

# BIOCHEMICAL AND ORGANIC COMPOUNDS

**1988  
PRICE LIST**



*Research*

## and DIAGNOSTIC CLINICAL REAGENTS

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### CUSTOMER/TECHNICAL SERVICE

Telephone numbers on convenient tear-out card inside front cover.  
Numbers also listed on page 11.

ALPHABETICAL LIST

EQUIPMENT BOOKS AND SUPPLIES

STANDARDS AND CONTROLS

CHROMA TOUGRAPHY

RESEARCH KITS AND REAGENTS

DIAGNOSTIC KITS AND REAGENTS

AUTOMATED REAGENTS

NEW ITEMS

# SIGMA<sup>®</sup>

## CHEMICAL COMPANY

P.O. BOX 14508, ST. LOUIS, MO 63178 USA

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C# 37881590  
 7C 8335538  
 FC: 52 S# 2599556  
 7C  
 EQ: 52 I# 37881590

## A FEW WORDS ABOUT OUR PRODUCTS

### ● USE OF OUR PRODUCTS

SIGMA RESEARCH REAGENTS ARE FURNISHED FOR LABORATORY USE ONLY.

This means our products:

- ... may be used in laboratory research and experiments,
- ... may **NOT** be used as **DRUGS**,
- ... may **NOT** be used as **COSMETICS**,
- ... may **NOT** be used as **AGRICULTURAL** or **PESTICIDAL PRODUCTS**,
- ... may **NOT** be used as **FOOD ADDITIVES**, and
- ... may **NOT** be used as **HOUSEHOLD CHEMICALS**.

SIGMA DIAGNOSTIC REAGENTS ARE FURNISHED FOR IN VITRO DIAGNOSTIC USE.

We are required to use "Due Diligence" when processing orders to ensure that our reagents are not purchased for drug or other use. In order to avoid delays, we recommend that orders carry the statement: "FOR LABORATORY USE ONLY. NOT FOR DRUG, HOUSEHOLD OR OTHER USES."

We are unable to ship our reagents to individuals not affiliated with institutions or firms. Please place your order through the institution or firm with which you are affiliated.

**Food & Drug Use:** Inquiries for our products for food and/or drug use are invited and will be considered on an individual basis under Food and Drug Administration regulations. For additional information, ask for the Sigma F & D Division.

**Commercial Use:** We will consider requests for commercial use of our products. For additional information, ask for the Commercial Division.

**All Orders From High Schools must be:** Submitted in writing and on an official school purchase order, with a minimum of two authorizing signatures.

### ● TOXICITY AND HAZARDS

Some reagents are marked with hazardous warnings; others are not. The absence of a warning must not be interpreted as an indication of safety. We must emphasize that information is not available on the possible hazards of many compounds.

Through our experience and/or extensive literature references, we have classified certain items as "EXTREMELY HAZARDOUS!" If you are unfamiliar with the hazards of these items, please request Safety Data Sheets from our Customer Service Department before ordering.

**CAUTION:** Failure to classify a product as "EXTREMELY HAZARDOUS!" does not imply lack of toxicity and hazards. Each product offered by Sigma is intended for use by qualified professionals who will safely handle and dispose of the products they receive.

### ● WARRANTIES

Sigma warrants that its products perform as described in Sigma literature. Should any fail for reason other than through misuse, at Sigma's option, Sigma will replace it free of charge or refund the purchase price.

**This warranty is exclusive and Sigma makes no other warranty, expressed or implied, including any implied warranty of merchantability or fitness for any particular purpose.** Sigma shall not be liable for any incidental, consequential or contingent damages.

For more information about the terms and conditions of sale, you should review our invoices and packing slips. Any customer who does not already have one of our invoices or packing slips may obtain a copy of our terms and conditions by writing or calling our Customer Service Department.

## UNITED STATES CUSTOMERS ORDERING CONTROLLED SUBSTANCES

regulations issued by the United States Department of Justice, Drug Enforcement Administration (DEA) require us to obtain certain documents before we can ship any Controlled Substance.

Customers ordering products on this page for the first time **must send a photocopy** of their federal registration, required for handling Controlled Substances, attached to the purchase order. As your federal registration is renewed by the DEA, a photocopy could be mailed to us for updating our records. This will reduce the time needed to process your order for shipment.

A single \$35.00 fee is added to multiple classes and/or items placed on one order

It is necessary that you furnish us with the following documents when ordering Controlled Substances listed on this page in either of the two following categories

- 1 Your written purchase order **must show**:
  - a) your DEA registration number,
  - b) the "ship to" name and address exactly as it appears on your DEA registration certificate,
  - c) your acceptance of a \$35.00 administrative fee. Because of the special handling and processing, we have been forced to increase the administrative fee. This fee should be added to each purchase order
  - d) Be sure we have a current copy of your Federal Registration Form 223 on file.
- 2 A completed DEA-222 form is required for orders of Classes I & II items. We are not permitted to fill orders on altered or incomplete order forms.

For complete product listings see our new section of CONTROLLED SUBSTANCES.

### CLASSES I & II

DEA Class No	Sigma Product No	Name	DEA Class No	Sigma Product No	Name	DEA Class No	Sigma Product No	Name
II A	0408	Alphaprodine HCl	II F	3886	Fentanyl Citrate	II N	7640	Norcodeine HCl
II A	5255	Amobarbital	II H	4516	Hydrocodone Bitartrate	II N	1513	Noroxymorphone
II A	0533	L-Amphetamine Free Base	II H	5136	Hydromorphone HCl	II O	1253	Opium Powder
II A	5880	D-Amphetamine Sulfate	I I	7003	Ibogaine HCl	II O	1378	Oxycodone HCl
II A	1263	α-Amphetamine Sulfate	II M	3142	Meperidine HCl	II P	3636	Pentobarbital
II B	4147	Benzoylcegonine Hydrate	II L	5143	Levorphanol Tartrate	II P	3761	Pentobarbital Sodium
II B	8021	Benzoylcegonine-d <sub>4</sub>	I M	8375	Mescaline Hemisulfate	II P	3029	Phencyclidine HCl
I B	0503	Bulofenone Monooxalate	I M	8500	Mescaline HCl	II P	4540	Phencyclidine-d <sub>4</sub> HCl
I C	7515	Cannabidiol	I M	6515	Mescaline Sulfate	II P	3522	Phenylacetone
I C	6888	Cannabinol	II M	0267	Methadone HCl	II S	1503	Secobarbital
I C	5776	Cocaine HCl	II M	8254	α-Methamphetamine HCl	II S	1378	Secobarbital Sodium
II C	5901	Cocaine	II M	8750	(+)-Methamphetamine HCl	I T	2386	1-Tetrahydrocannabinol
II D	0524	Dextropropoxyphene HCl	II M	2771	α-Methamphetamine-d <sub>4</sub> HCl	I T	2511	6-Tetrahydrocannabinol
I D	4636	N,N-Diethylglutamine	I M	9146	Methaqualone Free Base	II T	2019	Thebaine Alkaloid Powder
I D	6129	N,N-Dimethyltryptamine	I M	3637	Methaqualone HCl	II T	2641	Tropacocaine HCl
II D	6029	Diphenoxylate HCl	I M	6267	(+)-3,4-Methylenedioxyamphetamine HCl			
II E	5137	Egonine HCl						
II E	3761	Egonine-d <sub>4</sub> HCl	II M	2892	Methylphenidate HCl			
			II M	6886	Morphine-3-β-D-Glucuronide			

### CLASSES III & IV

DEA Class No	Sigma Product No	Name	DEA Class No	Sigma Product No	Name	DEA Class No	Sigma Product No	Name
III A	7652	Allylcyclopropenyl Barbituric Acid	IV C	1402	Clorazepate Dipotassium	IV M	3887	Mephobarbital
III A	7537	Alphenal	IV D	7282	Desmethyldiazepam	IV M	2392	Meproamate
III A	7144	Aprobarbital	IV D	1278	Desmethyldiazepam-d <sub>4</sub>	III M	2142	Methyprylon
IV B	0375	Barbital	III D	5761	5,5-Diallylbarbituric Acid	III N	3135	Nalorphine HCl
IV B	0500	Barbital Sodium	IV D	0899	Diazepam	IV N	3889	Nitrazepam
III B	8263	Benzphetamine HCl	IV D	0406	Diazepam-d <sub>4</sub>	IV O	1880	Oxazolam
IV B	4144	Bromazepam	IV D	0273	Diethylpropion HCl	IV P	5520	Paraldehyde
III B	8380	Bulbarbital	IV E	3258	Ethinamate	IV P	6260	Pemoline
III B	6638	Bulbital	IV F	8507	Fenfluramine HCl	IV P	6527	Pentazocine Free Base
III B	6763	Butethal	IV F	9261	Fluntrazepam	IV P	6652	Pentazocine HCl
IV C	8383	Chloral Hydrate	IV F	3883	Flurazepam Dihydrochloride	III P	5645	Phendimetrazine Bitartrate
IV C	2517	Chlordiazepoxide HCl	III G	6633	α-Glutethimide	IV P	1636	Phenobarbital
IV C	0531	Chlordiazepoxide-d <sub>4</sub>	III H	1005	Hexobarbital	IV P	3654	Prazepam
IV C	1277	Clonazepam	IV L	1764	(±) Lorazepam	IV T	8275	Temazepam
			IV L	7518	Lormetazepam	IV P	8653	Phentermine HCl
			III L	5376	o-Lysergic Acid	III T	0894	Thiamylal Sodium
			IV M	0521	Medazepam	III T	1019	Thiopental
						III T	6023	(±) Thiopental Sodium

### OTHER DEA CONTROLLED SUBSTANCES

(Not classified, but reporting required by the DEA)

886	4-Amino-2,2,6,6-Tetramethyl Piperidine	M 3519	1-Methylpiperidine	P 3156	cis-2,4-Piperidine Dicarboxylic Acid
7633	2-Ethylpiperidine	M 2394	2-Methylpiperidine	P 9657	cis-2,5-Piperidine Dicarboxylic Acid
2383	1-Ethylpiperidine	M 0270	3-Methylpiperidine		
3013	1-(2-Hydroxyethyl)piperidine	M 4019	4-Methylpiperidine	P 2031	cis-2,6-Piperidine Dicarboxylic Acid
2763	3-Hydroxymethyl-1-methyl-piperidine	P 7789	3-Phenylacetylaminomethyl-2,6-piperidinedione		
		P 5881	Piperidine	P 9159	Piperidine-4-sulphonic Acid
1629	3-Hydroxy-N-methyl-piperidine	P 8782	cis-2,3-Piperidine Dicarboxylic Acid	T 9264	2,2,6,6-Tetramethyl Piperidine

When ordering any of these items, please provide your written purchase order, your acceptance of the \$35.00 administrative fee, the intended ultimate use, and the signature of the end user. To avoid any delay in receiving material, we suggest double-checking your order and documents for accuracy and completeness before mailing them to us for processing.

Phone and telegraph orders not accepted

## SALE OF CONTROLLED SUBSTANCES TO CUSTOMERS OUTSIDE USA

The United States Department of Justice, Drug Enforcement Administration (DEA) regulates exporting of Controlled Substances from the United States. The products listed in the classes below are available for export. However, other Controlled Substances listed in this catalog may become eligible for exporting in the future. Please contact us if you have a requirement for a Controlled Substance not shown.

Sigma routinely ships these items via Air Freight or Surface Freight, F.O.B. Sigma. The shipping cost will be added to your invoice.

An administrative fee of \$45.00 is charged on each order to help defray our expenses in obtaining the necessary export documents. Multiple orders received at the **same time** for the **same product** or a combination of items from the **same group** listed below will be subject to only one administrative fee.

You must furnish us with the following documents when ordering from the two following groups of Controlled Substances:

1. A **signed, original** Import License or Import Permit issued by **your** government agency which corresponds to the U.S. Department of Justice, Drug Enforcement Administration. The Import Permit may be in the form of a letter from your drug agency advising us that you are authorized to import these items.
2. A **signed** statement from you stating that these substances will be used exclusively for scientific purposes and will not be exported.

