

 **Fluka**

Chemika-BioChemika

1993/94



To Place Orders

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Telefax	085 654 49/085 642 07 081 756 54 49 New from 3.2.93 081 756 42 07
Telex	855 282
Telegram	fluka 9470 buchs
Mail	Fluka Chemie AG P.O.Box 260 CH-9470 Buchs Switzerland

Every order is welcome.
There is no minimum-order charge.

Enquiries

General enquiries
Technical information
Custom synthesis

Please do not hesitate to contact us.

General correspondence	Fluka Chemie AG P.O.Box 172 CH-9470 Buchs Switzerland
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SAF Bulk Chemicals

For Bulk Enquiries please contact
our SAF department.

See inside back cover for details.

Telephone	085 695 29 081 755 25 29 New from 3.2.93 155 35 30 Toll Free
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Office Hours

Monday-Friday	07.00-18.00
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Fluka
Chemika-BioChemika

Fluka Chemie AG
Industriestrasse 25
CH-9470 Buchs
Switzerland



Chemika

Guaranteed Purities

Puriss. > 99%
Purum > 97%
Pract.
Techn.
Standard

Chemicals are clearly classified according to purity

Special Qualities

Grades suitable for specific applications

ChiraSelect

Chiral products of very high guaranteed enantiomeric purity

Selectophore®

Ionophores for the production of reliable ion-selective electrodes and optodes

BioChemika

Guaranteed Properties

Biochemicals have their properties very carefully characterised

MicroSelect

Products of high purity used in Biochemistry and Life Sciences

PeptiSelect

Peptides meeting stringent specifications

Quality is an essential criterion for every Fluka product.

Ordering from Fluka is your assurance of receiving a product that has been very carefully analysed and characterised.

Rely on Fluka for Quality Chemicals and Biochemicals.

Quality Assurance

In Fluka's corporate policy, quality assurance is among the priority objectives. This also explains the clear-cut structure of the quality assurance organization which is superimposed on the normal corporate structure.

Quality assurance measures have long been a tradition with Fluka. All Fluka products are always supplied with clear specifications (cf. catalogue specifications). Both the catalogue packages and the large containers are labelled with product and batch numbers; this means that comparisons with data at the time of production or purchase are always possible.

Products that are newly introduced into the product range are subjected to clearly defined test cycles until the necessary experience has been gained with regard to product stability and package tolerance. An EDP-controlled stock management system periodically conducts product-specific tests.

Quality control checks adherence to specifications for every individual batch, with particular attention paid to

- aspect, solubility,
- physical data,
- assay,
- identity check,
- application-relevant tests.

With the use of our laboratory data system we can ensure that any batch can only be released by the competent person (Analytical Product Manager). Analytical data are stored for more than 20 years and thus enable an uninterrupted retraceability of the products' history. On request, we supply the batch-specific analytical data, in the form of an analysis certificate, along with the product.

On the strength of the permission, obtained in 1991, to produce and distribute pharmaceutical agents (with the exception of sterile products, beta-lactam antibiotics, cytostatics, and steroid hormones), Fluka is in a position to produce and distribute individual substances in conformity with GMP standards on request. This is done in accordance with the directives of the IKS (Swiss Intercantonal Drug Control Authority) of 25 March, 1985, with the PIC of 20 June, 1986, as well as with the Directives for the Manufacture of Pharmaceutical Agents of June 1987.

We would also like to point out our line of chemicals which satisfy the requirements of the specified pharmacopoeias and of ACS specifications. In general, this does not mean that these products are treated in conformity with GMP.

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Chemika-BioChemika

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Guaranteed Purities

All Chemicals are subjected to exacting tests in our Control Laboratories for the determination of quality. The grades are classified according to purity.

Most of the Chemika products are characterised by one of the following purity grades

and correspond to the quantitative description stated below. Any deviations from these general descriptions are specified under the product entry.

In exceptional cases, specifications may be subject to change while the catalogue is still valid.

Purity Grade ⁽¹⁾	Assay ^(2, 3)	Ash ⁽⁴⁾	Physical Data	Aspect
puriss.	> 99%	< 0.1%	according to catalogue specifications $n_D^{20} \pm 0.001$ $d_4^{20} \pm 0.001$	according to the literature, no foreign colour
purum	> 97%	< 0.5%	according to catalogue specifications $n_D^{20} \pm 0.001$ $d_4^{20} \pm 0.002$	possible slight foreign colour in deviation from the literature
pract.	> 90% mostly > 95%	< 5%	according to catalogue specifications $n_D^{20} \pm 0.002$ $d_4^{20} \pm 0.005$	more pronounced deviation from the literature possible
techn.	fluctuating (cf. catalogue specifications)		according to catalogue specifications n_D^{20}, d_4^{20} : more pronounced deviation possible	considerable deviation from the literature possible
Standard Fluka	Products, mainly stains for microscopy, which are identical with a standard quality. ⁽⁵⁾			

- (1) Special qualities "for Specific Applications" are also available.
- (2) The calculation is based on the dry substance or on the hydrated form as indicated in the formula.
- (3) The assay of optically active substances is based on the sum of the enantiomers.
- (4) Inorganic products and compounds with ash-forming elements are excluded.
- (5) Dyes and stains are checked by thin layer chromatography and UV spectroscopy to correspond with the standard, and in general conform with the specifications in H.J. Conn's Biological Stains (1977).

Special Qualities

Many grades also have designations showing they are suitable for certain applications or meet specified quality requirements.

p.a.	pro analysi, products with a guarantee and/or suitability for special applications	
Ph. Eur. Ph. Helv. BP Codex France DAB USP/NF	this quality meets the requirements of the specified Pharmacopoeia, but is tested for laboratory use only	
for HPLC	solvent for liquid chromatography specially tested with gradient technique on rp-columns	
B. & J. Brand, Product line of Burdick & Jackson	high purity solvents suitable for different purposes	
Titrimetric standard	reagent for volumetric analysis	
for	cyclovoltammetry electron microscopy chromatography electrophoresis IR spectroscopy	photographic purposes polarography scintillation sequential analysis UV spectroscopy

ChiraSelect

These are chiral products of very high and guaranteed enantiomeric purity. The ChiraSelect quality grade is restricted to compounds used as chiral derivatizing agents or as chiral standards. The enantiomer ratio is used to specify the enantiomeric purity of these grades.

ChiraSelect products have an enantiomer ratio exceeding 99.5:0.5 and usually the chemical purity is greater than 99%.

Selectophore®

These products belong to the Fluka Ionophore group of products. Selectophore Ionophores meet the quality requirements for the production of reliable ion-selective electrodes. The systematic name and, if appropriate, the ETH number are given to enable cross reference with literature nomenclature. Selectophore® is a registered trade mark of Fluka Chemie AG.



