropanol or other organic solvents.

Microscope Slide Mailing Tubes

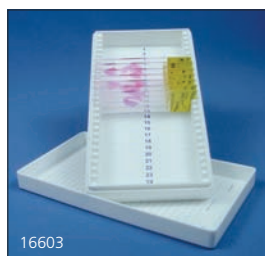
Polypropylene tubes to hold 1-4 slides. Can be used to mail slides and to store small numbers of slides. These mailing tubes can also be used as miniature Coplin jars to dip slides in photographic emulsion for autoradiography. The advantage of using these tubes with emulsion is the small amount of emulsion required. They are disposable. Eliminates worry about cross-contamination from one batch of emulsion to the next.

Microscope Slide Storage Boxes

Mahogany Large Box, holds 100 slides (Negafile)

Plastic Small box, holds 25 (slide saver)

Plastic Large box, holds 100 (slide saver)

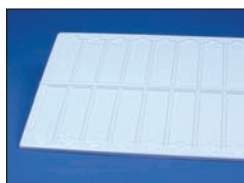


Microscope Slide Storage Cabinet



A stackable six-drawer cabinet accommodating up to 5000 3" x 1" glass slides. The base unit (sold separately) has rubber feet to prevent scratching the bench surface. The removable drawers permit easy handling and transport. The rail suspension design prevents drawers from being accidentally pulled out and spilling the contents. Sponge blocks are provided to support slides in partially filled drawers.

Microscope Slide Temporary Storage Tray



Has a capacity of 20 microscope slides which are stored in a horizontal position for full visibility. The white background makes it easy to distinguish the stains. Finger cut-outs simplify removal of slides. Dimensions are: 7.5" x 13.5" 6 trays per package.

Catalog # Size

19801A-1 1 ctn/
6 grips

24764-1 1 holder

23998-10 1 pkg
(10 tubes)

16885-1 1 box
16603-1 1 box
16604-1 1 box

22352-1 cabinet
22353-1 base unit

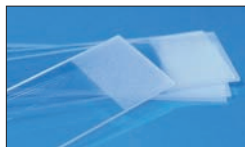
16602-1 1 pkg/
6 trays

Microscope Slides, Control



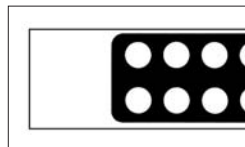
This slide allows the control specimen and the patient's specimen to be on the same slide with positive identification of both specimens. Identical Patient and Control stain procedures. The slide has a frosted end for easy marking and special coating for enhanced sample adhesion to the slide. 72 slides per box.

Microscope Slides, Frosted



Frosted on one end to be thumb detectable when working in a dark room. 72 slides per box.

Microscope Slides, Immunofluorescence



These slides have a durable teflon coating which is acetone-resistant, autoclavable and hydrophobic. They are 25mm x 75mm, 1mm thick and are useful for all fluorescent materials. These glass slides have 10mm x 6mm wells and are frosted on one end for easy labeling. 100 slides per box.

Microscope Slides, Micropure



Manufactured with optical quality pure glass, Micropure slides contain 47% less iron than water white slides. This allows visualization of true sample color. They have better hydrolytic resistance. They resist leaching, clouding and feature increased wettability. The slides are 25mm x 75mm, sandblasted. 72 slides per box.

Microscope Slides, Plain

Made of high quality glass guaranteed to be precleaned. The slides are ground smooth and free of sharp cutting edges. 72 slides per box.

Microscope Slides, Poly-L-Lysine Coated



Yellow label area for easy identification. Slides are coated with Poly-L-lysine to permit electrostatic coupling of the sample to the slide. The coating will allow the section to be manipulated after pick up while the slide is wet. Use of Poly-L-lysine Microscope Slides does not affect staining procedures. Slides are 25mm x 75mm x 1mm. 72 slides per box. Technical Data Sheet #518

NEW! Microscope Slides, Quartz

Introducing a very high quality, state of the art, family of clear fused quartz based microscope slides. These slides are manufactured from the very highest purity of clear fused quartz. Quartz slides and cover slips are recommended for most applications involving chemical microscopy, in order to be sure that nothing is lost due to absorption in a glass slide. The use of quartz slides and cover slips are also recommended whenever UV microscopy is contemplated, including UV confocal microscopy because of the high UV transparency of quartz.

Quartz Microscope Slides, 1" x 1" (25.4 x 25.4mm) x 1mm Thick	24957-1	1 each
Quartz Microscope Slides, 1" x 2" (25.4 x 50.8mm) x 1mm Thick	24958-1	1 each
Quartz Microscope Slides, 1" x 3" (25.4 x 76.2mm) x 1mm Thick	24959-1	1 each
Quartz Microscope Slides, 2" x 3" (50.8 x 76.2mm) x 1mm Thick	24960-1	1 each
Quartz Microscope Slides, 1" x 1" (25.4 x 25.4 mm) x 0.5mm Thin	24961-1	1 each
Quartz Microscope Slides, 1" x 2" (25.4 x 50.8mm) x 0.5mm Thin	24962-1	1 each
Quartz Microscope Slides, 1" x 3" (25.4 x 76.2mm) x 0.5mm Thin	24963-1	1 each

Catalog #	Size
24012-1	1 box
21911-1	1 box
18357-1	1 box
22245-1 22245-10	1 box 1 gross
07441-1	1 box
22247-1	1 box
24957-1	1 each
24958-1	1 each
24959-1	1 each
24960-1	1 each
24961-1	1 each
24962-1	1 each
24963-1	1 each

Microscope Slides, Super Frosted

These slides have a special coating impervious to processing reagents, which allows permanent marking with Secureline® pens. 72 slides per box.

Microscope Slides, Tissue-Tack™

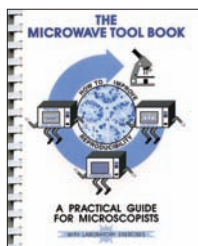


White label area

Treated with a specially formulated aminoalkylsilane, Polysciences' Tissue-Tack Slides provide a positively charged surface, which permits instant coupling of negatively charged tissue sections. Ideal for paraffin or plastic sections. The resultant bond stands up to the very aggressive solutions used in In-situ Hybridization (ISH) procedures. 72 slides per box. Technical Data Sheet #518

Microwave Toolbook - A Practical Guide for Microscopists

The Microwave Tool Book is the classic reference text for practical use of microwave processing in histology. Helpful with CAP Guidelines for microwaves in the laboratory.



G. R. Login, DMD and
A.M. Dvorak, MD ©1994

24 exercises, dozens of illustrations and several practical tips.

- Understand how your microwave works relative to laboratory procedures
- Learn how to calibrate and standardize lab microwave ovens
- Invaluable resource for students, technicians, teachers and researchers
- Includes lab exercises for learning the ins and outs of microwave technology

Mithramycin, min. 90% [18378-89-7] VWX7f

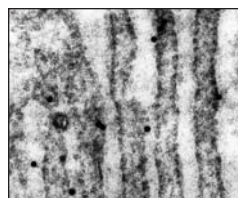
(Plicamycin; Aureolic acid; Mithracin) MW 1085.18 mp 180-183°

Common flow cytometric dye for early DNA analysis.

Stain Technol., 60, 145 (1985); *Merck Index* 11, 7510

MonoStep™ Lowicryl® Single Component Embedding Media

Pre-mixed, ready to use MonoStep™ Lowicryl® Embedding Media saves time and minimizes chemical contact. These products are ideal for use in Immunohistochemistry. They are based on our popular Lowicryl® K4M and HM20 formulations for low temperature embedding or freeze substitution. MonoStep™ products are especially appropriate for immunolabeling, resulting in better preservation of antigenicity and lower background labeling. Store at room temperature.



Golgi Stack in MonoStep K4M labeled for sialic acid embedded with PLT method. Image: Markus Durrenberger.

MonoStep™ Lowicryl® K4M Polar Embedding Media BHO6d

MonoStep™ Lowicryl® HM20 Non-polar Embedding Media CHO6d

Catalog # Size

21912-1 1 box

24216-1 1 box

23509-1 1 book

09330-5 5mg

23646-225 225g

23994-225 225g

Mounting Media

PolyGlass, Coverslipping Medium CH6g

Non-water soluble (xylene/toluene) liquid coverslipping media designed to eliminate the use of coverslips. Non-yellowing and scratch resistant, Polyglass simplifies the protection of prepared slides. The refractive index is near 1.48 and can be removed if necessary by soaking in toluene or xylene. Ideal for uneven thick sections that cause air bubbles under a coverslip with routine procedures. Sold individually or as a case containing 6x120ml of PolyGlass. Technical Data Sheet #432

Aqua-Poly/Mount Coverslipping Media, Non-Permanent Aqueous - See page 14.

Poly-Mount® CH5g



Crystal clear medium providing superior optical clarity. The viscosity permits bubble-free applications with minimal spreading and excellent adhesion of coverslips. Poly-Mount® is perfect for coverslipping and long term storage. It is non-water soluble, miscible with toluene and xylene. Packaged in 940ml bottles for bulk applications or convenient 120ml squeeze bottles. Poly-Mount® is also available in larger package sizes for higher volume users, please ask for a quotation.

Technical Data Sheet #432

- Refractive index: 1.484
- Viscosity: 192 CPS



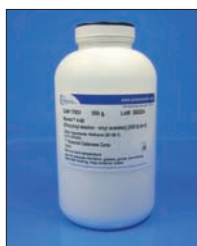
Poly-Mount® Xylene CH6g

Xylene based routine coverslipping medium for histology and cytology slides. This acrylic medium provides superior optical clarity and has a refractive index of 1.48. Poly-Mount® Xylene is recommended for automated coverslipping instruments that use both glass and tape coverslips. It contains an anti-fade agent to prevent fading and yellowing with long term storage. Medium dries quickly for viewing, storage and filing. Technical Data Sheet #432

- Viscosity: 107 CPS

Mouse IgG, whole molecule, lyophilized H4d

Mowiol 4-88® [9002-89-5] U5g



(Poly[vinyl alcohol] 88% hydrolyzed) MW ~31,000

Mowiol® 4-88 is a high quality anti-fade medium to be used for Immunofluorescence, as well as many molecular biology applications. It hardens and has the same refractive index as immersion oil. If used for Immunofluorescence applications the addition of glycerin is recommended. Immunofluorescence mounting media for cell surface antigens.

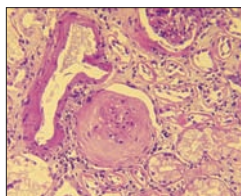
Cell, 18, 375 (1979); The Journal of Histochemistry and Cytochemistry, 41(12), 1833 (1993); Cytometry Part A, 52A, 90 (2003)

Catalog #	Size
22253-120	120ml
22253-6	6x120ml
08381-120	120ml
08381-940	940ml
Available in larger quantities, Please call for quote.	
24176-120	120ml
24176-940	940ml
23873-25	25mg
17951-500	500g

Multiple Stain Solution C5g

Used in **Tzanck preparations of herpetic lesions and differentiates acidophilic and basophilic structures. Multiple Stain is a replacement for the former Paragon Multiple Stain (PMS).**

Stain can be directly applied to frozen sections, epoxy, JB-4® embedded sections or paraffin. It is utilized as a general cytoplasmic and nuclear stain. Multiple Stain also differentiates various cytologic processes including basal cell carcinoma, squamous cell carcinoma, malignant melanoma, B-cell lymphoma, acute myelomonocytic leukemia and metastatic breast cancer. Multiple Stain Solution is an easy to use, one step procedure with H & E quality staining. Technical Data Sheet #269



Kidney stained with Multiple Stain Solution in Peel-A-Way® Micro-Cut Paraffin, 4u, 10X

N,N,N',N'-Tetramethylethylenediamine,

Chemzymes Ultra Pure®, 99% (TEMED) [110-18-9] BCH6g
MW 116.21 bp 120-122°

Polymerization accelerator with ammonium persulfate or riboflavin initiation.
Supplied in N₂ sealed ampoules. *Anal. Biochem.*, 35, 533 (1970); 74, 620 (1976)

N,N'-Methylenebisacrylamide,

Chemzymes Ultra Pure®, electrophoresis grade 99.9% [110-26-9] V4g
MW 154.2 mp 185° (dec) TSCA Crosslinking monomer used especially with acrylamide.

N-(γ-L-Glutamyl)-4-methoxy-2-naphthylamine [24723-50-0] HM7f
MW 302.3 mp 188-190° 98% purity based on dry form 88% purity based on water content. Amino acid and chiral reagent.



N,N-Dimethylaminoethanol (DMAE) [108-01-0] BE6g
MW 89.14 bp 130-136° Curing agent for epoxy resins.

Nadic Methyl Anhydride (NMA) [25134-21-8] HO6g MW 178.2



Liquid anhydride for curing epoxy resins. This material is a mixture of methyl isomers of methylbicyclo[2.2.1]hept-5-ene-2,3-dicarboxylic anhydride. The larger the proportion of NMA used in the epoxy resin formula, the harder the resultant block. See *Poly/Bed®*, pages 89-90.
Technical Data Sheet #233

Neuron specific enolase (NSE) A2d

Human, lyophilized, purity >99%

Rat, lyophilized, purity >99% H4d

Neuron specific enolase (NSE) is a unique form of the glycolytic enzyme enolase (E.C.4.2.1.11) found in neurons and in virtually all of the neuroendocrine, paraneuronal cell types. Certain neurological disorders are accompanied by increases in serum and spinal fluid NSE levels. NSE is also found in high concentrations in neuroendocrine tumors. Levels of NSE in biological fluids can be a useful parameter for the assessment of neural tissue damage in the brain. Our human NSE and rat NSE have a specific activity of 40-60 units per mg. Both can be used in conjunction with anti-human NSE or anti-rat NSE to formulate a RIA to measure NSE levels in tissue, serum, or spinal fluid. Technical Data Sheets #266 and #314

J. Neurochem., 36, 1093 (1981); *Ann. Rev. Neurosci.*, 10, 269 (1987); *Int. J. Dev. Neurosci.*, 6, 77 (1988).

Catalog # Size

08824-50 50ml
08824-100 100ml

08036-10 10x5ml

00719-25 25g
00719-100 100g

02410-50 50mg

01458-100 100g

00886-450 450g

17436-50 50µg

17435A-50 50µg

Neutral red, C.I. 50040, certified [553-24-2] *U5g*
(Basic red 5; 3-Amino-7-dimethylamino-2-methylphenazine hydrochloride; Toluidine red)
MW 288.78 λ max: 540nm
Used as an indicator. pH range 6.8 (red) - 8.0 (yellow). Also used as a biological stain.
Merck Index 11, 6395

Nitroblue tetrazolium chloride (NBT), ~90% [298-83-9] *HU6ae*
MW 817.65 mp 215-217° λ max: 257nm
Totally soluble and formazan free. Used for estimating dehydrogenases and other oxidases. Used in In-situ Hybridization (ISH).
Methods Enzymol., 6, 958 (1963); *Anal. Biochem.*, 56, 353 (1973); 212, 540 (1993); *J. Clin. Lab. Anal.*, 7, 174 (1993)



Nonenyl Succinic Anhydride (NSA), EM Grade [28928-97-4] *H4g* MW 224.3
Liquid anhydride for curing low viscosity embedding resin for EM. Used in Spurr formulations. Our material is specially distilled for EM applications and was developed in conjunction with Dr. Spurr.
J. Biochem., 113, 573 (1993)



Nuclear fast red, C.I. 60760 (Calcium red) [6409-77-4] *HU5g*
MW 357.28 λ max: 518nm Used for determination of calcium and a counterstain in Iron stain and Reticulin stain in histology. *Clin. Chim. Acta*, 2, 567 (1957)

Nylon wool fiber *A2g*
Nylon wool fiber can be used to separate leukocytes from peripheral blood and to separate T-cells from B-cells. Granulocytes and B-cells stick to the fibers, while T-cells and other cells do not. Technical Data Sheet #425A
Transfusion, 2, 221 (1962); *Immunol. Commun.*, 1, 571 (1972); *Eur. J. Immunol.*, 3, 645 (1973); *J. Clin. Invest.*, 61(3), 697 (1978)



Nylon wool fiber, sterile *A2g*
Ready to use, 500mg in 10cc syringes. Package of 10.

Oil red O, C.I. 26125, certified [1320-06-5] *A2g*
(Solvent red 27; Sudan red 5B; Ceres red 5B) MW 408.5 λ max: 518 (359)nm mp 120° (dec.)
A post-electrophoresis stain for lipoproteins on cellulose acetate plates and in histology for amyloid staining. *Z. Clin. Chem. Clin. Biochem.*, 7, 540 (1969)

Orange G, C.I. 16230, certified [1936-15-8] *U4g*
(Acid orange 10; Xylene fast orange G; 7-Hydroxy-8-phenylazo-1,3-naphthalenedisulfonic acid) MW 452.38 λ max: 475nm
Used in Mallory's stain for collagen in connective tissue. Also useful as a stain for granules, elastic fibers, mast cells and pollen tubes. A general histology and cytology counterstain.
Stain Technol., 13, 89 (1938); *Am. J. Clin. Path.*, 20, 665 (1950)

Osmium ammine-B [48016-91-7] *U5g*
Stable DNA stain. *J. Histochem. Cytochem.*, 37, 395 (1989)

Catalog #	Size
00915-25	25g
00928-500	500mg
00928-1	1g
01542-450	450gm
01542-4	4x450gm
09773-5	5g
18369-10	10g
18369-50	50g
21759-1	1 pkg
06317-25	25g
06317-100	100g
00968-100	100g
21033-100	100mg

Osmium tetroxide, crystalline, 99.95%* [20816-12-0] *GPRS7g*



MW 254.2 mp 39-41° d 4.90
Post fix and stain for EM. Supplied in pre-scored ampoules sealed in plastic bags. The ampoules are label free to avoid cleaning prior to preparation of solutions. Each ampoule is equipped with an ampoule cracker. Technical Data Sheet #119A

Osmium tetroxide, 4% solution* *BH6g* d 1.04

Post fix and stain for EM. The solution is microfiltered and features exact concentration, no cross contamination and has excellent stability when kept cold and in the dark. Supplied in pre-scored sealed ampoules. Each ampoule has its own ampoule cracker. Used for post staining of DAB/oxidase to darken and retain stain for long-term storage.

Technical Data Sheet #119A

Manual of Immunoperoxidase Techniques, 2nd Ed., ASCP Press: Chicago, 1987; p58 Electron Microscopic Immunocytochemistry, Principles and Practice, Eds., Polak and Priestly, Oxford University Press, 1992; p91

Osmium tetroxide, 2% solution* *BH6g*



Post fix and stain for EM. Microfiltered solution in pre-scored sealed ampoules. Each ampoule has its own ampoule cracker. Technical Data Sheet #119A

Osteo-Bed Bone Embedding Kit (for histology microscopy) *CGHOVWX6g*

Suitable for use with large and small mineralized (undecalcified) bone sections. The methylmethacrylate (MMA) formula yields clear, hard blocks for cutting sections with a heavy duty microtome. Not water-soluble. Technical Data Sheet #355

Kit Contains: 900ml Embedding Resin Solution A; 2 x 12g Benzoyl Peroxide Plasticized

Additional Kit Components:

Osteo-Bed Bone Embedding Resin Solution A *CHO5g*

Osteo-Bed Bone Embedding Benzoyl Peroxide Plasticized (Catalyst) *GH5g*

Osteo-Bed Bone Embedding Solvent *HVWX6g*

Removes plastic from sections for brilliant staining.

NEW! Osteo-Bed Plus Embedding Kit *CGHOVWX6g*



Osteo-Bed Plus Embedding Kit offers the same benefits as Osteo-Bed Bone Embedding Kit with the added benefit of producing much harder blocks for supporting undecalcified bone specimens and bone containing metal implants, grafts and stents.

Suitable for use with large and small mineralized (undecalcified) bone sections and hard tissues.

Benefits:

- Yields clear, hard blocks for cutting sections with a heavy duty microtome
- Infiltrates rapidly and produces high hardness after polymerization
- Try Osteo-Bed Bone Embedding Solvent (Cat. # 17734B) to remove plastic from sections for brilliant staining

*Poison pack charge required.

Catalog # Size

0223A-5 5x1g
0223B-10 10x1g
0223C-10 10x1/2g
0223D-10 10x1/4g

0972A-20 20x2ml
0972B-5 5x10ml
0972C-20 20x10ml

23310-10 10x2ml
23311-10 10x5ml

17734-1 1 kit

17734A-900 900ml
17734C-2 2x12g
17734B-4 4x500ml

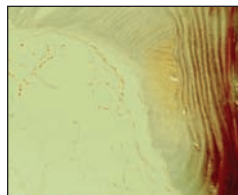
24889-1 1 kit

Osteochrome Villanueva Bone Stain CH6g

Useful for staining fresh, fixed, unembedded, or plastic-embedded sections of bone. Gives uniform and reproducible results. Useful in studying different metabolic bone diseases.

Technical Data Sheet #273

Stain Technol., 49, 1 (1974); *J. Histotechnol.*, 1, 19 (1977); 2, 23 (1979)



Human degenerative joint disease, stained with Villanueva Osteochrome Bone Stain, 20X.

ParaClear Odorless Xylene Substitute EH5g



ParaClear is a naphtha-petroleum derivative, that can replace xylene for clearing. It is odorless and presents a low hazard for routine histological processing and staining. ParaClear will remove alcohol during the final steps of routine tissue processing and is miscible with paraffin for infiltration. It has a higher flash point than xylene, reducing the flammability danger to the laboratory. Technical Data Sheet #671

Paraffin

GemCut® Paraffin

GemCut Paraffin, which melts at a range from 56-58°C, is a high polymer paraffin formulation for routine embedding and cutting. This paraffin is specially formulated to exhibit superior cutting performance in high humidity environments, with low compression. The paraffin is available in multiple colors to assist the histologic technician in visualizing small biopsies easily, even while using eosin, methylene blue or tissue marking dyes. Multiple colors organize samples by technician or tissue type. The coloring agents and polymer content do not interfere with the staining protocols or IHC. Technical Data Sheet #691



Catalog #	Size
16280-450	450ml
22463-4	4x3.8L
Case = 4x2.0kg	
24361-1	1 case
24362-1	1 case
24363-1	1 case
24364-1	1 case
24365-1	1 case
24366-1	1 case

GemCut® Pink Sapphire Paraffin A2g

GemCut® Aquamarine Paraffin A2g

GemCut® Citrine Paraffin A2g

GemCut® Emerald Paraffin A2g

GemCut® Opal Paraffin (Standard White) A2g

GemCut® Amethyst Paraffin A2g

Gold Standard Series Peel-A-Way® Micro-Cut Paraffin

Gold Standard Micro-Cut paraffin is a low polymer formulation in our Peel-A-Way® paraffin line. This low polymer paraffin gives improved viscosity, infiltration and embedding. The translucent appearance of the paraffin allows excellent tissue visibility and easier paraffin removal with all types of clearing agents. Available in a larger, more convenient 10kg (22lb) case size containing four 2.5kg stand alone bags. One case will fill most tissue processors. Available in 3 melting temperatures, for a variety of tissue types. Technical Data Sheet #525A

Micro-Cut Paraffin 52° - 54° C A2g

Micro-Cut Paraffin 56° - 58° C A2g

Micro-Cut Paraffin 62° - 64° C A2g

Micro-Cut Preferred (DMF) Paraffin 56° - 58°C, Peel-A-Way® A2g



Peel-A-Way® Micro-Cut Preferred (DMF) Paraffin is a formulation with DMF (dimethyl formamide) added to increase infiltration of tissue. This low polymer content formulation gives improved viscosity, infiltration and embedding. Available in a convenient 10kg case size (4 x 2.5kg bags) One case will fill most tissue processors. Technical Data Sheet #525A

PolyFin® Paraffin, (for light microscopy) A2g



This is a mixture of fine paraffin waxes and copolymer alloys in convenient pellets. PolyFin® produces ultra-thin compression-free ribbons. It is used to cut 2 micron sections routinely without icing. It functions flawlessly in pressure/ vacuum fluid flow processors. PolyFin® provides maximum support for both hard and soft tissue samples while maintaining exceptional clarity. The low 55°C melting point eliminates excessive heat distortion during tissue processing. Technical Data Sheet #429

SHUR/Trim™ Paraffin Block Dewaxer — See page 98.

Parafilm®

Seal laboratory vessels with a disposable, translucent film.



4" wide x 250' per roll

2" wide x 250' per roll

Catalog # Size

Case =4 x 2.5kg
24201-1 1 case

24198-1 1 case

24202-1 1 case

Case =4 x 2.5kg
24198D-1 1 case

Case=8 x 1kg
19562-1 1 case
19562-15 15kg

3989A-1 1 roll

3989C-1 1 roll

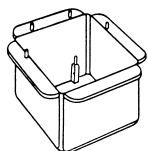
Paraformaldehyde EM Grade [30525-89-4] Dh6g



Paraformaldehyde depolymerizes in water at 60°C to a formaldehyde solution, yielding consistent quality fixative solutions. Sodium hydroxide solution is added dropwise to clear the solution if precipitate is present. *Karnovsky, J. Cell Biology, 27, 137A (1965)*

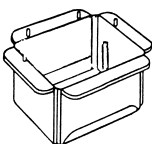
Peel-A-Way® Molds

Constructed of polyethylene, our Peel-A-Way® molds are disposable molds that are used with Gold Standard Mico-Cut Paraffins, PolyFin® Paraffin and GemCut® Paraffins and other routinely used paraffin products. These molds can be used with Tissue Freezing Media for orientation of specimens requiring exact alignment and frozen in liquid nitrogen with or without isopentane, dry ice or on a freezing stage in the cryostat. The molds will easily Peel-A-Way® leaving a formed block with a flat surface that is ready to section, no trimming necessary. The completed blocks can be easily attached to a chuck for sectioning. Peel-A-Way® molds can be used with GMA, MMA and epoxy resins by excluding all air during block polymerization. The mold must be covered and airtight for complete polymerization. Use with Identification Tabs (Cat. #19800A) to readily identify blocks after embedding and during storage.



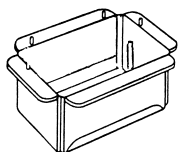
Square - S22
288 molds per case.
22mm x 22mm square x 20mm deep

18646A-1 1 case



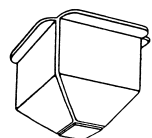
Rectangular - R30
288 molds per case.
22mm wide x 30mm long x 20mm deep

18646B-1 1 case



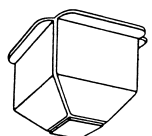
Rectangular - R40
264 molds per case.
22mm wide x 40mm long x 20mm deep

18646C-1 1 case



Truncated - T8
288 molds per case.
22mm x 22mm square truncated to 8mm x 8mm square, 20mm deep

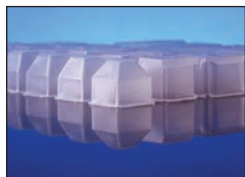
18985-1 1 case



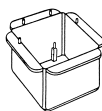
Truncated - T12
288 molds per case.
22mm x 22mm square truncated to 12mm x 12mm square, 20mm deep

18986-1 1 case

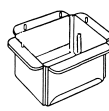
Peel-A-Way® Disposable Embedding Molds Sampler Pack



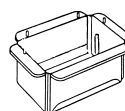
Determine the Peel-A-Way Embedding Mold that is right for your tissue with this convenient Sampler Pack.



18646A



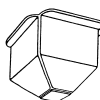
18646B



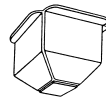
18646C

Contains the following:

- 18646A - Square Molds S22 - 16 molds
- 18646B - Rectangular Molds R30 - 8 molds
- 18646C - Rectangular Molds R40 - 8 molds
- 18985 - Truncated Molds T8 - 8 molds
- 18986 - Truncated Molds T12 - 8 molds

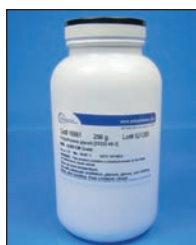


18985



18986

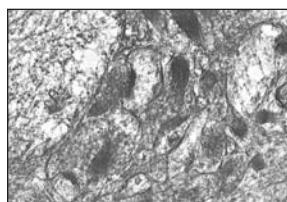
PEG 4000 Resin (Poly[ethylene glycol] 4000) [25322-68-3] A2g



This water soluble, nonionic material is used like paraffin to infiltrate and embed tissue. Melting point is 53-56°. Easily removed from sections with 95% ethanol for immunocytochemical and x-ray microanalytical techniques. Technical Data Sheet #279

J. Cell Biol., 95, 101a (1982);

Biol. Cell, 44, 85 (1982)



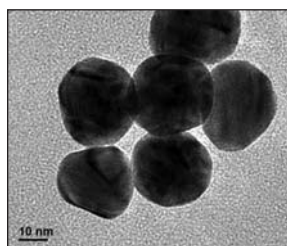
Resinless section of nerve that had been embedded in PEG 4000.

NEW! PEGylated Gold Nanoparticles

Gold nanoparticles are highly monodisperse in size and shape and demonstrate significantly improved reactivity. They are characterized by their size, shape and monodispersity, along with their surface reactivity. These properties are important in the fields of molecular labeling, particularly in diagnostics such as lateral flow, resonance light scattering (RLS) and surface enhanced Raman scattering (SERS).

Applications:

- Surface Enhanced Raman Scattering (SERS) Labels
- Resonance Light Scattering (RLS) Labels
- Standards in SEM, AFM, TEM, UV-VIS and sizing applications
- Fluorescence quenching
- X-Ray contrast enhancement
- Solar cell efficiency enhancement



Close up of 30nm spheres showing the monodispersity.

Composition:

Gold colloid with a carboxylic acid functionalized hydrocarbon capping agent. Packaged in distilled water.

Amino PEGylated Gold Nanoparticles* A2dm

15nm	
20nm	
30nm	

Catalog #	Size
18646D-1	1 pkg
16861-250	250g
24876-1.25	1.25ml
24877-1.25	1.25ml
24878-1.25	1.25ml

*Cold pack charge required.

PEGylated Gold Nanoparticles - cont.

Carboxyl PEGylated Gold Nanoparticles* A2dm

15nm	24870-1.25
20nm	24871-1.25
30nm	24872-1.25

Methyl PEGylated Gold Nanoparticles* A2dm

15nm	24879-1.25
20nm	24880-1.25
30nm	24881-1.25

Neutravidin PEGylated Gold Nanoparticles* A2dm

15nm	24873-1.25
20nm	24874-1.25
30nm	24875-1.25

Pens

Super PAP Pen, 4mm tip



Provides a thin film-like barrier when a circle is drawn around a specimen. The barrier creates the proper surface tension to hold antibody solution within the target area on a slide. The Super PAP pen is effective for immunology staining by PAP, ABC, frozen section and fluorescent antibody methods.

Two specimens can be separated by two circles for IHC staining on the same slide. The hydrophobic circle drawn by the Super PAP Pen is designed to withstand temperatures up to 120°C and can be applied directly to wet slides. The Super PAP Pen has a 4mm tapered tip and provides over 800 applications.

Super PAP Pen – Fine Tip, 2.5mm tip



This economical, fine tip version of our Super PAP Pen offers the same benefits with a 2.5mm tip for finer drawing. The Super PAP Pen – Fine Tip provides over 400 applications.

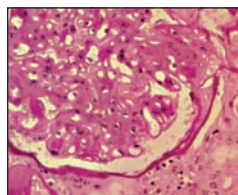
Secureline® Marker II



Writes on plastic tissue cassettes, painted or frosted-end microscope slides, ceramic, vinyl, porcelain, metal and Mylar®.

Periodic Acid Schiff's (PAS) Stain Kit

PAS techniques are used to demonstrate polysaccharides, neutral mucosubstances and basement membranes primarily in tissue. The PAS reagent is also called Fielgen Stain for the demonstration of DNA with a different protocol. Kidney is the most sensitive control. The demonstration of glycogen is best represented by a section of liver with a digestion step used as a negative control for staining. The kit is supplied with Harris' Hematoxylin Acidified (Cat. #24245) as a counterstain. Technical Data Sheet #602



Human kidney tissue stained with Periodic Acid Schiff's Stain Kit (PAS).

*Cold pack charge required.

Catalog #	Size
24870-1.25	1.25ml
24871-1.25	1.25ml
24872-1.25	1.25ml
24879-1.25	1.25ml
24880-1.25	1.25ml
24881-1.25	1.25ml
24873-1.25	1.25ml
24874-1.25	1.25ml
24875-1.25	1.25ml
24230-1	1 pen
24231-1	1 pen
21947-1	1 pen
24200-1	1 kit

Peroxidase Blocker, Ready-to-Use A4d

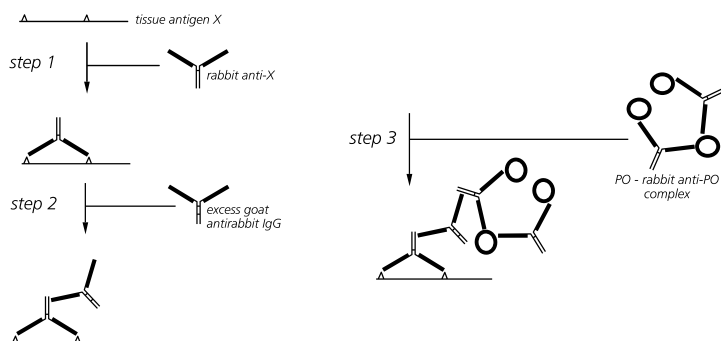


Many tissues contain Endogenous peroxidase and can increase your signal to noise ratio in Immunohistochemistry staining. Ready-to-use formulation can help block background staining and give your IHC slides a cleaner, more specific staining pattern. This 3% solution contains no sodium azide, making disposal easy and cost efficient. Store at 4°C. *When using this blocker on blood smears, prefix smears in Methanol for 5 minutes first.*

Peroxidase-anti-peroxidase (rabbit), lyophilized H4d

Sternberger's peroxidase-anti-peroxidase (PAP) immunocytochemical staining technique employs linkage of the visualizable enzyme horseradish peroxidase through unlabeled antibodies to a tissue antigen. Thus, any antigen for which you can prepare an antiserum can be visualized at the EM or light microscope level. The multiplication factor that is characteristic of enzyme reactions makes this one of the most sensitive assay techniques available.

Technical Data Sheets #194, #194A L.A. Sternberger, "Immunocytochemistry," Prentice Hall (1983)



1, 10-Phenanthroline [66-71-7] HV5g

MW 180.20 mp 114-117° Hygroscopic Formula: $C_{12}H_8N_2$
Yellow flakes. For the determination of Fe, Pd, V and detection of Fe and V.

Phosphomolybdic acid (12-Molybdophosphoric acid) [12026-57-2] BG6d

MW 3939.45 Electron dense metal stain.

Phenol Red, ACS [143-74-8]

(Phenolsulfonphthalein)

MW 354.38 λ max: 360, λ max: 557nm (2nd) Formula: $C_{19}H_{14}O_5S$

Phenol Red is suitable for use as a pH indicator.

Merck 13, 7329, Beilstein 19, V, 3, 457

Photographic Storage Envelopes

Printed glassine, holds 3.25" x 4.25" negatives, 500 per pack	1	03656-500	1 pk
Unprinted glassine, holds 3.25" x 4.25" negatives, 500 per pack	2	19484-500	1 pk
Unprinted glassine, holds 4" x 5" negatives, 500 per pack	3	19485-500	1 pk
Unprinted polyethylene, holds 3.25" x 4-4.25" negs. or plates, 500 per pack	4	07233-500	1 pk



1



2



3



4

Catalog # Size

24776-250 250ml

06382-25 25mg

24137-25 25g

01021-25 25g

25003-25 25g

03656-500 1 pk

19484-500 1 pk

19485-500 1 pk

07233-500 1 pk

Phosphotungstic acid hydrate [12501-23-4] B4g
 MW 2880.2 Negative Stain, EN Bloc Stain.
Principles and Techniques of E. M., 3rd ed., CRC Press, p. 273-279

NEW! Picrosirius Red Stain (Ready-to-Use Kit)



Picrosirius red method. Used to stain collagen I and III. The stain will quantify the amount of collagen in a given area of myocardial tissue, (i.e. the collagen area fraction). Picrosirius Red Stain binds specifically to collagen fibrils of varying diameter that is used to distinguish collagen type I from collagen type III. Collagenous structures of the mandible stain brilliant red. Dentinal tubules, Sharpey's fibers and other structures not easily seen in sections stained with hematoxylin and eosin alone can be seen clearly after this procedure. Under polarized light collagen fibers can be specifically identified and their orientation determined. Picrosirius red-hematoxylin is recommended for examination of normal or pathologic dental specimens.

Puchtler et al., 1973; Junqueira et al., 1979

Plastic, Microscope Slide Cover Slips

Square 22mm x 22mm x 0.157mm thick.

Plastic UV Mount Mounting Media HO5g



Designed for coverslipping epoxy, methacrylate and deparaffinized sections directly from water or alcohol. Plastic UV Mount matches the refractive index of JB-4® embedded sections, since the JB-4® embedding resin is not removed prior to staining. Methacrylate based Plastic UV Mount avoids optical distortion and improves the final image. When applied to sections with a small amount of xylene, Plastic UV Mount "hardens" permanently within 2 minutes with exposure to long UV light, thus obviating leaching of stains. Slides must be coverslipped for viewing. **Refractive index is 1.45 Viscosity: 28 CPS**
 Technical Data Sheet #432

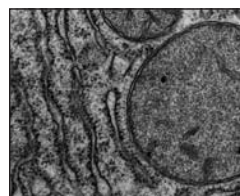
Pneumocystis carinii control slides



Designed to be used with our Fungi-Fluor® Kits (Cat. #17442 and #22363), slides are unstained. Each box contains 10 control slides.
 Technical Data Sheet #483

Poly/Bed® (for histology and electron microscopy)

Polysciences has been the leader in supplying epoxy embedding material to microscopists for many years. Use Poly/Bed for your scientific studies requiring beam stability, low shrinkage and good contrast. Poly/Bed Epoxy formulations are lower in viscosity than Araldite formulations and hence provide better penetration into tissue samples.



Pancreas embedded
 in Poly/Bed® 812

Poly/Bed® 812 Embedding Media [13236-02-7] H4g



Exact WPE number supplied on label, ranging from 140-160.
 Replacement for Epon® 812.
 Technical Data Sheets #233 & #124

Catalog #	Size
23224-25	25g
24901-250	250ml/kit
24901-500	500ml/kit
16601-1	1 box
16866-100	100ml
22251-1	1 box
08791-500	500g

Poly/Bed® Kits - cont.

Poly/Bed® 812 (Luft formulation) Embedding Kit/DMP-30 *BHOV7g*
Kit Contains: 500gm Poly/Bed 812, 450g Dodecenyl succinic anhydride (DDSA),
 450g Nadic Methyl Anhydride (NMA), 100g DMP-30, Instructions included.

Poly/Bed® 812 (Luft formulation) Mini Kit *BHOV7g*
Kit Contains: 50ml Poly/Bed 812, 30ml DDSA,
 20ml NMA, 5ml DMP-30
 Instructions included.



Poly/Bed® 812 Embedding Kit/BDMA (Glauert Version) *BHOV7m*
 This kit configuration provides even lower viscosity for faster diffusion and penetration than
 the standard Luft formulation.

Kit Contains: 200gm Poly/Bed 812, 160ml Dodecenyl Succinic Anhydride (DDSA), 100gm
 Nadic Methyl Anhydride (NMA), 20gm N-Benzyl dimethyl-amine (BDMA)
 Instructions included.

Poly/Bed® 812 Mini Kit/BDMA (Glauert Version) *BHOV7m*
Kit Contains:
 50ml Poly/Bed 812, 40ml DDSA, 25ml NMA, 5ml BDMA.
 Instructions included.



Mixing Chart for Poly/Bed® 812

WPE is Weight Per Epoxide equivalent. From this value, one determines the optimum amount of DDSA or NMA in grams to combine with 100 grams of resin for stoichiometric balance. This minimizes unreacted starting materials and allows control over the hardness for sectioning. The exact WPE value for each lot of Poly/Bed/Araldite Resin is put on the label of each container purchased from Polysciences.

Per 100 grams of Poly/Bed® 812 Resin at WPE	Mix this many grams of DDSA (soft mix)	Mix this many grams of NMA (hard mix)
130	112	102
140	104	95
150	97	89
160	91	83
170	85	78

The hard mix and the soft mix are then blended according to the desired hardness of the particular embedment procedure.

Poly/Bed® Araldite 502 *EHJO7g*
 Mollenhauer developed this Epon/Araldite formula which results in a somewhat softer block than our standard Poly/Bed formula.

Kit Contains: 500g Poly/Bed 812, 500g Araldite 502, 450g DDSA, 100g DMP-30.

Poly/Bed® Araldite 502 Mini Kit *EHJO7g*
Kit Contains: 30g Poly/Bed 812, 15g Araldite 502, 55g DDSA, 5ml DMP-30.

Mollenhauer, Stain Tech., 39, 111 (1964)

Catalog # Size

08792-1 1 kit

21958-1 1 kit

21844-1 1 kit

21959-1 1 kit

02595-1 1 kit

21960-1 1 kit

Poly G Blue, Ready-to-Use Stain CH4ag
Ready to use Coomassie G250 blue stain solution for protein electrophoresis staining applications. Convenient 500ml size saves time and preparation costs. Our ready to use format eliminates the exposure to potentially irritating powdered dyes.

Poly R Blue, Ready-to-Use Stain CH4ag
Ready to use Coomassie R250 blue stain solution for protein electrophoresis staining applications. Convenient 500ml size saves time and preparation costs. Our ready to use format eliminates the exposure to potentially irritating powdered dyes.

Poly/Clear Solvent (xylene substitute) [5989-27-5] EHO4g
MW 136.2

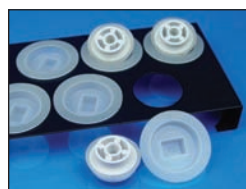
A pleasant citrus odor replaces the strong xylene smell when you switch to Poly/Clear Solvent as your clearing agent. This low-toxicity material is for use in histology and cytology procedures wherever xylene is used. The high flash point and biodegradability of this product makes it an attractive alternative. Poly/Clear is not miscible with all solvent based mounting medium and dissolves both PolyFin and Peel-A-Way Micro-Cut embedding paraffins. Should not be used in the clean cycle of automated processors. Technical Data Sheet #301

PolyCut-Ease A2g
The addition of 0.5 to 1% PolyCut-Ease to any epoxy embedding recipe will enable many stress free sections to be cut from a single area of a knife. It preserves the life of your diamond knife edge as it markedly reduces friction of the knife as it cuts through the plastic. The additive will not change the block color or EM image quality. Does not contain Silicone.
Technical Data Sheet #385 H.J. of EM Tech., 3, 217 (1986)

PolyFin®, Paraffin — See page 84.

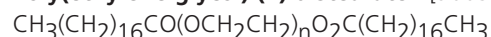
Polyethylene, Embedding Molds

For JB-4®, JB-4 Plus®, Immuno-Bed, L.R.-White®, L.R.-Gold® or Paraffin embedding. This is an embedding system of reusable molds and trays with colored stubs.



12mm x 8mm, package of 100 individual molds	23184-1	1 pkg
16mm x 8mm, package of 100 individual molds	23185-1	1 pkg
19mm x 13mm, package of 100 individual molds	23186-1	1 pkg
Embedding Mold Tray, package of 10 holds 6 molds	23188-1	1 pkg
4mm thin Embedding stubs - white, package of 100	23189-1	1 pkg
10mm thick Embedding stubs - mixed, package of 100	23197-1	1 pkg

Poly(ethylene glycol) (n) distearate [9005-08-7] A2g



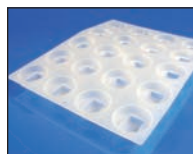
Waxy, water dispersible, solid. Soluble in: IPA, hot water, mineral oil.

MW = Molecular weight of PEG.

MW = 200 ...mp 32-36° TSCA	02298-100	100g
	02298-500	500g
MW = 400 ...mp 35-37° TSCA	01048-100	100g
	01048-500	500g
MW = 6,000 ...mp 52-57° TSCA	19234-100	100g

Polyethylene Molding Trays for Resins

Light-weight, durable plastic trays which are ideal for resin molding specimen blocks with JB-4® and other resins. Used in conjunction with Polysciences' popular and inexpensive Plastic Block Holders (page 58) and Chucks (page 57). The trays are re-useable.



- Polyethylene Molding Cup Trays, 6 x 12 x 5mm (20 cavities)
- Polyethylene Molding Cup Trays, 12 x 16 x 5mm (20 cavities)
- Polyethylene Molding Cup Trays, 6 x 8 x 5mm hexagon (9 cavities), 3 each . .
- Polyethylene Molding Cup Trays, 2 x 15 x 5mm (9 cavities), 3 each . . .
- Polyethylene Molding Cup Trays, 13 x 19 x 5mm (9 cavities), 3 each . .

PolyFreeze (Frozen Mounting Medium) A2g



(for frozen sections and muscle enzyme histochemistry)
Each case contains 6 x 120ml of our PolyFreeze embedding medium. The material sections flawlessly for routine frozen specimen thickness of 4 - 6µm and leaves no residue on the slide. The optimal freezing range of the medium is -8°C or lower. Water soluble.
Technical Data Sheet #678

PolyGlass, Coverslipping medium CH6g

Non-water soluble (xylene/toluene) liquid coverslipping media designed to eliminate the use of coverslips. Non-yellowing and scratch resistant, PolyGlass simplifies the protection of prepared slides. Sold individually or as a case containing 6 x 120ml of PolyGlass.

Viscosity: 149 CPS

PolyGlove Professional Handcream A2g



This professional handcream is a non-greasy, latex-safe product designed for use on hard working, gloved hands. The cream absorbs instantly into hands and provides moisture and comfort, while sealing out problems. To maximize skin care, wash your hands with BactiStop Hand Soap or BactiStop Antiseptic Hand Gel.

PolyGuard, Paraffin Repellent EH5g



A xylene free paraffin repellent, PolyGuard is used to put a protective coating on surfaces exposed to paraffin as well as to clean adhering paraffin off laboratory countertops and equipment. Available in 120ml bottles and cases of 6x120ml, PolyGuard will help keep your equipment and countertops clean and paraffin free.

Poly/LEM fixative (methanol-free, 10% NBF) HM6g

This popular methanol-free fixative is a formaldehyde-based (10% NBF) solution formulated to eliminate the need to select a fixative for tissue prior to knowing the type of microscopy to be employed or having to split the specimen. Technical Data Sheet #303

Catalog # Size

16643A-1 1 unit
16643B-1 1 unit
17177A-3 pkg of 3
17177B-3 pkg of 3
17177C-3 pkg of 3

19636-1 6x120ml

22253-120 120ml
22253-6 6x120ml

24007-1 1 pint
24007-6 6 pints

21168-120 120ml
21168-6 1 case

16864-3.75 3.75L
16864-4 4x3.75L

Poly-Mount® CH5g

 A crystal clear medium providing superior optical clarity. The viscosity permits bubble-free applications with minimal spreading and excellent adhesion of coverslips. Poly-Mount® is perfect for coverslipping and long term storage. It is non-water soluble, miscible with toluene and xylene. Packaged in 940ml bottles for bulk applications or convenient 120ml squeeze bottles. Poly-Mount® is also available in larger package sizes for higher volume users, please ask for a quotation. Technical Data Sheet #432
 Refractive index: 1.484 Viscosity: 192 CPS

Poly-Mount® Xylene CH6g

 A xylene-based mounting medium recommended for use with automatic coverslippers. Can also be used for manual coverslipping procedures.
 Viscosity: 107 CPS
 Technical Data Sheet #432

Poly-NoCal (Decalcifying Solution) B4g
 A hydrochloric acid/EDTA formula that removes calcium from tissue using both a chelating and acid reaction. Buffers are also included in this solution to help prevent cellular swelling or distortion. This solution is a rapid decalcifier used on fixed tissue specimens. Technical Data Sheet #523

Poly-NoCal & Fixative (Decalcifying Solution) BHM6g

 A formic acid and formaldehyde based solution that fixes and decalcifies in one step. Small histological specimens, such as bone marrow, will achieve softening sufficient for sectioning in four hours.
 Technical Data Sheet #523

Poly-NoCal Decalcifying EndPoint Determination Kit

 Includes all the necessary materials you need to determine endpoint decalcification by chemical analysis. The test depends on the detection of calcium in the used decalcifying solution. For use with less than 15% organic acid decalcifiers such as Poly-NoCal and Poly-NoCal & Fixative.
 Technical Data Sheet #524
Kit Contains: 500ml 5% Ammonium hydroxide, 250ml 5%, Ammonium oxalate, pH papers, measuring vials

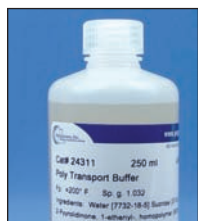
PolyPAGE-40 liquid solutions: 3 years of stability

By varying the monomer (acrylamide) and crosslinker (bisacrylamide) concentrations in a poly-acrylamide gel, one can optimize the pore size of the gel to give the best separation and resolution for your specific molecule. Polysciences offers the following convenient ready to use liquid formulations. Each PolyPAGE-40 product is specially produced to ensure maximum stability and shelf life and is guaranteed for 3 years.

40% (wt./vol.) acrylamide/bisacrylamide 19:1 solution HMO6d
 40% (wt./vol.) acrylamide/bisacrylamide 29:1 solution HMO6d
 40% (wt./vol.) acrylamide/bisacrylamide 37.5:1 solution HMO6d
 40% (wt./vol.) acrylamide/bisacrylamide 37.5:1 solution HMO6d

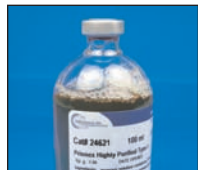
Catalog #	Size
08381-120	120ml
08381-940	940ml
Available in larger quantities, Please call for quote.	
24176-120	120ml
24176-940	940ml
24164-1	1L
24163-1	1L
24119-1	1 kit
24170-6	6x100ml
24169-6	6x100ml
24165-100	100ml
24165-6	6x100ml

PolyTransport Buffer A2g



Used to transport and preserve specimens from surgery to the point of grossing and fixation prior to further processing. PolyTransport Buffer prevents proteins from denaturing or crosslinking and prevents bacterial growth. PolyTransport Buffer also contains a cryoprotectant to prevent ice crystal formation during rapid freezing techniques and a membrane stabilizer to prevent membrane lysis. No washing of specimens necessary prior to placing in fixative or rapid freezing. Technical Data Sheet #631

Prionex® - Non BSA Alternative



Polypeptide fraction of highly purified dermal collagen of porcine origin which has excellent protein stabilizing properties. Free from cartilage, bone and plasma components and can therefore be considered as an extremely pure form of gelatine type A. Useful in PCR, cell cultures, etc.

PROMASTER® Lens Cleaning Brush



This handy lens cleaning tool removes fingerprints, smudges and grease marks with ease and is compact enough to fit in your pocket!

PROMASTER® MicroClean Cleaning Cloth



A special high-density treated fabric that absorbs oils and easily removes fingerprints, dust and other particles from delicate lens and LCD surfaces, leaving them sparkling clean and clear. The MicroClean cloth is safe for use on all coated optical surfaces as well as glass, polycarbonate and LCD surfaces. Machine Washable. Includes Case. Dimensions: 8" x 8"

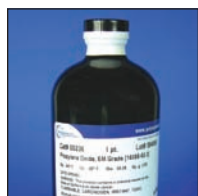
Propidium iodide, 95% [25535-16-4] *HVWX6g*

MW 668.41 mp 220-225° λ max: 493nm

Fluorescent marker. Used as a nuclear counterstain and for In situ Hybridization (ISH).

J. Histochem. Cytochem., 35, 123 (1987)

Propylene Oxide, EM Grade [75-56-9] *BCHV6g*



MW 58.1 bp 34° d 0.83

This solvent is used in the last stage of dehydration for epoxy embedding.

Protargol S™, certified (Silver protein) [9008-42-08] *H4g*

The recognized standard silver albumose (silver protein) for staining nerve tissue.

Technical Data Sheet #400 *Anat. Rec.*, 65, 89 (1936); *Lab. Med.*, 4, 40 (1973)

Protein A, unconjugated, lyophilized *H4d*

Protein G, unconjugated, lyophilized *H4d*

Catalog # Size

24311-250 250ml
24311-500 500ml

24621-100 100ml

24316-1 1 brush

24317-1 1 cloth

03748-100 100mg

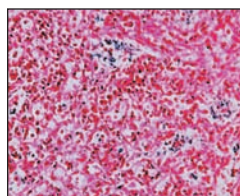
00236-1 1pt

01070-5 5g
01070-25 25g

23876-5 5mg
23878-1 1mg

Prussian Blue, Iron Stain Kit H4g

Prussian Blue or Perls' reaction is used to demonstrate ferric iron and ferritin. This is not a true staining technique, it is a histochemical reaction. The protein is splitoff by the hydrochloric acid, allowing the potassium ferrocyanide to combine with the ferric iron. This forms the ferric ferrocyanide or Prussian Blue color for which the stain is named. Technical Data Sheet #601



Human kidney tissue stained with Prussian Blue iron Stain Kit.

Purple Marking Dye for Tissue H6gm

For a complete description of our Tissue Marking Dye Kits and individual tissue marking dyes, see page 105.

Pyronin Y, C.I. 45005, certified [92-32-0] U5g

MW 302.8 λ max: 552nm

Used in combination with methyl green for the selective and differential staining of nucleic acids. Pyronin Y stains RNA red, while the methyl green stains DNA green. The combined methyl green-Pyronin Y stain is a useful histochemical reagent. Pyronin Y can also be used as a tracking dye for polyacrylamide gel electrophoresis.

Stain Technol., 27, 233 (1952); Clark, G., *Staining Procedures*, 4th ed., Williams and Wilkins 1981; p199

Pyroxylin, 23% solids solution in ethyl acetate CHV7g

(Celloidin; Nitrocellulose; Parlodion; Collodion). Used for making thin films for support grids.

NEW! Quartz Microscope Slide Cover Slips — See page 75

NEW! Quartz Microscope Slides — See page 77

Quetol 651

See *Ethylene glycol diglycidyl ether*, page 37.

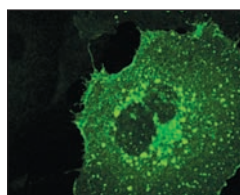
Quetol 651 Embedding Kit (for histology and electron microscopy) HO7g

Fast penetrating epoxy embedding medium. Water miscible. Polymerized blocks section easier than ordinary epoxy resin mixtures and show excellent electron image contrast. Acts as a dehydrating agent. Technical Data Sheet #297

Kit Contains: 100ml Quetol 651, 250g NSA, 30ml DMP-30. Instructions included.

Rabbit Anti-Green Fluorescent Protein Antibody H4d

Green Fluorescent Protein (GFP) was originally discovered in *Aequorea victoria*, a luminescent jellyfish. GFP is useful for gene expression studies. Anti-GFP antibodies have been used for immunohistochemical detection, purification via immunoprecipitation, protein-protein interaction studies, Western Blotting and ELISA-based assays. Polysciences' polyclonal Anti-GFP antibody can be used for detection and purification of GFP tagged proteins and reacts with a number of variants of *A. victoria* GFP. Specificity: Reacts with variants of *Aequorea victoria* GFP, such as S65T-GFP, RS-GFP and EGFP. Technical Data Sheet #609



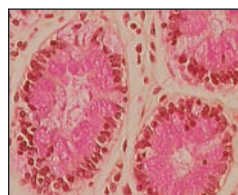
Rabbit Anti-GFP for Immunohistochemical detection and immunoprecipitation of chimeric GFP proteins.

Rabbit IgG, whole molecule, lyophilized H4d

Catalog #	Size
24199-1	1 kit
24120-2	2oz btl
24120-8	8oz btl
18614-5	5g
18614-25	25g
06456-50	50g
01479-100	100g
16908-1	1 kit
24240-0.1	0.1mg
24240-0.2	0.2mg
23874-10	10mg

Rapid Mucin Stain Kit

Secretions of mucins are produced in several areas including epithelial and connective tissue. Inflammation can cause secretion of mucin as well as some types of intestinal carcinomas. The use of a Rapid Mucin stain will quickly determine the presence of mucin and assist in the direction of other special stains or immunohistochemistry to determine the origin of the mucin producing cells. The entire kit procedure takes 12 to 15 minutes after paraffin removal. Technical Data Sheet #600



Human colon tissue, stained with Rapid Mucin Stain Kit.

NEW! Rhodamine 6G, C.I. 45160, certified [989-38-8]

(Basic Red 1) MW 479.01 Formula: $C_{28}H_{31}N_2O_3Cl$

Used as a tracer dye within water to determine the rate and direction of flow and transport. Rhodamine dyes fluoresce and thus can be detected easily, used extensively in fluorescence microscopy, flow cytometry, fluorescence correlation spectroscopy and ELISA.

Saengkhae, C., et al, *Biophys. J.* 85, 2006-2014, (2003)

Rhodamine B isothiocyanate, mixture of isomers [36877-69-7] U5g



MW 536.1 λ max: 555nm

Fluorescent marker for proteins. Used as a counterstain in conjunction with FITC. Also used for staining in immunohistochemistry reactions in IHC and histology.

J. Bacteriol., 83, 1358 (1962); *Arch. Biochem. Biophys.*, 133, 263 (1969)

Rhodamine WT, 5% aqueous solution H4g

Exc max: 554nm Emiss max: 579nm Water leak tracing dye.

NEW! Rose Bengal, C.I. 45440, certified [632-69-9]

(Acid Rose 94; Aniline Rose; Bengal Rose B sodium salt; 4,5,6,7-Tetrachloro-2',4',5',7'-tetraiodofluorescein sodium salt)

MW 1017.64 Formula: $C_{20}H_2Cl_4I_4Na_2O_5$ Certified Biological Stain

Rose Bengal can be used as an alternative to phloxine B in Kreyberg's stain for keratin and mucus. Useful for detecting bacteria in soil.

Merck 13, 8343, Beilstein 19, IV, 2926

Rosolic Acid, C.I. 43800, certified [603-45-2]

(Synonyms: Parasolic Acid; 4-[Bis(hydroxyphenyl)methylene]-2,5-cyclohexadienone; Aurin)

MW 290.31 λ max: 482nm Formula: $C_{19}H_{14}O_3$

Rosolic acid is an organic compound, forming yellowish or deep-red crystals with greenish metallic luster. Practically insoluble in water and freely soluble in alcohol. Soluble in strong acids to form a yellow solution or in aqueous alkalis to form carmine red solutions. Due to this behaviour it is suitable to be used as a pH indicator with pH transition range 5.0-6.8.

Merck 13, 885, Beilstein 8, IV, 2646

Ruthenium hexamine trichloride [14282-91-8] H4g

MW 309.61 Electron microscopy stain.

J. Histochem. Cytochem., 31, 717 (1983)

Ruthenium red [11103-72-3] H4g

MW 858.42 λ max: 534nm

Stain for polysaccharides and for elastic fiber in tissue. Also a myoneural junction stain.

J. Cell Biol., 57, 874 (1973)

Catalog # Size

24208-1 1 kit

25004-25 25g

25004-50 50g

00374-250 250mg

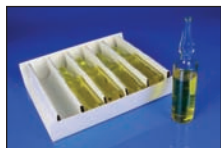
19922-4 4x8oz

25005-25 25g

25006-25 25g

17253-1 1g

01098-1 1g

Ruthenium tetroxide, 0.5% stabilized aqueous solution [20427-56-9] *U5g*

Ruthenium tetroxide is a stronger oxidizer of biological and polymeric material when compared to osmium tetroxide. It is supplied in pre-scored ampoules each with its own ampoule cracker. Recommended storage is 4°C in refrigerator.

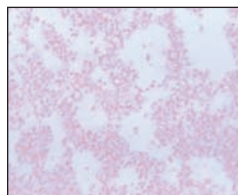
Hayat, M.A., Fixation for E.M., Academic Press, NY, 1981, page 194.

Safranin O, C.I. 50240, certified [477-73-6] *H5g*

(Basic red 2; 3,7-Diamino-2,8-dimethyl-5-phenylphenazinium chloride) MW 350.85 λ max: 530nm

A general biological stain. Used as a nuclear stain for histological studies. Can also be used as a cationic lipophilic probe and in the detection of glycosaminoglycans and proteoglycans.

Eur. J. Biochem., 194, 389 (1990); Biochem. Int., 24, 485 (1991)

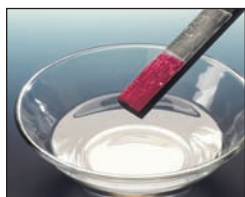


Francisella tularensis using a Safranin stain, Magnified 1000X. Image courtesy of CDC Public Health Library / Dr. P. B. Smith.

NEW! Saffron, C.I. 45160, certified [42553-65-1]

(Crocine, Gram Stain)

Saffron is used in a variety of histological staining methods including the Hematoxylin, Phloxine and Saffron (HPS) staining technique. The HPS stain demonstrates collagen in connective tissues. Hematoxylin, stains acidic structures such as DNA, purple. Phloxine, stains most proteins pink and Saffron stains collagen yellow.

SAR-GEL® Water Indicating Paste

- White paste turns red on contact with water
- Useful in detecting water content in laboratory recycled reagents, as well as other stain line reagents and solvents such as xylene and absolute alcohol

Water indicating paste provides a fast, reliable way to detect water bottoms in storage tanks containing gasoline and gasoline/alcohol blends, diesel, jet fuel, fuel oil, solvents and other materials.

Scissors, Stainless Steel

Angle, stainless steel

Iris, stainless steel, 4 1/4"

Scissors, Vannas Straight, 5mm Blades

Straight Cutting Edge, Vannas Microscissors. Useful for cutting NeuroVue® Dye Coated Filters for neuronal tract tracing studies. 5mm blades.

Scissors, Vannas Capsulotomy, Straight, 3mm Blades

Vannas Capsulotomy Micro Scissors. Straight Edge. Useful for cutting NeuroVue® Dye Coated Filters for neuronal tract tracing studies. 3mm blades.

Scissors, Vannas Capsulotomy, Straight, 7mm Blades

Vannas Capsulotomy Micro Scissors. Straight Edge. Useful for cutting NeuroVue® Dye Coated Filters for neuronal tract tracing studies. 7mm blades.

Catalog #	Size
18253-5	5x10ml
18253-10	10x10ml
18253-25	25x10ml
02782-25	25g
25007-25	25g
24615-1	1oz tube
24615-12	12x1oz
07389-1	1 unit
07390-1	1 unit
24839-1	1 unit
24908-1	1 unit
24856-1	1 unit

Scissors, Gills A - Welsh Vannas, Straight, 11mm Blades
Gills A - Welsh Vannas Micro Scissors. Straight Cutting Edge. Useful for cutting NeuroVue® Dye Coated Filters for neuronal tract tracing studies. 11mm blades.

Scott's Bluing Reagent A2g
A gentle formulation of "bluing" reagent for those specimens that may be affected by more harsh "bluing" agents. Our premixed and ready to use solution provides rapid bluing and crisp nuclear detail obtained with routine Hematoxylin and Eosin stains. For use in both Cytology and Histology.

Section Pick-up Loop
 Section Pick-up Loop for picking up floating ultra-microtome sections, freezing fracture replicas, etc. Interchangeable Nichromium loops may be fitted into vise type holder.
Size: 0.5mm

NEW! SHUR/Trim™ Paraffin Block Dewaxer
Block trimming has never been easier or safer - eliminate cut hands and fingers.

 The SHUR/Trim Paraffin Block Dewaxer is an efficient laboratory tool for removing excess paraffin from embedding tissue cassettes. Simply slide paraffin blocks across the heated grooved surface. Melted paraffin is shaved away to disposable receptacle below. Preparing embedded tissue blocks for insertion into microtome quick release clamps has never been easier or safer. Weight: 5 lbs. (3kg)

Dimensions: 6" W x 9" D x 7" H (15 x 23 x 18cm) 115 VAC, 50/60 Hz, 4 Amps.

Silane Modifiers for Glass Surfaces

 Alkoxysilanes react with glass and other silaceous materials in the presence of water to form covalently bound siloxane sites. Traces of ambient adsorbed water are sufficient to produce this reaction.

3-Aminopropyltriethoxysilane [919-30-2] *B7bd*
MW 221.4 d 0.951 n_D²⁰ 1.423 bp 122°/30mm

3-Methacryloxypropyltrimethoxysilane [2530-85-0] *EH5g*
MW 248.4 d 1.045 n_D²⁰ 1.429 bp 80°/1mm

Silver Enhancement Kit for Light Microscopy
Two component kit for use with both 1nm & 5nm immunogold labels which gives excellent results with silver enhancement. Adequate amplification is usually obtainable in a period of 5-10 minutes and can be monitored with a microscope. The enhancement is performed by mixing together one drop of each solution on a slide.

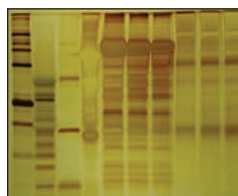
Kit Contains: 15ml of each component. Instructions included.

Silver nitrate [7761-88-8] *BG6g*
MW 169.89 Assay: 99.9% min. Silver content: 63.5% No insoluble matter. Equal to or better than ACS specifications. Silver stain techniques are widely used to detect nanogram quantities of proteins following electrophoresis. Silver nitrate is the silver source in most histology silver stain procedures. *Anal. Biochem.*, 156, 96 (1986)

Catalog #	Size
24855-1	1 unit
24605-100	100ml
24605-1	1gal
24179-1	1 loop
24980-1	1 unit
01983-250	250g
02476-250	250g
22708-1	1 kit
01125-25	25g
01125-100	100g

Silver Stain Kit BHMV7g

Silver staining is a highly sensitive method for detecting proteins in polyacrylamide slab gels. Most silver staining protocols are time consuming, complicated and dependent upon the purity of the reagents. Silver Stain Kit is simple, stable, controllable and very rapid. Our method is sensitive to proteins in the nanogram range and may be used either before or after Coomassie blue staining. Staining for proteins is initiated in an alkaline environment. Protein amino groups as well as cysteine and methionine sulfur groups are complexed with silver cations. Kit consists of six solutions preformulated with the highest purity reagents. 25 slab gels can be stained with one kit. Technical Data Sheet #293



Gel stained with Silver Stain Kit.

Kit Contains: Sodium Hydroxide, Formaldehyde, Ammonium Hydroxide, Detergent, Silver Nitrate, Citric acid, 3cc syringe, 23G 3/4 (19.0mm) needle

Microscope Slide Holder, Neat Stain

Durable slide holder. Adjusts to hold 2-5 slides for easy processing. Excellent for use with our Neat Stain Stain Kits, see pages 45, 52 and 106.

Sirius red, C.I. 35780 (Direct red 80) [2610-10-8] *H4g*

MW 1373.09 λ max: 528nm Cardiac muscle, collagen and cartilage stain.
Stain Technol., 62, 23 (1987); *J. Histochem. Cytochem.*, 41, 465 (1993)

Sodium dodecyl sulfate [151-21-3] *HO3g*

(SDS; Dodecyl sulfate, sodium salt; Sodium lauryl sulfate)
MW 288.38 mp 204-207° Assay as C₁₂: 99+% min.
Heavy metals: 10ppm max. Free fatty alcohols: 0.2% max. pH value of 1% solution: 6.0-7.5
Phosphate: 0.0001% max. O.D. of 1% aqueous solution at 230-350nm <0.1 max.
Not to be confused with commercial grades that contain C₁₀ and C₁₄ sulfates. Useful for the separation of proteins by polyacrylamide gel electrophoresis. Also useful as an anionic surfactant. Technical Data Sheet #299
Anal. Biochem., 74, 567 (1976); 81, 9 (1977); 85, 86 (1978); 214, 490 (1993); *Colloid Polymer Sci.*, 272, 141 (1994)

Sodium Phosphate Storage Buffer A2g

0.02M PBS with biocide (0.1% sodium azide), blocking protein BSA and glycerol.
For the storage of protein bound microspheres, IHC, ISH.

Sodium Polyanethole Sulfonate [52993-95-0] *AH4g*

Formula: [CH(C₆H₃[SO₃Na]OCH₃)CH(CH₃)-]_x
For inhibition of blood coagulation in vitro and to stabilize colloidal solutions like milk and gelatin.

Sodium Thiosulfate Pentahydrate, ACS Grade [10102-17-7] *H2g*

MW 248.18
Used to remove silver bromide crystals that remain in the photographic emulsion after latent image development. *Techniques of Autoradiography, Rodgers*, 25 (1973)

Soft Block A2g



Unique formula for softening difficult to cut tissue in paraffin. Effective on bone, nails and tissue. Easy to use, just soak pre-trimmed block surface in Soft Block for 5-15 minutes (depending on tissue size) and cut sections. Soft Block is environmentally safe. Special waste disposal is not required and will not damage equipment.

Catalog #	Size
16717-1	1 kit
25033-1	1 holder
09400-10	10g
09400-25	25g
03945-100	100g
03945-1	1kg
24171-20	20ml
24139-5	5g
06728-100	100g
24616-500	500ml
24616-1	1 gal

Soft Nail A2g
For really hard complex keratinized hair, nail and skin samples common in Mohs Histology laboratories. Hair, nail and skin samples that have been processed tend to flex and turn becoming difficult to cut and hold on slides for staining. Processing tends to harden these tissue samples and presents the challenge of cutting complete sections or sections without "venetian blind effect". Soft Nail is a unique formulation to soften keratin to allow for cutting. (not a decalcification solution)

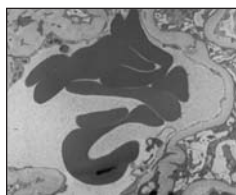
Advantages:

- Easy to use, no mixing required
- Keratinized samples cut and stain with greater ease
- Prevents tissue samples from shredding and tearing
- Alleviates tissue samples from folding on slides
- Breaks down the fibrous structural protein of hair, nail, horn, hoof, feathers and skin
- Useful in Mohs Laboratories, Veterinary Histology and Podiatry Nail Histology



Spurr Low Viscosity (for electron microscopy)

The low viscosity of the Spurr formulation allows rapid infiltration into tissues, minerals and other dense structures. A low viscosity of 60cps allows easy penetration into a variety of difficult materials. It can be used to prepare mineral specimens for polishing. Facilitates embedding of samples with high lipid content, hard membranes, or highly vacuolated *parenchymous* tissues.



Microscopic blood clot in glomerulus of the human kidney after transplant. Image Courtesy: Peggy Wills, Harris Medical Labs

Spurr Low Viscosity Mini Kit H MV7g 21961-1

1 kit

Kit Contains: 55ml Nonenylsuccinic anhydride (NSA), 20ml ERL-4221, 12ml DER736, 1ml Dimethylaminoethanol (DMAE), 3x10ml syringes, 1x5ml graduated syringe and 2 wooden mixers.

Spurr Low Viscosity Embedding Kit H MV7g 01916-1

1 kit

Kit Contains: 450g Nonenylsuccinic anhydride (NSA), 250g ERL-4221, 250g DER736 and 100g Dimethylaminoethanol (DMAE). Technical Data Sheet #127

Ultra Low Viscosity Embedding Kit (for electron microscopy) E HOV7g 17706-1

1 kit

ERL-4221 is useful for rapid embedding of materials which are difficult to infiltrate even with Spurr's resin. Exhibits good sectioning qualities, beam stability and staining properties. Miscible with alcohol or acetone so propylene oxide can be avoided. For EM and LM. Not water soluble. Instructions included. Technical Data Sheets #127 & #354

Kit Contains: 1x100g ERL-4221, 2x100g Octenyl Succinic Anhydride, 1x25g 1,4-Butanediol Diglycidyl Ether (BDE), and 1x100g Dimethylaminoethanol (DMAE)

Stains-all (Carbocyanin DBTC) [7423-31-6] H 5g 03943-1

1g

MW 559.6 λ max: 595-597nm
Stains proteins red, DNA blue and RNA bluish-purple. Also useful for staining acid polysaccharides. *Biochim. Biophys. Acta*, 264, 73 (1972); *Anal. Biochem.*, 29, 421 (1969); 56, 43 (1973); *J. Histochem. Cytochem.*, 22, 1169 (1974)

Stirrer, portable, for microfuge tubes, "Biovortexer"



This is a hand-held, portable unit allows mixing of samples directly in centrifuge tubes or small vials. It is light weight, easy to use and battery powered. The disposable polypropylene stirring rods come with the unit and eliminate cross contamination of materials.

Replacement stirrers
1/8" x 2", 1000 per package.

Catalog #	Size
21747-1	1 unit
21748-1	1 pkg
23858-5	5mg
23864-1	1mg
23860-1	1mg
23861-1	1mg
23862-1	1mg
23863-1	1mg
25008-25	25g
00346-1	1 kit

Streptavidin Reagents

Streptavidin, unconjugated, lyophilized H4d	23858-5	5mg
Streptavidin-AMCA conjugate, lyophilized H4d	23864-1	1mg
Streptavidin-Fluorescein conjugate, lyophilized H4d	23860-1	1mg
Streptavidin-Peroxidase conjugate, lyophilized H4d	23861-1	1mg
Streptavidin-Rhodamine conjugate, lyophilized H4d	23862-1	1mg
Streptavidin-Texas red conjugate, lyophilized H4d	23863-1	1mg

Streptavidin Coated Microspheres — *Microspheres / Particles Section, page 241.*

Super PAP Pen & Super PAP Pen – Fine Tip — *See page 87*

NEW! Sudan Black B, C.I. 26150, certified [4197-25-5]

(Ceres black BN, Fat Black HB, Solvent Black 3) Certified Biological Stain

MW 456.54 λ max: 415nm (2nd), λ max: 598nm Formula: $C_{29}H_{24}N_6$

Sudan Black B is useful for staining neutral triglycerides and lipids on frozen sections and some lipoproteins on paraffin sections. It has the appearance of a dark brown to black powder with maximum absorption at 596-605 nm and melting point 120-124°C. It stains blue-black. Sudan Black B is one of the dyes used for Sudan staining. Similar dyes include Oil Red O, Sudan III, and Sudan IV.

J. Biochem. Biophys. Methods 21, 9, (1990) Abstract, Penny, DP et al, Analysis and testing of biological stains - The Biological Stain Commission Procedures. Biotech. Histochem. 77(5&6), 237-275, (2002), Merck 13, 8970

2,4,6-sym-Collidine buffer kit, EM grade HX7g



A biologically stable buffer used with osmium tetroxide and other fixatives for Electron Microscopy (EM). Our sym-Collidine provides better stability and buffering capacity than traditional veronal acetate buffers. When half neutralized by hydrochloric acid, Collidine is a most efficient buffer in the pH 7.4 range where osmium tetroxide is most effective. Technical Data Sheet #111

Kit Contains: 5 x 5.34ml of Collidine and 5 x 18ml of 1.0N HCl. Makes 1000ml of buffer

Bennet, H.S. & Luft, J.H., J. Biophysics & Biochem. Cytol. 6, 113 (1959);

Hendrickson, A., et al., Stain Tech., 43, 175 (1968)

Szechrome Reagents

The Szechrome reagents listed below are nontoxic reagents specific for nitrate or nitrite ions in sea or lake water, soil, plant and meat extracts, biological fluids and fertilizers. These sensitive reagents react rapidly to produce stable colors suitable for precise quantitative determinations or rapid estimations in routine field work. Szechrome reagents offer several advantages over other methods for nitrate/nitrite testing: stable, not toxic, stable color develops rapidly and is not temperature sensitive. Szechrome NAS reagents produce color reactions which are specific and proportional to the nitrate content of the sample tested. Szechrome NIT is similarly specific for nitrite ions. Technical Data Sheet #239



Szechrome NAS U3g
Optical density (OD) at 570nm after 5 min. development is proportional to nitrate in the range of 2-20ppm.

Szechrome NIT H3g
This reagent develops a stable bluish-red color (λ max: 545nm) proportional to nitrite in the range of 0.03-2ppm.

Microb. Ecol., 6, 95 (1980); *Talanta*, 19, 1429 (1972); *Isr. Chem. Soc. 43rd Annual Meeting Proceedings*, 1975; pp106-107

Tannic acid, EM grade [1401-55-4] HM4abg
(Tannin; Gallotannin; Gallotannic acid) MW 1701.23
Useful as an EM fixative for negative staining. Also useful for enzyme immobilization and protein adsorption. *J. Microscopy*, 137, 57 (1985); *J. Chromatogr.*, 207, 13 (1981)

Tape, Silver Coated, Polyester
Used for making boats for glass knives. Silver 9mm x 66m

Taylor's Blue (3,7'-Bis(dimethylamino)-1,9-dimethyldiphenothiazin-5-ium chloride) — See page 18.

TB Fluorostain Kit
Fluorochrome staining of mycobacteria in an acid-fast smear offers several advantages over traditional carbol-fuchsin methods. Lower magnification is required; fluorescent mycobacteria stand out brightly on a darkened background. Smaller numbers of mycobacteria are easily identified with a fluorescent stain. The TB Fluorostain Kit offers a fast, fluorescent, microwaveable staining method for mycobacteria. Technical Data Sheet #488



Kit Contains: 525ml of Staining Solution A, 500ml of Acid Solution B, 500ml Counterstaining Solution C

TDMAC (Tridodecylmethylammonium chloride) [7173-54-8] HK4bg
MW 572.49 mp 110-112°



Used in chloride-selective solvent polymeric membrane electrodes. Also used in the production of TDMAC-heparin which is used as an antithrombogenic coating for catheters and tubing. Technical Data Sheet #172

Microchim. Acta, II, 235 (1978); *Microchim. Acta*, III, 1 (1984);
J. Biomed. Mater. Res., 7, 145 (1973)

Catalog # Size

08762-5 5g

08764-5 5g

04459-100 100g

08419-1 1 roll
08419-10 10 rolls

22422-1 1 kit

01595-5 5g
01595-25 25g

TDMAC-heparin (Tridodecylmethylammonium heparinate) *CHVW7d*

TDMAC-heparin has proven to be an effective antithrombogenic coating when applied to a variety of materials used to make catheters and tubing. For most materials a simple immersion of the device to be coated, air drying and sterilization are sufficient to provide an antithrombogenic surface that will resist clot formation. Technical Data Sheet #172

Trans. Am. Soc. Artif. Int. Organs, 15, 1 (1969); 18, 312 (1972); *Am. Thor. Surg.*, 14, 219 (1972); *J. Biomed. Mater. Res.*, 7, 145 (1973)



TDMAC-heparin, 2% (w/w) solution (~1,000 USP units/ml)

03921-50

50ml

TDMAC-heparin, 7% (w/w) solution (~3,500 USP units/ml)

03813-25

25ml

Terry's polychrome methylene blue 2% aqueous *A2g*

09978-470

470ml

A STAT staining method for unfixed and fixed tissue.

Excellent for frozen sections.

J. Lab. Clin. Med., 8, 3 (1922)



Tetrachrome stain, certified (MacNeal) [81142-52-1] *H4g*

02783-5

5g

λ max: 640 (524)nm

Blood stain similar to Wright's stain.

Also useful for staining bone sections.

Conn's Biological Stains, Williams & Wilkins, 9th ed., 1977, p 606



Thiazole orange [107091-89-4] *HK6g*

19352-25

25mg

MW 476.32 mp 270° (dec.) λ max: 512nm

Dye content: ~90% Fluorescent dye for reticulocyte analysis. Also useful for *Plasmodium* species analysis in Hematology.

Cytometry, 7, 508 (1986); 8, 568 (1987); *Angew. Chem.*, 111, 2340-2343, (1999);

Agnew. Chem. Int. Ed., 38, 2203-2206, (1999)

Thiocarbamyl nitroblue tetrazolium chloride (TCNBT) [36889-43-7] *HU4ad*

01165-1

1g

MW 935.93 mp 192° (dec.) Useful for assay of dehydrogenases.

J. Histochem. Cytochem., 15, 1 (1967)

Thiocarbohydrazide* [2231-57-4] *HPW7g*

01211-25

25g

(Carbonothioic dihydrazide; Thiocarbazine) MW 106.15 mp 171° (dec.)

Useful for the histochemical and ultracytochemical demonstration of glycomacro-molecules. Also useful for the enhancement of the fine structure of cytomembranes by osmium-thiocarbohydrazide bridging. Technical Data Sheet #184

J. Histochem. Cytochem., 29, 682 (1981); 32, 455 (1984)

Thionin, C.I. 52000, certified [78338-22-4] *U3g*

01220-10

10g

(Lauth's violet) MW 287.34 λ max: 598nm

A metachromatic, cationic thiazine dye that is used widely as a biological stain, especially in histology. Useful as a metachromatic stain for brain tissue and as a Nissl stain.

Stain Technol., 25, 195 (1950); 49, 49 (1974)

*Poison pack charge required.

Timer, up or down, pocket size



Counts up or down from 1 second to 24 hours. Alarm memory, turns off automatically. Includes clip, stand, magnet and 1.5 volt battery. Dimensions: 2.5"x 2.25"

Timer, 5 channel, pocket size, 100 hours



Five independent channels which count up or down for any interval from 1 second to 100 hours. Large display indicates channels in use. Each has 1 minute alarm. Automatically begins to count up to indicate time elapsed after count down reaches zero. Memory recalls last timer setting for reuse. Also has a clock mode. Includes a stand, pocket clip and a magnet. Dimensions: 2.7"x2.5"x 0.5". Weight: 2 ounces.

Tinuvin P® [2440-22-4] *HO4g*

(2-(2'-Hydroxy-5'-methylphenyl)-benzotriazole, min. 99%)

MW 225.2 mp 128-132° d 1.40 λ max: 340nm

A highly efficient UV absorbent (absorbs UV between 270-340nm) used in polystyrene, polyester, polycarbonate, Perspex, polyethylene, ABS resin, epoxy resin and cellulose resin. Absorbs almost no visible light, making it useful for colorless transparent and pale colored products. Can be used in plastic products for food. Yellow granules.