For complete product listings see our **new section of Controlled Substances.**

### Classes I & II

DEA Class No.	Sigma Product No.	Name	DEA Class No.	Sigma Product No.	Name
II	A 0408	Alphaprodine Hydrochloride	II	M 0267	Methadone HCl
II	A 5255	Amobarbital	II	M 8254	$\alpha$ -Methamphetamine HCl
II	A 5880	<i>o</i> -Amphetamine Sulfate	II	M 8750	(+)-Methamphetamine HCl
II	A 1263	$\alpha$ -Amphetamine Sulfate	II	M 6267	(+)-3,4-Methylenedioxyamphetamine HCl
II	A 0533	L-Amphetamine Free Base	II	M 2892	Methylphenidate HCl
II	B 4147	Benzoylcegonine Hydrate	II	N 7540	Norcodeine HCl
II	B 8021	Benzoylcegonine- $\delta$	II	N 1513	Noroxymorphone
II	C 5776	Cocaine HCl	II	O 1253	Opium Powder
II	C 5901	Codeine	II	O 1378	Oxycodone HCl
II	D 0524	Dextropropoxyphene HCl	II	P 3636	Pentobarbital
II	D 6029	Diphenoxylate HCl	II	P 3761	Pentobarbital Sodium
II	F 3886	Fentanyl Citrate	II	P 3522	Phenylacetone
II	H 4516	Hydrocodone Bitartrate	II	S 1503	Secobarbital
II	H 5136	Hydromorphone HCl	II	S 1378	Secobarbital Sodium
II	L 5143	Levorphanol tartrate	II	T 2019	Thebaine Alkaloid Powder
II	M 3142	Meperidine HCl			

### Classes III & IV

DEA Class No.	Sigma Product No.	Name	DEA Class No.	Sigma Product No.	Name
III	A 7662	Allylcyclopentenyl Barbituric Acid	IV	E 3258	Ethinamate
III	A 7537	Alphenal	IV	F 3883	Flurazepam Dihydrochloride
III	A 7144	Aprobarbital	III	G 6633	$\alpha$ -Glutethimide
IV	B 0375	Barbital	III	H 1005	Hexobarbital
IV	B 0500	Barbital Sodium	IV	L 7518	Lormetazepam
III	B 8263	Benzphetamine HCl	IV	M 3887	Mephobarbital
III	B 8380	Butabarbital	IV	M 2392	Meprobamate
III	B 6638	Butalbital	III	M 2142	Methpyrlyon
IV	C 8383	Chloral Hydrate	IV	N 3889	Nitrazepam
IV	C 1277	Clonazepam	IV	O 1880	Oxazolam
IV	D 7282	Desmethyldiazepam	IV	P 5520	Paraldehyde
III	D 5761	5,5-Diallylbarbituric Acid	III	P 5645	Phendimetrazine Bitartrate
IV	D 0273	Diethylpropion HCl	IV	P 1636	Phenobarbital
			IV	P 8653	Phentermine HCl
			III	T 0894	Thiamylal Sodium
			III	T 1019	Thiopental
			III	T 6023	( $\pm$ )Thiopental Sodium

### Other DEA Controlled Substances

(Not classified, but reporting required by the DEA)

A 8896	4-Amino-2,2,6,6-Tetramethyl Piperidine	P 7789	3-Phenylacetyl-amino-2,6-piperidinedione
E 7633	2-Ethylpiperidine	P 5881	Piperidine
E 2383	1-Ethylpiperidine	P 8782	cis-2,3-Piperidine Dicarboxylic Acid
H 3013	1-(2-Hydroxyethyl)piperidine	P 3156	cis-2,4-Piperidine Dicarboxylic Acid
H 2763	3-Hydroxymethyl-1-methylpiperidine	P 9657	cis-2,5-Piperidine Dicarboxylic Acid
H 1629	3-Hydroxy-N-methylpiperidine	P 2031	cis-2,6-Piperidine Dicarboxylic Acid
M 3519	1-Methylpiperidine	P 9159	Piperidine-4-sulphonic Acid
M 2394	2-Methylpiperidine	T 9264	2,2,6,6-Tetramethyl Piperidine
M 0270	3-Methylpiperidine		
M 4019	4-Methylpiperidine		

When ordering any of these items, please provide your written purchase order, your acceptance of the \$45.00 administrative fee, the intended ultimate use, and the signature of the end user.

4 In order to avoid any delay in receiving material, we suggest **double-checking your order and documents** for accuracy and completeness before mailing them to us for processing.

## SHIPPING INFORMATION

For over 35 years, Sigma has been paying almost all transportation charges. During the last few years, we have had an explosion of regulations and an increased awareness of hazards. We have been able to maintain our original policy of **no minimum charge and to pay shipping costs**. There are certain situations where our preferred method of shipment (which we consider to be safe, secure and economical) is not acceptable to our transportation agents, forcing us to alter our policy of paying transportation costs. Items which may fall into these situations are identified as **FOB SIGMA** in our catalog. The only other case where we ask you to pay transportation costs is if you request us to ship via air those items which are normally shipped via surface.

On a continuous basis, Sigma is doing everything possible to get relief from this deterrent to our "normal" policy of paying the shipping costs. We are working with local, national and international groups to get exemptions for shipments of small quantities of hazardous chemicals. In our opinion, there is very little rationale for refusing shipments of very small quantities of hazardous substances properly packaged in safe containers.

### DOMESTIC SHIPMENTS

One example where someone has listened to us: the U.S. Department of Transportation (D.O.T.) and U.S. Postal Service have granted exemptions from certain shipping requirements for transporting small packages of hazardous materials in the United States. Whenever possible we will take advantage of this exemption.

If we cannot take advantage of the U.S. D.O.T. guideline for your domestic shipment, to avoid charging expensive transportation costs we can ship by our "normal" methods using Poison Packs (\$8.50 will be charged) or Wooden Boxes (\$10.00 will be charged). We will combine all compatible items in a single container whenever possible for shipping in Poison Packs or Wooden Boxes.

### INTERNATIONAL SHIPMENTS

Even though we feel we have the finest and fastest means of distributing chemicals world-wide, hazardous items still cause shipping problems and create additional costs. One method we use to minimize your shipping costs for hazardous items is consolidated air freight and subsequent distribution to you via local methods. Unfortunately, customs or other regulations prevent us from doing this in all countries.

We will continue to do everything possible to minimize your shipping costs, but **YOU ALSO CAN HELP US** to continue to lower the costs of shipping your orders.

- Ask your local airline(s) and postal authorities to adopt the U.S. D.O.T. guidelines.
- Consolidate your orders of hazardous items so that airfreight costs can be spread over as many products as possible; air carriers, trucklines and shipping companies have minimum charges.
- Authorize accumulation of hazardous chemicals. We will ship when we have sufficient material to exceed the minimum charge.
- Consolidate orders from several departments of your institution; we can bill each separately as you instruct.
- Advise the best route for hazardous items which must be shipped by air cargo only (no passenger) planes, as some countries no longer have air cargo services.
- State on your order that you are aware of possible additional FOB freight charges. This will allow us to process your order promptly.
- Ask your favorite dealer to stock these items for you.

If you are aware of any other means of getting hazardous shipments to you, please advise us.

The foregoing information is correct as we understand the current regulations. However, there are numerous additional restrictions based upon toxicity, carcinogenicity and possible other factors that may affect our handling of this problem in the future.

### STORAGE - DRY ICE

Recommended Storage is indicated below each product number in the product listing, as follows:

**-70°C** = ULTRACOLD      **-20°C** = DEEP FREEZE      **-20°C** = FREEZER  
**-0°C** = FREEZER      **0-5°C** = REFRIGERATOR      **RT** = ROOM TEMPERATURE

Items requiring storage at other than ambient temperature, but not requiring ice for shipment, will be shipped under conditions that will ensure the quality of the product.

For shipments within the continental USA (excluding Alaska) of items requiring ice, package prices also include ice, container and freight. For shipment outside the USA see approximate Dry Ice shipping costs below.

Shipping weight of Dry Ice and container is about 35 lbs. We try to estimate Dry Ice needed; but we cannot predict time lost in Customs offices or en route. The customer is responsible for prompt Customs clearance. If you cannot ensure prompt Customs clearance, **be sure to order** additional dry ice, and **always specify** which airport you prefer.

The estimated airfreight F.O.B. costs to typical destinations are:

Africa .....	\$224.00	Canada.....	\$ 54 00	Mexico ..	\$ 75.00
Alaska .....	104.00	Europe.....	138.00	New Zealand.....	204.00
Asia.....	175 00	Hawaii.....	79.00	South America ..	168 00
Australia.....	244.00	India.....	192.00		

Hazardous items cannot generally be included with your ice (dry or wet) airfreight shipments. If your order consists of both an ice and hazardous shipment, please acknowledge that you expect two airfreight shipments; one for the ice shipment and one for the hazardous shipment.

## RETURN PRIVILEGES & POLICIES

Sigma is certainly unique with regard to policies of cooperation, whereby we will do almost anything to help you with your problems, but one matter in which we are rather stubborn is the acceptance of returns. Policies have been developed through the years which we feel are extremely fair and cover almost every conceivable situation. To avoid future misunderstandings, we have outlined these policies here:

**Any reagent offered by Sigma is unconditionally guaranteed to be "satisfactory" to you.** An reagent that does not perform as it should when you use it may be replaced without charge and postage paid anywhere in the world. We do not care how old the reagent is or if it was damaged in your own laboratory by improper storage conditions. If you have any problem using one of our reagents and feel that a personal conversation would be helpful, please telephone the Customer Service Department collect. We want you to tell us when you find something wrong and we as for an opportunity to replace the materials. However, government directives that require expiration dating before deterioration occurs, make it impossible for us to replace such items after the expiration date has been reached. Preferably, we hope you will advise us of your problem before making the return. Please telephone (collect) the Customer Service Department for return shipping instructions and a Returned Materials Number to identify an authorized return. Unidentified returns may be discarded; unauthorized returns will not be accepted.

**Any reagent which we ship to you because of an error on our part is, of course, immediately returnable for replacement.** Should this happen, not only the replacement but our sincere apologies for the inconvenience we have caused you will go with the shipment. Sometimes purchase orders are received which are not clear. A stock number is given together with an item description and they do not jibe. Such orders must be carefully scrutinized and compared with the customer's history in order to make a decision—to ship or not to ship—without delaying your work. If we write to you for clarification, you may be irritated with the delay. If we ship without writing to you first we are similarly risking your ire. Then when the inevitable return is made, we prefer to discard the reagents and charge it off to experience. Sometimes this is quite expensive to us, but you are entirely within your rights in sending it back. Here again, if time is of the essence, you may telephone us collect to bowl us out and ask that the correct item be shipped without further delay.

**Items that you receive because of your error are not returnable for credit.** We certainly want to be cooperative and pleasant in every way, but to accept returns because you are overstocked or have discontinued use of the reagent, or any of many other reasons would result in a tremendous loss to us unless we were to pass the expense on to other customers in some fashion. Although practically all other dealers will accept the return or a sealed package and resell it to someone else, we feel this could seriously jeopardize the work of the next customer. Once an item has been out of our control, we do not think it is fair to ask another customer to accept it. We acknowledge that in most cases the reagents are still entirely up to standard in every way and no harm would be done. However, in a small percentage of cases, purity or activity of the reagent is seriously affected by the extra trip, or by improper storage at the other end, or even by contamination. It is impossible for us to detect all of these possibilities and we could not resell that item with complete confidence. Fortunately, the vast majority of our customers are aware of Sigma's meticulous attention to detail and understand that this policy is one of many that give them confidence in Sigma. Instead of resenting this policy, many letters come to us expressing appreciation for it. Occasionally, we encounter a particularly stubborn individual typified by the expression, "My mind is made up; don't confuse me with facts!" who refuses to listen to reason and is only concerned with the refund. Of course, this person would be the first to refuse a shipment of a reagent if told in advance that it was returned merchandise. When such an individual is encountered, we personally want to talk to the customer and do everything possible to work out an agreeable solution to the problem. We sincerely want our customers to feel that "It's a pleasure doing business with Sigma. You must be satisfied or there is no cost."

**Please inspect your packages upon receipt and inform us immediately of any damage.** Should a product be found damaged, please retain the original shipping carton, shipping documents and any documents that might indicate that the shipment was received in a damaged condition.

**THANK YOU FOR TAKING TIME TO READ ABOUT THE SIGMA POLICY.  
WE ARE SURE THAT IT HAS HELPED US TO HELP YOU.**

## HOW TO USE THIS PRICE LIST

The products in this price list are divided into various sections:

ALPHABETICAL LIST OF COMPOUNDS  
EQUIPMENT, BOOKS AND SUPPLIES  
STANDARDS AND CONTROLS  
CHROMATOGRAPHY SUPPLIES

RESEARCH AND ANALYTICAL KITS  
DIAGNOSTIC KITS AND REAGENTS  
REAGENTS FOR AUTOANALYZERS

The alphabetical section contains specialty groups such as Affinity Chromatography, Bioactive Peptides, Tissue Culture. A complete list of these special groups may be found in the Table of Contents on page . These sections are indicated by a black border around the edge of the page and special headings at the top of the page. Note that these sections interrupt the alphabetical list of compounds where they appear. Immediately following the section, the alphabetical list picks up where it left off.

Below are 5 listings which are typical formats for our product listings.

<p>1. <b>HYPOXANTHINE-GUANINE</b>      250 units    10 50          1,000 units    34 10</p> <p>2. <b>PHOSPHORIBOSYL TRANSFERASE</b>          (HCPRT, Transphosphoribosidase, IMP pyrophosphate phosphoribosyltransferase, EC 2.4.2.8)</p> <p>3. <b>From Bakers Yeast</b></p> <p>4. <b>Lyophilized powder containing approx. 80% protein (Buret) and 5% MgCl<sub>2</sub>, balance primarily Tris buffer salts</b></p> <p>5. <b>Activity 300-600 units per mg protein</b></p> <p>6. <b>Unit Definition One unit will catalyze the formation of 1 nmole of inosine 5'-monophosphate (IMP) per min from hypoxanthine and phosphoribosyl pyrophosphate at pH 7.4 at 37°C</b></p> <p>7. <b>May be useful in the enzymatic determination of phosphoribosyl pyrophosphate (PRPP)</b></p> <p>8. <b>Ref: Salerno, C., et al., Experientia, 35, 1016 (1979)</b></p> <hr/> <p>9. <b>CHLOROMETHYLDIMETHYL-CHLOROSILANE (pfs)</b>      25 g    18 85          100 g    60 95</p> <p>10. <b>FOB Sigma</b></p>	<p>11. <b>L-α-LYSPHOSPHATIDYLCHOLINE (L-α-Lysolecithin)</b></p> <p>12. <b>Type III: Approx. 99%</b>      5 mg    10 75  <b>From Bovine Liver</b>      25 mg    33.20          White powder.      100 mg    106.05</p> <p>13. <b>Prepared by the action of phospholipase A on bovine liver L-α-phosphatidylcholine (P 7763). Contains primarily palmitic and stearic acids</b></p> <hr/> <p>14. <b>Type V: Approx. 99%</b>      5 mg    8 85  <b>From Bovine Brain</b>      25 mg    28 05          Prepared by the action of phospholipase A on bovine brain L-α-phosphatidylcholine (P 6638) Contains primarily palmitic, stearic and oleic acids.</p> <hr/> <p>15. <b>4-O-α-D-GALACTOPYRANOSYL-D-GALACTOPYRANOSE (α-D-Gal-[1-4]-D-Gal)</b>      Inquire</p>
--	---

