

Introduction

The list contained in this brochure has been produced to facilitate the identification of some scheduled chemicals of particular interest because of their trade or their use.

This is a preliminary list for information purposes only. It is based on information from declarations submitted by States Parties and from open sources.

Information on commercial applications and industrial uses was gathered from a variety of open sources but of course it does not cover all possible applications.

We hope it will be useful for identifying declarable activities and as a general reference.

The list covers 8 different topics:

- ▶ **Chemical names and synonyms:** Lists the most common chemical names and synonyms used to identify the same chemical. IUPAC name is indicated.
- ▶ **CAS RN:** A CAS Registry Number is a numeric identifier. It can contain up to 9 digits, divided by hyphens into 3 parts. Each CAS Registry Number designate only one substance with a unique numeric identifier.
- ▶ **Schedule:** Identifies toxic chemicals and their precursors with 3 digits and a letter as stated in the Convention's Annex on Chemicals for the application of verification measures.
 - The first digit identifies the schedule list 1, 2 or 3.

→ The letter A means a Toxic chemical that can be used as a chemical weapon.

→ The letter B means a Precursor.

→ The last two digits identify the serial number of the chemical in the schedule list. For example: 2A01 identifies a scheduled 2 toxic chemical with the serial number 1 in the schedule list, which is known as Amiton.

▶ **HS Code:** Is the International Harmonized System nomenclature recommendation of the World Customs Organization as of 18 June 1996 (Amended 25 June 1999).

▶ **Molecular formula:** Gives the total number of atoms contained in the chemical.

▶ **Chemical structure:** Is the graphic representation of the chemical.

▶ **Commercial applications/Industrial uses:** Compiles some commercial applications and industrial uses collected from a variety of open sources.

The Technical Secretariat would be grateful for further relevant information, and for any comments on the list including notification of errors.

Declarations Branch, OPCW

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This edition has been issued in August 2005

A SELECTION OF GENERALLY USED OR TRADED SCHEDULED CHEMICALS (Sorted by CAS)

Chemical name: Sulfur monochloride

CAS RN: 10025-67-9

Schedule: 3B12

HS Code: 2812.10

Molecular formula: S₂Cl₂

Synonyms: Disulfur dichloride (IUPAC name)

Thiosulfurous dichloride

Sulphur chloride (mono)

Sulfur subchloride

Sulfur monochloride

Sulfur monochloride

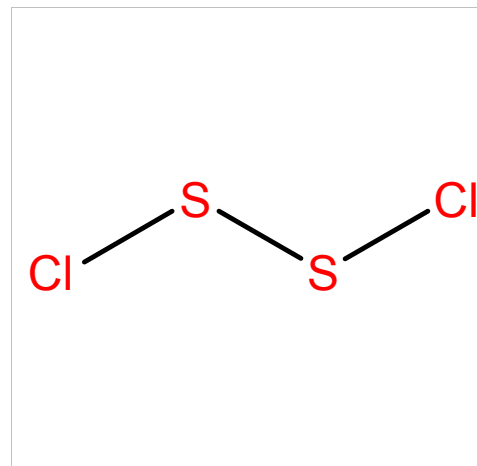
Sulfur chloride

Dichlorodisulfane

Chlorosulfane

Chloride of sulfur

Chemical structure:



Commercial applications/Industrial uses

Used in the production of many chemical products, mainly in the manufacture of vulcanising agents for rubber, lubricant additives, gum erasers, rubber additives, rubber substitutes, sulfur dyes, antioxidants, pesticides, herbicides, insecticides, pharmaceuticals, paper and textile auxiliaries, plastics, and in the synthesis of various organic chemicals. The principle commercial uses of this chemical are in the manufacture of lubricant additives and vulcanising agent for rubber.

Chemical name: Phosphorous oxychloride

CAS RN: 10025-87-3

Schedule: 3B05 **HS Code:** 2812.10

Molecular formula: POCl_3

Synonyms: Phosphoric trichloride (IUPAC name)

Trichlorophosphorus oxide

Trichlorophosphine oxide

Phosphoryl trichloride

Phosphoryl chloride

Phosphorus trichloride oxide

Phosphorus oxytrichloride

Phosphorus oxychloride

Phosphorus oxide trichloride

Phosphorus monoxide trichloride

Phosphorus chloride oxide

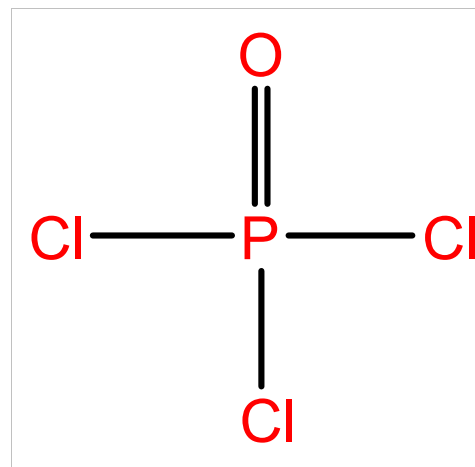
Phosphoroxytrichloride

Phosphoroxychloride

Phosphoric chloride

Phosphonyl trichloride

Chemical structure:



Commercial applications/Industrial uses

Precursor for pesticides, catalyst and reactant. Used to manufacture alkyl and aryl orthophosphate tri-esters, which are used in the production of: hydraulic fluids; plastic and elastomer additives; flame retardant; oil stabilisers; pesticides; medicinal intermediates; metal extraction solvents.

Chemical name: Phosphorous pentachloride

CAS RN: 10026-13-8

Schedule: 3B07

HS Code: 2812.10

Molecular formula: PCl_5

Synonyms: Pentachlorophosphorane (IUPAC name)

Phosphorus(V) chloride

Phosphorus perchloride

Phosphorus pentachloride

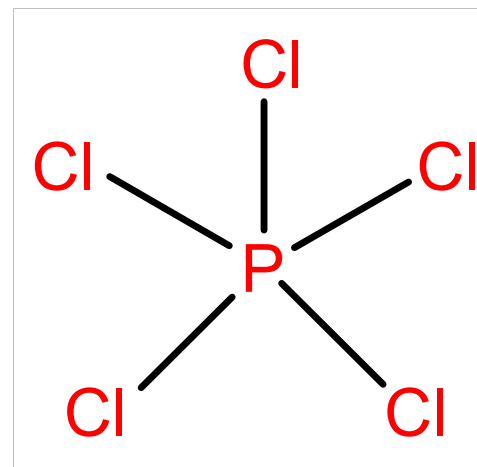
Phosphorus chloride

Phosphoric chloride

Pentachlorophosphorus

Pentachlorophosphorane

Chemical structure:



Commercial applications/Industrial uses

Used as a dehydrating agent for the synthesis of a variety of inorganic and organic phosphorous derivatives, water treatment chemicals, flame-retardants, plasticizers, and stabilizers for plastic elastomers, lube oil and paint additives. Used in the pharmaceutical industry in the manufacture of penicillin and cephalosporin antibiotics. In aluminium metallurgy, it is used as a grain refiner for Al-Si alloys and as a grain structure improver in metal casting.