Tissue Capsules, Peel-A-Way®



Resistant to most chemicals and acids used in processing. Provides three compartments for average size specimens and a removable divider for larger (34mm) specimens. They are weighted to assume an upright position for complete exposure during processing. Excellent for whole rat and mouse brains or large neuro samples. 12 pieces per carton. Technical Data Sheet #433

Tissue Cassette IV

This type of cassette allows infiltration, embedding, sectioning and filling steps to be done with a single specimen container. They have a plastic lid and base which are resistant to solvents, microwaving techniques and decalcifying solution. Their universal size fits all popular base molds.

The unique patented design permits maximum fluid exchange and drainage. All cassettes are 32mm length, 26mm width and 5mm deep and are available in different colors. They are designed for use with all paraffin microtome cassette clamps.



Blue

Yellow

Pink

Catalog # Size Price

21970-1 1 unit

18956-1 1 unit

21363-25 25g

19802A-1 1 carton

21468-250 250/pk

21469-250 250/pk

21471-250 250/pk

Marking Dye Kit for Tissue - 7 Color H6gm



Our tissue marking dye kit makes marking the margins of excised tissue specimens easier than ever before. The kit contains opaque pigments formulated for adherence to the tissue surface and the seven colors were selected to avoid confusion with routine histological stains. The viscosity allows an even, thin coating of pigment, penetrating the tissue surface slightly to allow it to remain visible through tissue processing. No secondary chemicals needed to fix dye to tissue. Technical Data Sheet #445

Kit Contains:

Seven 2oz. bottles of dye: blue, black, yellow, red, green, orange & purple, convenient wood bottle holder and application sticks

Marking Dye Kit for Tissue - 5 Color H6gm



Kit Contains: Five 2oz. bottles of dye: blue, black, yellow, red, green, convenient wood bottle holder and application sticks

2oz. & 8oz. Marking Dye Replacement Bottles:

Red Marking Dye for Tissue H6gm

Green Marking Dye for Tissue H6gm

Blue Marking Dye for Tissue H4gm

Yellow Marking Dye for Tissue H6gm

Black Marking Dye for Tissue H6gm

Orange Marking Dye for Tissue H6gm

Purple Marking Dye for Tissue H6gm

Catalog # Size

24772-1 1 kit

PolyPointer ⚡

Our Tissue Marking Dye stays bright through xylene, alcohol, fixatives and paraffin infiltration.

24108-1 1 kit

24109-2 2oz btl
24109-8 8oz btl
24110-2 2oz btl
24110-8 8oz btl
24111-2 2oz btl
24111-8 8oz btl
24112-2 2oz btl
24112-8 8oz btl
24113-2 2oz btl
24113-8 8oz btl
24117-2 2oz btl
24117-8 8oz btl
24120-2 2oz btl
24120-8 8oz btl



Tissue-Tack™, Adhesive *H5gm*
For adhering tissue sections to slides during immunostaining and routine histology staining procedures. Used primarily with GMA & MMA sections. Technical Data Sheet #289
Stain Technol., 6, 358 (1982)

Toluidine blue O, C.I. 52040, certified [92-31-9] *U5g*
MW 305.83 λ max: 626nm
A metachromatic, cationic thiazine dye that is widely used in *in vitro* biological applications. It has also been used in techniques for DNAase detection.
Stain Technol., 18, 35 (1943); 38, 281 (1963); *J. Clin. Microbiol.*, 21, 195 (1985); *Arch. Surg.*, 95, 16 (1967)

Toluidine blue O, C.I. 52040, purified [92-31-9] *U5g*
MW 305.83 λ max: 626nm Assay >60% anhydrous dye
Useful for staining RNA, oligodeoxynucleotides, proteins and glycosaminoglycans.
Nature, 213, 1133 (1967); *Anal. Biochem.*, 46, 156 (1972)

NEW! Trichrome Stain Kit, Neat Stain
 For the staining of stool specimens. Based upon the Wheatley Trichrome technique which is a rapid staining procedure providing very good results for routine examination. Simplified method, use of a mordant prior to staining is not necessary. Neat Stain offers the flexibility of a dip staining sequence in both the stain and counter-stain solution. Specifically designed for stat procedures and/or laboratories using manual staining methods. Purchase the Neat Stain Slide Holder separately, (Cat. #25033, page 99) **Kit Contains:** 3 Reagent Packs, Plastic Stand, 6 Reclosure Foils. Performs 75 tests. Technical Data Sheet #805

Tris base, Chemzymes Ultra Pure® [77-86-1] *H5g*
(Tris[hydroxymethyl]aminomethane) MW 121.14 mp 169-173° Purity: 99.9%
Ultra Pure Tris base, recrystallized is the buffer of choice for a variety of biochemical applications. Tris displays optimum performance in the pH range of 7 to 9, the range in which many enzymes exhibit maximum activity. It is used in enzyme purification and assay protocols. It is also widely used as a buffer for enzyme digestion of DNA and is ideally suited for use as an electrophoresis buffer for both agarose and polyacrylamide gels used to analyze DNA fragments, RNA and proteins. Technical Data Sheet #502 *Anal. Chem.*, 37, 1291 (1965)

1M Tris Base, pH 10.7±0.2 *A2d* 24098-500 500ml

1M Tris Hydrochloride, pH 4.1±0.2 *H4g* 24098-1 1L
Mix #24098 and #24099 to make 1M Tris-HCl buffer at the desired pH and then dilute with deionized water to get the desired molarity. 24099-500 500ml
24099-1 1L

Tris•HCl, Chemzymes Ultra Pure® [1185-53-1] *HK3g* 23484-100 100g
(Tris[hydroxymethyl]aminomethane hydrochloride) 23484-250 250g
MW 157.64 Purity: 99% 23484-500 500g
An alternative to Tris base in the preparation of Tris buffers. Technical Data Sheet #503

Triton® X-100 [9002-93-1] *HV5g* 04605-250 250g
(Octylphenol-polyethyleneglycol ether; Octylphenoxypolyethoxyethanol)
 n_D^{20} 1.490 d 1.07 HLB 13.5 MW 646
A nonionic surfactant useful in solubilizing protein aggregates. May also be used as a parting agent to facilitate removal of gels from tube walls.
Anal. Biochem., 34, 9 (1970); *Biochim. Biophys. Acta*, 211, 148 (1970)

Catalog # Size

16672-100 100ml
16672-500 500ml

01234-25 25g

15931-10 10g

25035-1 1 kit
25033-1 1 holder

23483-100 100g
23483-250 250g
23483-500 500g

Bulk quantities available,
Please call for quote.

24098-500 500ml
24098-1 1L
24099-500 500ml
24099-1 1L

23484-100 100g
23484-250 250g
23484-500 500g

04605-250 250g

Triton® X-100, 10% aqueous solution HV5g
Under nitrogen in sealed ampoules.

Trypan blue, C.I. 23850 [72-57-1] HVWX6g
(Direct blue 14; Niagara blue 3B) MW 960.83 mp >300° λ max: 607nm
Trypan blue has been widely used to assess the viability of eukaryotic cells. This method is often called trypan blue exclusion. Non-viable cells will exhibit a marked concentration of this blue dye in their nuclei. Tissue culture labs will find it extremely useful for determining the health and density of cell lines. Other studies have demonstrated trypan blue as an inactivating agent for measles and herpes simplex viruses and as a teratogenic agent in rats.
J. Histochem. Cytochem., 18, 581 (1970); *J. Gen. Virol.*, 64, 1365 (1983); *Teratology*, 26, 289 (1982)

12-Tungstosilicic Acid (silicotungstic Acid) [12027-43-9] A2bg
MW 3310.7 Formula: H₄SiO₄12WO₃XH₂O Formula weight: 2878.28 (anhy)
Catalyst for organic synthesis, minerals separation, reagent for alkaloids. Soluble in water.

Tween 20® [9005-64-5] A2g
(Poly[oxyethylene][20]sorbitan monolaurate)
MW 1227.54 n_D²⁰ 1.468 d 1.095 HLB 16.7
Nonionic detergent. Useful for IHC, ISH and Automated Stainers.

Catalog #	Size
18762-10	10x10ml
01294-100	100g
03424-25	25g
06110-100	100g

Tweezers

Polysciences has offered fine tweezers for use in scientific laboratories for decades. Our selection is based on our experience and understanding of your needs. Please make us aware of any product line additions that would be of interest to you. We proudly offer two brands of tweezers, Dumont and Rubis. Both brands are hand made in Switzerland and enjoy well deserved reputations in the industry. This line of fine tweezers is especially useful for electron microscopy applications. Our tweezers are for research and investigational use only. Not intended for food, drug, cosmetic or household use.

Selection Guide

Size: arranged by numbers, our tweezers range through 2, 3 and 5 which vary by increasing fineness of the tweezers tip.

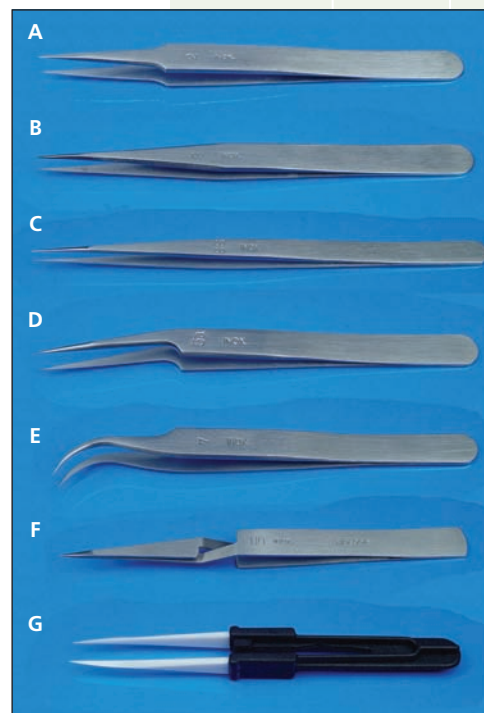
Length: most tweezers are 110mm-120mm in length; we list the exact length of each tweezer in the catalog listing.

Tip: we offer standard tips for general work and extra fine tips, "biology grade," for handling grids and other EM work.

Material of Construction: All of our tweezers are made of stainless steel, however, some are non magnetic (for handling nickel grids for instance). Non-magnetic stainless steel is not as hard as regular stainless steel.

Shape: Most tweezers have a straight form however some have curved or angled tips for ease of use in special situations. Also, reverse action tweezers are available which hold when you let go and vice versa.

Quantity: Polysciences offers a volume discount for purchases of tweezers by the dozen.



Tweezers - cont.

Strait Tip, Number 2 Tweezers - Strong fine long points, 120mm in length

2 Dumont INOX, standard tip (see A)

Catalog # Size

23554-1 single
23554-12 dozen

Strait Tip, Number 3 Tweezers - 3 are 120mm in length, 3C are 110mm in length

3 Dumont INOX, standard tip (see B)

07375-1 single
07375-12 dozen

3 Dumont INOX, biology grade (see B)

21972-1 single
21972-12 dozen

3 Rubis, standard tip (see B)

07376-1 single
07376-12 dozen

3C Dumont INOX, standard tip (see B)

07377-1 single
07377-12 dozen

3C Dumont INOX, biology grade (see B)

21973-1 single
21973-12 dozen

3C Dumont INOX - non magnetic, standard tip (see B)

07383-1 single
07383-12 dozen

3C Rubis - non magnetic, standard tip (see B)

07384-1 single
07384-12 dozen

Strait Tip, Number 5 Tweezers - Finer Tipped than Number 2, 110mm in length

5 Dumont INOX, standard tip (see A)

07379-1 single
07379-12 dozen

5 Dumont INOX, biology grade (see A)

21974-1 single
21974-12 dozen

5 Rubis, standard tip (see A)

07380-1 single
07380-12 dozen

Strait Tip, Number SS Tweezers - Longer and narrower tip, 135mm in length

SS Dumont INOX, standard tip (see C)

23553-1 single
23553-12 dozen

SS Rubis, standard tip (see C)

23557-1 single
23557-12 dozen

Angled Tip, Number 5a Tweezers - 135mm in length

5a Dumont INOX, standard oblique tip (see D)

23552-1 single
23552-12 dozen

Curved Tip, Number 7 Tweezers - Fine Tipped like Number 5, 115mm in length

7 Dumont INOX, standard tip (see E)

07381-1 single
07381-12 dozen

7 Dumont INOX, biology grade (see E)

21975-1 single
21975-12 dozen

7 Rubis, standard tip (see E)

07382-1 single
07382-12 dozen

Strait Tip, Reverse Action Tweezers - Finer than standard points, not as fine as biology grade.

115mm in length (see F)

08620-1 single

Strait Tip, Ceramic Tip Tweezers - Polyacetal handleor handling silver stains in Coplin Jars.

130mm in length (see G)

19382-1 single

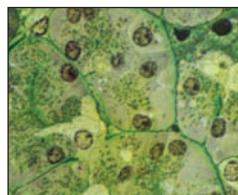
For research and investigational use only. Not intended for food, drug, cosmetic or household use.

Unicryl™ Resin* (for histology and electron microscopy) *EMU6f*
 Unicryl™ is a unique, largely hydrophilic, acrylic resin which has been developed for universal use, LM and EM applications. When fully polymerized Unicryl™ demonstrates excellent cutting characteristics. The sectioning surface follows the contours of the tissue during cutting action. ***This produces a highly exposed surface of proteins and nucleic acids for subsequent immuno-histochemistry techniques. The resin preserves these structures without interacting or crosslinking with them.***

Kit Contains: 250ml Unicryl™ Resin and Instructions

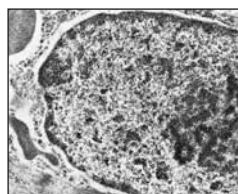
Benefits:

- No mixing required
- Resin remains liquid to -30°C
- Stable for a year at 4°C



Pancreas, 1µm section Polychromatic Stain

Uranyl Acetate, 98% ACS Reagent [6159-44-0] *HP6g* MW 424.15
 Improves tissue penetration and contrast without affecting immunolabeling. Useful as a positive or negative stain for thin sections. *EM J. Cell Biology, 101, 84a (1985)*



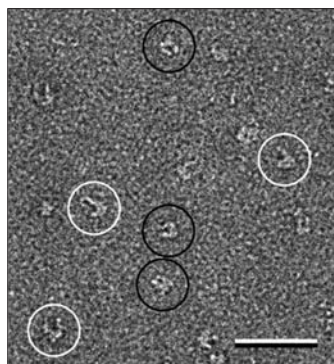
Rat skeletal muscle. Stained with Uranyl acetate and lead citrate. Courtesy, Dr. J. Fulthorpe, Dept. Muscular Dystrophy Research, Newcastle General Hospital, UK.

Uranyl Formate [16984-59-1] *PS7g*
 Electron dense, heavy metal compounds of uranium, tungsten and molybdenum have long been utilized for "negative staining" in electron microscopy. As demand for ultra-fine structure in biomolecules has increased, new fine grain structure materials are required.

Uranyl formate, $\text{UO}_2(\text{CHO}_2)_2 \cdot \text{H}_2\text{O}$, as an advancement in negative EM staining. The fine grain structure, fast biomedical tissue fixation properties and stability of this material make it unique for many imaging protocols.

Density: 3.7g/cc

Appearance: solid yellow crystals



Negative stain electron microscopy of the integrin $\alpha 5 \beta 1$ headpiece with and without a bound fibronectin (Fn) fragment containing Fn domains 7 to 10 (Fn9-10). a: Negative stain electron microscopy reveals that the $\alpha 5,1$ headpiece adopts two conformations, namely a closed (black circles) and an open conformation (white circles). Micrographs courtesy of Tom Walz, Harvard Medical School.

Uvitex® 2B [52232-33-4] *BH6g*
 (C.I. Fluorescent Brightener 362; Derivative of stilbene disulfonic acid)
 TSCA Exc max: 350nm Emiss max: 435nm in PBS Buffer
 UV absorber. Yellow powder. Nonspecific fluorescent stain for detecting and identifying fungi and algae in tissue sections.

Lab. Med., 18, 603 (1987)



Villanueva Osteochrome Bone Stain — See page 83.

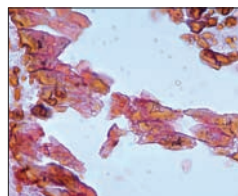
*Cold pack charge required.

Catalog #	Size
22770-250	250ml
21447-25	25g
24762-1	1g
24762-5	5g
19517-10	10g

NEW! Von Kossa Method for Calcium Kit

Demonstrates only calcium phosphate and calcium carbonate salts. Note that when used in skin specimens that the silver will reduce the melanin in the skin, to also give a black deposit.

Used as a bone stain to indicate osteomalacia, or in other paraffin embedded tissues to stain calcium deposits seen in metabolic diseases, Paget's disease, renal osteodystrophy and hyperparathyroidism, necrotic areas associated with TB, infarction (Gandy Gamna bodies), atheroma in blood vessels and Malakoplakia in the bladder (Michaelis-Gutman bodies).

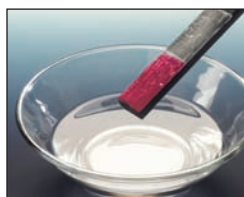


Calcified Necrotic kidney section, 4 microns, stained with Von Kossa Method for Calcium Stain Kit.

- **Fixation:** 10% NBF
- **Microtomy:** Paraffin embedded tissue or frozen sections cut at six microns
- **Results:** Mineralized bone, calcium deposits - black, Osteoid, supporting tissue and structures - red

Kit Contains: 3% Silver Nitrate, 5% Sodium Thiosulfate, Nuclear Fast Red

Water Indicating Paste, SAR-GEL®



- White paste turns red on contact with water
- Useful in detecting water content in laboratory recycled reagents, as well as other stain line reagents and solvents such as xylene and absolute alcohol

Water indicating paste provides a fast, reliable way to detect water bottoms in storage tanks containing gasoline and gasoline/alcohol blends, diesel, jet fuel, fuel oil, solvents and other materials.

Weighing dish, plastic



Our Peel-A-Way® weighing "tray" is designed for easy pouring. Tare weight is 1.38 grams and volume is 45ml. Packed in cartons of 500 or 2 cartons in a case. 85mm x 64mm x 22mm deep.

Wright-Giemsa Stain Solution CH6g

Wright-Giemsa Stain Solution is a dual purpose stain useful for blood films, parasites and bone marrow aspirates. Prepared from certified dyes. This ready-to-use solution makes the differentiation of human blood cells much easier to identify. Based on a commonly used Azure-Eosin formula. Technical Data Sheet #350

Stain Results:

- Erthrocytes pink-tan
- Eosinophiles red granules
- Lymphocytes red-purple granules, blue cytoplasm
- Neutrophils purple-pink granules

Catalog # Size

24633-1 1 kit

24615-1 1oz tube
24615-12 12x1oz

19803A-1 1 carton
19803B-1 1 case

08711-470 470ml
08711-1 1 liter
08711-10 10 liters

NEW! Wright-Giemsa Stain Phosphate Buffer pH 6.8

Yields satisfactory staining results every time when used with Wright-Giemsa stains. The buffer used in the Wright-Giemsa staining protocol needs to be pH 6.8 or results will be unsatisfactory. If the buffer is too acidic the stain will be too red and nuclei will be too light; if it is too basic the stain will be too blue and cytoplasmic detail will be indistinct.

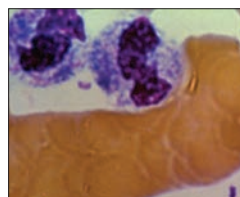
Stain results with Wright-Giemsa stain:

- Red blood cells should appear tan-pink
- Leukocyte nuclei should appear reddish-purple
- Neutrophil granules should appear reddish to pink lilac
- Eosinophil granules should appear bright red to orange
- Basophil granules should appear dark reddish purple

Wright stain, certified [68988-92-1] U4g

λ max: 640(522)nm

Used for staining blood films and malarial parasites in blood films.
Technical Data Sheet #350



Dark stained bipolar ends of *Yersinia pestis* can clearly be seen in this Wright's stain of blood from a plague victim. Image courtesy of the CDC Public Health Library.

NEW! Wright Stain Phosphate Buffer pH 6.8

Yields satisfactory staining results every time when used with the Wright staining method. The buffer used in the Wright staining protocol needs to be pH 6.8 or results will be unsatisfactory. If the buffer is too acidic the stain will be too red and nuclei will be too light; if it is too basic the stain will be too blue and cytoplasmic detail will be indistinct.

NEW! Wright Stain Solution

Dual purpose stain used for staining blood smears and bone marrow aspirates. This ready to use solution makes the differentiation of human blood cells much easier to identify.

Stain Results:

- Red blood cells - red to pink
- Neutrophils dark purple nuclei, pale pink cytoplasm, reddish-lilac small granules
- Eosinophils blue nuclei, pale pink cytoplasm, red to orange-red large granules
- Basophils purple to dark blue nucleus, dark purple, almost black large granules
- Lymphocytes dark purple to deep bluish purple nuclei, sky blue cytoplasm
- Platelets violet to purple granules

Catalog #	Size
24984-1	1 liter
24984-4	4 liters
02785-25	25g
02785-100	100g
24989-1	1 liter
24989-4	4 liters
24986-1	1 liter
24986-4	4 liters
24986-20	20 liters

X-gal, 5-Bromo-4-chloro-3-indolyl β -D-galactopyranoside [7240-90-6] *U5f*
 MW 408.64 mp 230° (dec.) Purity by HPLC $\geq$ 99%
 Histochemical chromagenic substrate for β -galactosidase. Yielding an easily detectable color.
 This material is widely used to detect β -galactosidase in DNA.
J. Med. Chem., 7, 574 (1964); *Histochemie*, 37, 375, (1973); *Hum. Gene Thor.*, 8, 1545 (1997)

XTT [111072-31-2] *HU7ad*
 (Tetrazolium XTT; Sodium 3'-[1-phenylamino-carbonyl]-3,4-tetrazolium]-bis[4-methoxy-6-nitro]benzenesulfonic acid hydrate)
 MW 673.5 Solubility: Min. 0.1% in water λ max: 283nm TLC: single spot



One of very few tetrazolium salts that forms a water soluble formazan on reduction. It is useful in *in vitro* cell growth assays with possible applicability to a variety of problems in cellular pharmacology and biology. An improved colorimetric assay for cell proliferation and viability utilizing XTT has been reported. An XTT-based colorimetric cellular cytotoxicity assay for melanoma and other tumor cells has also been reported.

Cancer Res., 48, 4827 (1988);
J. Immunol. Methods, 142, 257 (1991); 147, 153 (1992)

Xylene, histology grade [1330-20-7] *CH5g*
 MW 106.17 n_D^{20} 1.497 d 0.86
 Routine clearing agent used in Histology.
Merck Index, 11, 9988

Xylene Substitute — See *Clear-Advantage*, page 27.

Zinc Formalin Fixative, pH 6.25 *HVWX6g*



Excellent morphological preservation of nuclear and cytoplasmic components. Can replace neutral buffered formalin for routine tissue and immunohistochemical procedures. It is a non-precipitating fixative which can be used with automated and manual methods. Zinc formalin is used as a primary fixative which minimizes denaturation. Specimens initially fixed in buffered formalin may be post fixed in Zinc Formalin. Technical Data Sheet #458

J. Histochem. Cytochem., 31, 1435 (1983)

Catalog # Size

17316-100 100mg
 17316-1 1g

19661-100 100mg
 19661-500 500mg

08389-1 1gal

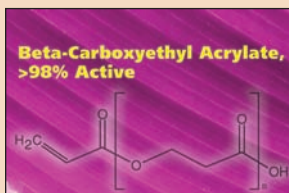
21516-3.75 3.75L

Monomers & Polymers



Acrylic Monomers - Neutral, Monofunctional
Amine Containing Monomers
Crosslinking Acrylic Monomers - Difunctional
Dual Reactive Acrylic Monomers
Epoxides / Anhydrides / Imides
Fluorescent Acrylic Monomers
UV (light) Active Monomers
Acid-Functional Polymers & Salts
Amine Functional Polymers
Biodegradable Polymers
Reactive Polymers
Water Soluble Polymers

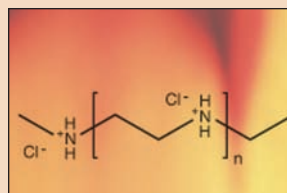
New Products



Beta-Carboxyethyl Acrylate, >98% Active

Can be polymerized in solution or emulsion to produce acrylic, vinyl-acrylic or styrenic-acrylic polymers with improved adhesive properties.

133

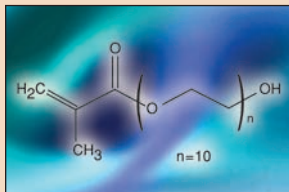


Polyethylenimine "Max"

High Potency Linear PEI - MW 4,000

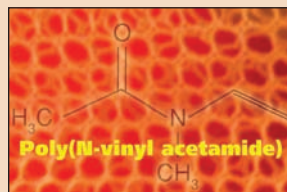
A nearly fully hydrolyzed linear polyethylenimine with longer contiguous ethyleneimine segments.

Now available in two molecular weights. 191



Poly Ethoxy (10) ethyl methacrylate (HEMA 10)

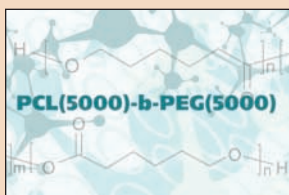
Homolog of HEMA bears 10 ethoxy units on the ester linkage. 152



Poly(N-vinyl acetamide)

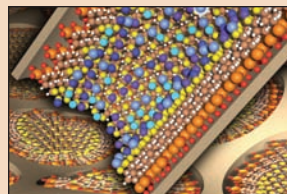
Unlike many polyvinylpyrrolidones (PVPs), it offers greater viscosity stability at higher temperatures and in the presence of salts such as sodium chloride.

203



Poly(ε-caprolactone)-block-poly(ethylene glycol) Diblock & Triblock Polymers

Leading candidates for biodegradation due to their approved uses by the FDA for drug delivery systems, sutures, long term implants and adhesion barriers as well as new tissue scaffold host systems. 182



Thiol-SAMMS® Metal Scavenger Kit

The latest in silica based "precious metal" recovery systems for heavy metal scavenging of heterogeneous or homogeneous catalysts in API synthesis. 211

Monomers

Polysciences stocks a wide portfolio of monomers. Such variety offers the synthetic chemist the tools to make a rich array of polymer compositions. Our Monomers Selection Guide organizes this set of reactive monomers into various groupings. These summary sets of data will quickly enable the scientist to determine which specific monomer can be used to synthesize custom polymers. In reviewing the data in these selection guides, you will be able to compare and contrast monomer alternatives quickly. More detailed information and chemical structures are included in the alphabetical listing which follows.

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Acid Containing Monomers

Acidic groups are often used to convey solubility to polymers in aqueous media. These moieties can be converted to a wide range of alternative functional groups. Acid groups can be utilized as catalysts for chemical reactions. Additionally they are employed in polymers as a functional group which enables improved adhesion to a variety of substrates through hydrogen bonding or metal chelation.

Name	Polymerizable	Polymerization		Special Features	Catalog #	Size
	Sites	Synthon	Form of Acid			
Acrylic acid	mono	acrylic	carboxylic acid	makes water soluble polymers	00020-250	250g
Acrylic anhydride	mono	acrylic	carboxylic acid (protected)	not a crosslinker	00488-50	50g
NEW! Beta-Carboxyethyl Acrylate, >98% Active	mono	acrylic	carboxylic acid	high purity, hydrophilic	24891-100	100g
t-Butyl methacrylate	mono	acrylic	carboxylic acid (protected)	acid formed by thermal elimination of isobutylene, homopolymer Tg = 230°C	02058-100	100g
Methacrylic acid	mono	acrylic	carboxylic acid	offers latex stability, homopolymer Tg = 185°C	00212-450	450g
NEW! Methacrylic Acid, 99.9%	mono	acrylic	carboxylic acid	high purity, hydrophilic	24897-250	250g
4-Methacryloxyethyl trimellitic anhydride	mono	acrylic	anhydride	adhesion promoter through anhydride	17285-10	10g
3-Methacryloyl-(l)-lysine	mono	acrylic	amino acid	zwitterionic, can derivatize acid or amine	24315-5	5g
o-Nitrobenzyl methacrylate	mono	acrylic	carboxylic acid (protected)	acid formed by photolabile deprotection	24360-10	10g
2-Propene-1-sulfonic acid, Na salt (35% in water)	mono	vinyl	sulfonic acid salt	water soluble	00064-10	10g
2-Sulfoethyl methacrylate	mono	acrylic	sulfonic acid	water soluble	02597-50	50g
Trichloroacrylic acid	mono	acrylic	carboxylic acid	carboxylic acid	02686-10	10g
4-Vinylbenzoic acid (4-carboxystyrene)	mono	styrenic	carboxylic acid	aromatic acid	04485-5	5g

Acid Containing Monomers, Metal Salts

Name	Polymerizable	Polymerization		Special Features	Catalog #	Size
	Sites	Synthon	Form of Acid			
Lead methacrylate 2-ethylhexanoate in MMA (.54/.46 mol ratio)	mono	acrylic	heavy metal salt	X-ray opacity and capture	16382-100	100g
Lithium methacrylate	mono	acrylic	metal salt	water soluble	17117-50	50g
Sodium acrylate	mono	acrylic	metal salt	can make high Tg salt polymers	01207-50	50g
3-Sulfopropyl acrylate, salt potassium	mono	acrylic	sulfonic acid salt	water soluble	17209-100	100g
3-Sulfopropyl methacrylate, potassium salt	mono	acrylic	sulfonic acid salt	water soluble	17210-100	100g
Barium methacrylate	dual	acrylic	metal salt	metal salt	01994-50	50g
Magnesium acrylate	dual	acrylic	metal salt	ionomeric crosslinking, high Tg polymers	02467-10	10g
Zinc dimethacrylate	dual	acrylic	metal salt	ionomeric crosslinking	03011-100	100g

Acrylic Monomers (Neutral, Monofunctional)

Monofunctional acrylics shape the type and nature of the main chain polymer backbone. Monomers are chosen to obtain the desired glass transition temperature, flexibility, mechanical strength, polarity, and hydrophilic/hydrophobic character of the resulting polymer. Generally, acrylamides exhibit improved resistance to hydrolysis compared to acrylic/methacrylic esters.

Name	Homopolymer Tg (°C)	Special Features	Catalog #	Size
N-(n-Octadecyl)acrylamide		hydrophobic	04673-10	10g
Acrylamide (UltraPure)	165	hydrophilic, hydrogel synthesis	00019-100	100g
N-Acryloylmorpholine		hydrophilic	21192-50	50g
t-Amyl methacrylate		hydrophobic	06127-10	10g
Benzhydryl methacrylate		high refractive index, aromatic	24286-10	10g
Benzyl acrylate	6	high refractive index, aromatic	01997-100	100g
Benzyl methacrylate	54	high refractive index, aromatic	02000-100	100g
N-Benzylmethacrylamide		high refractive index, aromatic	17969-25	25g
2-n-Butoxyethyl methacrylate		moderate polarity	02034-100	100g
t-Butyl acrylate	43	hydrocarbon building block monomer	02039-250	250g
n-Butyl acrylate	-54	hydrocarbon building block monomer	02037-500	500g
t-Butyl methacrylate		hydrophobic/protected acid	02058-100	100g
iso-Butyl methacrylate	53	hydrocarbon building block monomer	02056-500	500g
n-Butyl methacrylate	20	hydrocarbon building block monomer	02059-500	500g
sec-Butyl methacrylate	60	hydrocarbon building block monomer	02057-10	10g
4-Chlorophenyl acrylate	58	high refractive index, aromatic	01331-10	10g
Cyclohexyl acrylate	19	aliphatic, hydrophobic	02109-100	100g
Cyclohexyl methacrylate	83	aliphatic, hydrophobic	01837-100	100g
iso-Decyl acrylate	-55	hydrophobic, low tg	03008-100	100g
iso-Decyl methacrylate		hydrophobic	22493-100	100g
n-Decyl methacrylate	-30	hydrophobic	23344-25	25g
N,N-Diethylacrylamide		polar building block	00871-25	25g
N,N-Dimethylacrylamide	89	useful for chromatographic resins	02255-100	100g
N,N-Dimethylmethacrylamide		hydrolytic stability, useful for hydrogels	02270-25	25g
N,N-Diphenyl methacrylamide		bulky aromatic, hydrolytic stability	19663-25	25g
n-Dodecyl acrylate	-3	hydrophobic, long chain alkyl	02460-50	50g
n-Dodecyl methacrylate	-55	hydrophobic. Low Tg , long chain alkyl	02461-250	250g

Acrylic Monomers (Neutral, Monofunctional) *continued*

Name	Homopolymer Tg (°C)	Special Features	Catalog #	Size
N(n-Dodecyl)methacrylamide	15	hydrophobic, hydrolytic stability	04135-10	10g
2-(2-Ethoxyethoxy)ethyl acrylate	-70	hydrophilic, low Tg	02626-100	100g
2-Ethylhexyl acrylate	-50	hydrophobic	00587-250	250g
N-Ethylmethacrylamide		hydrolytic stability, useful for hydrogels	02322-10	10g
1-Hexadecyl methacrylate	22	hydrophobic, aliphatic	02396-25	25g
n-Hexyl acrylate	-45	hydrophobic, aliphatic	02411-100	100g
2-Methoxyethyl acrylate	-50	low Tg monomer	02487-100	100g
2-Methoxyethyl methacrylate	16	moderate polarity	02488-100	100g
Methyl methacrylate	105	versatile building block monomer	00834-1	1L
2-Naphthyl acrylate	24	fluorescent, hydrophobic, aromatic	06024-1	1g
n-Octyl methacrylate	-20	hydrophobic	23355-25	25g
N-(tert-Octyl)acrylamide		hydrophobic, hydrolytic stability	03141-25	25g
Pentabromophenyl acrylate		brominated, high refractive index	06344-10	10g
Pentabromophenyl methacrylate		brominated, high refractive index	04253-10	10g
Pentafluorophenyl acrylate		perfluorophenyl, low surface energy	06349-5	5g
Pentafluorophenyl methacrylate		perfluorophenyl, low surface energy	06350-5	5g
2-Phenoxyethyl methacrylate	54	aromatic, hydrophobic	02640-100	100g
Phenyl acrylate	57	aromatic, UV absorbing	02642-10	10g
Phenyl methacrylate	110	moderate UV absorbing, aromatic, hydrophobic	02644-10	10g
2-Phenylethyl acrylate	-3	moderate UV absorbing, aromatic, hydrophobic	02834-100	100g
2-Phenylethyl methacrylate	26	moderate UV absorbing, aromatic, hydrophobic	02911-100	100g
n-Propyl acrylate	-37	building block monomer	03132-25	25g
n-Propyl methacrylate	35	building block monomer	03174-100	100g
N-iso-propylacrylamide		hydrophilic	02455-100	100g
Stearyl acrylate (mixture of C16/C18)		hydrophobic, can form crystal domains	02636-100	100g
Tribromoneopentyl methacrylate		bromo aromatic	03057-10	10g
2,4,6-Tribromophenyl acrylate		bromo aromatic	03330-10	10g
Triethylene glycol monomethyl ether monomethacrylate		hydrophilic	18556-500	500g
3,3,5-Trimethylcyclohexyl methacrylate		aliphatic, bulky	02660-100	100g
Undecyl methacrylate		hydrophobic	02544-25	25g

Adhesion Promoting Monomers

Functional groups known to increase adhesion of polymers to surfaces include phosphate and carboxylic acids (metal adhesion) and silyl ethers (glass/siliceous adhesion) which hydrolyze to give reactive Si-OH bonds. While these monomers are well studied examples, many monomers having functional groups such as acids, amines and hydroxyls can also impart polymer adhesion to various substrates. Please refer to other tables for a more expansive listing of these monomers. *Also see Amine Monomer section.*

Name	Polymerizable Sites	Polymerization Synthon	Additional Reactive Functionality	Special Features	Catalog #	Size
Acrylic acid	mono	acrylic	carboxylic acid	acid provides metal adhesion	00020-250	250g
3-Methacryloxypropyl-trimethoxysilane	mono	acrylic	silyl ether	ethers react with siliceous surfaces to improve adhesion, glass pretreatment for polyacrylamide gels	02476-250	250g
4-Methacryloxyethyl trimellitic anhydride	mono	acrylic	anhydride	hydrolyzed acid offers improved adhesion	17285-10	10g
Vinyltriethoxy silane	mono	vinyl	silyl ether	reactive silyl ethers hydrolyze affording bonding sites to siliceous surfaces	04537-50	50g
Bis(2-methacryloxyethyl) phosphate	dual	acrylic	phosphate	crosslinking monomer with adhesion promoting capabilities, good for metals	16041-10	10g
Monoacryloxyethyl phosphate			phosphate	used for introducing phosphorus into polymers, adhesion promoter	22468-10	10g

Amine Containing Monomers

Amines are among the most widely versatile functional groups. In biopolymers, amines are the key synthetic handle to build structure and architecture to a polymer. Amine groups can act as base catalysts, can be quaternized to yield aqueous soluble polymers and can function as ligands to a variety of metals. Amines are good nucleophiles and can be converted to a wide set of functional groups. Amines can form salts with carboxylic and phosphoric acids to form biologically interesting complexes and structures.

Name	Polymerizable Sites	Polymerization Synthon	Additional Reactive Functionality	Special Features	Catalog #	Size
2-Aminoethyl methacrylate hydrochloride	mono	acrylic	primary, HCl salt		21002-10	10g
N-(2-aminoethyl) methacrylamide hydrochloride	mono	acrylic	secondary, HCl salt		24833-5	5g
N-(3-Aminopropyl)-methacrylamide hydrochloride	mono	acrylic	primary, HCl salt		21200-5	5g
N-(t-BOC-aminopropyl)-acrylamide	mono	acrylic	primary (protected)	solvent soluble, for primary amine polymers	24318-10	10g
2-(t-Butylamino)ethyl methacrylate	mono	acrylic	secondary	homopolymer Tg = 33°C	01797-100	100g
2-(N,N-Diethylamino)-ethyl methacrylate (DEAEMA)	mono	acrylic	tertiary	homopolymer Tg = 20°C	01872-500	500g
2-Diisopropylaminoethyl methacrylate	mono	acrylic	tertiary		24263-10	10g

Amine Containing Monomers *continued*

Name	Polymerizable Sites	Polymerization Synthon	Additional Reactive Functionality	Special Features	Catalog #	Size
2-(N,N-Dimethylamino)-ethyl acrylate	mono	acrylic	tertiary		02257-500	500g
N-[2-(N,N-Dimethylamino)-ethyl] methacrylamide	mono	acrylic	tertiary	hydrolytic stability	06172-5	5g
2-(N,N-Dimethylamino)-ethyl methacrylate	mono	acrylic	tertiary	homopolymer Tg = 19°C	00213-500	500g
3-Dimethylaminoneopentyl acrylate	mono	acrylic	tertiary		17970-10	10g
N-[3-(N,N-Dimethylamino)-propyl] acrylamide	mono	acrylic	tertiary	homopolymer Tg = 19°C	22018-10	10g
N-[3-(N,N-Dimethylamino)-propyl] methacrylamide	mono	acrylic	tertiary	hydrolytic stability	09656-100	100g
2-N-Morpholinoethyl acrylate	mono	acrylic	tertiary		17977-10	10g
2-N-Morpholinoethyl methacrylate	mono	acrylic	tertiary		17978-10	10g
3-Methacryloyl-(l)-lysine	mono	acrylic	amino acid	zwitterionic, multifunctional, water soluble	24315-5	5g
N,N-Diallylamine	dual	vinyl	secondary	forms cyclopolymers	21424-100	100g
Diallyldimethylammonium chloride (65% in water)	dual	vinyl	quat	cationic polymers via cyclopolymerization	15912-100	100g

Crosslinking Acrylic Monomers - Difunctional

Difunctional monomers are useful for imparting crosslinking or branching sites to polymer architectures. The “spacer” group between the acrylic end groups often helps determine the physical and mechanical attributes of the resulting crosslinked polymer structure. Acrylic moieties are generally more reactive than methacrylic moieties and are thus used when faster reaction kinetics are desired e.g. UV curable systems.

Name	Additional Reactive Functionality	Special Features	Catalog #	Size
2,2-Bis[4-(2-acryloxyethoxy)phenyl] propane	rigid hydrophobic crosslinker	rigid, aromatic	04136-25	25g
Barium methacrylate	carboxylic acid	divalent metal atom salt	01994-50	50g
Bis(2-methacryloxyethyl) phosphate	phosphate	adhesion promoter	16041-10	10g
Bis(2-methacryloxyethyl)-N,N'-1,9-nonylene biscarbamate		flexible, hydrophobic	21619-50	50g
2,2-Bis(4-methacryloxyphenyl) propane		rigid, hydrophobic	01381-25	25g
2,2-Bis[4-(2-hydroxy-3-methacryloxy-propoxy)phenyl] propane		rigid, aromatic	03344-100 03344-500	100g 500g
1,4-Butanediol diacrylate		aliphatic	02049-100	100g
1,3-Butanediol dimethacrylate		aliphatic	02047-500	500g
1,4-Butanediol dimethacrylate		aliphatic	05973-250	250g
Copper (II) Methacrylate	carboxylic acid	divalent metal atom salt	21222-25	25g
trans-1,4-Cyclohexanediol dimethacrylate		rigid, aliphatic	18912-10	10g

Crosslinking Acrylic Monomers - Difunctional *continued*

Name	Additional Reactive Functionality	Special Features	Catalog #	Size
N,N'-Cystaminebisacrylamide	disulfide	reversible crosslinking	09809-5	5g
1,10-Decanediol dimethacrylate		flexible, aliphatic, long chain	02140-25	25g
1,4-Diacryloylpiperazine		rigid	21190-10	10g
N,N'-Diallylacrylamide	acrylic	crosslinker	01848-10	10g
Diethylene glycol diacrylate		hydrophilic	02215-100	100g
Diethylene glycol dimethacrylate		hydrophilic	02214-100	100g
2,2-Dimethylpropanediol dimethacrylate		aliphatic	02276-100	100g
Dipropylene glycol dimethacrylate		flexible, H-Bonding sites	15156-50	50g
N,N'-Ethylene bisacrylamide		hydrogel crosslinker	09811-1	1g
Ethylene glycol diacrylate		UV curable, acrylate	02302-25	25g
Ethylene glycol dimethacrylate		aliphatic	24030-250	250g
NEW! Ethylene Glycol Dimethacrylate, 99.7%		hydrophilic, high purity	24896-250	250g
Fluorescein dimethacrylate		fluorescent	23589-100	100mg
N,N'-Hexamethylenebisacrylamide		hydrolytic stability	01495-5	5g
1,6-Hexanediol diacrylate		aliphatic	23671-100	100g
1,6-Hexanediol dimethacrylate		aliphatic	23672-100	100g
Magnesium acrylate	carboxylic acid	divalent metal atom salt	02467-10	10g
N,N'-Methylenebisacrylamide (Ultrapure)		hydrogel crosslinker	00719-25	25g
Nonanediol dimethacrylate		flexible, aliphatic	00801-10	10g
1,5-Pentanediol dimethacrylate		aliphatic	04260-25	25g
1,4-Phenylene diacrylate		rigid, aromatic	06389-10	10g
Tetraethylene glycol dimethacrylate		aliphatic	02654-50	50g
Triethylene glycol diacrylate		UV curable, acrylate>methacrylate	02655-250	250g
Triethylene glycol dimethacrylate		aliphatic	24034-100	100g
Zinc dimethacrylate	carboxylic acid	lonomeric crosslinker	03011-100	100g

Crosslinking Acrylic Monomers - Multifunctional

Typically used for generating highly crosslinked polymer structures, these monomers increase polymer toughness, modulus and solvent resistance. For UV curable formulations, multifunctional acrylates are typically faster reacting than their methacrylate analogs.

Name	Polymerizable Sites	Additional Reactive Functionality	Special Features	Catalog #	Size
Pentaerythritol triacrylate	tri	hydroxyl		04259-100	100g
1,1,1-Trimethylolpropane triacrylate	tri		useful for UV cure	02658-250	250g
1,1,1-Trimethylolpropane trimethacrylate	tri		useful for UV cure	02659-250	250g
Dipentaerythritol pentaacrylate (mixture of tetra, penta, hexa acrylates)	multiple		high crosslinking efficiency	16311-500	500g
Pentaerythritol tetraacrylate (mixture tri/tetra esters)	multiple			01547-100	100g

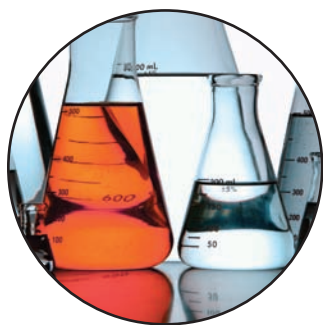
Dual Reactive Acrylic Monomers

It is often desirable to synthesize polymer architectures that are capable of further reaction to incorporate new functionality, graft new polymer chains, attach drugs or biomolecules, or make the polymer respond intelligently to changes in its environment. This diverse set of monomers have easily polymerizable carbon-carbon double bonds yet contain a secondary reactive group that can be elaborated in a multitude of ways. Some reactive groups e.g., carboxylic acid in o-Nitrobenzyl methacrylate are masked and are revealed by simple deprotection schemes.

Name	Additional Reactive functionality	Special Features	Catalog #	Size
Acrylic acid	carboxylic acid	incorporates carboxylic acid	00020-250	250g
4-(2-Acryloxyethoxy) -2 -hydroxybenzophenone	phenol	benzophenone is a strong UV absorber, potential UV radical initiator	19931-10	10g
N-Acryloxysuccinimide	ester (protected)	derivitization through ester link using mild reaction conditions, good for biologically active compounds	19930-1	1g
2-Carboxyethyl acrylate	carboxylic acid	lower volatility analog to acrylic acid	16719-100	100g
2-Cinnamoyloxyethyl acrylate	α , β unsat. ester	photocrosslinking monomer	24014-10	10g
Cinnamyl methacrylate	functionalized styrene	photocrosslinking monomer	02092-5	5g
Glycerol monomethacrylate	hydroxyl	isomer mixture, useful in hydrogel preparation, -OH can be functionalized in multiple ways	04180-25	25g
Glycidyl methacrylate	epoxide	versatile, introduces reactive sites into polymers, can be derivitized in post polymerization reactions with various nucleophiles	02607-500	500g
2-Hydroxyethyl acrylate (HEA)	hydroxyl	hydrophilic monomer building block	01902-250	250g
2-Hydroxyethyl methacrylate (HEMA)	hydroxyl	hydrophilic monomer building block, important co-monomer for hydrogel synthesis, contact lenses, controlled release matrices	03699-1	1kg
N-(2-Hydroxypropyl) methacrylamide	hydroxyl	hydrophilic monomer building block, can be post reacted through hydroxyl group	08242-10	10g
Hydroxypropyl methacrylate (mixture of isomers)	hydroxyl	hydrophilic monomer building block, can be post reacted through hydroxyl	00730-500	500g
4-Methacryloxyethyl trimellitic anhydride	anhydride	anhydride can be opened by nucleophiles to yield a variety of derivatives, hydrolyzed acid offers improved adhesion	17285-10	10g
4-Methacryloxy-2-hydroxybenzophenone	phenol	UV absorbing monomer, used in optics and ophthalmic applications	23350-25	25g
3-Methacryloxypropyl trimethoxysilane	silyl ether	ethers react with glass surfaces to improve adhesion, glass pretreatment for polyacrylamide gels	02476-250	250g
3-Methacryloyl-(l)-lysine	amino acid	derivatize through acid or amine.	24315-5	5g
Methacryloyl fluoride	halogen	reactive building block monomer. Used also to prepare other specialty monomers	17414-25	25g
Methacryloyl chloride	halogen	reactive building block monomer. Used also to prepare other specialty monomers	01518-50	50g
o-Nitrobenzyl methacrylate	carboxylic acid (protected)	nitrobenzyl ester removed by UV irradiation to afford carboxylic acid, used for catalysis, photoresists, latent reactive acid	24360-10	10g
t-Butyl methacrylate	carboxylic acid (protected)	can eliminate isobutylene thermally to form carboxylic acids; easily transesterified	02058-100	100g
N-(t-BOC-aminopropyl) acrylamide	amine (protected)	t-BOC easily deprotected to yield primary amine	24318-10	10g

Dual Reactive Acrylic Monomers *continued*

Name	Additional Reactive functionality	Special Features	Catalog #	Size
Acrylic anhydride	anhydride (protected)	allows formation of cyclic anhydrides	00488-50	50g
Allyl methacrylate	olefin	allyl double bond is less reactive than methacrylate, good for post polymerization reactions	01643-500	500g
2-Aminoethyl methacrylate hydrochloride	amine (as HCl salt)	can be used to prepare polymers with amine functionality	21002-10	10g
N-(3-Aminopropyl) methacrylamide hydrochloride	amine (as HCl salt)	can be used to prepare polymers with amine functionality	21200-5	5g
2-Bromoethyl acrylate	halogen	allows synthesis of heavy atom polymers, Br can be displaced with various nucleophiles	02015-10	10g
t-Butyl acrylate	carboxylic acid (protected)	used in photoresist formulations	02039-250	250g
2-(t-Butylamino)ethyl methacrylate	amine (secondary)	builds polymers with secondary amines, potential H-Bonding sites	01797-100	100g
2-Cyanoethyl acrylate	nitrile	polar building block monomer, can use nitrile for functionalization	01829-100	100g
N,N-Diallylacrylamide	allyl	crosslinking monomer	01848-10	10g
Dicyclopentenylacrylate	ethenyl	endo cyclic olefin does not readily polymerize, can be post reacted e.g. oxidative crosslinking	15797-25	25g
Methyl 2-cyanoacrylate	cyano	used in rapidly setting cements and adhesives	01520-10	10g
N-Methylolacrylamide (48% in water)	active methylene	acid catalyzed post polymerization crosslinking capabilities	02518-250	250g
Monoacryloxyethyl phosphate	phosphate	used for introducing phosphorus into polymers, adhesion promoter	22468-10	10g
Poly(ethylene glycol)-monomethacrylate	hydroxyl	long chain monomer, more polar than PO analog, can post react -OH to add additional functionality	multiple	
Propargyl acrylate	acetylenic	acetylenic group can be post functionalized, possible oxidative crosslinking monomer	02964-25	25g
Propargyl methacrylate	acetylenic	acetylenic group can be post functionalized, possible oxidative crosslinking monomer	02965-25	25g
N-(iso-Butoxymethyl) methacrylamide	oxo-methylene	acid + heat catalyzed crosslinking monomer	19221-100	100g
N-(Phthalimidomethyl) acrylamide	active methylene	used in photoresist formulations	19390-25	25g



cGMP Manufacturing Capabilities

- FDA registered and cGMP compliant • In-house production, mg to Kg scale
- Clean room operation • New product synthesis • Scale-up and process optimization
- Product documentation • Complete confidentiality • High-vacuum distillation and drying
- Specialized recrystallization and filtration • Fully equipped synthesis laboratories with 25+ hoods

Our expertise, custom manufacturing capabilities and rigorous quality standards allow us to provide you with the exact composition, properties and purity you need.

Epoxides / Anhydrides / Imides

Unlike ethylenic monomers which polymerize through free radical processes, epoxide resins react with amines, carboxylic acids, anhydrides, etc. to form polymers displaying a range of characteristics from tough and durable to soft and adhesive.

Name	Polymerizable Sites	Special Features	Catalog #	Size
4,4'-Bisphenol A, Bis-(N-methylphthalimide)	dual	useful monomer for synthesis of high temp. polymers	24284-25	25g
4,4'-Bisphenol A, Dianhydride	dual	useful monomer for synthesis of high temp. polymers	24283-25	25g
1,4-Butanediol diglycidyl ether	dual	can be used for post polymerization crosslinking of amine polymers	01795-50	50g
Citraconic anhydride	mono	reversible protection of amino groups in protein synthesis	01824-100	100g
Ethylene glycol diglycidyl ether (WPE =112)	dual	active crosslinking monomer for active nucleophiles, hydrophilic, used for hydrogels	01479-100	100g
Glycerol triglycidyl ether (WPE =145)	multiple	isomer mixture, efficient crosslinking monomer for various nucleophilic agents	09221-50	50g
Glycidyl butyl ether	mono	used in epoxy reactions as monofunctional diluent	05678-500	500g
Glycidyl cinnamate	mono	polymerized with various carboxylic acids, alcohols and amines; Olefin moiety can be photocrosslinked	16090-10	10g
Propylene glycol diglycidyl ether (WPE = 150)	dual	versatile crosslinker for amine, hydroxyl and carboxylate systems	24044-100	100g
Propylene oxide	mono	basic building block monomer for water dispersible polymers	00236-1	1pt
Triglycidyl isocyanurate	tri	crosslinking monomer for epoxy, urethane systems	16173-50	50g
Allyl glycidyl ether	mono	can react either epoxide or allyl group into polymers	19191-50	50g

Fluorescent Acrylic Monomers

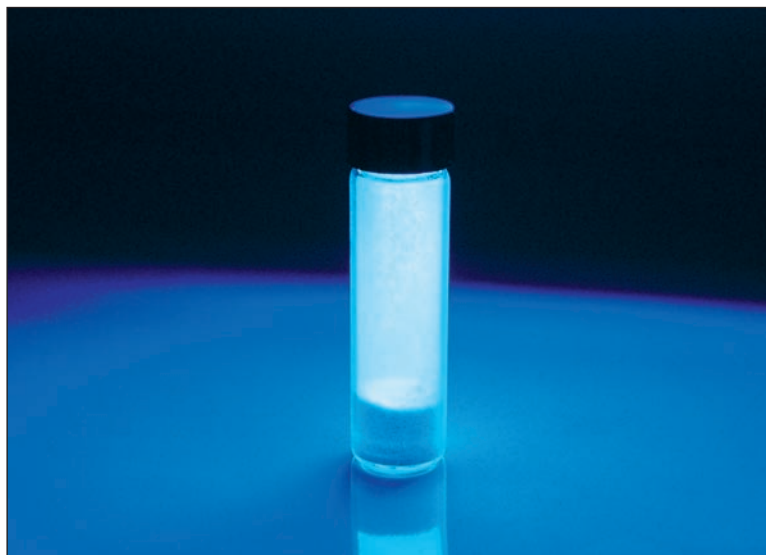
Monomers with fluorescent tags are often used to build polymers that can be detected at very low concentrations using fluorescence spectroscopy. Polymer migration and diffusion has been studied using fluorescent tags. Polymer microspheres containing fluorescent groups are used routinely for flow cytometry and medical diagnostic assays.

Name	Monomer Type	Comments	Catalog #	Size
3,8-Dimethylacryloyl ethidium bromide	ionic	Ex. max = 439 nm, Em. max = 512 nm, Insoluble in water	23590-100	100mg
Methacryloxyethyl thiocarbamoyl rhodamine B	ionic	Ex. max = 548 nm, Em. max = 570 nm, Purple crystals	23591-100	100mg
9-Anthracenylmethyl methacrylate	neutral	Ex. max = 362 nm, Em. max = 407 nm, Yellow crystals	23587-100	100mg
Fluorescein dimethacrylate	neutral	Ex. max = 470 nm, Em. = 511 nm	23589-100	100mg
O-Methacryloyl Hoechst 33258	neutral	Ex. max = 355 nm, Em. max = 497 nm, Off-white crystals	23592-100	100mg
2-Naphthyl acrylate	neutral	Hydrophobic, fluorescent monomer	06024-1	1g
2-Naphthyl methacrylate	neutral	Ex. max = 285 nm, Em. min = 345 nm	23602-100	100mg
1-Pyrenylmethyl methacrylate	neutral	Ex. max = 339 nm, Em. min = 394 nm, Pale yellow crystals	23588-100	100mg

Fluorinated Acrylic Monomers

Monomers containing fluorine provide polymers with unique low energy surfaces. Materials made from these monomers are typically chemical resistant and very hydrophobic.

Name	Homopolymer Tg (°C)	Catalog #	Size
1H,1H,7H-Dodecafluoroheptyl methacrylate	13	00767-25	25g
1H,1H,2H,2H-Heptadecafluorodecyl acrylate	0	19227-25	25g
1H,1H,2H,2H-Heptadecafluorodecyl methacrylate	40	19226-25	25g
1H,1H-Heptafluorobutyl acrylate	-30	21039-25	25g
1H,1H,3H-Hexafluorobutyl acrylate	-22	05631-10	10g
1H,1H,3H-Hexafluorobutyl methacrylate		05632-10	10g
1,1,1,3,3,3-Hexafluoroisopropyl acrylate		24970-25	25g
Bis-(1,1,1,3,3,3-Hexafluoroisopropyl) itaconate		24971-25	25g
Bis-(2,2,2-Trifluoroethyl) itaconate		24972-25	25g
Hexafluoro-iso-propyl methacrylate		02401-10	10g
1H,1H,5H-Octafluoropentyl acrylate	-35	21044-25	25g
1H,1H,5H-Octafluoropentyl methacrylate	36	21045-25	25g
Pentafluorophenyl acrylate		06349-5	5g
Pentafluorophenyl methacrylate		06350-5	5g
1H,1H,3H-Tetrafluoropropyl methacrylate		07577-25	25g
2,2,2-Trifluoroethyl acrylate	-10	01718-25	25g
2,2,2-Trifluoroethyl methacrylate	80	02622-25	25g



High / Low Refractive Index Monomers

Polymers that interact with light can be modified by optimizing their refractive index properties. These materials are useful in many types of optical applications: lenses, optical switches, optical fiber coatings, etc. Low RI monomers are typically highly fluorinated. Polymers using perfluorinated monomers are often hydrophobic and exhibit very low surface energies.

Name	Polymerization Synthon	Homopolymer Tg (°C)	Special Features	Catalog #	Size
NEW! Allyl Phenyl Ether, 98%	vinyl		hydrophobic	24894-100	100g
Benzhydryl methacrylate	acrylic		high RI (ca 1.56), non-halogenated	24286-10	10g
Benzyl acrylate	acrylic	6	high RI (ca 1.55), non-halogenated	01997-100	100g
N-Benzylmethacrylamide	acrylic		high RI (ca 1.60), non-halogenated	17969-25	25g
Benzyl methacrylate	acrylic	54	high RI (ca 1.57), non-halogenated	02000-100	100g
2-(9H-Carbazol-9-yl)-ethyl methacrylate	acrylic		high RI (ca 1.69)	24372-1	1g
4-Chlorophenyl acrylate	acrylic	58	high RI (ca 1.55), chlorinated aromatic	01331-10	10g
1H,1H,7H - Dodecafluoroheptyl methacrylate	acrylic	13	low RI (ca 1.36), fluorinated aliphatic	00767-25	25g
1H,1H,2H,2H-Heptadecafluorodecyl acrylate	acrylic	0	low RI (ca 1.34), fluorinated	19227-25	25g
1H,1H,2H,2H-Heptadecafluorodecyl methacrylate	acrylic	40	low RI (ca 1.35), fluorinated	19226-25	25g
1H,1H-Heptafluorobutyl acrylate	acrylic	-30	low RI (ca 1.37), fluorinated	21039-25	25g
1H,1H,3H- Hexafluorobutyl acrylate	acrylic	-22	low RI (ca 1.39), fluorinated	05631-10	10g
1H,1H,3H-Hexafluorobutyl methacrylate	acrylic		low RI (ca 1.40), fluorinated	05632-10	10g
Hexafluoro-iso-propyl methacrylate	acrylic		low RI (ca 1.38), fluorinated	02401-10	10g
1H,1H,5H-Octafluoropentyl acrylate	acrylic	-35	low RI (ca 1.38), fluorinated	21044-25	25g
1H,1H,5H-Octafluoropentyl methacrylate	acrylic	36	low RI (ca 1.39), fluorinated	21045-25	25g
Pentabromophenyl acrylate	acrylic		high RI (ca 1.7), brominated aromatic	06344-10	10g
Pentabromophenyl methacrylate	acrylic		high RI (ca 1.7), brominated aromatic	04253-10	10g
Pentafluorophenyl acrylate	acrylic		low RI (ca 1.4), fluorinated aromatic	06349-5	5g
Pentafluorophenyl methacrylate	acrylic		low RI (ca 1.4), fluorinated aromatic	06350-5	5g
1H, 1H, 3H- Tetrafluoropropyl methacrylate	acrylic		low RI (ca 1.4), fluorinated aliphatic	07577-25	25g
2,4,6-Tribromophenyl acrylate	acrylic		high RI (ca 1.6), brominated aromatic	03330-10	10g
2,2,2-Trifluoroethyl acrylate	acrylic	-10	low RI (ca 1.44), fluorinated aliphatic	01718-25	25g
2,2,2-Trifluoroethyl methacrylate	acrylic	80	low RI (ca 1.41), fluorinated aliphatic	02622-25	25g
N-Vinyl carbazole	vinyl		high RI (ca 1.68)	02429-25	25g

Hydroxy Containing Monomers

Hydroxyl groups have utility as hydrogen bonding sites and can provide polymers with compatibility for water or polar solvents. These versatile functional groups can be derivitized broadly. Polymers containing free –OH groups can be post reacted with acids, epoxies, isocyanates, etc. to create novel polymer properties and architectures.

Name	Polymerizable Sites	Polymerization Synthon	Reactive Functionality	Special Features	Catalog #	Size
Glycerol monomethacrylate	mono	acrylic	hydroxyl	useful for hydrogels	04180-25	25g
2-Hydroxyethyl acrylate (HEA)	mono	acrylic	hydroxyl	homopolymer Tg = 15°C	01902-250	250g
2-Hydroxyethyl methacrylate (HEMA) 99+%	mono	acrylic	hydroxyl	homopolymer Tg = 55°C	03699-100 03699-500	100g 500g
N-(2-Hydroxypropyl)methacrylamide	mono	acrylic	hydroxyl	hydrolytic stability	08242-10	10g
NEW! Hydroxypolyethoxy (10) Allyl Ether, 98%	mono	vinyl	hydroxyl	hydrophilic	24899-100	100g
NEW! (HEMA 10) Poly Ethoxy (10) ethyl methacrylate	mono	acrylic	hydroxyl	hydrophilic	24890-100	100g
Hydroxypropyl methacrylate (mixture of isomers)	mono	acrylic	hydroxyl	aliphatic	00730-1	1kg
Pentaerythritol triacrylate	tri	acrylic	hydroxyl	multifunctional crosslinker	04259-100	100g
Poly(propylene glycol) 300 monomethacrylate	mono	acrylic	hydroxyl	slightly hydrophilic, long chain graft	15934-250	250g
1,1,1-Trimethylolpropane diallyl ether (mono/di/triallyl mixture)	multi	vinyl	hydroxyl	hydrophilic crosslinker	05500-50	50g
1,1,1-Trimethylolpropane mono-allyl ether	mono	vinyl	hydroxyl	hydrophilic crosslinker	15914-50	50g
4-(2-Acryloxyethoxy)-2-hydroxybenzophenone	mono	acrylic	phenol	UV absorbing, aromatic	19931-10	10g
3-Allyl-4-hydroxyacetophenone	mono	vinyl	phenol	UV absorbing, aromatic	21196-10	10g
4-t-Butoxystyrene	mono	styrene	phenol (protected)	deprotect with heat	21760-10	10g
4-Methacryloxy-2-hydroxybenzophenone	mono	acrylic	phenol	UV absorber, aromatic	23350-25	25g

Mono and Difunctional Glycol Oligomeric Monomers

Ethylene glycol units are strongly hydrophilic through their multiple H-bonding sites. Monomers of this type are useful in the construction of hydrogels and water compatible polymer structures. New research suggests that bioactive molecules e.g. drugs with attached PEG chains have improved bioavailability characteristics.

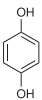
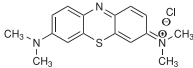
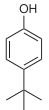
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Name	Polymerization Synthon (Sites)	Additional Reactive Group	Approx. # of Glycol Groups	Approx. Molecular Weight	Special Features	Catalog #	Size
Poly(ethylene glycol)-dimethacrylate	methacrylic (2)	none	4 to 6	350	hydrophilic crosslinking monomer	00096-100	100g
Poly(ethylene glycol)-dimethacrylate	methacrylic (2)	none	8 to 10	550		15179-100	100g
Poly(ethylene glycol)-dimethacrylate	methacrylic (2)	none	13 to 15	750		02364-100	100g
Poly(ethylene glycol)-dimethacrylate	methacrylic (2)	none	21 to 25	1150		15178-100	100g
Poly(ethylene glycol)-diacrylate	acrylic (2)	none	4 to 6	314	hydrophilic crosslinking monomer	00669-250	250g
Poly(ethylene glycol)-diacrylate	acrylic (2)	none	8 to 10	500		01871-250	250g
Poly(ethylene glycol)-diacrylate	acrylic (2)	none	90 to 100	4100		15246-1	1g
Poly(propyleneglycol) 400 dimethacrylate	methacrylic (2)	none	5 to 7	550	less polar than EO analog, water insoluble crosslinker	04380-250	250g
Poly(ethylene glycol)-monomethylether monomethacrylate	methacrylic (1)	none	4 to 6	280	adds hydrophilic grafts to polymers; adds long chain hydrophilic graft to polymer chain	16664-100	100g
						16664-500	500g
Poly(ethylene glycol)-monomethylether monomethacrylate	methacrylic (1)	none	8 to 10	490		16665-100	100g
						16665-500	500g
Poly(ethylene glycol)-monomethylether monomethacrylate	methacrylic (1)	none	21 to 25	1090		16666-100	100g
						16666-500	500g
Poly(ethylene glycol)-monomethacrylate	methacrylic (1)	hydroxy	4 to 6	270	long chain monomer, more polar than PO analog, can post react -OH to add additional functionality	16712-100	100g
Poly(ethylene glycol)-monomethacrylate	methacrylic (1)	hydroxy	8 to 10	480		16713-100	100g
Poly(propylene glycol) 300 monomethacrylate	methacrylic (1)	none	3 to 5	440	propylene glycol is more hydrophobic than ethylene glycol long chain monomer, can post react -OH to add functionality	15934-250	250g

Polymerization Inhibitors for Monomers

In the Monomer section, we list monomers which are inhibited with a variety of polymerization inhibitors. These inhibitors are chosen for effectiveness, and minimum color formation on storage. Below is a table identifying the inhibitors used and their structures.

Inhibitor	Chemical Name	Structure	Inhibitor	Chemical Name	Structure
HQ	Hydroquinone		Triethylene diamine (DABCO®)	2,4-Diazabicyclo[2.2.2]octane	
MEHQ	Hydroquinone monomethyl ether		t-Butylcatechol	4-t-butylcatechol	
PTZ	Phenothiazine		BHT(butylated hydroxytoluene)	2,6-di-t-Butyl-4-methyl-phenol	
Methylene Blue	3,7-Bis(dimethylamino)-phenazathionium chloride		p-t-Butylphenol	4-t-Butylphenol	

Styrenic Monomers

Popular alternatives to acrylic and related monomers, styrenic monomers generally provide polymers of higher glass transition temperature, higher modulus, increased hydrophobic character, and nominal UV absorbance. As such, coatings made with high concentrations of styrenic monomers can yellow with time if exposed to UV light. Crosslinked styrene resins (especially in microsphere form) are tough and chemically resistant. These form the basis for ion exchange resins and microbeads used as supports for biochemical reactions.

Name	Monomer Type	Additional Reactive Functionality	Homopolymer Tg (°C)	Special Features	Catalog #	Size
2-Methylstyrene	neutral		120	aromatic, hydrophobic	04581-5	5g
4-Methylstyrene	neutral		108	aromatic, hydrophobic	04234-100	100g
4-t-Butylstyrene	neutral		132	high Tg monomer	02606-25	25g
Divinyl benzene (80% active)	neutral	vinyl		aromatic, rigid crosslinker	22478-100	100g
Styrene	neutral		100		00660-500	500g
4-t-Butoxystyrene	protected group	phenol		deprotection gives phenol	21760-10	10g
4-Chloromethylstyrene (vinylbenzyl chloride 98%)	reactive	halogen		Merrifield resin building block	22193-25	25g
4-Nitrostyrene	reactive	nitro		nitro can be reduced to amine	02634-5	5g
4-Vinylbenzoic acid (4-carboxystyrene)	reactive	carboxylic acid		versatile -COOH synthesis handle	04485-5	5g
Chloromethylstyrene (vinylbenzyl chloride, 57% - meta /43% - para)	reactive	halogen		Merrifield resin building block	02718-100 02718-500	100g 500g

UV (light) Active Monomers

Polymers with aliphatic backbones often show little absorbance of light and usually do not absorb in the near and mid UV spectral range. UV absorbing monomers improve the capture of light at these wavelengths. These absorbers can be used to shield the polymer system or an underlying substrate from degradation by UV light, e.g. phenethyl methacrylate containing polymers for optical lenses. Additionally, some UV absorbing materials can act as sensitizers to promote photochemical reactions.

Name	Polymerization Synthon	Additional Reactive Functionality	Special Features	Homopolymer Tg (°C)	Comments	Catalog #	Size
4-(2-Acryloxyethoxy) - 2-hydroxybenzophenone	acrylic	phenol	UV absorbing		Benzophenone is a strong UV absorber, potential UV radical initiator	19931-10	10g
3-Allyl-4-hydroxy- acetophenone	vinyl	phenol	UV absorbing		Acetophenone is a strong UV absorber, potential UV radical initiator	21196-10	10g
Phenyl acrylate	acrylic		UV absorbing	57	hydrophobic, aromatic building block monomer	02642-10	10g
4-Methacryloxy- 2-hydroxybenzophenone	acrylic	phenol	UV absorber		monomer, used in UV absorbing optics and ophthalmic applications	23350-25	25g
2-(2'-Methacryloxy- 5'-methylphenyl) benzotriazole	acrylic		UV absorber		UV absorbing monomer, may act as polymerizable sensitizer	21871-25	25g
2-Cinnamoyloxyethyl acrylate	acrylic	α,β unsat.	photo reactive ester		Photocrosslinking monomer	24014-10	10g
Cinnamyl methacrylate	acrylic	α,β unsat.	photo reactive ester		Photocrosslinking monomer	02092-5	5g
Glycidyl cinnamate	epoxide	ethenyl	photo reactive		Polymerized with various carboxylic acids, alcohols and amines, Olefin moiety can be photocrosslinked	16090-10	10g
2-Phenylethyl acrylate	acrylic		moderate UV absorbing	-3	hydrophobic, aromatic monomer absorbing	02834-100	100g
2-Phenylethyl methacrylate	acrylic		moderate UV absorbing	26	hydrophobic, aromatic monomer	02911-100	100g
Phenyl methacrylate	acrylic		moderate UV absorbing	110	high Tg , aromatic building block monomer	02644-10	10g

Vinyl and Ethenyl Monomers

An alternative choice to styrenics and acrylics, these monomers are often used to create polymers with inert main chain features. Many of these monomers can be polymerized via metallocene or other metal mediated polymerization processes.

Name	Polymerizable Sites	Secondary Reactive Functionality	Special Features	Comments	Catalog #	Size
Acrolein	mono	aldehyde		incorporates aldehyde functionality to polymers	00016-5	5x10ml
Allyl glycidyl ether	mono	epoxide		incorporates reactive epoxide group to polymers, or reactive olefin to epoxy resins	19191-50	50g
3-Allyl-4-hydroxyacetophenone	mono	phenol	UV absorber	Acetophenone is a strong UV absorber; potential UV radical initiator	21196-10	10g
α,α -Dimethyl-3-isopropenylbenzyl isocyanate	mono	isocyanate		dual reactivity monomer, post polymerization crosslinking or functionalization via vinyl or isocyanate group	19706-100	100g
2-Propene-1-sulfonic acid, Na salt (35% in water)	mono		sulfonic acid, Na salt	can introduce polar ionic groups into polymers	00064-10	10g
1,1,1-trimethylolpropane mono allyl ether	mono	hydroxyl		hydrophilic monomer can be derivatized through -OH	15914-50	50g
Vinyl 2-furoate	mono			heterocyclic vinyl monomer	02829-10	10g
Vinyl benzoate	mono		aromatic	aromatic vinyl ester	02664-10	10g
Vinyl butyrate	mono			lower Tg monomer vs. vinyl acetate	02835-10	10g
Vinyl octadecyl ether	mono		hydrophobic	long chain fatty monomer, can form crystalline domains	01728-100	100g
N-Vinyl-2-pyrrolidone	mono		hydrophilic	homopolymers are water soluble	04000-250	250g
N-Vinylcaprolactam	mono			capable of radical and ring opening polymerization	16818-10	10g
N-Vinylcarbazole	mono		electroactive	useful for polymers in electronics, produces photoconductive polymers	02429-25	25g
Vinylferrocene	mono		Iron complex	builds organometallic polymer complexes	04503-1	1g
1-Vinylimidazole	mono			can be used to make cationic polymers, imidazoles can be used as catalysts	01726-100	100g
N-Vinyl-N-methyl acetamide	mono		hydrophilic	hydrophilic building block monomer	22065-25	25g
4-Vinylpyridine	mono			heterocyclic styrene analog, used to form cationic polymers, potential H-bonding	02668-100	100g
Vinyltriethoxy silane	mono	silyl ether	adhesion promoter	reactive silyl ethers hydrolyze affording bonding sites to silaceous surfaces	04537-50	50g
2,2-Bis[4-(2-acryloxyethoxy)-phenyl] propane	dual	rigid crosslinker		rigid, hydrophobic crosslinker	04136-25	25g

Vinyl and Ethenyl Monomers *continued*

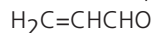
Name	Polymerizable Sites	Secondary Reactive Functionality	Special Features	Comments	Catalog #	Size
NEW! Diallyl Maleate - 99% Active	dual vinyl (2)	vinyl	hydrophilic	multiple post functionalization target sites at the pendant acrylic centers	24892-100	100g
Diallyl maleate	dual vinyl (2)	vinyl	hydrophilic	some pendant allyl groups survive polymerization; at low levels, useful for promoting branching in emulsion polymerization	02156-250	250g
N,N-Diallylamine	dual	amine (secondary)		used to form cyclopolymers	21424-100	100g
Diallyldimethylammonium chloride (65% in water)	dual			amine quat group, produces cationic polymers through cyclopolymerization	15912-100	100g
Divinyl sebacate	dual			diester crosslinking monomer	04632-5	5g
Triethylene glycol divinyl ether	dual			hydrophilic crosslinker for cationic photocured systems	19560-100	100g
Triallyl cyanurate	tri			crosslinking monomer	01236-100 01236-500	100g 500g
1,1,1-trimethylolpropane diallyl ether (mono/di/triallyl mixture)	multi	hydroxyl		crosslinking monomer, post reactive through -OH group	05500-50	50g

Alphabetical Listing of Monomers

Note: Glass transition temperature (T_g , °C) noted for homopolymer

- A -

Acrolein, distilled [107-02-8] BCOPR6acg 00016-5 5x10ml
MW 56.1 bp 52-53° n_D^{20} 1.4025 ca. 1000 ppm HQ inhibitor TSCA



For introduction of aldehyde groups into polymers, preparation of other monomers, e.g. azomethines. *Special packaging charge, for sale in United States only. Shipping by truck only.*

Acrylamide, Chemzyme Ultra Pure® [79-06-1] HMO6d 00019-100 100g
MW 71.1 >99.9% mp 84° uninhibited T_g 165° TSCA



Specific conductance of 35% (w/v) solution 2 μ mho/cm.

For introduction of hydrophilic sites, preparation of water-soluble polymers and in electrophoresis.

Acrylic acid, min. 99.5% [79-10-7] BEH7g 00020-250 250g
MW 72.1 mp 13° bp 139° n_D^{20} 1.420 ca. 200 ppm MEHQ inhibitor TSCA



Copolymerizes with many other monomers to introduce acid groups which are important in crosslinking, adhesion promotion, and stabilization of emulsion polymers. Homopolymers are water-soluble.

Acrylic anhydride min. 90% [2051-76-5] BH7d 00488-50 50g
MW 126.1 bp 97°/35mm n_D^{20} 1.444 inhibitors: 0.07%

Methylene blue, ca. 2.5ppm triethylenediamine inhibitor

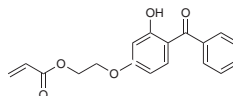


Used to prepare specialty acrylate, acrylamide monomers.

Forms cyclic anhydrides on polymerization and does not produce crosslinks in polymers.

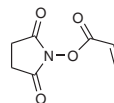
4-(2-Acryloxyethoxy)-2-hydroxybenzophenone [16432-81-8] A2g 19931-10 10g
MW 312.3 mp 77-80° uninhibited TSCA

For introduction of UV-absorbing sites into polymers.



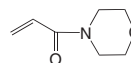
N-Acryloxysuccinimide [38862-24-7] U4d 19930-1 1g
MW 169.1 mp 69°

For preparation of acrylic derivatives, e.g., of biologically active compounds or dyes either in monomer or polymer form under mild conditions.



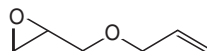
N-Acryloylmorpholine, min. 98% [5117-12-4] U7ag 21192-50 50g
MW 141.2 bp 104°/4mm n_D^{20} 1.512 ca. 1000 ppm MEHQ inhibitor

For preparation of water-soluble (neutral substituted acrylamide) polymers.



Allyl glycidyl ether, >98% [106-92-3] EHO5g 19191-50 50g
MW 114.1 bp 154° n_D^{20} 1.433 TSCA

Reactive allyl ether. Can be used to introduce epoxide functionality into polymers made by free-radical polymerization.



3-Allyl-4-hydroxyacetophenone [1132-05-4] U4g 21196-10 10g
MW 176.2 mp 115-118°

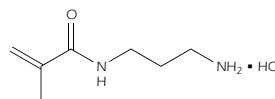
Potentially copolymerizable to introduce UV absorbing units.

Allyl methacrylate, >99% [96-05-9] *CH5g*
 MW 126.2 bp 55°/30mm n_D^{20} 1.436 200 ppm MEHQ inhibitor TSCA
 $H_2C=C(CH_3)CO_2CH_2CH=CH_2$
 Contains polymerizable units of differing reactivity; methacrylate moiety being more reactive than allyl.

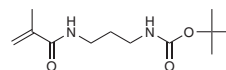
NEW! Allyl Phenyl Ether, 98% [1746-13-0] *H4d*
 MW 134 bp 185° Appearance: Amber Liquid Specific gravity (20°C): 0.97 TSCA
 High purity monomer which has a high refractive index allowing it to be used as a synthon in modifying polymer refractive index properties.

2-Aminoethyl methacrylate hydrochloride, min. 95% [2420-94-2] *B6e*
 MW 166.6 mp 121-124° uninhibited TSCA
 $H_2C=C(CH_3)CO_2CH_2CH_2NH_2 \cdot HCl$
 For preparation of polymers containing primary amine groups and preparation of specialty methacrylate monomers. Technical Data Sheet #522

N-(3-Aminopropyl)methacrylamide hydrochloride, >98% [72607-53-5] *U2bd*
 MW 178.7 mp 122-124° uninhibited TSCA
 Primary amine monomer, hydrolytically stable for preparation of polymers containing primary amine functionality.
 Technical Data Sheet #522

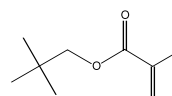


N-(t-BOC-aminopropyl)methacrylamide [2197-397-94] *U7bd*
 MW 242 mp 81-83° Solid white powder
 $C_{12}H_{22}O_3N_2$ uninhibited
 Solvent soluble, blocked primary amine monomer, soluble in a range of organic solvents and polymerized readily with other vinylic monomers. The t-BOC group is easily deprotected to the free amine with reagents including HCl/MeOH, Me_3SiCl , or heat (185°).

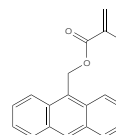


Macromol. Chem. Phys., 204, 1486-1496 (2003); Protective Groups in Organic Synthesis, 3rd edition, pgs. 520-522

tert-Amyl methacrylate [2397-76-4] *EHOV7d*
 (Neopentyl methacrylate) MW 156.3 $C_2H_5C(CH_3)_2OCOC(CH_3)=CH_2$
 Neutral ester monomer. Inhibited with 100 ppm MEHQ



9-Anthracenylmethyl methacrylate (PolyFluor® 407) [31645-35-9] *U3ag*
 MW 276.2 mp 82-84° Yellow crystals Ex. max: 362nm Em. max: 407nm
 Fluorescent monomer.



- B -

Barium methacrylate, >95% [17989-77-4] *HJX7d*
 MW 307.5 TSCA
 $[H_2C=C(CH_3)CO_2]_2Ba$
 Polymerizable metal salt. Imparts radio-opacity to polymers.

Benzhydryl methacrylate [25574-72-5] *U5d*
 MW 252.3 mp 80-82°C R.I. (polymer) ~1.56
 $(C_6H_5)_2CHOCO C(CH_3)=CH_2$
 Monomer with high refractive index. Useful in ophthalmic applications.
 Technical Data Sheet #509

Catalog # Size

01643-500 500g

24894-100 100g

21002-10 10g

21200-5 5g

24318-10 10g

06127-10 10g

23587-100 100mg
 23587-1 1g

01994-50 50g

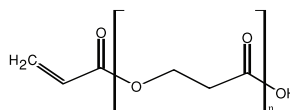
24286-10 10g

Benzyl acrylate, ~99% [2495-35-4] *H4g*
 MW 162.2 bp 100°/118mm n_D^{20} 1.514 ca. 150 ppm MEHQ inhibitor Tg 6° TSCA
 $C_6H_5CH_2OCOCH=CH_2$
 Used to make polymers of high (~1.55) refractive index.

N-Benzylmethacrylamide [3219-55-4] *U2g*
 MW 175.2 mp 82°
 $C_6H_5CH_2NHCO C(CH_3)=CH_2$
 Used to make polymers of high (1.5965) refractive index.

Benzyl methacrylate, min. 95% [2495-37-6] *H2d*
 MW 176.2 bp 231-233° n_D^{20} 1.512 ca. 50 ppm MEHQ inhibitor Tg 54° TSCA
 $H_2C=C(CH_3)CO_2CH_2C_6H_5$
 Used to make polymers of high (1.5680) refractive index.