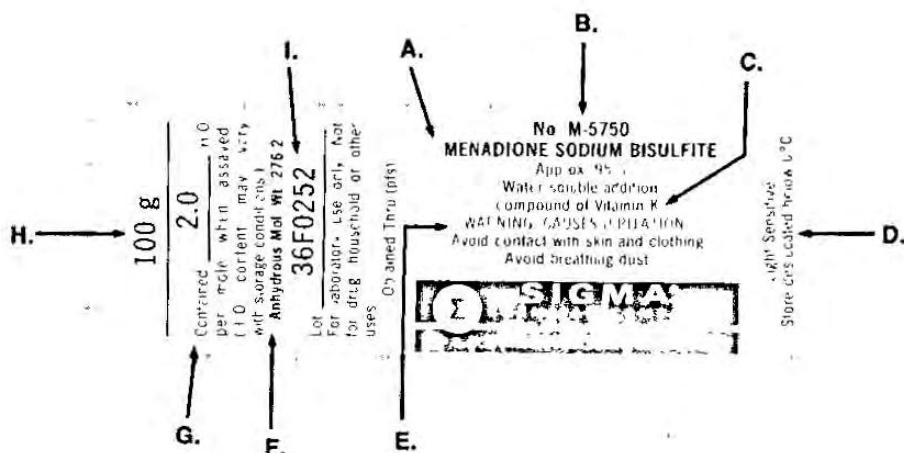
- |   |   |   |   |  |   |   |   |
|---|---|---|---|--|---|---|---|
| <ol style="list-style-type: none"> <li>1. Product Name</li> <li>2. Air symbol - Product is shipped by air or best method. Method of shipment is dependent upon country of destination, nature of product, and available modes of transportation. See page 5 for additional information.</li> <li>3. Product Number</li> <li>4. Storage Temperature<br/>Recommended storage is indicated as follows:<br/> <table border="0" style="font-size: small;"> <tr> <td><span style="border: 1px solid black; padding: 2px;">-70°C</span> = ULTRACOLD</td> <td><span style="border: 1px solid black; padding: 2px;">-20°C</span> = FREEZER</td> </tr> <tr> <td><span style="border: 1px solid black; padding: 2px;">-10°C</span> = DEEP FREEZE</td> <td><span style="border: 1px solid black; padding: 2px;">0-5°C</span> = REFRIGERATOR</td> </tr> <tr> <td><span style="border: 1px solid black; padding: 2px;">-20°C</span> = FREEZER</td> <td><span style="border: 1px solid black; padding: 2px;">RT</span> = ROOM TEMPERATURE</td> </tr> </table> </li> <li>5. New products for this price list</li> <li>6. Enzyme Commission number</li> <li>7. Source</li> <li>8. Activity specification</li> <li>9. Unit definition for activity</li> <li>10. Technical reference - related to preparation, application or explanation of product.</li> </ol> | <span style="border: 1px solid black; padding: 2px;">-70°C</span> = ULTRACOLD     | <span style="border: 1px solid black; padding: 2px;">-20°C</span> = FREEZER | <span style="border: 1px solid black; padding: 2px;">-10°C</span> = DEEP FREEZE | <span style="border: 1px solid black; padding: 2px;">0-5°C</span> = REFRIGERATOR | <span style="border: 1px solid black; padding: 2px;">-20°C</span> = FREEZER | <span style="border: 1px solid black; padding: 2px;">RT</span> = ROOM TEMPERATURE | <ol style="list-style-type: none"> <li>11. (pfs) - Prepared for Sigma, not prepared in our own laboratories. Located immediately after the product name when appropriate.</li> <li>12. FOB Sigma - see page 5 for complete explanation. Located in this position when applicable.</li> <li>13. Inquire - For current status please call for availability.</li> <li>14. Type - convenient classification to distinguish various preparations.</li> <li>15. Other descriptive information</li> <li>16. Products with various salt forms, purities, sources, or preparations are listed with common information above the related group of compounds. In the example, the name and synonym for L-α-Lysolecithin is common to both Type III and Type V (differ in source only).</li> <li>17. Purity</li> <li>18. Synonym</li> <li>19. Package Size(s) and Price(s)</li> </ol> |
| <span style="border: 1px solid black; padding: 2px;">-70°C</span> = ULTRACOLD   | <span style="border: 1px solid black; padding: 2px;">-20°C</span> = FREEZER       |   |   |  |   |   |   |
| <span style="border: 1px solid black; padding: 2px;">-10°C</span> = DEEP FREEZE   | <span style="border: 1px solid black; padding: 2px;">0-5°C</span> = REFRIGERATOR  |   |   |  |   |   |   |
| <span style="border: 1px solid black; padding: 2px;">-20°C</span> = FREEZER   | <span style="border: 1px solid black; padding: 2px;">RT</span> = ROOM TEMPERATURE |   |   |  |   |   |   |



# SIGMA PRODUCT LABELS .....

Sigma's product labels are designed to provide complete, up-to-date information on our products ... Information available when and where you need it most. On our labels, you can find:

- Complete product name and description
- Health and safety hazard information
- Lot specific analytical data on many types of products



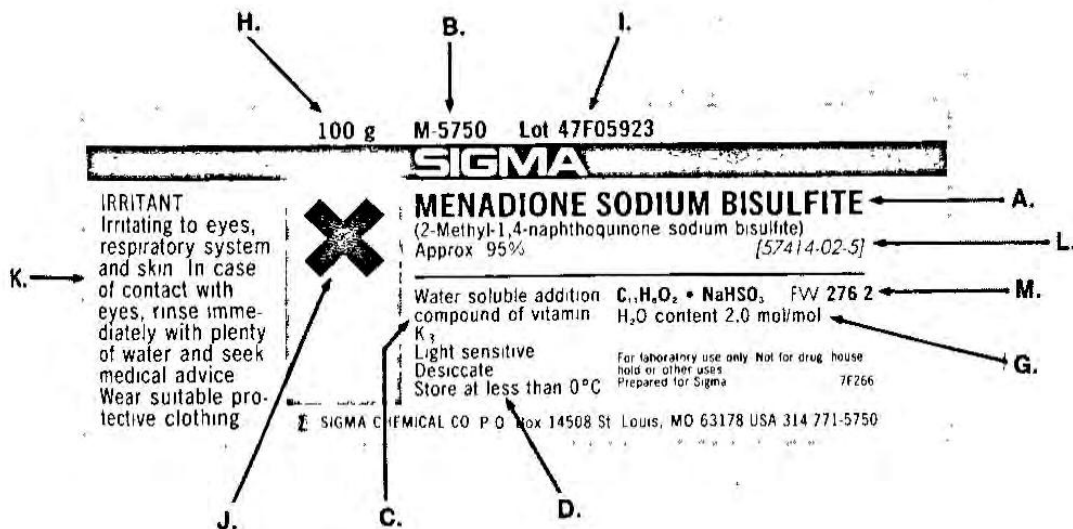
- |   |  |
|---|--|
| <p><b>A. Product Name and Description</b></p> <p><b>B. Product Number</b></p> <p><b>C. Further Descriptive Information</b></p> <p><b>D. Recommendations on handling and storage</b></p> <p><b>E. Hazard statement</b></p> <p><b>F. Anhydrous molecular weight</b></p> | <p><b>G. Lot analysis</b><br/>Data on activity, purity, degree of hydration, etc., for this lot</p> <p><b>H. Package Size</b><br/>Unless the material is described as pre-weighed, the package will normally contain at least the indicated amount</p> <p><b>I. Lot Number</b></p> |
|---|--|

# ..... AND, TO SERVE YOU BETTER ... **NEW** LABELS

Our new label format contains all the information you have always found, and adds:

- Pictograms for instant hazard recognition
- Useful data for reference, CAS (Chemical Abstracts Service) number, chemical formula

These new labels will be phased in for most of our 23,000 products over the next few years. If you have not already received products with new labels, you will soon.

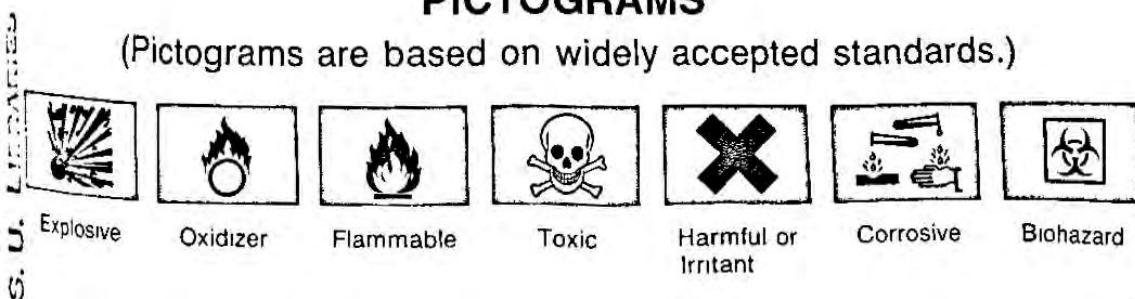


- J. Hazard pictogram**  
Lets you know at a glance what safety hazards are involved in the use of this product
- K. Further hazard information**  
More complete description of actual hazards, handling precautions, and emergency management procedures.

- L. CAS number**  
Chemical Abstract Service number wherever available, included for your convenience in accessing literature.
- M. Chemical formula and formula weight**  
Unless water of hydration is indicated in the formula, the formula weight is for the anhydrous material.

## PICTOGRAMS

(Pictograms are based on widely accepted standards.)





- Most comprehensive reagent/analyzer interface available today.
- Immediate access to 23,000 product inventory.
- Exclusive routine/special chemistry, random and batch analyzer applications.
- Largest selection of diagnostic kits for chemistry, hematology, cytochemistry and histology.
- Expert technical service available through a special HOTLINE.
- Same day shipment to most world markets.
- Exclusive assay reagents for oxalate,  $\beta$ -hydroxybutyrate, angiotensin converting enzyme, 5'-nucleotidase and more.
- Highly trained product specialists for field services.
- Exclusive line of histochemistry kits with unique liquid substrates/coupling agents.
- 100 types of standards for routine/special assays.
- Complete array of controls, including many exclusives.
- COMPUTROL<sup>SM</sup>, a complimentary program for computerized analysis of quality control data.
- 45 years of experience in diagnostic and research reagent formulation.

**IF THIS IS NOW,  
JUST IMAGINE  
THE FUTURE.**

**MAKING THE VISION  
A REALITY.**



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ST. LOUIS, MO 63178 USA  
For orders in the USA/Canada  
Call 1-800-325-3010 and outside the  
USA/Canada call 314-771-5750 collect  
New Technical Service HOTLINE number  
1-800-325-0250  
or call 314-771-3122 collect.

## PLACING YOUR ORDER

### TO PLACE AN ORDER TOLL FREE

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USA/Canada ..... 1-800-325-3010  
Outside USA/Canada call COLLECT ..... 314-771-5750

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USA (Diagnostic Technical Service) ..... 1-800-325-0250  
Outside USA/Canada (Call Collect) ..... 314-771-3122

### SERVICE IS AVAILABLE FROM OUR AFFILIATES

#### SIGMA CHEMICAL COMPANY LTD.

Fancy Road • Poole • Dorset BH17 7NH • England  
Telephone 0202 733114 (Charges Reversed)  
Telex 418242 - Sigma G

#### SIGMA CHIMIE S.a.r.l.

L'Isle d'Abeau Chesnes, B.P. 701, 38297 LaVerpillière Cedex, France  
Telephone 74956391  
Telex 308215 - Sigma F

#### SIGMA CHEMIE GmbH

Grünwalder Weg 30 • D-8024 Deisenhofen • W. Germany  
Telephone 089 61301 0  
Telex 528252 - Sigma D

# The Sigma-Aldrich Library of Chemical Safety Data

Edition II, Two-volume set

*A reference for the safe handling of over 14,500 chemicals*



Edition II of the safety library includes 7500 chemicals not in the first edition. Information on appearance of the chemical, irritation data and human toxicity are new to this expanded two-volume set.

This library will be useful to all those responsible for assessing individual and composite hazards of mixtures, solutions and reactions. Information in these volumes will be invaluable for developing a sound safety program, for complying with the Hazard Communication standards or for preparing material safety data sheets.

Indices include chemical name, Chemical Abstracts number, molecular formula, Aldrich product number and Sigma product number.

### Information contained in each entry includes:

- Chemical name
- Chemical Abstracts Service Registry number
- Aldrich and Sigma Product numbers
- Structure or formula
- Expanded physical data
- Appearance of the chemical
- Reference to Registry of Toxic Effects of Chemical Substances
- Irritation Data
- Toxicity data, reviews and standards
- Human toxicity data
- Specific health hazards
- Acute and chronic health effects
- First aid measures
- Incompatible materials and conditions
- Products of decomposition
- Protective equipment, handling precautions and storage conditions
- Suggested waste disposal methods
- Recommended equipment and procedures for spill or leak clean-up
- Extinguishing agents for fires involving the material

**The Sigma-Aldrich Library of Chemical Safety Data, Edition II, Robert E. Lenga, Ed.** **Z16,000-8** **\$325.00**

(includes Explanation of Codes Chart, Z17,475-0)

Over 4200 pages, in two hardbound volumes, with tearproof jacket.  
Page size 9½ × 12in.

**Explanation of Codes Chart** **Z17,475-0** **\$3.00**

# THE NEW ALDRICH CATALOG/HANDBOOK

**MORE COMPREHENSIVE  
5,000 NEW PRODUCTS  
OVER 24,000 LISTINGS**



The 1988-1989 Aldrich Catalog/Handbook of Fine Chemicals is a valuable resource for everyone interested in chemistry. It contains over 24,000 listings of organic and inorganic chemicals, biochemicals, stains & dyes, deuterated solvents, spectrophotometric solvents, reagents for hydroboration, organometallic reagents, polymers, catalysts, ion-exchange resins and adsorption media, HPLC solvents, pure elements, spin labels, optically active compounds, precious-metal salts, gases, chemical standards, carbon-13-labeled compounds, an expanded specialized glassware and equipment section and new product lines including standard solutions and gas calibration mixtures. Over 5,000 listings are new.

**Data for each product entry include prices, physical properties, structures, literature references, and handling & disposal methods.**

It's not just a chemical catalog, but a valuable, up-to-date handbook.

Use it, and you'll discover that Aldrich is your best chemical resource, offering the widest selection, the best prices and the fastest service. Most of our orders are shipped within 24 hours of receipt.

**Expanded sections on scientific glassware and laboratory equipment.**

Over 2,000 new items have been added to help improve your lab efficiency and productivity. Many items are unavailable anywhere else; descriptions and illustrations are clear and concise.