Chemical name: 2-(N,N-Diethylamino)ethanethiol

CAS RN: 100-38-9

Schedule: 2B12

HS Code: 2930.90

Molecular formula: C₆H₁₅NS

Synonyms: 2-(Diethylamino)ethanethiol (IUPAC name)

N,N-Diethylaminoethane-2-thiol

2-N,N-(Diethylamino)ethanethiol

Diethyl(2-mercaptoethyl)amine

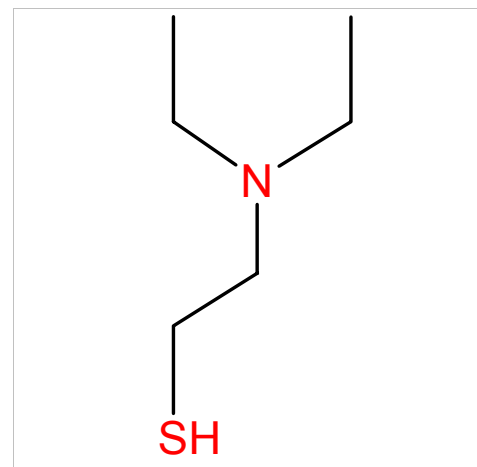
N,N-Diethylcysteamine

Diethylcysteamine

2-(Diethylamino)ethyl mercaptan

2-(Diethylamino)ethyl hydrosulfide

Chemical structure:



Commercial applications/Industrial uses

Production of THS, an antibiotic used for veterinarian application. Raw material for the synthesis of Tiamulin Base

Chemical name: Triethanolamine

CAS RN: 102-71-6

Schedule: 3B17

HS Code: 2922.13

Molecular formula: C₆H₁₅NO₃

Synonyms: 2,2',2''-Nitrilotriethanol (IUPAC name)

Trolamine

Tris(beta-hydroxyethyl)amine

Triethanolamin

TEOA

TEA (amino alcohol)

TEA

Sting-Kill

Sterolamide

2,2',2''-Nitrilotris[ethanol]

Nitrilotriethanol

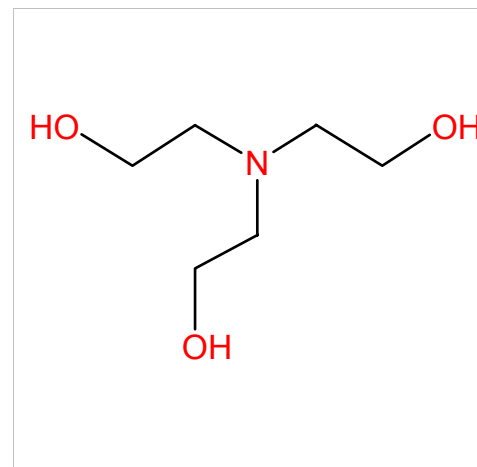
tris-(2-Hydroxyethyl)amine

Daltogen

Alkanolamine 244

Tris(2-hydroxyethyl)amine

Chemical structure:



Commercial applications/Industrial uses

Production of: emulsifiers, detergents, textile and leather chemicals, drilling and cutting oils (impregnating materials), medicinal soaps and high-quality cosmetics and toiletries, agricultural products, pharmaceuticals. Production of cleaners: all-purpose cleaners, cleaners that involve skin contact because of the mildness of this chemical, waterless hand cleaners. Production of wax formulations: cream waxes and polishes used for furniture, floors and automotive car wax. Production of cement and concrete: milling additive. Production of adhesives. Application in coatings technology: metal coating preparations, glass coating (shatter proofing, anti-frosting, anti-fogging and-dirt resistant films on glass and plastics), accelerator for photo -polymerisation coating (improves thermal properties and reduces cracking in prepared wire coatings). Application as corrosion inhibitor, used in gas purification processes, metal working, mining, petroleum and coal, polymers, textiles, pigment dispersion, pesticides and herbicides.

Chemical name: Sulfur dichloride

CAS RN: 10545-99-0

Schedule: 3B13

HS Code: 2812.10

Molecular formula: SCl_2

Synonyms: Sulfur dichloride (IUPAC name)

Sulfur dichloride (SCl_2)

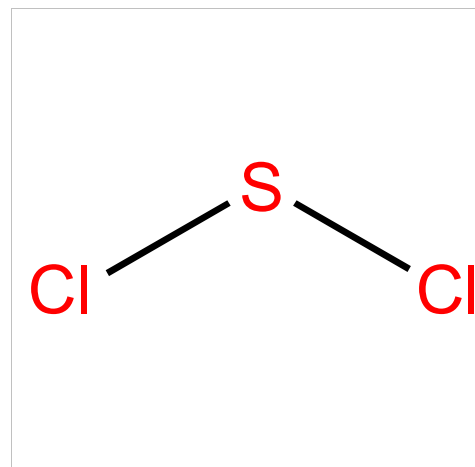
Sulfur chloride

Monosulfur dichloride

Dichlorosulfane

Chlorine sulfide (Cl_2S)

Chemical structure:



Commercial applications/Industrial uses

Uses are similar to that of sulfur monochloride. Lubricating oil additives of types similar to those produced using Sulfur monochloride are a significant application for Sulfur dichloride. Also useful in the rapid vulcanisation of rubber, and the cross-linking ability of Sulfur dichloride is also utilized to modify drying oils for varnishes and inks. Used to make an insecticide intermediate (4,4' -thiobisphenol), and is also an ingredient in the production of the fungicide captafol (Difolatan). Used as a chlorinating agent in the manufacture of parathion insecticide intermediates. Is also used in the food industry in the purification of sugar juices.

Chemical name: Methyldiethanolamine

CAS RN: 105-59-9

Schedule: 3B16

HS Code: 2922.19

Molecular formula: C₅H₁₃NO₂

Synonyms: 2,2'-(Methylimino)diethanol (IUPAC name)

N-Methyliminodiethanol

Methyliminodiethanol

N-Methyldiethanolamine

Methyldiethanolamine

Methylbis(2-hydroxyethyl)amine

N-Methylaminodiglycol

MDEA

N-(2-Hydroxyethyl)-N-methylethanolamine

Eve

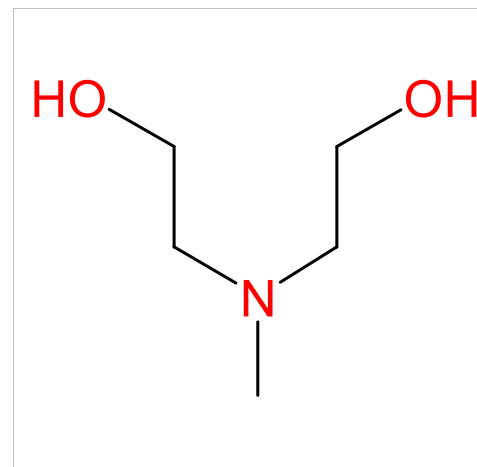
Ethanol, 2,2'-(methylimino)di-

Diethanolmethylamine

N,N-Bis(2-hydroxyethyl)methylamine

N-methyl-2,2'-iminodiethanol

Chemical structure:



Commercial applications/Industrial uses

Treatment of natural gas (removal of acidic components); photographic chemicals; pharmaceutical precursor.

Chemical name: Bis(2-hydroxyethyl)sulfide

CAS RN: 111-48-8

Schedule: 2B13

HS Code: 2930.90

Molecular formula: C₄H₁₀O₂S

Synonyms: 2,2'-Thiodiethanol (IUPAC name)

Kromfax Solvent

Bis(β -hydroxyethyl) sulfide

Bis(2-hydroxyethyl) sulfide

Bis(2-hydroxyethyl) thioether

Diethanol sulfide

β,β' -Dihydroxydiethyl sulfide

Di(2-hydroxyethyl) sulfide

Thiodiglycol

Ethanol, 2,2'-thiodi-

2,2'-Thiodiglycol

Tedegyl

3-Thiapentane-1,5-diol

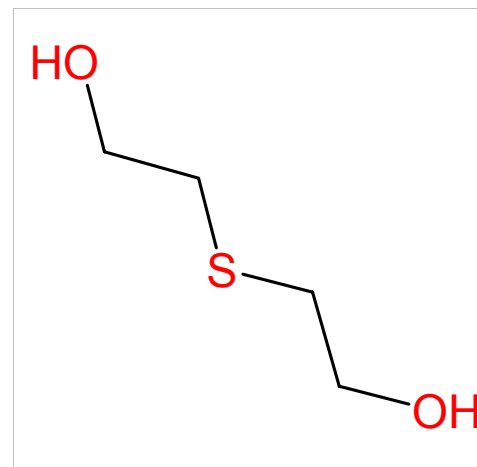
2,2'-Thiobisethanol

Thiodiethylene glycol

β -Thiodiglycol

β,β' -Dihydroxyethyl sulfide

Chemical structure:



Commercial applications/Industrial uses

Textile industry (textile printing and fabric softener); solvents; cosmetics; anti-arthritis drugs; plastics; elastomers; lubricants; stabilizers; antioxidants; inks; dyes; photographic; copying; antistatic agent; epoxides; coating; automotive enamels; metal plating.