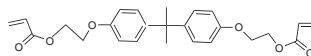
NEW! Beta-Carboxyethyl Acrylate, >98% Active [24615-84-7] *BHM4d*
 MW 144 Moisture (%): 0.70 1,000ppm MEHQ Appearance: Slightly Viscous Liquid
 $CH_2=CHCO_2(CH_2)_2CO_2H$
 High purity material is in the class of carboxylic monomers of the acrylic or methacrylic acid type. A significant difference is the greater separation of the carboxylic acid functionality from the polymerizable vinyl functionality. Can be polymerized in solution or emulsion to produce acrylic, vinyl-acrylic or styrenic-acrylic polymers with improved adhesive properties.



Other key differences compared to conventional carboxylic acid functional materials are:

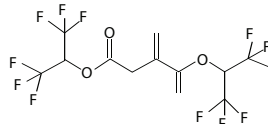
- Promotes flexibility in polymers owing to lower glass transition of its homopolymers (< 30°C).
- Provides improved adhesion and stability in emulsion polymers, due to its -COOH groups being more available than those in the conventional carboxylic acids.
- Much more reactive in its salt form than acrylic acid, allowing high levels of incorporation, over a wide pH range.
- More compatible with other monomers, thus reducing aqueous phase polymerization and producing more uniform copolymers.

2,2-Bis[4-(2-acryloxyethoxy)phenyl]propane [64401-02-1] *HO5d*
 MW 424.5 ca. 750 ppm MEHQ inhibitor TSCA
 Rigid, hydrophobic, crosslinking monomer.



Bis-GMA - See 2,2-Bis[4-(2-hydroxy-3-methacryloxypropoxy)phenyl]propane, see page 134.

NEW! Bis-(1,1,1,3,3,3-Hexafluoroisopropyl) Itaconate* [98452-82-5] *HU4d*
 MW 430.14 bp 75-77° @ 12mm d 1.54 grams/mL n_D^{20} 1.33 TSCA $C_{11}H_6F_{12}O_4$
 Fluoromonomer useful in producing polymers for the formulation of plastics with high performance and unique strength & durability. Products made from fluoropolymers include surfactants, optical fibers, biomaterials, coatings for nonstick bakeware and membranes for fuel cells.



*Cold pack charge required.

Catalog # Size

01997-100 100g

17969-25 25g

02000-100 100g

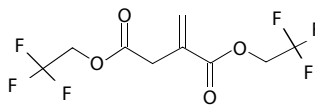
24891-100 100g

04136-25 25g

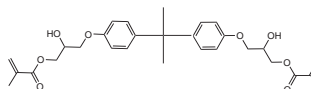
24971-25 25g

NEW! Bis-(2,2,2-Trifluoroethyl) Itaconate* [104534-96-5] *HU4d*
 MW 294.15 bp 772-5° @ 80mm d 1.47 grams/mL n_D^{20} 1.33 TSCA
 $C_9H_8F_6O_4$

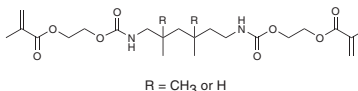
Fluoromonomer useful in producing polymers for the formulation of plastics with high performance and unique strength and durability. Fluoropolymers created from fluoromonomers are high value added materials with unique properties including chemical and heat resistance and the ability to withstand corrosion. Products made from fluoropolymers include surfactants, optical fibers, biomaterials, coatings for nonstick bakeware and membranes for fuel cells.



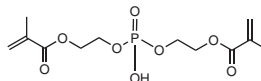
2,2-Bis[4-(2-hydroxy-3-methacryloxypropoxy)phenyl]propane [1565-94-2] *A2d*
 (Bis-GMA)
 MW 510.6 Gels before boiling n_D^{20} 1.550 ca.
 100 ppm MEHQ inhibitor TSCA
 Rigid, hydrophobic, crosslinking monomer.



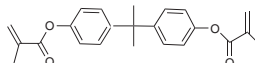
Bis(2-methacryloxyethyl)-N,N'-1,9-nonylene biscarbamate [72869-86-4] *U5d*
 (Diurethane dimethacrylate) MW 470.6 bp 200° n_D^{20} 1.485
 Long chain-length crosslinking monomer.



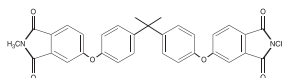
Bis(2-methacryloxyethyl) phosphate [32435-46-4] *U4d*
 MW 322.2 n_D^{20} 1.469 TSCA
 $[H_2C=C(CH_3)CO_2CH_2CH_2O]_2P(O)OH$
 Crosslinking monomer adhesion promoter through free phosphoric acid group.



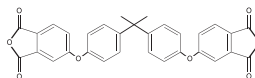
2,2-Bis(4-methacryloxyphenyl)propane, >99% [3253-39-2] *H2g*
 MW 364.4 mp 72-74° TSCA uninhibited
 Rigid, hydrophobic, crosslinking monomer.



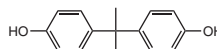
4,4'-Bisphenol A Bis-(N-Methylphthalimide) [54395-52-7] *H4g*
 MW 546.4 Tg ~ 67°C Solid, 4,4' isomer, ~95% uninhibited
 Useful in the production of heat resistant polyimides, thermoplastic polyetherimides and special plasticizers.



4,4'-Bisphenol A Dianhydride [38103-06-9] *H4g*
 MW 520.5 Tm 184-187°C (alternate Tm reported as 188-192°C) solid, 4,4' isomer, ~95%
 Used in the synthesis of high performance polyetherimides and for flame retardant, electrically insulating coatings, non-linear optical applications, for epoxy curing, heat curable and thermosetting copolymers with silicones.



Bisphenol A [80-05-7] *HO7g*
 MW 228.3 mp 158-159° bp 220°/4mm TSCA
 Used to make epoxy resins, polyethers.



*Cold pack charge required.

Catalog # Size

24972-25 25g

03344-100 100g
 03344-500 500g

21619-50 50g

16041-10 10g

01381-25 25g

24284-25 25g

24283-25 25g

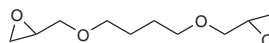
02548-100 100g

Bisphenol A dimethacrylate — See 2,2-Bis(4-methacryloxyphenyl)propane, page 134.

2-Bromoethyl acrylate, min. 95% [4823-47-6] *H5d*
 MW 179.0 bp 52-53°/5mm n_D^{20} 1.476 ca. 100 ppm MEHQ inhibitor
 $\text{BrCH}_2\text{CH}_2\text{OCOCH}=\text{CH}_2$
 Reactive halogen, has potential use in curable and reactive polymers and in synthesis of other monomers.

1,4-Butanediol diacrylate, min. 85% [1070-70-8] *BH5d*
 MW 198.2 bp 83°/0.3mm n_D^{20} 1.456 ca. 75 ppm HQ inhibitor Tg 45° TSCA
 $(\text{H}_2\text{C}=\text{CHCO}_2\text{CH}_2\text{CH}_2)_2$
 Crosslinking monomer.

1,4-Butanediol diglycidyl ether [2425-79-8] *BO6g*
 MW 202.3 WPE~130 bp 260-266° n_D^{20} 1.453
 (83°/0.3mm) TSCA
 For post-crosslinking reactions, preparation of aliphatic epoxy resins.

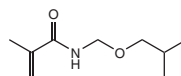


1,3-Butanediol dimethacrylate, ~98% [1189-08-8] *EHOV7d*
 MW 226.3 bp 73°/0.1mm n_D^{20} ca. 1.452 100 ppm MEHQ inhibitor TSCA
 $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{O}_2\text{C}(\text{CH}_3)=\text{CH}_2$
 Crosslinking monomer.

1,4-Butanediol dimethacrylate, min. 90% [2082-81-7] *HO2d*
 MW 226.3 bp 132°/4mm n_D^{20} 1.456 ca. 200 ppm MEHQ inhibitor TSCA
 $[\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2]_2$
 Crosslinking monomer.

2-n-Butoxyethyl methacrylate, ~99% [13532-94-0] *H6d*
 MW 186.2 bp 90-92°/3mm n_D^{20} 1.434 100 ppm HQ inhibitor
 $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2\text{O}(\text{CH}_2)_3\text{CH}_3$
 For low Tg polymers having higher polarity than alkyl methacrylate polymers.

N-(iso-Butoxymethyl)methacrylamide, min. 95% [4548-27-0] *H3g*
 MW 171.3 bp 127°/5mm n_D^{20} 1.460 ca. 250 ppm MEHQ inhibitor
 For thermally crosslinking polymers, especially under acid conditions using active methylene group.



4-tert-Butoxystyrene, min. 99% [95418-58-9] *H3g*
 MW 176.2 bp 72-73°/3mm n_D^{20} 1.524 200 ppm TBC inhibitor TSCA
 $4\text{-H}_2\text{C}=\text{CHC}_6\text{H}_4\text{OC}(\text{CH}_3)_3$

n-Butyl acrylate, min. 99% [141-32-2] *BEHJO6d* MW 128.2 bp 43-44°/14mm
 n_D^{20} 1.418 ca. 15-20 ppm MEHQ inhibitor TSCA
 $\text{H}_2\text{C}=\text{CHCO}_2(\text{CH}_2)_3\text{CH}_3$
 Forms hydrophobic, low Tg polymers soluble in hydrocarbons.

tert-Butyl acrylate, >97.5% [1663-39-4] *CH6d* MW 128.2 bp 30-31°/26mm
 n_D^{20} 1.411 ca. 10-20 ppm MEHQ inhibitor TSCA
 $\text{H}_2\text{C}=\text{CHCO}_2\text{C}(\text{CH}_3)_3$
 Forms hydrophobic polymers. Polymers are easily transesterified and thermally eliminate isobutene to form acid groups. Protected acrylic acid.

2-(tert-Butylamino)ethyl methacrylate, min. 90% [3775-90-4] *EH07g*
 MW 185.3 bp 100-105°/12 mm n_D^{20} 1.442 ca. 1100 ppm MEHQ inhibitor TSCA
 $H_2C=C(CH_3)CO_2CH_2CH_2NHC(CH_3)_3$
 Secondary amine monomer.

iso-Butyl methacrylate, min. 99% [97-86-9] *CH4d*
 MW 142.2 bp 154° Tg 53° n_D^{20} 1.420 ca. 10-20 ppm MEHQ inhibitor TSCA
 $H_2C=C(CH_3)CO_2CH_2CH(CH_3)_2$
 Forms hydrophobic polymers soluble in hydrocarbons.

n-Butyl methacrylate, min 99% [97-88-1] *EH0V7d*
 MW 142.2 bp 162° Tg 20° n_D^{20} 1.423 ca. 100 ppm MEHQ inhibitor TSCA
 $H_3C(CH_2)_3OCOC(CH_3)=CH_2$
 Forms hydrophobic polymers soluble in hydrocarbons.

sec-Butyl methacrylate, min 90% [2998-18-7] *CU4d*
 MW 142.2 bp 146° n_D^{20} 1.4195 ca. 100ppm MEHQ inhibitor Tg 60°
 $H_3CCH_2CH(CH_3)OCOC(CH_3)=CH_2$
 Forms hydrophobic polymers soluble in hydrocarbons.

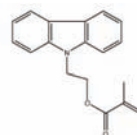
tert-Butyl methacrylate, min 98% [585-07-9] *CU6g*
 MW 142.2 bp 65-66°/57mm n_D^{20} 1.415 ca. 200 ppm MEHQ inhibitor Tg 107° TSCA
 $H_2C=C(CH_3)CO_2C(CH_3)_3$
 Polymer easily transesterified, thermally eliminates isobutene to form acid groups.

4-(tert-Butyl)styrene, 95% [1746-23-2] *EH6d*
 MW 160.3 bp 219° n_D^{20} 1.526 100 ppm t-butylcatechol inhibitor Tg 132° TSCA
 $4-(CH_3)_3CC_6H_4CH=CH_2$
 Higher Tg homolog of styrene, increased solubility in aliphatic hydrocarbons. Protected methacrylic acid.

n-Butyltrimethoxysilane [1067-57-8] *EH5g*
 MW 178.3 bp 164-165° n_D^{20} 1.398 TSCA
 $H_3C(CH_2)_3Si(OCH_3)_3$
 Hydrophobic siloxane monomer. Produces crosslinks in polysiloxanes.

- C -

2-(9H-Carbazole-9-yl) ethyl methacrylate [15657-91-7] *HO5d*
 MW 297.33 mp 82-84°C UV λ max: 241 nm n_D^{20} 1.69
 Analog of photoconductive polymer, N-Vinylcarbazole.



2-Carboxyethyl acrylate, 90% [24615-84-7] *BMO6d*
 MW 144.1 bp 96°/0.1mm n_D^{20} 1.457 1000 ppm MEHQ inhibitor TSCA
 $CH_2=CHCO_2(CH_2)_2CO_2H$
 Lower volatility than acrylic acid.

Catalog # Size

01797-100 100g

02056-500 500g

02059-500 500g
 02059-3 3kg

02057-10 10g

02058-100 100g

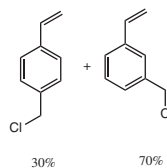
02606-25 25g

21094-250 250g

24372-1 1g

16719-100 100g
 16719-500 500g

Chloromethylstyrene, 43% para, 57% meta, ~96% [30030-25-2] *BH6d*
 (vinylbenzyl chloride) MW 152.6 bp 229° n_D^{20} 1.570
 50-100 ppm t-butylcatechol inhibitor
 700-900 ppm nitroparaffin inhibitor TSCA
 $3\&4\text{-H}_2\text{C=CHC}_6\text{H}_4\text{CH}_2\text{Cl}$
 Reactive styrene monomer. Can be used to prepare Merrifield resins without using a chloromethylation step.



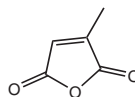
4-Chloromethylstyrene, 98% [1592-20-7] *BHO6g*
 (4-vinylbenzyl chloride)
 MW 152.6 bp ~229° ca. 500 ppm t-butylcatechol inhibitor,
 500 ppm nitroparaffin inhibitor TSCA
 $4\text{-CH}_2\text{=CHC}_6\text{H}_4\text{CH}_2\text{Cl}$
 Reactive styrene monomer. Can be used to prepare Merrifield resins without using a chloromethylation step.

4-Chlorophenyl acrylate [13633-87-9] *U4d*
 MW 182.6 bp 70°/1mm Tg 58° n_D^{20} 1.536 100 ppm HQ inhibitor
 $4\text{-ClC}_6\text{H}_4\text{OCOCH=CH}_2$
 Higher refractive index ($n = \sim 1.55$) than most acrylate esters.

2-Cinnamoyloxyethyl acrylate [52049-17-9] *HO4d*
 MW 246.3 n_D^{20} 1.562 MEHQ inhibitor
 $\text{C}_6\text{H}_5\text{CH=CHCO}_2\text{CH}_2\text{CH}_2\text{OCOCH=CH}_2$
 Photocrosslinking monomer.

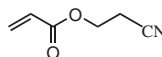
Cinnamyl methacrylate [31736-34-2] *U5d*
 MW 202.3 bp 141°/3mm n_D^{20} 1.446 100 ppm MEHQ inhibitor
 $\text{C}_6\text{H}_5\text{CH=CHCH}_2\text{OCOC(CH}_3\text{)=CH}_2$
 Photocrosslinking monomer.

Citraconic anhydride [616-02-4] *H7bg*
 MW 112.1 bp 213° n_D^{20} 1.471 TSCA
 Reactive acid anhydride monomer. Used for the reversible blocking of amino groups and for the dissociation of nucleoprotein complexes.
Methods Enzymol., 25, 546 (1972); *Biochem. J.*, 191, 269 (1980)

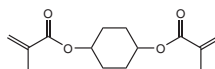


Copper (II) methacrylate [53721-10-1] *X7d*
 MW 233.7
 $[\text{H}_2\text{C=C(CH}_3\text{)CO}_2]_2\text{Cu}$
 Metal salt of methacrylic acid.

2-Cyanoethyl acrylate [106-71-8] *BOVW7bd*
 MW 125.1 bp 90°/5mm n_D^{20} 1.447
 400-800 ppm MEHQ inhibitor Tg 4° TSCA
 Polar acrylate ester.



trans-1,4-Cyclohexanediol dimethacrylate [38479-34-4] *EHOV7d*
 MW 252.3 mp 52-57°C Light yellow liquid. Purity ~95%
 Crosslinking monomer.



Catalog # Size

02718-100 100g
 02718-500 500g

22193-25 25g

01331-10 10g

24014-10 10g

02092-5 5g

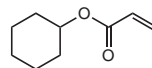
01824-100 100g

21222-25 25g

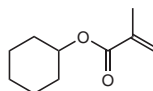
01829-100 100g

18912-10 10g

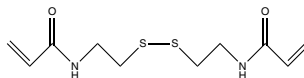
Cyclohexyl acrylate, min 85% [3066-71-5] *U7d*
 MW 154.1 bp 182-184° n_D^{20} 1.467 ca. 200 ppm MEHQ inhibitor
 Tg 19° TSCA Bulky alkyl acrylate ester.



Cyclohexyl methacrylate, ~98% [101-43-9] *EH4d*
 MW 168.2 bp 71-74°/5mm n_D^{20} 1.459 ca. 50 ppm MEHQ,
 2 ppm phenothiazine inhibitor Tg 83° TSCA
 Bulky alkyl methacrylate ester.



N,N'-Cystaminebisacrylamide, Electro Pure™* [60984-57-8] *U6f*
 MW 260.4 mp 120-125°
 Reversible crosslinking monomer. Can be used to introduce
 mercaptan groups into polymers by first polymerizing and
 then reducing to mercaptan.



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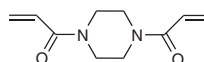
1,10-Decanediol dimethacrylate [6701-13-9] *EHOU6d*
 MW 310.4 bp 170°/2mm 1.458 ca. 270 ppm HQ inhibitor TSCA
 $[H_2C=C(CH_3)CO_2(CH_2)_5]_2$
 Hydrophobic, long-chain crosslinking monomer.

iso-Decyl acrylate, 99% [1330-61-6] *H4d*
 MW 212.3 bp 121°/10mm n_D^{20} 1.440 ca. 50 ppm MEHQ inhibitor Tg -55° TSCA
 $H_3CCH(CH_3)(CH_2)_7OCOC(CH_3)=CH_2$
 Hydrophobic ester monomer. Forms hydrocarbon-soluble polymers.

iso-Decyl methacrylate, min. 90% [29964-84-9] *H5g*
 MW 226.4 bp 78°/1mm n_D^{20} 1.441 ca. 100ppm MEHQ inhibitor TSCA
 $H_3CCH(CH_3)(CH_2)_7OCOC(CH_3)=CH_2$
 Hydrophobic ester monomer, forms oil-soluble polymers.

n-Decyl methacrylate, 99% [3179-47-3] *U5d*
 MW 226.4 bp 155-156°/22mm Tg -30° n_D^{20} 1.443 100 ppm MEHQ inhibitor TSCA
 $H_3C(CH_2)_9OCOC(CH_3)=CH_2$
 High-purity hydrophobic ester monomer, forms oil-soluble polymers.

1,4-Diacryloylpiperazine [6342-17-2] *H5d*
 MW 194.2 mp 90-92°
 Acrylamide-based crosslinking monomer.



N,N-Diallylacrylamide [3085-68-5] *U7d* MW 151.2 bp 108-110°/3mm
 n_D^{20} 1.489 100 ppm HQ inhibitor
 $(H_2C=CHCH_2)_2-NCOCH=CH_2$
 Crosslinking monomer.

Diallylamine, min. 98% [124-02-7] *IWX7g*
 MW 97.2 bp 110° n_D^{20} 1.440 TSCA
 $(H_2C=CHCH_2)_2NH$
 Forms soluble cyclopolymers.

*Dry ice packaging charge.

Catalog # Size

02109-100 100g

01837-100 100g

09809-5 5g

02140-25 25g

03008-100 100g

22493-100 100g

23344-25 25g

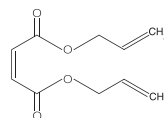
21190-10 10g

01848-10 10g

21424-100 100g

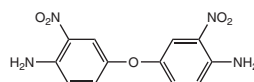
Diallyldimethylammonium chloride, 65% soln. in water [7398-69-8] *HJVVX7g*
HJVVX7g MW 161.7 TSCA
 $(\text{H}_2\text{C}=\text{CHCH}_2)_2\text{N}(\text{CH}_3)_2\text{Cl}$
 For preparation of linear all-aliphatic cationic polymers by cyclopolymerization mechanism.

NEW! Diallyl Maleate - 99% Active [999-21-3] *H4d*
 MW 196 Moisture (%): 0.05 Active Monomer (%): 99 Appearance: Clear Liquid
 $\text{CH}_2=\text{CHCH}_2\text{OCOCH}=\text{CHOOCH}_2\text{CH}=\text{CH}_2$
 Diallyl ester of maleic acid. Once polymerized through the vinyl center adjacent to the ester groups, it provides multiple postfunctionalization target sites at the pendant allylic centers. This makes it particularly useful both in acrylic chemistry but also in combination with alkyd and polyester resins. When employed at very low levels it is an effective site for branching generation in emulsion polymers.

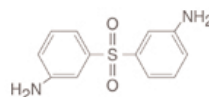


Diallyl Maleate, min. 98% [999-21-3] *HV4d*
 MW 196.2 bp 106 - 116°C/4mm Hg (lit.) n_D^{20} 1.469 mp -47°C (lit.) Fp > 230°C
 Density = 1.073g/cc TSCA
 $\text{CH}_2=\text{CHCH}_2\text{OCOCH}=\text{CHOOCH}_2\text{CH}=\text{CH}_2$
 Reactive functional monomer. Polymers formed with the incorporation of Diallyl Maleate have pendant allyl groups. Applications for Diallyl Maleate include polyester resins, adhesives, and ion exchange resins. When used at low levels, Diallyl Maleate is an effective agent for the promotion of branching in emulsion polymers.

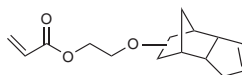
4,4'-Diamino-3,3'-dinitrodiphenyl ether [3273-78-7] *U5d*
 MW 290.2 mp 296°
 Preparation of polyamides, polyimides.



3,3'-Diaminodiphenyl sulfone, min. 98% [599-61-1] *EJU4g*
 MW 248 mp 171-172° 95% (contains 3,4'-isomer) TSCA
 $[3,3'-\text{H}_2\text{NC}_6\text{H}_4]_2\text{SO}_2$
 Preparation of polyamides, polyimides.



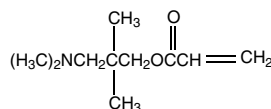
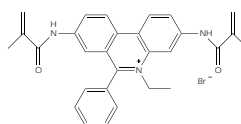
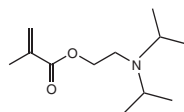
Dicyclopentenyl oxyethyl acrylate, 96% [65983-31-5] *HOV7d*
 MW 248.3 bp 113°/1mm n_D^{20} 1.501
 700 ppm MEHQ inhibitor Tg 11° TSCA
 Double bond in dicyclopentenyl ring does not participate in polymerization but can be post-reacted, e.g., by oxidative crosslinking.



N,N-Diethylacrylamide, min. 95% [2675-94-7] *U4d*
 MW 127.2 bp 93°/19mm n_D^{20} 1.464 100 MEHQ inhibitor
 $(\text{C}_2\text{H}_5)_2\text{NCOCH}=\text{CH}_2$
 Substituted acrylamide monomer.

2-(N,N-Diethylamino)ethyl methacrylate, min. 95% [105-16-8] *EHO5g*
 MW 185.3 bp 90-92°/3mm n_D^{20} 1.444 100 ppm PTZ inhibitor Tg 20° TSCA
 $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2\text{N}(\text{C}_2\text{H}_5)_2$
 Preparation of cationic polymers, especially quaternary ammonium polymers.

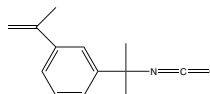
	Catalog #	Size
Diethylene glycol diacrylate, min. 99% [4074-88-8] <i>BOW6d</i> MW 214.2 bp >200°/760mm n_D^{20} 1.463 120 ppm MEHQ inhibitor TSCA $(H_2C=CHCO_2CH_2CH_2)_2O$ Hydrophilic crosslinking monomer.	02215-100	100g
Diethylene glycol dimethacrylate, min 94% [2358-84-1] <i>H4g</i> MW 242.3 bp >200°/760mm n_D^{20} 1.458 500 ppm MEHQ inhibitor Tg 66° TSCA $[H_2C=C(CH_3)CO_2CH_2CH_2]_2O$ Hydrophilic crosslinking monomer.	02214-100	100g
2-Diisopropylaminoethyl methacrylate, min 95% [16715-83-6] <i>U5d</i> MW 213.3 bp 70-75°/1mm n_D^{20} 1.449 Amine containing monomer. For preparation of polymers containing tertiary amine functionality. Used for improving antistatic properties of synthetic fibers and improved resistance of fibers and polymers to degradation by chlorine, UV, etc.	24263-10	10g
3,8-Dimethacryloyl ethidium bromide (5-ethyl-3,8-dimethacrylamido-6-phenylphenanthridinium bromide) <i>U4ag</i> (PolyFluor® 512) MW 530.2 mp 245.5-247° Ex. max: 439nm Em. max: 512nm Fluorescent monomer. Orange crystals.	23590-100 23590-1	100mg 1g
N,N-Dimethylacrylamide, min. 98% [2680-03-7] <i>ESVW5d</i> MW 99.1 bp 82-84°/21mm n_D^{20} 1.473 Tg 89° 500 ppm MEHQ inhibitor TSCA $H_2C=CHCON(CH_3)_2$ Water-soluble, hydrolytically stable acrylamide derivative used in chromatographic resins.	02255-100	100g
2-(N,N-Dimethylamino)ethyl acrylate, min. 95% [2439-35-2] <i>EHOV7d</i> MW 143.2 bp 53°/3mm n_D^{20} 1.438 1000 ppm MEHQ inhibitor TSCA $H_2C=CHCO_2CH_2CH_2N(CH_3)_2$ For preparation of cationic polymers, especially quaternary ammonium polymers.	02257-500	500g
N-[2-(N,N-Dimethylamino)ethyl]methacrylamide, 90% [13081-44-2] <i>U6d</i> MW 156.3 bp 87°/1.8mm n_D^{20} 1.474 100 ppm HQ inhibitor $(H_3C)_2NCH_2CH_2NHCOC(CH_3)=CH_2$ Amine-functional methacrylamide derivative.	06172-5	5g
2-(N,N-Dimethylamino)ethyl methacrylate, min. 99% [2867-47-2] <i>HO6d</i> MW 157.2 bp 75-77°/13mm n_D^{20} 1.440 1000 ppm MEHQ inhibitor Tg 19° TSCA $H_2C=C(CH_3)CO_2CH_2CH_2N(CH_3)_2$ For preparation of cationic polymers, especially quaternary ammonium polymers. Technical Data Sheet #213	00213-500	500g
3-Dimethylaminoneopentyl acrylate, 95% [20166-73-8] <i>EHVWX6d</i> MW 185.3 bp 53°/1.4mm n_D^{20} 1.439 100 MEHQ inhibitor Amine containing monomer. For preparation of polymers containing tertiary amine functionality. Used in photocurable dental composition and to improve antistatic property and acid dyeability of polyamide and polyester fabric.	17970-10	10g



N-[3-(N,N-Dimethylamino)propyl]acrylamide, min. 95% [3845-76-9] *U6d*
 MW 156.2 bp 85°/0.1mm n_D^{20} 1.482 uninhibited Tg 19°
 $(H_3C)_2N(CH_2)_3NHCOCH=CH_2$
 For preparation of cationic polymers, especially quaternary ammonium polymers.

N-[3-(N,N-Dimethylamino)propyl]methacrylamide, min. 98% [5205-93-6] *BH4g*
 MW 170.3 bp 141°/2mm n_D^{20} 1.479 600-750ppm MEHQ inhibitor TSCA
 $(H_3C)_2N(CH_2)_3NHCOC(CH_3)=CH_2$
 For preparation of cationic polymers, especially quaternary ammonium polymers. Monomer is more hydrolytically stable than corresponding esters.

α , α -Dimethyl-3-isopropenylbenzyl isocyanate, 95% [2094-99-7] *HO5g*
 MW 201.3 bp 268-271° 1.530 0.01% BHT inhibitor TSCA
 $H_2C=C(CH_3)C_6H_4C(CH_3)_2NCO$
 Aliphatic isocyanate monomer.



N,N-Dimethylmethacrylamide, min. 98% [6976-91-6] *U5d*
 MW 113.2 bp 65-67°/10mm n_D^{20} 1.460 100 ppm MEHQ inhibitor
 $(H_3C)_2NHCOC(CH_3)=CH_2$
 Substituted amide monomer.

2,2-Dimethylpropanediol dimethacrylate [1985-51-9] *EHOV7d*
 MW 240.3 bp 112°/1.2mm n_D^{20} 1.453 60 ppm MEHQ inhibitor TSCA
 $[H_2C=C(CH_3)CO_2CH_2]_2C(CH_3)_2$
 Crosslinking monomer.

Dipentaerythritol pentaacrylate (mixture of tetra-, penta-, and hexaacrylate) total esters >99% [60506-81-2] *HO5g* ..
 MW 524.5 1.490 270 ppm MEHQ inhibitor Tg 90° TSCA
 $O[CH_2C(CH_2OR)_3]_2$, R=COCH=CH₂
 Highly efficient crosslinking monomer, used especially in UV curing coatings.

N,N-Diphenylmethacrylamide [10254-08-7] *HOU7d*
 MW 237.3 bp 178° n_D^{20} 1.448 50 ppm MEHQ inhibitor
 $(C_6H_5)_2NHCOC(CH_3)=CH_2$
 Bulky aryl-substituted amide monomer.

Dipropylene glycol dimethacrylate [1322-73-2] *EU7ad*
 MW 270.3 bp >200° n_D^{20} 1.448 50 ppm HQ inhibitor
 $[H_2C=C(CH_3)CO_2C_3H_6]_2O$
 Crosslinking monomer.

Diurethane dimethacrylate —

See *Bis(2-methacryloxyethyl)-N,N'-1,9-nonylene biscarbamate*, page 134.

Divinylbenzene [1321-74-0] *H5d* MW 130.2 bp 198° mixed m,p-isomers
 (impurities mainly m,p-ethylstyrenes) ~1000 ppm t-butylcatechol inhibitor TSCA
 $3\&4-C_6H_4(CH=CH_2)_2$
 Crosslinking monomer used primarily with styrene.

50-60% active
 80% active n_D^{20} 1.574

Catalog # Size

22018-10 10g

09656-100 100g

19706-100 100g

02270-25 25g

02276-100 100g

16311-500 500g

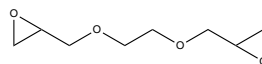
19663-25 25g

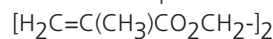
15156-50 50g

01892-100 100g

22478-100 100g

	Catalog #	Size
Divinyl sebacate, min. 90% [10355-50-7] <i>A2d</i> MW 254.3 bp 142-144°/3mm n_D^{20} 1.454 120 ppm HQ inhibitor $[H_2C=CHO_2C(CH_2)_4]_2$ Crosslinking vinyl ester monomer.	04632-5	5g
1H,1H,7H-Dodecafluoroheptyl methacrylate, min. 95% [2261-99-6] <i>EHOV7d</i> MW 400.2 bp 107°/23mm Tg 13° n_D^{20} 1.349 120 ppm HQ inhibitor ($n_D^{20} = \sim 1.36$) $H_2C=C(CH_3)CO_2CH_2(CF_2)_6H$ Low refractive index monomer.	00767-25	25g
n-Dodecyl acrylate, min. 90% [2156-97-0] <i>U5g</i> MW 240.4 bp 119°/0.8mm n_D^{20} 1.445 200 ppm MEHQ inhibitor Tg -3° TSCA $H_2C=CHCO_2(CH_2)_{11}CH_3$ Forms hydrophobic polymers soluble in hydrocarbons.	02460-50	50g
N-Dodecylmethacrylamide [1191-39-5] <i>U5g</i> MW 253.4 bp 145°/0.08mm mp 41° Tg 15° $H_2C(CH_2)_{11}NHCOC(CH_3)=CH_2$ Hydrophobic, long-chain alkyl-substituted amide monomer.	04135-10	10g
n-Dodecyl methacrylate, min. 98% [142-90-5] <i>H2g</i> MW 254.4 bp 142-143°/2mm n_D^{20} 1.445 400 ppm MEHQ inhibitor Tg -55° TSCA $H_2C=C(CH_3)CO_2(CH_2)_{11}CH_3$ Preparation of hydrophobic polymers.	02461-250	250g
- E -		
2-(2-Ethoxyethoxy)ethyl acrylate, min. 99% [7328-17-8] <i>HO4d</i> MW 188.2 bp 250° n_D^{20} 1.440 1000 ppm MEHQ inhibitor Tg -70° TSCA $H_2C=CHCO_2(CH_2CH_2O)_2C_2H_5$ Polar, hydrophilic, monomer, low volatility, low Tg. Higher polarity than n-octyl acrylate.	02626-100	100g
N,N' Ethylene Bisacrylamide [2656-58-3] <i>HU2d</i> N,N'-dimethylenebis(acrylamide), N,N'-bisacryloyl-1,2-diaminoethane MW 168.2 mp 144-145° $C_8H_{12}N_2O_2$ ($H_2C=CHCONHCH_2$) ₂ Crosslinking monomer used in preparation of polyacrylamide resins.	09811-1	1g
Ethylene glycol diacrylate, ~97% [2274-11-5] <i>EHOV7d</i> MW 170.2 bp 62°/0.9mm n_D^{20} 1.453 100 ppm MEHQ inhibitor TSCA $(H_2C=CHCO_2CH_2)_2$ Crosslinking monomer.	02302-25	25g
Ethylene glycol diglycidyl ether (Quetol 651) [2224-15-9] <i>H5g</i> MW (theor.) 174.2 WPE~112 bp 112°/4.5mm n_D^{20} 1.463 TSCA Crosslinker for carboxyl-, amine-, and hydroxyl-functional polymers. Material is ~100% active and contains higher molecular weight compounds having chloropropylene segments produced by reaction with more than one epichlorohydrin molecule per hydroxyl in synthesis.	01479-100	100g



Ethylene glycol dimethacrylate [97-90-5]MW 198.2 bp 83-85°/1mm n_D^{20} 1.454 TSCA

Ethylene Glycol Dimethacrylate is useful as a high purity crosslinker with bridging/specialty capability between polymer chains.

Min 88% 70 ppm HQ inhibitor U6d

Min 98% 100 ppm MEHQ inhibitor HJ6g

Min 99.7% 50 ppm MEHQ inhibitor HO2d

Catalog # Size

02303-250 250g
24030-250 250g
24896-250 250g**2-Ethylhexyl acrylate, 99%** [103-11-7] EH5d MW 184.3 bp 128-129°/50mm n_D^{20} 1.436 50 ppm MEHQ inhibitor Tg -50° TSCA

Hydrophobic, low Tg, monomer used as internal plasticizer for polymers of other high Tg monomers.

00587-250 250g

N-Ethylmethacrylamide, ~99% [7370-88-9] EIJ7d MW 113.2 bp 106°/4mm $H_3CCH_2NHCOC(CH_3)=CH_2$

Solvent-soluble, polymerizable amide.

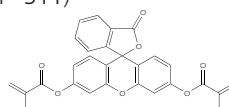
02322-10 10g

- F -**Fluorescein dimethacrylate** U5ad

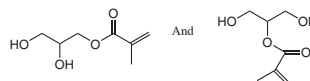
(3',6'-dimethacryloxyspirobenzo[c]-furan[1,9']xanthen-3-one; PolyFluor® 511)

MW 468.4 mp 154.5-156° Ex. max: 470nm Em. max: 511nm

Fluorescent monomer. Off-white crystals.

23589-100 100mg
23589-1 1g**- G -****Glyceryl monomethacrylate, mixture of isomers*** [5919-74-4] HO5f MW 160.2 bp 140°/0.6mm n_D^{20} 1.470 4000 ppm MEHQ inhibitor TSCA

Hydrophilic monomer useful in hydrogel preparation.

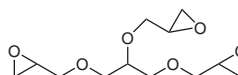


04180-25 25g

Glyceryl triglycidyl ether [25038-04-4] H4g

WPE 145 TSCA

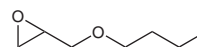
Effective crosslinker for hydroxyl-, amine- and carboxylic acid-functional polymers.



09221-50 50g

Glycidyl butyl ether, 95% (2,3-Epoxypropyl butyl ether) [2426-08-6] HW7g MW 130.2 bp 164-166° n_D^{20} 1.419 TSCA

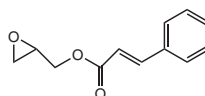
For modification of carboxyl-, amine- and hydroxyl-functional polymers. Additive used to reduce viscosity in epoxy embedding resins.



05678-500 500g

Glycidyl cinnamate [19532-86-8] HU7g MW 204.2 bp 180-183°/3mm n_D^{20} 1.575

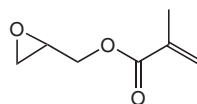
Can be reacted with groups such as hydroxyl, amine or carboxyl to introduce photocrosslinkable sites.



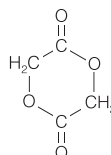
16090-10 10g

*Cold pack charge required.

Glycidyl methacrylate, min. 98.5% [106-91-2] *BEV7d*
 MW 142.2 bp 182° n_D^{20} 1.449 100 ppm MEHQ inhibitor Tg 41° TSCA
 Reactive ester monomer for preparation of other monomers
 and introduction of reactive sites into polymers.



Glycolide, 99.9% [502-97-6] *B6bf*
 MW 116.1 mp 84° TSCA
 For preparation of biodegradable polymers.



Glycol methacrylate — See 2-Hydroxyethyl methacrylate, page 146.

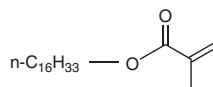
- H -

1H,1H,2H,2H-Heptadecafluorodecyl acrylate, min. 97% [27905-45-9] *BHO6d*
 MW 518.2 bp 100°/4mm n_D^{20} 1.337 100 ppm MEHQ inhibitor Tg 0°
 TSCA Polymer n_D^{20} ~1.34
 $H_2C=CHCO_2CH_2CH_2(CF_2)_7CF_3$
 Low refractive index monomer.

1H,1H,2H,2H-Heptadecafluorodecyl methacrylate, min. 98% [1996-88-9] *BHO6d* ...
 MW 532.2 bp 110°/4mm n_D^{20} 1.343 100 ppm MEHQ inhibitor Tg 40°
 TSCA Polymer n_D^{20} ~1.35
 $H_2C=C(CH_3)CO_2CH_2CH_2(CF_2)_7CF_3$
 Low refractive index monomer.

1H,1H-Heptafluorobutyl acrylate, min. 98% [424-64-6] *H6g*
 MW 254.1 bp 57°/30mm n_D^{20} 1.331 100 ppm MEHQ inhibitor Tg -30° TSCA
 Polymer n_D^{20} = 1.367
 $H_2C=CHCO_2CH_2CF_2CF_2CF_3$
 Low refractive index monomer.

1-Hexadecyl methacrylate [2495-27-4] *EHOV7d*
 MW 310.5 n_D^{20} 1.341 100 ppm HQ inhibitor Tg 22° TSCA
 Highly hydrophobic ester monomer.



1H,1H,3H-Hexafluorobutyl acrylate [54052-90-3] *CHO5d*
 MW 236.1 bp 48°/12mm n_D^{20} 1.352 100 ppm HQ inhibitor Tg -22°
 Polymer n_D^{20} = 1.392
 $H_2C=CHCO_2CH_2CF_2CH(F)CF_3$
 Low refractive index monomer.

1H,1H,3H-Hexafluorobutyl methacrylate, min. 95% [36405-47-7] *EHO5d*
 MW 250.2 bp 159° n_D^{20} 1.361 100 ppm HQ inhibitor TSCA Polymer n_D^{20} ~1.40
 $H_2C=C(CH_3)CO_2CH_2CF_2CH(F)CF_3$
 Low refractive index monomer.

Catalog # Size

02607-500 500g

17085-10 10g
 17085-50 50g

19227-25 25g

19226-25 25g

21039-25 25g

02396-25 25g

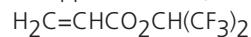
05631-10 10g

05632-10 10g

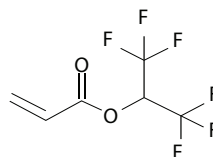
NEW! 1,1,1,3,3,3-Hexafluoroisopropyl acrylate* [2160-89-6] CH7d

MW 222.09 bp 65-68° @ 165mm d 1.33 grams/mL n_D^{20} 1.319

200 ppm of MEHQ FP 10°C / 50°C



Fluoromonomer useful in producing polymers for the formulation of plastics with high performance and unique strength and durability. Fluoropolymers created from fluoromonomers are high value added materials with unique properties including chemical and heat resistance and the ability to withstand corrosion.



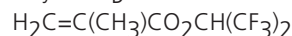
Catalog # Size

24970-25 25g

Hexafluoro-iso-propyl methacrylate, ~99% [3063-94-3] CH6g

MW 236.1 bp 50°/140mm n_D^{20} 1.331 50 ppm MEHQ inhibitor

Polymer n_D^{20} ~1.38 TSCA



Low refractive index monomer.

02401-10 10g

N,N'-Hexamethylenebisacrylamide [7150-41-6] U7d

MW 224.2 mp 135-145° C



Crosslinking amide monomer, greater hydrolytic stability than corresponding esters.

01495-5 5g

1,6-Hexamethylene diacrylate — See 1,6-Hexanediol diacrylate, below.

1,6-Hexamethylene dimethacrylate — See 1,6-Hexanediol dimethacrylate, below.

1,6-Hexanediol diacrylate [13048-33-4] HO4g

MW 226.3 bp 295° n_D^{20} 1.456 100 ppm MEHQ inhibitor Tg 43° TSCA

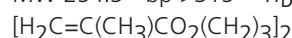


Crosslinking monomer.

23671-100 100g

1,6-Hexanediol dimethacrylate, min 98% [6606-59-3] HO5g

MW 254.3 bp >315° n_D^{20} 1.458 100 ppm HQ inhibitor TSCA

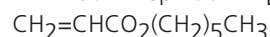


Crosslinking monomer.

23672-100 100g

n-Hexyl acrylate, min. 98% [2499-95-8] EHOV7d

MW 156.2 bp 190° n_D^{20} 1.428 85 ppm HQ inhibitor Tg -45° TSCA

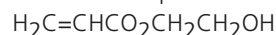


Hydrophobic, low Tg, monomer.

02411-100 100g

2-Hydroxyethyl acrylate, min. 97.5% [818-61-1] BHOR6g

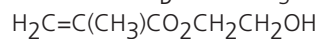
MW 116.1 bp 90°/12mm n_D^{20} 1.450 350-650 ppm MEHQ inhibitor Tg 15° TSCA



Hydrophilic monomer, reactive site for reactions.

01902-250 250g

*Cold pack charge required.

2-Hydroxyethyl methacrylate (glycol methacrylate) [868-77-9] *HO2g*MW 130.1 n_D^{20} 1.453 T_g 55° TSCA

2-Hydroxyethyl methacrylate (HEMA) is perhaps the most widely studied and used neutral hydrophilic monomer. The monomer is soluble, its homopolymer is water-insoluble but plasticized and swollen in water. This monomer is the basis for many hydrogel products such as soft contact lenses, as well as polymer binders for controlled drug release, absorbants for body fluids and lubricious coatings. As a co-monomer with other ester monomers, HEMA can be used to control hydrophobicity or introduce reactive sites.

	Purity %	Acid content %	EGDMA content %	Inhibitor (MEHQ) ppm	Color
Ophthalmic grade	min. 99	max. 0.05	max. 0.15	7-13	30
Low acid grade	min. 98	max. 0.10	max. 0.2	180-220	30
Technical grade	min. 97	max. 1.5	max. 0.2	180-220	50

N-(2-Hydroxypropyl)methacrylamide [21442-01-3] *U6d* MW 143.2 mp 67° $H_3CCH(OH)CH_2NHCOC(CH_3)=CH_2$

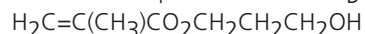
Hydrolytically stable hydrophilic monomer.

NEW! Hydroxypolyethoxy (10) Allyl Ether, 98% [27274-31-3] *H4d*

MW: 498 (mg KOH/mg): 115 Low viscosity Liquid Active content (%): 99

Ethylene oxide, moles: 10 Moisture content (%): 0.2

Difunctional molecule reactive in vinyl polymerization through its allylic group, to impart hydrophilic properties to aqueous solution or emulsion polymers. Hydroxypolyethoxy (10) Allyl Ether is a high purity material, clear, slightly viscous liquid (5 cps at 20°C) which undergoes partial solidification below 10°C to form a viscous paste. Soluble in water as well as alcohols and aromatic solvents.

Hydroxypropyl methacrylate, mixture of isomers, min. 98% [27813-02-1] *H4g* MW 144.2 bp 93-95°/9mm n_D^{20} 1.447 200 ppm MEHQ inhibitor TSCA

Hydrophilic monomer.

- L -

L-Lactic acid [79-33-4] *H23*

88% active, remainder is water.

DL-Lactide, min. 99.5% [95-96-5] *A2bd*

MW 144.1 mp 124-126° TSCA

Synthesis of biodegradable homo- and copolymers.

L-Lactide, min. 99.5% [4511-42-6] *H3bd*

Synthesis of biodegradable homo- and copolymers.

Catalog # Size

04675-100 100g
04675-500 500g03699-100 100g
03699-500 500g
03699-1 1kg

00227-1 1kg

08242-10 10g

24899-100 100g

00730-500 500g
00730-1 1kg

24618-250 250g

16640-100 100g

05749-100 100g

Lead methacrylate 2-ethylhexanoate in methyl methacrylate(0.54/0.46 moles) [1068-61-7], [301-08-6], [98-26-6] CHO5g 16382-100 100g
TSCA

Imparts x-ray opacity to polymers.

Lithium methacrylate [13234-23-6] U6d 17117-50 50g

MW 92.0



Water-soluble methacrylic acid salt.

- M -**Magnesium acrylate** [5698-98-6] EHOV7d 02467-10 10g

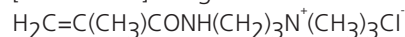
MW 166.4 Tg 400° TSCA



Polymerizable metal salt.

Methacrylamidopropyltrimethylammonium chloride, 50% soln. in water 09657-100 100g

[51410-72-1] A4g MW 220.7 ~600 ppm MEHQ inhibitor TSCA



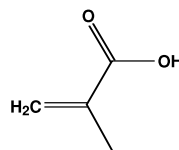
Quaternary ammonium monomer.

NEW! Methacrylic acid, min. 99.9% [79-41-4] BOW6d 24897-250 250g

MW 86 Moisture (%): 0.05 200ppm MEHQ inhibitor Appearance: Clear Liquid



High purity monomer for contact lens applications. High purity carboxylated monomers increase the hydrophilicity in polymers and provide crosslinking sites for divalent ions (e.g. Zn^{++}). We offer methacrylic acid in high purity (99.9%) as well as longer chain analog, Beta-Carboxyethyl acrylate, (99%) (Cat. #24891)

**Methacrylic acid, min. 99.5%** [79-41-4] BHO6g 00212-450 450gMW 86.1 bp 163° n_D^{20} 1.431 180-275 ppm MEHQ inhibitor Tg 185° TSCA

Carboxylic acid monomer widely used to improve adhesion and introduce reactive sites into polymers. Homopolymers are water-soluble.

Methacrylic anhydride, min. 90% [760-93-0] BEKX5g 01517-100 100mlMW 154.2 bp 80-85°/8mm n_D^{20} 1.453 2000 ppm BHT inhibitor TSCA

Reactive monomer used primarily in preparation of other monomers under mild reaction conditions. Homopolymers are linear and contain cyclic anhydride units, uncrosslinked.

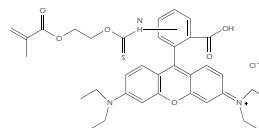
Methacryloxyethyl thiocarbamoyl rhodamine B U5ag 23591-100 100mg

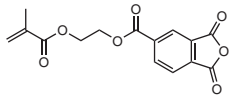
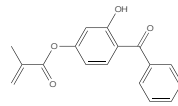
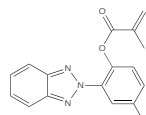
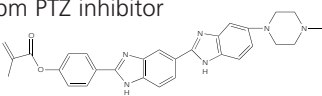
(N-[9-(2-carboxy-x-methacryloxy-ethylthiocarbamoylphenyl)-6-diethylamino-3H-xanthen-3-ylidene]-N-ethyl-ethanaminium chloride; PolyFluor® 570)

mp >90° <105° Purple crystals

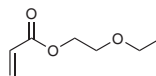
Ex. max: 548nm Em. max: 570nm

Fluorescent monomer.



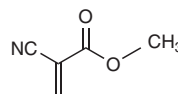
4-Methacryloxyethyl trimellitic anhydride [70293-55-9] <i>U5bd</i> MW 304.2 mp 95° Reactive monomer, especially in dental applications. Used as adhesion promoter.			
2-Methacryloxyethyltrimethylammonium chloride, 70% soln. in water [5039-78-1] <i>H2d</i> MW 207.7 700 ppm MEHQ inhibitor $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2\text{N}^+(\text{CH}_3)_3\text{Cl}^-$ Quaternary ammonium monomer.	16639-100	100g	
4-Methacryloxy-2-hydroxybenzophenone [2035-72-5] <i>U5d</i> MW 282.3 mp 70-72° λ max (MeOH): 205nm ($\epsilon = 3.03 \times 10^4$) 275nm ($\epsilon = 1.18 \times 10^4$) 325nm ($\epsilon = 7.23 \times 10^3$) UV absorbing monomer, especially for ophthalmic and optic applications. Technical Data Sheet #514			
Min. 94%	16989-25	25g	
Min. 99%	23350-25	25g	
2-(2'-Methacryloxy-5'-methylphenyl)benzotriazole [188680-81-1] <i>U7ad</i> MW 293.3 mp 57-59° UV absorbing monomer.	21871-25	25g	
3-Methacryloxypropyltrimethoxysilane, min. 98% [2530-85-0] <i>EH5g</i> MW 248.4 bp 80°/1mm n_D^{20} 1.431 TSCA $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2(\text{CH}_2)_3\text{Si}(\text{OCH}_3)_3$ Polymerizable silica-reactive monomer. Provides adhesion of polymers to silaceous surfaces. Used for pretreatment of glass plates prior to casting polyacrylamide gels, so gels do not lift from glass.	02476-250	250g	
3-Methacryloyl-(L)-Lysine [45158-94-8] <i>U6g</i> MW 214 mp 220° (dec) uninhibited $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CONH}(\text{CH}_2)_4\text{CH}(\text{NH}_2)\text{CO}_2\text{H}$ Primary amine monomer useful building block for producing custom made polymers with pendant amine functionality which facilitates further modification of the polymer.	24315-5	5g	
Methacryloyl chloride, min. 80%* [920-46-7] <i>BCPRS6d</i> MW 104.5 bp 95-96° n_D^{20} 1.442 200 ppm PTZ inhibitor TSCA $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{COCl}$ Reactive monomer. Can be used to prepare other monomers or reactive polymers. *Special packaging charge, for sale in United States Only. Shipped by truck only.	01518-50 01518-100	50g 100g	
Methacryloylcholine methyl sulfate, 40% soln. in water [6891-44-7] <i>H5ad</i> MW 283.4 800 ppm MEHQ inhibitor TSCA $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2\text{N}^+(\text{CH}_3)_3(\text{OSO}_3\text{CH}_3)^-$ Quaternary ammonium monomer.	05810-100	100g	
O-Methacryloyl Hoechst 33258 <i>U2d</i> [2'-(4-methacryloxyphenyl)-5-(4-methyl-1-piperazinyl)-2,5'-bibenzimidazolyl trihydrochloride; PolyFluor® 497] MW 601.9 mp >280° n_D^{20} 1.370 300 ppm PTZ inhibitor Ex. max: 355nm Em. max: 497nm Fluorescent monomer. Off-white crystals.	23592-100	100mg	

2-Methoxyethyl acrylate, min. 99% [3121-61-7] *EHW5d*
 MW 130.2 bp 65°/16mm n_D^{20} 1.427 50 ppm MEHQ inhibitor
 Tg -50° TSCA
 Low Tg, more polar than butyl acrylate.



2-Methoxyethyl methacrylate, min. 85% [6976-93-8] *U6d*
 MW 144.2 bp 66-67/11mm n_D^{20} 1.431 100 ppm MEHQ inhibitor Tg 16° TSCA
 $H_2C=C(CH_3)CO_2CH_2CH_2OCH_3$
 More polar than butyl methacrylate with similar Tg.

Methyl 2-cyanoacrylate [137-05-3] *H5d*
 MW 111.1 bp 133° TSCA
 Used in rapidly setting cements (e.g. super glues). Can be copolymerized with conventional monomers by using free radical initiators.

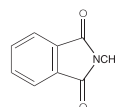


N,N'-Methylenebisacrylamide, Chemzymes Ultra Pure®, electrophoresis grade 99.9% [110-26-9] *V4g*
 MW 154.2 mp 185° (dec) TSCA
 Crosslinking monomer used especially with acrylamide.

Methyl methacrylate, min 99.5% [80-62-6] *CHO5g*
 MW 100.1 bp 99-100° n_D^{20} 1.414 25 ppm HQ inhibitor Tg 105° TSCA
 $H_2C=C(CH_3)CO_2CH_3$
 Widely used in preparation of stable, hard, polymers.

N-Methylolacrylamide, 48% soln. in water [924-42-5] *HV5g*
 MW 101.1 TSCA
 $H_2C=CHCONHCH_2OH$
 Reactive, acid-curing monomer, produces post-crosslinking site in polymers.

N-Methylphthalimide [550-44-7] *H4g*
 MW 161.1 mp ~137°C Solid, purity >99%
 Valuable synthon used as chemical intermediate for synthesis of dyes, drugs, agricultural chemicals and in coatings and adhesive formulations.

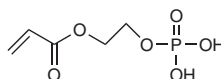


N-Methyl-N-Vinyl acetamide — See Page 158

2-Methylstyrene, min. 98% [611-15-4] *H2d*
 MW 118.2 bp 171° n_D^{20} 1.544 0.1% t-butylcatechol inhibitor Tg 120°
 $2-CH_3C_6H_4CH=CH_2$
 Substituted styrene monomer.

4-Methylstyrene, min. 99.5% [622-97-9] *EH5d*
 MW 118.2 mp -34° bp 170° n_D^{20} 1.542 25 ppm t-butylcatechol inhibitor Tg 108° TSCA
 $4-CH_3C_6H_4CH=CH_2$
 Substituted styrene monomer.

Monoacryloxyethyl phosphate, ~97% [32120-16-4] *B4f*
 MW 196.1 2000 ppm MEHQ inhibitor TSCA
 $H_2C=CHCO_2CH_2CH_2OP(=O)(OH)_2$
 Water-soluble phosphoric acid ester monomer.
 Contains Bis(2-Acryloxyethyl) Phosphate.



Catalog # Size

02487-100 100g

02488-100 100g

01520-10 10g

00719-25 25g

00719-100 100g

00834-1 1L

00834-3.8 3.8L

00834-4 4x1L

00834-5 5gal

02518-250 250g

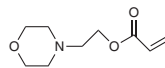
24281-25 25g

04581-5 5g

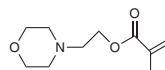
04234-100 100g

22468-10 10g

2-N-Morpholinoethyl acrylate, 95% [19727-38-9] *HO4g*
 MW 185.2 bp 67°/0.2mm 100 ppm MEHQ inhibitor
 Cationic monomer.

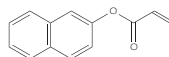


2-N-Morpholinoethyl methacrylate, 95% [2997-88-8] *EOV7g*
 MW 199.2 bp 78°/1.7mbar 100 ppm MEHQ inhibitor
 Cationic monomer.

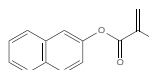


- N -

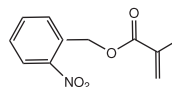
2-Naphthyl acrylate [52684-34-1] *U6d*
 MW 268.4 bp 138°/0.4mm Tg 24°
 Fluorescent monomer.



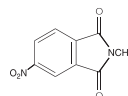
2-Naphthyl methacrylate (PolyFluor® 345) [10475-46-4] *U4d*
 MW 212.2 mp 39-41° Ex. max: 285nm Em. max: 345nm
 Fluorescent monomer.



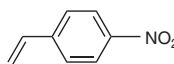
o-Nitrobenzyl methacrylate, min. 95% *U7d*
 purity >95% HQ 100ppm
 Blocked carboxylic acid monomer.



4-Nitro-N-Methylphthalimide [41663-84-7] *H4g*
 MW (dry) 206.1 Water wet solid, active ingredient, purity >95%
 Used in the preparation of crosslinking polyimides, and the
 synthesis of dyes, adhesives and coatings formulations.

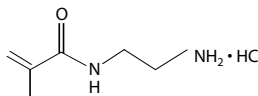


4-Nitrostyrene [100-13-0] *U6d*
 MW 149.2 mp 18-19° bp 120°/10mm
 4-NO₂C₆H₄CH=CH₂
 Polar styrene monomer. Can be used to introduce amino groups
 into polymers.



1,9-Nonanediol dimethacrylate [65833-30-9] *U7d*
 MW 296.4 100 ppm HQ inhibitor
 [H₂C=C(CH₃)CO₂(CH₂)₄]₂-CH₂
 Long-chain crosslinking monomer.

N-(2-aminoethyl) methacrylamide hydrochloride *U7d*
 Melting Point: 121-123°C (polymerization is initiated around 122°C)
 (C₆H₁₂N₂O)HCl
 Monomer building block for polymerization reactions which
 may yield a primary amine functional polymer. White to off-
 white free flowing powder.



- O -

N-(n-Octadecyl)acrylamide [1506-54-3] *U2d*
 MW 323.6 mp 74.5-75.5°
 H₃C(CH₂)₁₇NHCOCH=CH₂
 Hydrophobic acrylamide monomer.

Catalog # Size

17977-10 10g
 17977-100 100g

17978-10 10g
 17978-100 100g

06024-1 1g

23602-100 100mg
 23602-1 1g

24360-10 10g

24282-25 25g

02634-5 5g

00801-10 10g

24833-5 5g

04673-10 10g

	Catalog #	Size
1H,1H,5H-Octafluoropentyl acrylate, min. 97% [376-84-1] <i>B4d</i> MW 286.1 bp 56°/8mm n_D^{20} 1.349 100 ppm MEHQ inhibitor Tg -35° $H_2C=CHCO_2CH_2(CF_2)_3CHF_2$ Low refractive index monomer. Polymer n_D^{20} = 1.380	21044-25	25g
1H,1H,5H-Octafluoropentyl methacrylate, min. 98% [355-93-1] <i>EH4g</i> MW 300.2 bp 178-9° n_D^{20} 1.358 100 ppm MEHQ inhibitor Tg 36° $H_2C=C(CH_3)CO_2CH_2(CF_2)_3CHF_2$ Low refractive index monomer. Polymer n_D^{20} ~1.39	21045-25	25g
N-tert-Octylacrylamide [4223-03-4] <i>H5d</i> MW 183.3 mp 63.6° TSCA $H_3C(CH_2)_4C(CH_3)_2NHCOCH=CH_2$ Hydrophobic acrylamide derivative.	03141-25	25g
n-Octyl methacrylate [2157-01-9] <i>EU6d</i> MW 198.3 bp 105°/4mm Tg -20° Technical ~95% n_D^{20} 1.437 500ppm MEHQ inhibitor (Cat. #23355 - 99+% 100ppm MEHQ inhibitor) $H_3C(CH_2)_7OCOC(CH_3)=CH_2$ Hydrophobic methacrylate monomer.	02679-25 23355-25	25g 25g
- P -		
Pentabromophenyl acrylate [52660-82-9] <i>H4d</i> MW 542.6 mp 150-153° $C_6Br_5OCOCH=CH_2$ High refractive index monomer. Polymer n_D^{20} ~1.7	06344-10	10g
Pentabromophenyl methacrylate [18967-31-2] <i>H6ad</i> MW 556.7 mp 132-137° $C_6Br_5OCOC(CH_3)=CH_2$ High refractive index monomer. Polymer n_D^{20} = 1.7	04253-10	10g
Pentaerythritol tetraacrylate (mixture of the tri- and tetra- esters) [4986-89-4] <i>HO6g</i> MW 352.3 mp 18° n_D^{20} 1.487 350 ppm MEHQ inhibitor TSCA $(H_2C=CHCO_2CH_2)_4C$ Crosslinking monomer.	01547-100	100g
Pentaerythritol triacrylate [3524-68-3] <i>H4d</i> MW 298.3 mp 15° bp >315.5° n_D^{20} 1.484 300-400 ppm MEHQ inhibitor Tg 103° TSCA $(H_2C=CHCO_2CH_2)_3CCH_2OH$ Crosslinking monomer.	04259-100	100g
Pentafluorophenyl acrylate, 95% [71195-85-2] <i>EHJOV7d</i> MW 238.1 bp 145-149° n_D^{20} 1.433 $C_6F_5OCOCH=CH_2$ Low refractive index monomer. Polymer n_D^{20} ~1.40	06349-5	5g
Pentafluorophenyl methacrylate, 95% [13642-97-2] <i>H6d</i> MW 252.1 100 ppm MEHQ inhibitor $C_6F_5OCOC(CH_3)=CH_2$ Low refractive index monomer. Polymer n_D^{20} ~1.40	06350-5	5g

1,5-Pentanediol dimethacrylate [13675-34-8] *HU5d*
 MW 240.3 n_D^{20} 1.455 100 ppm HQ inhibitor TSCA
 $[H_2C=C(CH_3)CO_2CH_2CH_2]_2-CH_2$
 Crosslinking monomer.

2-Phenoxyethyl methacrylate, ~90% [10595-06-9] *U5g*
 MW 206.2 bp 130-132°/8mm n_D^{20} 1.513 200 ppm HQ and 200 ppm MEHQ inhibitor
 Tg 54° TSCA
 $H_2C=C(CH_3)CO_2CH_2CH_2OC_6H_5$
 High reactive lens material used in adhesives, moisture barrier coatings, composite materials,
 etc. Polymer n_D^{20} ~1.5

Phenyl acrylate, min. 95% [937-41-7] *HU7d*
 MW 148.2 bp 87-94°/12mm n_D^{20} 1.518 100 ppm MEHQ inhibitor Tg 57° TSCA
 $C_6H_5OCOCH=CH_2$
 UV absorbing monomer. Polymer n_D^{20} ~1.55

1,4-Phenylene diacrylate, ~97% [6729-79-9] *U5d*
 MW 218.2 mp 88-89° n_D^{20} 1.531
 $1,4-C_6H_4(OCOCH=CH_2)_2$
 Rigid aromatic crosslinking monomer.

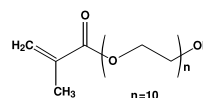
2-Phenylethyl acrylate, min. 92% [3530-36-7] *HO5d*
 MW 176.2 bp 104-106°/5mm n_D^{20} 1.509 100 ppm PTZ inhibitor Tg -3° TSCA
 $C_6H_5CH_2CH_2OCOCH=CH_2$
 Moderate UV absorbing monomer. Polymer n ~1.55

2-Phenylethyl methacrylate, min. 92% [3683-12-3] *H7d*
 MW 190.3 bp 119-120°/11mm n_D^{20} 1.508 100 ppm MEHQ inhibitor Tg 26° TSCA
 $C_6H_5CH_2CH_2OCOC(CH_3)=CH_2$
 Moderate UV absorbing monomer. Polymer n_D^{20} = 1.55

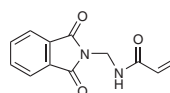
Phenyl methacrylate, >95% [2177-70-0] *BORVX7d*
 MW 162.2 bp 115-118°/10mm n_D^{20} 1.512 100 ppm MEHQ inhibitor Tg 110° TSCA
 $H_2C=C(CH_3)CO_2C_6H_5$
 Moderate UV absorbing monomer. Polymer n_D^{20} = 1.5706

NEW! Poly Ethoxy (10) ethyl methacrylate (HEMA 10) [25736-86-1] *HO4d*
 MW 526 Ethylene oxide, moles: 10 Active content (%): 90 Moisture content (%): 0.5
 Hydroxyl number (meq KOH/mg): 98 800ppm Inhibitor (para-benzophenone)
 Appearance: Viscous Liquid

This homolog of HEMA bears 10 ethoxy units on the ester linkage.
 These water soluble pendant, nonionic side chains not only increase
 water compatibility in the polymer but can enhance stabilization of
 latex systems alone or in combination with added non-ionic surfactants.



N-(Phthalimidomethyl)acrylamide [80500-44-3] *DU7g*
 MW 230.2 mp 190°
 Used as a photoresist and other photosensitive bodies.



Catalog #	Size

04260-25	25g

02640-100	100g

02642-10	10g

06389-10	10g

02834-100	100g

02911-100	100g

02644-10	10g

24890-100	100g

19390-25	25g

Poly(ethylene glycol)-bisphenol A diglycidyl ether adduct, tetraacrylate *HO4d*
 MW ~18,700
 $(H_3C)_2C[C_6H_4-4[OCH_2CH(OCOCH=CH_2)CH_2(OCH_2CH_2)_nOCOCH=CH_2]_2$
 Long-chain polyfunctional crosslinking monomer.

Poly(ethylene glycol) diacrylate [26570-48-9] *HO5g* TSCA
 $H_2C=CHCO(OCH_2CH_2)_nO_2CCH=CH_2$
 Hydrophilic crosslinking monomers. MW = Molecular Weight of PEG.

MW = 314 n_D^{20} 1.463 750 ppm MEHQ inhibitor	00669-250	250g
MW = 400 500 ppm MEHQ inhibitor Tg 3°	01871-250	250g
MW = 4,000 mp 56-60°	15246-1	1g

Poly(ethylene glycol) dimethacrylate [25852-47-5] *H5g* TSCA
 $H_2C=C(CH_3)CO(OCH_2CH_2)_nO_2CC(CH_3)=CH_2$
 Hydrophilic crosslinking monomers. MW = Molecular Weight of PEG.

MW = 200 n_D^{20} 1.463 75 ppm HQ inhibitor	00096-100	100g
MW = 400 250 ppm MEHQ and 135 ppm BHT inhibitor Tg -21°	15179-100	100g
MW = 600 Purity >83% 1000 ppm MEHQ inhibitor	02364-100	100g
MW = 1000 90 ppm MEHQ and 250 ppm BHT inhibitor	15178-100	100g

Poly(ethylene glycol) monomethacrylate [25736-86-1] *H5ad* TSCA
 $H_2C=C(CH_3)CO(OCH_2CH_2)_nOH$
 Long-chain hydrophilic monomers. Used to introduce hydrophilic sites into polymers, to stabilize emulsion polymers and to prepare comb polymers. MW = Molecular Weight of PEG.

MW = 200 n_D^{20} 1.464 up to 700 ppm MEHQ inhibitor <i>H3g</i>	16712-100	100g
MW = 400 Purity ~93% 800-1000 ppm MEHQ inhibitor <i>H5ad</i>	16713-100	100g

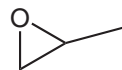
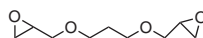
Poly (ethylene glycol) monomethyl ether monomethacrylate [26915-72-0] *BHJO6d* TSCA
 $H_2C=C(CH_3)CO_2(CH_2CH_2O)_nCH_3$
 Hydrophilic monomer used to introduce hydrophilic sites into polymers, to stabilize polymer emulsions and synthesis of comb polymers. MW = Molecular Weight of PEG.

MW = 200 n_D^{20} 1.449 100 ppm MEHQ and 300 ppm BHT inhibitor	16664-100	100g
	16664-500	500g
MW = 400 100 ppm MEHQ and 200 ppm BHT inhibitor Tg -62°	16665-100	100g
	16665-500	500g
MW = 1,000 100 ppm MEHQ and 300 ppm BHT inhibitor	16666-100	100g
	16666-500	500g

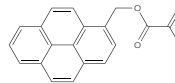
Poly(propylene glycol) (400) dimethacrylate [25852-49-7] *HO7d*
 bp >300° n_D^{20} 1.452 100 ppm MEHQ and 100 ppm BHT inhibitor TSCA
 $H_2C=C(CH_3)CO(OC_3H_6)_nO_2CC(CH_3)=CH_2$
 Water-insoluble crosslinking monomer.

04380-250 250g

	Catalog #	Size
Poly(propylene glycol) (300) monomethacrylate [39420-45-6] <i>HO3g</i> n_D^{20} 1.449 1050 ppm MEHQ inhibitor TSCA $H_2C=C(CH_3)CO[OCH_2CH(CH_3)]_nOH$ Long-chain monomer. Somewhat more hydrophobic than poly(ethylene glycol) analog. Can be used to prepare comb polymers.	15934-250	250g
Propargyl acrylate, min. 98% [10477-47-1] <i>CVWX6d</i> MW 110.1 bp 138° n_D^{20} 1.446 TSCA Acetylenic monomer. Polymer can be derivatized and possibly oxidatively crosslinked.	02964-25	25g
Propargyl methacrylate [13861-22-8] <i>U4ad</i> MW 124.1 bp 149-151° n_D^{20} 1.448 TSCA $HCCCH_2OCOC(CH_3)=CH_2$ Acetylenic monomer. Polymer can be derivatized and possible oxidatively crosslinked.	02965-25	25g
2-Propene-1-sulfonic acid, sodium salt, 35% soln. in water [2495-39-8] <i>HJU2g</i> MW 144.1 TSCA $H_2C=CHCH_2SO_3Na$ Water-soluble anionic monomer. Used to introduce polar, ionic sites into polymers.	00064-10	10g
N-iso-Propylacrylamide, ~98% [2210-25-5] <i>H5g</i> MW 113.2 mp 64-65° Tg 85° TSCA $H_2C=CHCONHCH(CH_3)_2$ Water-soluble monomer. Polymers are also water-soluble at room temperature but are insoluble at slightly higher temperatures.	02455-25 02455-100	25g 100g
n-Propyl acrylate, 98% [925-60-0] <i>EHJ4d</i> MW 114.2 bp 43-44°/40mm n_D^{20} 1.413 500 ppm MEHQ inhibitor Tg -37° TSCA $H_3CCH_2CH_2OCOCH=CH_2$ Neutral ester monomer.	03132-25	25g
Propylene glycol diglycidyl ether [16096-30-3] <i>H4g</i> MW (theor.) 188.2 WPE~150 Crosslinker for amine-, hydroxyl- and carboxyl-functional polymers. Comments on composition of ethylene glycol diglycidyl ether, page 142.	24044-100	100g
Propylene oxide, min. 99% [75-56-9] <i>BCHV6g</i> MW 58.1 bp 34° n_D^{20} 1.366 d 0.83 TSCA Undergoes ring-opening polymerization to make linear polymers which are water-dispersible but not water-soluble. Can be copolymerized with other oxiranes and reacted with carboxylic acid-, hydroxyl- or amine-functional polymers to modify properties.	00236-1	1pt
n-Propyl methacrylate, min. 95% [2210-28-8] <i>EU5d</i> MW 128.2 bp 140-141° n_D^{20} 1.419 100 ppm MEHQ inhibitor Tg 35° TSCA $H_3CCH_2CH_2OCOC(CH_3)=CH_2$ Neutral ester monomer.	03174-100	100g

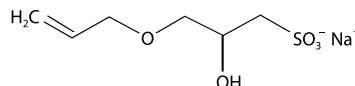


1-Pyrenylmethyl methacrylate (PolyFluor® 394) [86112-79-0] *U5d*
 MW 300.3 mp 99-101° Ex. max: 339nm Em. max: 394nm
 Fluorescent monomer. Pale yellow crystals.



- S -

Sodium 1-Allyloxy-2 hydroxypropyl Sulfonate [52556-42-0] *H4d*
 MW 218 H₂O (%): 60 Active Polymer (% in aq. sol.): 40 pH (10% in water): 7.5
 Sodium salt of the allyl ether sulfonate. It readily undergoes vinyl polymerization reactions in aqueous or emulsion systems and provides a bound source of anionically charged sulfonate groups in a polymer backbone.



Sodium acrylate, min. 98% [7446-81-3] *H5g*
 MW 94.1 Tg 230° TSCA
 $\text{H}_2\text{C}=\text{CHCO}_2\text{Na}$
 Polymerizable acid salt.

Stearyl acrylate, (mixture of C₁₆ and C₁₈) total esters >90% [4813-57-4] *U5d*
 MW 324.6 bp 160°/3mm mp 28° 75 ppm MEHQ inhibitor Tg 35° TSCA
 $\text{H}_2\text{C}=\text{CHCO}_2(\text{CH}_2)_{17}\text{CH}_3$ $\text{H}_2\text{C}=\text{CHCO}_2(\text{CH}_2)_{15}\text{CH}_3$
 Long-chain acrylate ester. Polymers are hydrocarbon-soluble.

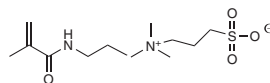
Stearyl methacrylate, (mixture of C₁₆ and C₁₈) total esters >90% [32360-05-7] *HO4d* ..
 MW 338.6 bp 181°/15mm n_D^{20} 1.452 100 ppm HQ inhibitor Tg 38° TSCA
 $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2(\text{CH}_2)_{17}\text{CH}_3$ $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2(\text{CH}_2)_{15}\text{CH}_3$
 Hydrophobic methacrylate ester. Polymers are hydrocarbon-soluble.

Styrene, min. 99% [100-42-5] *CHM6g*
 MW 104.5 bp 33-35°/8mm n_D^{20} 1.547 100-200 ppm MEHQ inhibitor Tg 100° TSCA
 $\text{C}_6\text{H}_5\text{CH}=\text{CH}_2$
 Widely used monomer which forms hard, hydrophobic polymers.

2-Sulfoethyl methacrylate, 95% [10595-80-9] *B4d*
 MW 194.1 n_D^{20} 1.477 3000 ppm MEHQ inhibitor d 1.3245 TSCA
 $\text{HO}_3\text{SCH}_2\text{CH}_2\text{OCOC}(\text{CH}_3)=\text{CH}_2$
 Water-soluble monomer. Used to introduce polar sites into polymer chains, confer shear stability to aqueous polymer dispersions.

3-Sulfopropyl acrylate, potassium salt, 98% [31098-20-1] *H2g*
 MW 232.3 mp 302° (dec.)
 $\text{H}_2\text{C}=\text{CHCO}_2(\text{CH}_2)_3\text{SO}_3\text{K}$
 Water-soluble monomer. Used to introduce polar sites into polymer chains and confer shear stability to aqueous polymer dispersions.

3-Sulfopropyldimethyl-3-methacrylamidopropylammonium inner salt [5205-95-8] *U4g* ...
 (Dimethyl[3-methacrylamidopropyl]-3-sulfopropylammonium, inner salt)
 MW 292.4 mp 199-200°
 Polar water-soluble monomer.
 Zwitterionic detergent and crosslinker.



Catalog # Size

23588-100 100mg
 23588-1 1g

24898-100 100g

01207-50 50g

02636-100 100g

02637-100 100g

00660-500 500g

02597-50 50g

17209-100 100g

16570-5 5g

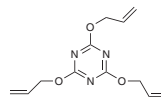
3-Sulfopropyl methacrylate, potassium salt, 98% [31098-21-2] *H5g*
 MW 246.3 mp 295° (dec.)
 $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2(\text{CH}_2)_3\text{SO}_3\text{K}$
 Water-soluble monomer. Used to introduce polar sites into polymer chains and confer shear stability to aqueous polymer dispersions.

- T -

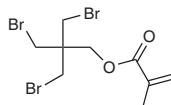
Tetraethylene glycol dimethacrylate, >99% [109-17-1] *HJO4d*
 MW 330.4 bp 220° n_D^{20} 1.463 75 ppm HQ inhibitor TSCA
 $[\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2]_2$
 Crosslinking monomer.

1H,1H,3H-Tetrafluoropropyl methacrylate, min. 98% [45102-52-1] *EHOV7d*
 MW 200.1 bp 69-72°/51mm n_D^{20} 1.373 100 ppm MEHQ inhibitor
 $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CF}_2\text{CHF}_2$
 Low refractive index monomer. Polymer n_D^{20} ~1.40

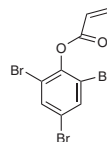
Triallyl cyanurate, 97% [101-37-1] *H5bg*
 MW 249.3 mp >110° bp 162°/2mm n_D^{20} 1.505
 100 ppm HQ inhibitor TSCA
 Crosslinking monomer.



Tribromoneopentyl methacrylate *U7d*
 MW 392.9
 Halogenated ester monomer for preparing flame-resistant polymers.



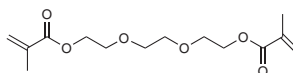
2,4,6-Tribromophenyl acrylate [3741-77-3] *U5d*
 MW 384.9 mp 77-78° TSCA
 For high refractive index (n_D^{20} ~1.60) polymers



Trichloroacrylic acid [18901-22-9] *B7g*
 MW 175.4 mp 72°
 Halogenated acrylic acid derivative.

Triethylene glycol diacrylate, 95% [1680-21-3] *BHO4g*
 MW 258.3 mp 125°/2mm n_D^{20} 1.461
 1170 ppm HQ inhibitor Tg 70° TSCA
 Crosslinking monomer. Used in UV curing coatings.

Triethylene glycol dimethacrylate, 98% [109-16-0] *A2d*
 MW 286.2 bp 162°/1.2mm n_D^{20} 1.460 80 ppm HQ inhibitor TSCA
 $[\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_2\text{CH}_2\text{OCH}_2]_2$
 Crosslinking monomer. Used in UV curing coatings, soft contact lenses.



Min 88%
 Min 95%

Catalog # Size

17210-100 100g

02654-50 50g

07577-25 25g

01236-100 100g

01236-500 500g

03057-10 10g

03330-10 10g

02686-10 10g

02655-250 250g

01319-250 250g

24034-100 100g

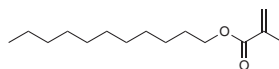
	Catalog #	Size
Triethylene glycol divinyl ether [765-12-8] <i>U4g</i> MW 202.3 bp 123°/18mm n_D^{20} 1.453 TSCA $H_2C=CH(OCH_2CH_2)_3OCH=CH_2$ Crosslinking monomer. Used in UV curing coatings.	19560-100	100g
Triethylene glycol monoethyl ether monomethacrylate, min. 85% [39670-09-2] <i>A2g</i> .. MW 246.3 bp >100°/1mm 100 ppm MEHQ inhibitor TSCA Hydrophilic monomer. See <i>poly(ethylene glycol) monomethyl ether monomethacrylate ester listings</i> , page 188, for longer chain length analogs.	18556-500	500g
2,2,2-Trifluoroethyl acrylate, min. 99% [407-47-6] <i>CH6d</i> MW 154.1 bp 91-92°/749mm n_D^{20} 1.350 100 ppm MEHQ inhibitor Tg -10° TSCA $H_2C=CHCO_2CH_2CF_3$ For reduced refractive index (n_D^{20} = 1.407) polymers.	01718-25	25g
2,2,2-Trifluoroethyl methacrylate, min. 99%* [352-87-4] <i>CH4f</i> MW 168.1 bp 30°/40mm n_D^{20} 1.361 100 ppm MEHQ inhibitor Tg 80° TSCA $H_2C=C(CH_3)CO_2CH_2CF_3$ For reduced refractive index (n_D^{20} = 1.437) polymers.	02622-25	25g
Triglycidyl isocyanurate [2451-62-9] <i>HO6g</i> MW 297.3 WPE 105 mp 95° TSCA Effective crosslinker for hydroxyl, amine and carboxylic acid-functional polymers.	16173-50	50g
3,3,5-Trimethylcyclohexyl methacrylate, min. 95% [7779-31-9] <i>H4d</i> MW 210.1 bp 80-82°/2mm n_D^{20} 1.456 200 ppm MEHQ inhibitor TSCA Ester monomer having a bulky alkyl group.	02660-100 02660-500	100g 500g
1,1,1-Trimethylolpropane diallyl ether, (mixture of mono-, di-, and triallyl-) diallyl content, min. 88% [682-09-7] <i>H7g</i> MW 214.3 bp 145°/25mm n_D^{20} 1.458 TSCA Crosslinking monomer.	05500-50	50g
1,1,1-Trimethylolpropane monoallyl ether, min. 99% [682-11-1] <i>U7g</i> MW 174.4 mp <-10° bp 160°/25mm n_D^{20} 1.467 TSCA $H_2C=CHCH_2OCH_2C(C_2H_5)(CH_2OH)_2$ Hydrophilic monomer.	15914-50	50g
1,1,1-Trimethylolpropane triacrylate [15625-89-5] <i>H4g</i> MW 296.3 bp 316° n_D^{20} 1.474 125 ppm HQ and 175 ppm MEHQ inhibitor Tg 62° TSCA $(H_2C=CHCO_2CH_2)_3CC_2H_5$ Crosslinking monomer.	02658-250	250g
1,1,1-Trimethylolpropane trimethacrylate [3290-92-4] <i>HO2d</i> MW 338.4 bp 185°/5mm n_D^{20} 1.472 65 ppm HQ inhibitor TSCA $[H_2C=C(CH_3)CO_2CH_2]_3CC_2H_5$ Crosslinking monomer.	02659-250	250g

*Poison pack charge required.

Monomers

- U -

Undecyl methacrylate, min. 95% [16493-35-9] *HO6f*
 MW 240.4 TSCA
 Long-chain alkyl methacrylate ester. High boiling liquid.