**When you think bulk, think Aldrich.**

We're not just a supplier of fine chemicals in research quantities. As a leading world source for organics and inorganics, we now offer many compounds in bulk, from drum to multiton quantities. Our facilities here and abroad help us meet bulk needs rapidly and at low prices, in a growing range of applications.

Are we competitive in bulk? Challenge us. Send us your requirements, and we'll return a firm quote; simply write or call our Bulk Sales Department at 800-255-3756.

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Neurelis - EX. 2006

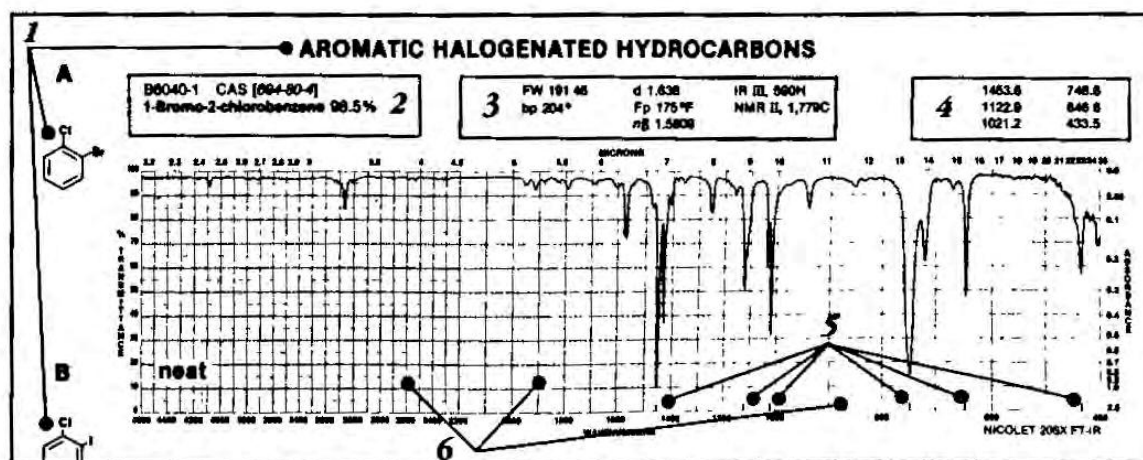
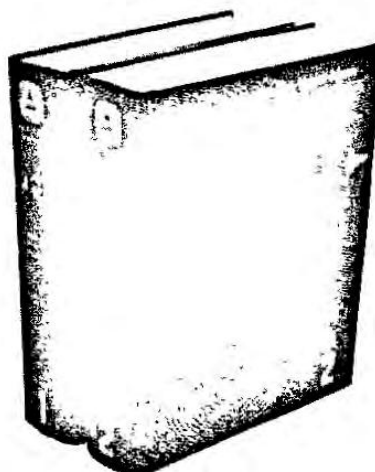
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# The Aldrich Library of FT-IR Spectra

*Over 10,600 FT-IR spectra, 2 cm<sup>-1</sup> resolution, linear in wavenumber*

The library begins with spectra of the simple hydrocarbons and proceeds through all the functional groups, e.g., halogens, alcohols, ethers, ketones and aldehydes, to aromatics, five-membered, six-membered and five-membered fused heterocycles, etc. It is indexed alphabetically, by Chemical Abstracts Service registry number, and by molecular formula.

Spectra were recorded on a Nicolet 20SX FT-IR spectrometer. Each spectrum measures 18 x 4.5cm. Four spectra per page.



1. Arranged in order of functionality and complexity for easy flip-through reference.
2. Aldrich Catalog Number, CAS reference, nomenclature.
3. Technical data, physical constants, Aldrich references.
4. Strongest band frequencies within spectral regions.
5. Tick marks indicate strongest bands.
6. Wavenumber grid lines printed every 20 cm<sup>-1</sup> for ease of recognizing three scale areas.

**The Aldrich Library of FT-IR Spectra, Edition I,**

**by Charles J. Pouchert**

**FTIR-1**

**\$375.00**

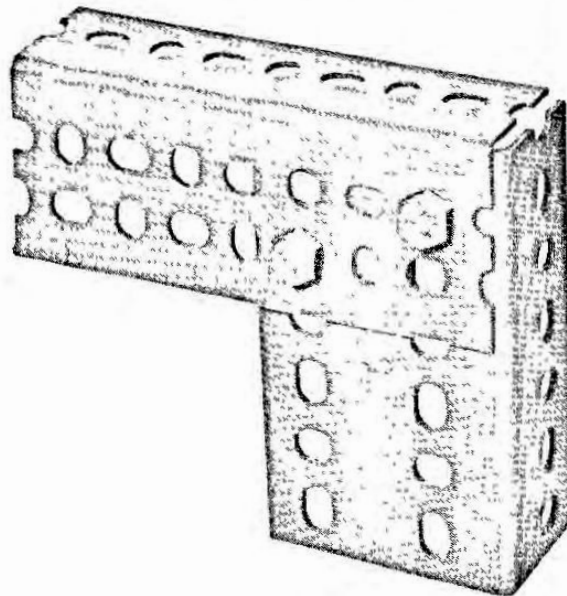
*2,900 pages in two hardbound volumes with tearproof jackets.  
Page size: 12 x 9 1/2 in.*

The digitized version of the library is available exclusively through  
Nicolet Instruments, 5225 Verona Rd., Madison, WI 53711 USA



# B-Line Slotted Angle

(Distributed through Sigma)



**Complete, economical support system.**  
**Three basic sizes, all Dura-Green™ epoxy coated.**  
**Versatile, adjustable, interchangeable**  
**and installs easily.**

The B-Line Slotted Angle is an all-purpose framing system for permanent or temporary warehousing and shelving jobs. It is roll-formed from high strength 12 or 14 gauge steel and is covered with Dura-Green™ epoxy coating.




Our slotted angle is available in three sizes which are interchangeable, although assembly is simplified if the same size slotted angle is used throughout. Each kit provides sufficient angle to make shelving 72" high x 48" wide x 18" deep (approx. 183 cm x 122 cm x 46 cm). Smaller racks can be made for bench top shelves etc. by cutting the angle to the desired size.

The kits are available in 3 flange sizes. SA158 has two 1-5/8" flanges; SA276 has a 2-7/16" and a 1-5/8" flange. Both are 14 gauge steel. SA318 has a 3-1/8" flange and a 1-5/8" flange and is 12 gauge steel for heavy-duty strength.

The alternate pattern of horizontal and vertical slots is calculated to assist in assembling a rack or structure. When slotted angle pieces are to be

fastened together, the vertical slots provide sufficient adjustment for bolts to align through all members and hold the assembly together. This alternate slot pattern also makes diagonal bracing possible where required.

**B-LINE SYSTEMS, INC.**  
 509 West Monroe St.  
 Highland, Illinois 62249, U.S.A.  
 Telephone: 618-654-2184  
 Telex: 44-7755 answerback BLINE HHLD

	<b>SA 158</b> 14 Gauge 10' x 1 5/8" x 1 5/8"	\$ 98.20 F.O.B. Sigma
	<b>SA 276</b> 14 Gauge 10' x 2 7/16" x 1 5/8"	127.25 F.O.B. Sigma
	<b>SA 318</b> 12 Gauge 10' x 3 1/8" x 1 5/8"	169.15 F.O.B. Sigma

Other length available on request.



*In Appreciation of Your Friendship*

SIGMA is pleased to supply you with  
Sodium Hydroxide for Enzyme Assays.

No need to purchase anything. You do not even have to be a customer.

## Routinely Gratis



### Sodium Hydroxide

**16 g Bottle Prewighed to produce 1 liter 0.4N or 100 ml 4.0N etc.  
Stock No. 505-8**

Multiple requests cannot be handled. Each request must be submitted individually.  
Reorders are welcome when needed.

This coupon must be sent by the using laboratory for shipment to the same  
laboratory. A new request form will be forwarded to you each time you send one in.

**This order form MUST be used. Please be sure to fill out both parts  
very carefully and cut along dotted line.**

---

Please send me a GRATIS package of Sodium Hydroxide, Stock No. 505-8.  
It will be used essentially for enzyme assays in my own laboratory.

**SHIPPING LABEL—PLEASE PRINT CLEARLY: Sigma will pay the postage** 505-8

Name \_\_\_\_\_

Institution \_\_\_\_\_

Dept \_\_\_\_\_

Street Address \_\_\_\_\_

City and State \_\_\_\_\_ Zip Code \_\_\_\_\_

Country \_\_\_\_\_

This offer is good only when this official form is used prior to January 1, 1989. We cannot accept requests by letter,  
purchase order or any other way, because of the increased handling involved.

**We reserve the right to discontinue or limit this program, without notice, before expiration date.**

---

A GIFT FROM: **SIGMA**<sup>®</sup> CHEMICAL COMPANY P.O. BOX 14508, ST. LOUIS, MO 63178 USA

Name \_\_\_\_\_

Institution \_\_\_\_\_

Dept. \_\_\_\_\_

Street Address \_\_\_\_\_

City and State \_\_\_\_\_ Zip Code \_\_\_\_\_

Country \_\_\_\_\_

For your convenience—

On the following pages we have listed many (but not all) items in various categories. We believe these lists will aid you in noting items of potential interest which might otherwise be overlooked.

For pricing information on ANY item, please see the ALPHABETICAL LIST OF ALL COMPOUNDS which begins on page 82. If you do not find an item in these categories, do not assume that we do not offer it; refer to the ALPHABETICAL LIST OF ALL COMPOUNDS.

Your suggestions for adding new categories to these pages are welcome.

## AFFINITY CHROMATOGRAPHY MEDIA

LISTED IN THE MAIN ALPHABETICAL LIST

See page 130 for a complete list of all affinity chromatography media available from Sigma.

## ALKALOIDS

LISTED IN THE MAIN ALPHABETICAL LIST

ACONITINE	DICENTRINE	(±)-NICOTINE
ALPHAPRODINE	DIGITALIN	NORNICOTINE
(±)-ANABASINE	DIHYDROERGOCRISTINE	NOSCAPINE
ANISODAMINE	DIHYDROERGOTAMINE	NUCIFEROLINE
ANISODINE	6,7-DIMETHOXY-1-VERATRYL- ISOQUINOLINE	PHENYLEPHRINE
ARECOLINE	DOMOIC ACID	PHYSOSTIGMINE
ATROPINE	DUGUETINE	PROTOVERATRINE
BENEXTRAMINE	EMETINE	PUERARIN
BERBAMINE	ERGOCRISTINE	QUINIDINE
BERBERINE	α-ERGOCRYPTINE	QUININE
BOLDINE	ERGOMETRINE	SCOPINE
2-BROMO-α-ERGOCRYPTINE	ERGONOVINE	(-)-SCOPOLAMINE
BRUCINE	ERGONOVINE MALEATE	SECURININE
BUFOTENINE MONOOXALATE	ERGOTAMINE	α-SOLANINE
BULBOCAPNINE	ERGOTAMINE MALEATE	SOLASODINE
CALYCANTHINE	ESERINE	(-)-SPARTEINE
CANADINE	EUCATROPINE	SPERMIDINE
CARMUSTINE	(+)-GLAUCINE	SPERINE
(-)-trans-CARYOPHYLLENE	GUATTERINE	STRYCHNINE
CARYOPHYLLENE OXIDE	HOMATROPINE	THEOBROMINE
CASSYTHICINE	HYOSCINE	TOMATIDINE
CEPHALOTAXINE	HYOSCYAMINE	TOMATINE
α-CHACONINE	ISOBOLDINE	TRIMETHYLCOLCHICINIC ACID
CHAKRANINE	ISOHARRINGTONINE	TROPINE
(+)-CHELIDONINE	LAUDANOSINE	TROPINONE
CINCHONIDINE	LEUCOXINE	d-TUBOCURARINE CHLORIDE
CINCHONINE	LYCOPERSICIN	VERATRIDINE
CINOXACIN	MESCALINE	VERATRINE
COLCHICINE	MONOCROTALINE	VINBLASTINE
(-)-COTININE	MYOSMINE	VINCAMINE
CROTALINE	NEONICOTINE	VINCRIStINE SULFATE
CYTISINE	NICOTINE	XYLOPINE
DEMISSIDINE		YOHIMBINE

## AMINO ACIDS & DERIVATIVES

LISTED IN THE MAIN ALPHABETICAL LIST

See also: PEPTIDES and POLYAMINO ACIDS

ABRINE	N-ACETYLSPARTIC ACID	N-ACETYLGLUTAMINE
N-(2-ACETAMIDO)GLYCINE	N-ACETYLCYSTEINE	N-ACETYLGLYCINE
ACETURIC ACID	N-ACETYL-3,5-DIIODOTYROSINE	N-ACETYLMOCYSTEINE THIOLACTONE
2-ACETOXY-N-(DIPHENYLMETHYLENE) GLYCINE ETHYL ESTER	N-ACETYL-3,5-DINITROTYSOSINE	N-ACETYLHYDROXYPROLINE
N-ACETYL-S-ACETACETYLCYSTEAMINE	N-ACETYL-3,5-DINITROTYSOSINE ETHYL ESTER	O-ACETYLHYDROXYPROLINE
N-ACETYLANALANINE	N-ACETYL-DNP-LYSINE	N-ACETYL-(allo)-ISOLEUCINE
N-ACETYLANALANINE p-NITROANILIDE	N-ACETYLDOPAMINE	N-ACETYLLEUCINE
N-ACETYL-C-ALLYLGLYCINE	N-ACETYL-o-FLUOROPHENYLALANINE	N-ACETYLLEUCINE p-NITROANILIDE
N-α-ACETYLRARGININE	N-ACETYL-m-FLUOROPHENYLALANINE	N-α-ACETYLLYSINE
N-α-ACETYLPARAGINE	N-ACETYL-p-FLUOROPHENYLALANINE	N-α-ACETYLLYSINE
ACETYLPARAGINE p-NITROANILIDE	N-ACETYLGLUTAMIC ACID	N-ACETYLLYSINE N-METHYLAMIDE
		N-α-ACETYLLYSINE METHYL ESTER

(CONTINUED)

## BIOLOGICAL DETERGENTS

Sigma offers a wide range of detergents useful to the biochemist for the solubilization of proteins and membrane components. This section is organized into the four major detergent categories:

### Anionic

### Cationic

### Zwitterionic (Amphoteric)

### Nonionic (Polar)

Included below is a table of Critical Micelle Concentration (CMC) values and molecular weights for selected detergents. Detergents with high CMC values are generally easy to remove by dilution; detergents with low CMC values are advantageous for separations on the basis of molecular weight. As a general rule, detergents should be used at their critical micelle concentration at a detergent-to-protein weight ratio of approximately ten <sup>2</sup>.