Chemical name: Trimethyl phosphite

CAS RN: 121-45-9

Schedule: 3B08

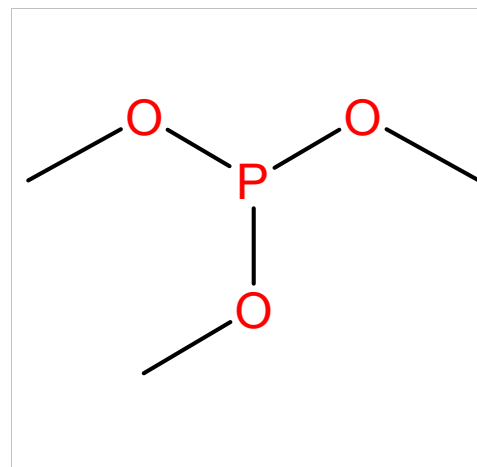
HS Code: 2920.90

Molecular formula: C₃H₉O₃P

Synonyms: Trimethyl phosphite (IUPAC name)

Trimethoxyphosphine

Chemical structure:



Commercial applications/Industrial uses

Key intermediate in the manufacture of phosphatic pesticides. Is also used as a stabilizer for PVC neoprene and as a raw material in the production of fire resistant and fire retardant materials. Also used as a plasticizer in nylons, as a catalyst in polymerization reaction, and as reagent in organic synthesis. Further uses include: dyestuffs, optical brighteners, plasticizers and lubricants.

Chemical name: Triethyl phosphite

CAS RN: 122-52-1

Schedule: 3B09

HS Code: 2920.90

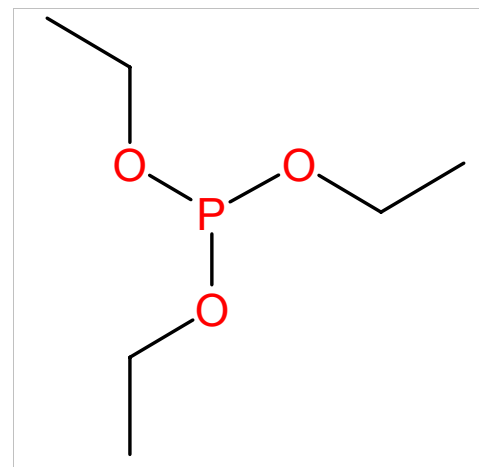
Molecular formula: C₆H₁₅O₃P

Synonyms: Triethyl phosphite (IUPAC name)

Tris(ethoxy)phosphine

Triethoxyphosphine

Chemical structure:



Commercial applications/Industrial uses

Is used in the manufacture of flame-retardants for rigid polyurethane foam, fluorescent whitening agents, insecticides, and active ingredients for pharmaceuticals (e.g. penicillin). Organic synthesis, plasticizers, lubricant additives. Is converted into insecticidal vinyl esters of phosphoric acid. The long-chained compounds are mainly used as antioxidants for plastics. Is widely used as organophosphorus reagent.

Chemical name: Ethyldiethanolamine

CAS RN: 139-87-7

Schedule: 3B15

HS Code: 2922.19

Molecular formula: C₆H₁₅NO₂

Synonyms: 2,2'-(Ethylimino)diethanol (IUPAC name)

N-Ethyl-2,2'-iminodiethanol

N-Ethyldiethanolamine

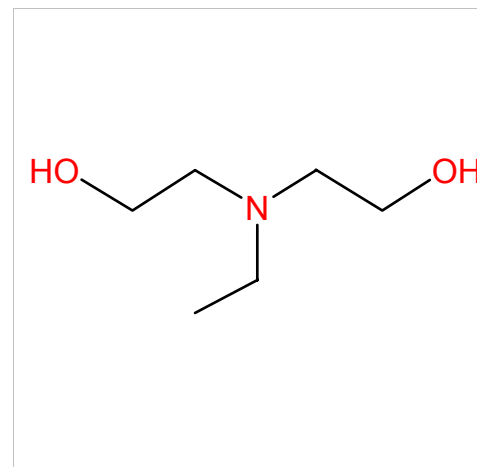
Ethylbis(2-hydroxyethyl)amine

Ethanol, 2,2'-(ethylimino)di-

Diethanoethylamine

N,N-Bis(2-hydroxyethyl)ethylamine

Chemical structure:



Commercial applications/Industrial uses

Used in pharmaceutical, agricultural, textile, detergent, cosmetic and metallurgic industries. Used mainly as intermediates, especially in the production of pharmaceuticals, crop protection agents and flocculants. Also important in the preparation of chemicals for the paper and leather industries. Use in the production of plastics has risen substantially in recent years. Direct uses include gas purification methods for removing acidic gases.

Chemical name: Mixture of CAS RN 41203-81-0 and CAS RN 42595-45-9

CAS RN: 170836-68-7

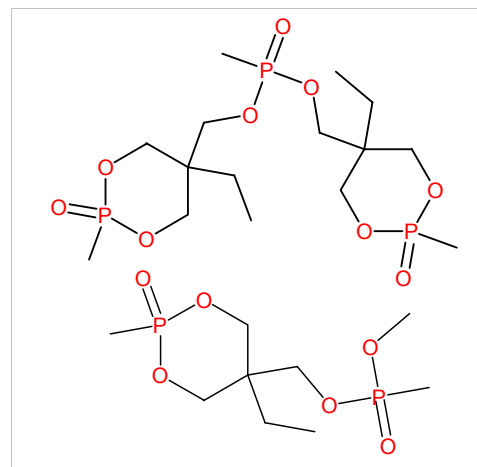
Schedule: 2B04

HS Code: 3824.90

Molecular formula: C₁₅H₃₁O₉P₃.C₉H₂₀O₆P₂

Synonyms:

Chemical structure:



Commercial applications/Industrial uses

Mixture of CAS 41203-81-0 and CAS 42595-45-9 (cyclic phosphonate esters). Used as a durable flame retardant for polyester fabrics and it is also used in textile coating applications.

Chemical name: Phosphonic acid, methyl-, polyglycol ester

CAS RN: 294675-51-7

Schedule: 2B04

HS Code: 2931.00

Molecular formula: Unspecified

Synonyms:

Chemical structure:

Phosphorus Polyol

Structural Formula
Unspecified

Commercial applications/Industrial uses

Flame retardant in the manufacture of special quality polyurethane foams

Chemical name: Saxitoxin

CAS RN: 35523-89-8

Schedule: 1A07

HS Code: 3002.90

Molecular formula: C₁₀H₁₇N₇O₄

Synonyms: [(4R)-10,10-dihydroxy-2,6-diiminooctahydro-1H,8H-pyrrolo[1,2-c]purin-4-yl]methyl carbamate (IUPAC name)

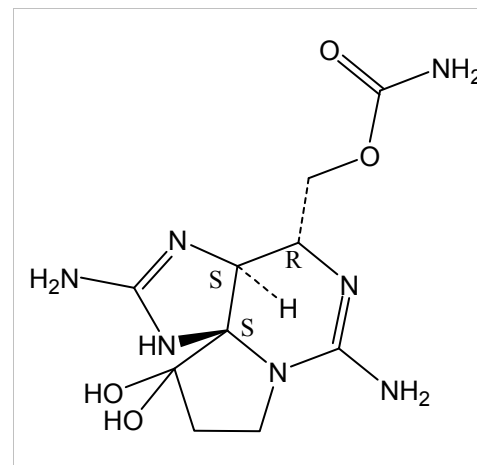
STX

Saxitoxin hydrate

(+)-Saxitoxin

Saxitoxin

Chemical structure:



Commercial applications/Industrial uses

Small quantities used for medical purposes(Paralytic Shellfish Poisoning)

NOT COMMONLY TRADED

Chemical name: 1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)-1-propene

CAS RN: 382-21-8

Schedule: 2A02

HS Code: 2903.30

Molecular formula: C₄F₈

Synonyms: 1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)prop-1-ene
(IUPAC name)

Propene, pentafluoro-2-(trifluoromethyl)-

Perfluoro-2-(trifluoromethyl)propene

Perfluoro-2-methylpropene

Perfluoroisobutylene

Perfluoroisobutene

1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)propene

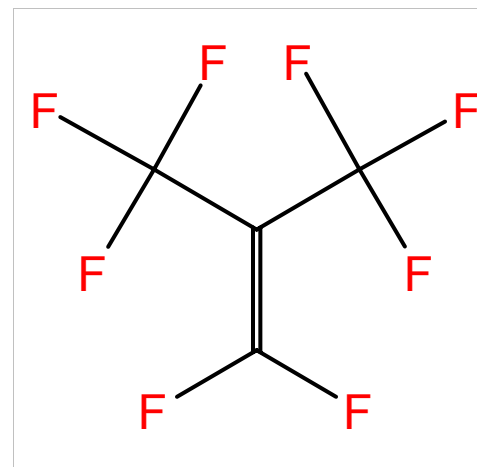
Octafluoroisobutylene

Octafluoroisobutene

1,1-Difluoro-2,2-bis(trifluoromethyl)ethene

PFIB

Chemical structure:



Commercial applications/Industrial uses

By product of fluoro-polymers manufacture and perfluoroacetone

NOT COMMONLY TRADED

Chemical name: Phosphonic acid, methyl-, (5-ethyl-2-methyl-2-oxido-1,3,2-dioxaphosphorinan-5-yl) methyl methyl ester

CAS RN: 41203-81-0

Schedule: 2B04

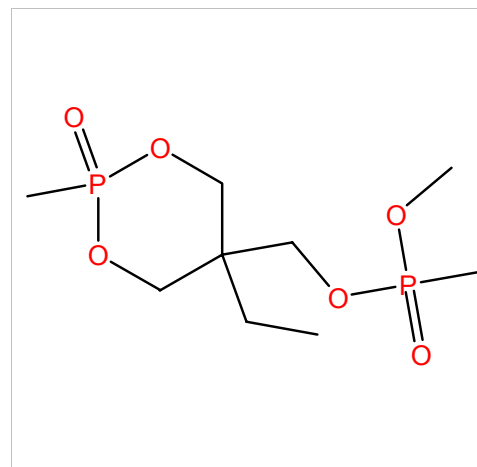
HS Code: 2931.00

Molecular formula: C₉H₂₀O₆P₂

Synonyms: (5-ethyl-2-methyl-2-oxido-1,3,2-dioxaphosphinan-5-yl)methyl methyl methylphosphonate (IUPAC name)

Phosphonothioic acid, methyl-, (5-ethyl-2-methyl-1,3,2-dioxaphosphorinan-5-yl) methyl methyl ester, P-oxide

Chemical structure:



Commercial applications/Industrial uses

Used as a durable flame retardant.

Chemical name: Phosphonic acid, methyl-, bis[(5-ethyl-2-methyl-2-oxido-1,3,2-dioxaphosphorinan-5-yl)methyl] ester

CAS RN: 42595-45-9

Schedule: 2B04

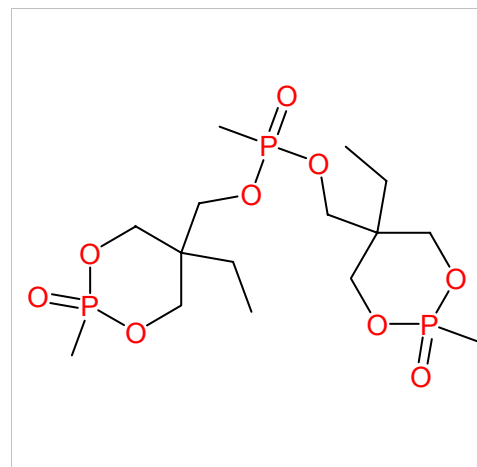
HS Code: 2931.00

Molecular formula: C₁₅H₃₁O₉P₃

Synonyms: bis[(5-ethyl-2-methyl-2-oxido-1,3,2-dioxaphosphorinan-5-yl)methyl] methylposphonate (IUPAC name)

Phosphonic acid, methyl-, bis[(5-ethyl-2-methyl-1,3,2-dioxaphosphorinan-5-yl)methyl] ester,P,P'-dioxide

Chemical structure:



Commercial applications/Industrial uses

Flame retardant

Chemical name: 2-(N,N-Diisopropylamino)ethyl chloride hydrochloride

CAS RN: 4261-68-1

Schedule: 2B10

HS Code: 2921.19

Molecular formula: C₈H₁₈ClN.HCl

Synonyms: N-(2-Chloroethyl)-N-isopropylpropan-2-aminium chloride (IUPAC name)

N,N-Diisopropylaminoethyl-2-chloride hydrochloride

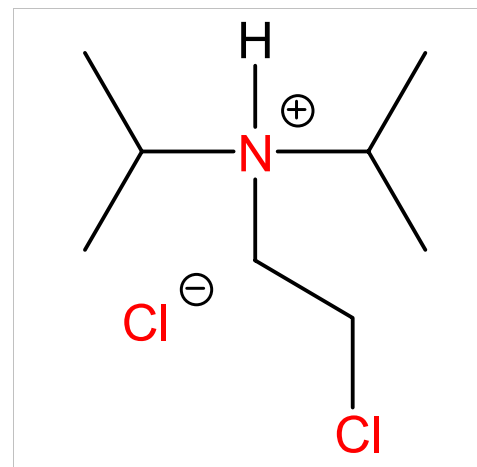
Triethylamine, 2''-chloro-1,1'-dimethyl-, hydrochloride

2-(Diisopropylamino)ethyl chloride hydrochloride

(β-Chloroethyl)diisopropylamine hydrochloride

N-(2-Chloroethyl)diisopropylamine hydrochloride

Chemical structure:



Commercial applications/Industrial uses

Pharmaceuticals: Anticancer flavanone analog preparation.

Chemical name: 2-(N,N-Dimethylamino)ethyl chloride hydrochloride

CAS RN: 4584-46-7

Schedule: 2B10

HS Code: 2921.19

Molecular formula: C₄H₁₀ClN.HCl

Synonyms: 2-Chloro-N,N-dimethylethanaminium chloride
(IUPAC name)

2-Chloroethyl dimethyl ammonium chloride

1-Chloro-2-(dimethylamino)ethane hydrochloride

2-Chloro-N,N-dimethylethanamine hydrochloride

2-Chloro-N,N-dimethylethylamine hydrochloride

Chloroethyldimethylamine hydrochloride

N-(2-Chloroethyl)dimethylamine hydrochloride

(β-Chloroethyl)dimethylamine-hydrochloride

(2-Chloroethyl)dimethylamine hydrochloride

Chloro(dimethylamino)ethane hydrochloride

N-(2-Chloroethyl)-N,N-dimethylammonium chloride

N,N-Dimethylaminoethyl-2-chloride hydrochloride

2-(Dimethylamino)chloroethane hydrochloride

Dimethylaminoethyl chloride hydrochloride

β-Dimethylaminoethyl chloride hydrochloride

2-(Dimethylamino)ethyl chloride hydrochloride

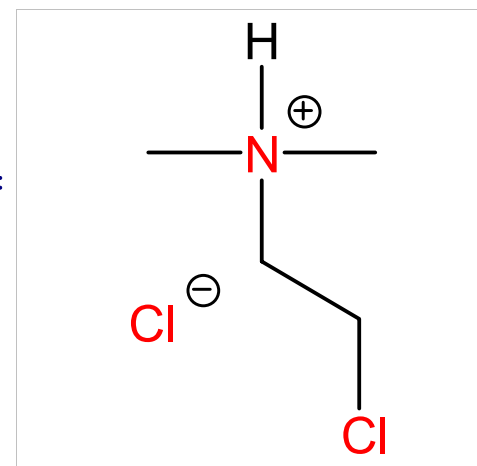
N,N-Dimethyl-N-(2-chloroethyl)amine hydrochloride