Catalog #

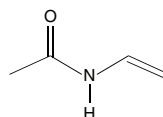
Size

02544-25

25g

- V -

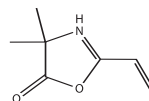
N-Vinyl acetamide (NVA) [5202-78-8] *HK4g*
 MW 85.1 mp 54°C bp 96°C (10 mm Hg) sp gr 1.05 @ 20°C TSCA
 Nonionic monomer. Polymers produced from NVA offer a balance of hydrophilic and hydrophobic properties and find applications ranging from adhesives and thickeners to formulating aids to binders for inorganics. This product is available in convenient protective foil packages for laboratory scale. *Call for custom quotations on large orders.*



24806-50

50g

Vinyl azlactone (4,4-dimethyl-2-vinyl-2-oxazolin-5-one) [29513-26-6] *EHU6f*
 MW 139.2 mp 6° bp 52°C at 9mm Hg n_D^{20} 1.4575
 Reactive heterocyclic monomer. Hydrolyzed to N-acryloyl-2-methylalanine.



21329-5

5g

Vinyl benzoate [769-78-8] *BORVX7d*
 MW 148.2 bp 72-76°/8mm n_D^{20} 1.529 20 ppm HQ inhibitor Tg 75°
 $C_6H_5CO_2CH=CH_2$
 Aromatic vinyl ester.

02664-10

10g

4-Vinylbenzoic acid, >98% [1075-49-6] *HVWX6g*
 MW 148.2 mp 143-144°
 $H_2C=CHC_6H_4CO_2H$
 Carboxylic acid styrene monomer.

04485-5

5g

Vinyl butyrate [123-20-6] *JU7dk*
 MW 114.1 bp 115-117° n_D^{20} 1.411 Tg -5°
 $H_2C=CHOCOCH_2CH_2CH_3$
 Polymer has lower Tg than poly(vinyl acetate) and is more hydrophobic.

02835-10

10g

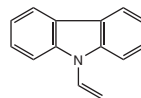
N-Vinylcaprolactam, 98% [2235-00-9] *HU4d*
 MW 139.2 mp 34.5-36.0° TSCA
 Capable of ring-opening polymerization as well as free radical polymerization.



16818-10

10g

N-Vinylcarbazole, 98% [1484-13-5] *HMO7g*
 MW 193.3 mp 65-67° n_D^{20} 1.683 TSCA
 Polymers are photoconductive, especially in the form of complexes.
 Technical Data Sheet #263



02429-25

25g

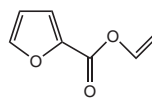
Vinylferrocene, 99% [1271-51-8] *U5g* MW 212.1
 mp 50-52° bp 80°/0.2mm Tg 187°
 Organometallic monomer.



04503-1

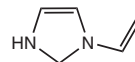
1g

Vinyl 2-furoate [1917-10-8] *U5d*
MW 138.1 bp 182°/10mm



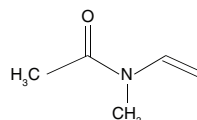
Catalog #	Size
02829-10	10g

1-Vinylimidazole, min. 99% [1072-63-5] *BE6g*
MW 94.1 bp 78-79°/13mm n_D^{20} 1.530 TSCA
Cationic monomer.



01726-100	100g

N-Vinyl-N-methylacetamide, 98% [3195-78-6] *H6g*
MW 99.13 bp 70°/25mm n_D^{20} 1.483 TSCA
 $H_2C=CHN(CH_3)COCH_3$
Water-soluble substituted acetamide.



22065-25	25g

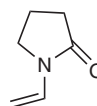
Vinyl octadecyl ether, 85% [930-02-9] *U6g*
MW 296.5 mp 27° bp 187°/5mm n_D^{20} 1.444 TSCA
 $CH_3(CH_2)_{17}OCH=CH_2$
Long-chain, hydrophobic vinyl ether.

01728-100	100g

4-Vinylpyridine, min. 95% [100-43-6] *BEVWX7f*
MW 105.1 bp 62-65°/15mm n_D^{20} 1.550 100 ppm HQ inhibitor Tg 142° TSCA
Aromatic amine monomer.

02668-100	100g

N-Vinyl-2-pyrrolidone (1-vinyl-2-pyrrolidinone) [88-12-0] *HM6d*
MW 111.1 mp 13-14° bp 90°/10mm n_D^{20} 1.512 Tg 175° TSCA
99.5% Redistilled, optical grade APHA color<30
Neutral hydrophilic monomer. Polymers are water-soluble.



04000-250	250g

Vinyltriethoxysilane, 97% [78-08-0] *BE6bg*
MW 190.3 bp 157-159° n_D^{20} 1.398 TSCA
 $H_2C=CHSi(OC_2H_5)_3$
For introducing sites into polymers which adhere to silaceous surfaces. Moisture sensitive.

04537-50	50g

- Z -

Zinc (di)methacrylate, min. 99% [13189-00-9] *HO4bd*
MW 235.5 mp >250° TSCA
 $[H_2C=C(CH_3)CO_2]_2Zn$
Can be used to introduce ionic crosslinks into polymers.

03011-100	100g



Polysciences, Inc. cGMP Manufacturing Facility

Chemistry Beyond the Ordinary

Polysciences, Inc. provides custom manufacturing and development of fine chemicals and intermediates for drug discovery, biotechnology, medical devices, cosmetics, electronics and analytical chemistry industries in large scale. Our manufacturing plant in Warrington, PA consists of three buildings containing modern reactors, purification equipment and quality control departments. Whether it is a start-up product, pilot scale-up or full-scale production, we can be an important link between your creative idea and commercialization of your product.

Production facilities and services include:

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- Clean room operations
- New product synthesis
- Scale-up and process optimization
- Product Documentation
- Complete confidentiality
- High-vacuum distillation and drying
- Specialized recrystallization and filtration
- Laboratory scale sample synthesis for customer evaluation
- Fully equipped synthesis laboratories with 25+ hoods
- Manufacturing facilities with stainless steel and glass-lined reactors

Our expertise, custom manufacturing capabilities and rigorous quality standards allow us to provide you with the exact composition, properties and purity you need.



Polymers Selection Guide

Polysciences stocks a wide portfolio of polymers. This variety provides the formulation scientist a useful set of tools to design compositions with markedly different performance. These polymers can also be used by the synthetic scientist as platforms on which to build yet more complex polymer systems.

Polymer Selection Guide At-A-Glance

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Acid-functional Polymers and Salts

Acidic groups are often used to convey solubility to polymers in aqueous media. These versatile moieties can be converted to a wide range of alternative functional groups. Acid groups can be utilized as catalysts for chemical reactions. Additionally they are employed in polymers as the functional group which enables improved adhesion to a variety of substrates through hydrogen bonding or metal chelation.

Carboxylic Acids

Name		Mol. Weight	Form	Catalog #	Size
Poly Acrylic Acid		2,000	63% aqueous	06513-250	250g
		5,000	50% aqueous	06519-250	250g
		50,000	25% aqueous	00627-250	250g
		345,000	25% aqueous	03326-250	250g
		450,000	powder	03312-100	100g
		1,000,000	powder	06500-100	100g
		4,000,000	powder	06501-100	100g
Poly Acrylic Acid, Ammonium Salt		250,000	powder	03311-25	25g
Poly Acrylic acid, Sodium Salt		2,000	powder	06568-250	250g
		3,000	40% aqueous	18608-250	250g
		6,000	powder	06567-250	250g
		10,000	powder	18609-250	250g
		60,000	35% aqueous	18611-250	250g
		225,000	20% aqueous	18613-250	250g
Poly Butadiene/Maleic Acid	(50/50)	12,000	42% aqueous	07787-500	500g
Poly Butyl Acrylate/Acrylic Acid	(50/50)		20% latex/alcohol	19911-10	10g
	(50/50)		powder	21058-5	5g
Poly Ethyl Acrylate/Acrylic Acid	(50/50)		20% in Ethanol	19914-10	10g
	(50/50)		powder	21056-5	5g
Poly Ethylene/Acrylic Acid	(92/8)			06517-100	100g
Poly Ethylene/Maleic anhydride	(50/50)	400,000		02308-50	50g
Poly Maleic Acid		1,000	50% aqueous	09732-10	10g
Poly Methacrylic Acid		100,000	powder	00578-10	10g
				00578-50	50g
				21169-25	25g
Poly Methacrylic Acid, Ammonium Salt		15,000	30% aqueous		
Poly Methacrylic Acid, Sodium Salt		15,000	30% aqueous	21170-25	25g
				21170-100	100g
Poly Methyl methacrylate/Methacrylic Acid	(75/25)	1,200,000	powder	08208-100	100g
	(80/20)		powder	08221-100	100g
	(90/10)	100,000	powder	08207-50	50g
	(95/5)	500,000	powder	19629-100	100g
Poly Styrene Sulfonic Acid/	(50/50)	15,000	25% aqueous	11795-25	25g
Maleic Acid, Sodium Salt	(75/25)	20,000	powder	18407-25	25g

Sulfonic Acids

Name		Mol. Weight	Form	Catalog #	Size
Poly(styrenesulfonic acid)		70,000	30% AQ	08770-250	250g
Poly(styrenesulfonic acid), sodium salt		75,000	powder	08772-25	25g
		1,000,000	powder	08773-25	25g

Phosphoric Acids

Poly(vinylphosphoric acid), sodium salt		>200,000	powder	04391-5	5g

Acid-Functional Polymers and Salts *continued*

Amides

Name	Mol. Weight	Form	Comments	Catalog #	Size
Polyacrylamide	1,500	50% AQ	water soluble polymer. High	23967-100	100g
	10,000	50% AQ	molecular weight polymers	22581-250	250g
	700K - 1,000,000	10% AQ	find application as flocculants.	19901-250	250g
	5,000,000 - 6,000,000	powder		02806-250	250g
	5,000,000	1% AQ		21485-250	250g
	18,000,000	powder		18522-100	100g
Poly(acrylamide/acrylic acid) 90:10, Na Salt	200,000	powder	acidic acrylamide polymer	04652-250	250g
Poly(acrylamide/acrylic acid) 60:40, Na Salt	>10,000,000	powder	acidic acrylamide polymer	18545-250	250g
Poly(acrylamide/acrylic acid) 30:70, Na Salt	200,000	powder	acidic acrylamide polymer	02220-250	250g
Polycaprolactam (Nylon 6)	18,000	powder	widely used in fibers	18180-250	250g
	35,000	powder		18179-250	250g
Poly etherimide	30,000	powder	high softening point resin	16845-100	100g
Poly(2-ethyl-2-oxazoline)	5000	powder	neutral water soluble.	24066-50	50g
	50,000	powder	can be hydrolyzed to	17808-100	100g
	200,000	powder	linear polyethylenimine	24882-100	100g
	500,000	powder		17810-100	100g
Poly(hexamethyleneadipamide) (Nylon 6/6)		powder	used in fibers. mp 265 - 270°C	06557-500	500g
Poly methacrylamide		powder	hydrophilic water soluble polymide	16144-10	10g
Poly(N-isopropylacrylamide)	40,000	powder	water soluble at RT. insoluble above 40°C	21458-10	10g

Amine-functional Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Chitin, practical		powder	acetylated amino glucose	00210-50	50g
Chitosan (poly d-glucosamine)	15,000	powder	cationic polymer	21161-50	50g
Chitosan practical	100K-300K	powder		00281-100	100g
Poly(acrylamide/2-methacryloxy-ethyltrimethylammonium bromide)	50,000	20% AQ	cationic polymer	21743-10	10g
Poly allylamine hydrochloride	12,000~20,000	powder	pH of 1% aqueous 4.0	18378-50	50g
Poly 4-amino styrene	>150,000	powder	insol in org solvents and mineral acids.	02823-1	1g
Polyaniline Emeraldine form					
Acid doped	15,000	powder	conductivity 2-4 S/cm	21288-5	5g
Undoped	~15,000	powder	conductivity 10 ⁻¹⁰ S/cm	24043-5	5g
Water soluble		powder	product of polyaniline with propanesultone.	23614-1	1g
Poly 3-chloro-2-hydroxypropyl-2-methacryloxyethyl-dimethyl-ammonium chloride		20% AQ	can be cyclized to oxirane with mild base	21480-10	10g
Poly(diallyldimethyl-ammonium chloride)	240,000	powder	linear cationic quat ammonium cyclopolymer	17338-10	10g
		28% AQ		19898-250	250g
Poly(2-dimethylaminoethyl methacrylate)	50,000	20% in tBuOH		21510-10	10g
Poly(ethylene glycol) alpha-2-aminoethyl, omega-methoxy	2,000	solid	used for protein conjugation	24304-1	1g
Poly(ethylene glycol) bis 2-aminoethyl	1,000	powder	bifunctional PEG derivative that can be used to conjugate proteins and drugs for delivery	24285-1	1g
	10,000	powder		24303-1	1g

Amine-functional Polymers *continued*

Name	Mol. Weight	Form	Comments	Catalog #	Size
Polyethylenimine, branched	600	liquid	highly branched polyamine containing primary, secondary and tertiary amine groups	02371-100	100g
	1,200	liquid		02371-500	500g
	1,800	liquid		06088-100	100g
				06088-500	500g
	10,000	liquid		06089-100	100g
				06089-500	500g
	10,000	30% AQ		17938-100	100g
	70,000	30% AQ		00618-100	100g
				00618-500	500g
	50K-100K	30% AQ		06090-100	100g
				06090-500	500g
Polyethylenimine, branched, benzylated			adsorbed on SiO ₂ / 40-200 mesh	17208-10	10g
Polyethylenimine, branched, permethylated, permethobromide	6,300	10% AQ	High charge density quaternary salt	21903-10	10g
Polyethylenimine, linear	25,000	powder	all secondary amine polymers	23966-2	2g
Polyethylenimine "Max"	Nominal 4,000	solid	easy to handle	24885-2	2g
	(Equ. to MW 2,500 in freebase form)		hydrochloride salt form	24765-2	2g
	Nominal 40,000	solid			
	(Equ. to MW 25,000 in freebase form)				
Poly(l-lysine hydrobromide)	40K-60K	powder	cationic polymer for	18619-50	50g
	60K- 120K	0.1% AQ	cell adhesion on surfaces	09730-25	25ml
				09730-250	250ml
	100K- 140K	powder		21430-100	100mg
Poly(2-methacryloxyethyl-trimethylammonium bromide)	50,000	20% AQ	cationic water soluble polymer	21479-10	10g
	200,000	20% AQ		21746-10	10g
Poly(N-methylvinylamine)	500,000	powder	water soluble all secondary polyamine	24038-5	5g
Poly vinylamine hydrochloride	25,000	powder	water soluble all primary	23965-1	1g
			polyamine salt	23965-5	5g
Poly(2-vinyl-1-methylpyridinium bromide)	50,000	20% AQ	cationic polymer, 50% quaternized	21477-10	10g
Poly(4-vinyl-1-methylpyridinium bromide)	50,000	20% AQ	cationic polymer, 85% quaternized	21478-10	10g
Poly(2-vinylpyridine)	40,000	powder	water soluble at low pH	21382-10	10g
	200K- 400K	powder	water soluble at low pH	19238-10	10g
	300K- 400K	powder	water soluble at low pH	17770-10	10g
Poly(4-vinylpyridine)	50,000	powder	water soluble at low pH	00112-50	50g
	150K- 200K	powder	water soluble at low pH	22176-50	50g
Poly(4-vinylpyridine/divinylbenzene) beads		beads	can be used as adsorbant or ion exchange resin	06579-10	10g
Poly(2-vinylpyridine N-oxide)	300K - 400K	powder	water soluble cationic	01564-10	10g
Poly(4-vinylpyridine N-oxide)	200,000	powder	water soluble cationic	23684-10	10g
Poly(N-vinylpyrrolidone)	2,500	powder	water soluble polymer used as a thickener or protective colloid	16693-250	250g
	4,000-6,000	powder		24737-250	250g
	10,000	powder		03315-250	250g
	40,000	powder	pharmaceutical grade	01051-250	250g
	40,000	powder		01052-250	250g
	1,000,000	powder		06067-250	250g
Poly(N-vinylpyrrolidone/2-dimethylaminoethyl methacrylate),dimethyl sulfate quaternary (90:10)	100,000	20% aqueous	water soluble quaternary salt	16294-100	100g

Biodegradable Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Polycaprolactone	43,000	flakes	hydroxyl end group. mp 55 - 65°C	19561-500	500g
Polycaprolactone diol	1,250	liquid	hydroxyl # 90mg / g of polymer	09706-500	500g
	2,000	liquid	hydroxyl # 56mg / g of polymer	09694-500	500g
Poly [(-)3-hydroxybutyric acid]	500,000	powder	mp 168 - 176°C	16916-10	10g
Poly(DL-lactic acid)	15,000	powder	i.v. 0.15 - 0.30	22505-10	10g
	20K - 30K	powder	i.v. 0.35 - 0.45	16585-10	10g
	330K - 600K	powder	i.v. 2.00 - 2.80	23976-10	10g
Poly(L-lactic acid)	1,600 - 2,400	powder	i.v. 0.10 - 0.20	18580-10	10g
	40,000 - 70,000	powder	i.v. 0.80 - 1.20	06529-1	1g
				06529-10	10g
	80K - 100K	powder	i.v. 1.30 - 1.60	18402-10	10g
	325K - 460K	powder	i.v. 4.00 - 5.00	18582-10	10g
	700,000		i.v. >7.00	21512-10	10g
Poly(DL-lactide/glycolide)	90/10	<10,000	powder i.v. 0.15 - 0.30	19076-5	5g
	85/15	20,000	powder i.v. 0.55 - 0.75	23989-5	5g
	80/20	<10,000	powder i.v. 0.15 - 0.30	19077-5	5g
	75/25	65,000	powder i.v. 0.50 - 0.65	23988-5	5g
	70/30	~10,000	powder i.v. 0.12 - 0.30	19247-5	5g
	50/50	12,000 - 16,500	powder i.v. 0.50 - 0.65	23986-5	5g
	50/50	16,500 - 22,000	powder i.v. 0.80 - 1.2	23987-5	5g
Poly(L-lactide/glycolide)	70/30	<10,000	powder	16587-5	5g
	70/30	10,000-20,000	powder	21864-5	5g
Poly(glycolic acid)	>100,000	powder	i.v. 1.0 - 2.00. decomposes in	06525-5	5g
			6 months at 37°C at pH 9.0	06525-25	25g

NEW! Poly(ε-caprolactone)-block-poly(ethylene glycol) Diblock & Triblock Polymers

Diblock Polymers (Numbers in parentheses refer to Mw of the segment)

Name	Form	Comments	Catalog #	Size
NEW! PCL(1000)-b-PEG(1000)	solid	biodegradable, diblock copolymers	25010-1	1g
NEW! PCL(1000)-b-PEG(2000)	solid		25011-1	1g
NEW! PCL(1000)-b-PEG(5000)	solid		25012-1	1g
NEW! PCL(5000)-b-PEG(1000)	solid		25022-1	1g
NEW! PCL(5000)-b-PEG(2000)	solid		25023-1	1g
NEW! PCL(5000)-b-PEG(5000)	solid		25024-1	1g

Triblock Polymers (Numbers in parentheses refer to Mw of the segment)

NEW! PCL(1000)-b-PEG(1000)-b-PCL(1000)	solid	biodegradable, triblock copolymers	25019-1	1g
NEW! PCL(1000)-b-PEG(2000)-b-PCL(1000)	solid		25020-1	1g
NEW! PCL(1000)-b-PEG(6000)-b-PCL(1000)	solid		25021-1	1g
NEW! PCL(1000)-b-PEG(10000)-b-PCL(1000)	solid		25013-1	1g
NEW! PCL(5000)-b-PEG(1000)-b-PCL(5000)	solid		25014-1	1g
NEW! PCL(5000)-b-PEG(2000)-b-PCL(5000)	solid		25015-1	1g
NEW! PCL(5000)-b-PEG(5000)-b-PCL(5000)	solid		25016-1	1g
NEW! PCL(5000)-b-PEG(10000)-b-PCL(5000)	solid		25025-1	1g

Biodegradable Polymers *continued*

Poly(ethylene glycol)/Poly(lactic acid) Diblock & Triblock Polymers

Diblock Polymers (Numbers in parentheses refer to Mw of the segment)

Name	Form	Comments	Catalog #	Size
PEG(350)-b-PLA(300)	liquid	biodegradable	24375-1	1g
PEG(1000)-b-PLA(750)	visc liquid	diblock copolymers	24378-1	1g
PEG(1000)-b-PLA(5000)	solid		24381-1	1g
PEG(5000)-b-PLA(1000)	solid		24386-1	1g
PEG(5000)-b-PLA(5000)	solid		24389-1	1g
NEW! PEG(5000)-b-PLA(10000)	solid		25018-1	1g
NEW! PEG(10000)-b-PLA(5000)	solid		25017-1	1g

Triblock Polymers (Numbers in parentheses refer to Mw of the segment)

PLA(1000)-b-PEG(1000)-b-PLA(1000)	visc liquid	biodegradable	24500-1	1g
PLA(2000)-b-PEG(1000)-b-PLA(2000)	solid	triblock copolymers	24501-1	1g
PLA(5000)-b-PEG(1000)-b-PLA(5000)	solid		24502-1	1g
PLA(1000)-b-PEG(4000)-b-PLA(1000)	solid		24503-1	1g
PLA(1000)-b-PEG(10,000)-b-PLA(1000)	solid		24509-1	1g
NEW! PLA(5000)-b-PEG(10,000)-b-PLA(5000)	solid		25026-1	1g
NEW! PLA(10000)-b-PEG(10,000)-b-PLA(10000)	solid	triblock polymer	25027-1	1g

Block Copolymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Poly(dimethylsiloxane-b-ethylene oxide), methyl terminated	25:75 600	liquid	surfactant-like diblock copolymer	09780-100	100g
	20:80 3,000	liquid	surfactant-like diblock copolymer	21870-100	100g
Poly(ethylene oxide-b-propylene oxide)	1,100	liquid	ratio 0.15:1	16273-100	100g
	3,400	liquid	ratio 0.33:1	16274-100	100g
	2,900	liquid	ratio 0.8:1	16275-100	100g
	13,300	waxy solid	ratio 3.0:1	16276-100	100g
	8,750	waxy solid	ratio 5.0:1	16277-100	100g

Additional block copolymers in Biodegradable Polymers group (PEG/PLA), see above.

Conductive Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Polyaniline Emeraldine form					
Acid doped	15,000	powder	conductivity 2-4 S/cm	21288-5	5g
Undoped	~15,000	powder	conductivity 10 ⁻¹⁰ S/cm	24043-5	5g
Water soluble		powder	product of polyaniline with propanesultone.	23614-1	1g
Poly(3,4-ethylenedioxythiophene/polystyrenesulfonate), aqueous dispersion		liquid	conductive polymer	24215-100	100g
Poly(3-methylthiophene)	500,000	powder	conductive polymer	21826-1	1g
Poly(3-octylthiophene)	100,000	powder		22052-1	1g
Polypyrrole		powder	conductive polymer	21304-5	5g
Poly(N-vinylcarbazole)	40,000	powder	photoconductive polymer	02428-50	50g

Halogen-containing Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Fluorinated Ethylene Propylene Copolymer (10-35 MFI)		fine powder	high release characteristics	24778-100	100g
Fluorinated Ethylene Propylene Copolymer (35-70 MFI)		fine powder	high release characteristics	24779-100	100g
Poly(4-bromostyrene)		powder	reactive bromine. ~43%	07030-1	1g
Poly(3-chloro-2-hydroxypropyl-2-methacryloxyethyl-dimethyl-ammonium chloride)		20% AQ	reactive quat salt. chlorohydroxypropyl group can be cyclized to oxirane	21480-10	10g
Poly(4-chlorostyrene)	250,000	powder		07041-5	5g
Poly(chlorotrifluoroethylene)	500 - 600	oil	inert liquid of high temp baths	15176-100	100g
Poly(4-iodostyrene/styrene/-divinylbenzene) 58/40/2			crosslinked styrene polymer with reactive iodine group	18148-5	5g
Polystyrene, brominated		powder	66% Br	21305-100	100g
Poly(tetrafluoroethylene) (Teflon®)		60% in H ₂ O	dispersion; 0.05 - 0.5 microns	21539-100	100g
		powder	35 microns	08816-100	100g
		powder	500 microns	01344-100	100g
Poly(vinylidene chloride/acrylonitrile) 80/20	150,000	powder	polymer with barrier properties	09747-100	100g
Poly(vinylidene fluoride)		powder	inert polymer,	15190-100	100g
		powder	often used as a coating	15191-100	100g
		powder		06094-100	100g
		powder		18734-100	100g

Liquid Crystals

Name	Mol. Weight	Form	Comments	Catalog #	Size
Cholesteryl Chloride		white solid	cholesteric derivatives	24814-50	50g
Cholesteryl Oleyl Carbonate		hazy semi-solid	liquid crystal polymers	24815-50	50g
Cholesteryl Nonanoate		white powder		24817-50	50g

Phenol-functional Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Poly(4-vinylphenol)	1,500 - 7,000	powder	reactive polyphenol	06527-10	10g
				06527-50	50g
	9,000 - 11,000	powder		18979-10	10g
	22,000	powder		18979-50	50g
				18980-10	10g
				18980-50	50g
Poly(4-vinylphenol), brominated	8,000	powder	softens at 210°C. flame retardant	09762-50	50g

Phosphonic Acids

Name	Mol. Weight	Form	Comments	Catalog #	Size
Poly(vinylphosphonic acid)	24,000	30% aqueous		24297-10	10g

Photoactive Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Poly(vinyl alcohol), N-methyl-4(4'-formylstyryl)-pyridinium methosulfate acetal	~45,000	13.3% Aqueous	high dielectric constant, photocrosslinkable	22570-75	75g
Poly(vinyl cinnamate)		powder	photocrosslinkable polymer	02648-10	10g

Reactive Polymers (under mild conditions)

Aldehyde and Ketone-functional Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size
Polyacrolein	200K-2,000,000	powder	due to intermolecular acetals, acts as if heavily crosslinked	04287-10	10g
Poly(vinylmethyl ketone)		powder	reactive carbonyl	04320-10	10g

Carboxylic Acid Anhydride-functional Polymers

Poly(butadiene/maleic anhydride) 1:1 molar	10,000 - 15,000	25% in acetone	can be reacted at anhydride or backbone olefin	07788-500	500g
Poly(ethylene/maleic anhydride) 1:1 molar	400,000	powder	reacts with alcohols or amines	02308-50	50g
Poly(maleic anhydride)	ca 5,000	powder	reacts with alcohols or amines	02348-5	5g
Poly(octadecene/maleic anhydride) 1:1 molar	30K-50K	powder	reacts with alcohols or amines, hydrophobic	05152-100	100g

Carboxylic Acid Chloride-functional Polymers

Poly(acryloyl chloride)	10,000	25% in dioxane	reacts with alcohols or amines	04293-10	10g
Poly(methacryloyl chloride)		25% in dioxane	reacts with alcohols or amines	04315-10	10g

Oxirane-functional Polymers

Poly(glycidyl methacrylate)	25,000	10% in MEK	reacts with carboxyls, hydroxyls or amines	06524-5	5g

Hydroxyl-functional Polymers

Poly(1-glycerol methacrylate)		waxy solid	hydrophilic, water soluble	16855-10	10g
Poly(2-hydroxyethyl methacrylate)	200,000	powder	water swellable	09689-25	25g
	200,000	12% in Ethanol		18894-100	100g
Poly(vinyl alcohol)	6,000	powder	80 mol % hydrolyzed	22225-500	500g
	25,000	powder	88 mol % hydrolyzed	02975-500	500g
	25,000	powder	98 mol % hydrolyzed	04397-500	500g
	78,000	powder	88 mol % hydrolyzed	15132-500	500g
	78,000	powder	98 mol % hydrolyzed	15130-500	500g
	78,000	powder	99.7 mol % hydrolyzed	15129-500	500g
	108,000	powder	99.7 mol % hydrolyzed	04324-500	500g
	125,000	powder	88 mol % hydrolyzed	04398-500	500g
	133,000	powder	99 mol % hydrolyzed	02815-500	500g

Nitrile-Functional Polymers

Polyacrylonitrile	150,000	powder		03914-100	100g
				03914-500	500g
Poly(butadiene/acrylonitrile) carboxyl terminated (67:33)		solid	widely used nitrile rubber	06561-500	500g
Poly(Methacrylonitrile)		powder		04314-10	10g

Water Soluble Polymers

Name	Mol. Weight	Form	Comments	Catalog #	Size	
Cellulose, carboxymethyl ether, Na+	80,000	powder	degree of substitution = 0.7	06140-250	250g	
	250,000	powder	degree of substitution = 0.7	06138-250	250g	
	700,000	powder	degree of substitution = 0.7	06139-250	250g	
Cellulose, hydroxyethyl ether	~90,000	powder		05570-500	500g	
	720,000	powder		05569-500	500g	
	1,000,000	powder		05568-500	500g	
Cellulose, methyl hydroxyethyl ether		2% soln. in H ₂ O	cellulose derivative	21275-500	500g	
Chitosan (Poly d-glucosamine)	15,000	powder	degree of deacetylation ~84%	21161-50	50g	
Chitosan (practical)	200,000	powder	amine 7-12%	00281-100	100g	
Dextran poly[(1,6)-alpha-d-glucose]	17,500	powder	i.v. 0.10 - 0.14	01341-100	100g	
	150,000	powder	i.v. 0.343	05056-100	100g	
	250,000	powder	i.v. 0.4 - 0.5/37°C	22500-100	100g	
	5,000,000	powder		05059-100	100g	
Dextran hydrogenated	5,000,000	powder	i.v. 0.055 terminal alcohol	16653-100	100g	
Dextran sulfate, sodium salt	500,000	powder	sulfur 19%, anionic dextran derivative	00407-100	100g	
Guar gum	1,200,000	powder	natural water-soluble polysaccharide	21255-100	100g	
Poly(acrylamide)	1,500	50% AQ	nonionic water-soluble polymer.	23967-100	100g	
	10,000	50% AQ	high Mw polymer is used as	22581-250	250g	
	850,000	10% AQ	flocculant	19901-250	250g	
	5,500,000	powder		02806-250	250g	
	5,000,000	1% AQ		21485-250	250g	
	18,000,000	powder		18522-100	100g	
Poly(acrylamide/acrylic acid) Na+	90/10	200,000	powder	anionic acrylamide polymer	04652-250	250g
	60/40	>10,000,000	powder		18545-250	250g
	30/70	200,000	powder		02220-250	250g
Poly(acrylamide/2-methacryloxyethyl-trimethylammonium bromide)	80/20	50,000	20% AQ	cationic acrylamide polymer	21743-10	10g
Poly(acrylic acid)	2,000	63% AQ	anionic water-soluble polymer.	06513-250	250g	
	5,000	50% AQ	can be crosslinked covalently or	06519-250	250g	
	345,000	25% AQ	ionically to form hydrogels	03326-250	250g	
	450,000	powder		03312-100	100g	
	1,000,000	powder		06500-100	100g	
	4,000,000	powder		06501-100	100g	
Poly(acrylic acid) NH ₄ ⁺	250,000	powder		03311-25	25g	
Poly(acrylic acid) Na+	2,000	powder	water-soluble anionic polymer,	06568-250	250g	
	3,000	40% AQ	low molecular weights used as	18608-250	250g	
	6,000	powder	pigment dispersants,	06567-250	250g	
	10,000	40% AQ	high Mw's used as flocculants	18609-250	250g	
	60,000	35% AQ		18611-250	250g	
	225,000	20% AQ		18613-250	250g	

Water Soluble Polymers *continued*

Name	Mol. Weight	Form	Comments	Catalog #	Size
NEW! Poly(Allyl Amine)	1,000	15% solid in H ₂ O	water soluble cationic polymer	24825-100	100g
	15,000	15% solid in H ₂ O	water soluble cationic polymer	24826-100	100g
NEW! Poly(Diallyl Dimethyl Ammonium Chloride)	8,500	28% solid in H ₂ O	supplied as hydrochloride salts	24828-100	100g
	40,000	28% solid in H ₂ O	supplied as hydrochloride salts	24830-100	100g
	240,000	powder	linear cationic cyclic polymer	17338-10	10g
NEW! Poly(Diallyl Methyl Amine Chloride)	5,000	25% solid in H ₂ O	supplied as hydrochloride salts	24827-100	100g
	20,000	50% solid in H ₂ O	supplied as hydrochloride salts	24829-100	100g
Poly(allylamine hydrochloride)	12,000~20,000	powder	polymeric primary amine	18378-50	50g
Poly(butadiene/maleic anhydride) 1:1 molar	12,500	42% AQ	anionic polymer capable of reaction at anhydride or backbone unsaturation	07787-500	500g
Poly(n-butyl acrylate/2-methacryloxy-trimethylammonium bromide 80:20)		20% AQ	cationic polymer	21744-10	10g
Poly(3-chloro-2-hydroxypropyl-2-methacryloxyethylidimethyl-ammonium chloride)		20% AQ	chlorohydroxypropyl group can be cyclized to oxirane by mild alkali	21480-10	10g
Poly(2-dimethylaminoethyl methacrylate)	50,000	20% in BuOH		21510-10	10g
Poly(ethyl acrylate/acrylic acid) 50:50		20% in EtOH		19914-10	10g
Poly(ethylene glycol)	200	liquid	nonionic water soluble polymer	01112-250	250g
	300	liquid		01110-250	250g
	400	liquid		01109-250	250g
	600	liquid		00684-250	250g
	1,000	solid		00682-250	250g
	1,450	solid		00679-250	250g
	3,400	solid		06102-250	250g
	7,500	solid	pharmaceutical grade	06103-250	250g
	10,000	solid		22567-250	250g
	20,000	solid		22568-250	250g
	1,540	solid		01102-100	100g
	3,400	solid		00678-100	100g
	8,000	solid		17243-100	100g
Poly(ethylene glycol)-bisphenol A-diglycidyl ether adduct	18,500	solid		04686-250	250g
Poly(ethylene glycol-200) adipate	ca 546	liquid	reaction product of one mole of adipic acid and 2 moles of PEG 200	21509-100	100g
Poly(ethylene glycol) alpha-2-aminoethyl, omega-methoxy	2,000	solid	used for protein conjugation	24304-1	1g
Poly(ethylene glycol) bis 2-aminoethyl	1,000	solid	can be used to conjugate proteins and drug substances for delivery	24285-1	1g
	10,000	solid		24303-1	1g
Poly(ethylene glycol) dimethyl ether	400	liquid	can be used to complex metals and as phase-transfer agents	17031-25	25g
	1,000	liquid		17032-25	25g
	2,000	liquid		17033-25	25g
Poly(ethylene glycol)monocarboxy-methyl ether monomethyl ether	750	solid	carboxylic acid-terminated, can be coupled to molecules with carbodiimides	21483-500	500g
Poly(ethylene glycol) monomethyl ether	350	liquid	hydroxyl group at one end	04200-500	500g
	550	low mp solid		04457-500	500g
	750	solid		00626-500	500g
	1,900	solid		04242-500	500g
	5,000	solid		05986-500	500g

Water Soluble Polymers *continued*

Name		Mol. Weight	Form	Comments	Catalog #	Size
Poly(ethylene oxide)		100,000	waxy solid		06104-500	500g
		200,000	waxy solid		17503-500	500g
		300,000	waxy solid		06105-500	500g
		600,000	waxy solid		06106-500	500g
		1,000,000	waxy solid		21295-500	500g
		4,000,000	waxy solid		04030-500	500g
		5,000,000	waxy solid		04031-500	500g
		8,000,000	waxy solid		21296-500	500g
Poly(ethylene oxide- b-propylene oxide)	0.15:1.0	1,100	liquid	water-soluble or water-dispersible	16273-100	100g
	0.33:1.0	3,400	liquid	polymers with surfactant	16274-100	100g
	0.8:1.0	1,900	liquid	properties, chains are hydroxyl	16275-100	100g
	3.0:1.0	13,300	waxy solid	terminated	16276-100	100g
	5.0:1.0	8,750	waxy solid		16277-100	100g
Polyethylenimine, branched		600	liquid	highly branched, with high charge	02371-100	100g
				density, contain primary, secondary	02371-500	500g
		1,200	liquid	and tertiary amine groups,	06088-100	100g
				soluble in water at all Mw's	06088-500	500g
		1,800	liquid		06089-100	100g
					06089-500	500g
		10,000	liquid		19850-100	100g
					19850-500	500g
		10,000	30% AQ		17938-100	100g
		70,000	30% AQ		00618-100	100g
					00618-500	500g
		50K-100K	30% AQ		06090-100	100g
					06090-500	500g
Polyethylenimine, branched, permethylated, permethobromide		6,300	10% AQ	high charge density, quaternary salt	21903-10	10g
Polyethylenimine, linear		2,500	powder	all secondary amine polymers	24313-2	2g
		25,000	powder		23966-2	2g
		250,000	powder		24314-2	2g
Polyethylenimine "Max"		Nominal 4,000	solid	easy to handle,	24885-2	2g
		(<i>Equ. to MW 2,500 in freebase form</i>)		hydrochloride salt form		
		Nominal 40,000	solid		24765-2	2g
		(<i>Equ. to MW 25,000 in freebase form</i>)				
Poly(2-ethyl-2-oxazoline)		5,000	powder	neutral polymer, can be hydrolyzed	24066-50	50g
		50,000	powder	to linear polyethylenimine	17808-100	100g
		200,000	powder		24882-100	100g
		500,000	powder		17810-100	100g
Poly(1-glycerol methacrylate)			waxy solid	hydrophilic, water-swellaable polymer, probably cross-linked	16855-10	10g
Poly(2-hydroxyethyl methacrylate/methacrylic acid)			solid	water soluble in presence of alkali	08725-10	10g
Poly(l-lysine hydrobromide)		50,000	powder	cationic polymer, used for promotion	18619-50	50g
		90,000	0.1% AQ	of cell adhesion to surfaces	09730-25	25g
		120,000	powder		21430-100	100g
Poly(maleic acid)		1,000	50% AQ		09732-10	10g
Poly(methacrylamide)		5,000	powder	water soluble polyamide	16144-10	10g
Poly(methacrylic acid)		100,000	solid	water soluble polymer	00578-10	10g
					00578-50	50g
Poly(methacrylic acid) ammonium salt		15,000	30% AQ	forms insoluble salts with polyamines	21169-25	25g
Poly(methacrylic acid) sodium salt		15,000	30% AQ	forms insoluble salts with polyamines	21170-25	25g
					21170-100	100g

Water Soluble Polymers *continued*

Name	Mol. Weight	Form	Comments	Catalog #	Size
Poly(2-methacryloxyethyltrimethyl-ammonium bromide)	50,000	20% AQ	cationic (quaternary ammonium)	21479-10	10g
	200,000	20% AQ	cationic (quaternary ammonium)	21746-10	10g
Poly(N-iso-propylacrylamide)	40,000	solid	soluble at RT, insoluble above 40°C	21458-10	10g
Poly(oxyethylene), sorbitan monolaurate	1,230	liquid	surfactant, Tween® 20	06110-100	100g
Poly(styrenesulfonic acid)	70,000	30% AQ	ionic polymer in acid form	08770-250	250g
Poly(styrenesulfonic acid), sodium salt	75,000	powder	ionic polymer in salt form	08772-25	25g
	1,000,000	powder		08773-25	25g
Poly(styrenesulfonic acid/ 1:1 molar	15,000	25% AQ	can be used as a pigment dispersant	11795-25	25g
maleic acid), sodium salt 3:1 molar	20,000	solid		18407-25	25g
NEW! Poly(N-vinyl acetamide)	~4,060,000	powder	moderately water soluble, stable	24808-50	50g
NEW! Poly(N-methyl N-vinyl acetamide) homopolymer		powder	may be converted to poly (N-methyl vinyl amine) by hydrolysis	24810-50	50g
NEW! Poly(N-vinyl acetamide-co-sodium acrylate)		powder	moderately water soluble, stable	24809-50	50g
NEW! Poly(N-vinyl acetamide) homopolymer, Crosslinked		powder	moderately water soluble, stable	24807-50	50g
Poly(vinyl alcohol)	6,000	powder	88% hydrolyzed	22225-500	500g
	25,000	powder	88% hydrolyzed	02975-500	500g
	25,000	powder	98% hydrolyzed	04397-500	500g
	78,000	powder	88% hydrolyzed	15132-500	500g
	78,000	powder	98% hydrolyzed	15130-500	500g
	78,000	powder	99.7% hydrolyzed	15129-500	500g
	108,000	powder	99.7% hydrolyzed	04324-500	500g
	125,000	powder	88% hydrolyzed	04398-500	500g
	133,000	powder	99% hydrolyzed	02815-500	500g
Poly(vinyl alcohol), N-methyl-4(4'-formylstyryl) pyridinium methosulfate acetal	45,000	13.3% AQ	photocrosslinkable polymer, high dielectric constant, used in making silkscreen printing screens	22570-75	75g
Poly(vinylamine) hydrochloride	25,000	powder	all primary amine	23965-1	1g
				23965-5	5g
Poly(2-vinyl-1-methylpyridinium bromide)	50,000	20% AQ	degree of quaternization ~50%	21477-10	10g
Poly(4-vinyl-1-methylpyridinium bromide)	50,000	20% AQ	degree of quaternization ~85%	21478-10	10g
Poly(vinylphosphoric acid), sodium salt	200,000	solid	straight chain; 5% phosphorus	04391-5	5g
Poly(vinylphosphonic acid), sodium salt	24,000	30% AQ	polydispersity ~1.24	24297-10	10g
Poly(2-vinylpyridine)	50,000	powder	water-soluble at low pH,	21382-10	10g
	300,000	powder	adhesive-promoting properties	19238-10	10g
	350,000	powder		17770-10	10g
Poly(4-vinylpyridine)	50,000	solid	water-soluble at low pH	00112-50	50g
	300,000	solid	water-soluble at low pH	22176-50	50g
Poly(2-vinylpyridine, N-oxide)	150K-200K	powder	water-soluble cationic resin	01564-10	10g
Poly(4-vinylpyridine, N-oxide)	200,000	powder	water-soluble cationic resin	23684-10	10g
Poly(N-vinylpyrrolidone)	2,500	powder	water-soluble polymer used as	16693-250	250g
	4,000-6,000	powder	a thickener, protective colloid	24737-250	250g
	10,000	powder		03315-250	250g
	40,000	powder		01051-250	250g
	40,000	powder	pharmaceutical grade	01052-250	250g
	1,000,000	powder		06067-250	250g
Poly(N-vinylpyrrolidone/2-dimethyl-aminoethyl methacrylate) dimethylsulfate 90/10	100,000	20% AQ	cationic quaternary salt	16294-100	100g
Poly(vinylsulfonic acid), sodium salt	5,000	25% AQ	anionic polymer	04392-100	100g

Alphabetical Listing of Polymers

- B -

Biodegradable Polymers Kit

Kit Contains:

5g Poly(glycolic acid) [26202-08-4]	MW 100,000	i.v 1.0-2.0 (#06525)
5g Poly(DL-lactic acid) [26969-66-4]	MW 20,000	i.v ~0.4 (#16585)
5g Poly(L-lactide-co-glycolide) 70:30 [30846-39-0]	MW 10,000	i.v ~0.2 (#16587)
5g Poly(L-lactic acid) [33135-50-1]	MW 100,000	i.v ~1.5 (#18402)

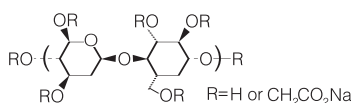
- C -

Cellulose, carboxymethyl ether, sodium salt [9004-32-4]

Degree of Substitution = 0.7

 n_D^{25} 1.3355 2% solution TSCA

Anionic water-soluble gum used as binder, thickener.



MW 80,000	Viscosity of 2% AQ = Max 18 cps	O5g
MW 250,000	Viscosity of 1% AQ = 1000-2800 cps pH 7.0	A5g
MW 700,000	Viscosity of 1% AQ = 1500-3000 cps pH 6.5-8.5	O5g

Cellulose, cyanoethyl ether [9004-41-5] U2g

MW 90,000-117,000 Tg 180° TSCA

R=—CH₂CH₂CN

Solvent-soluble cellulose ether. Soluble in polar solvents. High dielectric constant.

Soluble in: acetone, chloroform, pyridine.

Cellulose derivatives for chromatography (Selectacel®) — See Pages 208-209**Cellulose, ethyl ether** [9004-57-3] H4g n_D^{21} 1.3355 Tg 43° 50 cps (5% soln. in 80:20 toluene/ethanol) TSCAR= —CH₂CH₃

Solvent-soluble cellulose ether. Soluble in: lower alcohols, MDC, esters, toluene.

Degree of Substitution = 2.21-2.28, powder

Cellulose, ethyl hydroxyethyl ether [9004-58-4] A2g

TSCA

R=—CH₂CH₃ HOCH₂CH₂—

Extra low viscosity powder. Solvent-soluble cellulose ether. 10-20 cps (measured as 5% soln. in 80:20 toluene/ethanol)

Cellulose, hydroxyethyl ether [9004-62-0] H5g

TSCA

R= HOCH₂CH₂—

Water-soluble cellulose ether, used as a binder and thickening agent.

MW ~90,000	powder	Viscosity of 5% AQ = 75-150 cps
MW 720,000	powder	Viscosity of 2% AQ = 4,500-6,500 cps
MW 1,000,000	powder	Viscosity of 1% AQ = 1,500-2,500 cps

Catalog # Size

18401-1 1 kit

06140-250 250g
 06138-250 250g
 06139-250 250g

04687-10 10g

02354-500 500g

05431-100 100g

05570-500 500g
 05569-500 500g
 05568-500 500g

Cellulose, methyl hydroxyethyl ether [9032-42-2] A2g
8,000 cps (2% soln. in H₂O) TSCA
R = (CH₂CH₂O)_xH₁CH₃ or H
Water-soluble cellulose derivative.

Chitin, practical [1398-61-4] H5g
TSCA
Naturally derived acetylated amino glucose.

Chitosan (poly[d-glucosamine]) [9012-76-4] A2g
Cationic polymer prepared by deacetylation of chitin. Soluble in water at low (4-6) pH.
Soluble in: dilute organic and inorganic acids. TSCA

Purified powder MW ~15,000 Degree of deacetylation ~84%
Practical MW 100,000-300,000 Amine 7-12%

Cyclic Olefin Copolymers (COC)

Cyclic Olefin Copolymers are high transparency, low specific gravity, high heat resistant and have excellent optical properties and superior water vapor barrier characteristics. Combined with outstanding stiffness/ strength and favorable sterilization properties, they have found applications ranging from FDA approvals for pharmaceutical and food applications to optical applications and electronics materials. Whether used by itself or as a modifier for other resins, the ethylene-norbornene copolymer offers the optical clarity of polymethylmethacrylate (pMMA), the heat resistance of polycarbonate (PC) and superior dimensional stability.



Properties

- High transparency
- Outstanding moisture barrier
- High rigidity and strength
- Variable heat distortion resistance up to 170°C
- Excellent biocompatibility
- Very good resistance to acids and alkalis and polar organic solvents
- Low density
- Very good electrical insulation properties
- Exceptionally low moisture absorption
- Low birefringence

HDT = 170°C Tg = 180°C Density: 1.02 (Ethylene-Norbornene Copolymer)

HDT = 130°C Tg = 136°C Density: 1.02 (Ethylene-Norbornene Copolymer)

HDT = 150°C Tg = 160°C Density: 1.02 (Ethylene-Norbornene Copolymer)

HDT = 130°C Tg = 140°C Density: 1.02 (Ethylene-Norbornene Copolymer)

HDT = 75°C Tg = 80°C Density: 1.02 (Ethylene-Norbornene Copolymer)

HDT = Heat Deflection Temperature

beta-Cyclodextrin, 99% (cycloheptaamylose) [7585-39-9] VWX5g
MW 1,135.0 Cavity Diameter 7-8 Å TSCA
Host in host/guest complexes. Soluble in: water, lower alcohols.

Catalog # Size

21275-500 500g

00210-50 50g

21161-50 50g
00281-100 100g

24746-100 100g

24747-100 100g

24748-100 100g

24749-100 100g

24750-100 100g

00355-25 25g

- D -

D.E.R.® Resin — See *Epoxy Resins*, below.

Dextran (poly[(1,6)-alpha-d-glucose]) [9004-54-0] A2g

TSCA

$[C_6H_{10}O_5]_n$

Water soluble carbohydrate with many pharmaceutical and technical uses.

Soluble in: lower alcohols. For *Dextran MW standards*, see page 213.

i.v. 0.10-0.14	MW 15,000-20,000	01341-100	100g
i.v. 0.343	MW 100,000-200,000, Nonpyrogenic	05056-100	100g
i.v. 0.4-0.5/37°C	MW 200,000-300,000	22500-100	100g
	MW 3,000,000-7,000,000 Viscosity of 1% AQ = 3.96 cps	05059-100	100g

Dextran, DEAE ether (diethylaminoethyl ether) [9015-73-0] A2g

MW 500,000 Degree of substitution ~70%

$[-C_6H_9O_4[OCH_2CH_2N(CH_3)_2]]_n$

Cationic dextran derivative.

15757-50 50g

Dextran, hydrogenated U2g

MW 4,000 - 6,000 Intrinsic Viscosity 0.055

Properties are similar to dextran but aldehyde at chain ends is reduced to alcohol.

16653-100 100g

Dextran sulfate, sodium salt [9011-18-1] A2g

MW 500,000 TSCA Sulfur 19% Sp. viscosity 0.1-0.7 in 1M AQ NaCl pH of AQ 6.9

$[-C_6H_9O_4(OSO_3Na)]_n$

Anionic dextran derivative.

00407-100 100g

- E -

Epoxy Resins

Araldite® Resin HO5g

Grade 502 WPE 233-250 [84-74-2] TSCA $C_6H_4-1,2,-[CO_2(CH_2)_3CH_3]_2$

00552-500 500g

Grade 6005 WPE 182-189 [3101-60-8] TSCA

02116-500 500g

D.E.R.® Resins (poly(propylene glycol) diglycidyl ether) [26142-30-3] TSCA

Grade 732 WPE 305-335 Viscosity 55-100 cps MW ~600 HO7g

02922-450 450g

Grade 736 WPE 175-205 Viscosity 30-60 cps MW ~300 H2g

02923-450 450g

Epon® Resin 828 (Bisphenol A diglycidyl ether) [25068-38-6] HO2g

MW ~377 WPE 185-192 Viscosity 1-1.6 cps TSCA

Epon Resin 828 is a standard epoxy resin used in formulation, fabrication and fusion technology. Widely used for embedding and potting. When cross-linked or hardened with appropriate amine curing agents, very good mechanical adhesive, dielectric and chemical resistance properties are obtained.

02334-500 500g

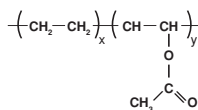
Epon® Resin 1001F (Bisphenol A diglycidyl ether) [25036-25-3] HO2g

MW 1075 WPE 525-550 Viscosity 7.0-9.6 cps

Viscous liquid. Higher MW epoxy resin cured by amine catalyst and used for embedding.

24305-500 500g

Ethylene Vinyl Acetate (EVA) H4g
 Tg°C - 7°C (Soft, flexible polymer) Solids Content: 99 +/- 1%
 Copolymer available as a free flowing powder that can easily be redispersed to form a latex dispersion. Powder is stabilized with a vinyl alcohol to allow it to remain free flowing but easily redispersible in water. Composition: Ethylene-Vinyl Acetate Copolymer with approximately 20 weight % ethylene and 80 weight % vinyl acetate.
 Particle Size: 1-7 micron dominant sizes; max 4% over 40 mesh.



- F -

Fluorinated Ethylene Propylene Copolymer

New fluorinated copolymers of ethylene and propylene improve overall performance when formulated into plastics, elastomeric polymers, paints and coatings or inks and lubricants.

Advantages

This product exhibits high release characteristics, excellent wear and mar resistance and slip resistance properties when used alone or in blends with other materials. The inherent toughness and high fluorine content imparts improved tear resistance, surface smoothness and flammability resistance in coating and ink formulations.



Properties

- Appearance: White Fine Powder
- Melting Point: (ASTM-D1457) 240 +/- 9°C
- Service Temperature Range: (ASTM-D1457) -200°C to 260°C
- Mean Particle Size: 4 microns
- Polymer Specific Gravity: 2.2-2.3
- Bulk Density: 350-550 grams/liter

FEP (Melt Flow Index 10-35MI)

FEP (Melt Flow Index 35-70MI)

- G -

Guar Gum [9000-30-0] A2g
 MW 1.2 million Viscosity of 1% AQ ~6000cps TSCA
 Natural water-soluble polysaccharide.

- M -

Methoxy polyethylene glycol — See *Poly(ethylene glycol) monomethyl ether*, page 187.

Molecular Weight Standards and Kits — See page 213

Catalog # Size

24763-50 50g

24778-100 100g

24779-100 100g

21255-100 100g

- N -

Nylon 6 — See *Polycaprolactam*, page 182.

Catalog #	Size
18180-250	250g
18179-250	250g

Nylon 6/6 — See *Poly(hexamethylenedipamide)*, page 192.

06557-500	500g

- P -

PEG — See *Poly(ethylene glycol)*, page 185.

Polyacetal resin (polyformaldehyde) [9002-81-7] A2g
MW ~41,000 mp 175° d 1.47 TSCA

02562-500	500g

Polyacrolein [25068-14-8] A2gh
MW 200,000-2 Million by viscosity, TSCA
Reactive polymer. Insoluble as supplied because of extensive inter- and intramolecular acetal linkages. Polyacrolein can be solubilized by reaction with reagents such as sodium bisulfite, hydrazine, etc. Insoluble in most of the organic solvents.

04287-10	10g

Polyacrylamide [9003-05-8] A2d
d 1.302 for AQ solution TSCA
 $[-CH_2CH(CONH_2)-]_n$
Important nonionic water-soluble polymer. High MW polymer is used primarily as a flocculant. Tg of high MW (>100,000) polymers = 165°. Unit weights are weights of solution. Soluble in: water, morpholine. For MW Standards, see page 213.

MW 1,500 50% soln. in water (50g polymer) Viscosity of 15% AQ 2-3 cps

23967-100	100g

MW 10,000 50% soln. in water (125g polymer) Viscosity of 15% AQ 5.5-9 cps

22581-250	250g

MW 600,000-1,000,000 10% soln. in water (25g polymer)

19901-250	250g
19901-1	1kg

MW 5,000,000-6,000,000 powder Viscosity of 0.1% AQ 2.2-2.7 cps

02806-250	250g

MW 5,000,000 1% soln. in water (2.5g polymer) Viscosity of 0.1% AQ 3.8 cps

21485-250	250g

MW 18,000,000 powder Viscosity of 0.2% AQ 1200 cps

18522-100	100g

Poly(acrylamide/acrylic acid) [25085-02-3] H2gh
Residual Monomer <0.03% TSCA Anionic acrylamide polymer.

90:10, Na salt MW 200,000 Viscosity of 10% AQ 150-170 cps

04652-250	250g

60:40, Na salt MW >10,000,000 pH 9.1

18545-250	250g

30:70, Na salt MW 200,000 Viscosity of 10% AQ 300-800 cps pH of 1% AQ 9.5 ..

02220-250	250g

Poly(acrylamide/acrylic acid), potassium salt, crosslinked [31212-13-2] A2g
Granular "super-absorbant" polymer powder, absorbs many times its weight of water. Active ingredient of low-bulk diapers.

24620-250	250g

Poly(acrylamide/2-methacryloxyethyl-trimethylammonium bromide) 80:20, 20% soln. in water [35429-19-7] *A2g*
(2g polymer) MW 50,000 TSCA
Cationic acrylamide polymer. Water-soluble.

Poly(acrylic acid) [9003-01-4] *H4g*
 n_D^{25} 1.527 TSCA

$[-CH_2CH(CO_2H)-]_n$
Important anionic water-soluble polymer. Can be crosslinked covalently or ionically to form hydrogels. Tg of high MW (>100,000) polymers = 106°

MW ~ 450,000 powder Viscosity of 4% AQ 1,000-2,000 cps

MW ~ 1,000,000 powder Viscosity of 4% AQ 4,000-11,000 cps

MW ~ 4,000,000 powder Viscosity of 4% AQ 40,000-60,000 cps

MW ~ 2,000 63% soln. in water (157.5g polymer) Mw/Mn 2.4 Viscosity 400-1400 cps . .

MW ~ 5,000 50% soln. in water (125g polymer) Mw/Mn 2.4 Viscosity 250-500 cps

MW ~ 50,000 25% soln. in water (62.5g polymer) Mw/Mn 2.9 Viscosity <300 cps

MW ~ 345,000 25% soln. in water (62.5g polymer) Mw/Mn 6.2 Viscosity 400-1200 cps .

Poly(acrylic acid) ammonium salt, powder [28214-57-5] *HK4bcg*
MW 250,000 TSCA
Water-soluble anionic polymer. Ammonia is slowly lost from dry polymer.

Poly(acrylic acid) sodium salt [9003-04-7] *H4g* TSCA
 $[-CH_2CH(CO_2Na)-]_n$
Water-soluble anionic polymer. Used at low molecular weights as pigment dispersant and at higher molecular weights as a flocculant. Polymer can form complexes with poly(ethylene oxide) and with nucleotides. *For MW Standards, see page 213.*

MW ~ 2,000 powder Mw/Mn 2.15 Viscosity of 25% AQ 320 cps

MW ~ 3,000 40% soln. in water (100g polymer) Mw/Mn 1.5

MW ~ 6,000 powder Mw/Mn 2.4

MW ~ 10,000 40% soln. in water (100g polymer) Mw/Mn <2

MW ~ 60,000 35% soln. in water (87.5g polymer)

MW ~ 225,000 20% soln. in water (50g polymer) Mw/Mn 6.1

Poly(acrylic acid), sodium salt, crosslinked [09003-04-7] *A2g*
Granular "super-absorbant" polymer powder, absorbs many times its weight of water.
Active ingredient of low-bulk diapers.

Catalog # Size

21743-10 10g

03312-100 100g

06500-100 100g

06501-100 100g

06513-250 250g

06519-250 250g

00627-250 250g

03326-250 250g

03311-25 25g

06568-250 250g

18608-250 250g

06567-250 250g

18609-250 250g

18611-250 250g

18613-250 250g

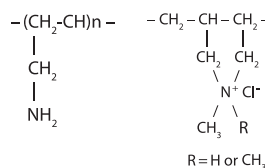
24619-250 250g

Polyacrylonitrile [25014-41-9] *A2gh*
 MW 150,000 d 1.18 n_D^{25} 1.420 T_g 97° TSCA
 $[-CH_2CH(CN)-]_n$
 Soluble in: DMF, DMSO, sulfolane.

Poly(acryloyl chloride), 25% soln. in dioxane (2.5g polymer) [25189-84-8] *CHM7g* ...
 MW ~10,000
 Reactive polymer.

PAA family of Poly(Allyl Amines) and PAS PolyAmine Series

Both offer high cationic charge density. They are now available from Polysciences, Inc. in ready to use aqueous solution form. Their ability to modify surfaces and provide cationic character allows the user to selectively attract negatively charged functional groups to the coated surface or to the dissolved water soluble cationic polymers. If other molecular weights are required, call for a custom quotation.



PAA & PAS General Structures

Poly(Allyl Amine) [30551-89-4] *B4g*

Water soluble cationic polymer with primary amino groups (free base types) for chemical reactions. 15% solids in water.

MW 1,000 24825-100 100g

MW 15,000 24826-100 100g

Poly(Diallyl Dimethyl Ammonium Chloride) [26062-79-3] *H4g*

Copolymer based on diallyl amine which generates a variety of cyclic tertiary amine structures. Supplied as ammonium salts. 28% solids in water.

MW 8,500 24828-100 100g

MW 40,000 24830-100 100g

Poly(Diallyl Methyl Amine Hydrochloride) [29566-78-7] *H4g*

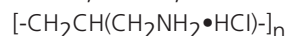
Copolymer based on diallyl amine which generates a variety of cyclic tertiary amine structures. Supplied as hydrochloride salts. 25% solids in water.

MW 5,000 24827-100 100g

MW 20,000 24829-100 100g

Poly(allylamine hydrochloride) [71550-12-4] *U4g*

Mw 12,000~20,000 TSCA pH of 1% AQ 4.0



Polymeric primary amine.

18378-50 50g

Poly(4-aminostyrene) [25086-42-4] *A2g*

Nitrogen content ~11% MW >150,000

Polymeric aromatic primary amine. Prone to oxidative crosslinking.

Insoluble in: organic solvents and mineral acids.

02823-1 1g

Poly(n-amyl methacrylate) [28551-45-3] *A2f*

Oil-soluble methacrylate ester polymer.

04295-10 10g

Polyaniline, Emeraldine form A2g

MW ~ 15,000 d 1.36 Conductive polymer.

Acid doped [25233-30-1] Conductivity 2-4 S/cm Soluble in: sulfuric acid, MeSO₃H . . .
Undoped [5612-44-2] Conductivity 10⁻¹⁰ S/cm Soluble in: sulfuric acid, MeSO₃H, . . .
DMF, NMP

Polyaniline, water-soluble U7g

Reaction product of polyaniline, (emeraldine form) with propanesultone.

Poly(gamma-benzyl l-glutamate) [25014-27-1] A2d

MW 150,000-300,000 Tg 15°

Liquid crystal polymer. Soluble in: dichloroacetic acid.

Poly(benzyl methacrylate) [25085-83-0] A4g

n_D²⁰ 1.568 Tg 54°

[-CH₂C(CH₃)(CO₂CH₂C₆H₅)-]_n

Aromatic methacrylate ester polymer.

Poly(4-bromostyrene) [24936-50-3] U4g

d 1.408 n_D²⁰ 1.594 Tg 11° Bromine content ~43%

[-CH₂CH(C₆H₄Br)-]_n

Polystyrene with reactive bromine substituent.

Polybutadiene [9003-17-2] A4g

d 0.89 TSCA [-CH₂CH=CHCH₂-]

Liquid polyene that can be cured with sulfur or peroxides. Soluble in: hydrocarbons, chloroform, THF. For MW Standards, see page 213.

MW 1,600 liquid, vinyl-1,2 = 80% n_D²⁰ 1.515 Viscosity 40,000±10,000 cps @ 45°C . .

MW 3,000 liquid, vinyl-1,2 = 80% n_D²⁰ 1.500 Viscosity 65,000 cps @ 45°C

MW 400,000 36% cis, 55% trans and 9% vinyl-1,2 n_D²⁰ 1.518

Polybutadiene, hydroxyl terminated [69102-90-5] A2g

MW 3,000 liquid, TSCA Hydroxyl value 0.64 meq/g 1,2-vinyl content 65 wt%,

1,4-cis content 12.5 wt% 1,4 trans content 22.5 wt% Viscosity 20 cps @ 25°C

Polydispersity=1.35 HO(-CH₂CH=CHCH₂-)_nOH

Functionalized polydienes which can be used in preparation of block copolymers, polymers with other groups.

Poly(butadiene/acrylonitrile) 67:33 [9003-18-3] A4g

d 0.99 n_D²⁰ 1.520 TSCA

[-CH₂CH(CN)-]_x(CH₂CH=CHCH₂-)_y

Widely used nitrile rubber. Soluble in: THF, chloroform, toluene.

Poly(butadiene/acrylonitrile), amine terminated A4g

butadiene ~83% acrylonitrile ~17% Mn = 5,500 Amine eq = 0.71

Viscosity 200,000 cps @ 27°C

Functionalized poly(butadiene/acrylonitrile) which can be used in preparation of block copolymers, polymers with other end groups.

Catalog # Size

21288-5 5g

24043-5 5g

23614-1 1g

21444-500 500mg

21444-1 1g

06562-10 10g

07030-1 1g

22395-100 100g

06081-100 100g

19808-10 10g

24857-100 100g

06561-500 500g

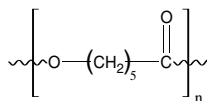
09753-100 100g

	Catalog #	Size
Poly(butadiene/maleic acid) 1:1 (molar), 42% soln. in water [28265-35-2] <i>H2g</i> (210g polymer) MW 10,000-15,000 Tg 57° Viscosity 2500 cps TSCA Anionic, water-soluble, polymer capable of reaction through acid groups or backbone unsaturation.	07787-500	500g
Poly(butadiene/maleic anhydride) 1:1 (molar), 25% sol. in acetone [25655-35-0] <i>CHX7g</i> . . . (125g polymer) MW 10,000-15,000 Tg 70° TSCA Viscosity 12 cps Reactive polymer capable of reacting at anhydride or backbone unsaturation.	07788-500	500g
Poly(1,4-butanediol adipate) [25103-87-1] <i>A4g</i> MW 12,000 Tg -118° TSCA $\text{HI-O(CH}_2)_4\text{O}_2\text{C(CH}_2)_4\text{CO}_2\text{-I}_n\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ Aliphatic polyester resin.	16269-10	10g
Poly(n-butyl acrylate/2-methacryloxyethyltrimethylammonium bromide) 80:20, 20% soln. in water [56727-55-0] <i>A2g</i> (2g polymer) Hydrophobic cationic polymer.	21744-10	10g
Poly(iso-butyl acrylate), 20% soln. in toluene [26335-74-0] <i>CH6g</i> (50g polymer) mp 81° Tg -24° Tacky, hydrocarbon-soluble, low Tg polymer.	07034-250	250g
Poly(n-butyl acrylate), 20% soln. in toluene [9003-49-0] <i>CH6g</i> (50g polymer) MW ~10,000 Tg -64° TSCA $[-\text{CH}_2\text{CH}[\text{CO}_2(\text{CH}_2)_3\text{CH}_3]\text{-}]_n$ Tacky, hydrocarbon-soluble, low Tg polymer.	03561-250	250g
Poly(tert-butyl acrylate), 35% soln. in toluene [25232-27-3] <i>CHX7g</i> (8.75g polymer) mp 200° Tg 43° TSCA Hydrocarbon-soluble polymer.	18240-25	25g
Poly(n-butyl acrylate/acrylic acid) [25119-83-9] Carboxyl-functional hydrophobic polymer. 50/50 copolymer is alkali-soluble.		
50:50 <i>CHV6g</i> TSCA 20% latex in alcohol (2g polymer)	19911-10	10g
50:50 <i>A2g</i> TSCA solid	21058-5	5g
Poly(iso-butyl methacrylate) fine powder, [η] = 0.60 [9011-15-8] <i>A2g</i> MW 200,000 d 1.045 n_D^{20} 1.477 Tg 53° TSCA $(-\text{CH}_2\text{C}(\text{CH}_3)(\text{CO}_2\text{CH}_2\text{CH}(\text{CH}_3)_2)\text{-})_n$ Firm, water-insensitive, polymer.	02452-500	500g
Poly(n-butyl methacrylate) [9003-63-8] MW ~180,000 d 1.06 n_D^{20} 1.483 TSCA $[-\text{CH}_2\text{C}(\text{CH}_3)(\text{CO}_2(\text{CH}_2)_3\text{CH}_3)\text{-}]_n$ Firm, water-insensitive, polymer. Soluble in: acetone, chloroform, IPA, MEK, THF, toluene.		
Fine powder, [η] = 0.50 <i>A2g</i> Tg 20°	02061-100	100g
40% solution in mineral spirits <i>EH7g</i>	19900-250	250g
Poly(tert-butyl methacrylate) [25189-00-8] <i>U4g</i> Tg 107° $[-\text{CH}_2\text{C}(\text{CH}_3)(\text{CO}_2\text{C}(\text{CH}_3)_3)\text{-}]_n$ Hard, thermally sensitive, methacrylate ester. Decomposes thermally to poly(methacrylic acid). For MW Standards, see page 213.	07037-25	25g

Polycaprolactam (Nylon 6) [25038-54-4] A2g
mp 215-250° n_D^{20} 1.530 TSCA
Widely used in fibers.

MW 18,000
MW 35,000 4.1 rel. visc.

Polycaprolactone [24980-41-4] H4g
MW 43,000 mp 55-65°C Form: ~3mm pellets TSCA
[-OCCH₂)₅CO-]_n
Biodegradable polymer, hydroxyl end group.



NEW! Poly(ε-caprolactone)-block-poly(ethylene glycol)

Diblock & Triblock Polymers

Among the leading candidates for biodegradation are caprolactone based materials due to their approved uses by the FDA for drug delivery systems, sutures, long term implants and adhesion barriers as well as new tissue scaffold host systems.

Caprolactone itself is a biodegradable polyester with a relatively low melting point (60°C) but a glass transition temperature (T_g) around -60°C. The high crystallinity in the polyester accounts for this property balance. It is made by metal catalyzed ring opening polymerization of epsilon caprolactone. A typical molecular weight of standard polycaprolactone homopolymer is 188k Daltons. By comparison, a 100% polylactic acid homopolymer with Mw 330k Daltons has a (T_g) temperature of +55°C and a melting temperature T_m of about 175°C.

Further modifications of polycaprolactone are possible by converting it into diblock (A-B) or triblock (A-B-A) copolymers with polyethylene glycol. Synthetic methods which lead to block structures allow the polymer to have controlled biodegradation rates as well as improved physiological compatibility characteristics.

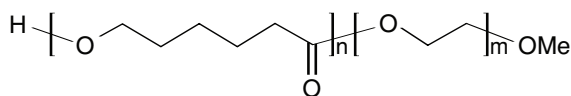
Additional custom synthesis materials are available upon request. Please contact us for a quotation for your custom synthesis needs.

Numbers in parentheses refer to Mw of the segment.

Diblock Polymers

(Numbers in parentheses refer to Mw of the segment.)

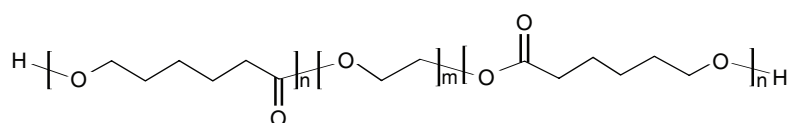
PCL(1000)-b-PEG(1000)	25010-1	1g
PCL(1000)-b-PEG(2000)	25011-1	1g
PCL(1000)-b-PEG(5000)	25012-1	1g
PCL(5000)-b-PEG(1000)	25022-1	1g
PCL(5000)-b-PEG(2000)	25023-1	1g
PCL(5000)-b-PEG(5000)	25024-1	1g



Triblock Polymers

(Numbers in parentheses refer to Mw of the segment.)

PCL(1000)-b-PEG(1000)-b-PCL(1000)	25019-1	1g
PCL(1000)-b-PEG(2000)-b-PCL(1000)	25020-1	1g
PCL(1000)-b-PEG(6000)-b-PCL(1000)	25021-1	1g
PCL(1000)-b-PEG(10000)-b-PCL(1000)	25013-1	1g
PCL(5000)-b-PEG(1000)-b-PCL(5000)	25014-1	1g
PCL(5000)-b-PEG(2000)-b-PCL(5000)	25015-1	1g
PCL(5000)-b-PEG(5000)-b-PCL(5000)	25016-1	1g
PCL(5000)-b-PEG(10000)-b-PCL(5000)	25025-1	1g

**Polycaprolactone diol** [36890-68-3] *H4g*

d 1.07 TSCA

 $\text{H}[-\text{O}(\text{CH}_2)_5\text{CO}]_n\text{OCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{O}[-\text{CO}(\text{CH}_2)_5\text{O}]_n\text{H}$

Biodegradable polymer. Can be used to make block copolymers.

MW 1,250 Viscosity 65-100 cps@55°C Hydroxyl number 90mg/g of polymer . . .	09706-500	500g
MW 2,000 Viscosity 530-730 cps@55°C Hydroxyl number 56mg/g of polymer . . .	09694-500	500g

Poly(3-chloro-2-hydroxypropyl-2-methacryloxyethyltrimethylammonium chloride), 20% soln. in water [76123-64-3] *U7g*

(2g polymer) Reactive quaternary ammonium polymer. Chlorohydroxypropyl group can be cyclized to oxirane by mild alkali.

Poly(4-chlorostyrene) [24991-47-7] *A2g* 07041-5 5g

MW 250,000 Tg 110°

 $[-\text{CH}_2\text{CH}(\text{C}_6\text{H}_4\text{Cl})-]_n$

Substituted polystyrene, can be converted to other substituted polystyrenes.

Poly(chlorotrifluoroethylene) [9002-83-9] *A2g* 15176-100 100g

MW 500-600 Tg -40° TSCA Tg 52° (static method) Tg 100° (mechanical method)

Viscosity 12 cps @ 37°C

 $[-\text{CF}_2\text{CF}(\text{Cl})-]_n$

Inert liquid for high temperature baths.

Poly(n-decyl acrylate), 20% soln. in toluene [29500-86-5] *CHX7g* 07042-50 50g

(10g polymer) MW ~130,000 TSCA

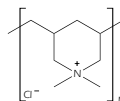
Soft, tacky, hydrophobic polymer.

Poly(diallyldimethylammonium chloride) [26062-79-3]

MW 240,000 d 1.072 Polydispersity 2-3 TSCA

Linear, cationic, aliphatic, quaternary ammonium cyclopolymer.

Soluble in: H₂O, MeOH, possibly other polar solvents.



Dry powder UK2g
28% soln. in water (70g polymer) Viscosity ~1000 cps; pH (as is) 25°C ~2 A2g ...

Catalog # Size

17338-10 10g
19898-250 250g

Poly(2-dimethylaminoethyl methacrylate), 20% soln. in tert-butanol [25154-86-3] C7g ...
(2g polymer) MW 50,000 Tg 20° TSCA

21510-10 10g

Poly(2,6-dimethyl-1,4-phenylene oxide) [25134-01-4] A2g
Mw 50,000 Mn 20,000 d 1.06 n_D²⁰ 1.575 Tg 209° Polydispersity ~2.5 TSCA
High softening point (90°). Soluble in: toluene, chloroform, chlorobenzene.

08794-100 100g

Poly(dimethylsiloxane), methyl terminated [63148-62-9] A2g

n_D²⁰ 1.430 Tg -127° TSCA

[-Si(CH₃)₂O-]_n

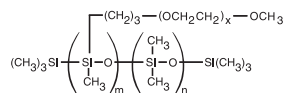
Inert hydrophobic liquids.

MW 3,900 Viscosity = 50 centistokes
MW 5,970 Viscosity = 100 centistokes
MW 17,000 Viscosity = 500 centistokes

09776-250 250g
02274-250 250g
03496-250 250g

Poly(dimethylsiloxane-b-ethylene oxide), methyl terminated [68937-54-2] EH4g

TSCA Surfactant-like diblock copolymers.

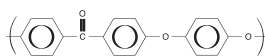


25:75 MW 600
Viscosity = 20 cps mp 0° d 1.007 n_D²⁰ 1.442
20:80 MW 3000
Viscosity = 80-150 cps mp 0° d 1.07 n_D²⁰ 1.454

09780-100 100g
21870-100 100g

Poly ether ether ketone (PEEK) [29658-26-2] A2g
mp 340° Tg 140° d 1.30 TSCA

Granules are dusted with a nominal 0.01% Calcium Stearate as a processing lubricant. High temperature resistant polymer.

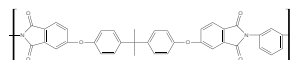


23969-50 50g

Polyetherimide [61128-46-9] A2g

Mw 30,000 Mn = 17,000 d 1.27 Tg 217° TSCA

High softening point (~200°) resin. Soluble in: MDC



16845-100 100g

Poly(ethyl acrylate) [9003-32-1] CH7g

MW ~70,000 n_D²⁰ 1.469 Tg -23° TSCA

[-CH₂CH(CO₂C₂H₅)-]_n

Low Tg acrylic ester polymer.

17342-2 2g

Poly(ethyl acrylate/acrylic acid) [25085-35-2]

TSCA Alkali-soluble or alkali-swellaable acrylic random polymers.

50:50, 20% soln. in ethanol (2g polymer) CH4g

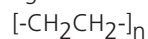
19914-10 10g

50:50, flakes A2g

21056-5 5g

Polyethylene [9002-88-4] A2g

Tg -125° TSCA



Hydrophobic, easily processed or fabricated resin. Soluble in: xylene, tetralin, TCE @ 50-60°.

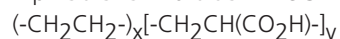
For MW Standards, see page 213.

MW 2,000	density = 0.97	n_D^{20} 1.545	mp 124°	lumps	07652-100	100g

MW 135,000	density = 0.915	n_D^{20} 1.510	mp 140°	20μ powder chromatographic	15184-100	100g
				(reversed phase HPLC) grade	15184-500	500g

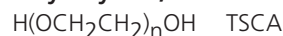
Poly(ethylene/acrylic acid) 92:8 [9010-77-9] A2g

mp 230-315° d 0.932 TSCA



Modified polyethylene resin. Improved adhesion. Can be converted into ionomers. Random copolymer. Soluble in: ternary solvents like perchloroethylene, IPA and toluene.

06517-100 100g

Polyethylene, chlorinated, 25% Cl [64754-90-1] A2g

Useful as primer or coating resin due to good adhesion properties. Randomly chlorinated HDPE.

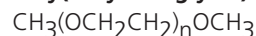
01814-100 100g

Poly(ethylene glycol) (PEG) [25322-68-3] A2g n_D^{20} 1.4563 Tg -41° TSCA

Water-soluble, nonionic, relatively inert, liquids or solids. Confers slip and humectant properties to coatings. See poly(ethylene oxide) for higher molecular weights. The terms poly(ethylene glycol) and poly(ethylene oxide) refer to polymers which are chemically identical. Polymer chains are hydroxyl-terminated at both ends. At all except the lowest molecular weights poly(ethylene glycol) has a broad molecular weight distribution ranging from ~0.5x to 1.5x the values shown. Soluble in: alcohol, acetone, chloroform, toluene, dichloromethane. Molecular Weight (MW) approximates. For MW Standards, see page 213.

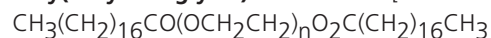
	mp	Viscosity (cps @ 100°C)		
MW 200 viscous liquid		.4-3	01112-250	250g
MW 300 viscous liquid	-15 to -8	.5-8	01110-250	250g
MW 400 viscous liquid	.4-8	.7-3	01109-250	250g
MW 600 viscous liquid	.20-25	.10-5	00684-250	250g
MW 1,000 waxy solid	37-40	.17-4	00682-250	250g
MW 1,450 waxy solid	.43-46	.25-32	00679-250	250g
MW 3,400 waxy solid	.54-58	.75-110	06102-250	250g
MW 7,500 waxy solid	.60-63	.700-900	06103-250	250g
MW 10,000 hard solid			22567-250	250g
MW 20,000 hard solid	.61-64		22568-250	250g
MW 1,540 pharmaceutical grade	.43-46	.25-32	01102-100	100g
MW 3,400 pharmaceutical grade	.54-58	.75-110	00678-100	100g
MW 8,000 pharmaceutical grade	.60-63	.700-900	17243-100	100g

	Catalog #	Size
Poly(ethylene glycol) (200) adipate [68647-16-5] A2g MW 530 TSCA $\text{H}(\text{OCH}_2\text{CH}_2)_n\text{O}_2\text{C}(\text{CH}_2)_4\text{CO}(\text{OCH}_2\text{CH}_2)_n\text{OH}$ Water-soluble, biodegradable, polymer. Reaction product of one molecule of adipic acid and two molecules of PEG 200.	21509-100	100g
Poly(ethylene glycol) MW 2000, α-2-aminoethyl ω-methoxy [80506-64-5] H4g MW 2000, solid Mono amino poly(ethylene glycol) for protein conjugation.	24304-1	1g
Poly(ethylene glycol) bis 2-aminoethyl [24991-53-5] U5g Shelf Life: stable when stored at room temperature. A bifunctional Poly(ethylene glycol) derivative that can be used to conjugate proteins and drug substances for targeted drug delivery studies.		
MW ~1000	24285-1	1g
MW 10,000	24303-1	1g
Poly(ethylene glycol)-bisphenol A diglycidyl ether adduct [37225-26-6] H6g MW 18,500 hard solid TSCA $(\text{CH}_3)_2\text{C}[\text{C}_6\text{H}_4-4-[\text{OCH}_2\text{CH}(\text{OH})\text{CH}_2(\text{OCH}_2\text{CH}_2)_n\text{OH}]]_2$ Polymer contains more hydroxyl groups (4 or more) than poly(ethylene glycol).	04686-250	250g
Poly(ethylene glycol) diacrylate [26570-48-9] HO5d $\text{H}_2\text{C}=\text{CHCO}(\text{OCH}_2\text{CH}_2)_n\text{O}_2\text{CCH}=\text{CH}_2$ Long-chain, hydrophilic, crosslinking monomers. MW = Molecular weight of PEG.		
MW = 200 d 1.122 n_D^{20} 1.464 Viscosity 25 cps @ 25° TSCA 750 ppm MEHQ inhibitor	00669-250	250g
MW = 400 d 1.117 n_D^{20} 1.4655 Viscosity 57 cps @ 25° Tg 3° TSCA 500 ppm MEHQ inhibitor	01871-250	250g
MW = 4,000 mp 56-60° TSCA	15246-1	1g
Poly(ethylene glycol) diglycidyl ether [26403-72-5] H5g Crosslinker for amine-, hydroxyl-, and carboxyl-functional polymers. MW = Molecular weight of PEG.		
MW = 200 WPE ~ 195 TSCA	08209-100	100g
MW = 400 WPE ~ 280 TSCA	08210-100	100g
MW = 600 WPE ~ 400 TSCA	08211-100	100g
MW = 1000 WPE ~ 600 TSCA	24047-100	100g
Poly(ethylene glycol) dimethacrylate [25852-47-5] H5g TSCA $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CO}(\text{OCH}_2\text{CH}_2)_n\text{O}_2\text{CC}(\text{CH}_3)=\text{CH}_2$ Long-chain hydrophilic, crosslinking monomers. MW = Molecular weight of PEG.		
density n_D^{20} Viscosity (cps @ 25°C) Tg Inhibitor ppm MW = 200 1.08 1.460 15 75 HQ ...	00096-100	100g
MW = 400 1.117 1.465 85-21 245 MEHQ .	15179-100	100g
MW = 600 1.101 1.466 67 100 MEHQ .	02364-100	100g
MW = 1000 1.10 1.460 76 (40°) 100 MEHQ .	15178-100	100g

Poly(ethylene glycol) dimethyl ether [24991-55-7] A2g TSCA

Metal complexing and phase-transfer agents. MW = Molecular weight of PEG.

	density	n_D^{20}	Viscosity (cps @ 25°C)	mp	Catalog #	Size
MW = 400	1.089	1.455	3.9		17031-25	25g
MW = 1,000	1.10			36-40°	17032-25	25g
MW = 2,000			63	52-55°	17033-25	25g

Poly(ethylene glycol) distearate [9005-08-7] A2g

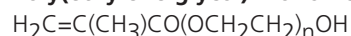
Waxy, water dispersible, solid. Soluble in: IPA, hot water, mineral oil. MW = Molecular weight of PEG.