Ref.: 1. Womack, M D., et al., *Biochim. Biophys. Acta*, **733**, 210 (1983).  
2. Matson, R.S. and Goheen, S.C., *LC-GC*, **4(7)**, 624 (1986).

BIOLOGICAL DETERGENT	CMC (mM)	AGGREGATION NUMBER	MOLECULAR WEIGHT
<b>Anionic</b>			
Caprylic Acid, Sodium Salt	351	--	166.2
Cholic Acid, Sodium Salt	14	2-4	430.6
1-Decanesulfonic Acid, Sodium Salt	32.6	--	244.3
Deoxycholic Acid, Sodium Salt	5	4-10	414.6
Glycocholic Acid, Sodium Salt	13	--	487.6
Glycodeoxycholic Acid, Sodium Salt	2	--	471.6
Lauryl Sulfate, Sodium Salt	8-27	62	288.5
Taurocholic Acid, Sodium Salt	10-15	4	537.7
Taurodeoxycholic Acid, Sodium Salt	2-6	5	521.7
<b>Cationic</b>			
Cetylpyridinium Chloride	0.90	--	274.0
Dodecyltrimethylammonium Bromide	14	--	308.4
Hexadecyltrimethylammonium Bromide	0.026	169	364.5
Tetradecyltrimethylammonium Bromide	0.28	--	336.4
<b>Zwitterionic</b>			
CHAPS	8	10	614.9
CHAPSO	8	11	630.9
<b>Non-Ionic</b>			
n-Decyl $\beta$ -D-glucopyranoside	2.2	--	320.4
Digitonin	--	6	1229.3
n-Dodecyl $\beta$ -D-glucopyranoside	0.19	--	348.5
n-Dodecyl $\beta$ -D-maltoside	0.16	--	348.5
n-Heptyl $\beta$ -D-glucopyranoside	70 (est.)	--	278.4
n-Octyl $\beta$ -D-glucopyranoside	25	27	292.4
n-Octyl $\alpha$ -D-glucopyranoside	10	--	292.4
Nonidet P-40	0.29	--	602.8
n-Nonyl $\beta$ -D-glucopyranoside	6.5	--	306.4
Triton X-100	0.24	140	624.9

We pay shipping costs (CIF) anywhere in the world unless otherwise indicated.

## ANIONIC DETERGENTS

PRODUCT NUMBER		US \$
<b>AEROSOL® 22 (pfs)</b>	100 ml	4.25
<b>A 9753</b>	1 ml = approx. 1.12 g.	500 ml 11.20
	FOB Sigma	
Aerosol is a registered trademark of American Cyanamid.		

<b>AEROSOL® -OT</b>	100 ml	4.90
<b>A 6627</b>	10% (w/v) Solution	
	Aerosol is a registered trademark of American Cyanamid.	

**ALGINIC ACID**  
A straight-chain, hydrophilic, colloidal, polyuronic acid composed primarily of anhydro-β-D-mannuronic acid residues with 1→4 linkage.

<b>A 7253</b>	Ammonium-Calcium Salt (pfs)	100 g	11.30
	From <i>Macrocystis pyrifera</i> (Kelp)	250 g	18.45
		500 g	34.50
		1 kg	61.45

<b>A 7128</b>	Sodium Salt (pfs)	100 g	9.90
	High Viscosity	250 g	16.40
	From <i>Macrocystis pyrifera</i> (Kelp)	500 g	28.85
	Off-white powder.	1 kg	53.75
	Viscosity of 2% solution at 25°C is approx. 14,000 centipoises.		

<b>A 2033</b>	Sodium Salt (pfs)	100 g	9.90
	Medium Viscosity	250 g	16.40
	From <i>Macrocystis pyrifera</i> (Kelp)	500 g	28.85
	Off-white powder.	1 kg	53.75
	Viscosity of 2% solution at 25°C is approx. 3,500 centipoises.		

<b>A 2158</b>	Sodium Salt (pfs)	100 g	9.90
	Low Viscosity	250 g	16.40
	From <i>Macrocystis pyrifera</i> (Kelp)	500 g	28.85
	Off-white powder.	1 kg	53.75
	Viscosity of 2% solution at 25°C is approx. 250 centipoises.		

<b>CAPRYLIC ACID</b>	10 g	6.35
<b>C 3901</b>	Sodium Salt	100 g 13.30
	99-100% by capillary GC	500 g 45.30
		1 kg 85.05

<b>CHOLIC ACID</b>	10 g	6.80
<b>C 1254</b>	Sodium Salt (pfs)	25 g 10.80
	(Sodium cholate)	100 g 24.20
	From Ox or Sheep Bile	500 g 90.40
		1 kg 162.50
		5 kg 768.05

<b>1-DECANESULFONIC ACID (pfs)</b>	5 g	17.00
<b>D 3147</b>	Sodium Salt	25 g 60.10
		100 g 193.85

<b>DEHYDROCHOLIC ACID (pfs)</b>	25 g	7.25
<b>D 3875</b>	Sodium Salt	100 g 21.60
	Approx. 95%	
	Crystalline	

<b>DEOXYCHOLIC ACID (pfs)</b>	10 g	5.05
<b>D 6750</b>	(Sodium deoxycholate)	25 g 9.00
	Sodium Salt	100 g 28.10
	Forms a colorless to light yellow aqueous solution at 50 mg per ml	500 g 109.25

PRODUCT NUMBER		US \$
<b>DIOCTYL SULFOSUCCINATE (pfs)</b>	50 g	6.20
<b>D 0885</b>	(Sulfosuccinic acid bis[2-ethylhexyl] ester)	100 g 9.15
		500 g 29.10
	Sodium Salt: Approx. 99%	
	White waxy solid producing a clear, colorless solution in alcohol.	

<b>1-DODECANESULFONIC ACID (pfs)</b>	100 mg	6.70
<b>D 5266</b>	Sodium Salt	250 mg 13.05
	Crystalline	500 mg 21.35
		1 g 35.25

<b>GLYCOCHOLIC ACID</b>	100 mg	6.55
<b>G 7132</b>	(N-[3α,7α,12α-Trihydroxy-24-oxocholan-24-yl]glycine)	500 mg 16.30
		1 g 25.60
	Sodium Salt: Crystalline	5 g 103.50
	Approx. 99%: Synthetic	25 g 358.10
	Also available as part of a kit.	
	See Standards and Controls Section.	

<b>GLYCODOXYCHOLIC ACID</b>	100 mg	3.00
<b>G 3258</b>	(N-[3α,12α-Dihydroxy-24-oxocholan-24-yl]glycine)	250 mg 4.00
		1 g 8.20
	Sodium Salt: Crystalline	5 g 28.60
	Approx. 98%	

<b>1-HEPTANESULFONIC ACID (pfs)</b>	5 g	12.95
<b>H 0386</b>	Sodium Salt	25 g 47.15
		100 g 148.05

<b>1-HEXANESULFONIC ACID (pfs)</b>	5 g	14.15
<b>H 0511</b>	Sodium Salt	25 g 45.45

<b>N-LAUROYLSARCOSINE (pfs)</b>	50 g	6.95
<b>L 5125</b>	(N-Dodecanoyl-N-methylglycine)	100 g 11.65
	Sodium Salt	500 g 37.50
	Minimum 97%	1 kg 67.35
	Crystalline	
	Reported to inhibit hexokinase.	

### LAURYL SULFATE

<b>L 4632</b>	Lithium Salt (pfs)	5 g 12.75
	(Lithium lauryl sulfate; Dodecyl lithium sulfate)	25 g 40.80
		50 g 60.35
	Approx. 99%	

<b>L 4509</b>	Sodium Salt (pfs)	10 g 4.95
	(SDS; Sodium dodecyl sulfate)	25 g 7.35
	Approx. 99%	100 g 17.70
		250 g 38.10
		500 g 68.20
		1 kg 113.35

<b>L 5750</b>	Sodium Salt (pfs)	100 g 5.95
	(SDS; Sodium dodecyl sulfate)	500 g 9.60
	Approx. 95% based on total alkyl sulfate content.	1 kg 15.65
	Contains approx. 70% lauryl sulfate, sodium salt; balance consists of higher homologs. Actual composition given on label.	5 kg 60.35
		FOB Sigma

<b>1-OCTANESULFONIC ACID (pfs)</b>	5 g	12.05
<b>O 7877</b>	Sodium Salt	25 g 39.65
		100 g 124.30

For information on the use of this price list see page 7.

PRODUCT NUMBER			US \$
	<b>1-PENTANESULFONIC ACID (pfs)</b>	5 g	8.75
<b>P 3153</b>	<b>Sodium Salt</b>	25 g	26.55
		100 g	76.95
	<b>TAUROCHOLIC ACID</b>	250 mg	4.65
<b>T 4009</b>	(2-[(3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -Trihydroxy-24-oxo-5 $\beta$ -cholan-24-yl)amino]ethanesulfonic acid)	1 g	8.70
		5 g	34.60
	<b>Sodium Salt: Crystalline</b>	25 g	154.35
		100 g	560.25
	<b>Approx. 98%</b>		
	<b>Synthesized from cholic acid</b>		
	<b>Also available as part of a kit.</b>		
	<b>See Standards and Controls Section</b>		
	<b>TAURODEOXYCHOLIC ACID</b>	1 g	7.50
<b>T 0875</b>	(2-[(3 $\alpha$ ,12 $\alpha$ -Dihydroxy-24-oxo-5 $\beta$ -cholan-24-yl)amino]ethanesulfonic acid)	5 g	23.30
		25 g	92.30
		50 g	161.40
	<b>Sodium Salt: Crystalline</b>	100 g	307.80
	<b>Also available as part of a kit.</b>		
	<b>See Standards and Controls Section.</b>		

PRODUCT NUMBER			US \$
	<b>TEEPOL® HB7 (pfs)</b>	500 ml	8.00
<b>T 6152</b>	39% (w/w) minimum aqueous solution of primary alkyl (C <sub>9</sub> -C <sub>13</sub> ) sodium sulfates.	1 liter	12.30
	Contains 0.5-1% formalin as an antimicrobial agent.		FOB Sigma
	<b>Teepol is a registered trademark of the Shell Chemical Company.</b>		
	<b>TERGITOL (pfs)</b>	100 ml	5.65
	Alkyl sodium sulfate surfactants.	500 ml	12.65
	"Tergitol" is a registered trademark of Union Carbide Corporation.		FOB Sigma
	<b>See also: Biological Detergents, Nonionic Page 321</b>		
<b>4</b>	<b>Type 4</b>		
<b>7</b>	<b>Type 7</b>		
<b>8</b>	<b>Type 8 (Approx. 40% solution)</b>		

## CATIONIC DETERGENTS

ALKYLTRIMETHYLAMMONIUM BROMIDES			
<b>D 8638</b>	<b>Dodecyltrimethylammonium Bromide (pfs)</b>	5 g	7.65
		25 g	24.55
	<b>Approx. 99%</b>	100 g	67.00
	<b>Crystalline</b>		
	(C <sub>12</sub> H <sub>25</sub> N(CH <sub>3</sub> ) <sub>3</sub> Br, Lauryltrimethylammonium bromide)		
<b>H 5882</b>	<b>Hexadecyltrimethylammonium Bromide (pfs)</b>	100 g	11.00
		250 g	21.35
	<b>Approx. 99%</b>	500 g	35.05
	<b>Crystalline</b>	1 kg	58.10
	(C <sub>16</sub> H <sub>33</sub> N(CH <sub>3</sub> ) <sub>3</sub> Br; Cetyltrimethylammonium bromide; Cetrimonium bromide; Palmityltrimethylammonium bromide; Cetrimide per USP)		
	<b>Soluble in water at 10% (w/v).</b>		
<b>M 7635</b>	<b>Mixed Alkyltrimethylammonium Bromide (Cetrimide per BP) (pfs)</b>	100 g	12.45
		250 g	24.05
	<b>Crystalline</b>	500 g	39.65
	Predominantly C <sub>14</sub> H <sub>29</sub> N(CH <sub>3</sub> ) <sub>3</sub> Br, but also contains C <sub>12</sub> and C <sub>16</sub> homologs.	1 kg	65.75
	<b>Soluble in water at 10% (w/v).</b>		
<b>T 4762</b>	<b>Tetradecyltrimethylammonium Bromide (pfs)</b>	100 g	13.10
		250 g	25.25
	<b>Approx. 99%</b>	500 g	41.65
	<b>Crystalline</b>	1 kg	69.10
	(C <sub>14</sub> H <sub>29</sub> N(CH <sub>3</sub> ) <sub>3</sub> Br; Myristyltrimethylammonium bromide)		FOB Sigma
	<b>Soluble in water at 10% (w/v).</b>		
<b>MTA-5</b>	<b>5% solution of M 7635 in 1 M Citrate, pH 6.0 at 25°C</b>	25 ml	4.45
		100 ml	8.45
<b>B 1383</b>	<b>BENZALKONIUM CHLORIDE (pfs)</b>	25 g	3.90
	(Alkyldimethylbenzylammonium Chloride)	100 g	9.10
		250 g	19.35
	Predominantly C <sub>12</sub> H <sub>25</sub> N(C <sub>6</sub> H <sub>13</sub> )Cl. Also contains C <sub>14</sub> and C <sub>16</sub> homologs.	1 kg	48.25
			FOB Sigma