Guaranteed Properties

All Fluka biochemicals are carefully analysed in our Quality Control Laboratories according to well established procedures to ensure high purity products. BioChemika products are described with a characteristic guaranteed property, e.g. the specific activity of enzymes, molecular weight of biopolymers, assay in the case of organic and inorganic products, and the absence of inhibitors in culture media products. These specific characteristics and additional specifications can be found in the product entry.

To meet the demand for basic reagents with a well defined very high purity desirable in Biochemistry and Life Sciences, Fluka also offers a unique **MicroSelect** range of products.

MicroSelect

MicroSelect products are basic reagents for use in biochemistry and life sciences where large amounts of reagents are required in comparison to those under investigation.

The MicroSelect standard guarantees:

- a homogeneous appearance (form, colour)
- a homogeneous and clear appearance in solution (solubility test)
- zero residue in the filter test
- limited UV absorbance at key biochemical wave-lengths
- a pH value of an aqueous solution within a defined range

Appearance

Each batch is checked for homogeneity. Special attention is paid to crystalline form and absence of foreign matter. A typical result is described as follows:
white crystalline powder

Assay

The content of MicroSelect products is normally assayed by titration on a Metrohm Titrprocessor. The type of titration is indicated in brackets and values are expressed as follows:

Assay: > 99.5% (Cl)

Solubility and Appearance in Solution

Solubility is usually checked in a 1 M reference solution in water (Product number 95304) at 20°C. Where appropriate, more diluted or more concentrated solutions in water or hydrochloric acid are used as reference standards.

The appearance of the solution is checked for the absence of foreign color and is described as follows:

Solubility: completely soluble, colorless (0.5 M in water, 20°C)

Checking for Insoluble Matter by Filter Test

Filter test results are the appropriate criteria for confirming the absence of insoluble matter. 20 ml of the reference solution are filtered through a Millipore® 0.45 µm filter membrane. After air drying the filter membrane is compared with a blank.

This result is expressed as follows:

Insoluble matter: passes filter test

Ultra-violet Absorption (UV)

The UV absorption of the appropriate reference solution is measured at wavelengths of 260 and 280 nm in a 1 cm quartz cell against the solvent. The figures are shown in dimensionless absorption units (OD).

These results are given as:

UV: $A_{260} < 0.02$ $A_{280} < 0.01$ (3 M in water)

pH of Solution

The pH of the reference solution is measured by a combined glass electrode at 20°C. The results are given in pH units ($-\log [H^+]$). Very dilute solutions including those in hydrochloric acid are not determined.

The result is expressed as follows:

pH: 3.0–4.0 (0.5 M in water, 20°C)

MicroSelect products are carefully handled and packed so as to ensure a very high quality product at the time of packaging. Cross-contamination is avoided by packing MicroSelect products in a controlled environment, free of both dust and moisture. Each package is securely sealed by a screw cap and can be identified by its batch number and packaging date.

New

MicroSelect for Molecular Biology

Products belonging to this new group are tested additionally in our laboratories for their suitability for use in molecular biology experiments.

Molecular biology reagents from Fluka are e.g. free of enzymatic contamination such as RNases, DNases, phosphatases or proteinases. Use of these basic reagents ensures that no interfering foreign activities are introduced into your experimental system.

Ask for an up-to-date list of Fluka MicroSelect reagents for molecular biology.

MicroSelect products can be categorised under the following headings:

Salts

Buffers and Buffer Components

Precipitation Reagents

Denaturation Reagents

Chelating Reagents

Antioxidants

Amino Acids

Carbohydrates

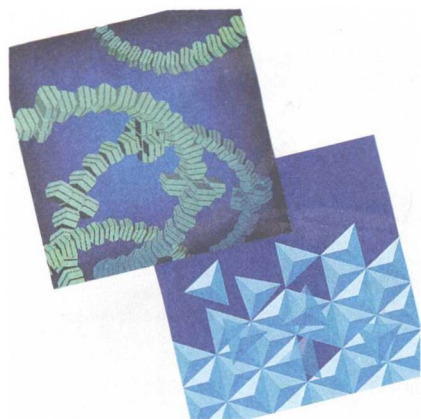
PeptiSelect

The product line PeptiSelect presents a series of high-quality peptides, which have been specially selected according to the following analytical purity control:

- quantitative amino acid analysis of both the acid and enzymatic hydrolysate leading, within the limits of error, to the theoretically expected ratios.
- high degree of purity as determined by high performance liquid chromatography and thin-layer chromatography in the most indicative experimental systems.
- determination of the optical purity of the constituent chiral amino acids.

Only peptides which meet these requirements obtain the PeptiSelect label to indicate their excellent quality.

Additional assays may vary depending on the product.



Fluka pays a great deal of attention to the consistent improvement and updating of its product range. The result is a sales programme tailored to the requirements of modern research and development, production and analysis.

The following Chemika and BioChemika list with product categories will provide you with a quick overview of what Fluka has to offer for particular fields of application.

Please ask for our special brochure "Chemika and BioChemika in Categories".

Adsorbents

Alkaloids

Amino Acid Analysis

Amino Acids and Derivatives

Anhydrous High Purity Solvents*

Antibiotics

Antioxidants

Bile Acids

Biogenic Acids

Biogenic Amines

Buffer Substances

Carbohydrates and Derivatives

Carcinogenics for the Experimental Induction of Cancer

Capillary Electrophoresis Reagents*

Catecholamines, Neurotransmitters and Related Compound

Cell Biology

Chiral Compounds*

ChiraSelect

Chromatography

Coenzymes, Vitamins and Related Compounds

Complexing Agents

Crystallization of Biopolymers

Denaturation of Biopolymers

Density Gradient Centrifugation

Derivatizing Agents for Chromatography

Detergents

Diagnostic Reagents

Diels-Alder-Reagents

Dyes, Indicators, Reagents, Stains in Solution

Electroorganic Synthesis: Solvents and Supporting Electrolytes

Electrophoresis

Enzymes

Enzyme Substrates

Fatty Acids and Methyl Esters

Fluorescent Labels

Fluorinating Agents

Hormones

HPLC Solvents*

Immobilization

Immunology

Inhibitors of Enzymes and Metabolic Pathways

Ionophores for Ion-Selective Electrodes*

IPC Reagents*

IR-Spectroscopy

Lipids

Mass Spectrometry, Marker Substances

Microbiology

Microscopy

MicroSelect (High-purity Reagents for Biochemistry)*

Molecular Biology

Natural Dyes

NMR-Spectroscopy

Nucleic Acid Modification

Nucleosides and Nucleotides

Oligonucleotide Synthesis

Peptides and Derivatives

Peptide Synthesis

pH-Indicators

Photosensitizers and Quenchers

Phosphorus Ligands

Polymerization Inhibitors

Polymer Reagents

Porphyrins and Related Compounds

Precipitation of Biopolymers

Protecting-Group Reagents according to Chemical Function

Protection of Amines as Urethans

Protein Modification

Proteins (other than Enzymes)

Protein Sequence Analysis

Pteridines

Purines and Pyrimidines

Quats, Crowns and Polyethers*

Radical Precursors

Reagents for TLC

Reference Substances for GLC

Resolution of Enantiomers

Salts (MicroSelect)*

Scintillation Chemicals

Silylating Agents and other Silicon Compounds*

Stationary Phases for GLC

Steroids

Strong and Hindered Nitrogen Bases

Sulfhydryl Reagents

Supported Reagents

Supports

Supports and Adsorbents for GLC

Supports and Adsorbents for LC

Terpenes

Toxins

UV Solvents*

Wittig- Horner Reagents

* Brochures are available from all groups printed in italics.