MW = 200	mp 32-36°	TSCA	02298-100	100g
			02298-500	500g
MW = 400	mp 35-37°	TSCA	01048-100	100g
			01048-500	500g
MW = 6,000	mp 52-57°	TSCA	19234-100	100g

Poly(ethylene glycol) (750)**monocarboxymethylether, monomethyl ether** [67665-18-3] U2g

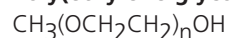
Carboxylic acid-terminated poly(ethylene glycol). Can be coupled to molecules of biomedical interest using carbodiimides.

21483-500 500mg

Poly(ethylene glycol) monomethacrylate [25736-86-1] H5ad

Long-chain hydrophilic macromonomers. Used to introduce hydrophilic sites into polymers, to stabilize emulsion polymers, and to prepare comb polymers. MW = Molecular weight of PEG.

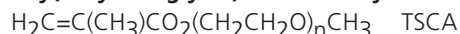
MW = 200	d^{20}_D 1.105	up to 700 ppm MEHQ inhibitor	TSCA	16712-100	100g
MW = 400	d^{20}_D 1.114	800-1000 ppm MEHQ inhibitor	TSCA	16713-100	100g

Poly(ethylene glycol) monomethyl ether [9004-74-4] A2g TSCA

Neutral, water-soluble, polymers with hydroxyl group at one end only.

	density	n_D^{20}	Viscosity (cps @ 100°C)	mp	Catalog #	Size
MW = 350	1.091	1.4555	4.1	-8°	04200-500	500g
MW = 550	1.106	1.455	7.5	20	04457-500	500g
MW = 750	1.082	1.459	10.5	30	00626-500	500g
MW = 1,900	1.102		63	52	04242-500	500g
MW = 5,000	1.106		613	59	05986-500	500g

Poly(ethylene glycol) monomethyl ether monomethacrylate [26915-72-0] HOV7d



Hydrophilic macromonomers used to introduce hydrophilic sites into polymers, to stabilize polymer emulsions, and in synthesis of comb polymers. MW = Molecular weight of PEG.

	n_{D}^{25}	Tg	Catalog #	Size
MW = 200 . . . 100 ppm MEHQ, 300 ppm BHT inhibitor	1.449		16664-100	100g
			16664-500	500g
MW = 400 . . . 100 ppm MEHQ, 200 ppm BHT inhibitor	1.457	-62° . . .	16665-100	100g
			16665-500	500g
MW = 1,000 . . 100 ppm MEHQ, 300 ppm BHT inhibitor	1.46	.40° . . .	16666-100	100g
			16666-500	500g

Poly(ethylene glycol) / Poly(lactic acid) Diblock & Triblock Polymers (PEG/PLA)

Polymer structures featuring polyethylene glycol (PEG), with biodegradable or biocompatible segments offering micellar, nano and microsphere morphologies which are useful for controlled release formulations. Molecular weights of blocks controlled by GPC. Alternative structures can be synthesized.

Historically there have been three basic building block monomers for degradable polymers: lactides, glycolides and caprolactone. All are in clinical use and show varying degrees of degradability based on backbone compositions, crystallinity and molecular weights.

Lactic acid is a "chiral" molecule having both (L) and (D) forms with (L) being the common metabolite. The family of lactic acid polymers includes the pure poly-L- lactic acid (L form of PLA), the pure poly-D-lactic acid and the poly-D,L-lactic acid (DL-PLA). Many other useful compositions occur when the polymer is organized into diblocks with ethylene glycol and/or glycolic acid comonomers or triblocks with ethylene glycol and/or glycolic acid.

Diblock Polymers HU4bg

(Numbers in parentheses refer to Mw of the segment)

PEG(350)-b-PLA(300)	24375-1	1g
PEG(1000)-b-PLA(750)	24378-1	1g
PEG(1000)-b-PLA(5000)	24381-1	1g
PEG(5000)-b-PLA(1000)	24386-1	1g
PEG(5000)-b-PLA(5000)	24389-1	1g

NEW! PEG(5000)-b-PLA(10000) 25018-1 1g

NEW! PEG(10000)-b-PLA(5000) 25017-1 1g

Triblock Polymers HU4bg

(Numbers in parentheses refer to Mw of the segment)

PLA(1000)-b-PEG(1000)-b-PLA(1000)	24500-1	1g
PLA(2000)-b-PEG(1000)-b-PLA(2000)	24501-1	1g
PLA(5000)-b-PEG(1000)-b-PLA(5000)	24502-1	1g
PLA(1000)-b-PEG(4000)-b-PLA(1000)	24503-1	1g
PLA(1000)-b-PEG(10,000)-b-PLA(1000)	24509-1	1g

NEW! PLA(5000)-b-PEG(10,000)-b-PLA(5000) 25026-1 1g

NEW! PLA(10000)-b-PEG(10,000)-b-PLA(10000) 25027-1 1g

Poly(ethylene glycol) monomethyl ether,**mono(succinimidyl succinate) ester** [78274-32-5] *U2g*

(SS-PEG) Reactive poly(ethylene glycol). Used to attach PEG chains to organic molecules, especially those of biomedical interest. MW = Molecular weight of PEG.

MW = 1900 21482-500 500mg

MW = 5000 18000-500 500mg

Poly(ethylene glycol) (200) mono-stearate [9004-99-3] *A3g*

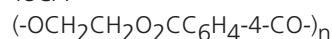
TSCA

Poly(ethylene glycol) having a hydrophobic chain end used as nonionic surfactant.

03142-100 100g

Poly(ethylene glycol terephthalate) [25038-59-9] *H2g*

TSCA



Polymer widely used in films, fibers, and drink bottles. Low gas permeability.

04301-250 250g

Poly(ethylene/maleic anhydride) 1:1 (molar) [9006-26-2] *H3g*

MW 400,000 Viscosity of 2% 5cps TSCA

Reactive with alcohols, amines. Hydrolyzes in water to a water-soluble anionic polymer.

02308-50 50g

Poly(ethylene oxide) (PEO) [25322-68-3] *H2g*TSCA $(-CH_2CH_2O-)_n$

Hard, waxy water-soluble polymer. Used to impart viscosity to and modify flow of aqueous solutions. See poly(ethylene glycol) for lower molecular weight analogs. Poly(ethylene oxide) has a broad molecular weight distribution ranging from ~0.5x to 1.5x the values shown. Soluble in: acetone, alcohol, chloroform, toluene, dichloromethane.

MW 100,000 Contains 0.01% BHT, SiO₂ 1.5% max, alkaline earth oxide as CaO 0.5%, mp 66-75°, n_D^{20} 1.510 - 1.540 06104-500 500g

MW 200,000 Viscosity of 5% AQ = 65-115 cps 17503-500 500g

MW 300,000 Viscosity of 5% AQ = 600-1200 cps 06105-500 500g

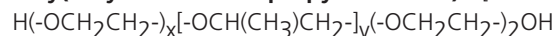
MW 600,000 Viscosity of 5% AQ = 4500-6800 cps 06106-500 500g

MW 1,000,000 Viscosity of 2% AQ = 400-800 cps 21295-500 500g

MW 4,000,000 Viscosity of 1% AQ = 1650-5500 cps 04030-500 500g

MW 5,000,000 Viscosity of 1% AQ = 5500-7500 cps 04031-500 500g

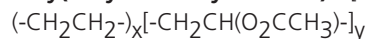
MW 8,000,000 Viscosity of 1% AQ = 10,000-15,000 cps 21296-500 500g

Poly(ethylene oxide-b-propylene oxide) [9003-11-6] *H4g* TSCA

Water-soluble or water-dispersible polymers with surfactant properties. Chains are hydroxyl terminated. Polymers are p(EO/PO/EO) triblocks.

				Viscosity (cps @ 100°C)	mp		
	density	n_D^{20}					
Ratio 0.15:1, liquid		MW 1,100	..1.02	..1.4515	165		16273-100 100g
Ratio 0.33:1, liquid		MW 3,400	..1.03	..1.4547	700		16274-100 100g
Ratio 0.8:1, liquid		MW 2,900	..1.05	..1.4575	550		16275-100 100g
Ratio 3:1, waxy solid	..	MW 13,300	..1.02		..3100	56°	16276-100 100g
Ratio 5:1, waxy solid	..	MW 8,750	..1.06		..1000	52°	16277-100 100g

Poly(ethylene/vinyl acetate) [24937-78-8] A2g TSCA

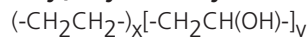


Used as a hot-melt adhesive, wax additive, and precursor to poly(ethylene/vinyl alcohol) resins.

Soluble in: toluene, xylene, TCE, THF, MEK, n-butanol.

60:40 (wt) d 0.965 . . . Antioxidant 540 ppm BHT mp 104°	06107-500	500g
72:28 (wt) d 0.95 . . . ~500 ppm BHT mp 127°	06108-500	500g

Poly(ethylene/vinyl alcohol) [25067-34-9] A2g TSCA

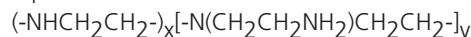


Polymer containing both hydrophilic and hydrophobic segments. Could be used to prepare other ethylene copolymers. Used in packaging films.

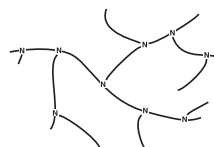
85:15 (wt)	18099-25	25g
74:26 (wt)	18100-25	25g
44:56 (wt) d 1.14 Tg 61° mp 164° Soluble in: DMF, DMSO, n-propanol	17402-25	25g
32:68 (wt) d 1.19 Tg 69° mp 181° Soluble in: DMF, DMSO, n-propanol	17403-25	25g

Polyethylenimine, branched [9002-98-6] UH4g

mp 70-79° TSCA



Highly branched polyamine with high charge density. Liquid polymers. Soluble in water at all molecular weights, also soluble in lower alcohols, glycols, and THF. Polymers contain primary, secondary, and tertiary amine groups in approximately 25/50/25 ratio. See *poly (2-ethyl-2-oxazoline)* for precursors to linear polyethylenimine.



	polydispersity	Viscosity (cps)		
MW 600 99% UH4g	1.08	500-2500	02371-100	100g
			02371-500	500g
MW 1,200 99% UH4g	1.08	3500-7500	06088-100	100g
			06088-500	500g
MW 1,800 99% UH4g	1.14	8500-15,000	06089-100	100g
			06089-500	500g
MW 10,000 99% UH4g		>10,000	19850-100	100g
			19850-500	500g
MW 10,000 30% soln. in water H4gm		100-200	17938-100	100g
MW 70,000 30% soln. in water H4gm	17±5.2	400-900	00618-100	100g
			00618-500	500g
MW 50,000-100,000 30% soln. in water H4gm		900-1500	06090-100	100g
			06090-500	500g

Polyethylenimine, branched, benzylated, on SiO₂ AK2g

40-200 mesh. Hydrophobic polyethylenimine derivative. Can be used as ion exchange resin.

Catalog # Size

06107-500 500g
06108-500 500g

18099-25 25g
18100-25 25g
17402-25 25g
17403-25 25g

02371-100 100g
02371-500 500g

06088-100 100g
06088-500 500g

06089-100 100g
06089-500 500g

19850-100 100g
19850-500 500g

17938-100 100g

00618-100 100g
00618-500 500g

06090-100 100g
06090-500 500g

17208-10 10ml

Polyethylenimine, branched,

permethylated, permethobromide, 10% soln.in water [28728-59-8] *U4g*

(1g polymer) MW ~6300 (prepared from PEI MW 1800)

Highly branched, high charge density, quaternary ammonium polymer.

Polyethylenimine, linear [9002-98-6] *UH4g*

MW 25,000 TSCA

All-secondary amine polymer, unlike branched polyethylenimines which contain primary, secondary and tertiary amino groups and are liquids at all molecular weights. Soluble in hot water, cold water at low pH, methanol, ethanol, and chloroform. Insoluble in benzene, ethyl ether, acetone, and cold water.

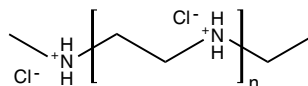


Contains up to 7-8% of poly(2-ethyl-2-oxazoline).

MW 2,500	24313-2	2g
MW 25,000	23966-2	2g
MW 250,000	24314-2	2g

Polyethylenimine "Max" High Potency Linear PEI [9002-98-6] *H6g*

A nearly fully hydrolyzed linear polyethylenimine with longer contiguous ethyleneimine segments. Although N-deacylation reactions are notoriously difficult, our new linear polyethylenimine material is believed to contain more than 11% additional free (protonatable) nitrogens than our linear polyethylenimine material. Easy to handle hydrochloride salt form. Insoluble in: common organic solvents (ethanol, acetone, tetrahydrofuran) Soluble in: cold and room temperature water.



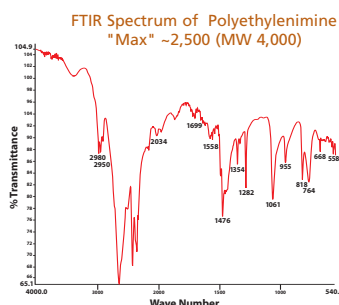
NEW! MW 4,000 (nominal) TSCA

Molecular Weight: ~2,500 Mw in free base form. Nominal 4,000 Mw in hydrochloride salt form. Comparable to Cat. #24313 - Polyethylenimine, Linear, Mw 2,500 which is not in the hydrochloride salt form.

Elemental Analysis (Mw 4,000)

	%C	%H	%N	%Cl	Total
Theoretical*	28.6	7.8	16.7	42.2	95.30
Found	28.99	7.47	16.52	42.06	95.042

*based on 5.4% H₂O content

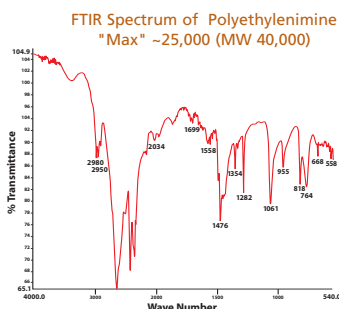


MW 40,000 (nominal) TSCA

Molecular Weight: 25,000 Mw in free base form. Nominal 40,000 Mw in hydrochloride salt form. Comparable to Cat. #23966 - Polyethylenimine, Linear, Mw 25,000, which is not in the hydrochloride salt form.

Elemental Analysis (Mw 40,000)

	%C	%N	%Cl
Theoretical	30.20	17.62	44.57
Found	29.92	17.35	44.25



24885-2 2g

24765-2 2g

Poly(3,4-ethylenedioxythiophene)/

poly(styrenesulfonate), aqueous dispersion (PEDT/PSS) [155090-83-8] *U5g*
Surface resistivity 730 KOhm/sq. Solid content 1.24%, sodium 280 ppm. Conductive polymer.

Poly(2-ethyl-2-oxazoline) [25805-17-8] *A2g*

d 1.14 n_D^{20} 1.520 T_g 70° TSCA

$[-N(COC_2H_5)CH_2CH_2-]_n$

Neutral, water soluble, polymer. Also soluble in DMF, lower alcohols, methyl ethyl ketone and methylene chloride. Can be hydrolyzed to linear polyethylenimine.

MW 5000 Viscosity of 100% @ 30° = 2.1 centistokes

MW 50,000 Polydispersity 1.9 . . .Viscosity of 10% AQ @ 30° = 6.2 centistokes . . .

MW 200,000Polydispersity ~3.4 Viscosity of 10% AQ @ 30° = 18-24 centistokes .

MW 500,000Polydispersity ~3.4 Viscosity of 10% AQ @ 30° = 72.3 centistokes . .

Polyformaldehyde — See *Polyacetal resin*, page 177.

Poly(furfuryl alcohol) [25212-86-6] *H6g*

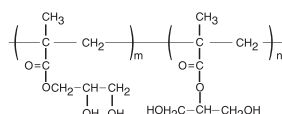
d^{25} 1.36 Viscosity 14,500±2500 cps TSCA

Dark, viscous, fluid with double bonds in the polymer backbone. Soluble in: acetone, alcohol, esters, toluene.

Poly(1-glycerol methacrylate) [28474-30-8] *U5g*

TSCA

Hydrophilic, water swellable, polymer. Probably cross-linked.



Poly(glycidyl methacrylate), 10% solution in MEK [25067-05-4] *CH5g*

(0.5g polymer) MW ~25,000 T_g 46° TSCA

Reacts with carboxyl, hydroxyl, and amine groups and can be used to immobilize biomolecules.

Poly(glycolic acid) (polyglycolide) [26124-68-5] [26202-08-4] *AK2bg*

MW >100,000 T_g 36° i.v. 1.0-2.0

$H(OCH_2CO)_nOH$

Biodegradable polymer. Decomposes in 6 months at 37° at pH 9.0.

Soluble in: HFIP, HFA-sesquihydrate.

Poly(glycolide-L-lactide) — See *Poly(L-lactide/glycolide)*, page 194.

Poly(hexamethylenedipamide) (Nylon 6/6) [32131-17-2] *A2g*

mp 265-70° d 1.22-1.25 n_D^{20} 1.530 T_g 45° TSCA

$[-NH(CH_2)_6NHCO(CH_2)_4CO-]_n$

Polymer used in fibers. Soluble in: cresols, formic acid, sulfuric acid.

Poly(hexyl isocyanate) [26746-07-6] *U2g*

MW ~80,000 i.v. ~1 Liquid crystal polymer.

Catalog # Size

24215-100 100g

24066-50 50g

17808-100 100g

24882-100 100g

17810-100 100g

15794-100 100g

16855-10 10g

06524-5 5g

06525-5 5g

06525-25 25g

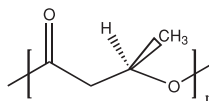
06557-500 500g

19249-1 1g

Poly(4-hydroxybenzoic acid) [26099-71-8] *HU4g*
 MW 12,000-16,000 mp >320° Size: 40-60µm
 High-melting polymer, insoluble in organic solvents. Soluble in: hot sulfuric acid, hot sodium hydroxide.

Poly((-)-3-hydroxybutyric acid) [26063-00-3] *A2g*
 MW ~500,000 mp 168-176° Tg 15°
 $[-COCH_2CH(CH_3)O-]_n$
 Biodegradable polymer. Soluble in: chloroform, MDC, benzene, ethylene carbonate.

Poly((R)3-hydroxybutyrate) [26063-00-3] *A2g*
 $[-COCH_2CH(CH_3)O-]_n$
 Biodegradable polymer. White or faintly beige powder.
 Soluble in: chloroform, MDC, benzene, ethylene carbonate.



MW ~500	16930-1	1g
MW ~1000	16932-1	1g
MW ~2000	16934-1	1g
MW ~3000	16936-1	1g
MW ~5000	16938-1	1g
MW ~10,000	16940-1	1g

Poly(2-hydroxyethyl methacrylate) [25249-16-5]
 MW ~200,000 n_D^{20} 1.512 Tg 55° $[CH_2C(CH_3)(CO_2CH_2CH_2OH)-]_n$
 Polymer is water-insoluble but water-swallowable. Used as a hydrogel. Soluble in: 95% lower alcohols (5% water), DMF. See *2-hydroxyethyl methacrylate*, page 146.

Powder <i>A2g</i>	09689-25	25g
12% soln. in ethanol MW ~200,000 <i>CH5g</i>	18894-100	100ml

Poly(2-hydroxyethyl methacrylate/methacrylic acid) 90:10 [31693-08-0] *A2g*
 TSCA
 Hydrophilic polymer, more readily water-soluble than poly(2-hydroxyethyl methacrylate), in the presence of alkali, aqueous 90% methanol.

Poly(2-hydroxypropyl methacrylate) [25703-79-1] *A2g*
 Tg 76° TSCA
 $(-CH_2C(CH_3)[CO_2CH_2CH(OH)CH_3]-)_n$
 Hydrophilic polymer. Soluble in: lower alcohols.

Poly(4-hydroxystyrene) — See *Poly(4-vinylphenol)*, page 202.

Poly(4-iodostyrene/styrene/divinylbenzene) ~58:40:2 [72330-89-3] *U4g*
 Iodine 22%. Cross-linked reactive styrene polymer easily converted into other derivatives via the iodine atom.

Polyisobutylene [9003-27-4] *A2g*
 n_D^{20} 1.505-1.510 Tg -73° TSCA
 $[-CH_2C(CH_3)_2-]_n$
 Generally inert, tacky, polymers. Primarily used as tackifying agent in polymer formulations.

MW 500 liquid	Viscosity 210-227 cps @ 38°	09894-100	100g
MW 1,350 viscous liquid	Viscosity 30,000 cps @ 38°	09896-100	100g

Poly(l-alanine) [25191-17-7] A2g
MW 3,000 - 4,000
Low molecular weight polypeptide useful for controlled release of bioactive substances.
Soluble in: water, methanol, alkaline water.

Poly(l-lysine hydrobromide) [25988-63-0] U5d
Cationic polymer. Used for promotion of cell adhesion to solid surfaces.
Journal of Cell Biology, Mazia, Schatten & Sale, 66 (1975) page 198.

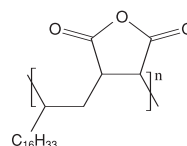
MW 40,000-60,000 Powder
MW 60,000-120,000 0.1% soln. in water

MW 100,000-140,000 Powder

Poly(maleic acid), 50% soln. in water (5g polymer) [26099-09-2] H5g
MW 800-1200 d 0.97 TSCA Polyacid, water-soluble.

Poly(maleic anhydride) [24937-72-2] U5g
MW ~5000 TSCA Polymer reacts with amines, alcohols.

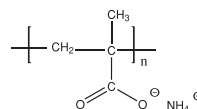
Poly(maleic anhydride/1-octadecene) 1:1 (molar) [25266-02-8] A2g
MW 30,000-50,000 d 0.97 TSCA
Alkali-soluble hydrophobic resin. Reacts with amines, alcohols.



Polymethacrylamide [25014-12-4] A2g
Hydrophilic, water-soluble polyamide. Also soluble in methanol, ethylene glycol and acetone.

Poly(methacrylic acid) [25087-26-7] HU7g
MW ~100,000 Tg 228° TSCA
Water-soluble polymer. Soluble in: water, methanol, alkaline water.

Poly(methacrylic acid) ammonium salt, 30% soln. in water [25086-15-1] H7g
(7.5g polymer) MW 15,000
Viscosity as is 75-200 cps (pH 8.0-9.5) TSCA
Low molecular weight, water-soluble polymer. Forms insoluble polysalts with polyamines. Used as a pigment dispersant.



Poly(methacrylic acid) sodium salt, 30% soln. in water [25086-62-8] H7g
MW 15,000 Viscosity 200 cps pH 10 TSCA
Low molecular weight, water-soluble polymer. Forms insoluble polysalts with polyamines.
Used as a pigment dispersant. *For MW Standards, see page 213.*

7.5g polymer for 25g size
30g polymer for 100g size

Poly(2-methacryloxyethyltrimethylammonium bromide), 20% soln. in water
[68912-04-9] H2g TSCA
Cationic (quaternary ammonium), water-soluble polymer.

MW 50,000 (2g polymer)
MW 200,000 (2g polymer)

Catalog #	Size
17028-100	100mg
18619-50	50mg
09730-25	25ml
09730-250	250ml
21430-100	100mg
09732-10	10g
02348-5	5g
05152-100	100g
16144-10	10g
00578-10	10g
00578-50	50g
21169-25	25g
21170-25	25g
21170-100	100g
21479-10	10g
21746-10	10g

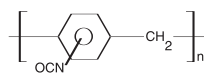
Poly(methacrylonitrile) [25067-61-2] *H3g*
 n_D^{20} 1.52 T_g 120° TSCA

This polymer can be used in production of scratch resistant coatings, fillers, electrical conductive laminates, molding compositions, medical products containing hemolysis inhibitor and lithium batteries. Other applications for this product are as an absorbant for protein separation and a corrosion inhibitor for steel. Soluble in: DMF, nitromethane, pyridine.

Poly(methacryloyl chloride), 25% soln. in dioxane [26937-45-1] *CHM7g*
 (2.5g polymer) Polymer reacts readily with alcohols and amines. Can be used to prepare polymers bearing bioactive molecules.

Poly[methylene(polyphenyl) isocyanate] [9016-87-9] *H5g*
 MW ~360 d 1.24 NCO content ~30% TSCA

$[-C_6H_3(NCO)CH_2-]_n$
 Low molecular weight polyisocyanate, reacts with glycols, polyamines to form gels. Soluble in: acetone, THF, toluene.



Poly(methyl methacrylate) [9011-14-7] *A2g*

d 1.20 n_D^{20} 1.49 T_g 105° TSCA

$[-CH_2C(CH_3)(CO_2CH_3)-]_n$

Hard, stable, non-yellowing polymer used in coating and in molded clear plastic objects.

Soluble in: acetone, toluene, chloroform, MEK, THF. *For MW Standards, see page 213.*

i.v. 0.18 .. MW 25,000 atactic beads, 200 μ m Polydispersity ~3.0

i.v. 0.40 .. MW 75,000 atactic beads, 200 μ m Polydispersity ~2.8

MW 100,000 atactic pellets

i.v. 1.25 .. MW 350,000 atactic beads, 200 μ m Polydispersity 2.7

Catalog # Size

04314-10 10g

04315-10 10g

03099-100 100g

04554-500 500g

04553-500 500g

17913-500 500g

04552-500 500g

NEW! Poly(methyl methacrylate/methacrylic

acid 5 aminofluoresceinamine) [~ 90:9:1% wgt] *A2g*

MW ~100,000 [~90:9:1% wgt] Fluorescent label: 1% weight TSCA

$[-CH_2C(CH_3)(CO_2CH_3)-]_x[-CH_2C(CH_3)(CO_2H)-]_y$

Fluorescent Polymer. Random copolymer. Used in positive electron beam photoresists.

Soluble in: ethyl cellosolve acetate, 9:1 IPA-water.

24911-1 1g

Poly(methyl methacrylate/n-butyl methacrylate) [26284-14-0] *A2g*

MW ~25,000 T_g 50° TSCA Used in coatings.

01922-500 500g

Poly(methyl methacrylate/methacrylic acid) [25086-15-1] *A2g* TSCA

$[-CH_2C(CH_3)(CO_2CH_3)-]_x[-CH_2C(CH_3)(CO_2H)-]_y$

Random copolymer. Used in positive electron beam photoresists. Soluble in: ethyl cellosolve

acetate, 9:1 IPA-water.

75:25 MW ~1.2 million

80:20

90:10 MW ~100,000

95:5 MW ~500,000 Dispersity ~4

08208-100 100g

08221-100 100g

08207-50 50g

19629-100 100g

Poly(alpha-methylstyrene) [25014-31-7] *H4g*

MW 5000 T_m 210° T_g 168° TSCA

$[-CH_2C(CH_3)(C_6H_5)-]_n$

Oligomers with well defined melting points. *For MW Standards, see page 213.*

07630-500 500g

NEW! Poly(alpha-methylstyrene) [25014-7] A2g
MW ~850,000 Mw/Mn ~ 1.08
Solvent-soluble (aromatic hydrocarbons, chlorinated hydrocarbons, tetrahydrofuran, esters).

Poly(4-methylstyrene/styrene) 90:10 [24936-42-3] A2g

Poly(3-methylthiophene) [84928-92-7] H2g
MW ~500,000 Conductivity 42 S/cm
Conductive polymer. Potentially convertible into other polythiophene derivatives.
Soluble in: chloroform.

Poly(N-methylvinylamine) [31245-56-4] U2g
MW ~500,000 Water-soluble all-secondary polyamine.

Poly(octadecyl methacrylate), 30% soln. in toluene [25639-21-8] CH6g
(40g polymer) Tg -100° TSCA
 $(-\text{CH}_2\text{C}(\text{CH}_3)(\text{CO}_2(\text{CH}_2)_{17}\text{CH}_3)-)_n$
Long-chain alkyl methacrylate soluble in hydrocarbons.

Poly(3-octylthiophene) [104934-51-2] U7g
Mw ~100,000 Mn ~15,000 Conductivity 20-30 S/cm
Conductive polymer. Soluble in: Chloroform, MDC, THF

Poly(oxyethylene)sorbitan monolaurate (Tween® 20) [9005-64-5] A2g
MW 1,227.5 d 1.095 n_D^{20} 1.468 TSCA
Water-soluble surfactant.

Poly(N-iso-propylacrylamide) [25189-55-3] A2g
MW ~40,000 (viscosity) mp >200° Tg 85° TSCA
Polymer is water-soluble at room temperature, insoluble above ~40°. Solubility ceiling has been used in mold and cell growth techniques since cells adhere to polymer film at incubation temperatures and are released as medium is cooled and polymer is dissolved. Soluble in: THF, dioxane, DMF, cold water, chloroform.

Polypropylene A2g TSCA
 $[-\text{CH}_2\text{CH}(\text{CH}_3)-]_n$
Widely used polyolefin. Soluble in: chlorinated hydrocarbons, aromatic hydrocarbons, isoamyl acetate. For MW Standards, see page 213.

Chromatographic grade [9003-07-0] 25-85µm mp 165° Tg -13°
Chromatographic grade [9003-07-0] 150µm
Atactic n_D^{20} 1.474 Tg -13°
Isotactic [25085-53-4] Mw 220,000/Mn 40,000 flakes mp 176-186° Tg -8°

Poly(propylene glycol) [25322-69-4] A2g
 n_D^{20} 1.450 Tg -75° TSCA
 $\text{H}[\text{OCH}(\text{CH}_3)\text{CH}_2]_n\text{OH}$
More hydrophobic than poly(ethylene glycol). Polymer is water-insoluble but is water dispersible. Polymer is also called poly(propylene oxide). Soluble in: acetone, toluene, chloroform, dioxane, THF.

MW 400 d 1.007 Hydroxyl number 263mg KOH/g polymer
MW 4,000 d 1.005 Hydroxyl number 28mg KOH/g polymer

Catalog #	Size
24867-250	250g
19831-10	10g
21826-1	1g
24038-5	5g
04321-100	100g
22052-1	1g
06110-100	100g
21458-10	10g
04342-100	100g
06068-100	100g
23968-100	100g
06536-100	100g
04784-250	250g
04788-250	250g

	Catalog #	Size
Poly(propylene glycol) (600) diglycidyl ether [26142-30-3] <i>H4d</i> TSCA WPE ~ 530 Viscosity 60-180 cps Crosslinker for amine-, hydroxyl-, and carboxyl-functional polymers.	24046-100	100g
Poly(propylene glycol) (400) dimethacrylate [25852-49-7] <i>HO7d</i> MW 660 d 1.01 n_D^{20} 1.452 TSCA $H_2C=C(CH_3)CO(OC_3H_7)_2CC(CH_3)=CH_2$ Water-insoluble crosslinking monomer.	04380-250	250g
Poly(propylene glycol) (300) monomethacrylate [39420-45-6] <i>HO3g</i> MW ~370 d 1.01 n_D^{20} 1.449 $H_2C=C(CH_3)CO[OCH_2CH(CH_3)]_nOH$ Long-chain monomer. Somewhat more hydrophobic than poly(ethylene glycol) analog. Can be used to prepare comb polymers.	15934-250	250g
Poly(propylene oxide), cyclocarbonate terminated [25511-85-7] <i>A2g</i> TSCA $[-CH(CH_3)CH_2OCO_2-]_n$ Reactive polymer, useful as crosslinker. Cyclocarbonate moiety was prepared from glycidyl ether.	21858-100	100g
Poly(iso-propyl methacrylate) [26655-94-7] <i>A2g</i> n_D^{20} 1.473 Tg 79° $(-CH_2C(CH_3)[CO_2CH(CH_3)_2])_n$	07052-10	10g
Polypyrrole [30604-81-0] <i>A2g</i> Conductive polymer. Not soluble in any organic solvents or water. Conductivity 12 S/cm.	21304-5	5g
Polystyrene [9003-53-6] <i>A2g</i> mp 240° d 1.05 n_D^{20} 1.590 TSCA $[-CH_2CH(C_6H_5)-]_n$ Widely used high Tg polymers. Soluble in: toluene, MEK, THF, dioxane, xylene. For MW Standards and Kits, see pages 213.		
MW 800-5,000 atactic flakes, softening point 125°	23637-100	100g
MW 50,000 atactic flakes, bimodal with MW ~50,000 & 1500 (50:50) .	18544-100	100g
MW 125,000-250,000 . . atactic pellets	00574-100	100g
Polystyrene, brominated [88497-56-7] <i>H2g</i> powder d 2.1 Tg 130-140° Bromine 66% TSCA Polystyrene with reduced flammability.	21305-100	100g
Poly(styrene/acrylonitrile) 75:25 [9003-54-7] <i>A2g</i> d 1.08 n_D^{20} 1.570 TSCA $[-CH_2CH(C_6H_5)-]_x[-CH_2CH(CN)-]_y$ High Tg polymer used as molding compound.	07053-500	500g
Poly(styrene/butadiene) 85:15 [9003-55-8] <i>A2g</i> MW~110,000 d 1.05 mp 49° TSCA $[-CH_2CH(C_6H_5)-]_x[-CH_2CH=CHCH_2-]_y$ Rubber modifier, random copolymer. Soluble in: aromatic and chlorinated hydrocarbons, ketones.	07073-500	500g

Poly(styrene/divinyl benzene) [9003-70-7] A2g

Beads for preparation of crosslinked poly(chloromethylstyrene) Merrifield resins and other functionalized beads.

92:8 200-400 mesh TSCA	04022-100	100g
98:2 200-400 mesh TSCA	16724-100	100g

Poly(styrene/maleic anhydride) [9011-13-6] U2g

n_D^{25} 1.564 TSCA

Alternating copolymer. Reactive polymeric anhydride. Reacts with alcohols, amines.

67:33 (molar) MW 7,500	03497-500	500g
75:25 (molar) MW 9,500	03498-500	500g

Poly(styrene/methyl methacrylate) 70:30 [25657-58-3] A2g

MW 270,000 n_D^{25} 1.560 Tg 102° Polydispersity ~5

Random copolymer. High Tg polymer.

15783-250 250g

Poly(styrenesulfonic acid), 30% soln. in water [28210-41-5] B6g

(75g polymer) MW 70,000 d 1.10 Viscosity ~200 cps TSCA

Water-soluble ionic polymer in acid form. Soluble in: lower alcohols, glycols.

08770-250 250g

Poly(styrenesulfonic acid), sodium salt [25704-18-1] U7g

TSCA $[-CH_2CH(C_6H_4SO_3Na)-]_n$

Water-soluble ionic polymer in salt form. For MW Standards, see page 213.

MW 75,000 Polydispersity 3-5 Viscosity in 20% AQ 15-55 cps	08772-25	25g
MW 1,000,000 Polydispersity 3-30	08773-25	25g

Poly(styrenesulfonic acid/maleic acid), sodium salt [73282-68-5] HK4g

Low MW. Water-soluble polymer. Has been used as a pigment dispersant.

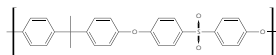
1:1 (molar) Mw 15,000 25% soln. in water (6.25g polymer)	11795-25	25g
3:1 (molar) Mw 20,000 Viscosity in 30% AQ 30 cps	18407-25	25g

Polysulfone [25154-01-2] A2g

MW 30,000 n_D^{25} 1.633 Tg 176° TSCA

High melting polymer used in preparation of filters for biological materials. Cell and protein adhesion is very low.

Soluble in: DMF, THF, ketones, toluene, chloroform.



07074-500 500g

Polysulfone, dihydroxy terminated [25135-51-3] U7gk

Can be modified via hydroxyl groups, converted into graft copolymers.

21186-5 5g

Poly(tetrafluoroethylene) [9002-84-0] H3g

d 2.28 n_D^{25} 1.350-1.380 Tg -113° TSCA

$(-CF_2CF_2-)_n$

Inert polymer. Soluble in: perfluoro kerosene.

0.05-0.5µm (Teflon® 30B) . . . 60% nonionic disp. in H ₂ O . . . Viscosity ~20 cps	21539-100	100g
35µm (Teflon® 7A) powder	08816-100	100g
500µm (Teflon® 6) powder	01344-100	100g

Poly(tetramethylene ether glycol) (Polytetrahydrofuran) [25190-06-1] AK2g
 d 0.97 T_g -84° TSCA
 $H(OCH_2CH_2CH_2CH_2)_nOH$
 More hydrophobic polyether than poly(ethylene glycol). Hydroxyl groups at chain ends.
 Soluble in: alcohol, slightly in water.

MW 650	Hydroxyl No. = 170	mp 15°	n_D^{20} 1.462
MW 1,000	Hydroxyl No. = 112	mp 19°	
MW 2,900	Hydroxyl No. = 38	mp 35-37°	n_D^{20} 1.464

Poly(tetrafluoroethylene propylene) A2g
 Poly(tetrafluoroethylene propylene) (PTFE) Copolymer.

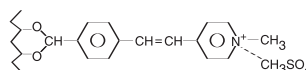
Poly(vinyl acetate) [9003-20-7] A2g
 MW 90,000 d 1.18 n_D^{20} 1.462 T_g 32° TSCA
 $[-CH_2CH(O_2(CH_3))-]_n$
 Water sensitive resin, readily hydrolyzed. Used to prepare poly(vinyl alcohol) of varying degrees of hydrolysis. Soluble in: toluene, acetone, chloroform, alcohol, THF.

Poly(vinyl acetate), 40% hydrolyzed [25213-24-5] A2g
 MW 72,000 TSCA
 Hydrophilic polymer, highly swollen in water.

Poly(vinyl alcohol) [9002-89-5] A2g
 $mp >220^\circ$ d 1.29 T_g 85° TSCA
 Water-soluble resins of low toxicity. Resins with high % hydrolysis require heating at ~96°C in water for solution. Resins of lower % hydrolysis can be dissolved at progressively lower temperatures with 88% hydrolyzed resin requiring only 85°C for solution. Soluble in: hot glycerol, hot glycols, hot water.

	Polydispersity	Viscosity of 4% AQ (cps)
MW ~ 6,000 80 mol% hydrolyzed	~1.7	2.5-3.5
MW ~ 25,000 88 mol% hydrolyzed	~1.9	5.2-6.2
MW ~ 25,000 98 mol% hydrolyzed	~2.0	5.5-6.0
MW ~ 78,000 88 mol% hydrolyzed	~1.9	23.0-27.0
MW ~ 78,000 98 mol% hydrolyzed	~1.7	28.5-32.5
MW ~ 78,000 99.7 mol% hydrolyzed	~1.7	28.0-32.0
MW ~ 108,000 99.7 mol% hydrolyzed	~1.7	62.0-72.0
MW ~ 125,000 88 mol% hydrolyzed	~2.0	45.0-55.0
MW ~ 133,000 99 mol% hydrolyzed	~2.4	62.0-72.0

**Poly(vinyl alcohol), N-methyl-4 (4'-formylstyryl)
 pyridinium methosulfate acetal, 13.3% soln. in water** [107845-59-0] U5acd
 (10g polymer) (SbQ-PVA) MW ~45,000 4.1 mol SbQ
 Water-soluble, photocrosslinkable, polymer. Used in making
 silkscreen print screens.



Poly(vinylamine) hydrochloride [26336-38-9] U4g
 MW 25,000 TSCA Water-soluble all-primary polyamine.

Catalog #	Size
07784-500	500g
07785-500	500g
17746-500	500g
04615-50	50g
04615-250	250g
06069-500	500g
17561-25	25g
22225-500	500g
02975-500	500g
04397-500	500g
15132-500	500g
15130-500	500g
15129-500	500g
04324-500	500g
04398-500	500g
02815-500	500g
22570-75	75g
23965-1	1g
23965-5	5g

Poly(vinyl butyral) [63148-65-2] A2g n_D^{20} 1.480-1.490 Tg 50° TSCA

Tough, solvent-soluble, resin. Broad MW distribution. Contains ~20% vinyl alcohol and ~2% vinyl acetate, the rest butyral. Soluble in: acetone, alcohols, THF, MEK.

MW 70,000-100,000 24617-50 50g
 MW 100,000-150,000 d 1.100 06100-50 50g

Poly(N-vinylcarbazole) [25067-59-8] A2gMW ~40,000 mp >320° n_D^{20} 1.683 Tg 200° TSCA

Photoconductive polymer, especially in the form of complexes. Soluble in: toluene, chloroform, THF, Dioxane. Technical Data sheet #263

02428-50 50g

Poly(vinyl chloride) [9002-86-2] A2gMW 110,000 d 1.39 n_D^{20} 1.540-1.550 Tg 81° <75µm Polydispersity ~2 TSCA[-CH₂CH(Cl)-]_n

Widely used industrial resin with good resistance to water, other environmental factors.

09708-250 250g

Poly(vinyl chloride/vinyl acetate/maleic acid) 86:13:1 [25085-82-9] A2g

d 1.350 Tg 74° i.v. 0.50 TSCA

Poly(vinyl chloride) with improved adhesion to substrates.

18356-500 500g

Poly(vinyl cinnamate) [9050-06-0] A2g

TSCA

[-CH₂CH(O₂CCH=CHC₆H₅)-]_n

Photocrosslinkable polymer. Soluble in: THF, NMP.

02648-10 10g

Poly(vinylferrocene) [34801-99-5] U5g

MW ~50,000 Tg 184-194°

Polymer containing organometallic units. Soluble in: CS₂, THF, MDC, chloroform, benzene, chlorobenzene.

09746-1 1g

Poly(vinyl formal)* [9003-33-2] H3gMW 24,000-40,000 n_D^{20} 1.500 Tg 108° TSCA

Polymer contains cyclic acetal units, some residual hydroxyl groups. Soluble in: acetic acid, dioxane, THF, chloroform.

Powder Hydroxyl content 5.0-6.5%; acetate 9.5-13.0 Formal 82% 00631-100 100g
 0.5% soln. in ethylene dichloride (0.5g polymer) 04672-100 100g

Poly(vinylidene chloride/acrylonitrile) 80:20 [9010-76-8] A2g

MW 150,000 d 1.600 Tg 50° Viscosity 2% DMF 2.2 cps TSCA

(-CH₂CCl₂-)_x[-CH₂CH(CN)-]_y

Polymer with barrier properties as coatings or films. Soluble in: DMF, THF.

09747-100 100g

Poly(vinylidene fluoride) [24937-79-9] A2gd 1.76 n_D^{25} 1.420 Tg -40° Polydispersity 2.5-3.0 (-CH₂CF₂-)_n TSCA

Inert coating resin. Soluble in: DMF, DMAc, DMSO, ethylene carbonate.

mp 165-172° melt viscosity 5-12K poise (ASTM D-3835) 15190-100 100g
 mp 165-172° melt viscosity 15-23 K poise 15191-100 100g
 mp 160° melt viscosity 26 K poise 06094-100 100g
 mp 155-160° melt viscosity 28-34 K poise 18734-100 100g

*Poison pack charge required.

	Catalog #	Size
Poly(vinyl methyl ether), 50% soln. in water [9003-09-2] <i>H6gm</i> MW ~30,000 d 1.030 n_D^{20} 1.467 T_g -34° $[-CH_2CH(OCH_3)-]_n$ Tacky resin. Water-insoluble above 28°. Used to prepare heat-sensitive latex. Soluble in: aromatic and chlorinated hydrocarbons, alcohols, esters, glycols.	03032-500	500g
Poly(vinyl methyl ketone) [25038-87-3] <i>A2g</i> d 1.12 n_D^{20} 1.50 $[-CH_2CH(COCH_3)-]_n$ Reactive polyketone. Soluble in: ketones, THF, dioxane, DMF, chloroform, ethyl acetate.	04320-10	10g
Poly(2-vinyl-1-methylpyridinium bromide), 20% soln. in water [29471-77-0] <i>H4g</i> (2g polymer) MW 50,000 Degree of quaternization ~50% Cationic quaternary ammonium polymer.	21477-10	10g
Poly(4-vinyl-1-methylpyridinium bromide), 20% soln. in water [62962-69-0] <i>A2g</i> ... (2g polymer) MW 50,000 Degree of quaternization ~85% Cationic quaternary ammonium polymer.	21478-10	10g
Poly(4-vinylphenol) [24979-70-2] <i>A2g</i> d 1.2 n_D^{20} 1.600 T_g 150° TSCA $[-CH_2CH(C_6H_4OH)-]_n$ Reactive polyphenol. Has applications in photoresists. Soluble in: THF, lower alcohols, dioxane. Technical Data sheet #198		
MW 1,500-7,000 Polydispersity 1.5-2.2	06527-10	10g
	06527-50	50g
MW 9,000-11,000 Polydispersity ~3	18979-10	10g
	18979-50	50g
MW 22,000 Polydispersity ~5	18980-10	10g
	18980-50	50g
Poly(4-vinylphenol) brominated, 50% Br <i>A2g</i> MW 8,000 T_g 120° Polydispersity 2 Softening Point 210° Flame-retardant polymer. Technical Data Sheet #198	09762-50	50g
Poly(vinyl phosphoric acid), sodium salt [29690-74-2] <i>A2g</i> MW >200,000 Phosphorous content min 5% Water-soluble polymeric phosphate salt. Uncrosslinked.	04391-5	5g
Poly(vinylphosphonic acid), 30% Soln. [27754-99-0] <i>BH4g</i> MW 24,000 Polydispersity ~1.24 Water-soluble polymeric phosphonic acid.	24297-10	10g
Poly(2-vinylpyridine) [25014-15-7] <i>A2g</i> mp >200° T_g 104° TSCA Water-soluble at low pH, has adhesive-promoting properties. Soluble in: acetic acid, t-butanol, DMF, DMSO, lower alcohols. <i>For MW Standards, see page 213.</i>		
MW 40,000 Viscosity of 20% isopropanol 30-90 cps	21382-10	10g
MW 200,000-400,000 Viscosity of 20% methanol 300-1800 cps	19238-10	10g
MW 300,000-400,000	17770-10	10g

Poly(4-vinylpyridine) [25232-41-1] *H5g*

d 1.10 Tg 142° TSCA

Water-soluble at low pH, has adhesive-promoting properties.

Soluble in: acetic acid, t-butanol, DMF, DMSO, lower alcohols.

MW 50,000 Viscosity of 20% methanol solution 15-50 cps

MW 15,000 - 200,000

Catalog # Size

00112-50 50g

22176-50 50g

Poly(4-vinylpyridine/divinylbenzene) beads [19017-40-7] *U7g*

Has uses as absorbent and ion-exchange resin.

06579-10 10g

Poly(2-vinylpyridine N-oxide) [9016-06-2] *A2g*

MW 300,000-400,000 Water-soluble cationic resin. Soluble in: alcohols.

01564-10 10g

Poly(4-vinylpyridine N-oxide) [26715-00-4] *A2g*

MW ~200,000 Water-soluble cationic resin. Soluble in: alcohols.

23684-10 10g

NEW! Poly(N-vinyl acetamide) [28408-65-3] *HK4g*

MW ~4,060,000 Tg 189°C

Unlike many polyvinylpyrrolidones (PVPs), it offers greater viscosity stability at higher temperatures and in the presence of salts such as sodium chloride. Unlike sodium polyacrylates, Poly (N-vinyl acetamide) maintains stability as a function of pH over a wide range from about pH 2-14. Moderately soluble in: water, methanol, ethanol and blends of alcohols with water.

24808-50 50g

Poly(N-methyl N-vinyl acetamide) homopolymer

A free flowing solid that has hydrophilic character. The material may be converted to poly (N-methyl vinyl amine) by subsequent hydrolysis of the acetamide functional group.

24810-50 50g

Poly(N-vinyl acetamide-co-sodium acrylate) *HK4g*

Water-soluble cationic resin. Soluble in: alcohols.

24809-50 50g

Poly(N-vinyl acetamide) homopolymer, Crosslinked *HK4g*

Water-soluble cationic resin. Soluble in: alcohols.

24807-50 50g

Poly(N-vinylpyrrolidone) (poly[N-vinylpyrrolidinone]) [9003-39-8] *A2g* η_{sp}^0 1.530 TSCA

Water-soluble polymer used as a thickener, protective colloid. Soluble in: alcohols, chloroform, nitroparaffins, water, MDC.

Polydispersity Rel. Viscosity (cps) Tg (°C)

MW 2,500 1.9 5% AQ 1.25-1.37~90°

16693-250 250g

MW 4,000-6,000 120°

24737-250 250g

MW 10,000 3.6 1% AQ 1.21-1.28 155°

03315-250 250g

MW 40,000 3.33 1% AQ 2.7 168°

01051-250 250g

MW 40,000 (pharmaceutical grade) . .3.33 1% AQ 3.65 168°

01052-250 250g

MW 1,000,000~2.00 1% AQ 4.90>175°

06067-250 250g

Poly(N-vinylpyrrolidone/2-dimethylaminoethyl methacrylate), dimethyl sulfate quaternary 90:10 (20g polymer) [53633-54-8] A2g
MW 100,000 20% soln. in water TSCA
Water-soluble cationic (quaternary ammonium) polymer.

Poly(N-vinylpyrrolidone/vinyl acetate) [25086-89-9] CHV4g
d 0.955 Tg 108° TSCA Hydrophilic neutral polymer.
Soluble in: alcohols, THF, water, dioxane, ketones, MDC, toluene.

(30:70), 50% soln. in isopropanol (50g polymer) MW 25,000
(50:50), 50% soln. in isopropanol (50g polymer) MW 45,000
(70:30), 50% soln. in isopropanol (50g polymer) MW 66,000

Poly(vinylsulfonic acid) sodium salt, 25% soln. in water [9002-97-5] A2g
(25g polymer) Mw 4000-6000 Mn 2,000 TSCA
Water-soluble anionic polymer. Has been used as a pigment dispersant.

Pullulan, desalinized [9057-02-7] A2g
Mn ~200,000 TSCA Viscosity of 10% AQ solution at 30° 100-180cps
Natural polysaccharide from Aureobasidium pullulans.

- S -

SS-PEG

See *Poly(ethylene glycol) monomethyl ether, mono(succinimidyl succinate) ester*, page 189.

Starch, poly(acrylamide/acrylic acid) graft, acid sodium salt [9005-25-8] H5g
TSCA 60% grafted Fluid uptake 400ml/g, wet-out time 125 sec
particle/size 75% between 40-120 mesh pH 7.5
Water-absorbing, water-holding resin.

Catalog #	Size
16294-100	100g
09718-100	100g
09717-100	100g
09716-100	100g
04392-100	100g
21115-50	50g
08215-100	100mg

cGMP Manufacturing Capabilities

- FDA registered and cGMP compliant
- In-house production, mg to Kg scale
- New product synthesis
- Product documentation
- High-vacuum distillation and drying
- Specialized recrystallization and filtration
- Fully equipped synthesis laboratories with 25+ hoods
- Scale-up and process optimization
- Complete confidentiality
- Clean room operation



Our expertise, custom manufacturing capabilities and rigorous quality standards allow us to provide you with the exact composition, properties and purity you need.

Alphabetical Listing of Adjuncts

- A -

Absorbent beads — See *poly(styrene/divinyl benzene)*, page 199.

Acrylic cement, MC-Bond BHJV7g 16752-4Q 4x1 qt
Solvent-type cement for acrylic, PETG, or polycarbonate sheet. Forms strong bonds after short contact time. Technical Data Sheet #270 16752-0.5 4x0.5gal

Alumina, activated powder [1344-28-1] H5g 23678-250 250g
MW 102.1 TSCA 100µm
 Al_2O_3
Used to remove inhibitor from monomers. See Inhibitor Removal Column, (Cat. #19708) for a column suitable for use with alumina.

3-Aminopropyltriethoxysilane, 99% [919-30-2] B7bd 01983-250 250g
MW 221.4 bp 122°/30mm TSCA
 $\text{H}_2\text{N}(\text{CH}_2)_3\text{Si}(\text{OC}_2\text{H}_5)_3$
Reacts with glass and other silaceous surfaces creating aminopropyl substituents. Surfaces so modified have enhanced adhesion properties and can adsorb anionic matter. Used for improving tissue section adhesion to glass slides.

- B -

Benzil, 98% [134-81-6] H7g 01946-25 25g
MW 210.2 mp 95° TSCA
 $\text{C}_6\text{H}_5\text{COCOC}_6\text{H}_5$
UV polymerization catalyst optimum at 310-380nm. Technical Data Sheet #370

Benzoin ethyl ether, min. 99% [574-09-4] VH7ag 01359-50 50g
MW 240.3 mp 60° TSCA
 $\text{C}_6\text{H}_5\text{CH}(\text{OC}_2\text{H}_5)\text{COC}_6\text{H}_5$
UV polymerization catalyst optimum at 310-380nm.

Benzoin methyl ether, min. 98% [3524-62-7] VH7ag 00425-10 10g
MW 226.3 mp 47-49° TSCA
 $\text{C}_6\text{H}_5\text{CH}(\text{OCH}_3)\text{COC}_6\text{H}_5$
UV polymerization catalyst optimum at 310-380nm. Technical Data Sheet #370

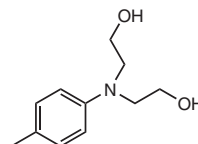
Benzoin iso-propyl ether, min. 99% [6652-28-4] H5g 00932-25 25g
MW 254.3 mp 78° TSCA
 $\text{C}_6\text{H}_5\text{CH}[\text{OCH}(\text{CH}_3)_2]\text{COC}_6\text{H}_5$
Photopolymerization initiator optimum at 310-380nm.

2-(2H-Benzotriazol-2-yl)-4-methylphenol (Tinuvin® P) 21363-25 25g
See *2-(2'-Hydroxy-5'-methylphenyl)-benzotriazole*, page 207

Benzoyl Peroxide [94-36-0] *HF4gp*
 MW 242.23 mp 105° TSCA ~70% active (water wet) (70g benzoyl peroxide)
 $(C_6H_5CO)_2O_2$
 Thermal polymerization catalyst.

Benzoyl Peroxide, Plasticized [94-36-0] *HG5g*
 MW 242.23
 $(C_6H_5CO)_2O_2$
 Thermal polymerization catalyst. Dry Powder. Easier to use.

N,N-Bis(2-hydroxyethyl)-4-toluidine, 94% [3077-12-1] *HK3abcd*
 MW 195.26 mp 50° TSCA
 $CH_3C_6H_4N(CH_2CH_2OH)_2$
 Accelerator or promoter in peroxide-catalyzed polymerizations.



- C -

dl-Camphorquinone, min. 99% [10373-78-1] *HU7g*
 MW 166.2 mp 198-200° λ max: ~460nm TSCA
 $(C=2, CH_3OH)$
 Photopolymerization initiator useful in the visible (blue) region. Technical Data Sheet #370

- D -

Dibutyl phthalate [84-74-2] *H7g*
 MW 278.4 bp 340° d 1.043 n_D^{20} 1.492 TSCA
 $C_6H_4-1,2-[CO_2(CH_2)_3CH_3]_2$
 Plasticizer for polymers such as poly(vinyl chloride), poly(methyl methacrylate) and poly(vinyl acetate).

Dibutyltin dilaurate [77-58-7] *BHV7g*
 MW 631.6 bp 205° mp 24° d 1.066 n_D^{20} 1.470 min Tin 15% TSCA
 $[CH_3(CH_2)_{10}CO_2]_2Sn[(CH_2)_3CH_3]_2$
 Catalyst for polymerizing lactide and glycolide, and isocyanate reactions. Yellowish liquid.

Di-(2-ethylhexyl) phthalate (dioctyl phthalate) [117-81-7] *HM7g*
 MW 390.6 bp 384° d 0.985 n_D^{20} 1.486 TSCA
 Plasticizer for polymers, especially poly(vinyl chloride).

N,N-Dimethylaminoethanol, min. 99% (DMAE) [108-01-0] *BE6g*
 MW 89.14 bp 130-136° TSCA
 $HOCH_2CH_2N(CH_3)_2$
 Catalyst for curing epoxy resins.

Diphenyl adipate [3195-37-7] *U2g*
 MW 298.3 mp 105-106° Solid plasticizer for polymers.

Catalog # Size

21446-100 100g

24232-100 100g

04011-100 100g

17181-10 10g

00434-450 450g

01862-50 50g

05195-500 500g

01458-100 100g

19521-25 25g

DMP-30, min. 96% [90-72-2] BH6g
 MW 265.4 bp 316° n_D^{20} 1.515 Viscosity ~200 cps TSCA
 $[(CH_3)_2NCH_2]_3C_6H_2OH$
 Curing catalyst for epoxy resins. Straw to yellow liquid.



Dodecenylsuccinic anhydride, (DDSA) [26544-38-7] HO7g
 MW 266.4 bp 181°/5mm d 1.005 n_D^{20} 1.479 Viscosity 440 cps Acid No. min. 395 TSCA
 Curing catalyst accelerator for epoxy resins.

- E -

Embedding Kits

Polysciences offers a full line of embedding kits developed for use in microscopy and have also been used to make castings or embedments for other purposes such as electronics, metallurgy, mineralogy, etc. For a complete listing of all of our embedding kits, see *Embedding Media & Kits* in the *BioSciences* section of this catalog.

- H -

2-(2'-Hydroxy-5'-methylphenyl)-benzotriazole, min. 99% [2440-22-4] HO4g
 (Tinuvin P®) MW 225.2 mp 128-132° d 1.40 λ max: 340nm
 A highly efficient UV absorbent (absorbs UV between 270-340nm) used in polystyrene, polyester, polycarbonate, Perspex, polyethylene, ABS resin, epoxy resin and cellulose resin. Absorbs almost no visible light, making it useful for colorless transparent and pale colored products. Can be used in plastic products for food. Yellow granules.

2-Hydroxy-4-n-octoxybenzophenone, 98% [1843-05-6] U2g
 MW 326.4 mp 47° TSCA λ max 240nm, 289nm, and 325nm
 $CH_3(CH_2)_7OC_6H_3(OH)COC_6H_5$
 UV-absorber.

- I -

Inhibitor Removal Column
 250ml capacity; The Inhibitor Removal Column, when filled with alumina (Cat. #23678), will remove phenolic inhibitor from ~170 volumes of monomer where inhibitor content is 100 ppm. Inhibitor Removal Column can also be used with De-Hibit 200 (Cat. #24013) for the removal of phenolic inhibitors from neutral monomers.



Catalog #	Size
00553-100	100g
00563-450	450g
00563-4	4x450g
21363-25	25g
01925-50	50g
19708-1	1 ea

Selectacel® Ion Exchangers

Ion Exchange Cellulose derivatives for chromatography

Selectacel® ion exchangers are chemical derivatives of cellulose. These ion exchangers have been shown to be particularly effective in the fractionation of a variety of high molecular weight ionic substances including serum proteins, enzymes, and nucleic acids. Their ability to perform these separations is due to their functionality and the highly hydrophilic and porous nature of the cellulose lattice. These ion exchangers possess properties that are not approached by other resin exchangers currently available. Their capacity for proteins is high, and elution may be carried out under mild conditions which prevent denaturation.

Selectacel® products continue on following page.

Cellulose, diethylaminoethyl ether (Selectacel® DEAE, type 20) A2g
Cationic cellulose derivative with ion exchange properties

	Flow time (sec/10ml)	Specific Volume (ml/g, wet)	Capacity (Meq/g [±.1])
Standard (05178-100)	60-100	10-15	0.9
Type 20 (18627-100)	140-160	5-9	0.9

The most widely used of all cellulosic ion exchangers is the diethylaminoethyl ether derivative of cellulose. It is an anion exchanger that is recommended for separation and purification of proteins, peptides, enzymes, hormones, polypeptides and related materials. Selectacel®-DEAE is an effective adsorbent for polyanions even at pH values higher than those normally used in the chromatography of proteins.

Cellulose, carboxymethyl ether (Selectacel® CM, standard) [9000-11-7] H2g
Anionic cellulose derivative with ion exchange properties.

	Flow time (sec/10ml)	Specific Volume (ml/g, wet)	Capacity (Meq/g [±.1])
Standard (18631-100)	50-70	10-14	0.7

The most widely used cellulosic cation exchanger is the well known carboxymethyl derivative of cellulose. It is a weakly acidic cation exchanger and is most effective at a pH above 4, although it has been used effectively at pH values as low as 2 in special cases. It is a high capacity adsorbent for fractionation of neutral and basic proteins, e.g., albumins, hemoglobin, hormones and enzymes.

Cellulose, phosphate ester (Selectacel® phosphate, type 20) [9015-14-9] H6gh
Anionic cellulose derivative with ion exchange properties.

Catalog # Size

18627-100 100g

18631-100 100g

19791-100 100g

Cellulose, phosphate ester (Selectacel® phosphate, type 40) [9015-14-9] *H6gh*
Anionic cellulose derivative with ion exchange properties.

Catalog # **Size**
19792-100 100g

	Flow time (sec/10ml)	Specific Volume (ml/g, wet)	Capacity (Meq/g [±.1])
Standard (19793-100)	80-140	7-12	0.9
Type 20 (19791-100)	150-260	5-7	0.9
Type 40 (19792-100)	280-460	5-6.5	0.9

This is a bifunctional cation exchanger in which both strong and weak acid groups exist. It adsorbs certain cations from very acidic media.

Cellulose, epichlorohydrin/triethanolamine ether (Selectacel® ECTEOLA, standard) [9015-13-8] *H6gh*
Cationic cellulose derivative with ion exchange properties.

18628-100 100g

	Flow time (sec/10ml)	Specific Volume (ml/g, wet)	Capacity (Meq/g [±.1])
Standard (18628-100)	100-150	6-7.5	0.3

Cellulose, quaternary aminoethyl (Selectacel® QAE) *H6gh*
Quaternary aminoethyl derivative of cellulose. A strong anion exchanger used for chromatography of proteins and other labile biological substances. Cationic cellulose derivative with ion exchange properties.

18630-100 100g

Ion Exchange Resins

Amberlite® 200 [12626-25-4]
Strong acid (sodium sulfonate), 0.49mm, capacity 1.7 meq/ml (wet)
For separation of rare earths, amino acids.

15617-250 250g

Amberlite® IR-120 [9002-23-7]
Strong acid (sodium sulfonate), 0.5mm, capacity 1.9 meq/ml (wet)
For separation of rare earths, amino acids.

04714-250 250g

Amberlite® IR-120 Plus [63182-08-1]
Strong acid (sodium sulfonate), 0.5mm, capacity 1.9 meq/ml (wet)
For separation of rare earths, amino acids.

04698-250 250g

Amberlite® IR-122 [39288-70-5]
Strong acid (sodium sulfonate), 0.54mm, capacity 2.1 meq/ml (wet)
For water conditioning.

15626-250 250g

Amberlite® IRA-93 [9036-92-4]
Weak base (free base), 0.49mm, capacity 1.2 meq/ml (wet)
For dye waste decolorization, cyanide and silver removal.

15622-250 250g

Ion Exchange Resins *continued*

Amberlite® IRA-458 [9084-78-0]
Strong base (quaternary ammonium chloride), 0.50mm, capacity 1.25 meq/ml (wet)
For water conditioning.

Amberlite® IRA-900 [60177-39-1]
Strong base (quaternary ammonium chloride), 0.53mm, capacity 1.0 meq/ml (wet)
For deionization of water and removal of organics.

Amberlite® IRA-958 [79620-27-2]
Strong base (quaternary ammonium chloride), 0.49mm, capacity 0.8 meq/ml (wet)
For removal of color, organics, and cyanide.

TMD-8 [69011-20-7] [69011-16-1]
Mixed bed (quaternary ammonium hydroxide/sulfonic acid), 16-50 mesh,
capacity 0.55 meq/ml (wet)

De-Hibit 200 [9003-70-7] A2g
Resin for removal of phenolic inhibitors (hydroquinone, hydroquinone monomethyl ether, or
t-butylcatechol) from neutral monomers, e.g., acrylate esters or styrene derivatives. Suitable
for use with Inhibitor Removal Column (Cat. #19708). Technical Data Sheet #256

- M . N . O . P -

Methyl Benzoylformate [15206-55-0] H7ad
C6H5COCO2CH3
Synthesis intermediate, photoinitiator for UV curable systems.

Nadic methyl anhydride, min. 99% [25134-21-8] HO6g
MW 178.2 bp 140°/10mm d 1.232 n_D²⁵ 1.505 Viscosity 220 cps TSCA
Curing agent for epoxy resins.

Nonenylsuccinic anhydride [28928-97-4] H6g
MW 224.3 d 1.032 1.476 Viscosity ~60 cps Acid Number min. 470 TSCA
Curing agent for epoxy resins. Yellow liquid.

n-Octenylsuccinic anhydride [26680-54-6] H6g
MW 210.3 bp 320° d 1.000 1.469 Acid Number min. 520 TSCA
Curing agent for epoxy resins. Pale yellow liquid. Used as a replacement for hexenylsuccinic
anhydride in Polysciences's Ultra Low Viscosity Embedding Kit, (Cat. #17706).

Poly/Bed® 812 [13236-02-7] H7g
WPE min. 140 Viscosity 100-200 cps TSCA
Epoxy resin for embedding. Cured by amine catalysts.

2-iso-Propylthioxanthone, 97% [5495-84-1] H4g
MW 254.3 mp 66-73° λ max: 255nm TSCA
Photopolymerization catalyst. Yellow powder.

Catalog # Size

15629-250 250g

19522-250 250g

15621-250 250g

21445-250 250g

24013-500 500g

17308-25 25g

00886-450 450g

01542-450 450g
01542-4 4x450g

19830-100 100g

08791-500 500g

21314-25 25g

- S . T . U -

Selectacel®—See Ion Exchange, various derivatives, pages 208-209.

NEW! Thiol-SAMMS® Metal Scavenger Kit



The latest in silica based “precious metal” recovery systems for heavy metal scavenging of heterogeneous or homogeneous catalysts in API synthesis. Thiol-SAMMS®*, stands for “**S**elf **A**ssembled **M**onolayers on **M**esoporous **S**upport”. Molecularly engineered mesoporous functionalized silica has the unique ability to bind palladium and other precious metals. The high surface area and functional thiol binding sites give the Thiol-SAMMS® tremendous capacity and kinetics to absorb such metals very quickly in catalyzed reactions.

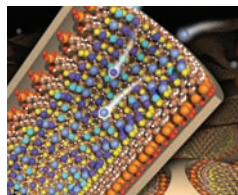
See Technical Data Sheet #782

Kit Contains: THMS-03 (50 grams), THMS-04 (50 grams) and THMS-M1 (100 gram sample)

Please Note: THMS-03 and THMS-04 are interchangeable in terms of capacity and performance.

Advantages of Thiol-SAMMS® Technology:

- Adsorption of 99% of targeted metals in minutes
- Capacity up to 60% of SAMMS weight
- Operational over a wide pH range (pH 2-12)
- Meets the requirements of TCLP (EPA Toxicity Characteristic Leaching Procedure)
- Allows for the reclamation of metals and adsorbents



Features of Thiol-SAMMS® Technology vs. Competitive Systems Including:

- Superior scavenging for a range of metals such as Pd, Pt, Rh, Ru, Au, Ag, Cu, Cd, Hg & Pb
- Metals may be in colloidal form, oxidized or zero - valent
- Solvent compatible for homogeneous catalysts
- Controlled pore size structures with high specific surface area
- Excellent filtration behavior
- High thermal stability with excellent thermal and structural stability
- Thiol-SAMMS® may be used in batch mode or fixed bed mode
- Available as a test kit for quick sample evaluations and bulk quantities
- Cost effective compared to alternative commercial technologies

Physical Properties of Thiol-SAMMS®

	THMS-03	THMS-04	THMS-M1**
Average particle size (micron, d50)	20	20	50
Tap Density (g/cc)	0.23	0.23	1.25
Color	White	White	Dark Brown

For convenience in laboratory scale testing, Polysciences, Inc. also offers rare earth block magnets (Neodymium-Iron-Boron) or Multi-SEP Magnetic separator magnets that will accommodate test tubes for metal separation. *All materials are commercially available in bulk quantities, please call for quotation.*

* Thiol-SAMMS® technology is supplied by Polysciences, Inc. under agreement with Steward Environmental Solutions, Chattanooga, TN

**THMS-M1 is a ferrite based magnetic support that allows for magnetic removal of the support containing the captured metal.

Catalog # Size

24886-1 1 kit

Tinuvin® P
See 2-(2'-hydroxy-5'-methyl)-benzotriazole, page 207.

2,4,6-Trimethylbenzoyldiphenylphosphine oxide [75980-60-8] *H4ag*
MW 348.0 mp 87-93° Abs max: 383nm yellow crystals
(CH₃)₃C₆H₂COP(O)(C₆H₅)₂
Photopolymerization initiator.

1-(2-Trimethylsiloxyethoxy)-1-trimethylsiloxy-2-methylpropene, min. 97% [85248-36-8] *EH4g*
MW 276.5 d 0.87 bp 62-63°/1mm
Group transfer initiator. Polymers made by this method are more nearly monodisperse than by free radical catalysts. Decomposes in water.

Uvitex® 2B [52232-33-4] *BH6g*
(C.I. Fluorescent Brightener 362; Derivative of stilbene disulfonic acid)
Ex. max: 350nm Em. max: 435nm in PBS Buffer TSCA
UV absorber. Yellow powder.

Catalog #	Size
21363-25	25g
24067-10	10g
21053-25	25g
19517-10	10g

Custom Synthesis Overview

Polysciences, Inc. offers custom synthesis of milligram to multi kilogram quantities of compounds for use in research and development.

Our objective is to become a partner with innovative companies, providing a complete range of custom synthesis and cGMP contract manufacturing services.

- Monomer synthesis
- Polymer synthesis
- Homopolymers and co-polymers
- Unique and ultra-pure specialty chemicals
- Different end group chemistries
- Scale from milligrams to thousands of kilograms
- Molecular weights ranging from a few thousand to several million



Polymer Standards

Polysciences, Inc., provides a comprehensive series of carefully characterized, ultrapure, polymer and particle standards for use in calibrating columns and instruments. Polymer molecular weight standards were prepared by techniques which yield narrow molecular weight distribution and when this is not possible by fractionation of polymers of broader molecular weight distribution. We have listed standards of a range of molecular weights for widely studied polymers. For your special needs we can prepare quotes on items not listed.

Molecular Weight Standards

Each catalog listing for a molecular weight standard describes the polymer by an approximate Molecular Weight (MW) and an approximate polydispersity value (Mw/Mn). The Molecular Weight averages have been rounded for descriptive purposes.

Homopolymers, Individual Standards and Kits

Dextran [9004-54-0] A2g

Water-soluble.

MW ~ 10,000 Mw/Mn ~ 1.50	19411-250	250mg
MW ~ 40,000 Mw/Mn ~ 1.50	19412-250	250mg
MW ~ 60,000 Mw/Mn ~ 1.70	24832-250	250mg
MW ~ 180,000 Mw/Mn ~ 2.16	24239-250	250mg
MW ~ 500,000 Mw/Mn = 3.25	24766-250	250mg
MW ~ 636,400 Mw/Mn = 1.80	24767-250	250mg

Polyacrylamide [9003-05-8] A2d

Water-soluble.

MW ~ 12,000 Mw/Mn ~ 1.50	18255-250	250mg
MW ~ 22,000 Mw/Mn ~ 1.60	18256-250	250mg
MW ~ 65,000 Mw/Mn ~ 1.60	18257-250	250mg
MW ~ 80,000 Mw/Mn ~ 1.80	19410-250	250mg
MW ~ 400,000 Mw/Mn ~ 2.60	19790-250	250mg
MW ~ 600,000 Mw/Mn ~ 2.50	18259-250	250mg
MW ~ 1,000,000 Mw/Mn ~ 2.50	18260-250	250mg
MW ~ 5,000,000 Mw/Mn ~ 2.30	18263-250	250mg
MW ~ 9,000,000 Mw/Mn ~ 2.10	18543-250	250mg

Poly(acrylic acid), sodium salt [9003-04-7] *H4g*

Water-soluble.

MW ~ 2,000 Mw/Mn ~ 1.60

MW ~ 5,000 Mw/Mn ~ 1.60

MW ~ 8,000 Mw/Mn ~ 1.30

MW ~ 20,000 Mw/Mn ~ 1.40

MW ~ 35,000 Mw/Mn ~ 1.60

MW ~ 70,000 Mw/Mn ~ 1.80

MW ~ 85,000 Mw/Mn ~ 1.80

MW ~ 150,000 Mw/Mn ~ 1.70

MW ~ 250,000 Mw/Mn ~ 1.60

MW ~ 500,000 Mw/Mn ~ 1.60

MW ~ 800,000 Mw/Mn ~ 1.60

MW ~ 1,300,000 Mw/Mn ~ 1.50

Catalog

Size

18744-250 250mg

18745-250 250mg

18746-250 250mg

18747-250 250mg

18748-250 250mg

18749-250 250mg

18750-250 250mg

18751-250 250mg

18752-250 250mg

18753-250 250mg

18754-250 250mg

18755-250 250mg

Polybutadiene [9003-17-2] *A4g*

Solvent-soluble. Soluble in: hydrocarbons, tetrahydrofuran, higher ketones, higher aliphatic esters.

MW ~ 2,800 Mw/Mn ~ 1.20

09827-1 1g

Poly(tert-butyl methacrylate) [25189-00-8] *A2d*

Solvent-soluble. Soluble in: benzene, xylene, methylene chloride, methyl ethyl ketone, ethyl acetate. Can be easily transesterified to prepare standards for other methacrylate esters.

MW ~ 10,000 Mw/Mn ~ 1.07

MW ~ 20,000 Mw/Mn ~ 1.04

21175-250 250mg

21176-250 250mg

Polyethylene

NIST Standard for determining melt flow rate in polymers. Melt flow rate is widely used in polymer technology as a product specification since this value, which includes a statement of the load and temperature under which it is obtained, gives an indication of the processing properties of the polymer.^{1,2}

Polyethylene, branched [9002-88-4] *A2g*

Soluble in: 1-chloronaphthalene, 1,2,4-trichlorobenzene, decalin above 60°

Limiting viscosity number = 0.8132 dI/g in 1-chloronaphthalene

08277-1 1g

Polyethylene, linear [9002-88-4] *A2g*

Soluble in: 1-chloronaphthalene, 1,2,4-trichlorobenzene, decalin above 80°

MW ~ 52,000 Mw/Mn ~ 2.90

09829-1 1g

1) ASTM D 1238-00; Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer; ASTM Standards, Vol. 08.01, American Society for Testing and Materials, West Conshohocken, PA (2001)

2) Taylor, B.N.; Guide for the Use of the International System of Units (SI); NIST Special Publication 811; Ed. (April 1995)

Poly(ethylene glycol) [25322-68-3] A2g

Water-soluble Also soluble in: benzene, chloroform, dimethylformamide, esters, alcohols.

MW ~ 600 Mw/Mn ~ 1.10	15645-1	1g
MW ~ 1,000 Mw/Mn ~ 1.10	15646-1	1g
MW ~ 1,500 Mw/Mn ~ 1.10	15647-1	1g
MW ~ 5,000 Mw/Mn ~ 1.10	15648-1	1g
MW ~ 9,000 Mw/Mn ~ 1.10	15649-1	1g
MW ~ 11,000 Mw/Mn ~ 1.10	16913-1	1g
MW ~ 20,000 Mw/Mn ~ 1.13	17172-1	1g

*For a poly(ethylene glycol) standards kit — See page 219.***Poly(isoprene-1,4)** [9003-31-0] A2g

Solvent-soluble Soluble in: hydrocarbons, tetrahydrofuran, higher ketones, higher aliphatic esters.

MW ~ 1,000 Mw/Mn ~ 1.20	09828-250	250mg
MW ~ 4,700 Mw/Mn < 1.15	18006-250	250mg
MW ~ 30,000 Mw/Mn ~ 1.05	16202-250	250mg
MW ~ 300,000 Mw/Mn ~ 1.05	16203-250	250mg

Poly(methacrylic acid), sodium salt [54193-36-7] H7g

Water-soluble.

MW ~ 7,000 Mw/Mn ~ 1.07	21180-250	250mg
MW ~ 25,000 Mw/Mn ~ 1.04	21181-250	250mg
MW ~ 70,000 Mw/Mn ~ 1.03	21182-250	250mg
MW ~ 350,000 Mw/Mn ~ 1.05	21184-250	250mg

Poly(methyl methacrylate) [9011-14-7] A2g

Solvent-soluble. Soluble in: aromatic hydrocarbons, chlorinated hydrocarbons, methyl ethyl ketone, ethyl acetate.

MW ~ 6,000 Mw/Mn ~ 1.05	21172-250	250mg
MW ~ 12,000 Mw/Mn ~ 1.04	21173-250	250mg
MW ~ 30,000 Mw/Mn ~ 1.10	16204-250	250mg
MW ~ 60,000 Mw/Mn ~ 1.10	16206-250	250mg

Poly(methyl methacrylate) *continued*

MW ~ 75,000 Mw/Mn ~ 1.04	08287-250	250mg
MW ~ 100,000 Mw/Mn ~ 1.10	16209-250	250mg
MW ~ 125,000 Mw/Mn ~ 1.04	08288-250	250mg
MW ~ 150,000 Mw/Mn ~ 1.10	16211-250	250mg
MW ~ 185,000 Mw/Mn ~ 1.10	18756-250	250mg
MW ~ 225,000 Mw/Mn ~ 1.04	21104-250	250mg
MW ~ 350,000 Mw/Mn ~ 1.15	16214-250	250mg

Catalog # Size**Poly(methyl methacrylate), isotactic**

MW ~ 100,000	21489-250	250mg

Poly(methyl methacrylate), syndiotactic [25188-97-0] A2g

MW ~ 100,000	08729-250	250mg

Poly(alpha-methylstyrene) [25014-31-7] A2g

Solvent-soluble

Soluble in: aromatic hydrocarbons, chlorinated hydrocarbons, tetrahydrofuran, esters.

MW ~ 20,000 Mw/Mn ~ 1.15	16218-250	250mg
MW ~ 400,000 Mw/Mn ~ 1.05	18530-250	250mg

Polypropylene [9003-07-0] A2g

Solvent-soluble Soluble in: hydrocarbons, chlorinated hydrocarbons.

MW ~ 50,000 Mw/Mn <2.20	19905-250	250mg
MW ~ 100,000 Mw/Mn <3.40	19906-250	250mg
MW ~ 140,000 Mw/Mn <3.70	19907-250	250mg
MW ~ 200,000 Mw/Mn <4.90	19908-250	250mg
MW ~ 230,000 Mw/Mn <5.60	19909-250	250mg
MW ~ 350,000 Mw/Mn <8.00	19910-250	250mg

Polystyrene [9003-53-6] A2g

Solvent-soluble. Soluble in: aromatic hydrocarbons, chlorinated hydrocarbons, tetrahydrofuran, esters.

	Catalog #	Size
MW ~ 300 (liquid) Mw/Mn ~ 1.20	22404-250	250mg
MW ~ 500 (liquid) Mw/Mn ~ 1.20	22405-250	250mg
MW ~ 600 Mw/Mn ~ 1.30	08279-250	250mg
MW ~ 1,000 Mw/Mn ~ 1.30	16227-250	250mg
MW ~ 2,000 Mw/Mn ~ 1.30	16228-250	250mg
MW ~ 4,000 Mw/Mn ~ 1.04	08280-250	250mg
MW ~ 9,000 Mw/Mn ~ 1.04	16231-250	250mg
MW ~ 20,000 Mw/Mn ~ 1.06	01844-250	250mg
MW ~ 30,000 Mw/Mn ~ 1.06	16234-250	250mg
MW ~ 35,000 Mw/Mn ~ 1.06	16235-250	250mg
MW ~ 50,000 Mw/Mn ~ 1.06	16236-250	250mg
MW ~ 63,000 Mw/Mn ~ 1.04	09821-250	250mg
MW ~ 100,000 Mw/Mn ~ 1.06	00867-250	250mg
MW ~ 160,000 Mw/Mn ~ 1.10	18346-250	250mg
MW ~ 200,000 Mw/Mn ~ 1.06	02356-250	250mg
MW ~ 400,000 Mw/Mn ~ 1.06	03823-250	250mg
MW ~ 600,000 Mw/Mn ~ 1.10	16239-250	250mg
MW ~ 900,000 Mw/Mn ~ 1.10	16240-250	250mg
MW ~ 1,000,000 Mw/Mn ~ 1.10	16241-250	250mg
MW ~ 1,800,000 Mw/Mn ~ 1.10	16242-250	250mg
MW ~ 3,000,000 Mw/Mn ~ 1.20	07676-250	250mg
MW ~ 6,000,000 Mw/Mn ~ 1.20	16243-250	250mg
MW ~ 23,000,000 Mw/Mn ~ 1.30	16244-250	250mg
MW ~ 30,000,000 Mw/Mn ~ 1.30	16315-250	250mg

Polystyrene, 60% isotactic [25086-18-4] A2g

Solvent-soluble. Used as a polystyrene tacticity standard. Soluble in: aromatic hydrocarbons, chlorinated hydrocarbons, tetrahydrofuran, esters.

	Catalog #	Size
MW ~ 1,780,000 Mw/Mn ~ 2.25	02963-250	250mg

Polystyrene, fluorescein labeled A2g

Solvent-soluble. Soluble in: aromatic hydrocarbons, chlorinated hydrocarbons, tetrahydrofuran, esters. Can be used as a marker in column chromatography.

MW ~ 3,200 Mw/Mn ~ 1.20	21658-100	100mg

MW ~ 12,000 Mw/Mn ~ 1.17	21659-100	100mg

Poly(styrene sulfonic acid), sodium salt [9080-79-9] U7g

Water-soluble.