<b>B 8879</b>	<b>BENZETHONIUM CHLORIDE (pfs)</b>	100 g	11.05
	<b>Crystalline</b>	250 g	21.75
		500 g	35.45
		1 kg	58.80
			FOB Sigma
<b>B 4136</b>	<b>BENZYL DIMETHYLHEXADECYL-AMMONIUM CHLORIDE (pfs)</b>	25 g	8.75
		100 g	27.20
			FOB Sigma
	<b>BENZYLTRIMETHYLAMMONIUM METHOXIDE</b>		
	<i>See: Alphabetical Section Page 268</i>		
<b>C 0636</b>	<b>CETYLDIMETHYLETHYL-AMMONIUM BROMIDE (pfs)</b>	25 g	7.35
		100 g	18.15
	<b>Approx. 85% cetyl (C<sub>16</sub>); balance stearyl (C<sub>18</sub>) homolog.</b>	500 g	58.70
<b>C 5881</b>	<b>CETYLPYRIDINIUM BROMIDE (pfs)</b>	10 g	4.50
	(1-Hexadecylpyridinium bromide)	25 g	8.40
	<b>Crystalline</b>	50 g	12.35
		100 g	16.55
		500 g	65.85
<b>C 9002</b>	<b>CETYLPYRIDINIUM CHLORIDE (pfs)</b>	25 g	5.35
	(1-Hexadecylpyridinium chloride)	100 g	10.85
	<b>Crystalline</b>	500 g	40.90
<b>D 1260</b>	<b>DECAMETHONIUM BROMIDE (pfs)</b>	1 g	7.05
	Off-white crystals.	5 g	22.40
		10 g	36.65
		25 g	72.75
			FOB Sigma
<b>D 2779</b>	<b>DIMETHYLDIOCTADECYL-AMMONIUM BROMIDE (pfs)</b>	10 g	20.70
		50 g	79.45
<b>M 7379</b>	<b>METHYLBENZETHONIUM CHLORIDE (pfs)</b>	100 g	17.65
	(N,N-Dimethyl-N-[2-(2-[methyl-4-(1,1,3,3-tetramethylbutyl)-phenoxy]ethoxy)ethyl]benzenemethanaminium chloride)	250 g	34.75
	<b>Crystalline</b>	500 g	57.05
			FOB Sigma

For shipping restrictions and cost of FOB items see page 5.

PRODUCT NUMBER		US \$
METHYL MIXED TRIALKYL-AMMONIUM CHLORIDE (pfs)	100 ml	8.30
M 7016	500 ml	18.65
(Adogen 464)	FOB Sigma	
Alkyl chain length between C <sub>8</sub> and C <sub>16</sub>		
1 ml = approx. 0.88 g.		
Useful in the separation of nucleic acids by reverse-phase chromatography.		
Ref.: Egan, B.Z., et al., <i>Biochemistry</i> , 10, 1890 (1971).		

PRODUCT NUMBER		US \$
4-PICOLINE DODECYL SULFATE		Inquire
P 7654		

### ZWITTERIONIC DETERGENTS

▶ CHAPS	1 g	11.10
C 3023 (3-[(3-Cholamidopropyl)-dimethylammonio]-1-propanesulfonate)	5 g	44.55
	25 g	178.40
	100 g	461.75
Conductivity of a 1.0 M aqueous solution at 24°C: <50 μmho per cm.		
Ref.: Hjelmeland, L.M., <i>Proc. Nat. Acad. Sci. USA</i> , 77, 6368 (1980).		

▶ CHAPSO	1 g	21.70
C 3649 (3-[(3-Cholamidopropyl)-dimethylammonio]-2-hydroxy-1-propanesulfonate)	5 g	88.60
	25 g	356.30
Ref.: MacDonald, R.C., <i>Biochim Biophys. Acta</i> , 733, 210 (1983).		

N-DECYL-N,N-DIMETHYL-3-AMMONIO-1-PROPANESULFONATE		Inquire
D 4266		

N-DODECYL-N,N-DIMETHYL-3-AMMONIO-1-PROPANESULFONATE		Inquire
D 4516		

N-HEXADECYL-N,N-DIMETHYL-3-AMMONIO-1-PROPANESULFONATE		Inquire
H 6883		

N-OCTYL-N,N-DIMETHYL-3-AMMONIO-1-PROPANESULFONATE		Inquire
O 6626		

DL-α-PHOSPHATIDYLCHOLINE, DIPALMITOYL  
See Alphabetical Section Page 1151

N-TETRADECYL-N,N-DIMETHYL-3-AMMONIO-1-PROPANESULFONATE		Inquire
T 7763		

### NONIONIC DETERGENTS

▶ BIGCHAP	500 mg	21.10
B 9518 (N,N-bis[3-D-Gluconamidopropyl]cholamide)	1 g	38.00
	5 g	150.50
Min. 95%		
Useful in solubilization of functional opiate receptor		
Ref.: Hjelmeland, L.M., et al., <i>Anal. Biochem.</i> , 130, 485 (1983).		

▶ DECANOYL-N-METHYLGLUCAMIDE (MEGA-10)	500 mg	12.70
D 6277	1 g	22.35
	5 g	86.90
	25 g	320.05
Approx. 98%		

▶ n-DECYL β-D-GLUCOPYRANOSIDE	250 mg	13.45
D 5394	1 g	33.95
	5 g	132.20
Approx. 98%		

▶ DIETHYLENE GLYCOL MONO-PENTYL ETHER (pfs)	500 mg	18.75
D 3023	1 g	28.05
	5 g	109.00
	10 g	195.25
Useful in solubilizing membrane proteins.		
Ref.: 1. LeMaire, M. et al., <i>Eur. J. Biochem.</i> , 129, 529 (1983).		
2. Hayter, J.B. and Zulauf, M., <i>Coll. Polymer Sci.</i> , 260, 1023 (1982).		

▶ DIGITONIN (pfs) (Digitin)	250 mg	9.15
D 5628	1 g	25.00
	5 g	98.25
	25 g	465.75
	100 g	1769.15
Crystalline: Approx. 50%		
Suitable for cholesterol determination.		
FOB Sigma		

▶ n-DODECYL β-D-GLUCOPYRANOSIDE (pfs) (n-Dodecyl glucoside)	100 mg	9.95
D 4765	250 mg	19.40
	1 g	52.60
Approx. 98%		

▶ n-DODECYL β-D-MALTOSE	500 mg	21.80
D 4641	1 g	39.20
	5 g	155.25

▶ HEPTANOYL-N-METHYL-GLUCAMIDE (MEGA-7)	500 mg	12.70
H 1639	1 g	22.35
	5 g	86.90
	25 g	342.45
Approx. 98%		

▶ n-HEPTYL β-D-GLUCOPYRANOSIDE	500 mg	20.60
H 1389	1 g	36.60
	5 g	143.60
Approx. 98%		

▶ n-HEPTYL β-D-THIO-GLUCOSIDE (pfs)	100 mg	7.50
H 3264	250 mg	15.00
	1 g	41.70

▶ n-HEXYL β-D-GLUCOPYRANOSIDE (pfs)	500 mg	21.25
H 0385	1 g	37.55
	5 g	148.00

▶ LUBROL (pfs) (Ethylene oxide condensates of fatty alcohols)	100 g	13.30
L 3753	250 g	25.85

Type PX  
Reported to be superior to Triton X-100 in dissolving membrane-bound adenylyl cyclase.  
Ref.: Levey, G.S., *Biochem. Biophys. Res. Comm.*, 38, 86 (1970).

▶ 1-MONOOLEOYL-rac-GLYCEROL (1-Mono-[(cis)-9-octadecenoyl]-rac-glycerol, Glycerol cis-9-octadecanoate; Monoolein)	25 mg	5.95
M 7765	50 mg	9.70
	100 mg	15.85
	500 mg	39.05
	1 g	62.40
Approx. 99%		
Contains approx. 1% 2-isomer.		

For information on the use of this price list see page 7.

## NONIONIC DETERGENTS (continued)

PRODUCT NUMBER		US \$
N 1138	NONANOYL-N-METHYLGLUCAMIDE	500 mg 12.70
	(MEGA-9)	1 g 22.35
	Approx. 98%	5 g 86.90
		25 g 342.45
N 6507	NONIDET P-40 (pfs)	50 ml 8.70
	An octylphenol-ethylene oxide condensate containing an average of 9 moles ethylene oxide per mole of phenol.	100 ml 13.65
		500 ml 41.55
	1 ml = approx. 1.06 g.	
N 7507	n-NONYL β-D-GLUCOPYRANOSIDE	250 mg 14.15
	Approx. 98%	500 mg 25.50
		1 g 46.00
		5 g 182.00
O 3129	OCTANOYL-N-METHYLGLUCAMIDE	500 mg 12.70
	(MEGA-8; OMEGA)	1 g 21.60
	Approx. 98%	5 g 86.90
		25 g 342.45
O 0630	n-OCTYL α-D-GLUCOPYRANOSIDE	100 mg 12.50
	(n-Octyl α-glucoside)	500 mg 39.70
	Minimum purity 98%	1 g 61.50
	Ref.: Brown, G.M., et al., Canadian J. Chem. 48, 2525 (1970).	5 g 240.20
O 8001	n-OCTYL β-D-GLUCO-PYRANOSIDE	100 mg 6.50
	(n-Octyl glucoside)	250 mg 11.75
	Crystalline	500 mg 20.10
		1 g 31.00
		5 g 120.35
		10 g 215.15
	25 g 418.25	
	100 g 1350.25	
O 6004	OCTYL β-D-THIOGLUCOPYRANOSIDE	500 mg 12.00
	Crystalline	1 g 20.00
	Ref.: Saito, S. and Tsuchiya, T., Biochem. J., 222, 829 (1984).	5 g 80.00
<b>POLYOXYETHYLENE ETHERS</b>		
P 3769	2 Cetyl Ether (Brij 52) (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 5759	10 Cetyl Ether (Brij 56) (pfs)	100 g 6.55
	Contains antioxidants.	500 g 15.45
		1 kg 25.50
		FOB Sigma
P 5884	20 Cetyl Ether (Brij 58) (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 4391	4 Lauryl Ether (Brij 30) (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 9641	9 Lauryl Ether (pfs)	10 g 6.50
	(Polidocanol)	50 g 20.50
		100 g 33.75
	FOB Sigma	
P 9769	10 Lauryl Ether (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma

(Continued)

PRODUCT NUMBER		US \$
(Continuation of)		
<b>POLYOXYETHYLENE ETHERS</b>		
P 1254	23 Lauryl Ether (Brij 35) (pfs)	100 g 4.75
	Suitable for use in Stein-Moore chromatography.	500 g 9.15
	Ref.: Stein, W H and Moore, S.J., J. Biol. Chem., 211, 893 (1954).	1 kg 16.15
	See also: Brij 35 Solution, 30% w/v solution for use in various automated procedures Page 347	5 kg 52.25
	FOB Sigma	
P 4144	2 Oleyl Ether (Brij 92) (pfs)	100 g 6.55
	Contains antioxidants.	500 g 15.45
		1 kg 25.50
		FOB Sigma
P 6136	10 Oleyl Ether (Brij 96) (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 5641	20 Oleyl Ether (Brij 99) (pfs)	100 g 6.55
	Contains antioxidants.	500 g 15.45
		1 kg 25.50
		FOB Sigma
P 3894	2 Stearyl Ether (Brij 72) (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 5516	10 Stearyl Ether (Brij 76) (pfs)	100 g 6.55
	Contains antioxidants.	500 g 15.45
		1 kg 25.50
		FOB Sigma
P 4019	20 Stearyl Ether (Brij 78) (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 6153	21 Stearyl Ether (Brij 721) (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 2393	10 Tridecyl Ether (pfs)	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
P 7516	W-1	10 g 3.45
	May be of use as a solubilizing agent for a variety of membrane bound enzymes or in applications that call for lubrol PX and WX.	100 g 6.55
		500 g 15.45
		1 kg 25.50
		FOB Sigma
<b>POLYOXYETHYLENESORBITAN</b>		
P 1379	Monolaurate (Tween 20) (pfs)	100 ml 5.15
	Syrup	500 ml 7.75
	Fatty acid composition: Lauric acid approx. 55%; balance primarily myristic, palmitic, and stearic acids.	1 gal 25.90
		FOB Sigma

(Continued)

We pay shipping costs (CIF) anywhere in the world unless otherwise indicated.