1993-1994 Chemika-Biochemika

This catalogue contains nearly 15 500 products of which 2000 are new. We continue to add new products to help our customers with their total scientific requirements. Our products include chemicals, biochemicals, laboratory equipment and books.

Research Products

There is no minimum-order charge. When placing your order, please specify product number, unit size and quantity desired.

For new customers we may require that an account be established prior to shipment. We are unable to ship our products to individuals not affiliated with institutions or firms.

Bulk Quantities

Most of the chemicals listed in this catalogue can be supplied in larger quantities. Contact us for a prompt quotation on price and delivery.

Chemicals not listed; Custom Syntheses

We are constantly adding new products and welcome suggestions. If you require a chemical not listed in our catalogue, we will consider making it as a custom synthesis.

Acknowledgement

Orders which cannot be delivered from stock are acknowledged in writing, with an estimated delivery time, which may be subject to alteration.

Prices

Prices are shown in Swiss francs FCA Buchs/SG, Switzerland. Special packaging charges will be added to the invoice.

For orders over Sfr. 500.- within Switzerland, normal freight costs will be absorbed by Fluka. Orders from customers in Switzerland are also subject to purchase tax. If you place your order by phone, we will confirm our current price with you at that time. Please contact us for current prices if you require this information prior to placing your order. We will guarantee our quotations for 30 days. When placing your order, please reference our quoted prices or our pro forma number.

Price Increases – Since we try to ship all orders the day of receipt, shipment will be made promptly even if prices have been nominally increased (unless you tell us not to).

Price Reductions – They will automatically apply to the invoice.

Quantity Discount

We grant 5% on orders for at least six identical packs of the same product and 10% for at least 24 identical packs.

Quotations

We will promptly quote on your needs, giving current prices and estimates of insurance and freight charges. The usual and customary international credit terms are offered.

Terms

All orders are accepted on the terms and conditions stated on standard Fluka invoices in effect on the date of shipment. The terms and conditions covering transactions as of the date of printing of this catalogue are reprinted on pages 14 and 15.

We attempt to fill all orders completely. When complete shipments cannot be made, partial shipments will be made at our discretion.

We reserve the right not to accept cancellation of orders.

Shipping

We generally ship our chemicals in accordance with the method specified or implied by your order. However, we reserve the right to change this method for certain hazardous chemicals which, when required by regulations or in our judgment, cannot be shipped safely by the method specified or implied. The despatch by mail of products with dangerous properties is restricted.

Return Shipments

We will not accept return shipments unless we have given prior written permission and shipping instructions. We want to be fair and will do our best to cooperate, but the circumstances involving returns are often complicated and require individual attention and specific handling. Unidentified return shipments may be discarded.

Return of Steel Cylinders

Cylinders are only returnable where a separate "Gas price" is shown in the catalogue. If returned empty, carriage paid, within the time shown, we will credit on the cylinder price:
Six months – 80%
One year – 60%
Two years – 20%
Cylinders kept longer than two years are not refundable.

Transport Insurance

We generally insure all consignments regardless of destination and charge the customer with the premium at cost. Countries for which no transport insurance is possible are exempt from this ruling. Major damage during transport must be reported by official agents. For lesser damage confirmation from the transport agency is sufficient.

The minimum premiums to insure consignments up to Sfr. 1000.- are:

Sfr. 1.- for Switzerland
Sfr. 4.- for Europe
Sfr. 6.- for all other countries

Premiums may be higher for dangerous goods.

Claims for lost or Damaged Shipments

If you should need assistance in filing a claim for a lost, incomplete or damaged shipment, we will be happy to help you. Please inspect packages immediately upon receipt and inform our Sales Department of any shortage or damage within 5 days of receipt.

Use

Most of our chemicals and biochemicals are offered for laboratory use only. They are not for drug, household or other uses. This means that they may **not** be used as:
drugs
cosmetics
food additives
household chemicals
agricultural products

For certain chemicals we may ask the buyer to provide written assurance that the chemicals will neither be purchased nor resold for an improper use. We will consider requests for commercial use of our products. Please contact our Sales Department.

Since we cannot be certain of your application of our chemicals, we offer no warranties regarding use, and will not be responsible for any loss involving their use.

Throughout this catalogue we list possible uses for certain chemicals as described in the referenced literature. These uses are provided for experimental or technical purposes only; that is, use in the laboratory under supervision of a technically qualified person. We expressly disclaim any warranties of merchantability and fitness for a particular purpose.



The indications in this chapter concern both the storage and the handling of our products. The knowledge of certain properties and the measures to be taken in accordance with them will guarantee that product quality is preserved and product handling is safe.

The full wording of these indications is reproduced on the labels. In the catalogue, they will be found under the abbreviation F... (number).

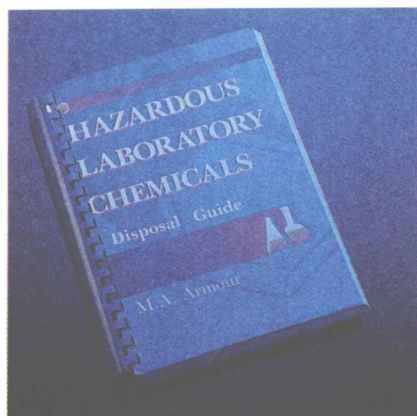
- F 1 Sensitive to air and humidity.
- F 2 Sensitive to air and CO₂.
- F 3 Hygroscopic.
- F 4 Do not heat over ... °C.
- F 5 Dry material may explode.
- F 6 Reacts with acids.
- F 7 Keep under CO₂.
- F 8 Photosensitive.
- F 9 Keep under nitrogen.
- F 10 Keep under argon.
- F 11 Keep under inert gas.
- F 12 Shake before use.
- F 13 Malodorous.
- F 14 Carefully observe warning label.
- F 15 Short shelf life.
- F 16 Decomposes easily.
- F 17 May decompose by explosion.
- F 18 Must be handled by instructed people only.
- F 19 Lachrymator.
- F 20 Not to be swallowed.
- F 21 Sensitive to humidity.
- F 22 Keep dust-free in the dark.
- F 23 Sensitive to air.
- F 24 Spontaneously flammable with alcohol.
- F 25 Keep under CO.
- F 26 Before distillation test for absence of peroxides.
- F 27 Cool before opening.
- F 28 May become cloudy (Polyformaldehyde).
- F 29 Spontaneously flammable when dry.
- F 30 Sediment unavoidable.
- F 31 Do not puncture.
- F 32 Avoid contact with heavy metal salts esp. iron salts.
- F 33 Causes fall in blood pressure.
- F 34 Sensitive to CO₂.