MW ~ 1,000 Mw/Mn < 1.20	24812-250	250mg

MW ~ 3,600 Mw/Mn ~ 1.20	24813-250	250mg

MW ~ 4,600 Mw/Mn ~ 1.10	16248-250	250mg

MW ~ 8,000 Mw/Mn ~ 1.10	16249-250	250mg

MW ~ 18,000 Mw/Mn ~ 1.10	16250-250	250mg

MW ~ 35,000 Mw/Mn ~ 1.10	16251-250	250mg

MW ~ 67,000 Mw/Mn < 1.20	18008-250	250mg

MW ~ 220,000 Mw/Mn ~ 1.10	16254-250	250mg

MW ~ 400,000 Mw/Mn ~ 1.10	16255-250	250mg

MW ~ 509,000 Mw/Mn ~ 1.15	24831-250	250mg

MW ~ 1,132,000 Mw/Mn ~ 1.10	08666-250	250mg

For poly(styrenesulfonic acid), sodium salt, standards kit — See page 219.

Poly(2-vinylpyridine) [25014-15-7] A2g

Solvent-soluble. Soluble in: benzene, methanol, tetrahydrofuran, pyridine, water at low pH. Cationic MW standard.

MW ~ 3000 Mw/Mn ~ 1.29	22509-250	250mg

MW ~ 7000 Mw/Mn ~ 1.31	22510-250	250mg

MW ~ 30,000 Mw/Mn ~ 1.45	22565-250	250mg

MW ~ 240,000 Mw/Mn ~ 1.70	22563-250	250mg

Molecular Weight Standard Kits

Poly(ethylene glycol) Kit [25322-68-3]	16900-1	1 kit
5 x 250mg each of MW 100, 1,000, 5,000, 9,000, 15,000		
Polystyrene (Broad MW Range) Kit [9003-53-6]	16902-1	1 kit
10 x 250mg each of MW 600, 1,000, 4,000, 20,000, 50,000, 100,000, 400,000, 1,000,000, 6,000,000, 20,000,000		
Polystyrene (Low MW) Kit	18009-1	1 kit
5 x 250mg each of MW 600, 1,000, 4,000, 20,000, 50,000		
Poly(styrenesulfonic acid, sodium salt) Kit [9080-79-9]	19918-1	1 kit
5 x 250mg each of MW 4,600, 6,500, 35,000, 67,000, 780,000		

Block Copolymer Standards

There are many possible block copolymer compositions, and we have listed only our most popular products with relatively few permutations. Within the polymer systems listed below we are capable of producing many products that fit your particular needs.

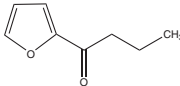
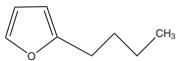
Diblocks

Poly(isoprene-1,4-b-styrene)	21697-250	250mg
A2g MW 135,000 (~67,500/67,500) Mw/Mn = 1.06		
Poly(methyl methacrylate-b-styrene) A2g		
MW 20,500 (10,700/9800) Mw/Mn = 1.14	21702-250	250mg
MW 65,500 (32,500/33,000) Mw/Mn = 1.06	21703-250	250mg

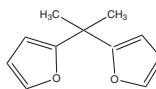
Furan Based Organic Building Blocks

Furan based synthons are finding new uses in organic and polymer synthesis applications including the pharmaceutical, flavors & fragrances, graphic arts and organic intermediates industries. Polysciences, Inc. is pleased to announce a family of furan derivatives including the difficult-to-find 3rd position substituted and disubstituted furans. Our unique halogen functional furan building blocks are appropriate for use in "Suzuki Synthesis" carbon-carbon bond forming reactions catalyzed by palladium.

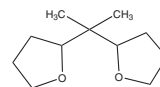
2 Position Substituted Furans

2-Butanoyl Furan [4208-57-5]	24700-10	10g
C ₈ H ₁₀ O ₂		
		
2-Butyl Furan, (2-n-butyl furan) [4466-24-4]	24699-10	10g
MW 124.18 bp 153-154°C Form: Liquid		
C ₈ H ₁₂ O		
		

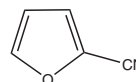
Difuryl Propane [17920-88-6] EUV7g
 bp 170°C (338°F) FP (Setaflash): 163°F (72°C) Specific Gravity: 1.04 g/ml
 Solubility in water (g/100 g at 20 °C): <1% TSCA
 $C_{11}H_{12}O_2$ Cationic polymer coupling agent.
 Cationic polymer coupling agent.



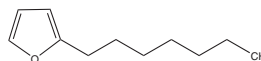
Ditetrahydrofuryl Propane [89686-69-1] H4g
 bp 145°C (294°F) at 60mm FP (Tag. Closed Cup): 95°C (203°F)
 Specific Gravity (20/20°C): 1.1
 Solubility in water (g/100 g at 20°C): 0.36 TSCA
 $C_{11}H_{20}O_2$
 Lithium catalyst modifier for anionic polymerization for high performance rubber.



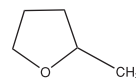
2-Furonitrile [617-90-3]
 MW 93.09 bp 146-148°C Density 1.06 g/ml
 Form: Liquid
 C_5H_3NO



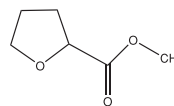
2-Heptyl Furan [3777-71-7]
 MW 166.27 bp 96-98°C/30 min.
 $C_{11}H_{18}O$



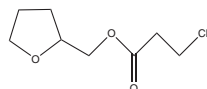
2-Methyl Tetrahydrofuran [96-47-9] CH4g
 MW 86.13 FP TCC (deg C): -11.1 mp -136°C bp 80°C
 Solubility in water (g/100 g at 25°C): 13
 Specific Gravity: 0.86g/ml at 20°C Form: Liquid TSCA
 $C_5H_{10}O$
 Grignard Solvent, Organometallic Chemistry, Extraction Solvent,
 Dichloromethane replacement solvent.



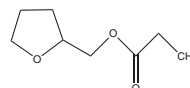
2-Methyl Tetrahydrofuroate [37443-42-8] EH4g
 FP (TCC): 64°C (147°F) bp (at 14 mm) 76°C (169°F)
 Specific Gravity (15/15°C): 1.1
 Solubility in water (g/100 g at 25°C): miscible
 $C_6H_{10}O_3$
 Synthetic intermediate for pharmaceuticals.



2-Tetrahydrofurfuryl Butyrate [2217-33-6]
 $C_9H_{16}O_3$



2-Tetrahydrofurfuryl Propionate [637-65-0]
 $C_8H_{14}O_3$



Catalog #	Size
24727-10	10g
24728-10	10g
24733-1	1g
24704-10	10g
24707-100	100g
24726-25	25g
24711-10	10g
24712-10	10g

Tetrahydrofurfuryl Alcohol [97-99-4] *EH4g*

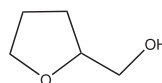
MW 102.13 FP (Setaflash): 183°F mp -80°C bp 178°C

Solubility in water (g/100 g at 20°C): miscible

Specific Gravity (20/20°C): 1.05 Form: Liquid TSCA

 $C_5H_{10}O_2$

Agricultural "green" solvent or adjuvant, Electronics Cleaner, printing inks, reactive diluent for epoxy resins, industrial cleaner/paint stripper, pharmaceutical intermediate

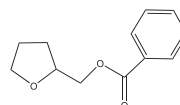


Catalog #

Size

24714-250

250g

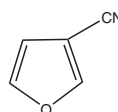
2-Tetrahydrofurfuryl Benzoate

24729-25

25g

3 Position Disubstituted Furans**3-Furonitrile** (3 Substituted Furan) [30078-65-0]

MW: 93.09 bp: 150-151°C mp: 28-30°C Form: Liquid

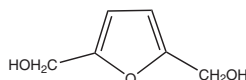
 C_5H_3NO 

24734-1

1g

2,5 Position Disubstituted Furans**Bis-(hydroxymethyl) Furan** [1883-75-6] *U4g* $C_6H_8O_3$

Specialty Diol

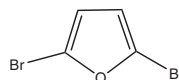


24723-10

10g

2,5 Dibromofuran

MW 225.88 bp 164-165° (764mm)

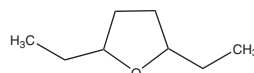
 $C_4H_2Br_2O$ 

24730-2.5

2.5g

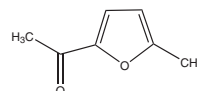
2,5-Diethyltetrahydrofuran [041239-48-9]

Form: Liquid

 $C_8H_{16}O$ 

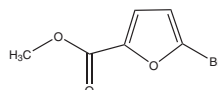
24719-10

10g

2-Methyl-5-Acetyl Furan [1193-79-9] $C_7H_8O_2$ 

24721-5

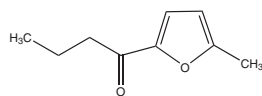
5g

Methyl-2-Bromofuran-carboxylate [2527-99-3] $C_6H_5O_3Br$ 

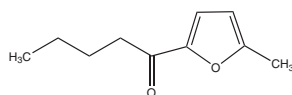
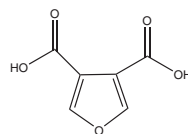
24722-10

10g

2-Methyl-5-Butanoyl Furan



2-Methyl-5-Pentanoyl Furan

**3,4 Position Disubstituted Furans****Furan-3,4-Dicarboxylic Acid** [3387-26-6] $C_6H_4O_5$ **Other Furans****Tetrahydrofuran** [109-99-9] CH_4g

MW 72.11 mp -108°C bp 65-67°C Density 0.889 g/ml

Form: Liquid

 C_4H_8O 

Catalog # Size

24731-5 5g

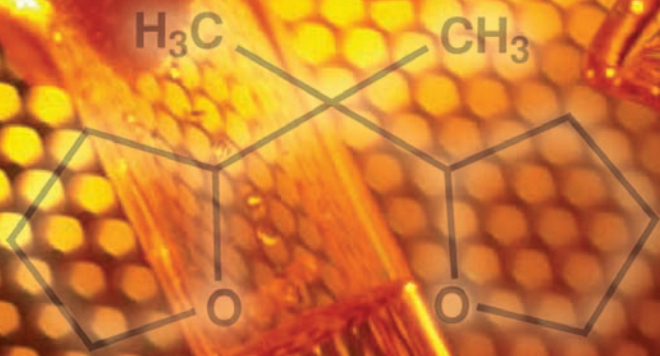
24732-2.5 2.5g

24725-10 10g

24752-500 500g

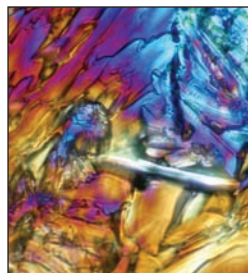
Furan Based

Organic Building Blocks



Organic Specialties - Liquid Crystals

Liquid crystals are organic compounds that are capable of responding to small amounts of radiant energy and undergo a phase transition with selective reflection of light. Specific colors are obtained depending on the wavelength of light which is determined by the organic crystal array "pitch length." The "pitch length" will vary considerably depending on temperature and the reflected light will also therefore depend on temperature. Liquid crystal application areas range from thermally activated displays to sensors and detection devices to cosmetics. Three of the most commonly studied cholesteric derivatives are listed below but many more are available upon request.



Applications: Thermally Activated Displays, Sensors and Detection Devices, Cosmetics.

Cholesteryl Chloride [910-31-6] *HU4g*
(3 β -chloro-5-cholestene)

24814-50

50g

Appearance:

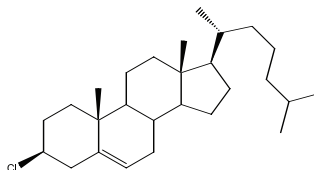
White Solid

Transition temperature:

Crystal - isotropic state at 96-98°C

On cooling isotropic - cholesteric at 95°C

Cholesteric - crystal 64°C



Cholesteryl Oleyl Carbonate [17110-51-9] *HU4g*
(3-cholestene-3 β -ol oleyl carbonate)

24815-50

50g

Appearance:

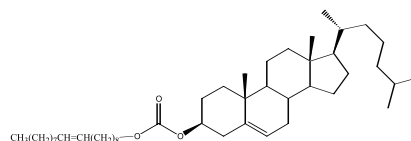
Hazy semi-solid to viscous liquid

Transition temperature:

Crystal - isotropic state at 20°C

On cholesteric - isotropic at 40°C

Normally in smectic phase but will slowly crystallize to a solid



Synonyms: OCC

Cholesteryl Nonanoate [1182-66-7]
 (5-cholestene-3 β -ol nonanoate)

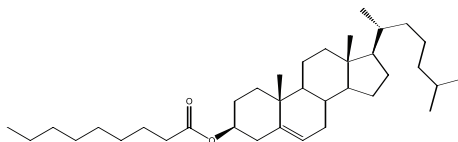
Appearance:

White, free flowing powder

Transition temperature:

Crystal - smectic at 77.5°C
 Smectic - cholesteric 79°C

Cholesteric - isotropic 90°C



Catalog #

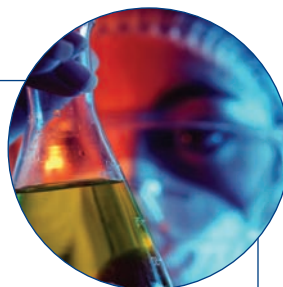
Size

24817-50

50g

Specialty & Bulk Manufacturing

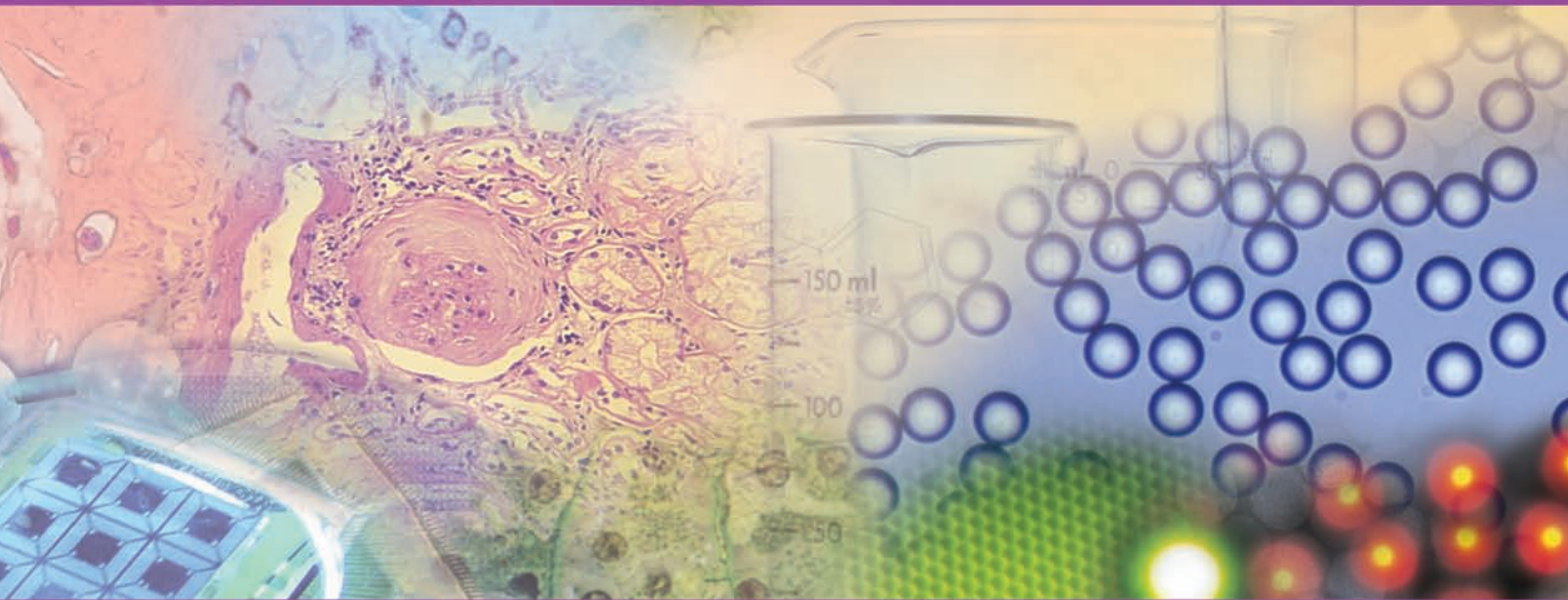
Our Specialty & Bulk Chemicals Group offers extensive expertise in producing and sourcing a vast range of products for your production and research applications. Bulk chemicals include reagents, microspheres and intermediates available in multi-kilogram quantities.



Product Areas Include

- Polymers for biomedical applications
- Poly Ethylene Vinyl Acetate (PEVA)
- Methacrylates
- Organic intermediates
- Electronic materials
- Raw materials for personal care products
- Specialty monomer and polymer synthesis
- Polylactides and other biodegradable polymers
- Silicones, adhesives and copolymers
- Epoxides / Anhydrides / Imides
- Fluorescent acrylic monomers
- Reactive polymers
- Water soluble polymers
- Numerous synthetic and purification methods

Microspheres & Particles



Calibration & Validation

Cell Separation

Agglutination Tests / Assays

Magnetic Particle Assays

Proximity Assays

Molecular Diagnostics

Nucleic Acid Purification

Flow Cytometry / Fluorescence Microscopy

Immunochromatographic Strip Tests / Assays

New Products



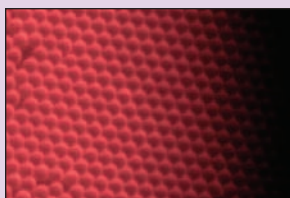
Bead Solution

Ready-to-use aqueous suspending solution for the dilution or storage of uncoated plain, dyed or functionalized polymer microspheres. **273**



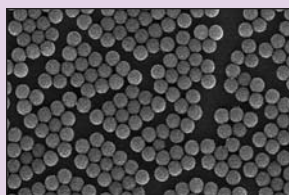
Bead Coupling Buffers

Ready-to-use buffers, available in a variety of pH levels (4.5 to 9.0). **273**



Flash Red Intensity Standard

Kit consists of five populations of $\sim 8\mu\text{m}$ microspheres dyed with increasing amounts of our Flash Red fluorophore. **236**



ProMag™ 1 Series

COOH Surfactant-free/Streptavidin

Highly uniform superparamagnetic microspheres! ProMag™ is now offered in a $1\mu\text{m}$ size. **264**

Simply Cellular® anti-Rat IgG

Antibody Binding Standards are particles which have ligands covalently linked to their surfaces to bind specific proteins in calibrated quantities. **250**

Simply Cellular® Compensation Standard

A mixture of two Simply Cellular® anti-Mouse IgG particle populations capable of binding high and low levels of the mouse monoclonal antibody used in your assay. **251**

Microspheres / Particles

Polysciences, Inc. is a world leader in the development of particle-based solutions for diagnostics, bioprocessing and instrument standardization. Our capabilities in life sciences, coupled with our expertise in specialty chemicals and electronics, allow us to address the unique requirements of advanced applications in medical devices, biosensors and nanotechnology.

Polysciences offers the most comprehensive range of particle solutions in the industry. We are your source for organic, inorganic, biodegradable, magnetic, fluorescent, dyed and specific antibody and general protein coated particles in diameters spanning the range of 40nm to 10mm.

Our line of BioMag® products include superparamagnetic particles and kits that offer superior performance in the isolation and purification of nucleic acids, antibodies and other proteins. Specific cell populations may be enriched or depleted using our range of BioMag® anti-CD marker particles.

We have also developed an expansive selection of NIST Traceable Particle Size Standards. Low coefficients of variation make these particles suitable for use in a wide range of applications, including instrument calibration, particulate testing, filter challenge and clean room validation. In addition, Bangs Flow Cytometry Standards for instrument set-up, calibration and validation complement our other flow cytometry products.

If a product that you require is not in our catalog, please check our website, as our product line is continually expanding. For special requirements, please contact us regarding our custom synthesis and contract manufacturing services.

Microspheres / Particles Selection Guide by Product Line At-A-Glance

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Microspheres / Particles Selection Guide by Application At-A-Glance

Calibration / Validation

Precision Size Standards: NIST Traceable Particle Size Standards are the industry leaders for calibrating or validating your instruments, filters or clean rooms.

Precision Size Standards 228

Image-based instrument Viability Controls offer discrete “live” and “dead” populations delivered in customizable ratios and concentrations. Concentration Controls are also available.

ViaCheck™ 243

Flow Check® beads are ideal for Flow Cytometry / Fluorescence applications. Fluorescent YG beads are perfect when green fluorescent visualization is necessary.

Flow Check® 243

In order to perform reliable flow cytometric analyses, the instrument must be properly set up and its performance validated. Bangs Flow Cytometry Standards are designed to help achieve these goals.

Bangs Flow Cytometry Standards 247

Cell Separation

Our full line of antigen-specific BioMag® particles are ideal for cell separation applications.

BioMag® 257

BioMag®Plus 259

ProMag™ 264

Agglutination Tests / Assays

Polybead® and Fluoresbrite® particles are well-suited for agglutination assays. The reproducibility and consistency of these products ease your development time.

Polybead® 230

Fluoresbrite® 236

Magnetic Particle Assays

BioMag® has a very high iron content that reduces separation time. The wide variety of functional groups and large lot sizes will speed your assay development success.

BioMag® 257

BioMag®Plus 259

ProMag™ 264

Immunochromatographic Strip Tests / Assays

Our line of Polybead® and Fluoresbrite® particles are great for lateral flow tests. The brilliant colors make your test strip stand out, while helping your dynamic range. The available conjugation chemistries give you a wide choice for molecule attachments.

Polybead® 230

Fluoresbrite® 236

Proximity Assays

When you need to bring the analytes together, look to our particles for the ideal surface or substrate.

Polybead® 230

Fluoresbrite® 236

Flow Cytometry / Fluorescence Microscopy

Our flow cytometry particles offer calibrators for size, fluorescence, alignment and linearity.

Fluoresbrite® 236

Flow Check® 243

Bangs Flow Cytometry Standards 247

Molecular Diagnostics

BioMag® has a very high iron content that speeds separation. The wide variety of functional groups and large lot sizes will speed your assay development success.

BioMag® 257

BioMag®Plus 259

ProMag™ 264

Nucleic Acid Purification

BioMag® products offer specific and nonspecific nucleic acid separation / purification. Inorganic silica particles offer the hydrophilic surface that you may need.

BioMag® 257

BioMag®Plus 259

ProMag™ 264

SNARE™ DNA Purification Systems 263

Silica 265

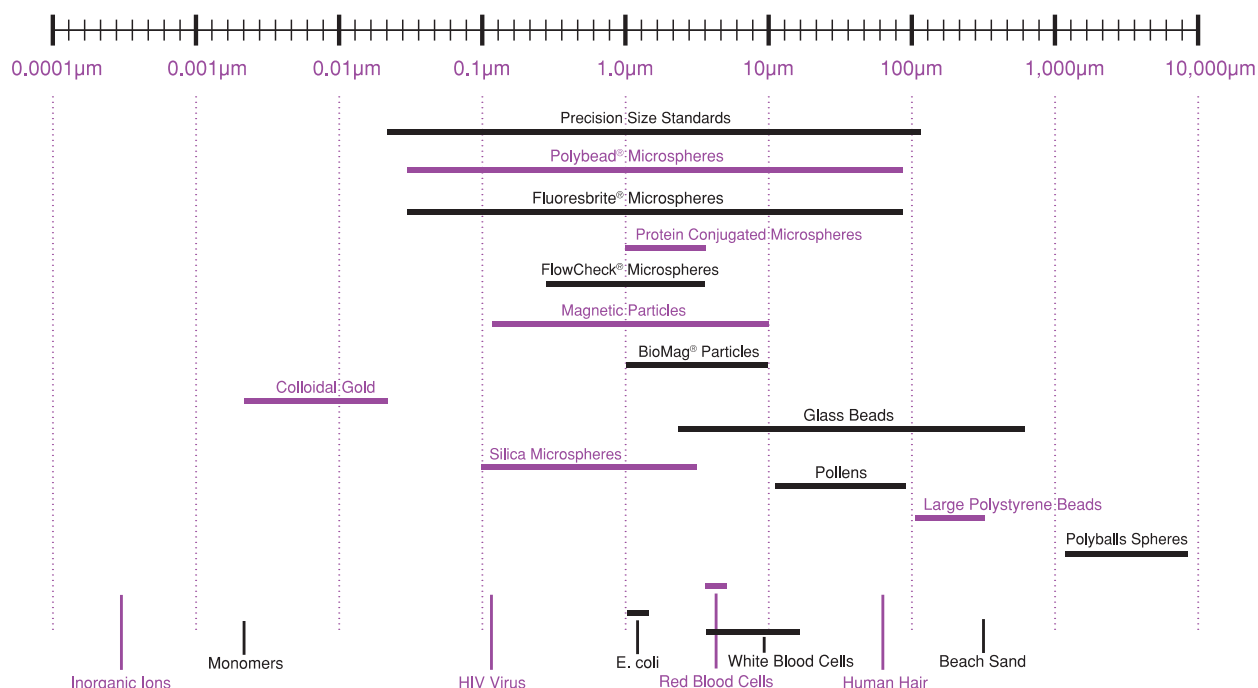
How Particles Measure Up

Precision Size Standards	.04 - 175µm
Polybead® Microspheres	.05 - 90µm
Fluoresbrite® Microspheres	.05 - 90µm
Protein Conjugated Microspheres	.1 - 6µm
Flow Check® Microspheres	.05 - 6.0µm
Magnetic Particles	.02 - 10µm
BioMag® Particles	.10 - 10µm
Colloidal Gold	.005 - 0.06µm
Glass Beads	.3 - 850µm
Silica Microspheres	.01 - 5.0µm
Pollens	.12 - 90µm

Large Polystyrene Beads	.106 - 600µm
Polyballs	.1,587.5 - 9,525µm
Inorganic Ions	.0006µm
Monomers	.0045µm
HIV virus	.012µm
E. coli	.1 - 2µm
Red Blood Cells	.6 - 8µm
White Blood Cells	.7 - 25µm
Human Hair	.80µm
Beach Sand	.650µm

How Polysciences' Microspheres and Other Particles Measure Up

1 Micron (µm) = 1,000 Nanometers = 10,000 Angstroms



Precision Size Standards

Precision Size Standards are offered in three size groupings: Nanobead, Microbead and Megabead. They are measured on in-house instruments calibrated with NIST Standard Reference Materials. Each product is supplied with a Certificate of Analysis. The size, standard deviation, coefficient of variation and lot number are printed on the label for easy reference.

See Technical Data Sheet #623



Nanobead NIST Traceable Particle Size Standards A2dm

Nanobead NIST Traceable Particle Size Standards are monodisperse polystyrene microspheres ranging from 40nm to 950nm. They are packaged in convenient, easy-to-use 15ml dropper bottles at 1% solids (w/v) in an aqueous suspension.

Nom. Dia.	Size Range	Catalog #	Size
40nm	36-44nm	64004-15	15ml
50nm	45-55nm	64005-15	15ml
60nm	54-66nm	64006-15	15ml
70nm	63-77nm	64007-15	15ml
80nm	72-88nm	64008-15	15ml
90nm	81-99nm	64009-15	15ml
100nm	90-110nm	64010-15	15ml
125nm	119-131nm	64011-15	15ml
150nm	143-158nm	64012-15	15ml
200nm	190-210nm	64013-15	15ml
250nm	238-263nm	64014-15	15ml
300nm	285-315nm	64015-15	15ml
350nm	333-368nm	64016-15	15ml
400nm	380-420nm	64017-15	15ml
450nm	428-473nm	64018-15	15ml
500nm	475-525nm	64019-15	15ml
550nm	523-578nm	64020-15	15ml
600nm	570-630nm	64021-15	15ml
650nm	618-683nm	64022-15	15ml
700nm	665-735nm	64023-15	15ml
750nm	713-788nm	64024-15	15ml
800nm	760-840nm	64025-15	15ml
850nm	808-893nm	64026-15	15ml
900nm	855-945nm	64027-15	15ml
950nm	903-998nm	64028-15	15ml

Microbead NIST Traceable Particle Size Standards A2dm

Microbead NIST Traceable Particle Size Standards are monodisperse polystyrene microspheres ranging from 1.0µm to 9.0µm. They are packaged in convenient, easy-to-use 15ml dropper bottles at 1% solids (w/v) in an aqueous suspension.

Nom. Dia.	Size Range	Catalog #	Size
1.00µm	0.95-1.05µm	64030-15	15ml
1.25µm	1.19-1.31µm	64035-15	15ml
1.50µm	1.43-1.58µm	64040-15	15ml
1.75µm	1.66-1.84µm	64045-15	15ml
2.00µm	1.90-2.10µm	64050-15	15ml
2.50µm	2.38-2.63µm	64055-15	15ml
3.00µm	2.85-3.15µm	64060-15	15ml
3.50µm	3.33-3.68µm	64065-15	15ml
4.00µm	3.80-4.20µm	64070-15	15ml
5.00µm	4.50-5.50µm	64080-15	15ml
6.00µm	5.40-6.60µm	64090-15	15ml
7.00µm	6.30-7.70µm	64100-15	15ml
8.00µm	7.20-8.80µm	64110-15	15ml
9.00µm	8.10-9.90µm	64120-15	15ml

Megabead NIST Traceable Particle Size Standards A2dm

Megabead NIST Traceable Particle Size Standards are monodisperse polystyrene microspheres ranging from 10.0µm to 175.0µm. They are packaged in convenient, easy-to-use 15ml dropper bottles at 1% solids (w/v) in an aqueous suspension.

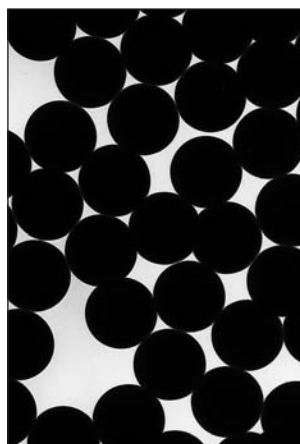
Nom. Dia.	Size Range	Catalog #	Size
10.0µm	9.00-11.00µm	64130-15	15ml
12.0µm	10.80-13.20µm	64140-15	15ml
15.0µm	13.50-16.50µm	64155-15	15ml
20.0µm	18.00-22.00µm	64160-15	15ml
25.0µm	22.50-27.50µm	64165-15	15ml
30.0µm	27.00-33.00µm	64170-15	15ml
40.0µm	36.00-44.00µm	64180-15	15ml
50.0µm	45.00-55.00µm	64190-15	15ml
60.0µm	54.00-66.00µm	64200-15	15ml
80.0µm	72.00-88.00µm	64210-15	15ml
100.0µm	90.00-110.00µm	64220-15	15ml
125.0µm	112.50-137.50µm	64225-15	15ml
150.0µm	135.00-165.00µm	64230-15	15ml
175.0µm	157.50-192.50µm	64235-15	15ml

Additional sizes can be ordered on a custom basis. Call for quote.

Polybead® Microspheres

Polybead® Microspheres are monodisperse polystyrene microspheres, supplied in sizes with nominal diameters from 50nm to 90µm. Diameters 10µm and larger are crosslinked with divinylbenzene (DVB). Our experienced chemists control the synthesis to provide precise monodisperse particle size distributions. These particles contain a slight anionic charge from sulfate ester.

Most of our Polybead® microspheres are packaged in an economical 2.5% solids (w/v) aqueous suspension. Particles used in diagnostic assays (sizes from 0.75µm to 2.00µm) can be prepared without surfactant. All other sizes have minimal surfactant in the final preparation. Polybead® microspheres are ideally suited for protein binding using passive adsorption techniques.



Polybead® Microspheres A2dm

Coefficient of Variance

0.05µm	≤15%	08691-10	10ml
0.10µm	≤15%	00876-15	15ml
0.20µm	≤8%	07304-15	15ml
0.35µm	≤5%	07306-15	15ml
0.50µm	≤3%	07307-15	15ml
0.75µm	≤3%	07309-15	15ml
1.00µm	≤3%	07310-15	15ml
1.50µm	≤5%	17133-15	15ml
2.00µm	≤5%	19814-15	15ml
3.00µm	≤5%	17134-15	15ml
4.50µm	≤7%	17135-5	5ml
6.00µm	≤10%	07312-5	5ml
10.0µm*	≤10%	17136-5	5ml
15.0µm*	≤10%	18328-5	5ml
20.0µm*	≤10%	18329-5	5ml
25.0µm*	≤10%	07313-5	5ml
45.0µm*	≤10%	07314-5	5ml
75.0µm*	≤10%	24049-5	5ml
90.0µm*	≤10%	07315-5	5ml

*These microspheres are crosslinked with divinylbenzene (DVB).

Polybead® Microspheres, Dry Form A2g

Our freeze-drying technique reduces the aggregation usually associated with dried beads. Dry material allows for the buffer of choice to be easily added.



1.00µm	
1.50µm	
3.00µm	

Catalog #	Size
19518-500	500mg
19519-500	500mg
19520-500	500mg

PolyPointer⚡

Lyophilization

We offer custom drying services using a lyophilizer. Please contact us to discuss your custom drying needs.

Polybead® Microsphere Kits

Polybead® Sampler Kit I A2dmw

Kit contains 5ml of standard monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these nominal sizes: 0.5µm, 0.75µm, 1.0µm, 2.0µm, 3.0µm.

19822-1	1 kit

Polybead® Sampler Kit II A2dmw

Kit contains a hollow fiber filter-based separation device for washing and handling small particles, plus 5ml of standard monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these nominal sizes: 0.1µm, 0.2µm, 0.5µm, 1.0µm.

21756-1	1 kit

Polybead® Sampler Kit III A2dmw

Kit contains 1ml of standard monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these nominal sizes: 0.05µm, 0.2µm, 0.5µm, 1.0µm, 45.0µm, 90.0µm.

16905-1	1 kit



Polybead® Functionalized Microspheres

Polybead® Amino Microspheres A2dm

Polybead® Amino Microspheres are monodisperse polystyrene microspheres that contain surface primary amine groups. Protein coupling using glutaraldehyde as a coupling agent will result in protein binding 11-12 carbon atoms from the surface of the bead. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions. See *Glutaraldehyde Kit with Hollow Fiber Filtering System*, page 242; also see *Glutaraldehyde Kit for Amino and Blue Dyed Microspheres*, page 242.

Coefficient of Variance

0.10µm	≤25%	16586-5	5ml
0.20µm	≤20%	15699-5	5ml
0.50µm	≤11%	07763-5	5ml
0.75µm	≤3%	17144-5	5ml
1.00µm	≤6%	17010-5	5ml
3.00µm	≤5%	17145-5	5ml
6.00µm	≤10%	19118-2	2ml

Polybead® Carboxylate Microspheres A2dm

Polybead® Carboxylate Microspheres are monodisperse polystyrene microspheres that contain surface carboxyl groups. This allows for covalent binding of proteins to the bead surface. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions. See *PolyLink Protein Coupling Kit for Carboxylate Microspheres*, page 242.

Coefficient of Variance

0.05µm	≤15%	15913-10	10ml
0.10µm	≤15%	16688-15	15ml
0.20µm	≤8%	08216-15	15ml
0.35µm	≤5%	21753-15	15ml
0.50µm	≤3%	09836-15	15ml
0.75µm	≤3%	07759-15	15ml
1.00µm	≤3%	08226-15	15ml
2.00µm	≤5%	18327-10	10ml
3.00µm	≤5%	09850-5	5ml
4.50µm	≤7%	17140-5	5ml
6.00µm	≤10%	17141-5	5ml
10.0µm	≤15%	18133-2	2ml
20.0µm	≤10%	24811-2	2ml

Polybead® Carboxy-Sulfate Microspheres A2dm

Polybead® Carboxy-Sulfate Microspheres are monodisperse, surfactant-free polystyrene microspheres. We manufacture these particles to have sulfate charge groups in addition to carboxyl groups. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions.

1.00µm		19406-15	15ml

Polybead® Sulfate Microspheres *A2dm*

Polybead® Sulfate Microspheres are monodisperse polystyrene microspheres that offer a higher level of surface sulfate groups than our standard polystyrene microspheres. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions.

0.20µm	19402-15	15ml
0.50µm	19403-15	15ml
1.00µm	19404-15	15ml
2.00µm	19405-10	10ml

Polybead® Hydroxylate Microspheres *A2dm*

Polybead® Hydroxylate Microspheres are monodisperse polystyrene microspheres that contain surface hydroxyl groups. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions.

0.20µm	15717-15	15ml
0.50µm	07762-15	15ml
0.75µm	19128-15	15ml
1.00µm	17142-15	15ml
2.00µm	19129-10	10ml
3.00µm	17143-5	5ml

Polybead® Functionalized Microsphere Kits**Polybead® Amino Sampler Kit** *A2dmw*

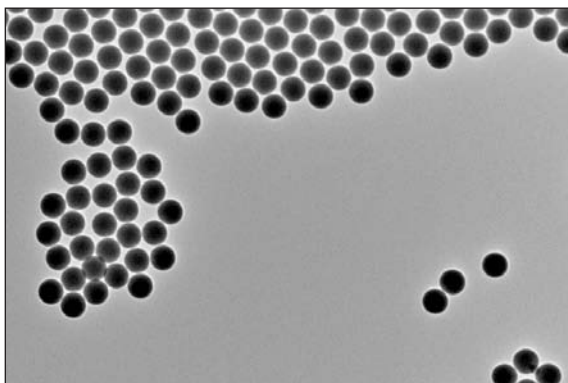
Kit contains 5ml of amino monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these nominal sizes: 0.5µm, 0.75µm, 1.0µm, 3.0µm.

Polybead® Carboxylate Sampler Kit I *A2dmw*

Kit contains 5ml of carboxylate monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these nominal sizes: 0.5µm, 0.75µm, 1.0µm, 2.0µm, 3.0µm.

Polybead® Carboxylate Sampler Kit II *A2dmw*

Kit contains a hollow fiber filter-based separation device for washing and handling small particles and 5ml of monodisperse carboxylate polystyrene microspheres (2.5% solids [w/v] in water) for each of these nominal sizes: 0.1µm, 0.2µm, 0.35µm, 0.5µm.

**PolyPointer** ⚡

Polybeads® are produced in our FDA registered facility, which is audited regularly for its GMP compliance.

Polybead® Dyed Microspheres

Polysciences is the leading supplier of visibly dyed polystyrene microspheres to the latex diagnostic marketplace. Diagnostic manufacturers rely on our precisely controlled particle synthesis to ensure reproducibility in both assay design and performance. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions and are available in a variety of nominal mean diameters and colors. See Technical Data Sheet #238D

Polybead® Blue Dyed Microspheres* A2dm

0.20µm	15706-15	15ml
0.50µm	15709-15	15ml
1.00µm	15712-15	15ml
3.00µm	17138-15	15ml
6.00µm	15715-5	5ml
10.0µm	18138-2	2ml

**Blue Dyed Microspheres also have amine groups and can be used for covalent coupling procedures using glutaraldehyde. See Technical Data Sheet #238G*

Polybead® Red Dyed Microspheres A2dm

0.20µm	15705-15	15ml
0.50µm	15708-15	15ml
1.00µm	15711-15	15ml
3.00µm	17137-15	15ml
6.00µm	15714-5	5ml

Polybead® Violet Dyed Microspheres A2dm

0.50µm	24064-15	15ml
0.80µm	24065-15	15ml
1.00µm	18134-15	15ml
3.00µm	18135-15	15ml
6.00µm	18136-5	5ml
10.0µm	18139-2	2ml

Polybead® Yellow Dyed Microspheres A2dm

0.20µm	15707-15	15ml
0.50µm	15710-15	15ml
1.00µm	15713-15	15ml
3.00µm	17139-15	15ml
6.00µm	15716-5	5ml
10.0µm	18337-2	2ml

Polybead® Black Dyed Microspheres A2dm

0.20µm	24290-15	15ml
0.50µm	24291-15	15ml
1.00µm	24287-15	15ml
3.00µm	24292-15	15ml
6.00µm	24293-5	5ml
10.0µm	24294-2	2ml

Polybead® Dyed Microsphere Kits

Polybead® Blue Dyed Microsphere Sampler Kit A2dmw 19821-1 1 kit
Kit contains 5ml of blue dyed monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these nominal sizes: 0.2µm, 0.5µm, 1.0µm, 3.0µm.

Polybead® Dyed Microsphere Sampler Kit I A2dmw 16906-1 1 kit
Kit contains 1ml of dyed 1.0µm monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these colors: red, blue, yellow, violet and unlabeled.

Polybead® Dyed Microsphere Sampler Kit II A2dmw 18336-1 1 kit
Kit contains 1ml of dyed and fluorescent 1.0µm monodisperse polystyrene microspheres (2.5% solids [w/v] in water) for each of these colors: red, blue, yellow, violet and Fluoresbrite® YG, BB, YO, PC Red and unlabeled. See spectra on pages 236-238.

Polybead® Carboxylate Dyed Microspheres

Polybead® Carboxylate Green Dyed Microspheres A2dm
0.20µm 13371-15 15ml
1.00µm 13370-15 15ml

Polybead® Carboxylate Orange Dyed Microspheres A2dm
0.20µm 13369-15 15ml
1.00µm 13368-15 15ml

Polybead® Carboxylate Blue Dyed Microspheres* A2dm
0.30µm 11975-15 15ml
0.50µm 19816-15 15ml
1.00µm 19120-15 15ml
3.00µm 19123-5 5ml
6.00µm 19126-5 5ml

Polybead® Carboxylate Red Dyed Microspheres A2dm
0.30µm 24063-15 15ml
0.50µm 19815-15 15ml
1.00µm 19119-15 15ml
3.00µm 19122-5 5ml
6.00µm 19125-5 5ml

Polybead® Carboxylate Yellow Dyed Microspheres A2dmw
0.50µm 19817-15 15ml
1.00µm 19121-15 15ml
3.00µm 19124-5 5ml
6.00µm 19127-5 5ml

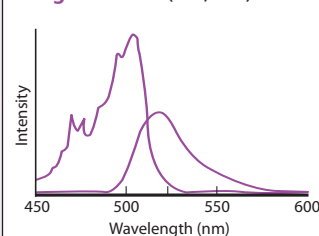
PolyLink Protein Coupling Kit — See page 242

*Blue Dyed Microspheres also have amine groups and can be used for covalent coupling procedures using glutaraldehyde. See Technical Data Sheets #238D and #238G



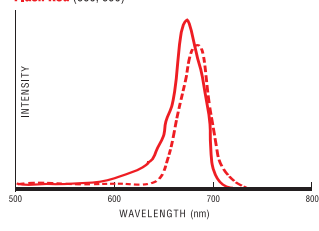
BLIDG06M-1 1 kit

Dragon Green (480, 520)



BLIFR06M-1 1 kit

Flash Red (660, 690)

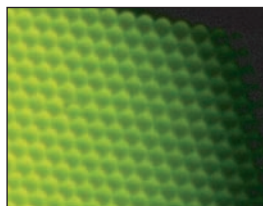


19507-5 5ml
18660-5 5ml
19508-2 2ml
19111-2 2ml

Intensity Standards

Dragon Green Intensity Standard A2dm

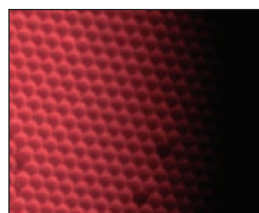
The Dragon Green Intensity Standard kit consists of five populations of ~8µm microspheres dyed with increasing amounts of our Dragon Green fluorophore. The different intensity populations may serve as relative intensity standards in fluorescent microscopy and, as internally-dyed beads, they will stand up to the rigors of imaging. Dragon Green is an excellent spectral surrogate for fluorescein and is suitable for use with fluorescein filter sets.



The beads may also serve as very bright relative intensity or linearity standards for flow cytometry; ask about the Bangs Laboratories, Inc. QuickCal® Linearity Template if this is your interest.

NEW! Flash Red Intensity Standard A2dm

The Flash Red Intensity Standard kit consists of five populations of ~8µm microspheres dyed with increasing amounts of our Flash Red fluorophore. As Flash Red is spectrally similar to Cy™5, traditional red fluorophore filter sets (e.g. Cy™5 / microscope; PE-Cy™5 or APC / cytometer) may be used with the standard. The different intensity populations may serve as relative intensity standards for fluorescence-based applications in microscopy or flow cytometry, and as internally-dyed beads, they will stand up to the rigors of imaging.



The beads may also serve as linearity standards for flow cytometry; ask about the Bangs Laboratories, Inc. QuickCal® Linearity Template if this is your interest.

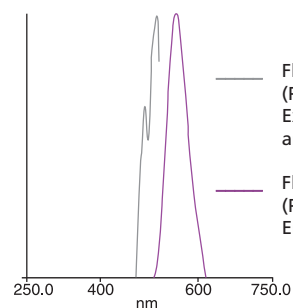
Fluoresbrite® Microspheres

Fluoresbrite® is the trade name for the world's leading fluorescent polystyrene microspheres. Instrument manufacturers and major diagnostic companies turn to Polysciences for consistently superior products and custom fluorescent microspheres. The continued developments by our polymer chemists have resulted in products which lead the market in such applications as diagnostic assays, protein-binding assays, cell tracers and flow cytometry. These microspheres are supplied in sizes with nominal diameters from 50nm to 90µm and packaged as 2.5% solids (w/v) aqueous suspensions.

Fluoresbrite® Polychromatic (PC) Red Microspheres A2dm

Fluoresbrite® Polychromatic Red Microspheres will fluoresce in different colors, depending on the light source and filters used. When viewed under a UV light source, the beads will appear as vivid orange. Microscopic viewing using a 475-490nm filter shows an extremely bright red fluorescence, while use of a 545-610nm filter yields a yellow fluorescence with excitation maxima of 491nm and 512nm and emission maxima at 554nm.

Fluoresbrite® Polychromatic (PC) Red Microspheres Excitation and Emission Spectra



Fluoresbrite® Polychromatic (PC) Microspheres
Excitation Maxima, 491nm
and 512nm

Fluoresbrite® Polychromatic (PC) Microspheres
Emission Maxima, 554nm

0.50µm
1.00µm
2.00µm
6.00µm

Fluoresbrite® Yellow Green (YG) Microspheres A2dm

Fluoresbrite® Yellow Green Microspheres have excitation and emission spectra similar to FITC with excitation maxima of 441nm and emission maxima at 485nm. They are one of the brightest microspheres available at this wavelength and are used extensively in phagocytosis studies, flow cytometry and diagnostic assays. See YG spectra on page 238.



	Catalog #	Size
0.05µm	17149-10	10ml
0.10µm	17150-10	10ml
0.20µm	17151-10	10ml
0.50µm	17152-10	10ml
0.75µm	17153-10	10ml
1.00µm	17154-10	10ml
2.00µm	18338-5	5ml
3.00µm	17155-2	2ml
6.00µm	17156-2	2ml
10.0µm	18140-2	2ml
20.0µm	19096-2	2ml
25.0µm	18241-2	2ml
45.0µm	18242-2	2ml
90.0µm	18243-2	2ml

Fluoresbrite® Yellow Green (YG) Microspheres, Calibration Grade A2dm

A special grade of Fluoresbrite® Yellow Green Microspheres that have been evaluated both for particle diameter, as well as the uniformity of the fluorescent dye distribution. Instrument manufacturers have demanded these high quality particles for their flow cytometry standards. See YG spectra on page 238. For the size range kit, see page 240.

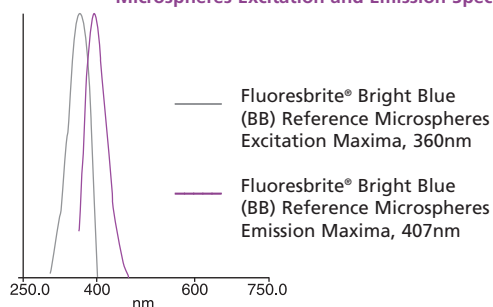
0.50µm	18859-1	1ml
1.00µm	18860-1	1ml
2.00µm	18604-1	1ml
3.00µm	18861-1	1ml
6.00µm	18862-1	1ml

Fluoresbrite® Carboxylate Microspheres

Fluoresbrite® Carboxylate Microspheres are fluorescent monodisperse polystyrene microspheres that have carboxylate groups on their surfaces which can be activated for the covalent coupling of proteins. Polysciences' Fluoresbrite® particles are used extensively in phagocytosis and neural retrograde transport studies and as markers for cell bound antigens. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions. See PolyLink Protein Coupling Kit, page 242.

Fluoresbrite® Bright Blue (BB) Carboxylate Microspheres A2dm

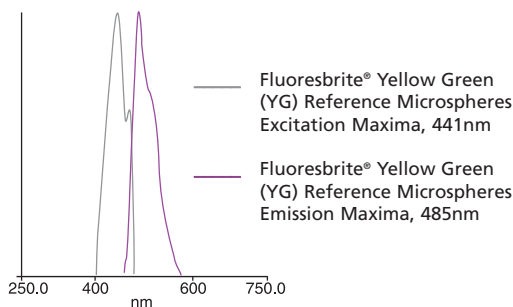
**Fluoresbrite® Bright Blue (BB) Reference
Microspheres Excitation and Emission Spectra**



0.05µm	19773-10	10ml
0.10µm	19774-10	10ml
0.50µm	18339-10	10ml
1.00µm	17458-10	10ml
1.75µm	17686-5	5ml
4.50µm	18340-5	5ml
6.00µm	19102-2	2ml
10.0µm	19103-2	2ml

Fluoresbrite® Yellow Green (YG) Carboxylate Microspheres A2dm

Fluoresbrite® Yellow Green (YG) Reference
Microspheres Excitation and Emission Spectra



YG COOH Size Range Kits — See page 240

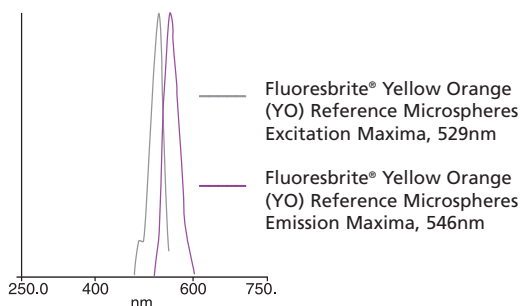
0.05µm	
0.10µm	
0.20µm	
0.30µm	
0.35µm	
0.40µm	
0.50µm	
0.75µm	
1.00µm	
1.50µm	
1.75µm	
2.00µm	
3.00µm	
4.50µm	
6.00µm	
10.0µm	

Catalog # Size

16661-10	10ml
16662-10	10ml
09834-10	10ml
24051-10	10ml
24052-10	10ml
24053-10	10ml
15700-10	10ml
07766-10	10ml
15702-10	10ml
09719-10	10ml
17687-5	5ml
09847-5	5ml
17147-5	5ml
16592-5	5ml
18141-2	2ml
18142-2	2ml

Fluoresbrite® Yellow Orange (YO) Carboxylate Microspheres A2dm

Fluoresbrite® Yellow Orange (YO) Reference
Microspheres Excitation and Emission Spectra



0.05µm	
0.10µm	
0.20µm	
0.50µm	
1.00µm	
1.75µm	
3.00µm	
4.50µm	
6.00µm	

19775-10	10ml
18719-10	10ml
19391-10	10ml
18720-10	10ml
18449-10	10ml
19392-5	5ml
19393-5	5ml
19394-5	5ml
19395-2	2ml

YO has limited water solubility and some leaching may occur.

Polysciences' dyes match popular filter settings:

YG = FITC
YO = Rhodamine
PC RED = Phycoerythrin

Fluoresbrite® Multifluorescent Microspheres A2dm

Fluoresbrite® Multifluorescent Microspheres are offered in three sizes. Each microsphere is dyed with three different fluorescent dyes with excitation maxima of 377, 517 and 588nm and emission maxima of 479, 546 and 612nm, respectively. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions.

0.20µm	
0.50µm	
1.00µm	

24050-5	5ml
24054-5	5ml
24062-5	5ml

Fluoresbrite® PolyFluor® Microspheres *A2dm*

Fluoresbrite® PolyFluor® Microspheres incorporate a series of polymerizable fluorescent compounds which produce fluorescence at a variety of wavelengths. These microspheres have a nominal diameter of 1.0µm. The fluorescence is uniformly distributed throughout the outer 25% of the radii of the particles. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions.

Fluoresbrite® PolyFluor® 345 Microspheres	24055-10	10ml
Fluoresbrite® PolyFluor® 394 Microspheres	24056-10	10ml
Fluoresbrite® PolyFluor® 407 Microspheres	24057-10	10ml
Fluoresbrite® PolyFluor® 497 Microspheres	24058-10	10ml
Fluoresbrite® PolyFluor® 511 Microspheres	24059-10	10ml
Fluoresbrite® PolyFluor® 512 Microspheres	24060-10	10ml
Fluoresbrite® PolyFluor® 570 Microspheres	24061-10	10ml

Dye	Excitation Max. (nm)	Emission Max. (nm)
PolyFluor® 345	285	345
PolyFluor® 394	339	394
PolyFluor® 407	362	407
PolyFluor® 497	355	497
PolyFluor® 511	470	511
PolyFluor® 512	439	512
PolyFluor® 570	548	570

Excitation and emission data listed are for free dyes.

Fluoresbrite® Microsphere Kits**Fluoresbrite® Carboxylate Color Range Kit I** *A2dmw*

Kit contains 1ml each of ~1.75µm Fluoresbrite® monodisperse polystyrene microspheres (2.5% solids [w/v] in aqueous suspension) containing dyes with these excitation maxima: 273nm, 360nm, 441nm, 529nm, 641nm and 763nm.

Excitation Wavelength			
Fluoresbrite® Carboxylate 1.75µm.	273nm	17685-1	1ml
		17685-5	5ml
Fluoresbrite® Carboxylate 1.75µm (BB)	360nm	17686-5	5ml
Fluoresbrite® Carboxylate 1.75µm (YG)	441nm	17687-5	5ml
Fluoresbrite® Carboxylate 1.75µm (YO)	529nm	19392-5	5ml
Fluoresbrite® Carboxylate 1.75µm.	641nm	17797-1	1ml
Fluoresbrite® Carboxylate 1.75µm.	763nm	17690-1	1ml

Catalog #

Size

Fluoresbrite® Carboxylate Color Range Kit II *A2dmw*
 Kit contains 1ml each of ~0.50µm Fluoresbrite® monodisperse polystyrene microspheres (2.5% solids [w/v] in aqueous suspension) containing dyes with these excitation maxima: 273nm, 360nm, 441nm, 529nm, 641nm, 763nm.

Excitation Wavelength

Fluoresbrite® Carboxylate 0.5µm	273nm
Fluoresbrite® Carboxylate 0.5µm (BB)	360nm
Fluoresbrite® Carboxylate 0.5µm (YG)	441nm
Fluoresbrite® Carboxylate 0.5µm (YO)	529nm
Fluoresbrite® Carboxylate 0.5µm	641nm
Fluoresbrite® Carboxylate 0.5µm	763nm

Fluoresbrite® Carboxylate Size Range Kit I *A2dmw*
 Fluoresbrite® Carboxylate Size Range Kits allow you to evaluate which fluorescent particle size performs optimally for your specific application. Kit contains 1ml of Fluoresbrite® YG monodisperse polystyrene microspheres (2.5% solids [w/v] in aqueous suspension) for each of these nominal sizes: 0.10µm, 0.20µm, 0.50µm, 0.75µm, 1.0µm. See *YG spectra on page 238*.

Fluoresbrite® Carboxylate Size Range Kit II *A2dmw*
 Fluoresbrite® Carboxylate Size Range Kits allow you to evaluate which fluorescent particle size performs optimally for your specific application. Kit contains 1ml of Fluoresbrite® YG monodisperse polystyrene microspheres (2.5% solids [w/v] in aqueous suspension) for each of these nominal sizes: 1.75µm, 2.0µm, 3.0µm, 4.5µm, 6.0µm. See *YG spectra on page 238*.

Fluoresbrite® Calibration Grade Size Range Kit *A2dmw*
 Our flow cytometry customers demand precisely manufactured microparticles as calibration tools. Our unique synthesis methods routinely result in particles with fluorescence CV's of less than 5% and often as low as 1%. This kit guarantees that our discriminating customers will have the finest particles with the lowest fluorescence CV currently available from our stock. A range of 5 sizes of Fluoresbrite® YG microspheres can be used to calibrate the green channel. Kit contains 1ml (2.5% solids [w/v] in aqueous suspension) for each of these nominal sizes: 0.5µm, 1.0µm, 2.0µm, 3.0µm, 6.0µm. See *YG spectra on page 238*.

Catalog #	Size
19839-1	1 kit
21118-1	1ml
18339-10	10ml
15700-10	10ml
18720-10	10ml
21116-1	1ml
21117-1	1ml

21636-1 1 kit

21637-1 1 kit

18132-1 1 kit



Protein Conjugated Microspheres

We offer antibodies, Protein A and Protein G covalently coupled to fluorescent YG, non-fluorescent and blue dyed polystyrene microspheres. Antibody conjugated microspheres can be used to detect trace amounts of specific antigens in solution and to deplete them from solution. Microspheres coupled with Protein A and Protein G will bind to the Fc portion of antibodies raised in most mammals. See Technical Data Sheet #615

Our protein conjugated microspheres have a nominal diameter of 1.0µm and are packaged as 1.25% solids (w/v) aqueous suspensions. Proteins of your choice can be coupled to microspheres on a custom basis.

Goat anti-Mouse IgG (H&L)

Blue Dyed Microspheres A2dmx	17697-1	1ml
Undyed Microspheres A2dmx	17694-1	1ml
Fluoresbrite® YG Microspheres A2dmx	17843-1	1ml

Goat anti-Rabbit IgG (H&L)

Blue Dyed Microspheres A2dmx	17696-1	1ml
Undyed Microspheres A2dmx	17693-1	1ml
Fluoresbrite® YG Microspheres A2dmx	17844-1	1ml

Protein A

Blue Dyed Microspheres A2dmx	17699-1	1ml
Undyed Microspheres A2dmx	17698-1	1ml
Fluoresbrite® YG Microspheres A2dmx	17845-1	1ml

Protein G

Blue Dyed Microspheres A2dmx	21105-1	1ml
Undyed Microspheres A2dmx	21106-1	1ml
Fluoresbrite® YG Microspheres A2dmx	21107-1	1ml

Streptavidin Conjugated Microspheres

Streptavidin is covalently coupled to undyed and Fluoresbrite® YG (excitation: 441nm, emission: 486nm) polystyrene microspheres. These microspheres are packaged as 1.25% solids (w/v) aqueous suspensions. See Technical Data Sheet #616

Fluoresbrite® YG Microspheres, 1.0µm A2dmw	24161-1	1ml
	24161-5	5ml
Undyed Microspheres, 1.0µm A2dmw	24162-1	1ml
	24162-5	5ml
Fluoresbrite® YG Microspheres, 2.0µm A2dmw	24159-1	1ml
	24159-5	5ml
Undyed Microspheres, 2.0µm A2dmw	24160-1	1ml
	24160-5	5ml
Fluoresbrite® YG Microspheres, 6.0µm A2dmw	24157-1	1ml
	24157-5	5ml
Undyed Microspheres, 6.0µm A2dmx	24158-1	1ml
	24158-5	5ml

Sodium Phosphate Storage Buffer — see page 99, in the BioSciences section.

Biotin Conjugated Microspheres

Biotin is covalently coupled to undyed and Fluoresbrite® YG (excitation: 441nm, emission: 486nm) polystyrene microspheres. These microspheres are packaged as 1.25% solids (w/v) aqueous suspensions. See Technical Data Sheet #616

Fluoresbrite® YG Microspheres, 2.0µm A2dmw

24173-1 1ml
24173-5 5ml

Undyed Microspheres, 2.0µm A2dm

24172-1 1ml
24172-5 5ml

Protein Coupling Kits

Protein Coupling Kits for Large (>0.5µm) Microspheres

We offer kits for covalently coupling antibodies and other proteins to Polybead® microspheres greater than 0.5µm in diameter. One kit contains buffers and other reagents for coupling proteins to carboxylate microspheres, while the other kit contains buffers and reagents for coupling proteins to amino and blue dyed microspheres. The contents of each kit are sufficient for coupling proteins to at least fifty 0.5ml samples (2.5% solids [w/v] in aqueous suspension) of microspheres. A detailed instruction sheet is enclosed with each kit. Microspheres must be purchased separately.

PolyLink Protein Coupling Kit for Carboxylate Microspheres HO6bf

The PolyLink Protein Coupling Kit enables researchers to quickly couple proteins to carboxylated microspheres in two hours or less. The procedure provided with the kit has been optimized for polymer microspheres 1µm or larger. See Technical Data Sheet #644



24350-1 1 kit

Kit Contains: 55ml Coupling Buffer, 45ml Wash / Storage Buffer and 0.75g EDAC. Each kit is sufficient for 50 coupling reactions of 200-500µg of protein per reaction.

Glutaraldehyde Kit for Amino and Blue Dyed Microspheres BIX7dw

The Glutaraldehyde Kit contains 3 x 225ml Phosphate Buffered Saline, 2 x 10ml ampoules 25% EM Grade Glutaraldehyde, 60ml 0.2M Ethanolamine in Phosphate Buffered Saline, 60ml Bovine Serum Albumin solution, 60ml Storage Buffer and a labeled mixing and storage bottle. See Technical Data Sheet #238G

19540-1 1 kit

Protein Coupling Kits for Small (0.1 to 0.5µm) Microspheres

These kits offer the same PolyLink (Cat. #24350) and Glutaraldehyde (Cat. #19540) reagents plus a hollow fiber separation device to aid in the washing and isolation steps. Microspheres of 0.1µm to 0.5µm diameter can be handled easily without laborious high speed centrifugation techniques. The device may not be suitable for microspheres smaller than 0.1µm. Detailed instruction sheets are enclosed. Microspheres must be purchased separately.

PolyLink Kit with Hollow Fiber Filtering System BVW7dw

See Technical Data Sheet #238F

24818-1 1 kit

Glutaraldehyde Kit with Hollow Fiber Filtering System BIX7dw

See Technical Data Sheet #644

23964-1 1 kit

ViaCheck™

Viability Controls

Image-based instrument viability controls. Our particle standards offer discrete “live” and “dead” populations. They can be delivered in customizable ratios and concentrations.



Viable (%)	Count or Particles/ml
0	1×10^6
50	1×10^6
75	1×10^6
90	1×10^6
100	1×10^6

Catalog # Size

24622-20	20ml
24623-20	20ml
24624-20	20ml
24625-20	20ml
24626-20	20ml

Concentration Controls

Count or Particles/ml
1×10^6
4×10^6
8×10^6

24627-20	20ml
24628-20	20ml
24629-20	20ml

Flow Check® Microspheres and Kits

Flow Check® beads have been designed to assist flow cytometry users in checking the suitability of their instruments and their procedures. The particles are made from a polystyrene base and stored as an aqueous suspension. The components of the Flow Check® kits are also available individually.



Flow Check® Particles and Compensation Particle Sets

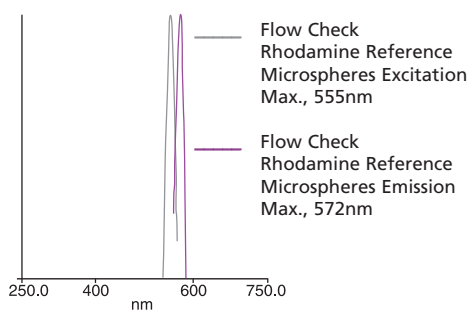
Flow cytometers are complex instruments that require the fluidic system, excitation optics and detection optics to be in optimal working order. The precise alignment of these systems insures the highest levels of sensitivity and repeatability. In addition to optimizing the overall performance of the flow cytometer, it is also necessary to set up the instrument for the particular type of samples being analyzed. To facilitate these processes, Polysciences offers a wide range of fluorescent microspheres for flow cytometry calibration and set up that contain the actual dyes used in antibody conjugations. These particles are “surface dyed” and will closely mimic cells that have membrane bound antibodies conjugated to dyes.

Flow Check® Rhodamine Intensity Set *A2dm*
Flow Check® Rhodamine Intensity Set is composed of 6µm particles labeled with four levels of fluorescence intensity: Low-Brite, Med-Brite, High-Brite and Maxi-Brite. These particles can be used for detection in channels FL2 and FL3 of the flow cytometer. The Flow Check® Rhodamine Intensity Set is supplied with an undyed particle for comparison. All particles are supplied at $\sim 1 \times 10^7$ particles per ml (5ml per component) in an aqueous suspension.

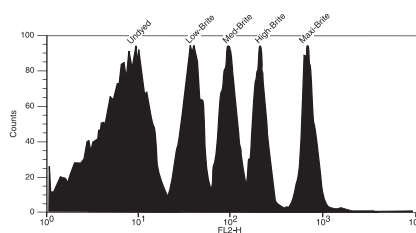
Components

Flow Check® Rhodamine Low-Brite	24257-5	5ml
Flow Check® Rhodamine Med-Brite	24258-5	5ml
Flow Check® Rhodamine High-Brite	24259-5	5ml
Flow Check® Rhodamine Maxi-Brite	24260-5	5ml
Flow Check® Undyed Particle	24262-5	5ml

Flow Check® Rhodamine Reference Microspheres
Excitation and Emission Spectra



Flow Check® Rhodamine Intensity Set

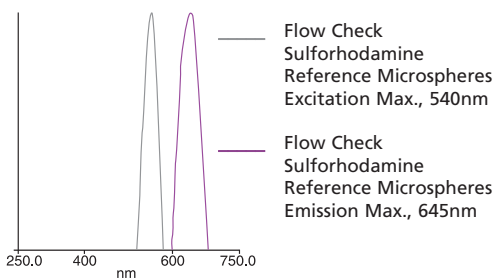


Flow Check® Sulforhodamine Intensity Set *A2dm*
Flow Check® Sulforhodamine Intensity Set is composed of 6µm particles labeled with four levels of fluorescence intensity: Low-Brite, Med-Brite, High-Brite and Maxi-Brite. These particles are specific for green excitation and detection in the FL3 channel of the flow cytometer. The Flow Check® Sulforhodamine Intensity Set is supplied with an undyed particle for comparison. All particles are supplied at $\sim 1 \times 10^7$ particles per ml (5ml per component) in an aqueous suspension.

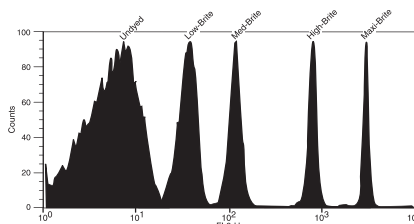
Components

Flow Check® Sulforhodamine Low-Brite	24269-5	5ml
Flow Check® Sulforhodamine Med-Brite	24270-5	5ml
Flow Check® Sulforhodamine High-Brite	24271-5	5ml
Flow Check® Sulforhodamine Maxi-Brite	24272-5	5ml
Flow Check® Undyed Particle	24262-5	5ml

Flow Check Sulforhodamine Reference Microspheres
Excitation and Emission Spectra



Flow Check Sulforhodamine Intensity Set



Catalog # Size

24261-1	1 kit
24257-5	5ml
24258-5	5ml
24259-5	5ml
24260-5	5ml
24262-5	5ml

24273-1	1 kit
24269-5	5ml
24270-5	5ml
24271-5	5ml
24272-5	5ml
24262-5	5ml

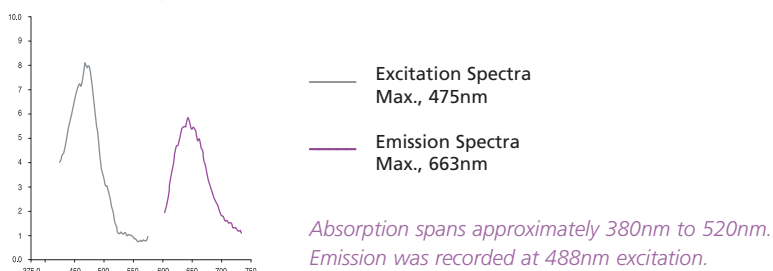
Additional Flow Check® Microspheres and Kits

Flow Check® Ruby Red Fluorescent Microspheres A2dm

Flow Check® Ruby Red Fluorescent Microspheres are 6µm narrow distribution polystyrene particles that can be used for flow cytometry applications where fluorescence emission in the range of 600nm to 710nm is needed. Particles are supplied at an approximate concentration of 5×10^6 microspheres per ml in a convenient dropper bottle. See Technical Data Sheet #624

- Excitation maximum: 475nm
- Emission maximum: 663nm
- Suitable for 488nm excitation, detection in FL3 and 633nm excitation, detection in FL4, APC, APC-Cy™7
- Uses: check and adjust instrument settings, check instrument sensitivity, monitor instrument performance

Excitation and Emission Spectra of Flow Check®
Ruby Red Reference Microspheres in Water



Flow Check® YG Kit 2.0 A2dm

The particles in this kit allow the comparison of various levels of green fluorescence from uniform polystyrene beads. The kit contains one bottle each of a full intensity bead, two intermediate intensity beads and an unlabeled bead. All particles are supplied at $\sim 1 \times 10^7$ particles per ml (10ml per component) in an aqueous suspension. The CV's of these particles offer one of the best combinations of narrow size and fluorescence CV control.

Components

High Intensity	23518-10	10ml
Low Intensity Level 1	23524-10	10ml
Low Intensity Level 2	23525-10	10ml
Unlabeled	23526-10	10ml

Flow Check® YG Kit 6.0 A2dm

The particles in this kit allow the comparison of various levels of green fluorescence from monodisperse polystyrene beads. The kit contains one bottle each of a full intensity bead, two intermediate intensity beads and an unlabeled bead. All particles are supplied at $\sim 2 \times 10^6$ particles per ml (10ml per component) in an aqueous suspension.

Components

High Intensity	23519-10	10ml
Low Intensity Level 1	23522-10	10ml
Low Intensity Level 2	23523-10	10ml
Unlabeled	23521-10	10ml

Catalog # Size

24288-5 5ml

23513-1 1 kit

23518-10 10ml
23524-10 10ml
23525-10 10ml
23526-10 10ml

23512-1 1 kit

23519-10 10ml
23522-10 10ml
23523-10 10ml
23521-10 10ml

Flow Check® BB/YG Compensation Kit *A2dm*
 This kit contains two types of 0.5µm particles supplied at ~1x10⁹ particles per ml (10ml per component) and is designed for checking the suitability of systems using both UV excitable dyes with blue emission and 488nm excitable dyes with green emission. The small size has been chosen to coincide with the use of Hoechst dyes for the detection of bacteria. The green particles, which mimic FITC fluorescent signals, are similarly sized and can be separated when using blue or green detection parameters.

Components

YG (Green) Calibration Grade
 BB (Blue) Calibration Grade

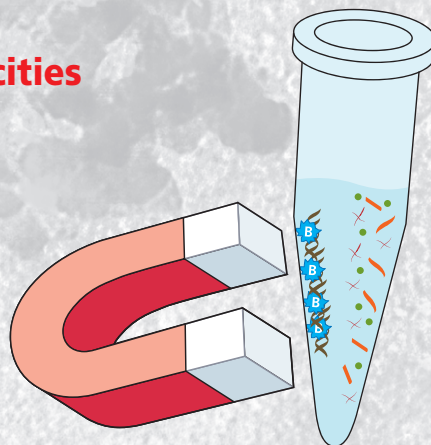
23515-1	1 kit
23516-10	10ml
23520-10	10ml

BioMag® Superparamagnetic Particles

Quickly Isolate DNA/RNA, Proteins, Biotinylated Molecules or Cells

- Higher Binding Capacities
- Irregularly Shaped
- Larger Surface Areas

See page 257



Bangs Flow Cytometry Standards

In order to perform reliable flow cytometric analyses, the instrument must be properly set up and its performance validated. Bangs Flow Cytometry Standards are designed to help achieve these goals and are presented in the following categories: Instrument Set-Up, Calibration, Validation and Data Analysis. Most of the Bangs Flow Cytometry Standards are available in three convenient sizes: Trial (A Size: 20 tests, 1ml), Standard (B Size: 100 tests, 5ml) and Economy (C Size: 280 tests, 14ml). A test requires one drop (50 μ l) of particle suspension, which is equivalent to ~100,000 particles. Bangs Flow Cytometry Standards are ~7-9 μ m in diameter (unless otherwise noted) to approximate the size of human lymphocytes. QuantumPlex™ for particle-based flow assays is also featured in this section.



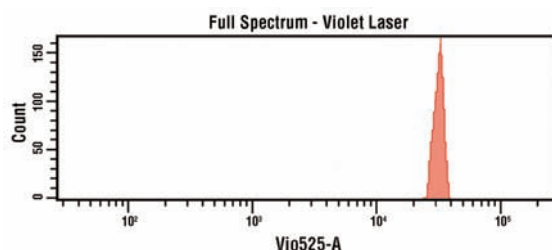
Instrument Set-Up

General Fluorescence Reference Standards

Full Spectrum™ adm

The Full Spectrum™ multi-color reference standards are highly uniform microspheres which fluoresce over a broad range of the spectrum to provide several reference positions in multi-detector analysis. This standard is used for daily quality control for flow cytometers. Excited from UV to red, this standard emits over the entire spectrum.

20 tests	BLI885A-1	1ml
100 tests	BLI885B-5	5ml
280 tests	BLI885C-14	2x7ml



Ultra Rainbow Fluorescent Particles adm

Ultra Rainbow Fluorescent Particles are internally labeled with a mixture of fluorophores, which enable them to be excited at wavelengths from 365nm to 650nm.

Ultra Rainbow Fluorescent Particles, ~3.8 μ m

20 tests	BLI610A-1	1ml
100 tests	BLI610B-5	5ml
280 tests	BLI610C-14	2x7ml

Ultra Rainbow Fluorescent Particles, ~10.2 μ m

20 tests	BLI611A-1	1ml
100 tests	BLI611B-5	5ml
280 tests	BLI611C-14	2x7ml

Fluorescence Reference Standards adm

Fluorescence Reference Standards are labeled with specific fluorochromes so that they give rise to the same fluorescence spectra as cells labeled with the same fluorochromes. Fluorescence intensity is similar to biological samples.

Certified Blank™ (no label)

20 tests	BLI890A-1	1ml
100 tests	BLI890B-5	5ml
280 tests	BLI890C-14	2x7ml

General Fluorescence Reference Standards continued

	Catalog #	Size
Autofluor™ Reference Standard		
20 tests	BLI910A-1	1ml
100 tests	BLI910B-5	5ml
280 tests	BLI910C-14	2x7ml
Acridine Orange Reference Standard		
20 tests	BLI897A-1	1ml
100 tests	BLI897B-5	5ml
280 tests	BLI897C-14	2x7ml
Allophycocyanine Reference Standard		
20 tests	BLI901A-1	1ml
100 tests	BLI901B-5	5ml
280 tests	BLI901C-14	2x7ml
APC-Cy™7 Reference Standard		
20 tests	BLI914A-1	1ml
100 tests	BLI914B-5	5ml
280 tests	BLI914C-14	2x7ml
Chlorophyll Reference Standard		
20 tests	BLI898A-1	1ml
100 tests	BLI898B-5	5ml
280 tests	BLI898C-14	2x7ml
Dansyl Chloride Reference Standard		
20 tests	BLI896A-1	1ml
100 tests	BLI896B-5	5ml
280 tests	BLI896C-14	2x7ml
DAPI Reference Standard		
20 tests	BLI906A-1	1ml
100 tests	BLI906B-5	5ml
280 tests	BLI906C-14	2x7ml
Fluorescein Reference Standard		
20 tests	BLI891A-1	1ml
100 tests	BLI891B-5	5ml
280 tests	BLI891C-14	2x7ml
Fluorescein 2µm Reference Standard		
20 tests	BLI851A-1	1ml
100 tests	BLI851B-5	5ml
280 tests	BLI851C-14	2x7ml
Fura 2 Reference Standard		
20 tests	BLI903A-1	1ml
100 tests	BLI903B-5	5ml
280 tests	BLI903C-14	2x7ml
Hoechst 33342 Reference Standard		
20 tests	BLI894A-1	1ml
100 tests	BLI894B-5	5ml
280 tests	BLI894C-14	2x7ml
Indo 1 Reference Standard		
20 tests	BLI902A-1	1ml
100 tests	BLI902B-5	5ml
280 tests	BLI902C-14	2x7ml

General Fluorescence Reference Standards continued

	Catalog #	Size
Oxazine 1 Reference Standard		
20 tests	BLI900A-1	1ml
100 tests	BLI900B-5	5ml
280 tests	BLI900C-14	2x7ml
PE-Cy[™]5 Reference Standard		
20 tests	BLI908A-1	1ml
100 tests	BLI908B-5	5ml
280 tests	BLI908C-14	2x7ml
PE-Cy[™]7 Reference Standard		
20 tests	BLI889A-1	1ml
100 tests	BLI889B-5	5ml
280 tests	BLI889C-14	2x7ml
PE-TR Reference Standard		
20 tests	BLI909A-1	1ml
100 tests	BLI909B-5	5ml
280 tests	BLI909C-14	2x7ml
Propidium Iodide Reference Standard		
20 tests	BLI892A-1	1ml
100 tests	BLI892B-5	5ml
280 tests	BLI892C-14	2x7ml
Propidium Iodide 2µm Reference Standard		
20 tests	BLI852A-1	1ml
100 tests	BLI852B-5	5ml
280 tests	BLI852C-14	2x7ml
R-Phycoerythrin Reference Standard		
20 tests	BLI899A-1	1ml
100 tests	BLI899B-5	5ml
280 tests	BLI899C-14	2x7ml
Rhodamine B Reference Standard		
20 tests	BLI904A-1	1ml
100 tests	BLI904B-5	5ml
280 tests	BLI904C-14	2x7ml
Rhodamine 123 Reference Standard		
20 tests	BLI907A-1	1ml
100 tests	BLI907B-5	5ml
280 tests	BLI907C-14	2x7ml
Texas Red[®] Reference Standard		
20 tests	BLI893A-1	1ml
100 tests	BLI893B-5	5ml
280 tests	BLI893C-14	2x7ml
T.M. Rhodamine Reference Standard		
20 tests	BLI905A-1	1ml
100 tests	BLI905B-5	5ml
280 tests	BLI905C-14	2x7ml

Unified Fluorescence Intensity Range Products

Right Reference Standard™ *adm*

Each standard consists of a single population of particles labeled with a single fluorochrome at a given reference intensity range (Low, Medium or High) which will provide a unified fluorescence range for a particular fluorescence channel.

Right Reference Standard™ Fluorescein Low - 100 tests	BLI510-5	5ml
Right Reference Standard™ Fluorescein Medium - 100 tests	BLI511-5	5ml
Right Reference Standard™ Fluorescein High - 100 tests	BLI512-5	5ml
Right Reference Standard™ Phycoerythrin Low - 100 tests	BLI513-5	5ml
Right Reference Standard™ Phycoerythrin Medium - 100 tests	BLI514-5	5ml
Right Reference Standard™ Phycoerythrin High - 100 tests	BLI515-5	5ml
Right Reference Standard™ PE-Cy™5 Low - 100 tests	BLI516-5	5ml
Right Reference Standard™ PE-Cy™5 Medium - 100 tests	BLI517-5	5ml
Right Reference Standard™ PE-Cy™5 High - 100 tests	BLI518-5	5ml
Right Reference Standard™ APC Low - 100 tests	BLI519-5	5ml
Right Reference Standard™ APC Medium - 100 tests	BLI520-5	5ml
Right Reference Standard™ APC High - 100 tests	BLI521-5	5ml

Antibody Binding Standards *dm*

Antibody Binding Standards are particles with ligands covalently linked to their surfaces to bind specific proteins (e.g. mouse IgG antibodies) in calibrated quantities.

Simply Cellular® anti-Mouse IgG		
20 tests	BLI810A-1	1ml
100 tests	BLI810B-5	5ml
280 tests	BLI810C-14	2x7ml
Simply Cellular® anti-Human IgG		
20 tests	BLI812A-1	1ml
100 tests	BLI812B-5	5ml
280 tests	BLI812C-14	2x7ml
NEW! Simply Cellular® anti-Rat IgG		
20 tests	BLI813A-1	1ml
100 tests	BLI813B-5	5ml
280 tests	BLI813C-14	2x7ml

QC3™ Reference Standards *adm*

QC3™ are microbeads labeled with fluorochromes for defining an upper fluorescence threshold for each detector in multi-color flow cytometry.

QC3™ (FITC/PE)		
20 tests	BLI841A-1	1ml
100 tests	BLI841B-5	5ml
280 tests	BLI841C-14	2x7ml
QC3™ (FITC/PE/PE-TR)		
20 tests	BLI842A-1	1ml
100 tests	BLI842B-5	5ml
280 tests	BLI842C-14	2x7ml

	Catalog #	Size
QC3™ (FITC/PE/PE-Cy™5)		
20 tests	BLI843A-1	1ml
100 tests	BLI843B-5	5ml
280 tests	BLI843C-14	2x7ml
QC3™ (FITC/PE/PE-Cy™5, APC)		
20 tests	BLI844A-1	1ml
100 tests	BLI844B-5	5ml
280 tests	BLI844C-14	2x7ml
QC Windows® adm		
QC Windows® Kits include both multi-color and blank microbead standards, as well as a Table of Initial Target Channels. These kits allow the operator to establish a unified Window of Analysis for each detector, permitting meaningful data comparison between instruments and over time. Visit www.bangslabs.com for a description of "Window of Analysis".		
QC Windows® (FITC/PE)		
20 tests	BLI845A-1	1ml
100 tests	BLI845B-5	5ml
280 tests	BLI845C-14	2x7ml
QC Windows® (FITC/PE/PE-TR)		
20 tests	BLI846A-1	1ml
100 tests	BLI846B-5	5ml
280 tests	BLI846C-14	2x7ml
QC Windows® (FITC/PE/PE-Cy™5)		
20 tests	BLI847A-1	1ml
100 tests	BLI847B-5	5ml
280 tests	BLI847C-14	2x7ml
QC Windows® (FITC/PE/PE-Cy™5, APC)		
20 tests	BLI848A-1	1ml
100 tests	BLI848B-5	5ml
280 tests	BLI848C-14	2x7ml

Compensation Products

Simply Cellular® Compensation Standard dg

Simply Cellular® Compensation Standard is a mixture of two Simply Cellular® anti-Mouse IgG particle populations capable of binding high and low levels of the mouse monoclonal antibody used in your assay. Ideal for performing compensation in multi-color (2, 3, 4 or more) analysis.