## NONIONIC DETERGENTS (continued)

PRODUCT NUMBER (Continuation of)

### POLYOXYETHYLENESORBITAN

**P 1754 Monooleate (Tween 80) (pfs)** 100 ml 5.40  
 Syrup 500 ml 8.00  
 Fatty acid composition: Oleic acid approx. 75%; balance primarily linoleic, palmitic, and stearic acids.  
 See also: Tissue Culture Media and Reagents Page 1334  
 1 gal 26.15  
 FOB Sigma

**P 1504 Monopalmitate (Tween 40) (pfs)** 100 ml 5.15  
 Syrup 500 ml 7.75  
 Fatty acid composition: Palmitic acid approx. 90%; balance primarily stearic acid.  
 1 gal 25.90  
 FOB Sigma

**P 1629 Monostearate (Tween 60) (pfs)** 100 ml 5.15  
 Fatty acid composition: Stearic acid approx. 55%; balance primarily palmitic acid.  
 500 ml 7.75  
 1 gal 25.90  
 FOB Sigma

**P 4634 Trioleate (Tween 85) (pfs)** 100 ml 5.15  
 500 ml 7.75  
 1 gal 25.90  
 FOB Sigma

### SORBITAN

**\$ 6635 Monolaurate (Span 20) (pfs)** 250 ml 8.95  
 1 liter 26.65  
 Fatty acid composition: Lauric acid (C12:0) approx. 56%; balance primarily myristic (C14:0), palmitic (C16:0) and stearic (C18:0) acids.  
 FOB Sigma

**\$ 6760 Monooleate (Span 80) (pfs)** 250 ml 8.95  
 1 liter 26.65  
 Fatty acid composition: Oleic acid (C18:1) approx. 75%; balance primarily linoleic (C18:2), linolenic (C18:3) and palmitic (C16:0) acids.  
 FOB Sigma

**\$ 6885 Monopalmitate (Span 40) (pfs)** 250 g 8.95  
 Fatty acid composition: Palmitic acid (C16:0) approx. 90%; balance primarily stearic acid (C18:0).  
 1 kg 26.65  
 FOB Sigma

**\$ 7010 Monostearate (Span 60) (pfs)** 250 g 8.95  
 Fatty acid composition: Stearic acid (C18:0) approx. 50%; balance primarily palmitic acid (C16:0).  
 1 kg 26.65  
 FOB Sigma

**\$ 3386 Sesquioleate (pfs) (Arlacel 83)** 250 ml 8.95  
 1 liter 26.65  
 Fatty acid composition: Oleic acid (C18:1) approx. 70%; balance primarily palmitic acid (C16:0), stearic acid (C18:0) and linoleic acid (C18:2).  
 FOB Sigma

**\$ 7135 Trioleate (Span 85) (pfs)** 250 ml 8.95  
 Fatty acid composition: Oleic acid (C18:1) approx. 74%; linoleic acid (C18:2) approx. 7%; linolenic acid (C18:3) approx. 2%; palmitoleic acid (C16:1) approx. 7%; balance primarily palmitic acid (C16:0).  
 1 liter 26.65  
 FOB Sigma

PRODUCT NUMBER US \$

**TERGITOL (pfs)** 100 ml 4.45  
 Polyglycol Ether surfactants 500 ml 8.15  
 "Tergitol" is a registered trademark of Union Carbide Corporation.  
 FOB Sigma

See also: Biological Detergents, Anionic Page 318

<b>NP-7</b>	Type NP-7	15-S-3	Type 15-S-3
<b>NP-10</b>	Type NP-10	15-S-5	Type 15-S-5
<b>NP-14</b>	Type NP-14	15-S-7	Type 15-S-7
<b>NP-35</b>	Type NP-35	15-S-9	Type 15-S-9
<b>NP-40</b>	Type NP-40	15-S-12	Type 15-S-12
<b>TMN-6</b>	Type TMN-6	15-S-15	Type 15-S-15
<b>TMN-10</b>	Type TMN-10 (Approx. 90% solution)	15-S-20	Type 15-S-20
		15-S-30	Type 15-S-30
<b>XD</b>	Type XD	15-S-40	Type 15-S-40
<b>XH</b>	Type XH	T 1135	MIN FOAM 1x
		T 1260	MIN FOAM 2x

**TRITON (pfs)** 100 ml 4.65  
 Various Polyoxyethylene Ethers and other surface-active compounds.  
 500 ml 10.70  
 1 gal 42.80  
 FOB Sigma

The following liquid types are usually available.

X-15	X-301	CF-32	W-30
X-35	X-305	CF-54	770
X-45	X-705 (70%)	DF-12	
X-102	XQS-20	DF-16	
X-151	N-42	GR-5M	
X-152	N-57	GR-7M	
X-155	N-60	QS-9	
X-165	B-1956	QS-15	
X-200	CF-10	QS-30	
X-207	CF-21	QS-44	

X-67 (solid flake) 100 g 4.15  
 500 g 7.60  
 FOB Sigma

All of the following package sizes are available for each of the following products.

X-100	100 ml	4.50
X-114	500 ml	7.25
X-405	1 liter	12.75
N-101	1 gal	29.00
	5 gal	125.00
		FOB Sigma

X-100R 5 g 14.20  
 Reduced 25 g 46.35  
 Not to be confused with Triton  
 X-100.  
 FOB Sigma

May contain up to 2% non-reduced material which will have U.V. absorption.

X-405R 5 g 14.00  
 Reduced 25 g 45.00  
 Not to be confused with Triton  
 X-405.  
 FOB Sigma

"Triton" is a registered trademark of the Rohm & Haas Co.

**TYLOXAPOL (pfs)** 10 g 9.15  
**T 8761** A nonionic liquid polymer of the alkyl aryl polyether alcohol type. 25 g 18.00  
 50 g 28.60  
 250 g 133.75

**N-UNDECYL  $\beta$ -D-GLUCO-** 100 mg 11.10  
**U 3752 PYRANOSIDE (pfs)** 250 mg 23.70  
 Approx. 97% 1 g 75.70

For information on the use of this price list see page 7.



# NEW ITEMS

## NEW ITEMS (Inquire)

Items listed below and as inquire in the alphabetic section, did not have stock available when this catalog was published. However, if you are interested in any of these products, please call. We are constantly adding stock and your item may have become available. If it is not, we will record your inquiry and will notify you when the item becomes available.

Page 83

**A 1922** 2-ACETAMIDO-2-DEOXY-4-O-([4-O-β-D-GALACTOPYRANOSYL]-β-D-GALACTOPYRANOSYL)-D-GLUCOPYRANOSE

Page 254

**A 4798** AZINO-bis(3-ETHYLBENZTHIAZOLINE-6-SULFONIC ACID) TABLETS

Page 336

**B 8770** N-t-BOC-(2R,3R)-3-AMINO-2-HYDROXY-5-METHYL-HEXANOIC ACID

**B 8020** N-t-BOC-(2S,3R)-3-AMINO-2-HYDROXY-5-METHYL-HEXANOIC ACID

Page 367

**C 8288** CARBOMETHOXYETHYLTHIOETHYL 2-ACETAMIDO-2-DEOXY-4-O-β-D-GALACTOPYRANOSYL-β-D-GLUCOPYRANOSIDE

**C 7413** CARBOMETHOXYETHYLTHIOETHYL 4-O-(4-O-[6-O-α-D-GLUCOPYRANOSYL-α-D-GLUCOPYRANOSYL]-α-D-GLUCOPYRANOSYL)-β-D-GLUCOPYRANOSIDE

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**C 7788** CARBOXYETHYLTHIOETHYL 2-ACETAMIDO-4-O-(2-ACETAMIDO-2-DEOXY-β-D-GLUCOPYRANOSYL)-6-O-(α-L-FUCOPYRANOSYL)-2-DEOXY-β-D-GLUCOPYRANOSIDE-BOVINE SERUM ALBUMIN CONJUGATE

**C 8038** CARBOXYETHYLTHIOETHYL 2-ACETAMIDO-2-DEOXY-3-O-β-D-GALACTOPYRANOSYL-β-D-GALACTOPYRANOSIDE-BOVINE SERUM ALBUMIN CONJUGATE

**C 7663** CARBOXYETHYLTHIOETHYL 2-ACETAMIDO-2-DEOXY-3-O-β-D-GALACTOPYRANOSYL-β-D-GLUCOPYRANOSIDE-BOVINE SERUM ALBUMIN CONJUGATE

**C 7913** CARBOXYETHYLTHIOETHYL 2-ACETAMIDO-2-DEOXY-4-O-β-D-GALACTOPYRANOSYL-β-D-GLUCOPYRANOSIDE-BOVINE SERUM ALBUMIN CONJUGATE

**C 7538** CARBOXYETHYLTHIOETHYL 4-O-α-D-GALACTOPYRANOSYL-β-D-GALACTOPYRANOSIDE-BOVINE SERUM ALBUMIN CONJUGATE

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**C 3035** COMPLEMENT C4

Page 446

**B 8021** BENZOYLECGONINE-d<sub>5</sub>

Page 456

CRYSTALLIN

Page 457

**C 4413** γ-Crystallin

Page 473

**D 7658** N-DECYL β-D-MALTOPYRANOSIDE

Page 479

**D 8533** 1-DEOXYMANNOJIRIMYCIN

Page 515

**D 7034** DIGALACTURONIC ACID

Page 565

**E 1636** β-ESTRADIOL 3,17-DISULFATE

Page 571

**E 4136** ETHYL 2-ACETAMIDO-4-O-(2-ACETAMIDO-2-DEOXY-β-D-GLUCOPYRANOSYL)-6-O-(α-L-FUCOPYRANOSYL)-2-DEOXY-β-D-GLUCOPYRANOSIDE

**E 4386** ETHYL 2-ACETAMIDO-2-DEOXY-4-O-(4-O-α-D-GALACTOPYRANOSYL-β-D-GALACTOPYRANOSYL)-β-D-GLUCOPYRANOSIDE

Page 574

**E 4261** ETHYL 4-O-(4-O-α-D-GALACTOPYRANOSYL-β-D-GALACTOPYRANOSYL)-β-D-GLUCOPYRANOSIDE

Page 580

**F 8138** FATTY ACID SYNTHETASE

Page 609

**G 8269** 4-O-α-D-GALACTOPYRANOSYL-D-GALACTOPYRANOSE

**G 8394** 4-O-(4-O-β-D-GALACTOPYRANOSYL-β-D-GALACTOPYRANOSYL)-D-GLUCOPYRANOSE

Page 610

**G 3266** α-D-GALACTOPYRANOSYLPHENYL ISOTHIOCYANATE

Page 621

**G 8519** 4-O-(4-O-[6-O-α-D-GLUCOPYRANOSYL-α-D-GLUCOPYRANOSYL]-α-D-GLUCOPYRANOSYL)-D-GLUCOPYRANOSE

Page 646

**G 6267** GLYCEROL DEHYDROGENASE

From *Bacillus* sp.

Page 648

**G 3267** GLYCINE BENZYL ESTER

Hydrochloride

Page 670

**H 7641** HEPARAN SULFATE

Sodium Salt  
From Bovine Intestine

**H 7516** HEPARIN

Sodium Salt  
Low Molecular Weight from Bovine Intestinal Mucosa  
Av. Mol. Wt. approx. 3,000

**H 7766** Sodium Salt  
Low Molecular Weight From Bovine Intestinal Mucosa  
Av. Mol. Wt. approx. 5,000

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**H 8891** HEPARINASE III

Page 705

**H 5891** 21-HYDROXYPREGNENOLONE 3-ACETATE

Page 927

**L 7893** δ-LYSIN

Page 951

**M 3901** METHYL 3-O-(2-ACETAMIDO-2-DEOXY-β-D-GALACTOPYRANOSYL)-α-D-GALACTOPYRANOSIDE

**M 4026** METHYL 4-O-(3-O-[2-ACETAMIDO-2-DEOXY-4-O-β-D-GALACTOPYRANOSYL-β-D-GLUCOPYRANOSYL]-β-D-GALACTOPYRANOSYL)-β-D-GLUCOPYRANOSIDE

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**M 3776** METHYL 3-O-α-D-GALACTOPYRANOSYL-α-D-GALACTOPYRANOSIDE

Page 1070

**N 8265** cis-3-NONENYLTRIPHENYLPHOSPHONIUM BROMIDE

**N 7640** NORCODEINE

Page 1075

**O 3630** OCTADECYLTHIOETHYL 4-O-α-D-GALACTOPYRANOSYL-β-D-GALACTOPYRANOSIDE

**O 3755** OCTADECYLTHIOETHYL 4-O-(4-O [6-O-α-D-GLUCOPYRANOSYL-α-D-GLUCOPYRANOSYL]-α-D-GLUCOPYRANOSYL)-β-D-GLUCOPYRANOSIDE

Page 1211

**P 2289** PROTEASE

From *Lysobacter enzymogenes*

Page 1332

**T 7903** TIGLIC ACID METHYL ESTER

Page 1460

**T 0279** TRIGALACTURONIC ACID

Page 1470

**T 2779** 1,6,6'-tris(O-TRITYL)SUCROSE PENTAACETATE

Page 1479

**T 0652** TUNICAMYCIN A<sub>2</sub> HOMOLOG



# SIGMA PEPTIDES

## SIGMA BIOACTIVE PEPTIDES...

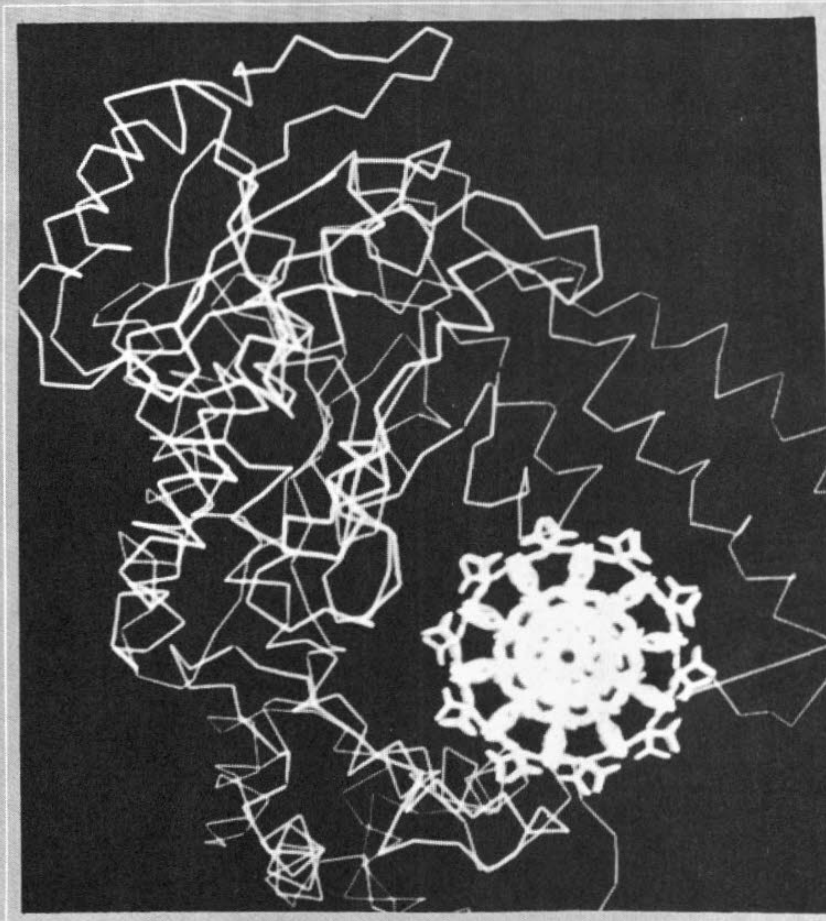
more than 500 compounds  
grouped under the following categories:

Adrenocorticotrophic Hormone and Fragments . . . . .	Page 273
Angiotensin and Related Peptides . . . . .	Page 274
Bradykinin and Related Peptides . . . . .	Page 276
Chemotactic Peptides . . . . .	Page 277
Dynorphin and Related Peptides . . . . .	Page 279
Endorphins and $\beta$ -Lipotropin Fragments . . . . .	Page 279
Enkephalin and Related Peptides . . . . .	Page 280
Enzyme Inhibitors . . . . .	Page 284
Gastrointestinal Peptides . . . . .	Page 285
Growth Hormone Releasing Peptides . . . . .	Page 288
Luteinizing Hormone Releasing Hormone and Related Peptides . . . . .	Page 289
Melanocyte Stimulating Hormone and Related Peptides . . . . .	Page 291
Neurotensin and Related Peptides . . . . .	Page 291
Opioid Peptides . . . . .	Page 292
Oxytocin, Vasopressin, Vasotocin and Related Peptides . . . . .	Page 293
Parathyroid Hormone and Fragments . . . . .	Page 295
Somatostatin and Related Peptides . . . . .	Page 296
Substance P and Related Peptides . . . . .	Page 297
Miscellaneous Bioactive Peptides . . . . .	Page 300

MOLECULAR  
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BIOLOGY

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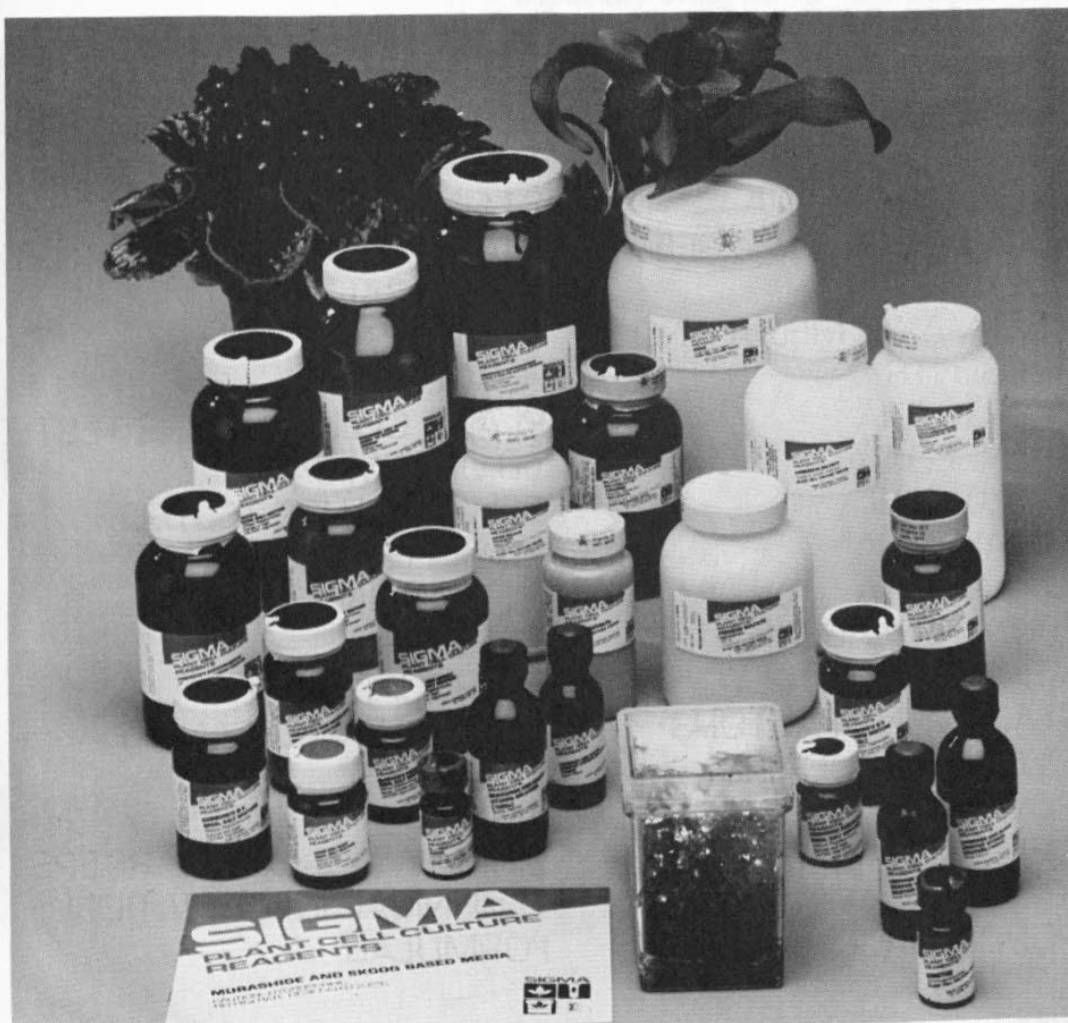
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see pp. 977-1015

# SIGMA

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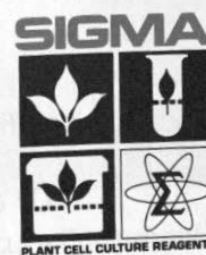


### SIGMA...

Your source for Plant Cell Culture biochemicals, reagents, powdered media and vitamin mixtures.

See Pages 1392 through 1408

For a complete listing



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LIQUID MEDIA	VITAMINS
BALANCED SALT SOLUTIONS	REAGENTS
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HUMAN SERA	CELL CULTURE TESTED BIOCHEMICALS
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ATTACHMENT FACTORS	MICROCARRIER BEADS
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HORMONES	SIGMAWARE LAB MARKERS
LECTINS	TECHNICAL INFORMATION
LIPOPOLYSACCHARIDES	FORMULAS

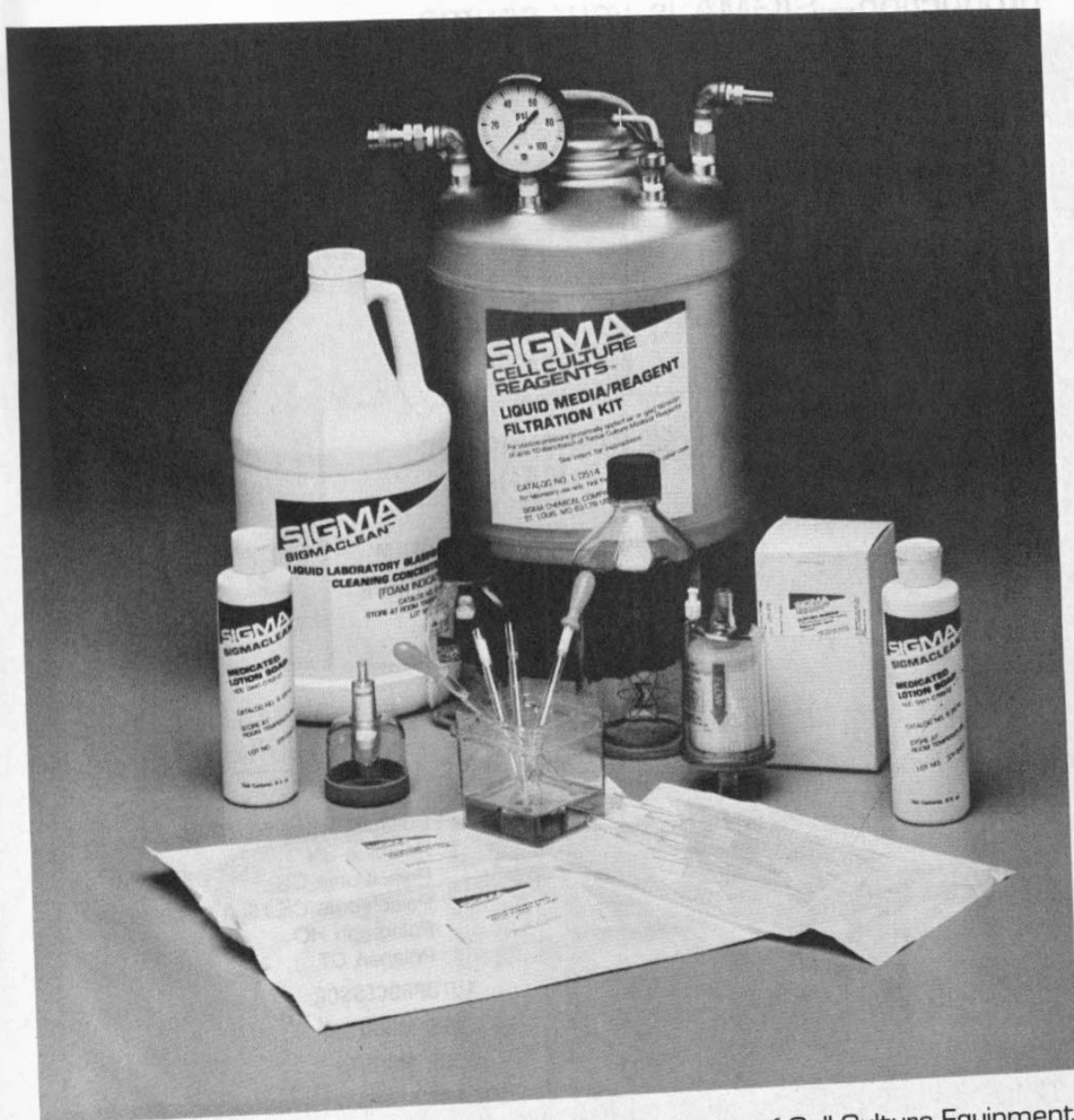
You can find them all in the Tissue Culture Media and Reagents Section  
Beginning on Page 1334.

Or check the complete index of Tissue Culture products on  
Pages 1440 through 1445.

# SIGMA CELL CULTURE REAGENTS®

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See Pages 1422 through 1433 For a complete listing of Cell Culture Equipment.

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- $^{14}\text{C}$ -Molecular Weight Markers
- $^3\text{H}$ -Nucleotides & Nucleosides

FOR  
COMPLETE PRODUCT LISTINGS  
SEE PAGES 1233-1255

C# 37881590  
FC: <sup>7C</sup>9Z S# <sup>8335538</sup>~~7559990~~  
BR: <sup>7C</sup>9Z L# 37881590

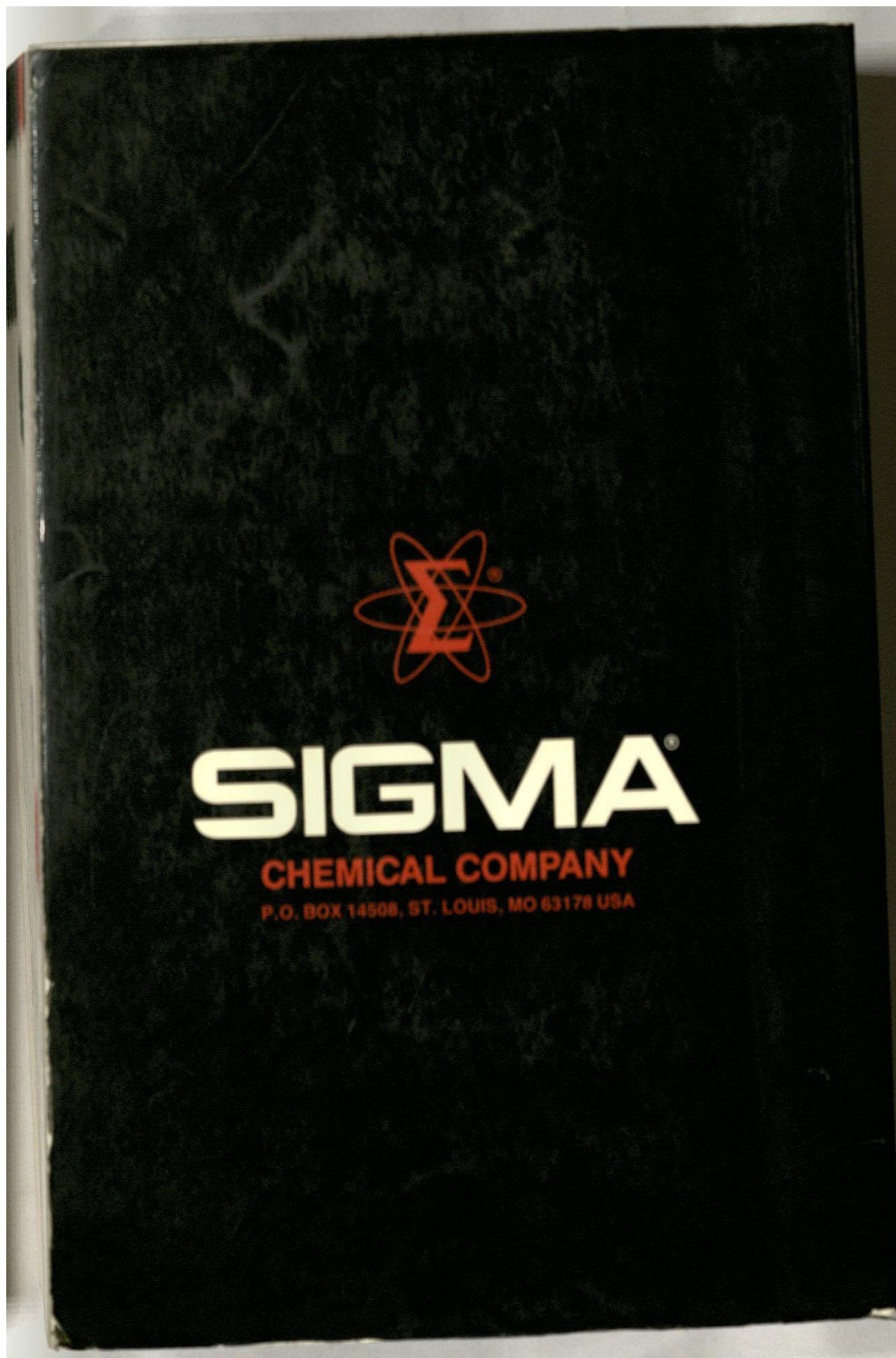
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