Disposal

Generally, chemicals must be disposed of in accordance with the local and national rules and regulations applicable to the site of the plant. Fluka's safety data sheets provide general indications with regard to disposal. For the transformation of small amounts into a form which makes disposal possible in the first place, we recommend that the following manuals be consulted: "The Manufacturing Chemists Associations, Guide for Safety in the Chemical Laboratory" (New York: Van Nostrand Reinhold Company, 1972), "Prudent Practices for Handling Hazardous Chemicals in Laboratories" (*Fluka 99798*), and "Prudent Practices for Disposal of Chemicals from Laboratories" (Washington D.C.: National Academy Press, 1981 and 1983, respectively) (*Fluka 99799*), Hazardous Laboratory Chemicals, Disposal Guide, CRC Press, Inc., Boca Raton, FL, 1991, 484 pp. (*Fluka 98054*).

Fluka shall not assume any responsibility for the application of such instructions.

Care must be taken that only qualified personnel conversant with any possible hazards and observing all safety instructions are entrusted with the destruction of any reactive compounds. Any such work must be carried out in a fume hood and with appropriate protective equipment (protective goggles, protective gloves, protective clothing, breathing equipment and facial mask where applicable).



Hazards and Toxicity









All of our products should be handled only by qualified individuals trained in laboratory procedures and familiar with their potential hazards. Some chemicals are extremely toxic or otherwise hazardous.

Hazardous products are marked with Hazard Symbols and Risk and Safety Phrases in accordance with the rules of the European Community Commission. This information is listed on the product labels and in the catalogue;

it is, however, the label which is applicable, since it reflects the latest state of both legislation and knowledge. The absence of a warning must not be interpreted as an indication of safety. We would like to emphasize that on the basis of existing information, the hazard potential of many compounds cannot finally be assessed.

Safety Data Sheets are available for all products.

Hazard Symbols

Explosive	 E	Hazard: This symbol designates substances which may explode under definite conditions. Caution: Avoid shock, friction, sparks and heat.
Oxidizing	 O	Hazard: Oxidizing substances can ignite combustible material or worsen existing fires and thus make fire-fighting more difficult. Caution: Keep away from combustible material.
Extremely flammable	 F+	Hazard: Liquids with flash points below 0° C and a boiling point/initial boiling point of max. 35° C. Caution: Avoid all contact with all sources of ignition.
Highly flammable	 F	Hazard: 1. Spontaneously flammable substances. Chemicals igniting in air. Caution: Avoid contact with air. Hazard: 2. Gases, gas mixtures (also liquified ones) which have an ignition range with air at normal pressure. Caution: Avoid formation of flammable gas-air mixtures and keep away from sources of ignition. Hazard: 3. Substances sensitive to moisture. Chemicals which readily form flammable gases on contact with water. Caution: Avoid contact with moisture or water. Hazard: 4. Liquids with a flash point below 21° C. Caution: Keep away from open fires, sources of heat and sparks. Hazard: 5. Solid substances which ignite easily after a short-term effect of a source of ignition. Caution: Avoid all contact with all sources of ignition.
Very toxic Toxic	 T+ T	Hazard: The substances are very hazardous to health when breathed, swallowed or in contact with the skin and may even lead to death. Non-recurring, recurring or lengthy exposure to these substances may result in irreversible damage. Caution: Avoid contact with the human body and immediately consult a doctor in cases of malaise.
Harmful	 Xn	Hazard: Inhalation and ingestion of, or skin penetration by these substances is harmful to one's health. Non-recurring, recurring or lengthy exposure to these substances may result in irreversible damage. Caution: Avoid contact with the human body, including inhalation of the vapours and in cases of malaise consult a doctor.
Corrosive	 C	Hazard: Living tissue as well as equipment are destroyed on contact with these chemicals. Caution: Do not breathe vapours and avoid contact with skin, eyes and clothing.
Irritant	 Xi	Hazard: This symbol designates substances which may have an irritant effect on skin, eyes and respiratory organs. Caution: Do not breathe vapours and avoid contact with skin and eyes.

Risk Phrases

- R 1 Explosive when dry.
- R 2 Risk of explosion by shock, friction, fire or other sources of ignition.
- R 3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.
- R 4 Forms very sensitive explosive metallic compounds.
- R 5 Heating may cause an explosion.
- R 6 Explosive with or without contact with air.
- R 7 May cause fire.
- R 8 Contact with combustible material may cause fire.
- R 9 Explosive when mixed with combustible material.
- R 10 Flammable.
- R 11 Highly flammable.
- R 12 Extremely flammable.
- R 13 Extremely flammable liquefied gas.
- R 14 Reacts violently with water.
- R 15 Contact with water liberates highly flammable gases.
- R 16 Explosive when mixed with oxidizing substances.
- R 17 Spontaneously flammable in air.
- R 18 In use, may form flammable/explosive vapour-air mixture.
- R 19 May form explosive peroxides.
- R 20 Harmful by inhalation.
- R 21 Harmful in contact with skin.
- R 22 Harmful if swallowed.
- R 23 Toxic by inhalation.
- R 24 Toxic in contact with skin.
- R 25 Toxic if swallowed.
- R 26 Very toxic by inhalation.
- R 27 Very toxic in contact with skin.
- R 28 Very toxic if swallowed.
- R 29 Contact with water liberates toxic gas.
- R 30 Can become highly flammable in use.
- R 31 Contact with acids liberates toxic gas.
- R 32 Contact with acids liberates very toxic gas.
- R 33 Danger of cumulative effects.
- R 34 Causes burns.
- R 35 Causes severe burns.
- R 36 Irritating to eyes.
- R 37 Irritating to respiratory system.
- R 38 Irritating to skin.
- R 39 Danger of very serious irreversible effects.
- R 40 Possible risk of irreversible effects.
- R 41 Risk of serious damage to eyes.
- R 42 May cause sensitization by inhalation.
- R 43 May cause sensitization by skin contact.
- R 44 Risk of explosion if heated under confinement.
- R 45 May cause cancer.
- R 46 May cause heritable genetic damage.
- R 47 May cause birth defects.
- R 48 Danger of serious damage to health by prolonged exposure.
- R 49 May cause cancer by inhalation.
- R 50 Very toxic to aquatic organisms.
- R 51 Toxic to aquatic organisms.
- R 52 Harmful to aquatic organisms.
- R 53 May cause long-term adverse effects in the aquatic environment.
- R 54 Toxic to flora.
- R 55 Toxic to fauna.
- R 56 Toxic to soil organisms.
- R 57 Toxic to bees.
- R 58 May cause long-term adverse effects in the environment.
- R 59 Dangerous for the ozone layer.