Simply Cellular® Compensation Standard (anti-Mouse) - 100 tests	BLI550-5	5ml
NEW! Simply Cellular® Compensation Standard (anti-Rat) - 100 tests	BLI551-5	5ml
Simply Cellular® Compensation Standard (anti-Human) - 100 tests	BLI552-5	5ml

FITC/PE Compensation Standard adm

The FITC/PE Compensation Standard is a convenient means of setting two color compensation on a flow cytometer. Each kit contains an Autofluor™ bead, as well as a bead labeled with FITC, a bead labeled with PE and one labeled with both FITC and PE.

FITC/PE Compensation Standard

20 tests	
100 tests	
280 tests	

Catalog # Size

BLI820A-1	1ml
BLI820B-5	5ml
BLI820C-14	2x7ml

Quantitation / Calibration Products

Quantum™ MESF adm

Quantum™ MESF Kits consist of a series of reference microbead standards whose intensities have been calibrated in Molecules of Equivalent Soluble Fluorochrome (MESF) units. The kits are used in quantitative fluorescence cytometry to evaluate surface marker expression of cells. Quantum™ MESF Kits may also be used to assess the detection threshold, resolution and linearity of the fluorescent channel. Our free Flow Cytometry Data Analysis template works with all Quantum™ MESF Kits. See *QuickCal® v. 2.3*, page 253.

Quantum™ APC

20 tests	
100 tests	
280 tests	

BLI823A-1	1ml
BLI823B-5	5ml
BLI823C-14	2x7ml

Quantum™ FITC (low level)

20 tests	
100 tests	
280 tests	

BLI824A-1	1ml
BLI824B-5	5ml
BLI824C-14	2x7ml

Quantum™ FITC (low level) premixed

20 tests	
100 tests	
280 tests	

BLI824PA-1	1ml
BLI824PB-5	5ml
BLI824PC-2	2x7ml

Quantum™ FITC (high level)

20 tests	
100 tests	
280 tests	

BLI825A-1	1ml
BLI825B-5	5ml
BLI825C-14	2x7ml

Quantum™ FITC (high level) premixed

20 tests	
100 tests	
280 tests	

BLI825PA-1	1ml
BLI825PB-5	5ml
BLI825PC-2	2x7ml

Quantum™ FITC (medium level)

20 tests	
100 tests	
280 tests	

BLI826A-1	1ml
BLI826B-5	5ml
BLI826C-14	2x7ml

Quantum™ FITC (medium level) premixed

20 tests	
100 tests	
280 tests	

BLI826PA-1	1ml
BLI826PB-5	5ml
BLI826PC-2	2x7ml

Quantum™ R-PE	
20 tests	BLI827A-1
100 tests	BLI827B-5
280 tests	BLI827C-14

Catalog #	Size
BLI827A-1	1ml
BLI827B-5	5ml
BLI827C-14	2x7ml

Quantum™ PE-Cy™5	
20 tests	BLI828A-1
100 tests	BLI828B-5
280 tests	BLI828C-14

BLI828A-1	1ml
BLI828B-5	5ml
BLI828C-14	2x7ml

Quantum™ Simply Cellular® *dm*

Quantum™ Simply Cellular® Kits contain a mixture of microbeads that bind specific amounts of IgG antibodies. These standards are calibrated in terms of Antibody Binding Capacity (ABC) and can be used to construct calibration plots to determine the ABC of unknown samples and monitor instrument performance. Our free Flow Cytometry Data Analysis is designed to work with all Quantum™ Simply Cellular® Kits. See *QuickCal® v. 2.3*, below.

Quantum™ Simply Cellular® anti-Mouse IgG	
20 tests	BLI815A-1
100 tests	BLI815B-5
280 tests	BLI815C-14

BLI815A-1	1ml
BLI815B-5	5ml
BLI815C-14	2x7ml

Quantum™ Simply Cellular® anti-Human IgG	
20 tests	BLI816A-1
100 tests	BLI816B-5
280 tests	BLI816C-14

BLI816A-1	1ml
BLI816B-5	5ml
BLI816C-14	2x7ml

Quantum™ Simply Cellular® anti-Rat IgG	
20 tests	BLI817A-1
100 tests	BLI817B-5
280 tests	BLI817C-14

BLI817A-1	1ml
BLI817B-5	5ml
BLI817C-14	2x7ml

Size Calibration Standards Kit *dm*

The Size Calibration Standards Kit includes five highly uniform unlabeled microbead populations of different diameters, which can be used to construct calibration plots for electronic volume and light scatter instrumentation.

Size Calibration Standards Kit (unstained; ~4-11µm diameter)	
100 tests	BLI829B-5
280 tests	BLI829C-14

BLI829B-5	5ml
BLI829C-14	2x7ml

Flow Cytometry Data Analysis

QuickCal® v. 2.3

QuickCal® utilizes pre-formatted spreadsheet templates to generate standard curves and report sample MESF or ABC values, based on the specific product purchased.

Access a **FREE** quantitative analysis program, QuickCal® v. 2.3, by visiting www.bangslabs.com/products/quickcal and entering the Access Number provided with your standards.

Validation Products

Flow Cytometry Absolute Count Standard™ *A2adm*

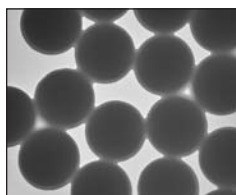
The Flow Cytometry Absolute Count Standard™ consists of highly uniform cell-sized microspheres labeled with a full spectrum dye and provided at a known concentration ($\sim 1 \times 10^6$). These beads fluoresce over a broad range of the spectrum, allowing them to be used as count standards in multiple detectors.

Flow Cytometry Absolute Count Standard™ - 20 tests

Catalog #	Size
BLI580-10	10ml

QuantumPlex™

QuantumPlex™ is an innovative kit for multiple analyte detection research applications in flow cytometry. QuantumPlex™ allows for the detection of up to ten different analytes per sample or for the efficient screening of multiple samples. This results in flexible, efficient and cost-effective research.



QuantumPlex™ kits consist of 5- or 10-particle sets, dyed with varying amounts of Bangs' Starfire Red™ dye, which are suitable for use with any standard flow cytometer. Particles are available with Streptavidin to bind biotinylated ligands, anti-Mouse IgG for binding mouse Ab, or carboxyl groups for direct attachment.

Product Details: We started with two different "cell-sized" carboxyl-modified polystyrene particles and dyed both with five different intensities of dye. Our proprietary fluorochrome, Starfire Red™, is excitable by 488nm and 633nm laser-lines and emits in the red PE-Cy™5 or APC (with minimal carryover into lower wavelengths). Streptavidin, anti-Mouse IgG (Fc), and Carboxyl versions are available for attachment of a range of ligands.

QuantumPlex™ *adm*

QuantumPlex™ anti-Mouse IgG 4.4µm (5 dye intensities)

100 data points	BLI205A-1	5x1ml
500 data points	BLI205B-5	5x5ml
1000 data points	BLI205C-10	5x10ml

QuantumPlex™ anti-Mouse IgG 5.5µm (5 dye intensities)

100 data points	BLI208A-1	5x1ml
500 data points	BLI208B-5	5x5ml
1000 data points	BLI208C-10	5x10ml

QuantumPlex™ anti-Mouse IgG 4.4 & 5.5µm (2 x 5 dye intensities)

200 data points	BLI209A-2	10x1ml
1000 data points	BLI209B-10	10x5ml
2000 data points	BLI209C-20	10x10ml

QuantumPlex™ Streptavidin 4.4µm (5 dye intensities)

100 data points	BLI215A-1	5x1ml
500 data points	BLI215B-5	5x5ml
1000 data points	BLI215C-10	5x10ml

QuantumPlex™ Streptavidin 5.5µm (5 dye intensities)

100 data points	BLI218A-1	5x1ml
500 data points	BLI218B-5	5x5ml
1000 data points	BLI218C-10	5x10ml

QuantumPlex™ continued

	Catalog #	Size
QuantumPlex™ Streptavidin 4.4 & 5.5µm (2 x 5 dye intensities)		
200 data points	BLI219A-2	10x1ml
1000 data points	BLI219B-10	10x5ml
2000 data points	BLI219C-20	10x10ml
QuantumPlex™ Carboxyl 4.4µm (5 dye intensities)		
100 data points	BLI235A-1	5x1ml
500 data points	BLI235B-5	5x5ml
1000 data points	BLI235C-10	5x10ml
QuantumPlex™ Carboxyl 5.5µm (5 dye intensities)		
100 data points	BLI238A-1	5x1ml
500 data points	BLI238B-5	5x5ml
1000 data points	BLI238C-10	5x10ml
QuantumPlex™ Carboxyl 4.4 & 5.5µm (2 x 5 dye intensities)		
200 data points	BLI239A-2	10x1ml
1000 data points	BLI239B-10	10x5ml
2000 data points	BLI239C-20	10x10ml
QuantumPlex™ SP adm		
QuantumPlex™ is also available as a Single Population (SP).		
QuantumPlex™ SP anti-Mouse IgG 4.4µm		
100 data points	BLI204A-1	1ml
300 data points	BLI204B-3	3ml
QuantumPlex™ SP anti-Mouse IgG 5.5µm		
100 data points	BLI207A-1	1ml
300 data points	BLI207B-3	3ml
QuantumPlex™ SP Streptavidin 4.4µm		
100 data points	BLI214A-1	1ml
300 data points	BLI214B-3	3ml
QuantumPlex™ SP Streptavidin 5.5µm		
100 data points	BLI217A-1	1ml
300 data points	BLI217B-3	3ml
QuantumPlex™ SP Carboxyl 4.4µm		
100 data points	BLI234A-1	1ml
300 data points	BLI234B-3	3ml
QuantumPlex™ SP Carboxyl 5.5µm		
100 data points	BLI237A-1	1ml
300 data points	BLI237B-3	3ml

QuantumPlex™ continued

QuantumPlex™M adm

The QuantumPlex™M kit consists of 5-bead sets of ~6µm highly uniform superparamagnetic microspheres, internally dyed with varying intensities of our Starfire Red™ fluorescent dye.

QuantumPlex™M Carboxyl ~6µm Magnetic (5 dye intensities)

100 data points	BLI250A-1	5x1ml
500 data points	BLI250B-5	5x5ml
1000 data points	BLI250C-10	5x10ml

QuantumPlex™M Streptavidin ~6µm Magnetic (5 dye intensities)

100 data points	BLI252A-1	5x1ml
500 data points	BLI252B-5	5x5ml
1000 data points	BLI252C-10	5x10ml

QuantumPlex™M SP adm

QuantumPlex™M is also available as a Single Population (SP).

QuantumPlex™M SP Carboxyl ~6µm Magnetic

100 data points	BLI251A-1	1ml
300 data points	BLI251B-3	3ml

QuantumPlex™M SP Streptavidin ~6µm Magnetic

100 data points	BLI253A-1	1ml
300 data points	BLI253B-3	3ml

Magnetic Particles

Superparamagnetic Microparticles

These superparamagnetic microparticles are available with plain or functionalized surfaces for passive adsorption or covalent attachment. They will respond to a magnetic field, will easily resuspend when the field is removed and are useful in a variety of applications that require fast, gentle separation during washing and isolation procedures. These particles are packaged as 2.5% solids (w/v) aqueous suspensions.

Polystyrene Superparamagnetic Microspheres, 1-2µm A2dm	18190-2	2ml
	18190-5	5ml

Fluorescent YG Superparamagnetic Microspheres, 1-2µm A2dm	19133-2	2ml
	19133-5	5ml

Amino Superparamagnetic Microspheres, 1-2µm A2dm	18879-2	2ml
	18879-5	5ml

Iron Oxide Particles

Black Iron Oxide Particles, 0.2µm A2g	17526-1	1g
	17526-5	5g

Red Iron Oxide Particles, 0.3-0.8µm H2g	07674-1	1g

Iron Powder, Ferromagnetic

Spherical Iron Powder, 2-3µm H2bg	19844-1	1g

Spherical Iron Powder, 4-5µm H2bg	19829-1	1g

BioMag® Superparamagnetic Particles

BioMag® Superparamagnetic Particles are irregularly shaped iron oxide particles between 1-2µm with a mean diameter of ~1.5µm. The particles are covered with a silane coating which provides functional groups for the attachment of proteins or antibodies. The irregular shape of the BioMag® particles provides increased surface area that results in high binding ability.



BioMag® Magnetic Immobilization Kit

The BioMag® Magnetic Immobilization Kit contains unconjugated BioMag® Amine particles (Cat. #84100), a BioMag® Flask Separator (Cat. #84101S), and ultrapure glutaraldehyde.

BioMag® Unconjugated Particles *A2dm*

	Concentration	Stoichiometry		
BioMag® Amine*	50mg/ml	240µmol/g	84100-10	10ml
			84100-100	100ml
BioMag® Carboxyl*	20mg/ml	240µmol/g	84125-10	10ml
			84125-100	100ml

BioMag® Secondary Antibody Particles *A2dm*

	Concentration	Binding Capacity		
BioMag® Goat anti-Rabbit IgG*	1mg/ml	>0.20mg/ml	84300-50	50ml
			84300-500	500ml
BioMag® Goat anti-Human IgG*	1mg/ml	>0.10mg/ml	84320-50	50ml
BioMag® Goat anti-Human IgG (Fc)*	5mg/ml	>0.20mg/ml	84324-50	50ml
BioMag® Goat anti-Human IgM*	1mg/ml	>0.15mg/ml	84325-50	50ml
BioMag® Goat anti-Rat IgG*	1mg/ml	>0.15mg/ml	84330-50	50ml
			84330-500	500ml
BioMag® Goat anti-Rat IgG (Fc)*	5mg/ml	>0.20mg/ml	84334-50	50ml
			84334-500	500ml
BioMag® Goat anti-Rat IgM*	5mg/ml	>0.10mg/ml	84335-50	50ml
			84335-500	500ml
BioMag® Goat anti-Mouse IgG*	1mg/ml	>0.20mg/ml	84340-50	50ml
			84340-500	500ml
BioMag® Goat anti-Mouse IgG (Fc)*	5mg/ml	>0.15mg/ml	84344-50	50ml
			84344-500	500ml
BioMag® Goat anti-Mouse IgM*	1mg/ml	>0.20mg/ml	84350-50	50ml
			84350-500	500ml

BioMag® anti-Human Leukocyte Particles *A2dm*

	Concentration	Cellular Distribution		
BioMag® SelectaPure anti-Human CD2*	~4mg/ml	Thymocytes, T cells	85002-5	5ml
BioMag® SelectaPure anti-Human CD3*	~4mg/ml	Pan T Mature	85003-5	5ml
BioMag® SelectaPure anti-Human CD4*	~1.5mg/ml	T Helper	85004-5	5ml
BioMag® SelectaPure anti-Human CD8*	~1.5mg/ml	Suppressor Cytotoxic T cells	85008-5	5ml
BioMag® SelectaPure anti-Human CD11b*	~1mg/ml	Activated Lymphocytes, Monocytes	85011-5	5ml
BioMag® SelectaPure anti-Human CD14*	~1.5mg/ml	Monocytes	85014-5	5ml
BioMag® SelectaPure anti-Human CD16*	~4mg/ml	NK cells	85016-5	5ml
BioMag® SelectaPure anti-Human CD19*	~4mg/ml	B Progenitors Pan B	85019-5	5ml
BioMag® SelectaPure anti-Human CD34*	~4mg/ml	Myeloid cells	85034-5	5ml
BioMag® SelectaPure anti-Human CD45*	~4mg/ml	Common Leukocyte cells	85045-5	5ml
BioMag® SelectaPure anti-Human CD56*	~4mg/ml	NK cells, Neuroectodermal cells	85056-5	5ml
BioMag® SelectaPure anti-Human CD71*	~4mg/ml	Proliferating Neoplastic cells	85071-5	5ml

*Cold pack charge required.

Catalog # Size

84001K-1 1 kit

84100-10 10ml
84100-100 100ml

84125-10 10ml
84125-100 100ml

84300-50 50ml
84300-500 500ml
84320-50 50ml
84324-50 50ml
84325-50 50ml
84330-50 50ml
84330-500 500ml
84334-50 50ml
84334-500 500ml
84335-50 50ml
84335-500 500ml
84340-50 50ml
84340-500 500ml
84344-50 50ml
84344-500 500ml
84350-50 50ml
84350-500 500ml

BioMag® Superparamagnetic Particles continued

BioMag® anti-Mouse Leukocyte Particles A2dm

Concentration Cellular Distribution

BioMag® SelectaPure anti-Mouse CD4*	~1mg/ml	T Helper
BioMag® SelectaPure anti-Mouse CD8a*	~1mg/ml	Suppressor Cytotoxic T cells
BioMag® SelectaPure anti-Mouse CD45R*	~1mg/ml	Restricted Leukocyte cells

Negative Selection Cell Sorting Particles A2dm

Concentration

BioMag® SelectaPure Human CD3+	~1mg/ml	
T cell Enrichment System*		
BioMag® SelectaPure Human CD4+	~1mg/ml	
T cell Enrichment System*		
BioMag® SelectaPure Human CD8+	~1mg/ml	
T cell Enrichment System*		

BioMag® Binding Proteins A2dm

Concentration

BioMag® Protein A*	.5mg/ml	
BioMag® Protein G*	.5mg/ml	
BioMag® Biotin*	.5mg/ml	
BioMag® Streptavidin*	.5mg/ml	

BioMag® Dextran-coated Charcoal A2dm

Concentration

Diameter

BioMag® Dextran-coated Charcoal*	5mg/ml	~7µm
BioMag® Dextran-coated Charcoal Concentrate*	50mg/ml	~7µm

BioMag® Nucleic Acid Kits and Particles

BioMag® SelectaPure mRNA Purification System A2dm

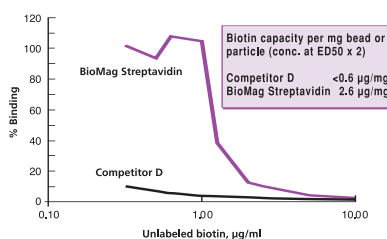
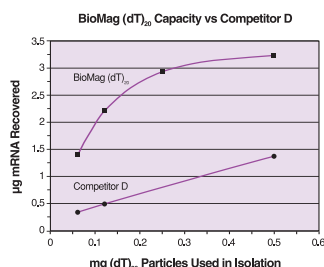
Isolates mRNA from total RNA or tissue in 15-45 minutes depending upon sample.

BioMag® Oligo (dT)₂₀, Nuclease-free A2dm

BioMag® Oligo (dT)₂₀, Nuclease-free particles purify mRNA from total RNA, tissue and cells in 15-45 minutes depending upon sample.

BioMag® Streptavidin, Nuclease-free A2dm

A suspension of nuclease-free streptavidin attached to BioMag® particles for capturing or immobilizing biotinylated compounds.



*Cold pack charge required.

ProMax Albumin Removal Kit A2dm

Based on patented BioMag® superparamagnetic particle technology, the ProMax Albumin Removal Kit depletes albumin from human serum samples in 30 minutes or less. ProMax Albumin Removal particles, along with optimized buffers, allow the binding and release of the less abundant proteins in serum while minimizing the binding of albumin, so that it may be washed away. The kit is supplied with all the components needed for carrying out 25 procedures. See Technical Data Sheet #658


ProMax Serum IgG Removal Kit A2dm

Reveal biomarkers in four easy steps. Based on patented BioMag® superparamagnetic particle technology, the ProMax Serum IgG Removal Kit selectively removes IgG from human serum samples in less than 30 minutes. The kit contains enough ProMax IgG Removal particles and optimized buffers for 10 reactions. Remove serum albumin from your IgG depleted samples with the ProMax Albumin Removal Kit. See Technical Data Sheet #659


BioMag® Maxi, ~6µm A2dm

BioMag® Maxi superparamagnetic particles are irregularly shaped iron oxide particles of ~6µm in size. This size distinguishes BioMag® Maxi from BioMag® particles, which are ~1.5µm and BioMag®Plus particles, which are ~1.0µm in size. It has been shown that larger, more dense particles are more efficient in immunomagnetic capture assays, especially in viscous solutions.

Concentration

BioMag® Maxi Carboxyl* 20mg/ml
See Technical Data Sheet #721

BioMag® Maxi Amine* 50mg/ml
See Technical Data Sheet #722

BioMag® Superparamagnetic Iron Oxide, ~10µm A2dm

Concentration

BioMag® Superparamagnetic Iron Oxide* 50mg/ml

BioMag®Plus Superparamagnetic Particles

BioMag®Plus Superparamagnetic Particles have a large available surface area due to their irregular shape – greater than 20 times that of the same size spherical particles. BioMag®Plus particles are approximately ~1µm in size. The small size of BioMag®Plus particles provides enormous binding capacity and fast magnetic separation for the isolation and purification of biological and non-biological molecules.

**BioMag®
Plus**

BioMag®Plus Amine* A2dm

BioMag®Plus Amine superparamagnetic particles offer a high level of amine functionality on magnetically responsive particles. Covalent attachment of proteins can be accomplished via a reaction with glutaraldehyde. These particles are provided as a suspension at 50mg per ml. See Technical Data Sheet #617

*Cold pack charge required.

Catalog #
Size

24351-1 1 kit

24352-1 1 kit

84130-10 10ml

84140-10 10ml

84200-10 10ml

86001-10 10ml

BioMag®Plus Superparamagnetic Particles continued

BioMag®Plus Amine Protein Coupling Kit* <i>HOV6d</i> The BioMag®Plus Amine Protein Coupling Kit provides all the reagents necessary for the covalent attachment of proteins to BioMag®Plus Amine superparamagnetic particles. The contents of the kit are sufficient for five coupling reactions. The kit includes: 25ml BioMag®Plus Amine, 2x10ml glutaraldehyde (EM Grade, 25%), 5x50ml conical centrifuge tubes, BioMag®MultiSep Magnetic Separator (Cat. #85200-1), 2x125ml Pyridine Wash Buffer (PWB), 2x125ml Quenching Solution (1M Glycine, pH 8.0), and 125ml Wash Buffer. See Technical Data Sheet #617	86000-1	1 kit
BioMag®Plus Carboxyl* <i>A2dm</i> BioMag®Plus Carboxyl superparamagnetic particles are provided for the covalent attachment of proteins using carbodiimide (EDAC method). These particles are provided as a suspension at 20mg per ml. See Technical Data Sheet #618	86011-10	10ml
BioMag®Plus Carboxyl Protein Coupling Kit* <i>HO6bd</i> The BioMag®Plus Carboxyl Protein Coupling Kit includes all of the reagents necessary for the covalent attachment of proteins to BioMag®Plus Carboxyl superparamagnetic particles. The contents of the kit are sufficient for five coupling reactions. The kit includes: 2.5ml BioMag®Plus Carboxyl, 0.10g EDAC (1-ethyl-3-(3-dimethylaminopropyl)carbodiimide), 5x15ml conical centrifuge tubes, BioMag®MultiSep Magnetic Separator (Cat. #85200-1), 2x175ml 0.05M MES buffer (pH 5.2), 25ml Quenching Solution (1.0M Glycine, pH 8.0), and 125ml Wash Buffer. See Technical Data Sheet #618	86010-1	1 kit
BioMag®Plus Goat anti-Mouse IgG* <i>A2dm</i> BioMag®Plus Goat anti-Mouse IgG particles are a suspension of BioMag®Plus superparamagnetic particles that have goat anti-Mouse IgG antibody covalently attached. BioMag®Plus Goat anti-Mouse IgG particles are suitable for enzyme immunoassays that utilize a mouse IgG primary monoclonal antibody and in magnetic cell sorting methods that utilize mouse monoclonal antibodies directed to specific cell surface receptors. See Technical Data Sheet #619	86021-50	50ml
BioMag®Plus Goat anti-Mouse IgG Antibody Coupling Kit* <i>A2dm</i> The BioMag®Plus Goat anti-Mouse IgG Antibody Coupling Kit includes all of the reagents for the attachment of antibodies to BioMag®Plus superparamagnetic particles. The contents of the kit are sufficient for five binding reactions. The kit includes: 25ml BioMag®Plus anti-Mouse IgG, 250ml Coupling/Wash Buffer, 5 x 15ml conical centrifuge tubes and BioMag® MultiSep Magnetic Separator (Cat. #85200-1). See Technical Data Sheet #619	86020-1	1 kit
BioMag®Plus Protein A* <i>A2dm</i> BioMag®Plus Protein A are superparamagnetic particles that have Protein A covalently attached. Isolation of immunoglobulins using BioMag®Plus Protein A particles allows isolation from small samples (50µl or less), as well as the option to easily scale up to larger samples. See Technical Data Sheet #620	86041-2 86041-10	2ml 10ml
BioMag®Plus Protein A Antibody Isolation Kit* <i>A2dm</i> The BioMag®Plus Protein A Antibody Isolation Kit contains all the reagents necessary for the isolation of antibodies from serum and cell culture supernatants. The contents of the kit are sufficient for five binding reactions. The kit includes: 2.5ml BioMag®Plus Protein A, 10 x 1.5ml microcentrifuge tubes, 50ml Protein A Binding/Wash Buffer, BioMag® SoloSep Microcentrifuge Tube Separator (Cat. #8MB4112S-1), 5ml Protein A Elution Buffer and 1ml Protein A Neutralization Buffer. See Technical Data Sheet #620	86040-1	1 kit

*Cold pack charge required.

BioMag®Plus Superparamagnetic Particles continued

BioMag®Plus Protein G* A2dm
BioMag®Plus Protein G are superparamagnetic particles that have Protein G covalently attached. Isolation of immunoglobulins using BioMag®Plus Protein G particles allows isolation from small samples (50µl or less), as well as the option to easily scale up to larger samples. See Technical Data Sheet #620

BioMag®Plus Protein G Antibody Isolation Kit* A2dm
The BioMag®Plus Protein G Antibody Isolation Kit contains all the reagents necessary for the isolation of antibodies from serum and cell culture supernatants. The contents of the kit are sufficient for five binding reactions. The kit includes: 2.5ml BioMag®Plus Protein G, 10 x 1.5ml microcentrifuge tubes, 50ml Protein G Binding/Wash Buffer, BioMag®SoloSep Microcentrifuge Tube Separator (Cat. #8MB4112S-1), 5ml Protein G Elution Buffer and 1ml Protein G Neutralization Buffer. See Technical Data Sheet #620

BioMag®Plus Streptavidin* A2dm
BioMag®Plus Streptavidin are a suspension of superparamagnetic particles that are covalently attached to streptavidin. Use these particles for the capture of biotinylated oligonucleotides, proteins, dNTPs and other molecules. These particles are provided as a suspension at ~5mg per ml. See Technical Data Sheet #621

BioMag®Plus Streptavidin / Biotin Binding Kit* A2dm
The BioMag®Plus Streptavidin / Biotin Binding Kit contains all of the reagents needed for the attachment of biotinylated proteins to BioMag®Plus superparamagnetic particles. The contents of the kit are sufficient for five coupling reactions. The kit includes: 5ml of BioMag®Plus Streptavidin, 250ml Coupling/Wash Buffer, BioMag® MultiSep Magnetic Separator (Cat.# 85200-1) and 5 x 15ml conical centrifuge tubes. See Technical Data Sheet #621

BioMag®Plus Mouse anti-Fluorescein IgG* A2dm
BioMag®Plus Mouse anti-Fluorescein IgG are a suspension of superparamagnetic particles covalently coupled to Mouse anti-Fluorescein IgG antibody. The suspension is supplied at 1mg per ml in Phosphate Buffered Saline (pH 7.4) with EDTA and sodium azide added as stabilizers. These particles are used for the magnetic separation of fluoresceinated cells, components or complexes from solution. See Technical Data Sheet #692

BioMag®Plus Wheat Germ Agglutinin (WGA)* A2dm
BioMag®Plus Wheat Germ Agglutinin (WGA) microparticles provide a convenient means for isolating N-acetylglucosamine-containing glycoproteins from cell lysate or to explore other lectin/glycan-mediated processes. The BioMag®Plus magnetic particle format provides high surface area and permits easy and efficient separations. See Technical Data Sheet #759

BioMag®Plus Concanavalin A (Con A)* A2dm
BioMag®Plus Con A-coated microparticles provide a convenient means for isolating mannosyl and glucosyl-containing glycoproteins and polysaccharides from serum or cell lysate, or for investigating other lectin/glycan-mediated processes. The BioMag®Plus magnetic particle format provides high surface area and permits easy and efficient separations. See Technical Data Sheet #766

Catalog #	Size
86051-2	2ml
86051-10	10ml
86050-1	1 kit
86031-10	10ml
86030-1	1 kit
86053-50	50ml
86054-3	3ml
86054-10	10ml
86057-3	3ml
86057-10	10ml

*Cold pack charge required.

BioMag® Magnetic Separators

BioMag® Flask Separator

For use with tissue culture flasks. Each separator measures 12.5cm x 6cm. For more concentrated solutions of BioMag® and BioMag®Plus, two units are recommended; one for each side of the flask, see inset. See Technical Data Sheet #571



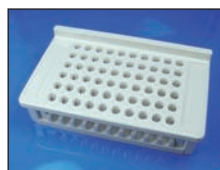
BioMag® 15ml/50ml Tube Separator

Holds five 15ml tubes and three 50ml tubes for cell sorting, small-scale ligand attachment and other applications. See Technical Data Sheet #572



BioMag® 12mm x 75mm Test Tube Separator

Holds sixty 12mm x 75mm tubes for radio-immunoassays and other applications. BioMag® and BioMag®Plus particles pellet at the bottom of the test tube. See Technical Data Sheet #573



BioMag® Multi-32 Microcentrifuge Tube Separator

For molecular biology applications of 0.5ml to 1.5ml. The sixteen tubes in the inner row are magnetically separated, while the sixteen tubes in the outer row are held outside the field for mixing and pipetting. See Technical Data Sheet #574



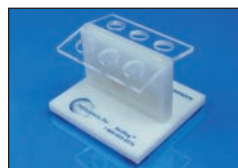
BioMag® 96-Well Plate Separator

For most 96-well plate applications. Particles pellet at the bottom of the plate. See Technical Data Sheet #575



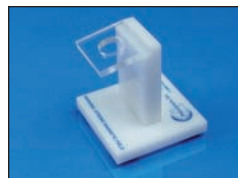
BioMag® Multi-6 Microcentrifuge Tube Separator

Holds six 1.5ml microcentrifuge tubes for separations of 20-500µl. See Technical Data Sheet #576



BioMag® Solo-Sep Microcentrifuge Tube Separator

Holds one 1.5ml microcentrifuge tube for separations of 20-500µl. See Technical Data Sheet #577



Catalog #	Size

84101S-1	1 ea

84102S-1	1 ea

84104S-1	1 ea

84106S-1	1 ea

8MB4109S-1	1 ea

8MB4111S-1	1 ea

8MB4112S-1	1 ea

BioMag® 96-Well Plate Side Pull Magnetic Separator

The BioMag® 96-Well Plate Side Pull Magnetic Separator is designed to work with plates that allow magnetic pins to fit between the well. This allows the BioMag® and BioMag®Plus superparamagnetic particles to be pulled to the side of the wells, giving better access to the bottom of the wells for more complete fluid removal and less chance of particle aspiration. The magnetic separator consists of 24 permanent Neodymium-Iron-Boron rod magnets. Each magnet addresses four wells of a 96-well plate. See Technical Data Sheet #575A



BioMag® MultiSep Magnetic Separator

One magnetic separator that can be used for different tube sizes is a convenient and economical alternative to having a specific magnetic separator for each tube size. The MultiSep can be used with 1.5ml, 15ml or 50ml centrifuge tubes and has a simple robust design. The MultiSep is well suited for those labs that do not need to perform simultaneous multiple magnetic particle separations.



Neodymium Iron Magnet Unit

This rare earth magnet is a Neodymium-Iron-Boron (Nd-Fe-B) block magnet. 1" x 0.5" thick.

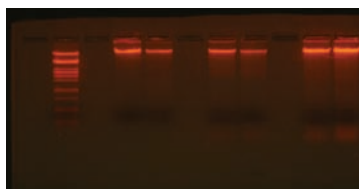
SNARE™ Simple Nucleic Acid Recovery

All **SNARE™** products are based on new, patent pending technology.

SNARE™ Genomic DNA Purification System dm

The SNARE™ Genomic DNA Purification System offers a rapid, cost-effective method for isolating DNA. DNA Separation Particles, supplied in the system, are a suspension of superparamagnetic particles that bind double-stranded DNA. Once bound, the DNA-particle complex is stable, allowing impurities or unwanted proteins to be washed from the sample. The DNA is then eluted from the DNA-particle complex, leaving a clean DNA preparation. Material for 100 isolations. See Technical Data Sheets #710 and #710A

DNA Isolated from Whole Blood



SNARE™ Plasmid DNA Purification System dm

The SNARE™ Plasmid DNA Purification System offers a rapid, cost-effective method for isolating DNA. DNA Separation Particles, supplied in the system, are a suspension of superparamagnetic particles that bind plasmid DNA. Once bound, the DNA-particle complex is stable. Impurities or unwanted proteins can be washed from the sample. The DNA is then eluted from the DNA-particle complex, leaving a clean DNA preparation. Material for 100 isolations. See Technical Data Sheet #711

SNARE™ Plant Genomic DNA Purification System dm

The SNARE™ Plant Genomic DNA Purification System offers a rapid, cost-effective method for isolating DNA. The procedure does not require the use of organic solvents and is adaptable to different plant species. DNA Separation Particles, supplied in the system, are a suspension of superparamagnetic particles that bind double-stranded DNA. Once bound, the DNA-particle complex is stable. Impurities or unwanted proteins can be washed from the sample. The DNA is then eluted from the DNA-particle complex, leaving a clean DNA preparation. Material for 100 isolations. See Technical Data Sheet #712

Catalog #	Size
85072S-1	1 ea
85200-1	1 ea
19772-1	1 ea
85080-1	1 kit
85081-1	1 kit
85082-1	1 kit

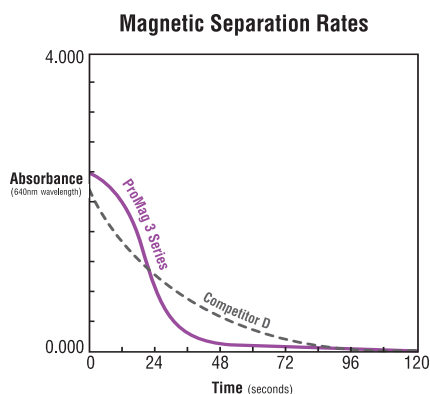
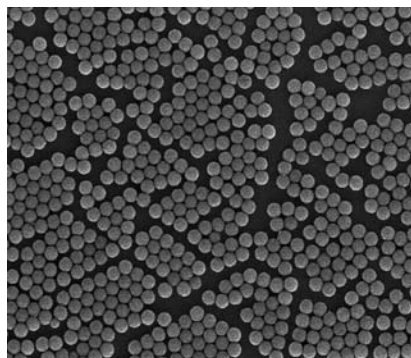
ProMag™

Highly Uniform Superparamagnetic Microspheres

One of the newest additions to our magnetic microsphere product line, ProMag™ is now offered in both 1µm and 3µm sizes. ProMag™ supports diagnostic applications that require highly uniform, high-binding beads and fast separation times. ProMag™ have a proprietary surface to reduce nonspecific binding in protein-based systems and for superior handling without the use of surfactant. For our bulk quantity and OEM customers, ProMag™ will offer superior performance throughout the assay development process and in your customers' hands.

Introducing our VERY BEST superparamagnetic microspheres yet!

The smaller 1µm size offers far greater surface area per unit weight, which can present a considerable advantage for the purification of biomolecules or the capture of low concentration targets. Additionally, smaller diameter spheres remain suspended for longer periods of time, simplifying assay incubation steps. See Technical Data Sheets #755.



NEW! ProMag™ 1 Series – COOH Surfactant-free, 1µm

25029-5 5ml
25029-25 25ml

NEW! ProMag™ 1 Series – Streptavidin, 1µm

25031-1 1ml
25031-2 2ml
25031-5 5ml
25031-10 10ml

ProMag™ 3 Series – COOH Surfactant-free, 3µm

86055-5 5ml
86055-25 25ml

ProMag™ 3 Series – Streptavidin, 3µm

86056-1 1ml
86056-2 2ml
86056-5 5ml
86056-10 10ml

Inorganic Particles

Carbon Graphitized HM5g
0.027-0.030µm

08441-1 1g

Colloidal Gold — See *Unconjugated Gold Colloid*, page 56 of the BioSciences section.

Glass Beads A2g

Polysciences has a full size range of glass beads that are manufactured from specially selected soda lime and borosilicate with a density of $\sim 2.5\text{g/cm}^3$. Glass beads are supplied dry.

3-10 μm	07666-1	1g
10-30 μm	07668-1	1g
30-50 μm	18901-100	100g
50-100 μm	15926-100	100g
105-150 μm	15927-100	100g
150-210 μm	05483-250	250g
210-250 μm	18902-100	100g
250-300 μm	18903-100	100g
355-420 μm	18905-100	100g
420-500 μm	18906-100	100g
500-850 μm	17596-250	250g

Glass Beads, Functionalized H3g

These are high surface area soda lime glass beads which have been functionalized by reaction with the appropriate organosilane. Prior to organosilane treatment, the surfaces of the glass particles are etched. Proteins, peptides, dyes and other compounds can be coupled to the amine-functional beads as supplied and the glycidyl-functional beads after periodate oxidation. Additional sizes are available on a custom basis.

Amine, 30-50 μm	23584-10	10g
Glycidyl, 30-50 μm	23585-10	10g

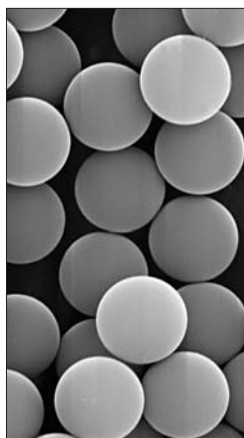
Glass Beads, Hollow A2g

Our hollow glass beads offer the strength and stability of glass with a nominal density of $\sim 1.1\text{g/cc}$.

2-20 μm	19823-5	5g

Silica Microspheres

Polysciences offers monodisperse silica microspheres packaged as economical 10% solids (w/v) aqueous suspensions. One of the advantages of silica microspheres over polymer microspheres is their exceptional stability. In addition, the surface of silica microspheres can be easily functionalized by reaction with organosilanes. Most lots will have CVs of 10-15%. For applications that require highly stringent CVs (e.g. 2-5%), call for product availability.

Silica Plain (Hydrophilic) Microspheres A2dm

Mean Diameter Range	% Solids		
0.15 $\mu\text{m} \pm 0.03\mu\text{m}$	10%	24320-15	15ml
0.3 $\mu\text{m} \pm 0.043\mu\text{m}$	10%	24321-15	15ml
0.4 $\mu\text{m} \pm 0.03\mu\text{m}$	10%	24322-15	15ml
0.5 $\mu\text{m} \pm 0.07\mu\text{m}$	10%	24323-15	15ml
0.7 $\mu\text{m} \pm 0.04\mu\text{m}$	10%	24324-15	15ml
0.9 $\mu\text{m} \pm 0.04\mu\text{m}$	10%	24325-15	15ml
1.0 $\mu\text{m} \pm 0.05\mu\text{m}$	10%	24326-15	15ml
1.5 $\mu\text{m} \pm 0.08\mu\text{m}$	10%	24327-15	15ml
2.0 $\mu\text{m} \pm 0.05\mu\text{m}$	10%	24328-15	15ml
2.5 $\mu\text{m} \pm 0.15\mu\text{m}$	10%	24329-15	15ml
3.0 $\mu\text{m} \pm 0.105\mu\text{m}$	10%	24330-15	15ml
4.0 $\mu\text{m} \pm 0.20\mu\text{m}$	10%	24331-15	15ml
5.0 $\mu\text{m} \pm 0.20\mu\text{m}$	10%	24332-15	15ml

Silica Colloidal Microspheres A2dm

Colloidal silica products are offered as 5% solids dispersions of amorphous silica particles in water with NaOH as a stabilizer. Like our larger silica microspheres, colloidal silica particles may be functionalized by reaction with organosilanes.

Mean Diameter Range	% Solids
0.01µm (broad distribution)	5%
0.05µm ± 0.01µm	5%
0.10µm + 0.03µm	5%

Catalog #	Size
24298-10	10ml
24040-10	10ml
24041-10	10ml

Functionalized Silica Microspheres

Silica Carboxyl Microspheres A2

Carboxylic Acid functionalized, 100% solids. These silica microspheres are available with nominal diameters from 0.5µm to 5.0µm to allow the researcher to tailor his/her product design for specific assays.

0.5µm	24753-1	1g
1.0µm	24754-1	1g
5.0µm	24755-1	1g

Silica Amine Microspheres A2

Amine functionalized, 100% solids. These silica microspheres are available with nominal diameters from 0.5µm to 5.0µm to allow the researcher to tailor his/her product design for specific assays.

0.5µm	24756-1	1g
1.0µm	24757-1	1g
5.0µm	24758-1	1g

Silica Streptavidin-coated Microspheres A2dm

Streptavidin coated, 1% solids. Streptavidin modified microspheres bind biotinylated ligands easily and with great affinity. They are offered as a 1% dispersion in water. These silica microspheres are available with diameters in the range of 0.5µm to 5.0µm.

0.5µm	24759-2	2ml
1.0µm	24760-2	2ml
5.0µm	24761-2	2ml

Natural Biological Particles

Corn Pollen A2g 85-90µm

07664-1 1g

Paper Mulberry Pollen A2g 12-13µm

07670-1 1g

Pecan Pollen A2g 45-52µm

07671-1 1g

Ragweed Pollen A4g 19-20µm

07673-1 1g

Ragweed pollen is a short type, botanical name *Ambrosia artemisiifolia*. It is collected under a vacuum method and exceeds identity and purity by microscopic identification. It contains less than 0.1% contamination with foreign pollens or molds. Plant parts do not exceed 5% for anemophilous (wind pollinated) pollen or 12% for entomophilous (insect pollinated) pollen.

Sporopollenin Lycopodium A4g 28µm

16867-1 1g

Additional Polymer Microspheres

Polysciences is a world leader in the production of high purity, quality polymers and monomers. The products offered below are just a sampling of our extensive line.

Biodegradable Microspheres *CHP6d*

Our biodegradable Poly(DL- ϵ -caprolactone) microspheres are packaged as a 2.5% solids (w/v) suspension in heptane and can be transferred to an aqueous medium. The life of the microspheres in aqueous medium will be limited.

Nominal 1 μ m diameter

21846-10 10ml

Polybead® Acrylate Microspheres *A2dm*

Polybead® Acrylate Microspheres are monodisperse microspheres with surfaces that contain copolymers of styrene and an acrylic ester. The reactive ester sites on the polymer will furnish points for further organic reactions which may lead to innovative forms of activation (e.g. reaction with ammonia may lead to amide formation which may then undergo Beckmann rearrangement). These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions.

Nominal 1 μ m diameter

18602-15 15ml

Polybead® Chloromethyl Microspheres *A2dm*

Polybead® Chloromethyl Microspheres have surfaces with chloromethylstyrene functionality for direct coupling with proteins. These microspheres are packaged as 2.5% solids (w/v) aqueous suspensions.

Nominal 0.5 μ m diameter

17159-5 5ml

Polybead® Crosslinked Melamine Particles *A2dm*

Polybead® Crosslinked Melamine Particles are crosslinked by acid-catalyzed reaction with formaldehyde. The particles have a much higher density (1.51g/cc) than polystyrene, are hydrophilic with amine and methylolamine groups and are not noticeably swelled by organic solvents. The particles can be lyophilized and then redispersed in water. These particles are packaged as 2.5% solids (w/v) aqueous suspensions.

Nominal 1 μ m diameter

23579-5 5ml

Polybead® Hollow Microspheres *A2dm*

The biomedical advantages of a polystyrene surface are combined with a low effective density in this class of microspheres. A relatively dense shell of a polystyrene-based copolymer is formed around a void in the middle of the particle. The void is filled with water when received as a 5% solids (w/v) aqueous suspension and the water-filled particle will have an effective density of near 1.00g/cc. Water is lost from the void upon drying, as the particles are slightly porous. This results in a hollow particle with a shell approximately 0.10 μ m thick. Surfactants on the surface of the spheres help stabilize the particles.

Nominal 0.40 μ m diameter

23567-10 10ml

Nominal 0.55 μ m diameter

23568-10 10ml

Nominal 1.00 μ m diameter

23569-10 10ml

Polybead® Poly(methyl methacrylate) Microspheres A2dm

Polybead® Poly(methyl methacrylate) Microspheres or PMMA are less hydrophobic than polystyrene and should show reduced nonspecific protein and peptide binding. The density of these beads, 1.19g/cc, is considerably higher than that of polystyrene beads, making them easier to concentrate by centrifugation. The beads are not free of surfactant and contain surface carboxylic acid groups at higher concentration than the standard Polybead® Carboxylate Microspheres.

PMMA Microspheres with Anionic Surfactant, 5% solids (w/v), 0.08 - 0.09µm	23570-10	10ml
PMMA Microspheres with Nonionic Surfactant, 5% solids (w/v), 0.08-0.13µm	23571-10	10ml
PMMA Microspheres, Monodisperse, 2.5% solids (w/v), 0.30µm	12083-10	10ml
PMMA Microspheres, Broad Distribution, 5% solids (w/v), 1-10µm	19130-10	10ml

Polystyrene Beads, Large A2g

Large Polystyrene Beads are larger than Polybeads®, yet smaller than Polyballs. We offer a full size range of crosslinked polystyrene beads and can offer particles of intermediate sizes on a custom basis.

106-125µm	19824-1	1g
200-300µm	19825-1	1g
355-425µm	19826-1	1g
500-600µm	21392-1	1g

Poly(styrene/divinylbenzene) [9003-70-7] A2g TSCA

Beads for preparation of crosslinked poly(chloromethylstyrene) Merrifield resins and other functionalized beads.

2.0% DVB, 200-400 mesh	16724-100	100g
8.0% DVB, 200-400 mesh	04022-100	100g

Poly(ethyl methacrylate) Beads [9003-42-3] A2g TSCA

Tough methacrylate resin.

MW 50,000 Tg 65°	03197-250	250g

Poly(4-iodostyrene/styrene/divinylbenzene) ~58:40:2 [72330-89-3] U4g

Iodinated, crosslinked beads that can be further derivatized.

200-400 mesh	18148-5	5g

Poly(4-vinylpyridine/divinylbenzene) Beads [19017-40-7] U7g

Used as an absorbent and ion-exchange resin.

Poly(methyl methacrylate) [9011-14-7] A2g

MW 25,000 ~200µm	04554-500	500g
MW 75,000 ~200µm	04553-500	500g

Polyethylene, Chromatographic Grade [9002-88-4] A2g

Spherical particles, 3-45µm	15184-100	100g
	15184-500	500g

Polypropylene, Chromatographic Grade [9003-07-0] A2g

Nominal 35µm diameter	04342-100	100g

Poly(tetrafluoroethylene) [9002-84-0] A2g

Nominal 35µm diameter (Teflon® 7A)	08816-100	100g

Phenolic Beads, Hollow A2g

5-127µm	17806-100	100g

Polyballs A2g

Polysciences has a line of high quality larger polymer spheres for your research needs. Polyballs have a smooth surface unless noted otherwise.

Polyamide, 6/6 (Nylon), 1/16" Diameter ~1.19g/cc	08295-100	100 balls
Polyethylene, 3/8" Diameter, Hollow ~0.53g/cc	19529-100	100 balls
Polypropylene, 1/4" Diameter ~0.92g/cc	16026-100	100 balls
Polystyrene, 1/4" Diameter ~1.05g/cc	19827-100	100 balls
Polystyrene, 1/4" Diameter, Etched Surface ~1.05g/cc	16730-100	100 balls
	16730-500	500 balls
Polystyrene, 1/8" Diameter, Etched Surface ~1.05g/cc	17175-100	100 balls
Polystyrene, 1/8" Diameter, for Biological Applications ~1.05g/cc	18547-100	100 balls
Polystyrene, 1/4" Diameter, for Biological Applications ~1.05g/cc	18548-100	100 balls
Teflon®, 1/8" Diameter ~2.14g/cc, <i>Chemically resistant</i>	17649-100	100 balls
Teflon®, 1/4" Diameter ~2.14g/cc, <i>Chemically resistant</i>	17650-100	100 balls

Polyballs, Modified A2g

Our high quality Polyball polymer spheres are also offered with modified surfaces to allow covalent coupling of biomolecules, as well as blue dyed for easier visualization.

Polystyrene, 1/8" Diameter, Carboxylate ~1.05g/cc	19841-50	50 balls
Polystyrene, 1/4" Diameter, Carboxylate ~1.05g/cc	19840-50	50 balls
Polystyrene, 1/4" Diameter, Amine Blue Dyed ~1.05g/cc	19842-50	50 balls

Microdispers and DispersEZ PTFE Particles

This novel patented class of polytetrafluoroethylene (PTFE) particles are available in two types. Microdispers particles are provided in a dry powder form and DispersEZ self-stabilized fluoro particles (SSFP) are supplied as a 30% suspension in water or as a solid. These particles range in size from 200nm to 10µm. (Teflon® Nanopowder)

Microdispers-200 [9002-84-0] *H4g*
Polytetrafluoroethylene (PTFE) particles provided in dry powder form. These particles require far less added dispersant than traditional PTFE particles to form stable dispersions. Microdispers particles are useful for many applications, including coatings, gloss reducers and coating additives that impact water pickup or surface energy. With good powder flow properties, these particles are easily compounded in a number of thermoplastic matrices with appropriate heat /shear mixing.

Mean Particle Size: 200 - 300nm

Microdispers-3000 [9002-84-0] *H4g*
Polytetrafluoroethylene (PTFE) particles provided in dry powder form. These particles require far less added dispersant than traditional PTFE particles to form stable dispersions. Microdispers particles are useful for many applications, including coatings, gloss reducers and coating additives that impact water pickup or surface energy. With good powder flow properties, these particles are easily compounded in a number of thermoplastic matrices with appropriate heat /shear mixing.

Mean Particle Size: 3000nm (<10% of particle size distribution is above 10µm)

Microdispers-5000 [9002-84-0] *H4g*
Polytetrafluoroethylene (PTFE) particles provided in dry powder form. These particles require far less added dispersant than traditional PTFE particles to form stable dispersions. Microdispers particles are useful for many applications, including coatings, gloss reducers and coating additives that impact water pickup or surface energy. With good powder flow properties, these particles are easily compounded in a number of thermoplastic matrices with appropriate heat /shear mixing.

Mean Particle Size: 5000nm (<10% of particle size distribution is above 12µm)

Microdispers-8000 [9002-84-0] *H4g*
Polytetrafluoroethylene (PTFE) particles provided in dry powder form. These particles require far less added dispersant than traditional PTFE particles to form stable dispersions. Microdispers particles are useful for many applications, including coatings, gloss reducers and coating additives that impact water pickup or surface energy. With good powder flow properties, these particles are easily compounded in a number of thermoplastic matrices with appropriate heat /shear mixing.

Mean Particle Size: 8000nm

Product Description	Product Form	Mean Particle Size (nm)	Molecular Weight	Surfactant Demand (3)	Surface Area (m ² /g) (4)	Surface Reactivity (5)
Microdispers-200	White powder	200-300	8 x 10 ⁴	Lower	10	Low
Microdispers-3000	White powder	3000 (1)	2 x 10 ⁴	Lower	2	Low
Microdispers-5000	White powder	5000 (2)	2 x 10 ⁴	Much Lower	2	Low
Microdispers-8000	White powder	8000	1 x 10 ⁵	Lower	<2	Low

(1) <10% of particle size distribution is above 10µm. (2) <10% of particle size distribution is above 12µm.

(3) Amount of stabilizer needed to maintain stabilization compared to traditional PTFE powders.

(4) BET surface area measurement. (5) Concentration of accessible reactive sites versus traditional PTFE beads.

Catalog # Size

24333-100 100g

24334-100 100g

24335-100 100g

24336-100 100g

DispersEZ-200W1 [9002-84-0] H4g

A novel patented class of polytetrafluoroethylene particles, our unique DispersEZ particles have chemically treated surfaces to orient stabilizing polar moieties (both hydroxyl and carboxylic acid groups) to the exterior of the particle. These molecules, which are chemically grafted to the PTFE surface, allow the particles to disperse easily in both aqueous and solvent media without the need for added surfactants or stabilizers that can interfere with desired properties. The carboxyl and hydroxyl moieties on the surface of the DispersEZ particles act as synthetic handles to which a variety of chemical species can be attached. Groups such as esters, isocyanates, halogens, aldehydes, ethers and epoxides can be formed with the appropriate reagents, under the proper conditions. Similarly, the surface carboxyl groups can be derivitized with esters and amides. Applications for DispersEZ particles range from solid phase synthesis supports to bioreagents for diagnostic assays.

Mean Particle Size: 200-300nm

Concentration: 30% solids dispersion in water

Surfactant Demand: None (self-stabilized without added surfactant)

Surfactant Reactivity:

Medium (concentration of accessible reactive sites versus traditional PTFE beads)

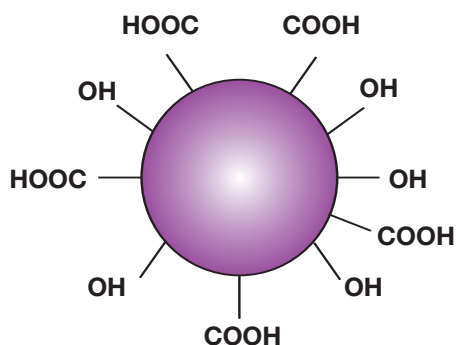
Product Description	Product Form	Mean Particle Size (nm)	Molecular Weight	Surfactant Demand ⁽¹⁾	Surface Area (m ² /g) ⁽²⁾	Surface Reactivity ⁽³⁾
DispersEZ-200W1	30% solids dispersion in H ₂ O	200-300	1 x 10 ⁶	None ⁽⁴⁾	10	Medium
DispersEZ-300	Cream colored powder	200-300	1 x 10 ⁵	None ⁽⁴⁾	8	High

⁽¹⁾ Amount of stabilizer needed to maintain stabilization compared to traditional PTFE powders.

⁽²⁾ BET surface area measurement.

⁽³⁾ Concentration of accessible reactive sites versus traditional PTFE beads.

⁽⁴⁾ Self-stabilized without added surfactant.



Using a patented process, our unique DispersEZ particles have chemically treated surfaces to orient stabilizing polar moieties (both hydroxyl and carboxylic acid groups) to the exterior of the bead.

Catalog #	Size
24337-100	100g

DisperseEZ-300 [9002-84-0] H4g

A novel patented class of polytetrafluoroethylene particles, our unique DisperseEZ particles have chemically treated surfaces to orient stabilizing polar moieties (both hydroxyl and carboxylic acid groups) to the exterior of the particle. These molecules, which are chemically grafted to the PTFE surface, allow the particles to disperse easily in both aqueous and solvent media without the need for added surfactants or stabilizers that can interfere with desired properties. The carboxyl and hydroxyl moieties on the surface of the DisperseEZ particles act as synthetic handles to which a variety of chemical species can be attached. Groups such as esters, isocyanates, halogens, aldehydes, ethers and epoxides can be formed with the appropriate reagents, under the proper conditions. Similarly, the surface carboxyl groups can be derivitized with esters and amides. Applications for DisperseEZ particles range from solid phase synthesis supports to bioreagents for diagnostic assays.

Mean Particle Size: 200-300nm

Surfactant Demand: None (self-stabilized without added surfactant)

Surfactant Reactivity:

High (concentration of accessible reactive sites versus traditional PTFE beads)

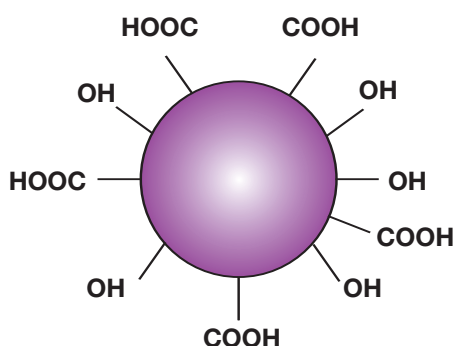
Product Description	Product Form	Mean Particle Size (nm)	Molecular Weight	Surfactant Demand ⁽¹⁾	Surface Area (m ² /g) ⁽²⁾	Surface Reactivity ⁽³⁾
DisperseEZ-200W1	30% solids dispersion in H ₂ O	200-300	1 x 10 ⁶	None ⁽⁴⁾	10	Medium
DisperseEZ-300	Cream colored powder	200-300	1 x 10 ⁶	None ⁽⁴⁾	8	High

⁽¹⁾ Amount of stabilizer needed to maintain stabilization compared to traditional PTFE powders.

⁽²⁾ BET surface area measurement.

⁽³⁾ Concentration of accessible reactive sites versus traditional PTFE beads.

⁽⁴⁾ Self-stabilized without added surfactant.



Using a patented process, our unique DisperseEZ particles have chemically treated surfaces to orient stabilizing polar moieties (both hydroxyl and carboxylic acid groups) to the exterior of the bead.

Buffers and Solutions

Polysciences Bead Solution

Polysciences Bead Solution is a ready-to-use aqueous suspending solution for the dilution or storage of uncoated plain, dyed or functionalized polymer microspheres. An antimicrobial agent deters microbial contamination and stabilizers promote suspension dispersity, peace of mind and harmonious accord in the laboratory.



Polysciences Bead Buffers

Polysciences Bead Buffers are ready-to-use Coupling Buffers in a variety of pH levels (4.5 to 9.0) that can be used as coupling or wash buffers for plain, dyed or functionalized polymer microspheres. Our Storage Buffers are available in two pH levels (7.5 and 8.5).



Polysciences Bead Coupling Buffer, pH 4.5	24973-500	500ml
	24973-1000	1000ml
	24973-2000	2000ml
Polysciences Bead Coupling Buffer, pH 6.0	24976-250	250ml
	24976-500	500ml
	24976-1000	1000ml
	24976-2000	2000ml
Polysciences Bead Coupling Buffer, pH 7.4	24977-250	250ml
	24977-500	500ml
	24977-1000	1000ml
	24977-2000	2000ml
Polysciences Bead Coupling Buffer, pH 9.0	24974-250	250ml
	24974-500	500ml
	24974-1000	1000ml
	24974-2000	2000ml
Polysciences Bead Storage Buffer, pH 7.4	24978-250	250ml
	24978-500	500ml
	24978-1000	1000ml
	24978-2000	2000ml
Polysciences Bead Storage Buffer, pH 8.5	24979-250	250ml
	24979-500	500ml
	24979-1000	1000ml
	24979-2000	2000ml
	24975-250	250ml
	24975-500	500ml
	24975-1000	1000ml
	24975-2000	2000ml

Additional Buffers

Polysciences offers an extensive line of solutions and buffers for your research needs. If the solution or buffer you need is not listed above, please see pages 22-23 in the BioSciences section of this catalog for a full listing of our liquid concentrates, powdered blends and buffer components.



Microspheres and Particles Handling Guide

Polysciences, Inc. offers a wide selection of microspheres and particles. The information contained in this section covers many of the frequently asked questions about these products. Please contact us with any further questions you might have.

General Information

Microspheres offer a highly convenient and flexible system for developing reagents for assays and bioseparations and for use as instrument standards. As there are many varieties of microspheres available, it is important to think about the demands the application will place on them when making a base bead selection. Physical and optical properties should be considered in the context of handling and detection and thought should also be given to requirements for diameter and size distribution, composition, surface chemistry and any other needed properties.

Property	Considerations
Size	Diameter Uniformity / distribution
Composition	Density Refractive index Hydrophobicity / -philicity Nonspecific binding Autofluorescence
Surface chemistry	Reactive groups Level of functionalization Charge
Special properties	Visible dye / fluorophore Superparamagnetic

Particle Size

Microsphere size may be critical to the proper function of an assay, or it may be secondary to other characteristics. Considering traditional diagnostic methods, the test or assay format commonly dictates particle size, such as the use of very small spheres (~0.1-0.4µm) to ensure satisfactory wicking in lateral flow tests, or the use of larger, cell-sized spheres (~4-10µm) for bead-based flow cytometric assays.

In magnetic separations, particularly those involving capture and elution of target, the exact size of the magnetic particle may be unimportant provided that the particles are in some general size range and offer desired separation characteristics.

Diameter also determines surface area. Small-diameter spheres present more surface area per unit weight, while larger spheres present more surface area per bead. Size also effects ease of handling, process considerations (such as the method used for separations [centrifugation, dialysis, filtration]) and the amount of reagent needed for coating.

All sizes listed in this catalog are nominal sizes. For most products, the mean diameter of your particles will be printed on the label with the standard deviation.

Particle Composition

Common microsphere compositions include polystyrene (PS), poly(methyl methacrylate) (PMMA) and silica. These materials possess different physical and optical properties, which may present advantages or limitations for different applications.

Polymer beads are generally hydrophobic and, as such, have high protein binding abilities. However, they often require the use of some surfactant (e.g. 0.01-0.1% Tween® 20 or SDS) in the storage buffer to ensure ease of handling. During synthesis, functional monomers may be co-polymerized with styrene or methyl methacrylate to develop beads with reactive surface groups. Functional groups may be used in covalent binding reactions and also aid in stabilizing the suspension.

Silica microspheres are inherently hydrophilic and negatively charged. Consequently, aqueous silica suspensions rarely require the use of surfactants or other stabilizers. Carboxyl- and amine-functionalized silica spheres are available for use in common covalent coating protocols and plain silica microspheres may be modified using a variety of silanes to generate functional groups or alter surface properties.

Composition	Refractive Index (589nm)	Density (g/cm ³)	Glass Transition Temperature (°C)
PS	1.59	1.05	95
PMMA	1.49	1.19	105
Silica	1.43-1.46*	2.0*	>>1000

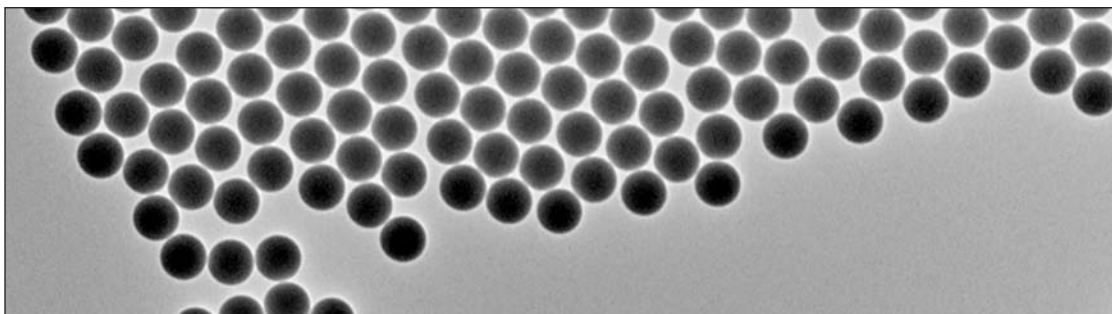
*Determined using representative samples. Other values are as reported in the literature for bulk polymer or silica.

Particle Suspension

The number of particles per ml will vary with the specified weight to volume (w/v) concentration, diameter of the particle and density of particle composition. The number of particles per milliliter can be calculated using the following equation:

$$\frac{6x \cdot 10^{12}}{y \cdot \pi \cdot z^3}$$

x = particle weight (g) per ml
y = density (g/ml)
z = diameter (μm)



The following grid gives the estimated particles per ml for polystyrene ($\gamma = 1.05\text{g/ml}$) suspended at 2.5% solids (w/v) and silica ($\gamma = 2.0\text{g/ml}$) suspended at 10% solids, at common diameters:

Diameter (μm)	Polystyrene 2.5% Solids (particles/ml)	Silica 10% Solids (particles/ml)	Diameter (μm)	Polystyrene 2.5% Solids (particles/ml)	Silica 10% Solids (particles/ml)
0.05	3.64×10^{14}	N/A	4.50	4.99×10^8	1.07×10^9
0.10	4.55×10^{13}	9.74×10^{13}	6.00	2.10×10^8	4.5×10^8
0.20	5.68×10^{12}	1.22×10^{13}	10.0	4.55×10^7	N/A
0.35	1.06×10^{12}	2.27×10^{12}	15.0	1.35×10^7	N/A
0.50	3.64×10^{11}	7.8×10^{11}	20.0	5.68×10^6	N/A
0.75	1.08×10^{11}	2.31×10^{11}	25.0	2.91×10^6	N/A
1.00	4.55×10^{10}	9.74×10^{10}	45.0	4.99×10^5	N/A
1.50	1.35×10^{10}	2.89×10^{10}	75.0	1.08×10^5	N/A
2.00	5.68×10^9	1.22×10^{10}	90.0	6.24×10^4	N/A
3.00	1.68×10^9	3.61×10^9			

Surface to Volume Ratios

Use the following formulas as a rough guide to estimate the surface area or the volume of a sphere.



$$\text{Surface Area} = 4 \pi r^2$$

$$\text{Volume} = 4 \pi r^3/3$$

Determination of the surface area of polystyrene spheres is complicated by the unique form of the polymer. These beads are made by the formation of many single chain polymers which may be likened to a ball of wool. Thus, the surface area will be much greater than that predicted by the simple formula. This is particularly important for protein binding applications and charge calculations.

Centrifugation

Washing particles may be done via centrifugation. This procedure must be performed carefully as excess centrifugation may result in resuspension difficulties. For the purposes of pelleting, it is important to understand the settling velocities of particles. Centrifuging magnetic particles is not recommended. For spherical particles, settling velocity can be calculated using Stokes' Law:

$$V = \frac{2Ga^2(\rho_1 - \rho_2)}{9\eta}$$

V = Velocity (cm/sec)

G = G force (cm/sec²)

ρ_1 = density of particle (g/cm³)

ρ_2 = density of suspending media (g/cm³)

η = coefficient of viscosity (poise; g/cm-sec)

a = radius of spherical particle in cm

For calculating the settling velocity of polystyrene spheres at 1 G in 20°C water, Stokes Law can be expressed in the following formula where d = diameter (μm) ($\rho_1 = 1.05 \text{ g/cm}^3$, $\rho_2 = 1.00 \text{ g/cm}^3$ and $\eta = 1.002 \text{ cp}$); $V = 2.77 \times 10^{-6} d^2$. To estimate appropriate times for centrifugation, settling velocity is multiplied by the G forces generated by the centrifuge. The resultant velocity is then compared to the height of the centrifuge tube.

For example:

A $1.0 \mu\text{m}$ polystyrene particle placed in a microcentrifuge generating 10,000 G will settle at a velocity of $2.77 \times 10^{-2} \text{ cm/sec}$.

Pelleting the particle in a 4cm high tube would require a 144 second (minimum) centrifuge run. The actual time required to form an acceptable pellet could possibly be 50% longer. These calculations are intended to be used as guidelines to assist in determining centrifugation time. Different size particles yield dramatically different settling velocities. A $10.0 \mu\text{m}$ particle could settle in 2 seconds under the aforementioned conditions, whereas a $0.01 \mu\text{m}$ particle could take at least 4 hours to settle. Brownian motion and particle concentration also affect settling rate.

Handling and Storage

Our microspheres are synthesized in water and should be stored in water. Deionized water is the best suspending medium since high concentrations of ions may result in irreversible aggregation. Storage of particles over long periods of time should be at 4-8°C to deter the growth of microbes and the particle suspensions must not be allowed to freeze. Dyed and fluorescent particles should be protected from light. Biocides may be added for extended storage.

Washing

Microspheres sold as instrument standards can often be used as-is, or simply diluted in an appropriate buffer or aqueous solution. Conversely, microspheres that will be coated or otherwise modified should be washed to remove additives and residuals that could interfere with the binding reactions or other processes.

Common washing and separation methods for non-magnetic beads include centrifugation, filtration and dialysis. Selection of the "best" method will depend on scale, required throughput and microsphere characteristics. Centrifugation is often used for small-scale separations of $\geq 0.5 \mu\text{m}$, dialysis for spheres $< 0.5 \mu\text{m}$ and filtration for small spheres $< 0.5 \mu\text{m}$, or to achieve higher throughput. Superparamagnetic microparticles are separated using rare earth or electro-magnets.

Aggregation

Our microspheres are available in a variety of compositions, including polystyrene, poly(methyl methacrylate), and silica. Though polymer microspheres are more susceptible to hydrophobic-mediated aggregation, there are several factors that may influence the dispersity of the suspension. For example, low surface charge, small diameter (high surface area : volume ratio), high microsphere concentration and suboptimal buffer composition or pH may promote aggregation. Strategies that are effective in addressing aggregation thus counter these conditions, i.e. use of surfactant to reduce hydrophobicity (e.g. 0.01-0.1% Tween® 20 or SDS), sonication to disrupt aggregates and adjusting microsphere concentration or buffer pH to deter contact between individual spheres.

Polystyrene Microspheres

Polystyrene Microsphere General Characteristics

Parameter	Description
Size	0.05 - 150µm for a wide range of applications.
Monodispersity	Coefficient of variance $\leq 10\%$ for size range 0.5 - 90µm.
Concentration	2.5%
Suspending Medium	DI water with residual surfactant, to ensure stable dispersions.
Color	Undyed, red, yellow, black, blue, violet, orange, green and several fluorescent colors.
Functionality	Plain, COOH, -NH ₂ , -OH and CH ₂ Cl acrylated.
Stability	Inert, safe for handling and ideal for biological studies.
Protein Affinity	Covalent coupling for functionalized spheres or passive adsorption possible.
Glass Transition	~94°C, stable to moderate heating temperature; some diameters feature a low level of DVB crosslinking.
Bead Density	~1.05 g/cm ³ , similar to cell densities.
Refractive Index (589nm)	~1.59-1.60, ideally suited for instrumentation applications.
Biocides	None (except where noted), particles are compatible with azide, thimerosal and other treatments.

Polystyrene Microsphere Stability

Polysciences offers a one year shelf life. Unless noted, biocides are not added and the particles are shipped in DI water with residual surfactant. All polystyrene products should be stored at 4°C to prevent microbial growth. Microsphere suspensions must be protected from freezing to safeguard against irreversible aggregation. If long-term storage is required, the addition of biocide is recommended.

Polystyrene Microsphere Monodispersity

The following chart lists our specifications for the uniformity of our particles, expressed as the coefficient of variance (CV).

The actual diameter (D) and the standard deviation (SD) for each lot is printed on the label. The % CV is expressed as the SD/D x 100.

Diameter (µm)	CV Maximum (%)	Diameter (µm)	CV Maximum (%)
0.05	≤ 15	1.50	≤ 5
0.10	≤ 25	2.00	≤ 5
0.20	≤ 20	3.00	≤ 5
0.35	≤ 5	4.50	≤ 7
0.50	≤ 11	6.00	≤ 10
0.75	≤ 3	10.00	≤ 10
1.00	≤ 6	15.00 - 19.00	≤ 10

Polystyrene Microsphere Sterility and Shelf Life

Our polystyrene microspheres are packaged as non-sterile suspensions. We have made the decision to give the customer the option of adding biocides or preservatives into the product upon receipt. The particles will be stable for up to one year after the date of sale. Degradation of the particles, their functional groups, or the incorporated dyes is not expected under normal conditions and our primary concern is the quality of the DI water. We make every effort to insure that our water source and packaging procedures will allow us to meet our one year shelf life. If a sterile product is necessary, then the particles can be gamma irradiated, which results in some darkening of the products. Additions of biocides, such as thimerosal or sodium azide, are common. For research applications involving *in vivo* studies or live cells, the particles can be suspended in alcohols prior to use.

Embedding Tissues Containing Polystyrene Microspheres

Polystyrene microspheres have been visualized by light microscopy in unembedded coverslip monolayers, in fixed or unfixed frozen sections, in paraffin sections and in glycol methacrylate kits. For paraffin sections, n-butyl alcohol must be used for clearing and deparaffination since the typical organic solvents, such as toluene, THF, or ethyl acetate, will destroy the beads. The beads cannot be embedded in methyl or butyl methacrylate media. TEM embeddings in Epon and Spurr's have been successful.

Polybead® and Fluoresbrite® Dyed Particles

Types of Dyes Used

For our Fluoresbrite®, Polybead® and some of our Flow Check® products, water insoluble dyes* are used. This minimizes the incidence of dye leaching from the particles into aqueous buffers. Our visibly dyed microspheres are available as black, blue, red, violet, orange, green and yellow. Other colors and intensities are available at the customer's request. Our Flow Check® Alignment and Compensation particles are "surface dyed" using the same fluorochromes used with conjugated antibodies. Polysciences can custom manufacture Fluoresbrite® particles with a customer's dye of choice. Polysciences' most popular fluorescent dyes match the following filter settings:

Polysciences' Fluorescent Particles	Filter Setting	Dyed Particle	Excitation Max. (nm)	Emission Max. (nm)
BB (Bright Blue)	Coumarin	BB	360	407
YG (Yellow Green)	Fluorescein	YG	441	486
YO (Yellow Orange)*	Rhodamine	YO	529	546
PC (Polychromatic Red)	Phycoerythrin	PC	491; 512	554
		Ruby Red	475; 600	663
		FITC	492	512
		PE	492	512
		Rhodamine	556	573
		Sulforhodamine	540	645
		APC	583	654

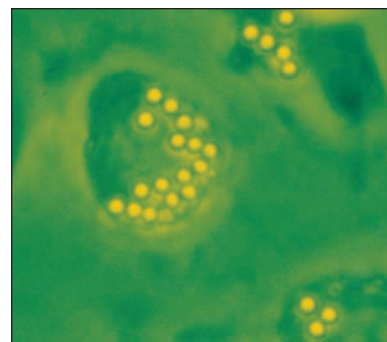
Dyed Microspheres and Microscopy

A 6µm visibly dyed (non-fluorescent) particle is the smallest colored particle that can reasonably be observed under light microscopy conditions (400x). Infinite magnification of a dyed particle will result in an undyed appearance. Fluorescently-labeled Fluoresbrite® microspheres are recommended for microscopic viewing of particles smaller than 6µm. Fluoresbrite® 0.05µm particles have been identified using a fluorescent microscope set at 100x objective and 10x ocular magnification.

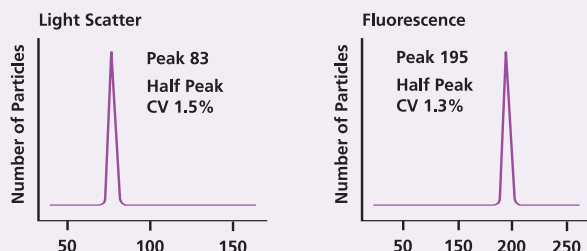
* YO has limited water solubility, some leaching may occur with aggressive washing.

Fluoresbrite® for Phagocytosis or Retrograde Transport

These consistently sized polystyrene particles are ideal for cell interaction. Identification is made easy by the intense fluorescence and polystyrene has long been recognized as a biologically active surface for cell attachment. Using two different fluorescent particles allows researchers to track two populations in one study.



Flow Cytometer Results



Data for this chart was obtained on a EPICS V instrument with fluorescent polystyrene beads, 2µm in diameter. Data courtesy of Kristi Harkins, University of Nebraska / Lincoln.

Fluoresbrite® to Calibrate Flow Cytometers

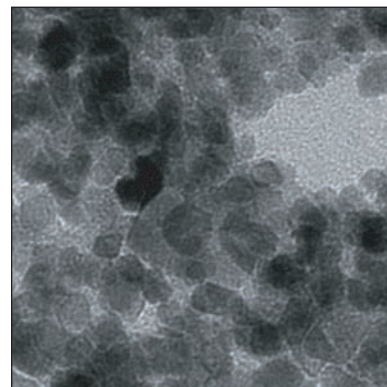
Our Fluoresbrite® particles have had a long history of use as flow cytometry standards. As a manufacturer of the base particle, as well as an innovator in the incorporation of fluorescent dyes, we have advised even instrument manufacturers on the proper types of beads to use for aligning flow cytometers.

BioMag®, BioMag®Plus & BioMag® Maxi

BioMag® Physical Characteristics

Our conventional BioMag® are irregularly shaped iron oxide particles that vary in size between 1-2µm, with most particles measuring ~1.5µm. BioMag®Plus are similar, but have undergone additional processing for the reduction of outliers. BioMag® Maxi are ~6µm. The particles are covered with an aminosilane coating, which provides functional groups for the attachment of proteins or antibodies. The irregular shape of the BioMag®, BioMag®Plus and BioMag® Maxi particles provide increased surface area and therefore increased binding capacity.

BioMag® particle surface area:	>100m ² /g
BioMag® particle density:	2.5g/cc
BioMag® settling rate:	4% in 30 minutes



BioMag® Stability

Since the BioMag® base particle is composed of coated iron oxide, the particle itself is very stable. However, any proteins or antibodies attached to the BioMag® particle are susceptible to degradation over time. BioMag® should not be frozen or exposed to extreme heat.

BioMag® Stability in Solvents

BioMag® particles have been used in various coupling buffers at pH ranging from 5.5 to 8.0. It is best to test the suitability of BioMag® usage in organic solvents or extreme pH conditions.

BioMag® Magnetic Responsiveness

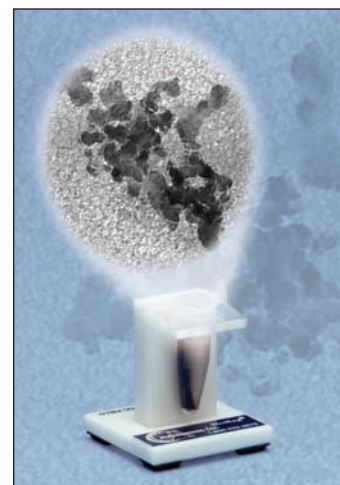
BioMag® particles are superparamagnetic meaning they have no magnetic memory and will readily resuspend if the magnetic force is removed. The particles are greater than 90% magnetite content and have a magnetization of 25-35 emu/g (Electromagnetic Units).

Positive and Negative Selection with BioMag®

BioMag® particles can be used for both positive and negative selections. In negative selection, the unwanted components are pulled out of solution by the BioMag® particles. After magnetic separation, the resulting supernatant is enriched for the target cells or molecules. In positive selection, the BioMag® particles are used to pull out of solution only the target cells or molecules of interest. All unwanted cell populations, cells or molecules will be left in the supernatant and can be discarded, resulting in a purified suspension of the target components.

Magnetic Separator for BioMag®

For maximum performance, BioMag® particles should be used with one of the Polysciences magnets. Since BioMag® particles are so small, they require a strong magnetic field in order to separate them in a timely fashion. Polysciences' magnets are rare earth (Neodymium-Iron-Boron) magnets embedded in plastic housings, with magnetic strengths ranging from 27 megagauss Oersteds to 35 megagauss Oersteds, depending on the magnet.



Coupling Efficiency Determination

Coupling efficiency can be determined by measuring the change in absorbance of the supernatant before and after coupling.

1. Set spectrophotometer wavelength to 280nm. Blank with the Coupling Buffer.
2. Measure the absorbance of the Pre-Coupling Solution. A further dilution may be necessary to read an absorbance depending upon the amount of protein added (D = dilution factor).
3. Measure the absorbance of the Post-Coupling Solution. A dilution may be necessary to read the absorbance (D = dilution factor).
4. Calculate the coupling efficiency, expressed as the % Protein Uptake, as follows. Typical values of Protein Uptake are >60%.

$$\frac{[(A_{280} \text{ Pre-Coupling Solution}_1 \times D) - (A_{280} \text{ Pre-Coupling Solution}_2 \times D)] \times 100}{(A_{280} \text{ Pre-Coupling Solution}_1 \times D)}$$

For complete technical information for each BioMag® product, refer to the Technical Information page of our website.

Coating Microspheres

Microspheres may be coated with capture molecules such as antibodies, oligonucleotides, peptides, etc. for use in diagnostic or separation applications. Microsphere coatings are typically optimized to achieve desired specific activity, while minimizing nonspecific interactions. Consideration should also be given to the required stability, development timeframe and budget and the specific biomolecule to be coated. These factors will aid in determining the most fitting coating strategy for both short- and long-term objectives.

Standard microsphere products support three basic coating strategies: passive adsorption, covalent coupling and affinity binding. It is important to note that each binding strategy has benefits and limitations, which should be weighed in the context of study objectives and the demands that will be placed upon the finished reagent.

Passive Adsorption

Passive adsorption relies primarily on hydrophobic interactions between the biomolecule and the polymer particle. Such coatings are fairly simple to conduct, involving incubation of the microspheres with the purified biomolecule. They typically require little optimization and reagents may be developed relatively quickly. However, as adsorption relies on the formation of multiple attachment points between the molecule and the particle, this strategy is typically reserved for use with proteins and non-functionalized polymer spheres. Adsorption is generally not suitable for hormones, peptides, or nucleic acids in hybridization-based applications and protein adsorption to silica is expected to be less efficient than to polymer. Most techniques using passive adsorption technology report four to six months of bead stability.

Covalent Coupling

Covalent coupling results in the permanent attachment of the molecule to the functionalized (e.g. carboxyl or amine) microsphere. It can provide needed stability when developing a commercial reagent and for multiplexed assays, where analyte-specific bead populations are mixed. Additionally, specialized chemical linkers may be employed to address steric effects or to optimally orient the molecule. If surfactant is required as an additive in the assay, covalent coupling procedures are recommended as surfactants can displace adsorbed proteins from the surface. Covalent binding is also important for the immobilization of oligonucleotides or peptides, where end-point attachment is required. Although covalent binding protocols often involve a higher level of optimization than other approaches, coupling kits are available to simplify the process.

When Coupling to Particles Less Than 0.5µm

The chemical aspects of the protocols are universally applied, but the mechanical separations of these particles must be adapted for specific sizes. Most protocols suggest centrifugation to separate the particles from the reagents. This is not practical for particle sizes less than 0.5µm, since most microcentrifuges cannot spin these particles down within 30 minutes. Even extremely high G forces are not recommended, as resuspension becomes arduous. Other separation techniques can be utilized, such as dialysis, forced membrane filtration or centrifugal filter devices. Polysciences offers coupling kits that use hollow fiber filtration techniques to effect separation of 0.1-0.5µm particles.