N,N-Dimethyl-2-chloroethylamine hydrochloride

Ethylamine, 2-chloro-N,N-dimethyl-, hydrochloride

2-Chloroethyldimethylamine monohydrochloride

Chemical structure:



Commercial applications/Industrial uses

Pharmaceuticals; speciality surfactants; flocculants; agricultural chemicals. Pharmaceutical: Pyrrolopyridine preparation, antiinflammatory. Production of Diltiazem. Consumed for the manufacturing of Brompheniramine maleate(Antihistaminic), Chlorphenoxamine HCl(Anticholinergic), Doxilamine sucoinate(Antihistaminic), Orphenadrine hydrochloride(Muscle relaxant), Orphenadrine citrate(Muscle relaxant), Phenyltoloxamine citrate(Antihistaminic), Chloropiramine hydrochloride.

Chemical name: Cyanogen chloride

CAS RN: 506-77-4

Schedule: 3A02

HS Code: 2851.00

Molecular formula: CNCl

Synonyms: Cyanogen chloride (IUPAC name)

Cyanochloride

Chlorocyanogen

Chlorocyanide

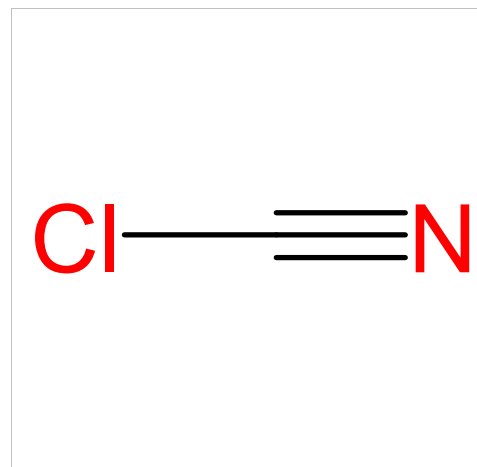
Chlorocyanide

Chlorocyan

Chlorine cyanide

Chlorine cyanide

Chemical structure:



Commercial applications/Industrial uses

Chemical synthesis. In metal cleaners, ore refining, production of triazine herbicides (e.g. Atrazine) and insecticides (e.g. Menazon), optical brighteners, dyestuffs and synthetic rubber. Production of diphenylguanidine

Chemical name: Butyl methylphosphinate

CAS RN: 6172-80-1

Schedule: 2B04

HS Code: 2931.00

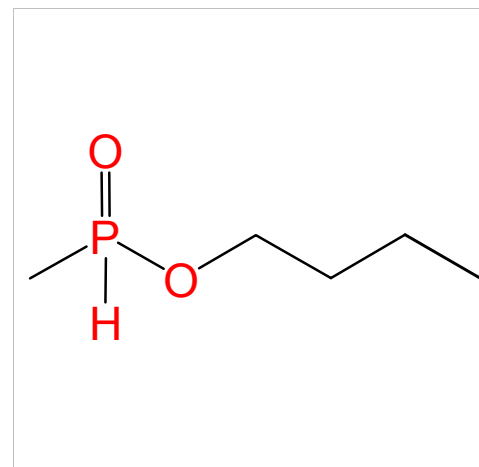
Molecular formula: C₅H₁₃O₂P

Synonyms: Butyl methylphosphinate (IUPAC name)

Butyl methanephosphinite

Butyl methanephosphinate

Chemical structure:



Commercial applications/Industrial uses

Raw material for herbicides

Chemical name: 3-Quinuclidinyl benzilate

CAS RN: 6581-06-2

Schedule: 2A03

HS Code: 2933.39

Molecular formula: C₂₁H₂₃NO₃

Synonyms: 1-Azabicyclo[2.2.2]oct-3-yl hydroxy(diphenyl)acetate (IUPAC name)

Ro 2-3308

β-Quinuclidinyl benzilate

3-Quinuclidinol, benzilate (ester)

3-Quinuclidinol benzilate

QNB

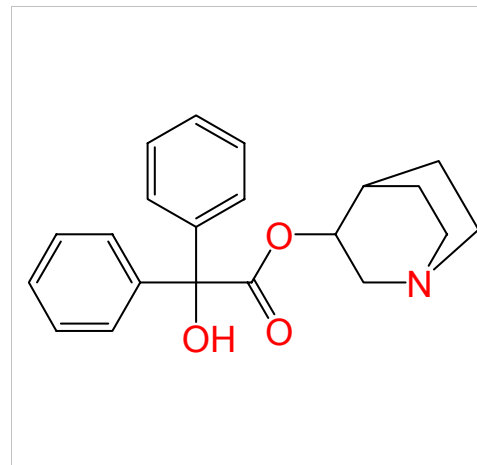
3-Oxyquinuclidine benzilate

3-Hydroxyquinuclidine benzilate

Benzilic acid, 3-quinuclidinyl ester

BZ

Chemical structure:



Commercial applications/Industrial uses

Intermediate in the manufacture of pharmaceutical clidinium bromide, which is a co-ingredient with chlordiazepoxide in anticholinergic preparations

NOT COMMONLY TRADED

Chemical name: Methylphosphonous dichloride

CAS RN: 676-83-5

Schedule: 2B04

HS Code: 2931.00

Molecular formula: CH₃Cl₂P

Synonyms: Methylphosphonous dichloride (IUPAC name)

Phosphine, dichloromethyl-

Methylphosphorus dichloride

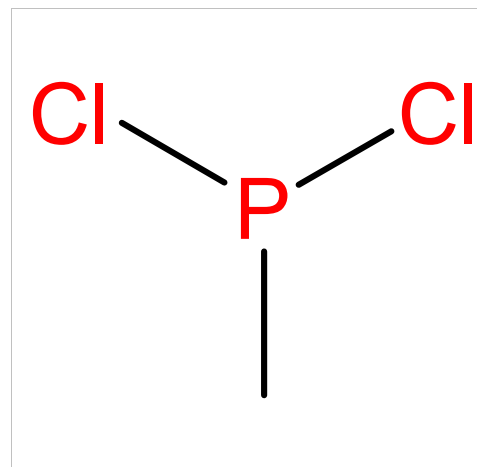
Methylphosphinous dichloride

Methylphosphinic dichloride

Methyldichlorophosphine

Dichloromethylphosphine

Chemical structure:



Commercial applications/Industrial uses

Used in the production of methyl phosphinic acid. Can be used in synthesis due to reactivity of P-Cl bond as well as trivalent phosphorous itself

Chemical name: Methylphosphonic dichloride

CAS RN: 676-97-1

Schedule: 2B04

HS Code: 2931.00

Molecular formula: CH₃Cl₂OP

Synonyms: Methylphosphonic dichloride (IUPAC name)

DC

Methylphosphonyl dichloride

Methylphosphonyl chloride

Methylphosphonodichloridic acid

Methylphosphonic acid dichloride

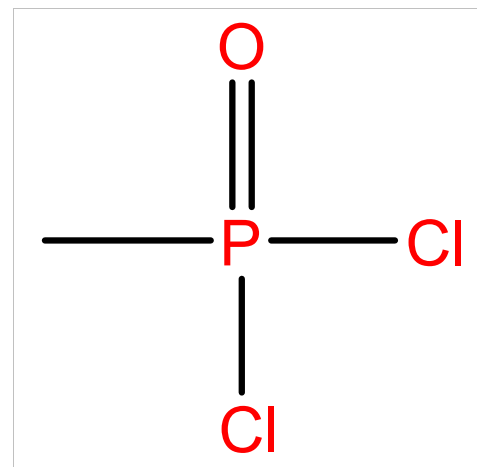
Methanephosphonyl dichloride

Methanephosphonyl chloride

Methanephosphonodichloridic acid

Dichloromethylphosphine oxide

Chemical structure:



Commercial applications/Industrial uses

Chlorinating agent, chemical intermediate.