Combination Risk Phrases

- R 14/15 Reacts violently with water liberating highly flammable gases.
- R 15/29 Contact with water liberates toxic, highly flammable gas.
- R 20/21 Harmful by inhalation and in contact with skin.
- R 20/22 Harmful by inhalation and if swallowed.
- R 21/22 Harmful in contact with skin and if swallowed.
- R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
- R 23/24 Toxic by inhalation and in contact with skin.
- R 23/25 Toxic by inhalation and if swallowed.
- R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.
- R 24/25 Toxic in contact with skin and if swallowed.
- R 26/27 Very toxic by inhalation and in contact with skin.
- R 26/28 Very toxic by inhalation and if swallowed.
- R 26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.
- R 27/28 Very toxic in contact with skin and if swallowed.
- R 36/37 Irritating to eyes and respiratory system.
- R 36/38 Irritating to eyes and skin.
- R 36/37/38 Irritating to eyes, respiratory system and skin.
- R 37/38 Irritating to respiratory system and skin.
- R 39/23 Toxic: danger of very serious irreversible effects through inhalation.
- R 39/24 Toxic: danger of very serious irreversible effects in contact with skin.
- R 39/25 Toxic: danger of very serious irreversible effects if swallowed.
- R 39/23/24 Toxic: danger of very serious irreversible effects through inhalation and in contact with skin.
- R 39/23/25 Toxic: danger of very serious irreversible effects through inhalation and if swallowed.
- R 39/24/25 Toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
- R 39/23/24/25 Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
- R 39/26 Very toxic: danger of very serious irreversible effects through inhalation.
- R 39/27 Very toxic: danger of very serious irreversible effects in contact with skin.
- R 39/28 Very toxic: danger of very serious irreversible effects if swallowed.
- R 39/26/27 Very toxic: danger of very serious irreversible effects through inhalation, in contact with skin.
- R 39/26/28 Very toxic: danger of very serious irreversible effects through inhalation and if swallowed.
- R 39/27/28 Very toxic: danger of very serious irreversible effects in contact with skin and if swallowed.
- R 39/26/27/28 Very toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

- R 40/20 Harmful: possible risk of irreversible effects through inhalation.
- R 40/21 Harmful: possible risk of irreversible effects in contact with skin.
- R 40/22 Harmful: possible risk of irreversible effects if swallowed.
- R 40/20/21 Harmful: possible risk of irreversible effects through inhalation and in contact with skin.
- R 40/20/22 Harmful: possible risk of irreversible effects through inhalation and if swallowed.
- R 40/21/22 Harmful: possible risk of irreversible effects in contact with skin and if swallowed.
- R 40/20/21/22 Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.
- R 42/43 May cause sensitization by inhalation and skin contact.
- R 48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.
- R 48/21 Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
- R 48/22 Harmful: danger of serious damage to health by prolonged exposure if swallowed.
- R 48/20/21 Harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
- R 48/20/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
- R 48/21/22 Harmful: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
- R 48/20/21/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
- R 48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- R 48/24 Toxic: danger of serious damage to health by prolonged exposure in contact with skin.
- R 48/25 Toxic: danger of serious damage to health by prolonged exposure if swallowed.
- R 48/23/24 Toxic: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
- R 48/23/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
- R 48/24/25 Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
- R 48/23/24/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

Safety Phrases

- S 1 Keep locked up.
S 2 Keep out of reach of children.
S 3 Keep in a cool place.
S 4 Keep away from living quarters.
S 5 Keep contents under... (appropriate liquid to be specified by the manufacturer).
S 6 Keep under... (inert gas to be specified by the manufacturer).
S 7 Keep container tightly closed.
S 8 Keep container dry.
S 9 Keep container in a well ventilated place.
S 12 Do not keep the container sealed.
S 13 Keep away from food, drink and animal feeding stuffs.
S 14 Keep away from ... (incompatible materials to be indicated by the manufacturer).
S 15 Keep away from heat.
S 16 Keep away from sources of ignition – No smoking.
S 17 Keep away from combustible material.
S 18 Handle and open container with care.
S 20 When using do not eat or drink.
S 21 When using do not smoke.
S 22 Do not breathe dust.
S 23 Do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer).
S 24 Avoid contact with skin.
S 25 Avoid contact with eyes.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 27 Take off immediately all contaminated clothing.
S 28 After contact with skin, wash immediately with plenty of ... (to be specified by the manufacturer).
S 29 Do not empty into drains.
S 30 Never add water to this product.
S 33 Take precautionary measures against static discharges.
S 34 Avoid shock and friction.
S 35 This material and its container must be disposed of in a safe way.
S 36 Wear suitable protective clothing.
S 37 Wear suitable gloves.
S 38 In case of insufficient ventilation, wear suitable respiratory equipment.
S 39 Wear eye/face protection.
S 40 To clean the floor and all objects contaminated by this material, use... (to be specified by the manufacturer).
S 41 In case of fire and/or explosion do not breathe fumes.
S 42 During fumigation/spraying wear suitable respiratory equipment (appropriate wording to be specified).
S 43 In case of fire, use... (indicate in the space the precise type of fire-fighting equipment. If water increases the risk, add – Never use water).
S 44 If you feel unwell, seek medical advice (show the label where possible).
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 46 If swallowed seek medical advice immediately and show this container or label.
S 47 Keep at temperature not exceeding ... °C (to be specified by the manufacturer).
S 48 Keep wetted with ... (appropriate material to be specified by the manufacturer).
S 49 Keep only in the original container.
S 50 Do not mix with ... (to be specified by the manufacturer).
S 51 Use only in well ventilated areas.
S 52 Not recommended for interior use on large surface areas.

- S 53 Avoid exposure – obtain special instructions before use.
S 54 Obtain the consent of pollution control authorities before discharging to wastewater treatment plants.
S 55 Treat using the best available techniques before discharge into drains or the aquatic environment.
S 56 Do not discharge into drains or the environment, dispose to an authorised waste collection point.
S 57 Use appropriate containment to avoid environmental contamination.
S 58 To be disposed of as hazardous waste.
S 59 Refer to manufacturer/supplier for information on recovery/recycling.
S 60 This material and/or its container must be disposed of as hazardous waste.

Combination Safety Phrases

- S 1/2 Keep locked up and out of reach of children.
S 3/7/9 Keep container tightly closed in a cool well-ventilated place.
S 3/9 Keep in a cool, well-ventilated place.
S 3/9/14 Keep in a cool, well-ventilated place away from ... (incompatible materials to be indicated by the manufacturer).
S 3/9/14/49 Keep only in the original container in a cool well-ventilated place away from ... (incompatible materials to be indicated by the manufacturer).
S 3/9/49 Keep only in the original container in a cool well-ventilated place.
S 3/14 Keep in a cool place away from ... (incompatible materials to be indicated by the manufacturer).
S 7/8 Keep container tightly closed and dry.
S 7/9 Keep container tightly closed and in well-ventilated place.
S 20/21 When using do not eat, drink or smoke.
S 24/25 Avoid contact with skin and eyes.
S 36/37 Wear suitable protective clothing and gloves.
S 36/39 Wear suitable protective clothing and eye/face protection.
S 37/39 Wear suitable gloves and eye/face protection.
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 47/49 Keep only in the original container at temperature not exceeding ... °C (to be specified by the manufacturer).