Coupling to Dyed Particles

The surfaces of dyed beads are available for protein adsorption or covalent attachment via functional groups. Polysciences' capability to manufacture custom lots with exact sizing and relative control of dye content per bead has enhanced its prominence as a world leader in supplying the diagnostic assay market.

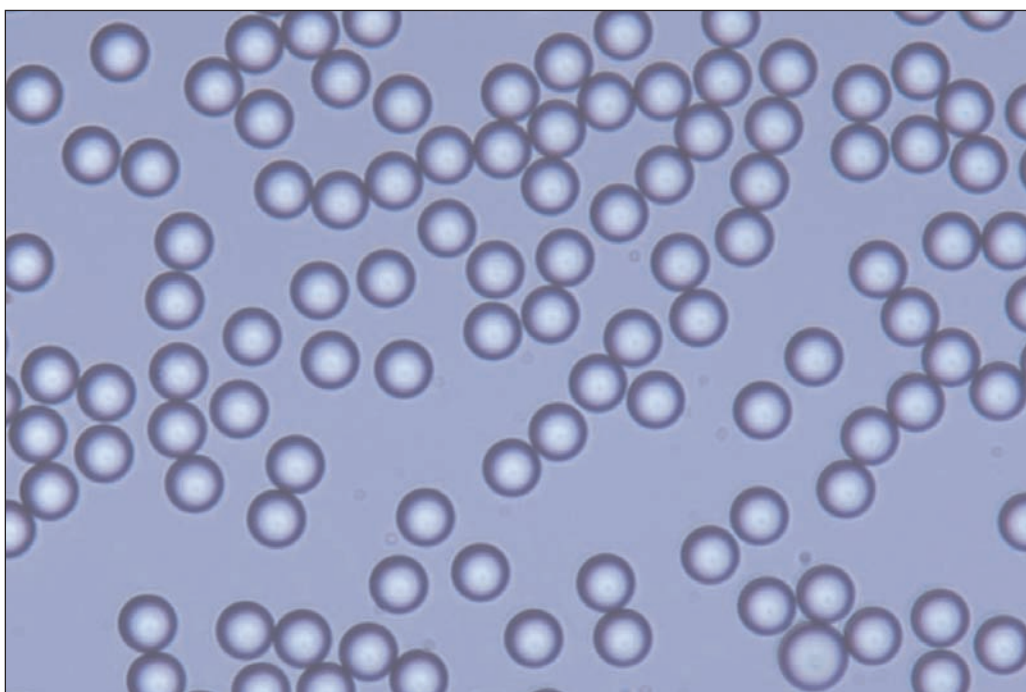
Affinity Binding

Affinity binding is a straightforward method for immobilizing primary antibodies or biotinylated molecules. Protein A and G and Fc-specific antibody coatings permit the directed immobilization of primary antibodies and streptavidin is used extensively for the binding of biotinylated molecules, such as antibodies, peptides and oligonucleotides.

Biomolecule	Coating Strategy	Notes
Peptides	Covalent Streptavidin / biotin	End-point attachment to preserve the activity of the peptides.
Nucleic acids	Covalent Streptavidin / biotin	End-point attachment to permit hybridization of probe sequence with target sequence.
Proteins (e.g. antibodies)	Covalent Adsorption	Common proteins are generally large enough that multi-point attachment and nonspecific orientation do not compromise their activity. However, linkers or spacers (covalent or SA/B) may be employed to address steric effects or sub-optimal orientation.

Alternative for BSA as a Blocking Agent

Any innocuous protein may be used to block the effects of non-specific adsorption. In selecting an alternative to BSA, it is suggested that the size of the active protein and the size of the blocking protein be compared. BSA is highly recommended for IgG coupling. However, the large size of BSA will obscure the activity of smaller, active proteins. Glycine or small polypeptides may be used as alternatives.



Well dispersed 10µm Polybead® Microspheres

Protein Binding Protocols

The following sequences serve as guidelines for protein binding. Technical Data Sheets (TDS) with detailed step-by-step protocols can be downloaded from our website.

Adsorbing Protein on Particles

TDS #238E

Plain Particles

- Initial Buffer: 0.1M Borate Buffer, pH 8.5
- Suspend in buffer, spin down and resuspend 2 or 3 times.
- Suspend in borate buffer.
- Add protein and mix end-to-end overnight.
- Spin and save supernatant for protein determination.
- Resuspend in BSA in appropriate buffer and spin down twice.
- Resuspend in PBS, pH 7.4, containing BSA and glycerol (storage buffer).
- Protein bound directly on surface.

Coupling by Carbodiimide

TDS #238C & #644

Carboxylate Functional Particles

- Initial Buffer: 0.1M Carbonate Buffer
- Suspend in buffer, spin down and resuspend 2 or 3 times.
- Suspend in phosphate buffer.
- Add fresh carbodiimide solution dropwise and incubate for 15-30 minutes.
- Wash to remove excess carbodiimide, then resuspend in borate buffer.
- Add protein and mix end-to-end for 2-4 hours.
- Add ethanolamine, mix for 30 minutes.
- Spin and save supernatant for protein determination.
- Resuspend in BSA-containing buffer and spin down twice.
- Resuspend in PBS, pH 7.4, containing BSA and glycerol (storage buffer).
- Protein bound 2-3 carbon atoms from surface.

Coupling by Glutaraldehyde

TDS #238D & #238G

Amino or Blue Dyed Particles

- Initial Buffer: 0.02M PBS, pH 7.4
- Suspend in buffer, spin down and resuspend 2 or 3 times.
- Suspend in PBS.
- Suspend in 8% glutaraldehyde in PBS, pH 7.4 and mix end-to-end for 4-6 hours.
- Wash to remove excess glutaraldehyde and resuspend in PBS buffer.
- Add protein and mix end-to-end overnight.
- Add ethanolamine, mix for 30 minutes.
- Spin and save supernatant for protein determination.
- Resuspend in BSA-containing buffer and spin down twice.
- Resuspend in PBS, pH 7.4, containing BSA and glycerol (storage buffer).
- Protein bound 5 carbon atoms from surface of blue dyed beads and 11-12 carbon atoms from surface of amino beads.

PolyPointer ⚡

Easily find all of our Technical Data Sheets by visiting www.polysciences.com

Protein Coupling Troubleshooting

Below are some solutions for protein coupling troubleshooting. If you do not see a solution to the problem you are experiencing, please email us at: info@polysciences.com

Problem	Solution
Clumping prior to use	Careful sonication
Clumping after procedure • Carbodiimide addition causes clumping • Glutaraldehyde addition causes clumping • Protein addition causes clumping • Washing causes clumping	Isolate which step causes clumping Add slowly, agitate beads, decrease bead concentration Add slowly, agitate beads, decrease bead concentration; add an excess of glutaraldehyde to avoid chemical crosslinking of particles; clumping will typically resolve by the conclusion of the protein coupling Increase protein concentration Add surfactant or reduce washing steps
Low binding	Move pH of binding closer to protein isoelectric point
Variable coating	Use pure water - no contaminants; use fresh reagents
Coating, but no reaction	Optimize pH away from isoelectric point
Centrifuge not practical	Use membrane filtration, dialysis, or spin fibers for small particles
Nonspecific adsorption	Use an alternative for BSA (glycine, casein)
Small proteins bound, but not reactive	Use a crosslinking agent to extend coupling away from the surface of the bead
Long-term storage leaches protein	Try covalent attachment or lyophilize final product

Special Properties

Many applications in the life sciences demand added properties, such as fluorescence or a visible color, or iron oxide inclusions for magnetic separations. Polymer spheres (and some polymer-based magnetic spheres) are often internally dyed via organic solvent swelling and many standard products are available. Dye concentrations can be adjusted to produce beads with different intensities to meet special needs, such as QuantumPlex™ for multiplexed flow cytometric assays or our Dragon Green or Flash Red Intensity standards, which support imaging applications and associated instrument QC. Many surface- or internally-labeled fluorescent beads are also available as specialized flow cytometry standards.

Various types of superparamagnetic microparticles are available as well – with different matrices, magnetite content, surface groups, etc. For new assays or applications, magnetic beads should be evaluated with application demands in mind.

The following tables provide product suggestions for common microsphere applications. These are offered as general guidelines only. Further literature research and screening experiments may be appropriate.

Microsphere Selection for Common Test and Assay Formats:

Test / Assay Format	Bead Size	Bead Type	Coating Strategy	Detection Strategy
Flow cytometric (suspension array)	2-15µm	QuantumPlex™ QuantumPlex™™ (encoded populations for multiplexing) Non-fluorescent	Covalent Streptavidin / biotin	Flow cytometer
Lateral flow	0.1-0.4µm	Dyed (visible or fluorescent)	Covalent Adsorption	Visual or automated reader (absorbance, fluorescence)
Lateral flow - Boulders in the Stream	0.1-0.4µm ~2-3µm	Dyed (visible mobile phase) Undyed (capture phase)	Covalent Adsorption	Visual
Dipstick	0.1-0.4µm	Dyed (visible)	Covalent Adsorption	Visual
Latex Agglutination Tests (LATs)	0.2-1.0µm	Undyed Visibly dyed	Covalent Adsorption	Visual (may be microscope-assisted)
Light Scattering (automated LAT - Nephelometric or Turbidimetric)	0.36-0.76µm (diameter equal to wavelength of light being scattered)	Undyed	Covalent	Nephelometer Turbidimeter

Suggested Products for Magnetic Assays:

Assays	Suggested Products
Immunoassays	ProMag™ or BioMag®
Hybridization-based assays	ProMag™

Suggested Products for Magnetic Separations:

Magnetic Separations	Suggested Products
Cells	BioMag® anti-CD marker or secondary antibody
Subcellular organelles	BioMag®
Immunoprecipitates	BioMag®
mRNA	BioMag® Oligo dT (20) or mRNA Purification System
Biotinylated oligonucleotide capture or binding	ProMag™ or BioMag®
Biopanning	ProMag™ or BioMag®

Instrument Quality Control

For confidence in test or assay results, a facility must employ a comprehensive quality assurance program that encompasses employee training and routine instrument maintenance and quality control. Facilities should also ensure that studies, particularly those involving quantitative fluorescence measurements, are conducted with appropriate standardization.

Microsphere standards aid in defining the instrument's capabilities and limitations in terms of sensitivity, precision and accuracy and provide a means for ensuring that the instrument is stable and suitable for use. They are also helpful in understanding the effects of extraneous factors, such as temperature, humidity and electronic noise. The comparison of daily and historical QC data aids in the identification of random errors (due to electronic noise, air bubbles, etc.) and systematic errors (due to bias, shifts and trends caused by temperature variation, laser deterioration, misalignment, etc.) so that suitable corrective action may be taken.

Daily Controls

Flow cytometers are highly configurable and results can vary dramatically with different instrument settings. Establishing a common "Window of Analysis" for each detector, with the upper and lower fluorescence limits defined, allows reference populations to be positioned in approximately the same place on the same scale. This type of standardized instrument set-up ensures consistency of results from specific instruments and enables meaningful comparison between instruments. Therefore, the general status and stability of the cytometer must be checked daily. In addition, by plotting values over time, random and systemic errors may be identified and corrected. Manually aligned instruments must be aligned daily. If the data from multiple instruments and/or sites are to be compared, all instruments must be standardized daily, using the same standard bead. If multi-color analysis and/or quantitation is being performed, then the appropriate standards must be run on that same day.

Weekly Controls

If only qualitative analyses are being run, weekly checks of the detection threshold, resolution and linearity are sufficient to establish sensitivity. Some cytometers are fixed alignment instruments. For these, alignment may be verified weekly rather than established daily.

In addition to a regular QA/QC program, specific analyses may require other controls, such as count standards, size standards or reference standards. Experiments and analyses must be critically evaluated for inclusion of the appropriate controls prior to instrumental analysis.



The following chart outlines a basic program of quality control and standardization that includes suggestions regarding specific products and their frequency and method of use.

Category	Purpose	Frequency	Products
Daily QC	General check of instrument stability / status	Daily	Full Spectrum™ (multi), Ultra Rainbow Fluorescent Particles (multi), Fluorescence Reference Standards (single), Flow Check® Ruby Red Fluorescent Microspheres (single)
Daily QC	General check of instrument optical system	Daily	Full Spectrum™ (multi), Ultra Rainbow Fluorescent Particles (multi), Fluorescence Reference Standards (single), Flow Check® Ruby Red Fluorescent Microspheres (single)
Daily QC	Optical alignment	Daily	Right Reference Standard™, Flow Check® Alignment and Compensation Particle Sets
Daily QC	Fluidics check	Daily	Surface-labeled fluorescent microspheres, e.g. QC Windows®, QC3™, Fluorescence Reference Standards, Quantum™ MESF
Weekly QC	Optical system sensitivity, resolution for linearity (for specific lasers / PMTs)	Weekly	Quantum™ MESF
Daily Set-Up	Standardized instrument set-up	Daily or between runs if settings are changed	QC Windows®, QC3™
Daily Set-Up	Standardized compensation settings for multi-color analyses	Daily or between runs if settings are changed	FITC/PE Compensation Standard, Simply Cellular® Compensation Standard, Quantum™ Simply Cellular®
Application	Fluorescence quantitation in cellular expression studies or bead-based assays	Daily when quantitative analyses are performed or between different applications if fluorescence PMT settings are changed	Quantum™ MESF, Quantum™ Simply Cellular®
Application	F:P ratio determination for quantitative fluorescence analyses	As needed, i.e. with each new lot of fluorochrome-conjugated antibody	Simply Cellular® (used in conjunction with Quantum™ MESF)
Application	Compensation for multi-color flow cytometry	Daily or between different applications if fluorescence PMT settings are changed	FITC/PE Compensation Standard, Simply Cellular® Compensation Standard, Quantum™ Simply Cellular®
Application	Cell counting	As needed	Flow Cytometry Absolute Count Standard™
Application	Cell size estimation	As needed	Size Calibration Standards Kit
Application	Suspension array	Platform for development of bead-based flow cytometric assays	QuantumPlex™, QuantumPlex™M

High Performance/ Electronic Materials



NoSWEEP™ Wire Bond Encapsulants

Optical Encapsulants and Adhesives

Encapsulants for Fragile Substrates

Microelectronic Encapsulants,
Adhesives, Coatings & Dams

High Performance Encapsulants and Adhesives

Electronic Grade Potting & Encapsulation Materials

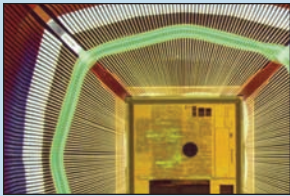
Ultra Pure Chemicals for Electronic Processes

NIST Traceable Particle Standards

JEDEC Reference Guide

Glossary of Terms

New Products



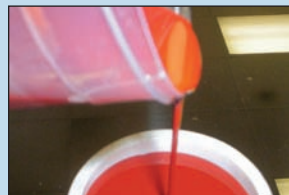
NoSWEEP™ Wire Bond Encapsulants
Eliminates wire sweep during transfer molding by locking wires together. 290



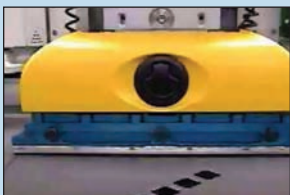
OptiCLEAR™ Liquid Encapsulants
Transparent liquid encapsulants. 292



LoSTRESS™ Liquid Encapsulants
Encapsulants for fragile substrates. 292



Epoxy Encapsulants, Adhesives and Potting Compounds for Microelectronics and Medical Applications. 294



StenSEAL®
Stencil applied encapsulants. 293

ZipCURE™ Die Attach

EdgeCONTROL® DAM Encapsulants

Epoxy Encapsulants, Adhesives and Potting Compounds for Microelectronics and Medical Applications

Silicone Encapsulants, Adhesives and Potting Compounds for Microelectronics Applications

Epoxy Potting Compounds

Silicone Encapsulants and Potting Compounds

Conformal Coatings

Chemicals for CMP

High Performance / Electronic Materials

Polysciences, Inc. offers innovative polymer products to meet the high performance requirements of the electronic and semiconductor industry. Our expanded line of electronics polymers and chemicals includes underfills, liquid encapsulants, die attach and optical adhesives for advanced applications. Additionally, we provide custom formulation, high purity polymer and monomer synthesis, as well as contract packaging services.

High Performance / Electronic Materials Selection Guide At-A-Glance

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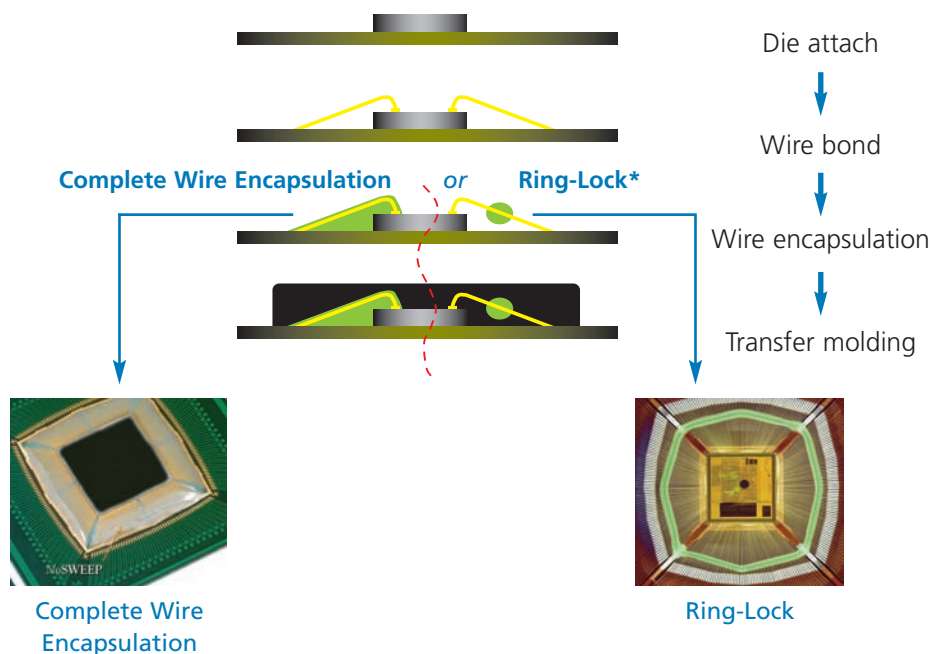
High Performance / Electronic Materials

NoSWEEP™ Wire Bond Encapsulant

NoSWEEP™ wire bond encapsulants are the flagship product line of Polysciences' High Performance / Electronic Materials division. NoSWEEP™ eliminates wire sweep during transfer molding by locking the wires together. This patented technology is ideal for ultra fine pitch wire bonds, multi-tier bonding and 3-D packaging. NoSWEEP™ can be dispensed on conventional off-line dispense systems or in-line on an on-wire bonder dispenser made by Kulicke and Soffa. There are UV, UV/Thermal and thermal cure versions.

The thermal cure glob top versions of NoSWEEP™ are designed for full device encapsulation. These products offer JEDEC (see page 300 for JEDEC reference guide) level 2A reliability and are designed to work with lead free (260°C) re-flow (see page 301, for JEDEC reliability test references). There is also a compatible dam for package designs which are not glob top friendly.

The NoSWEEP™ Patented Technology Process



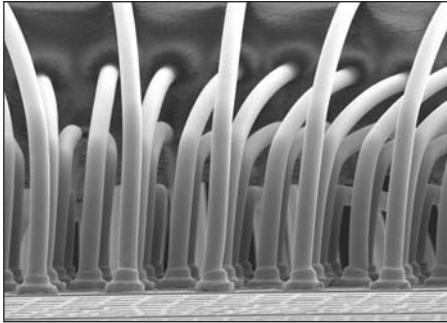
Key Benefits vs. Conventional Molding Systems:

- Enables implementation of sub-35µm pitch roadmap wire bonding.
- Allows for the use of longer wires with low cost, high-density substrates and enables simple die shrinks.
- Enables cost reduction through the use of thinner diameter gold wire.
- Simplifies the design and production of complex stacked die and other 3-D package designs.
- NoSWEEP™ is Lead Free compatible.

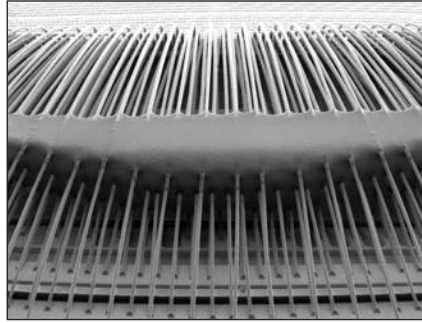
NoSWEEP™ Products continue on next page.

NoSWEEP™ Wire Bond Encapsulant

The patented technology Ring-lock dispense method (developed jointly with Kulicke & Soffa) was created especially for lead-frame and 3-D packages. NoSWEEP™'s unique high performance epoxy chemistry allows a very small bead of material to be extruded across the wires. The material encapsulates a small section of the wires and is then UV gelled to lock the polymer and the wires in place before molding. Because only a very small amount of polymer is used, this process is an extremely cost effective solution for wire sweep and allows much broader design leeway.



Side view SEM of NoSWEEP™ Ring-lock* dispense method completely encapsulating a wire section on a quad tier copper wire bonded device.



SEM of NoSWEEP™ Ring-lock* dispense method on the same quad tier copper wire bonded device.

	Viscosity		Modulus		CTE		Cure		Reflow
Specific Gravity	@ 25°C (CPS)	Tg (°C)	@ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Schedule (°C)	JEDEC Level	Temp (°C)	

Ring-lock Bead Encapsulant

1.67	250K	174	9000	23	63	UVA 1J/cm2 @ 90°C or 60min @ 130+°C 180min @ 175°C (typical post mold cure)	2A	260	EW7073-10**

Comments: UV + thermal cure, Ring-lock or full wire encapsulation; thermal cure during transfer mold post most cure cycle.

Wire Only Encapsulant

1.80	115K	>180	14000	14	29	UVA 1J/cm2 @ >90°C or 120min @ 130+°C 120min @ 170 (typical post mold cure)	3	240	EW7072-10**

Comments: Excellent flow through wires, UV-thermal cure.

Glob Top Wire Only Encapsulant

1.70	50K	120	2000	20	70	60min @ 100+°C 60min @ 165°C	2	260	EW8002-10**

Comments: Low viscosity version of EW8003 for glob top or dam/fill.

1.70	250K	160	2500	18	50	90min @ 100+°C 60min @ 165°C	2	260	EW8003-10**

Comments: High performance glob top, low moisture abs.

Catalog # Size

For volume pricing, send e-mail requests to: info@polysciences.com or call:

U.S. Headquarters
(215) 343-6484 or
(800) 523-2575

European Headquarters
+(49) 6221-765767

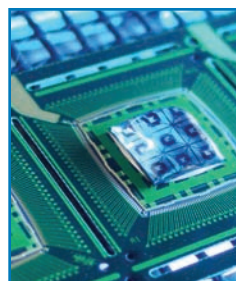
** Product subject to dry ice shipment fee.

Optical Encapsulants and Adhesives

Polysciences, Inc. optical adhesives and optical encapsulants are specially formulated for use on optical sensors, digital cameras, light transmission devices and doming applications.

OptiCLEAR™ Liquid Encapsulant

OptiCLEAR™ is a transparent liquid encapsulant. These 100% solids, no odor epoxies, can be UV and/or thermally cured for maximum process flexibility. They are engineered to work well when applied in thick or thin films, available in several viscosity ranges. OptiCLEAR™ products are excellent alternatives to acrylic encapsulants.



Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	JEDEC Level	Reflow Temp (°C)	Form
1.08	4700	40	175	110	200	UVA 7.5J/cm2 or 120min @ 120 + 120min @ 150	3	260	1 part

Comments: Refractive Index is 1.54

1.08	4700	40	175	110	200	UVA 7.5J/cm2 or 120min @ 120 + 120min @ 150	3	260	1 part

Comments: Improved flow SF502A

1.08	95K	20	15	115	210	UVA 7.5J/cm2 or 120min @ 120 + 120min @ 150	3	260	1 part

Comments: High viscosity, stays in place.

1.10	1500	65	36	55	200	7 days @ RT or < @ elevated temps.	N/A	260	2 part

Comments: Optically clear epoxy. Mixed viscosity 250 cps

Encapsulants for Fragile Substrates

LoSTRESS™ Liquid Encapsulant

LoSTRESS™ Epoxy encapsulants have a low modulus of elasticity which puts minimal cure stress on fragile ceramic and/or flexible substrates. These encapsulants are novel, epoxy-based 100% solids, single component liquid semiconductor encapsulants designed for devices requiring high toughness, flame retardancy and strong adhesion to various substrates such as metal, ceramic and organic. LoSTRESS™ is especially suitable for SAW filter applications. LoSTRESS™ can virtually eliminate warp on ceramic substrates due to the low cure stress. Dam and fill and glob top versions are available.

Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	JEDEC Level	Reflow Temp (°C)	Form
1.12	9K	<20	5	149	240	90min @ 90°C + 60min @ 150°C + 60min @ 160°C	3	260	1 part

Comments: Dielectric Constant 3 @ 2GHz

1.25	30K	<20	1	130	250	90min @ 100°C + 60min @ 150°C + 60min @ 160°C	3	260	1 part

Comments: Green. Excellent thermal aging and reliability. Flame retardant.

** Product subject to dry ice shipment fee.

Microelectronic Encapsulants, Adhesives, Coatings and Dams

Polysciences offers a number of additional polymers for a wide array of microelectronic manufacturing and packaging applications.

Wafer Level Coatings

Specific Gravity	Viscosity		Modulus		CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	JEDEC Level	Reflow Temp (°C)	Form	Type
	@ 25°C (CPS)	Tg (°C)	@ 25°C (Mpa)								
1.15	110	120	25		70	170	60min @ 160°C	2	260	1 part	Epoxy

Comments: Solvent based, high adhesion.

1.15	110	120	25		70	170	60min @ 160°C	2	260	1 part	Epoxy

Comments: Solvent based, high adhesion improved WL2000 wetting & flow.

StenSEAL® Stencil Applied Encapsulants

Specific Gravity	Viscosity		Modulus		CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	JEDEC Level	Reflow Temp (°C)	Form	Type
	@ 25°C (CPS)	Tg (°C)	@ 25°C (Mpa)								
2.13	230K	>170	17		17	45	90min @ 60+°C 30min @ 90+°C 60min @ 125°C	3	260	1 part	Epoxy

Comments: UL 94V-0 Flame Retardant, Low CTE.

ZipCURE™ Die Attach

Specific Gravity	Viscosity		Modulus		CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	JEDEC Level	Reflow Temp (°C)	Form	Type
	@ 25°C (CPS)	Tg (°C)	@ 25°C (Mpa)								
4.43	500K	55	10		40	140	15min @ 185°C	1	260	1 part	Epoxy

Comments: Silver filled.

EdgeCONTROL® DAM Encapsulants

Specific Gravity	Viscosity		Modulus		CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	JEDEC Level	Reflow Temp (°C)	Form	Type
	@ 25°C (CPS)	Tg (°C)	@ 25°C (Mpa)								
1.08	1,000K	<20	1		130	250	90min @ 90+°C 60min @ 150+°C 60min @ 160°C	3	260	1 part	Epoxy

Comments: Low CTE, base cured, limited flow.

** Product subject to dry ice shipment fee. *** Cold Pack charge required.

EdgeCONTROL® DAM Encapsulants (continued)

EdgeCONTROL® DAM Encapsulants

Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	JEDEC Level	Reflow Temp (°C)	Form	Type	Catalog #	Size
1.13	5,500K	55	500	100	200	Co-cure with OptiCLEAR™ products.	3	260	1 part	Epoxy	SD1000-30***	3x30cc
1.21	5,500K	160	2000	50	160	Co-cure with NoSWEEP™ 8000 series products.	2	260	1 part	Epoxy	SD1010-30***	3x30cc

High Performance Encapsulants and Adhesives

Polysciences offers a wide array of high performance epoxy, silicone encapsulants and adhesives designed to meet your highest performance criteria.

Epoxy Encapsulants, Adhesives and Potting Compounds for Microelectronics and Medical Applications

Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Thermal Cond. (W/m²K)	Cure Schedule (°C)	Reflow Temp (°C)	Form	Catalog #	Size
2.51	36.5K	85.0	24	32	80	102	120 min @ RT	240	2 part	PC600K-1	1kit
Comments: Therm Cond/UL 94V-0 Flame Retardant.											
2.75	600K	85.0	35	21	55	1.4	120 min @ RT	240	2 part	PC620K-1	1kit
Comments: Therm Cond/UL 94V-0 Flame Retardant.											
1.14*	400*	129	6.5	58	232	NA	7 days @ RT or elevated temps	260	2 part	PC310K-1	1kit
Comments: Low viscosity, cost effective potting compound. Quick gel time at RT.											
1.15*	8750*	140	10	55	200	NA	120min @ 110°C +30min @ 170°C	260	2 part	PC300K-1	1kit
Comments: High adhesion to SS & other metals. Excellent against H ₂ O exposure, sterilization. Designed for medical and microelectronic applications.											

* Mixed values of 2 part system. *** Cold Pack charge required.

High Performance Encapsulants and Adhesives (continued)

Silicone Encapsulants, Adhesives and Potting Compounds for Microelectronics Applications

Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Thermal Cond. (W/m°K)	Cure Schedule (°C)	Reflow Temp (°C)	Form
0.98	300	<-80	0.004	N/A	600	.15	30min @ 130°C	260	2 part

Comments: Soft non-tacky gel.

0.98	36K	<-80	0.004	N/A	600	.15	12hrs @ RT or 30min @ 60°C	260	2 part

Comments: Soft. PSA type gel.

Catalog # Size

HV100K-1 1kit

HV102K-1 1kit

Electronic Grade Potting and Encapsulation Materials

Our general potting and encapsulation materials are designed for a variety of applications that require low cost solutions while still maintaining above average performance. One kit is approximately 1/2 gallon of potting compound.

Epoxy Potting Compounds

Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	Form
1.14**	140K**	129	65	58	292	7 days @ RT or elevated temps. Gel 3 hrs @ RT	2 part

Comments: Low viscosity, cost effective potting compound. Quick gel time at RT.

1.15**	8750**	140	10	55	200	120min @ 110+°C 30min @ 170°C	2 part

Comments: High adhesion to SS, other metals & excellent against H₂O exposure, sterilization. Designed for medical and microelectronic applications.

1.76**	500k**	48	15	34	134	7 days @ RT or elevated temps. Gel <3 hrs @ RT	2 part

Comments: Low viscosity, cost effective potting compound. Quick gel time at RT.

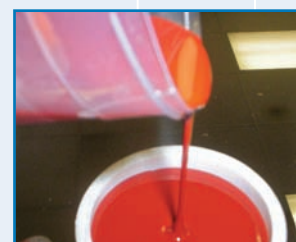
1.65**	25K**	110	15	30	175	30min @ 125+°C 60min @ 170°C	1 part

2.42	10K**	85	250	32	80	120 min @ RT	2 part

Comments: Flame Retardant. Therm Cond/UL 94V-0***

2.65	35K**	85	55	21	55	120 min @ RT	2 part

Comments: Flame Retardant. Therm Cond/UL 94V-0***



02334K-1* 1kit

PC110K-1* 1kit

PC112K-1* 1kit

PC2001-1G 1gal

PC400K-1* 1kit

PC410K-1* 1kit

* Product subject to hazardous material shipment fee. ** Mixed values of 2 part system. ***As tested by Polysciences, Inc.

Silicone Encapsulants and Potting Compounds

									Catalog #	Size	
Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	Form	Comments			
.98	300	<-80	.004	N/A	<400	30min @ 130°C	2 part	Soft non-tacky gel.	HV500K-1	1kit	
.98	47K	<-80	.004	N/A	<400	12 hrs. @ RT or 30 min. @ 60°C	2 part	Soft very tacky PSA type gel.	HV520K-1	1kit	
.98	100K	<-80	.017	N/A	<400	60 min. @ 100°C	1 part	High Strength	HV1300-1	1gal	
1.03	30K	<-80	.017	N/A	<400	60 min. @ 100°C	2 part	High Strength	HV200K-1	1kit	
.98	65K	<-80	.017	N/A	<400	65 min. @ RT	2 part	High Strength	HV220K-1	1kit	
2.13	10K	<-80	.5	N/A	190	60 min. @ RT	2 part	Thermal Conductivity: 1W/m °K	HV300K-1	1kit	
2.28	50K	<-80	.5	N/A	170	65 min. @ RT	2 part	Thermal Conductivity: 1.3 W/m °K	HV320K-1	1kit	
1.77	10K	<-80	.5	N/A	190	65 min. @ RT	2 part	Low viscosity filled, 82 shore hardness	HV400K-1	1kit	

Conformal Coatings

Specific Gravity	Viscosity @ 25°C (CPS)	Tg (°C)	Modulus @ 25°C (Mpa)	CTE a1 (ppm/°C)	CTE a2 (ppm/°C)	Cure Schedule (°C)	Form	Comments			
1.15	110	120	25	70	170	60min @ 160°C	1 part	Solvent based, high adhesion, thin protective coating.	CC1001-1Q	1qt	
1.19	400	120	25	70	170	60min @ 160°C	1 part	Solvent based, high adhesion, thin protective coating.	CC1002-1Q	1qt	
1.22	600	120	25	70	170	60min @ 160°C	1 part	Solvent based, high adhesion, thin protective coating.	CC1003-1Q	1qt	
1.24	2,000	120	25	70	170	60min @ 160°C	1 part	Solvent based, high adhesion, thin protective coating.	CC1004-1Q	1qt	
1.15	110	120	25	70	170	60min @ 160°C	1 part	Solvent based, high adhesion, improved CC1001 wetting and flow.	CC1011-1Q	1qt	

Ultra Pure Chemicals for Electronic Processes

Chemicals for CMP (Chemical Mechanical Polishing)

Polysciences offers several unique surfactants/particle suspension aids for using in CMP. In addition to the ultra-pure semiconductor grade listed below, we can custom formulate or synthesize materials for your specific requirements.

Poly(acrylic acid) [9003-01-4] H4g TSCA

Electronic Grade-0.2um Filtered Reduced Ionic Content

MW 5,000 30% soln. in water	24600-125	125g
MW 10,000 30% soln. in water	24597-125	125g
MW 15,000 30% soln. in water	24598-125	125g
MW 50,000 25% soln. in water	24599-125	125g

High Refractive Index Polymers

2,2,2 Trifluoroethyl acrylate, min. 99% [407-47-6] CH6d	01718-25	25g
MW 154.1 bp 91°-92°/749mm n_D^{20} 1.350 100ppm MEHQ inhibitor Tg-10° TSCA		
For reduced refractive index (n=1.407) polymers		

2,2,2 Trifluoroethyl methacrylate, min. 99% [352-87-4] CH4f	02622-25	25g
MW 168.1 bp 91°-92°/749mm n_D^{20} 1.350 100ppm MEHQ inhibitor Tg-10° TSCA		
For reduced refractive index (n=1.407) polymers.		

Photoactive Polymers – See page 168 in Polymers section.

Photoconductive Materials

N-Vinylcarbazole [1484-13-5] HMO7g	02429-25	25g
MW 193.3 mp 65-67° TSCA		
Poly(N-vinylcarbazole) [25067-59-8] A2g	02428-50	50g
MW ~40,000 mp>320° n_D^{20} 1.683 Tg 200 ° TSCA		

Conductive Polymers

Polyaniline, Emeraldine form [25233-30-1] U7g		
Acid doped MW -15,000 d 1.36 Conductivity 2-4 S/cm	21288-5	5g
Soluble in: sulfuric acid, Me SO ₃ H		
Undoped [5616-44-2]	24043-5	5g
Conductivity 10-10S/cm Soluble in: sulfuric acid, Me SO ₃ H, Also DMF, NMP		
Poly(N-vinylcarbazole) [25067-59-8] A2g	02428-50	50g
MW ~40,000 mp>320° nD 1.683 Tg 200 ° TSCA		

SARGEL® Water Indicating Paste

Water indicating paste provides a fast, reliable way to detect water bottoms in storage tanks containing gasoline and gasoline/alcohol blends, diesel, jet fuel, fuel oil, solvents and other materials.



Catalog #

Size

NIST Traceable Precision Particle Size Standards

Precision Particle Size Standards are measured on in-house instruments calibrated with NIST Standard Reference Materials. Each product is supplied with a Certificate of Analysis and the exact size, standard deviation, coefficient of variation, and lot number printed on the label for easy reference. Technical Data Sheet #623



Nanobead NIST Traceable Particle Size Standards A2dmw

Nanobead NIST Traceable Particle Size Standards are monodisperse polystyrene particles ranging from 40nm to 950nm. They are packaged in convenient, easy to use 15ml dropper bottles at 1% solids in an aqueous suspension.

Nom. Dia.	% Solids	Size Range	Catalog #	Size
40nm	1.0%	36-44nm	64004-15	15ml
50nm	1.0%	45-55nm	64005-15	15ml
60nm	1.0%	54-66nm	64006-15	15ml
70nm	1.0%	63-77nm	64007-15	15ml
80nm	1.0%	72-88nm	64008-15	15ml
90nm	1.0%	81-99nm	64009-15	15ml
100nm	1.0%	90-110nm	64010-15	15ml
125nm	1.0%	119-131nm	64011-15	15ml
150nm	1.0%	143-158nm	64012-15	15ml
200nm	1.0%	190-210nm	64013-15	15ml
250nm	1.0%	238-263nm	64014-15	15ml
300nm	1.0%	285-315nm	64015-15	15ml
350nm	1.0%	333-368nm	64016-15	15ml
400nm	1.0%	380-420nm	64017-15	15ml
450nm	1.0%	428-473nm	64018-15	15ml
500nm	1.0%	475-525nm	64019-15	15ml
550nm	1.0%	523-578nm	64020-15	15ml
600nm	1.0%	570-630nm	64021-15	15ml
650nm	1.0%	618-683nm	64022-15	15ml
700nm	1.0%	665-735nm	64023-15	15ml
750nm	1.0%	713-788nm	64024-15	15ml
800nm	1.0%	760-840nm	64025-15	15ml
850nm	1.0%	808-893nm	64026-15	15ml
900nm	1.0%	855-945nm	64027-15	15ml
950nm	1.0%	903-998nm	64028-15	15ml

Microbead NIST Traceable Particle Size Standards A2dmw

Microbead NIST Traceable Particle Size Standards are monodisperse polystyrene particles ranging from 1.0µm to 9.0µm. They are packaged in convenient, easy to use 15ml dropper bottles at 1% solids in an aqueous suspension.

Nom. Dia.	% Solids	Size Range	Catalog #	Size
1.00µm	1.0%	0.95-1.05µm	64030-15	15ml
1.25µm	1.0%	1.19-1.31µm	64035-15	15ml
1.50µm	1.0%	1.43-1.58µm	64040-15	15ml
1.75µm	1.0%	1.66-1.84µm	64045-15	15ml
2.00µm	1.0%	1.90-2.10µm	64050-15	15ml
2.50µm	1.0%	2.38-2.63µm	64055-15	15ml
3.00µm	1.0%	2.85-3.15µm	64060-15	15ml
3.50µm	1.0%	3.33-3.68µm	64065-15	15ml
4.00µm	1.0%	3.80-4.20µm	64070-15	15ml
5.00µm	1.0%	4.50-5.50µm	64080-15	15ml
6.00µm	1.0%	5.40-6.60µm	64090-15	15ml
7.00µm	1.0%	6.30-7.70µm	64100-15	15ml
8.00µm	1.0%	7.20-8.80µm	64110-15	15ml
9.00µm	1.0%	8.10-9.90µm	64120-15	15ml

Megabead NIST Traceable Size Standards A2dmw

Megabead NIST Traceable Size Standards are monodisperse polystyrene particles ranging from 10.0µm to 175.0µm. They are packaged in convenient, easy to use 15ml dropper bottles at 1% solids in an aqueous suspension.

Nom. Dia.	% Solids	Size Range	Catalog #	Size
10.0µm	1.0%	9.00-11.00µm	64130-15	15ml
12.0µm	1.0%	10.80-13.20µm	64140-15	15ml
15.0µm	1.0%	13.50-16.50µm	64155-15	15ml
20.0µm	1.0%	18.00-22.00µm	64160-15	15ml
25.0µm	1.0%	22.50-27.50µm	64165-15	15ml
30.0µm	1.0%	27.00-33.00µm	64170-15	15ml
40.0µm	1.0%	36.00-44.00µm	64180-15	15ml
50.0µm	1.0%	45.00-55.00µm	64190-15	15ml
60.0µm	1.0%	54.00-66.00µm	64200-15	15ml
80.0µm	1.0%	72.00-88.00µm	64210-15	15ml
100.0µm	1.0%	90.00-110.00µm	64220-15	15ml
125.0µm	1.0%	112.50-137.50µm	64225-15	15ml
150.0µm	1.0%	135.00-165.00µm	64230-15	15ml
175.0µm	1.0%	157.50-192.50µm	64235-15	15ml

Additional sizes can be ordered on a custom basis. Please call for quote, (800) 523-2575.

JEDEC Reference Guide

IPC/JEDEC J-STD-20 MSL Classifications

Level	Time	Condition degC/%RH	Soak Requirements			
			Standard	Accelerated		
			Time (hrs) degC/%RH	Condition degC/%RH	Time (hrs) degC/%RH	Condition degC/%RH
1	unlimited	<=30/85%	168+5/-0	85/85	n/a	n/a
2	1 year	<=30/60%	168+5/-0	85/60	n/a	n/a
2a	4 weeks	<=30/60%	696+5/-0	30/60	120+1/-0	60/60
3	168 hours	<=30/60%	192+5/-0	30/60	40+1/-0	60/60
4	72 hours	<=30/60%	96+2/-0	30/60	20+0.5/-0	60/60
5	48 hours	<=30/60%	72+2/-0	30/60	15+0.5/-0	60/60
5a	24 hours	<=30/60%	48+2/-0	30/60	10+0.5/-0	60/60
6	TOL	<=30/60%	TOL	30/60	n/a	60/60

Mil-Std-883, Method 1011 Specs: Thermal Shock Test

- Total Transfer Time <10 seconds
- Total Dwell Time >2 minutes
- Specified Temp reached in <5 minutes
- Must be conducted for a minimum of 15 cycles

Mil-Std-883 Method 1011 Thermal Shock Test Conditions.

Condition	Low Temp	High Temp
A	- 0 (+2/-10) °C	100 (+10,-2) °C
B	-55 (+0/-10) °C	125 (+10,-0) °C
C	-65 (+0/-10) °C	150 (+10,-0) °C

JEDEC JESD22-A106 Specs: Thermal Shock Test

- Total Transfer Time <10 seconds
- Total Dwell Time >2 minutes
- Specified Temp reached in <5 minutes
- Must be conducted for a minimum of 15 cycles

Mil-Std-883 Method 1011 Thermal Shock Test Conditions.

Condition	Low Temp	High Temp
A	-40 (+0/-30) °C	85 (+10/-0) °C
B	- 0 (+2/-10) °C	100 (+10,-2) °C
C	-55 (+0,-10) °C	125 (+10,-0) °C
D	-65 (+0,-10) °C	150 (+10,-0) °C

JEDEC Reliability Test References

Mil-Std-883, Method 1010 Specs: Temperature Cycle Test

- Total Transfer Time $\leq$ 1 minute
- Total Dwell Time $\geq$ 10 minutes
- Specified Temp reached in $\leq$ 15 minutes
- Must be conducted for a minimum of 10 cycles

Mil-Std-883 Method 1010 Temperature Cycle Test Conditions.

Condition	Low Temp	High Temp
A	-55 (+0/-10) °C	85 (+10,-0) °C
B	-55 (+0/-10) °C	125 (+15,-0) °C
C	-65 (+0/-10) °C	150 (+15,-0) °C
D	-65 (+0/-10) °C	200 (+15,-0) °C
E	-65 (+0/-10) °C	300 (+15,-0) °C
F	-65 (+0/-10) °C	175 (+15,-0) °C

JEDEC JESD22-A104 Specs: Temperature Cycle Test

- Total Transfer Time $\leq$ 1 minute
- Total Dwell Time $\geq$ 10 minutes
- Specified Temp reached in $\leq$ 15 minutes
- Recommended for lot acceptance screen: 10 cycles
- Recommended for qualification: 1000 cycles

JEDEC JESD22-A104 Specs Temperature Cycle Test Conditions.

Condition	Low Temp	High Temp
A-55	(+0/-10) °C	85 (+10,-0) °C
B-55	(+0/-10) °C	125 (+10,-0) °C
C-65	(+0/-10) °C	150 (+10,-0) °C
D-65	(+0/-10) °C	200 (+10,-0) °C
F-65	(+0/-10) °C	175 (+10,-0) °C
G-40	(+0/-10) °C	125 (+10,-0) °C
H-55	(+0/-10) °C	150 (+10,-0) °C

Summary of industry-standard HTS

(High Temperature Storage) conditions: 1000 hours at 150 °C.

Mil Std 883, Method 1008, Stabilization Bake Specs:

- Storage at a high temperature for a specified duration
- Test Condition A: 75 °C / 24 hours minimum
- Test Condition B: 125 °C / 24 hours minimum
- Test Condition C: 150 °C / 24 hours minimum
- Test Condition D: 200 °C / 24 hours minimum
- Test Condition E: 250 °C / 24 hours minimum
- Test Condition F: 300 °C / 24 hours minimum
- Test Condition G: 350 °C / 24 hours minimum
- Test Condition H: 400 °C / 24 hours minimum

High Performance / Electronic Materials Glossary of Terms

ALPHA-1 & ALPHA-2 (a1 & a2): Alpha 1 is the Coefficient of Thermal Expansion (see also CTE) below the glass transition temperature (T_g). Alpha 2 is the CTE above the T_g.

ALPHA EMISSIONS: Are radioactive, high energy particles that can damage semiconductor devices. Memory devices are especially sensitive to alpha emission because the passing of the alpha particle through the device can cause the memory to change its state from a 1 to a 0 or a 0 to a 1. The device does not fail, but because the memory now has the wrong value stored, it is called a soft failure. To avoid such failures, memory devices use only "low alpha" solder. Low alpha solder contains Lead which has less radioactivity than normal Lead. Because this low alpha Lead is scarce, it is more expensive.

ANISOTROPIC: material that has different values when measured in different directions. Some methods of die connections use anisotropic conductors, which is a suspension of metal particles in an adhesive tape or paste. The metal conducts through the tape/paste (vertically), but not in the plane of the tape (horizontally). The products are commonly called ACF for film and ACP for paste. The ACF or ACP is placed on the substrate and the die to be connected is flipped upside down and pushed into the paste to make the connections between the chip pads and the substrate conductors. Sometimes the pads have a gold bump on them to improve the connection.

BLEEDING: Die Attach adhesives will leak out from under the die before it is cured. This leakage is called "bleed". Since wire bonds will not stick in areas where bleed has occurred it is important that bleed not exceed a few mils. Bleeding can be controlled by formulation (filler particle size, resin/hardener selection) and process (cure temp, out time). In addition, material will bleed differently on different surfaces (Silver, Nickel, Palladium, solder mask, polyimide).

CAPILLARY ACTION: The action by which the surface of a liquid in contact with the walls of a capillary tube or between two closely spaced plates is drawn into the tube or between the plates by a wicking action. An example of capillary action is in Flip Chip assembly, the underfill is dispensed next to the die and the material is pulled into the gap by the force of capillary action.

CATALYST: A chemical that when added to other materials starts or speeds up a chemical reaction. The catalyst is not consumed in the reaction, it only acts to make the reaction take place.

CONDUCTIVITY, ELECTRICAL: How well a material allows electricity to flow through it. The inverse of conductivity is resistivity. Most polymers do not conduct electricity, so they have very low conductivity. To make them conduct electricity we add metal particles, usually flakes of Silver. In order for the combined polymer and metal to conduct electricity, the particles must be close enough to touch.

Table of Electrical Conductivity

Material	Resistivity (Ohm-cm) 10 E-6
Copper (Cu)	1.5
Silver (Ag)	1.5
Gold (Au)	2.0
Aluminum (Al)	2.4
Solder (60/40)	1.5
Die Attach Epoxy	100 to 400 (.0001 to .0004 ohm-cm)

CONDUCTIVITY, THERMAL: How well a material allows heat to flow through it. Most metals have good thermal conductivity but ceramic and polymers have poor thermal conductivity. In order to increase the thermal conductivity of polymers, they need to be filled with a material that conducts heat well. This can be a metal (cheapest and best way) but adding a metal will also make the polymer electrically conductive. To achieve improved thermal conductivity while allowing the polymer to remain an insulator, ceramic powders such as Alumina or Aluminum Nitride are added. The unit of measure of thermal conductivity is Watt/meter-Kelvin.

Table of Thermal Conductivity

Material	Thermal Conductivity (Watts/meter-Kelvin)
Diamond (C)	600
Silver (Ag)	410
Copper (Cu)	390
Gold (Au)	300
Aluminum (Al)	240
Alumina	40
Solder (60/40)	50
Silica	4
Typical Die Attach	1.5 to 2.0

High Performance / Electronic Materials Glossary of Terms

CONFORMAL COATING: Low viscosity polymer coating typically spun or sprayed onto a device or semiconductor. These coatings protect the devices from the environment or provide electrical insulation value. They do not protect well against physical shock as they are only a thin coating.

CTE (Coefficient of Thermal Expansion): How much a material grows when heated (and shrinks when cooled). The unit of measure is parts per million/per degree centigrade. The CTE differences (CTE mismatch) among the materials in a semiconductor package will cause stresses as the part is exposed to temperature changes in its working life. In most cases, it is useful for an epoxy connecting two materials to have a CTE that falls between the CTE's of the materials being joined.

CTE's of Common Materials	ppm/C
Silica	1
Silicon Die	2.5 to 4
Alumina	6.5
Gold	14
FR4 Substrate	14
Copper	17
BT Laminate	20
Solder Ball	25
Unfilled Polymer	60 or higher

CURE: Non-specific term that is widely used to mean the solidification of a polymer. Curing can be accomplished by applying heat or UV light. Several intermediate steps take place during curing that also have non-specific definitions. When the outside layer of the liquid forms a rubbery coating this is called skinning. When the entire liquid material is solid, but has not yet achieved stable mechanical properties this is called gelling. When the material reaches its final mechanical properties it is said to be cured.

CURING PROFILE: Sometimes referred to as cure cycle or cure schedule, defines the time and temperature required to change the state of a material to achieve its best-desired performance characteristics.

DAM: A wall of material around the perimeter of a device. The dam is formed by dispensing a high viscosity material through a single nozzle that traces a pattern around the device. The dam's main function is to contain a low viscosity fill material that is applied to encapsulate the device.

DIE: A single semiconductor cut from a wafer.

DIE ATTACH: Adhesive that bonds the semiconductor die to the substrate. Can be thermally conductive or non-thermally conductive.

DIELECTRIC CONSTANT: Ratio of the capacitance of a material (materials that do not conduct electricity) to the capacitance of air. A measure of the insulating strength of a dielectric material.

DIELECTRIC LOSS: Electric energy transformed into heat in a dielectric subjected to changing electric fields. The amount of electrical energy lost to the dielectric.

DSC (DYNAMIC SCANNING CALORIMETER): Analytical instrument that measures the heat absorbed or released by a material as it's temperature is raised at a controlled rate. A significant change in the graph of this measure indicates a chemical reaction is occurring. This measure is used to determine the temperature at which an epoxy material will change from liquid to solid. This instrument also measures the percentage cure of epoxy materials.

DTA (DYNAMIC THERMAL ANALYSIS): DTA is an analytical instrument used to measure the effects of temperature on the performance of materials. It is key to determining the temperature at which a material changes phase, such as from a glass-like solid to a soft, rubbery condition. The temperature at which this transition occurs is referred to as the glass transition temperature, or Tg. This instrument can also measure modulus. It is an extension to the older means of using a TMA (Thermal Mechanical Analyzer) for some of these measurements.

ENCAPSULANT: A material that seals or covers a semiconductor to provide mechanical and environmental protection. Typical materials are: molding compound, glob top, dam & fill and potting compound.

EPOXY: Family of thermosetting resins that are used as the media for bonding and protecting semiconductor devices. The main advantages of epoxy are the ability to form strong bonds to many surfaces, low processing temperature and low cost. Epoxies come in many variations with many different properties.

EPOXY ANHYDRIDE: Anhydride is the curing agent most commonly used in semiconductor materials such as die attach adhesive. As a curing agent, it not only causes the polymerization reaction to occur, it becomes a part of the finished compound. The nature of the anhydride reaction is such that it starts to cause the epoxy to change to a solid (gel) at room temperature without the addition of heat.

EXTRACTABLE IONS: Ions in a material that are released in the presence of moisture. Normally measured by placing a material in boiling water for a pre-determined period of time. Then measuring the concentration of the ions in the water. A typical specification will report the ion (K+, Na+, Cl- or F-) as <20 ppm.

FILLER: Particles added to a compound to improve properties and or decrease cost. The filler in conductive die attach adhesive is usually Silver flake to improve conductivity. The filler in encapsulants and underfills is usually inert Silica to increase modulus, optimize CTE and reduce cost.

FILLET: Rounded configuration of material at the edge interface between two other materials. For die attach adhesive, the adhesive around the perimeter of the die that extends part way up the side of the die and slopes outward to the substrate. The shape of the fillet around a flip chip is very important to the ability of the assembly to withstand reliability tests.

FORMULATION: Specific combination of chemical components required to achieve a desired set of material properties.

GEL: The first stage of hardness as a material transforms from a liquid to a solid during curing.

GLASS TRANSITION TEMPERATURE (Tg): See Tg.

GLOB TOP: Moderately viscous liquid encapsulation material applied around and on top of a semiconductor. The viscosity of glob top allows it to be applied without a dam and still hold its position and shape.

GPa (GigaPascal): Common unit of tensile strength, pressure and stress. For materials with very low modulus, the value may be expressed as MegaPascals (MPa). 1 GPa = 1000 MPa. For reference, 1 MPa = 145 psi. Also, 100,000 psi = .689 GPa. The expression of a material's elastic modulus is commonly given in units of GPa. The lower the number, the more elastic or rubbery the material. The higher the number, the more rigid the material.

HARDNESS: Property of a material that resists permanent indentation or scratching. Hardness is measured by making a mark with a special tool. The hardness tool has a tip of prescribed size and shape. The tool is pressed into the test material with a defined force. The depth that the tool penetrates into the test material is measured and compared to a chart of values. The chart of values is used to convert the depth into the measure of hardness, which

is durometer. Common scales for measuring hardness are Shore and Rockwell. The Shore hardness is measured as a dimensionless unit from 0-100. The Shore D indenter is round and must be made of a material harder than the test piece. The Rockwell method uses a 10kg load (for soft materials) on a round indenter and the corresponding depth is measured.

HAST (Highly Accelerated Stress Test): Subjecting a plastic package in water vapor at 131°C and 33.3 psi of pressure for 96 hours qualifies the packages' ability to survive heat and humidity. The test is considered equivalent to a standard 1000 hour test at 85% RH/85°C, because it usually activates the same failure mechanisms. The higher temperature and pressure conditions force the moisture into areas of the package much more quickly than other test methods that take a much longer time period to affect the integrity of the package. HAST achieves results quickly, 96 hours vs. 1000 hours of standard testing. This is a JEDEC reliability test (JEDEC Standard No. 22-A110-A). An electrical bias may also be applied during the stress test. The higher temperature and pressure accelerate these failures.

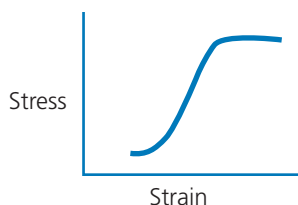
JEDEC (Joint Electronic Device Engineering Council): A test and specification writing body of the Electronic Industry Association that establishes performance, outline and reliability standards in the United States.

JEDEC LEVELS: JEDEC testing classifies parts according to their ability to survive solder reflow after exposure to moisture. There are 6 levels of test; Level 6 is the least severe and Level 1 the most severe. They indicate how long a part can be exposed to ambient conditions without being baked dry. The test involves exposure to prescribed heat and humidity conditions for a set time followed by three passes through solder reflow. The highest level the parts survive indicate its level. The JEDEC Level is usually measured on the finished package.

(See JEDEC testing schedules, pages 300-301)

MODULUS OF ELASTICITY: Modulus is the amount of force per cross sectional area of material (stress) required to change the shape of the material divided by the amount of change in shape (strain). For example, it is the force applied to a steel rod that is required to cause the rod to stretch or get longer divided by the amount the rod stretches. Modulus is a measure of the flexibility or elasticity of a material. The lower the number, the more elastic the material. A rubber band has a very low modulus because it stretches very easily. An aluminum bar has a higher modulus because it takes more force to stretch it. Glass has a very high modulus; it will usually break before it stretches.

Modulus is frequently shown as a stress-strain graph:



In semiconductors, modulus is an indication of a material's ability to absorb stress induced during curing and temp cycle due to CTE mismatches between the die and substrate. The lower the elastic modulus the more stress absorbing capability. The unit of measurement for modulus is usually Giga-Pascal (GPa).

MSDS: Material Safety Data Sheet. Document that provides end users with chemical composition and safety information. It also includes handling information that is required by OSHA (Occupational Health & Safety Administration) in the US.

MONOMER: A molecule that can combine with others to form a polymer. During the curing process, monomers are joined together to form polymers.

OUTGAS: Amount of weight loss of an adhesive during curing or at elevated temperatures. Any solvent and low boiling temperature components of the polymer formulation can evaporate. The temperature and conditions entirely depend on the materials of the formulation. Bubbles formed as the outgas material tries to escape can form voids in the die attach, underfill or encapsulant. These voids can interfere with conductivity and adhesion. The gas can also condense on nearby bond pads and leads interfering with wire bonding.

PCT (PRESSURE COOKER TEST): Way to accelerate testing the moisture and temperature resistance of a device. Parts are put in a chamber at 2 atmospheres with water at 121°C to determine their moisture resistance. Since an autoclave is typically used for this test, it is also called the Unbiased Autoclave Test (JEDEC A102). The HAST (Highly Accelerate Stress Test) is a higher pressure and temperature version of the PCT in reliability testing.

pH: A measure of the acid/base nature of a material. Neutral, neither acid nor base, is a pH of 7. Numbers below 7 are very acidic. Numbers higher than 7 are very basic. The further the pH is away from 7, the stronger the acid or base. High pH materials can be present in detergents and soaps. Fluxes can be acidic. Extractable ionic contaminants in the epoxy materials can alter the pH from neutral in the presence of moisture. The acid or base formed by the ionics can causing corrosion.

POLYMER: Compounds consisting of large molecules made up by a linked series of short molecules called monomers. When the short molecules join together to form the long molecules, the material is said to have cured or polymerized. The structure of the polymer contributes most of the physical characteristics of materials containing them.

POLYMERIZE: Bonding of two or more monomers to form a polymer. The process of polymerizing is also called curing.

POT LIFE: Also known as working life. This is an indication of how long the material can be held at room temperature and still be processed. Two factors contribute to pot life limitations: 1) Increases in viscosity because the material begins to polymerize at room temperature; and 2) settling or separation of filler from the resin. In both cases, inconsistent dispensing results and performance in the finished package is inconsistent.

POTTING COMPOUND: Resin used to encapsulate or seal large areas of a device or combination of devices. Potting compounds are normally poured or dispensed into a device enclosure, filling the entire area.

REFLOW TEMPERATURE: Temperature that the device is sent through to melt solder. For lead solders this is typically 230°C, for lead free alloys the value is 260°C.

RESIN: Term used for the liquid portion of epoxy formulations. The resin is the polymer that performs the chain branching and crosslinking during cure. Resin provides many of the key performance properties of the resulting cured polymer. Unfilled materials are 100% resins. Filled materials such as die attach adhesive and underfill contain 20% to 40% resin.

RHEOLOGY: Description of the flow characteristics of a fluid. The properties of viscosity and thixotropic index are descriptors of the rheology of a material.

SEPARATION: Also known as Filler Settling. In Silver or Silica filled materials, the particles are in suspension from the mixing process. These products are frozen to the fillers in suspension and uniformly dispersed throughout the resin. At room temperature, gravity will cause the more dense filler particles to settle through the lighter polymer.

SHEAR STRENGTH: Key measure of adhesion for die attach adhesives and underfills. A shear strength tester pushes a die or a test part with increasing sideways force until the bond fails. Shear strength is reported in Kilograms (Kg), Kilograms Force (Kg-f), Kg/cm², and PSI. The total force is a function of the die size and type of substrate so it is important to always describe the parts being tested. Dage and Royce are two main suppliers of shear test equipment.

SHELF LIFE: Length of time that a material may be stored and still perform per specification. Many polymers require storage at low temperature in order to be stored successfully. This temperature is typically -40°C for most polymers used as adhesive and +4°C for molding compound. Two things lead to limits in shelf life; curing of the polymer and separation (settling) of the filler.

SILICA: Common name for Silicon Dioxide. Silica is the most commonly found material on earth. Silica has a very low CTE (as low as 1.5ppm), is chemically inert and in some forms can be inexpensive. It is an ideal material to use as filler for polymer materials. Silica comes in two common shapes, angular and spherical. The angular Silica is a ground up natural material (sand) and is very inexpensive. It is widely used for low cost applications such as low end molding compound. Unfortunately, because it has sharp points, it does not flow easily around obstructions (like solder bumps on a Flip Chip). It is also very abrasive and can scratch the very thin oxide on the surface of a die. Spherical Silica is fused (melted) to remove the sharp points and is preferred for advanced applications. Because the material is made using more steps it is more costly. As applications require the polymer to flow into very tight spaces (e.g., between fine pitch wires or low Flip Chip bumps) the Silica particles must be very small, typically not larger than 1/3 the narrowest gap.

SILICONES: Organic compounds containing Carbon, Hydrogen, Silicon and Oxygen. Because they contain Silicon and Oxygen they are also part of the larger set of chemicals called Siloxanes. Silicones are generally stable chemicals that resist many chemicals, have good adhesion when formulated as adhesives, resist moisture and are very flexible.

SILVER: Most commonly used conductive filler material. Silver is relatively inexpensive (compared to Gold), and is an excellent electrical and thermal conductor. Commonly used as flakes (tiny sheets) or kernels (rough spheres).

SINGLE COMPONENT (1K): Polymer that is premixed and ready to use, requiring shipping and storage conditions below -40°C to inhibit cure. 1K is also referred

to as 1 part. Some polymers require mixing two or more separate liquids just before customer use. These are dual or multi component materials commonly called 2K or 2 part.

SLUMP: When screen printing or dispensing a relatively thick (tall) quantity of material, the material can collapse along its edge. This collapsing is known as slump. Slump limits the practical height to which a material can be screened or dispensed. As a rule of thumb, materials cannot be printed with a height that is more than 50% of the width of the finished pattern. This is known as the Aspect Ratio. If the height is the width of a dam, the Aspect Ratio is 1 to 2.

SNAP CURE: Describes die attach materials that cure in less than two minutes.

SOLVENT: Material used to dissolve a solid or to reduce the viscosity of a liquid. Many commonly used semiconductor polymers are so highly viscous that they require the addition of a solvent in order to get satisfactory flow. This solvent typically must evaporate (boil off) during the curing process. If not properly managed, this can lead to voids in the cured material.

SYNTHESIS: Formation of a compound from simpler compounds or elements. When organic chemicals are combined to create new properties without changing the structure of the molecules they are said to have been formulated.

Tg (Glass Transition Temperature): Most materials such as metals and ceramics do not have any sudden shift in their properties over temperature. The properties may change slowly, but the change is continuous. That is not true for most polymers. Many polymer materials undergo an abrupt change in their mechanical properties at a temperature which is called the glass transition temperature. Below the glass transition temperature, polymer materials are somewhat glass like, they are stiffer and have relatively low CTE. Above the glass transition temperature, polymers are less stiff but have higher CTE. In some polymers the change in properties can be very large. For example the CTE above the Tg can be three times than below it. This makes Tg and CTE a very important contributor to stresses generated by thermal changes.

THERMAL CYCLING: General term that refers to repeatedly raising and lowering the temperature of a circuit to see if it deteriorates. Cycling can be done by moving the test unit between temperature extremes slowly or rapidly. If cycling is done rapidly it is referred to

as thermal shock. Most thermal cycling is done for 1000 cycles. The temperature extremes to which the unit is cycled depends on the intended application as follows:

The JEDEC definition for Thermal Cycling requires achievement of the temperature limit within 15 minutes.

Application	Realistic Representative Use Environments		Accelerated Test Condition	
	Low Temp	High Temp	Low Temp	High Temp
Consumer	[0°C]	[+60°C]	[0°C]	[+100°C]
Automotive	[-40°C]	[+125°C]	[-40°C]	[+105°C]
Under Hood	[-55°C]	[+150°C]	[-65°C]	[+150°C]
Industrial	[-55°C]	[+95°C]	[-50°C]	[+150°C]
Telecomm	[-40°C]	[+85°C]	[-50°C]	[+125°C]
Military	[-55°C]	[+95°C]	[-65°C]	[+150°C]

THERMAL SHOCK: Refers to rapidly moving a test unit from a chamber at high temperature to another chamber at low temperature. The chambers can be air to air, or liquid to liquid. Heat transfer, and stress on the unit, is much higher when the unit is dipped into a liquid. The liquid/liquid test is more severe than the air/air test even if the temperature range is the same.

TGA (Thermogravimetric Analyzer): Measures the weight loss of a Polymer material experiences as it is exposed to increasing temperature. There are three characteristics of the material that are of interest:

- 1) How much weight loss is there as the material cures (since this loss is almost always a gas, it causes voids if it is high).
- 2) After curing, if the material is heated above the cure temperature, does it continue to lose weight (an indication that the cure was not complete)?
- 3) Heat the material to very high temperatures and see at what temperature it begins to deteriorate (when the polymer breaks down it will exhibit significant weight loss).

TMA (Thermal Mechanical Analyzer): Instrument that measures the CTE of a material as a function of temperature. Unlike most common materials, polymer materials exhibit a relatively sharp change in their CTE as the temperature is increased. The temperature at which this change in CTE occurs is referred to as glass transition temperature.

THERMOSET: Polymer material which, once cured remains a solid at all temperatures. Thermosetting materials will remain solid until they char (burn) if the temperature is raised high enough, but they will never become liquid again.

THIXOTROPIC INDEX: Most liquids exhibit constant resistance to force regardless of how fast the force is applied, e.g. - if you stir a glass of water, no matter how fast you stir, the water will resist the force in the same amount (the viscosity does not change). Some materials (such as most polymers) show a decrease in resistance to force if the speed at which the force is applied increases. If you stir a polymer faster, it gets easier to stir (the viscosity decreases). This phenomenon is called Thixotropic behavior. In order to compare materials, a standard test is used which is called the Thixotropic Index. Viscosity is measured at 0.5 RPM and at 5.0 RPM. The ratio of these two measurements is the Thixotropic index. The Thixotropic Index of a material determines how well the material will perform in several key semiconductor packaging applications.

When dispensing die attach adhesive, it is desirable for the material to flow easily from the syringe. The material should stay in place without reflow. This kind of behavior is achieved with a Thixotropic Index of above 5.0

UNDERFILL: When a die is Flip Chip attached, (turned upside down and it's pads are attached with solder or conductive epoxy) the CTE mismatch of the substrate and die can create stress on the joints causing them to fail over time or extended thermal cycling. In order to reduce the stress, a polymer material is flowed or otherwise placed under the flipped die. This material is called underfill. Underfill that flows under the die after it is attached it is called conventional underfill. Underfill that is placed under the die before the die is attached it is called no-flow underfill.

VISCOSITY: The speed of fluid flow and/or the resistance to shear. Usually measured in Centipoise (cps). Water is 1 cps, cooking oil is 200 cps, honey is 50,000 cps peanut butter is 1,000,000 cps.

VOID: Any hole in the encapsulant, die attach adhesive or underfill is called a void. Voids can exist because air is trapped during the dispense and bond process (the hole is 'surrounded' by polymer and gets trapped) or can form because the polymer releases gas during curing. Voids reduce thermal conductivity and, if severe, can reduce adhesion strength. They can also trap moisture and reduce device reliability.

VOLATILES: Any material that evaporates or boils rapidly at the temperatures at which it is used or processed is said to be volatile. Many organic materials which are used as solvents are volatile. If a polymer requires the use of such solvents (because it won't flow without their help) it is said to contain volatile materials. When volatile materials escape, they can create voids and must be processed accordingly.



Contact us for more information about custom products and/or services:
info@polysciences.com, (800) 523-2575 or (215) 343-6484 (outside U.S. & Canada)

Polysciences, Inc. Fluorophores and Filter Sets for Fluorescence Microscopy

Fluorophore Dye	Cat. #	Size(s)	Filter Set	Cat. #
Acridine Orange C.I. 46005	04539	500mg / 5g	Filter Set XF104-3	24784
Acridine Orange, 2% Solution	24603	10ml	Filter Set XF104-3	24784
Auramine O	24665	1 Kit	Filter Set XF20	24780
Bisbenzimidazole (Hoechst 33342)	15787	100mg	Filter Set XF06	24787
Bisbenzimidazole (Hoechst 33258)	09460	100mg	Filter Set XF06	24787
Calcein (2,4-Bis(N,N'-di[carboxymethyl] aminomethyl) fluorescein)	03321	1g	Filter Set XF100-2	24792
CTC (Cyanoditoly Tetrazolium Chloride)	19292	100mg / 1g	Filter Set XF21	24796
DAPI (4',6-Diamidino-2-phenylindole dihydrochloride)	09224	10mg / 50mg	Filter Set XF06	24787
Eosin Y	02740	50g	Filter Set XF104-3	24784
Ethidium bromide	04033	5g	Filter Set XF103-2	24800
FITC (Fluorescein isothiocyanate)	00373	1g	Filter Set XF100-2	24792
Fungi-Fluor® Kit for Fungal Detection	17442	1 Kit	Filter Set XF06	24787
Fungi-Fluor® Kit for Fungal Detection*	17442E*	1 Kit	Filter Set XF06	24787
Fungi-White Kit	24692	1 Kit	Filter Set XF06	24787

*sold in Europe only

Filter Sets for Fluorescence Microscopy

We provide additional filter sets for use with our fluorescent stain kits and reagents for fluorescence microscopy. We have listed a range of popular set sizes here, but due to the complex nature of filter sets for specific use or instrumentation, we recommend that you call for a custom quote on all requests.

Vivid Standard Filters are standard filter sets which provide good overall performance for most fluorescent dyes. Excitation filters are bandpass designs. Dichroics are hard surface coated. The emission filter is a bandpass design. This design transmits the prominence of the fluorophore signal while blocking unwanted background energy.

ALPHA Vivid Filters use proprietary ALPHA technology for both the excitation and the emission filters. Passband slopes are extremely steep, with transmission approaching unity in both the excitation and emission channels. The crossover between excitation and emission has the highest optical density (OD) of any available filter sets. ALPHA Vivid sets are manufactured without auto-fluorescent absorption glass typically used in manufacturing filters. With extreme edge steepness, high throughput, and high density crossover blocking, ALPHA Vivid sets are the current state-of-the-art for signal-to-noise in low light level imaging applications.

Filter Set General Features

- Designed for overall optimization of signal-to-noise, brightness, and multi-color discrimination.
- Excitation & emission bands optimized for color perception.
- Optimized for system speed of microscopes.

Vivid Standard Filter Set XF06

Vivid Standard filter set, provides good overall performance for most fluorescent dyes. Polysciences, Inc. primary compatible fluorophores are BisBenzamide (Hoechst 33342), BisBenzamide (Hoechst 33258), Fungi-White, DAPI, Fungi Fluor for Fungal Detection.

Catalog #	Size	
20mm Exciter, 18 x 26mm Dichroic, 20mm Emitter	24787-20	1 set quote
25mm Exciter, 25.7 x 36mm Dichroic, 25mm Emitter	24787-25	1 set quote

Filter Sets for Fluorescence Microscopy *continued*

Due to the complex nature of filter sets for specific use or instrumentation, we recommend that you call for a custom quote on all requests.

Auramine O Vivid Standard Filter Set XF20

This Vivid Standard filter set provides good overall performance for most fluorescent dyes. Polysciences, Inc. primary compatible fluorophore is Auramine O.

20mm Exciter, 18 x 26mm Dichroic, 20mm Emitter	24780-20	1 set
25mm Exciter, 25.7 x 36mm Dichroic, 25mm Emitter	24780-25	1 set

Vivid Standard Filter Set XF21

This Vivid Standard filter set provides good overall performance for most fluorescent dyes. Polysciences, Inc. Primary Fluorophore: CTC (Cyanoditoly tetrazolium chloride).

20mm Exciter, 18 x 26mm Dichroic, 20mm Emitter	24796-20	1 set
25mm Exciter, 25.7 x 36mm Dichroic, 25mm Emitter	24796-25	1 set

ALPHA Vivid Filter Set XF100-2

This ALPHA Vivid filter set provides good overall performance for most fluorescent dyes. Polysciences, Inc. Primary Fluorophores: FITC (Fluorescein isothiocyanate) and Calcein.

20mm Exciter, 18 x 26mm Dichroic, 20mm Emitter	24792-20	1 set
25mm Exciter, 25.7 x 36mm Dichroic, 25mm Emitter	24792-25	1 set

Ethidium Bromide ALPHA Vivid Filter Set XF103-2

This ALPHA Vivid filter set provides good overall performance for most fluorescent dyes. Polysciences, Inc. Primary Fluorophore: Ethidium bromide.

20mm Exciter, 18 x 26mm Dichroic, 20mm Emitter	24800-20	1 set
25mm Exciter, 25.7 x 36mm Dichroic, 25mm Emitter	24800-25	1 set

Acridine Orange ALPHA Vivid Filter Set XF104-3

This ALPHA Vivid filter set provides good overall performance for most fluorescent dyes. Polysciences, Inc. primary compatible fluorophores are Acridine Orange C.I. 46005, Acridine Orange 2% Solution, Eosin Y.

20mm Exciter, 18 x 26mm Dichroic, 20mm Emitter	24784-20	1 set
25mm Exciter, 25.7 x 36mm Dichroic, 25mm Emitter	24784-25	1 set

New! Fluorescence Microscopes from Polysciences, Inc.

Polysciences, Inc. has formed a partnership with IntraCellular Imaging to bring you two new fluorescence microscope packages. These microscopes ship complete with our self aligning metal halide light source and filter sets. Everything necessary to start doing fluorescent work today!

See pages 6-7 for details

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TERMS AND CONDITIONS OF SALE FOR SALES FROM TELEPHONE ORDER, PURCHASE ORDER, WEBSITE ORDER, OR CATALOG ORDER

1. ACCEPTANCE Acceptance of Customer's order is limited to the terms and conditions contained herein and on the face page of this contract. Seller hereby notifies and Customer hereby acknowledges that Seller objects to all terms and conditions in any purchase order or any other communications from the Customer which are additional to, different from, or conflicting with the terms and conditions contained herein. Neither the failure of Seller to object to a purchase order or any other communication from the Customer, nor shipment of the Products described on the front of this contract shall be deemed an acceptance of any terms or conditions which are additional to, different from, or conflicting with the terms and conditions contained herein. The Customer shall be deemed to have accepted all of the terms and conditions contained herein and on the front of the contract, and no other, upon Customer's acceptance or use of the Products described on the front of this contract.

2. PRICES Prices set forth on the front page of this contract are exclusive of all federal, state, excise and similar taxes, including, without limitation, taxes on manufacture, sales, receipts, and all costs of transportation, packaging, insurance and other costs, including export and import duties, if applicable. All such taxes and costs will be added to the invoice as a separate charge and paid by Customer. Prices are based on current costs and therefore subject to change without notice to account for changes in the cost of raw materials and other direct costs beyond Seller's control.

3. SHIPMENT & RISK All sales are freight and insurance prepaid by Customer from Seller's shipping point unless otherwise noted. If shipping and handling charges are quoted or invoiced, they will include charges in addition to actual freight costs. Delivery of the goods to the carrier at Seller's shipping point shall constitute delivery to Customer and Customer shall bear all risk of loss or damage in transit. The general method of shipment for each item is listed in Seller's catalog or website. However, Seller reserves the right, in its discretion, to determine the exact method of shipment. Seller reserves the right to make delivery in installments, all such installments to be separately invoiced and paid for when due per invoice, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve Customer of its obligations to accept remaining deliveries. Shipments made thirty (30) days after specified date of delivery, if date is so specified, shall constitute good delivery. Any delivery not in dispute shall be paid for regardless of other controversies relating to other delivered or undelivered Products.

4. DELAYS Seller will not be liable for any damages suffered by Customer by reason of any delay in the performance of this contract, or in the delivery or shipment of the Products, when such delay is directly or indirectly caused by, or in any manner arises from, fires, floods, accidents, acts of terrorists, riots, acts of God, war or insurrection, governmental interference or embargoes (whether by priorities, rationing or otherwise), strikes, labor difficulties, shortages of labor, fuel, power, materials or supplies, transportation delays or any other cause (whether or not similar to any of the foregoing) beyond Seller's control. If any of the above mentioned contingencies occur, Seller reserves the right to cancel in whole or in part, this contract without any resulting liability.

5. TERMS OF PAYMENT & INTEREST Terms of payment are net cash thirty (30) days. All payments shall be made in U.S. dollars for orders shipped through Polysciences, Inc. All payments shall be made in Euros for orders shipped through Polysciences Europe GmbH. Seller reserves the right to impose a money service charge at the rate of one and one-half percent (1½%) per month on invoices unpaid after thirty (30) days. Any payment terms specified on the front of this contract supersede any inconsistent part of this section.

6. RAW CHEMICALS Seller reserves the right to select sources of supply for raw chemicals. Seller does not guarantee the compatibility or performance of raw chemicals with any specific customers' Product. This contract is subject to Seller's ability to obtain the necessary raw chemicals. All chemicals should be handled only by qualified individuals trained in procedures and familiar with the potential hazards of the chemicals. The absence of warning must not be interpreted as an indication of safety. *All chemicals are offered for research and investigational purposes only and are not intended for food, drug, cosmetic or household use. Buyer assumes all risk and liability for the use and/or results obtained by the use of the Products whether used singly or in combination with other products.*

7. LIMITED WARRANTY SELLER GIVES NO WARRANTY AS TO MERCHANTABILITY OR AS TO FITNESS FOR ANY PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FRONT OF THIS CONTRACT OR BEYOND THE TERMS AND CONDITIONS CONTAINED HEREIN. The sole and exclusive warranty provided herein is that the Products sold are warranted to be free from defects in material or workmanship as established by Seller's standards of acceptable quality. This express warranty is in lieu of all other warranties, express or implied. Customer's sole remedy under this warranty is to have its account credited with the invoice amount, or at Seller's sole option to have any Products which contain defects at variance with Seller's specifications replaced, provided the specific defect is reported to Seller within fifteen (15) days after the date of initial shipment. Every such claim under this warranty shall be deemed waived by Customer unless it is made in writing within said fifteen (15) day period. Defective Products may be returned to Seller only after Seller's inspection and then only upon receipt of definite instructions for the return received from Seller, i.e., the Customer must obtain a written Returned Material Authorization number from the Seller. Any Products returned without Seller's advance written instructions will not be received for replacement or credit. Products returned without defect which are approved for return by the Seller are subject to a restocking charge equal to 25% of the purchase price of the subject item.

8. LIMITATION OF LIABILITY UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE TO CUSTOMER OR ANY OTHER PERSON FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, LOSSES OR EXPENSES ARISING FROM THIS CONTRACT OR ITS PERFORMANCE OR IN CONNECTION WITH THE USE OF, OR INABILITY TO USE THE PRODUCTS FOR ANY PURPOSE WHATSOEVER, OR FOR INJURY TO PERSON, OR DAMAGE TO OR LOSS OF PROPERTY OR VALUE CAUSED BY THE PRODUCTS.

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10. CONFIDENTIALITY Any designs, sketches, formulae, proofs, etc. originated by Seller are submitted in confidence and will not be disclosed by Customer to any third party. Unless otherwise agreed in writing, such items and all copyrights or patents protecting them are owned by Seller.

11. MODIFICATION Modifications, additions, cancellations or suspensions of any order resulting from this contract shall not be effective or binding upon Seller unless evidenced in writing on the front of this contract or in a separate writing, signed by an authorized manager of both the Customer and the Seller, expressly stating the terms modified and the nature of the modification. This contract supersedes all prior agreements, proposals, arrangements and communications, whether oral or written with respect to this order.

12. JURISDICTION Customer and the Seller, each, to the extent that it may lawfully do so, hereby consents to the jurisdiction of the courts of the Commonwealth of Pennsylvania and the United States District Court for the Eastern District of Pennsylvania for any suit, action, or other proceeding arising out of any of its obligations hereunder or with respect to the transactions contemplated hereby, and expressly waives any and all objections such party may have to venue in any such courts. Each party, to the extent that it may lawfully do so, further agrees that a summons and complaint commencing an action or proceeding in any of such courts shall be properly served and shall confer personal jurisdiction if served personally or by certified mail to it as its address provided on the front of this contract or as otherwise provided under the laws of the Commonwealth of Pennsylvania. This contract and the obligations of the parties hereto, shall be construed in accordance with and all disputes shall be governed by the laws of the Commonwealth of Pennsylvania, U.S.A. (without reference to its conflict of rules), including provisions of the Uniform Commercial Code as adopted by this Commonwealth of Pennsylvania.

13. LIMITATION OF ACTIONS No action regardless of form arising out of any contract with the Customer may be commenced more than one (1) year after the cause of action has accrued except an action for nonpayment. Customer shall reimburse Seller for any attorney's fees and other legal expenses incurred in enforcing or defending its rights under this contract.

Unless Customer notifies Seller in writing to the contrary within five (5) days after the receipt of this contract by Customers, the Customer's acceptance of the Products or payment therefore shall be equivalent to Customer's assent to the terms and conditions hereof.

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