Raw material to produce Phosdiol-A and Phospolyol-2, hydroxilated esters of methyl phosphonic acid in oligomeric forms used as fire retardants in self-extinguish mixtures in aircraft industry

Chemical name: 2,4,6-Tripropyl-1,3,5,2,4,6-trioxatriphosphinane 2,4,6-trioxide

CAS RN: 68957-94-8

Schedule: 2B04

HS Code: 2931.00

Molecular formula: C₉H₂₁O₆P₃

Synonyms: 2,4,6-Tripropyl-1,3,5,2,4,6-trioxatriphosphinane 2,4,6-trioxide (IUPAC name)

Propylphosphonic anhydride

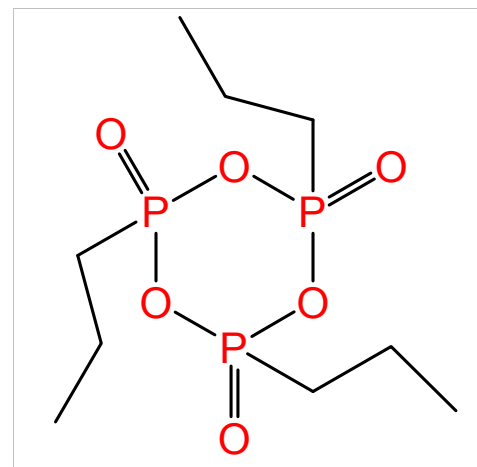
n-Propylphosphonic cyclic anhydride

Propylphosphonic anhydride

1-Propanephosphonic acid cyclic anhydride, 50% in ethyl acetate

1-Propanephosphonic acid cyclic anhydride

Chemical structure:



Commercial applications/Industrial uses

Paper industry, Pharmaceutical industry, Plastics and synthetic resin industries. Peptide synthesis, Flame retardants, Paper making auxiliaries.

Chemical name: Mixture of Dimethyl methylphosphonate, Oxirane and Phosphorus oxide(P2O5)

CAS RN: 70715-06-9

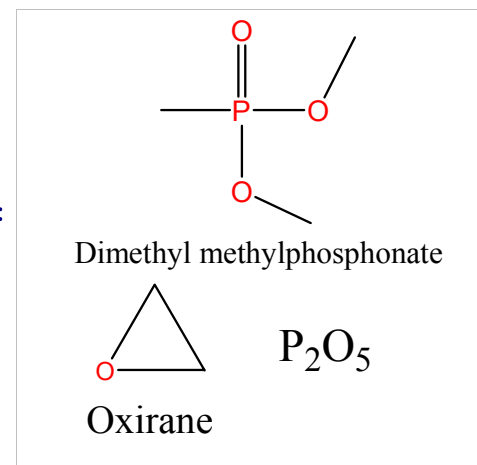
Schedule: 2B04 **HS Code:** 3824.90

Molecular formula: (C3H9O3P.C2H4
O.O5P2)X

Synonyms: Phosphorus oxide, polymer with dimethyl methylphosphonate and oxirane

Dimethyl methylphosphonate, polymer with phosphorus pentoxide and ethylene oxide

Chemical structure:



Commercial applications/Industrial uses

Mixture which is used as a durable flame retardant
Components:

Phosphorus Pentoxide(P2O5), Dimethyl methylphosphonate and Oxirane

Chemical name: Hydrogen cyanide

CAS RN: 74-90-8

Schedule: 3A03

HS Code: 2811.19

Molecular formula: HCN

Synonyms: Nitrilomethane (IUPAC name)

Prussic acid

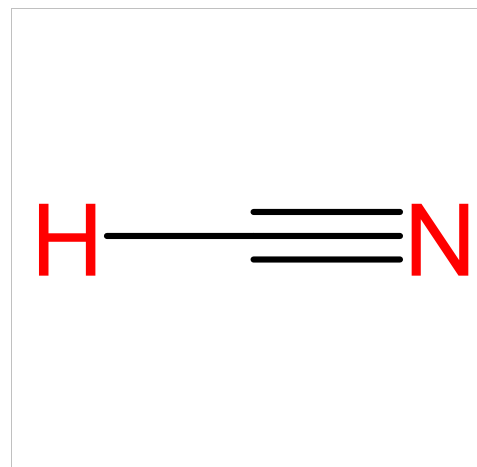
Formonitrile

Formic anammonide

Evercyn

Carbon hydride nitride (CHN)

Chemical structure:



Commercial applications/Industrial uses

Manufacturing of metal polishes, acrylates, cyanide salts, dyes, rodenticides, pesticides, synthetic fibers, plastics, and electroplating solutions. Used in metallurgical and photographic processes, and to produce cyanuric acid. Used as a starting material for nylon 66. Used to fumigate ships and warehouses, and in ore-extracting processes. It is an intermediate for methyl methacrylate, sodium cyanide, aminopolycarboxylic and acid chelating agents, and a raw material for nitriloacids.

Chemical name: Carbonyl dichloride

CAS RN: 75-44-5

Schedule: 3A01

HS Code: 2812.10

Molecular formula: CCl₂O

Synonyms: Carbonyl dichloride (IUPAC name)

Phosgene

Phosgen

Dichloroformaldehyde

Chloroformyl chloride

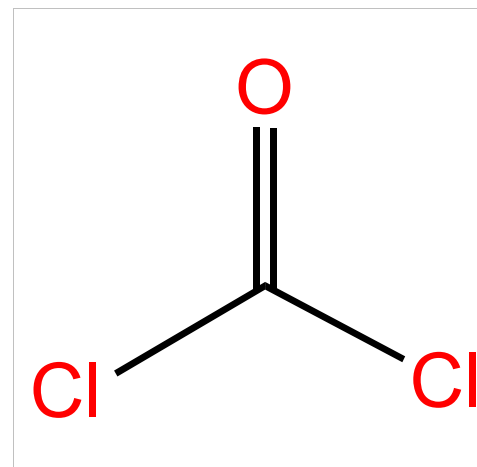
CG

Carbonyl chloride

Carbon oxychloride

Carbon dichloride oxide

Chemical structure:



Commercial applications/Industrial uses

Production of intermediates and products in many branches of large-scale industrial chemistry. Production of di-isocyanates as starting materials of polyurethane chemistry. Polycarbonate resins, Polyurethane coatings. Cholinergic medicines. Chloroformates. The reaction of phosgene with alcohols to form chloroformic esters is very important for industrial applications. These esters are exceptionally versatile intermediates for the production of, for example, carbonic esters, as well as for many other applications (e.g. used in the pharmaceutical industry and in the production of carbamate insecticides). In inorganic chemistry, phosgene is used as an intermediate for the large-scale production of aluminium chloride.