Water hazard classification

(German WGK) (WHC in Germany)

- 0 = Substances not generally harmful to water
1 = Substances slightly harmful to water
2 = Substances harmful to water
3 = Substances greatly harmful to water

Swiss toxicity classification (CH)

- 1* = Extremely toxic substances with carcinogenic, teratogenic or mutagenic potential
1 = Extremely toxic substances
2 = Very toxic substances
3 = Toxic substances
4 = Substances with possible hazard
5 = Slightly harmful substances
Frei = Non-toxic substances

Transport of Hazardous Products

Products with dangerous properties are not allowed to be dispatched by post. They are classified (depending on their mode of transport) according to one of the following transport regulations:

Road Transport ADR/SDR

European and Swiss agreement on the Transport of Dangerous Goods by Road

Rail Freight RID/RSD

European and Swiss agreement on the Transport of Dangerous Goods by Rail

Sea Freight IMDG-CODE

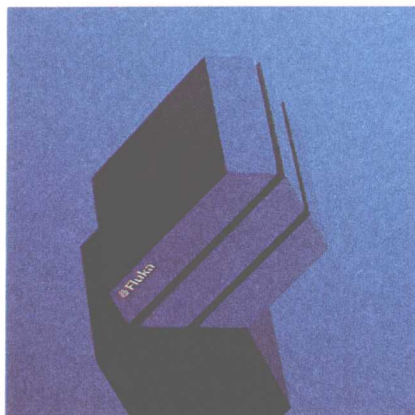
International Maritime Dangerous Goods Code

Air Freight ICAO-TI

International Civil Aviation Organisation Technical Instructions for the Safe Transport of Dangerous Goods by Air

Transport Regulations

Hazard Classification	RID/ADR/IMDG-CODE ICAO-TI
Explosives	1a or 1
Gases	2
Flammable liquids	3
Flammable solids	4.1
Spontaneously combustible	4.2
Dangerous when wet	4.3
Oxidizing agents	5.1
Organic peroxides	5.2
Poisons	6.1
Corrosives	8
Miscellaneous dangerous substances	9



>	More than	I	
<	Less than	ibid.	Ibidem
≈	Corresponds about to	(ICP-AES)	Inductively Coupled Plasma-Atomic Emission Spectroscopy
~	Approximately	(IR)	Infra-Red Spectroscopy
ϵ	Extinction Coefficient	K	
$\lambda_{\max}, \lambda_{\min}$	Wave length in nm	kg	Kilogram
μm	$10^{-3} \text{ mm} = 10^{-6} \text{ m}$	(KT)	Complexometric Titration
A		L	
A	Absorption	l	Litre
(AAS)	Atomic Absorption	Lit.	Literature
abs.	Absolute	log ϵ	Logarithm of molar extinction coefficient
ACS	American Chemical Society Specification	M	
aq	Water	m	1. as prefix milli- 2. Molality (mol/kg solvent)
ASTM	American Society for Testing and Materials	M	Molarity (mol/l solution)
asym.	Asymmetrical	mg	Milligram
(AT)	Argentometric Titration	Mn	Number-averaged molecular mass
B		Mp	Molecular mass at peak maximum
Bact.	Dye for Bacteriological Staining	ml	Millilitre
Beil.	Reference to "Beilsteins Handbuch der Org. Chemie"	mp	Melting Point
Bot.	Dye for Botanic Staining	mPa.s	mPascal · sec (viscosity)
BP	British Pharmacopoeia	Mr	Molecular mass (for elements Atomic mass)
bp	Boiling Point	Mw	Weight-averaged molecular mass
BRN	Beilstein Registry Number (for research with the Beilstein data base)	N	
C		NF	National Formulary
c	Concentration in per cent (optical rotation g/100 ml)	nm	10^{-9} metres
(CH) (CH N)	Elemental Analysis	(NMR)	Nuclear Magnetic Resonance Spectroscopy
CH-Giftkl.	Swiss toxicity classification (CH)	(NT)	Non Aqueous Titration
C.I. No.	Colour Index Number	P	
conc.	Concentrated	(PG)	Polarography
cryst.	Crystallised	pharm.	Pharmaceutical
D		Ph. Eur.	European Pharmacopoeia
DAB	Deutsches Arzneibuch	Ph. Helv.	Pharmacopoeia Helvetica
dec.	Decomposition	pH	pH-value
denat.	Denaturated	prim.	Primary
dest.	Distilled	R	
E		rac.	Racemic
EC	Enzyme Commission	red.	Reduced
ee	Enantiomeric excess	redest.	Redistilled
E (1%, 1 cm)	Absorption of 1% solution (Layer thickness 1 cm)	resubl.	Resublimated
EINECS	European Inventory of Existing Chemical Substances	(RT)	Redox Titration
(enzym.)	Enzymatic assay	RTECS	"Registry of Toxic Effects of Chemical Substances"
er	Enantiomer ratio	S	
et al.	And other collaborators	sec.	Secondary
F		sicc.	Dry
F'	Fluorides	(SDS-PAGE)	Sodium lauryl sulfate – Polyacrylamide Gel Electrophoresis
FDA	Food and Drug Administration	SN	Saponification Number
Fieser	Reference to "Reagents for Organic Synthesis"	sp	Solidification Point
Fl.	Dye for fluorescence microscopy	stab.	Stabilized
FL	Function-test by Luminescence Spectroscopy	subl.	Sublimated
Flpt.	Flash Point	sym.	Symmetrical
G		synth.	Synthetic
g	Gram	T	
(GC)	Gas Chromatography	(T)	Acidimetric Titration
(GE)	Gel Electrophoresis	tert.	Tertiary
H		TLC	Thin Layer Chromatography
h	Hour	U	
Hist.	Dye for histological staining	U	International Unit
HLB	Hydrophiles/lipophiles relation	USP	United States Pharmacopoeia
(HPLC)	High Performance Liquid Chromatography	(UV)	Ultra-Violet Spectroscopy
HV	High Vacuum	V	
		vic.	Vicinal
		Vit.	Dye for Vital Staining
		W	
		WGK	German Water Hazard Classification



D-, L-	Designation given to carbohydrates, amino acids, lipids and those compounds whose stereochemistry is derived from carbohydrates and amino acids, according to the corresponding conventions.	rac.	Is only used in the synonym for racemic lipids.
D(+)-	Specifically indicates the direction of optical rotation in addition to the D- (or L-) affix, hence providing a more accurate characterization (often in the literature only the direction of rotation is specified).	ee	Enantiomeric excess, specifies the excess of the predominant enantiomer over the racemic part in a mixture as a percentage. $ee = \frac{A-B}{A+B} \cdot 100$ A: predominant enantiomer B: its antipode
DL-	Denotes the racemate of a compound whose enantiomers have the designation D- or L-.	er	Enantiomeric ratio, specifies the proportion of both enantiomers in the product, e.g., er: (R):(S) > 99.5:0.5.
(+)- or (-)- ... D- or L-	Derivatives of compounds designated with D- or L-; the direction of rotation refers to the derivative.	ChiraSelect	Fluka ChiraSelect products have very high and guaranteed enantiomeric purity: er > 99.5:0.5
d, l	Rare designations used for compounds derived from a natural product with a positive (d-) or negative (l-) optical rotation.		
erythro-threo-	Compounds with two vicinal asymmetric centres. erythro: in the Fischer projection the two similar substituents point to the same side; threo: in the Fischer projection the two similar substituents point to different sides.		
(R), (S)-	Indicates compounds with one asymmetric centre which is systematically designated according to the CIP sequence rule procedure.		
R(+)-, S(-)-	Indicates in addition the direction of rotation.		
(aR,bR,...)-	Indicates compounds with two or more asymmetric centres, classified systematically according to the sequence rule (a and b define the positions).		
(+)-(aR,bR,...)-	Analogous with the above.		
(±)-	Indicates a racemate whose enantiomers have been designated according to the sequence rule procedure; this symbol is stated only when the (R)- and/or (S)- enantiomers are present in the catalogue.		
(+), (-)-	Some natural products have adopted this designation (e.g. camphor); the systematic nomenclature of the synonym is in accordance to the sequence rule.		
sn-	Stereospecific numbering, applied to chiral lipids (glycerol derivatives). In the Fischer projection the central hydroxyl group is positioned to the left and the C atoms are numbered 1–3 starting from above.		

1. Provisions Governing Acceptance

Fluka Chemie AG (Seller) acknowledges receipt of Buyer's order, and accepts Buyer's order expressly conditional on Buyer's assent to the terms and conditions herein contained, whether additional to or different from those contained in Buyer's purchase order or any other form or document heretofore or hereafter supplied by Buyer to Seller. Buyer will be deemed to have assented to these terms and conditions unless Seller receives written notice of any objection within 15 days after Buyer's receipt of this form and in all events prior to any delivery or other performance of Buyer's order. Seller's failure to object to provisions contained in any purchase order or any other form or document from Buyer shall not be construed as a waiver of these terms and conditions nor an acceptance of any such provision. This contract and the terms and conditions shall be governed by and construed in accordance with the laws of Switzerland.

2. Changes, Cancellation

No change by Seller of any term or condition of this contract or any of Seller's rights or remedies hereunder shall be binding on Seller, nor shall the order hereby acknowledged be cancelled or changed by Buyer, unless Seller shall expressly consent thereto in writing by Seller's authorized officer. There are no representations, agreements, promises or understandings between Buyer and Seller that are not expressed herein.

3. Delivery, Claims, Delays

Unless specified differently in writing, all sales are FCA Buchs/SG, Switzerland. Delivery of goods to the carrier at Seller's plant or other loading point, shall constitute delivery to Buyer and regardless of shipping terms, all risk of loss or damage in transit shall be borne by Buyer. 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 Buyer of Buyer's obligations to accept remaining deliveries.

Immediately upon Buyer's receipt of any goods shipped hereunder, Buyer shall inspect the same and shall notify Seller in writing of any claims for shortages, defects or damages and shall hold the goods for Seller's written instructions concerning disposition. If Buyer shall fail to so notify Seller within five days after the goods have been received by Buyer, such goods shall conclusively be deemed to conform to the terms and conditions hereof and to have been irrevocably accepted by the Buyer.

Seller shall not be liable for any loss, damage or penalty as a result of any delay in or failure to manufacture, deliver or otherwise perform hereunder due to any cause beyond Seller's reasonable control, including, without limitation, unsuccessful reactions, act of Buyer, embargo or other governmental act, regulation or request affecting the conduct of Seller's business, fire, explosion, accident, theft, vandalism, riot, acts of war, strikes or other labor difficulties, lightning, flood, windstorm or other acts of God, delay in transportation, or inability to obtain necessary labor, fuel, materials, supplies or power at current prices.

4. Allocation of Goods

If Seller is unable for any reason to supply the total demands for goods specified in Buyer's order, Seller may allocate its available supply among any or all buyers on such basis as Seller may deem fair and practical, without liability for any failure of performance which may result therefrom.

5. Payment, Reservation of Title

Our invoices are payable net on receipt of goods. No discounts or other deductions can be made, unless a credit note has been previously issued.

For orders under SF 1000.- where payment against sight-draft is required, an additional charge of SF 100.- will be made to cover bank charges. For orders under SF 2000.- where payment against Irrevocable Letter of Credit is required, the charge will be SF 250.-.

Default interest of 3% per quarter will be charged on outstanding payments as from the date of request for payment.

If Buyer defaults in any payment when due, under this or any other order, Seller, at its option without prejudice to its other lawful remedies, may defer delivery or cancel this contract.

All the goods supplied by Seller remain the property of Seller pending full payment of the purchase price, including any further incidental claims. If the supplied material is converted to a new product, Seller's reservation of title remains in effect. Buyer must immediately inform Seller in case of seizure or any other effect on Seller's reservation of title.

6. Taxes and Other Charges

Any use tax, sales tax, excise tax, duty, custom, inspection or testing fee, or any other tax, fee or charge of any nature whatsoever imposed by any governmental authority, on or measured by the transaction between Seller and Buyer shall be paid by Buyer in addition to the prices quoted or invoiced. In the event Seller is required to pay any such tax, fee or charge, Buyer shall reimburse Seller therefor; or in lieu of such payment, Buyer shall provide Seller at the time the order is submitted an exemption certificate or other document acceptable to the authority imposing the tax, fee or charge.

7. Warranties

Seller warrants that its products shall conform to the description of such products as provided in Seller's catalog, Seller's Product Information Report or other literature, if furnished to Buyer. The values stated therein are typical values which may vary slightly from batch to batch. **This warranty is exclusive, and Seller makes no other warranty, express or implied, including any implied warranty of merchantability or fitness for any particular purpose.** Seller's warranties made in connection with this sale shall not be effective if Seller has determined, in its sole discretion, that Buyer has misused the products in any manner or has failed to use the products in accordance with instructions, if any, furnished by Seller.

Seller's sole and exclusive liability and Buyer's exclusive remedy with respect to products proved to Seller's satisfaction to be defective or nonconforming shall be the replacement of such products without charge or refund of the purchase price, in Seller's sole discretion, upon the return of such products in accordance with Seller's instructions. **Seller shall not be liable for any incidental, consequential or contingent damages.**

8. Compliance with Laws, Regulations

Seller certifies that to the best of its knowledge its products are produced in compliance with applicable requirements. Seller assumes no responsibility or liability for compliance with these laws once the products leave Seller's premises. Any applicable national or international laws or regulations concerning the handling of the products, including transport, processing or trading, are to be observed by Buyer.