Chemical name: Dimethyl methylphosphonate

CAS RN: 756-79-6

Schedule: 2B04

HS Code: 2931.00

Molecular formula: C₃H₉O₃PS

Synonyms: Dimethyl methylphosphonate (IUPAC name)

Methylphosphonic acid dimethyl ester

Methanephosphonic acid dimethyl ester

Metaran

Fyrol DMMP

Furan TF 2000

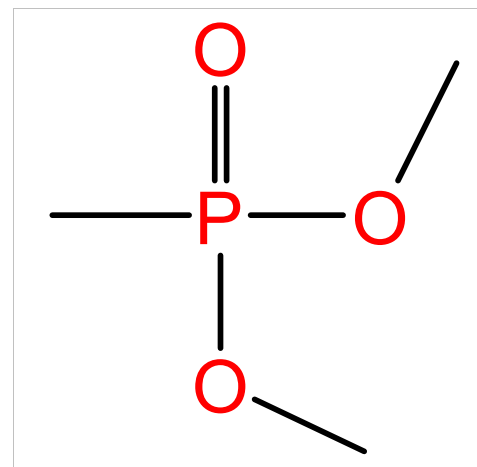
DMMP

O,O-Dimethyl methylphosphonate

Dimethyl methanephosphonate

Dimethoxymethyl phosphine oxide

Chemical structure:



Commercial applications/Industrial uses

Flame retardant for resins, with application in: building materials, furnishings; transportation equipment and fittings; electrical industry (cables, housing); upholstery; lubricant additive.

Chemical name: Trichloronitromethane

CAS RN: 76-06-2

Schedule: 3A04

HS Code: 2904.90

Molecular formula: CCl₃NO₂

Synonyms: Trichloro(nitro)methane (IUPAC name)

PS

Picfume

Nitrotrichloromethane

Nitrochloroform

Microlysin

Larvacide

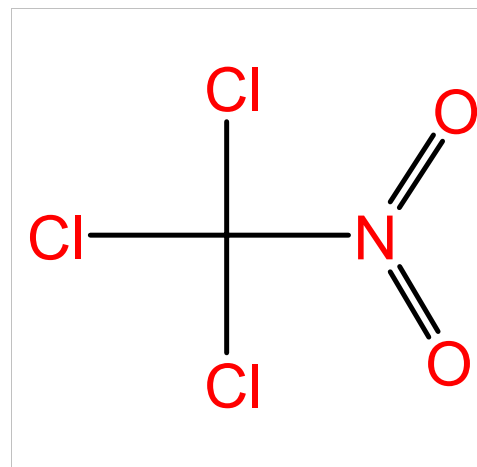
G 25

Chlorpicrin

Chloropicrin

Acquinite

Chemical structure:



Commercial applications/Industrial uses

Mainly used as a soil disinfectant for control of nematodes, soil insects, soil fungi and weed seeds. Is also used for fumigation of stored grain to control insects and rodents, and for glass houses and mushroom house fumigation. Often used in combination with methyl bromide and other fumigants. Is used as a tear gas because of its lachrymatory properties. Is used in the chemical industry as a raw material in organic synthesis, i.e. in manufacturing dyes.

Chemical name: Diethyl phosphite

CAS RN: 762-04-9

Schedule: 3B11

HS Code: 2920.90

Molecular formula: C₄H₁₁O₃P

Synonyms: Diethyl hydrogen phosphite (IUPAC name)

Hydrogen diethyl phosphite

Diethyl phosphonate

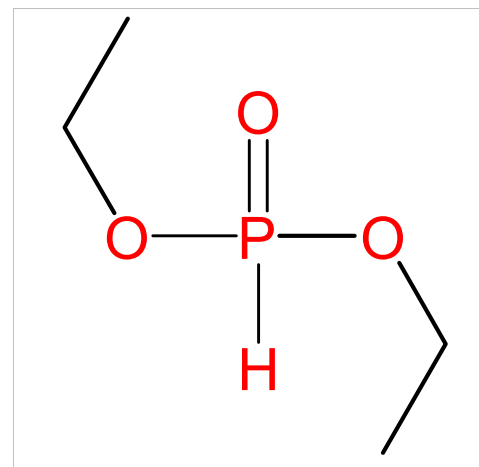
Diethyl hydrogen phosphite

Diethyl acid phosphite

Diethoxyphosphine oxide

CGI 1700

Chemical structure:



Commercial applications/Industrial uses

Used as a paint solvent, lubricant additive, antioxidant for plastics, reducing agent, intermediate in flame retardants (e.g. in the manufacture of rigid polyurethane foams), and crop protection agents (insecticides), and as a phosphorylating agent. It is a reactive intermediate for use in organic synthesis.

Chemical name: 2,2-Diphenyl-2-hydroxyacetic acid

CAS RN: 76-93-7

Schedule: 2B08

HS Code: 2918.19

Molecular formula: C₁₄H₁₂O₃

Synonyms: 2,2-Diphenyl-2-hydroxyacetic acid (IUPAC name)

α -Hydroxy- α -phenylbenzeneacetic acid

2-Hydroxy-2,2-diphenylacetic acid

α -Hydroxy-2,2-diphenylacetic acid

α -Hydroxydiphenylacetic acid

Hydroxydiphenylacetic acid

2,2-Diphenyl-2-hydroxyacetic acid

α,α -Diphenyl- α -hydroxyacetic acid

Diphenylhydroxyacetic acid

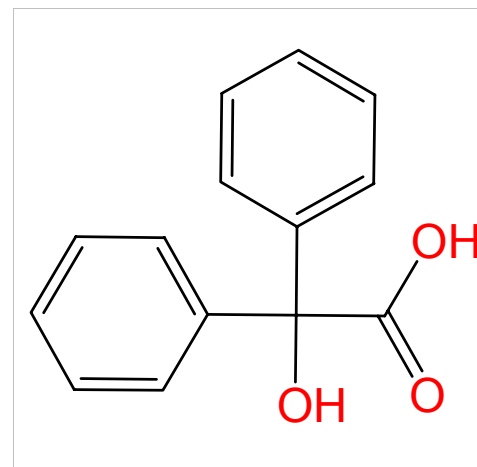
α,α -Diphenylglycolic acid

Diphenylglycolic acid

Benzilic acid

Hydroxy(diphenyl)acetic acid

Chemical structure:



Commercial applications/Industrial uses

Commercial use comes under the broad spectrum of organic synthesis, especially as an intermediate in preparation of pharmaceuticals. Precursor in the manufacture of BZ. Pharmaceuticals: treatment of urinary incontinence and their preparation, anticholinergics, antidepressants, antispasmodic drug, bronchodilator. Dyestuff industry. Aluminium benzilic acid is an ingredient of the toner. Acaricides. Preparation of Clinidinium bromide used in treatment of peptic ulcers.

Chemical name: Thionyl chloride

CAS RN: 7719-09-7

Schedule: 3B14

HS Code: 2812.10

Molecular formula: Cl₂OS

Synonyms: Thionyl dichloride (IUPAC name)

Thionyl chloride (SOCl₂)

Sulfur oxychloride (SOCl₂)

Sulfur oxychloride

Sulfurous oxychloride

Sulfurous dichloride

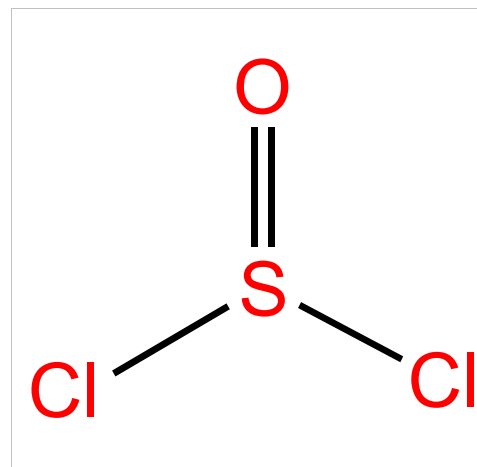
Sulfur chloride oxide (S₂Cl₂O)

Sulfur chloride oxide (Cl₂SO)

Sulfinyl dichloride

Sulfinyl chloride

Chemical structure:



Commercial applications/Industrial uses

One of the most important chlorinating agents in organic chemistry. Application in the production of: crop-protection agents (herbicides and insecticides); pharmaceuticals (drugs and vitamins); dyes; paper and textile auxiliaries.