9. Buyer's Use of Products

Seller's products are intended primarily for laboratory research purposes and, unless otherwise indicated on the front of Seller's invoice or on product labels, are not to be used for any other purposes, including but not limited to, *in vivo* diagnostic purposes, in foods, drugs or cosmetics for humans or animals or for commercial purposes. Buyer acknowledges that the products have not been tested by Seller for safety and efficacy in food, drug, device, cosmetic, commercial or any other use, unless otherwise stated in Seller's literature furnished to Buyer. Buyer expressly represents and warrants to Seller that Buyer will properly test, use, manufacture and market any products purchased from Seller and any final articles made from them in accordance with the practices of a reasonable person who is an expert in the field and in strict compliance with all applicable food, drug, device, and cosmetic and other relevant laws and regulations, now and hereinafter enacted.

Buyer realizes, that since Seller's products are intended primarily for research purposes they may not be on the inventory for toxic substances under applicable laws regarding toxic substances. Buyer assumes responsibility to assure that products purchased from Seller are approved for use under the applicable laws regarding toxic substances.

Buyer has the responsibility to verify the hazards and to conduct any further research necessary to learn the hazards involved in using products purchased from Seller. Buyer also has the duty to warn Buyer's customers and any auxiliary personnel (such as freight handlers, etc.) of any risks involved in using or handling the products. Buyer agrees to comply with instructions, if any, furnished by Seller relating to the use of the products and not misuse the products in any manner. If the products purchased from Seller are to be repackaged, relabeled or used as starting materials or components of other products, Buyer will verify Seller's assay of the products. No products purchased from Seller shall be considered to be foods, drugs, cosmetics, or devices.

Buyer agrees to indemnify and hold Seller harmless from and against any and all losses, damages and expenses (including attorney's fees and other costs of defending any action) that Seller may sustain or incur as a result of any claim of negligence, breach of implied warranty, strict liability in tort or other theory of law, by Buyer, its officers, agents or employees, its successors and assigns, and its customers, whether direct or indirect, in connection with the use of Seller's products, or by reason of Buyer's failure to perform the obligations herein contained. Buyer shall notify Seller within 15 days of Buyer's receipt of knowledge of any accident involving Seller's products resulting in personal injury or damage to property, and Buyer shall fully cooperate with Seller in the investigation and determination of the cause of such accident and shall make available to Seller all statements, reports and tests made by Buyer or made available to Buyer by others. The furnishing of such information to Seller and any investigation by Seller shall not constitute an assumption of any liability by Seller.

10. Patent Disclaimer

Seller does not warrant that the use or sale of the products delivered hereunder will not infringe the claims of any patents covering the product itself or the use thereof in combination with other products or in the operation of any process.

11. Returns

Goods may not be returned for credit except with Seller's permission in written form, and then only in strict compliance with specified legal transport requirements and Seller's return shipment instructions.

12. Technical Assistance

At Buyer's request, Seller may furnish technical assistance and information with respect to Seller's products. Unless otherwise agreed, all such technical assistance and information will be provided gratis, and Buyer assumes sole responsibility for results obtained in reliance thereon. Seller makes no warranties of any kind or nature with respect to technical assistance or information provided by it. Any suggestions by Seller regarding use, application or suitability of the products shall not be construed as an express warranty unless expressly designated as such in writing signed by Seller.

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Trimethylbromosilane, TMBS [Bromotrimethylsilane; Trimethylsilyl bromide](CH₃)₃BrSi C₃H₉BrSi Mr 153.10 [2857-97-8] BRN... EINECS: 220 67 20purum; >97% (Br); stab. with silver wool; bp 77-80°; d₄²⁰ 1.183; n_D²⁰ 1.424 1 l ≈ 1.18 kg

Powerful silylating agent: L. Aringer, et al., *Steroids* 17, 377 (1971); *ibid.* 18, 381 (1971); S.J. Gaskell, et al., *Biomed. Mass. Spectrom.* 2, 148 (1975); H.H. Hergott, G. Simchen, *Liebigs Ann. Chem.* 1781 (1980); Review: A.H. Schmidt, *Chem.-Ztg.* 104, 253 (1980); E.W. Colvin, "Silicon in Organic Synthesis" (1981), Butterworths; W.P. Weber, "Silicon Reagents for Organic Synthesis" (1983), Springer; For the preparation of alkyl and aryl bromides: H. Ku., J.R. Barrio, *J. Org. Chem.* 46, 5239 (1981); H.R. Kricheldorf, et al., *Synthesis* 383 (1981); J.W. Gillard, M. Israel, *Tetrahedron Lett.* 22, 513 (1981); Mild cleavage of ethers: E.C. Friedrich, G. DeLucca, *J. Org. Chem.* 48, 1678 (1983); S. Hanessian, et al., *Tetrahedron Lett.* 25, 2515 (1984)

Merck Index 11, ..., Beil. 4, IV, 4008, Fieser 9, 73, 10, 59

R: 10-34-37; S: 26-28; F: 10-21

RTECS... RID/ADR 8/37 b 25° CH-Giftkl. 5 WGK 1

- ① Synonyms
- ② Usual Abbreviations
- ③ Product Name
- ④ Extended Formula
- ⑤ Empirical Formula
- ⑥ Molecular Mass
- ⑦ CAS-No. (Chemical Abstract Registry Number)
- ⑧ BRN: Beilstein Registry Number; for research with the Beilstein data base
- ⑨ EINECS: European Inventory of Existing Chemical Substances
- ⑩ Product Number (please state product number when ordering)
- ⑪ Storage Temperature
- ⑫ Purity Grade (description see page 4)
- ⑬ Literature references about applications etc.
- ⑭ Merck Index reference to "The Merck Index"
e.g. Merck Index 11, 453 — Index
volume
- ⑮ Beilstein reference to "Beilsteins Handbuch der Organischen Chemie"
e.g. Beil. 4, IV, 4008 — page
supplement
volume
- ⑯ Fieser reference to "Reagents for Organic Synthesis", L.F. Fieser & M. Fieser
e.g. Fieser 9, 73, 10, 59 — page (regarding the example, this page refers to volume 10)
volume
page
volume
- ⑰ F phrases: Information on properties and handling (see page 8)
- ⑱ Hazard Symbols (acc. EEC-directions; see page 9)
- ⑲ RTECS-No. ["Registry of Toxic Effects of Chemical Substances", NIOSH (National Institute for Occupational Safety and Health)]
- ⑳ Risks and Safety Phrases R: Nature of the special risks attaching to dangerous substances (see page 10)
S: Safety advice concerning dangerous chemical substances (see page 11)
- ㉑ RID/ADR – European agreement on the international transport of dangerous goods on the road (see also page 11)
- ㉒ Flash Point in °C
- ㉓ CH-Giftkl.: Swiss toxicity classification (CH)
- ㉔ WGK: German water hazard classification