Chemical name: Phosphorous trichloride

CAS RN: 7719-12-2

Schedule: 3B06

HS Code: 2812.10

Molecular formula: PCl_3

Synonyms: Phosphorous trichloride (IUPAC name)

Trichlorophosphine

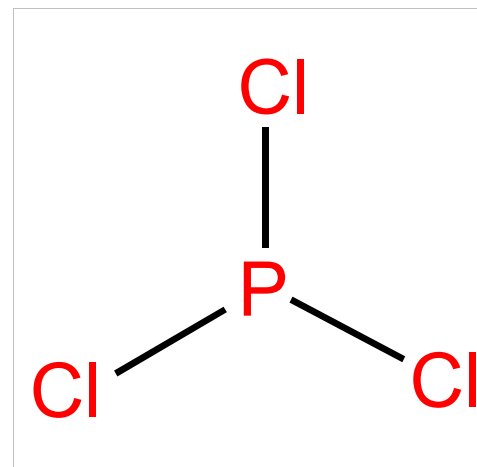
Phosphorus chloride (PCl_3)

Phosphorus chloride (Cl_3P)

Phosphorous chloride

Phosphine, trichloro-

Chemical structure:



Commercial applications/Industrial uses

Used as chlorinating agents and catalyst. Starting material in production of organophosphorus and inorganic compounds: phosphoryl chloride, phosphorus pentachloride, phosphonic acid. Reacts with pure oxygen to produce an important intermediate used for the production of: synthetic colourants; pharmaceutical products; organic phosphates (insecticides, fire-retardants, plasticisers, metal extraction solvents).

Chemical name: Diethyl ethylphosphonate

CAS RN: 78-38-6

Schedule: 2B04

HS Code: 2931.00

Molecular formula: C₆H₁₅O₃P

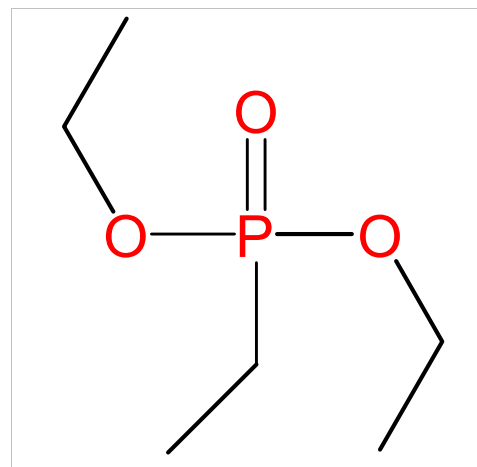
Synonyms: Diethyl ethylphosphonate (IUPAC name)

Diethyl ethanephosphonate

Diethoxyethylphosphine oxide

Amgard V 490

Chemical structure:



Commercial applications/Industrial uses

Gasoline additive; raw material for insecticides; flame-proofing agent; stabiliser and antioxidant for plastics.

Chemical name: O,O-Diethyl S-2-diethylaminoethyl phosphorothiolate

CAS RN: 78-53-5

Schedule: 2A01

HS Code: 2930.90

Molecular formula: C₁₀H₂₄NO₃PS

Synonyms: O,O-Diethyl S-2-diethylaminoethyl phosphorothioate
(IUPAC name)

R 5158

Metramac

Inferno

DSDP

O,O-Diethyl S-2-diethylaminoethyl phosphorothioate

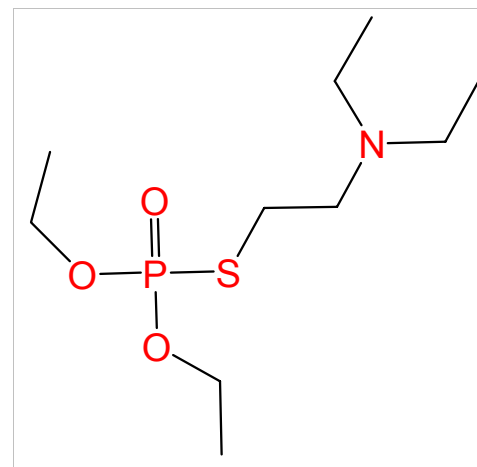
O,O-Diethyl S-2-diethylaminoethyl phosphorothiolate

S-(Diethylaminoethyl) O,O-diethyl phosphorothioate

Amiton

S-[2-(diethylamino)ethyl] O,O-diethyl thiophosphate

Chemical structure:



Commercial applications/Industrial uses

Insecticide

NOT COMMONLY TRADED

Chemical name: Mixture: 50% Methylphosphonic acid / 50% (Aminoiminomethyl)urea

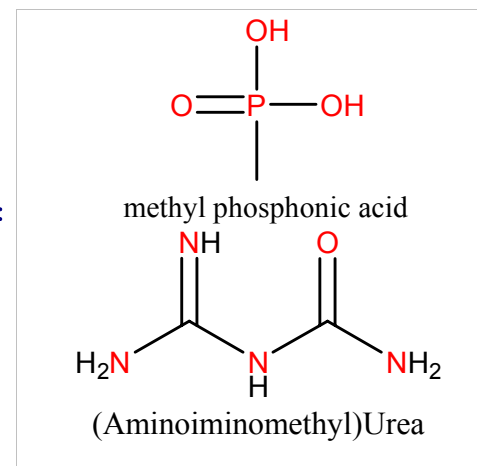
CAS RN: 84402-58-4

Schedule: 2B04 **HS Code:** 3824.90

Molecular formula: C₂H₆N₄O₃.CH₅O
3P

Synonyms: Methylphosphonic acid compound with (aminoiminomethyl)urea (1:1)

Chemical structure:



Commercial applications/Industrial uses

Flame retardant (specifically for polyesters, polyurethane foams).

Cleaning agents and emulsifiers, textile improvers, anticorrosion agents, fabrics.

Chemical name: Sodium 3-(trihydroxysilyl)propyl methylphosphonate

CAS RN: 84962-98-1

Schedule: 2B04

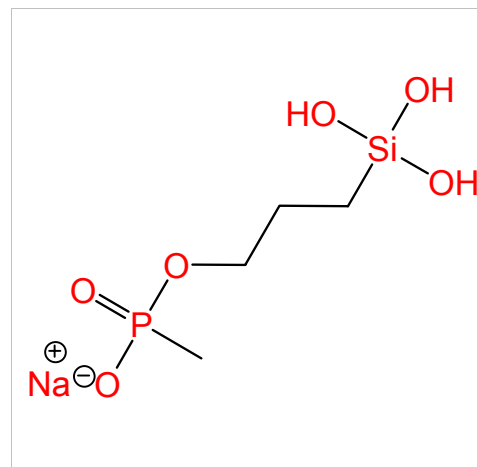
HS Code: 2931.00

Molecular formula: C₄H₁₂O₆PSi.Na

Synonyms: Sodium 3-(trihydroxysilyl)propyl methylphosphonate
(IUPAC name)

Methylphosphonic acid mono[3-
(trihydroxysilyl)propyl] ester, monosodium salt

Chemical structure:



Commercial applications/Industrial uses

Antifreeze additive

Chemical name: Dimethyl phosphite

CAS RN: 868-85-9

Schedule: 3B10

HS Code: 2920.90

Molecular formula: C₂H₇O₃P

Synonyms: Dimethyl hydrogen phosphite (IUPAC name)

Methyl phosphonate ((MeO)₂HPO)

Hydrogen dimethyl phosphite

Dimethyl phosphonate

Dimethyl hydrogen phosphonate

Dimethyl hydrogen phosphite

Dimethyl acid phosphite

Dimethoxyphosphine oxide

NCI-C54773

Dimethylfosfonat

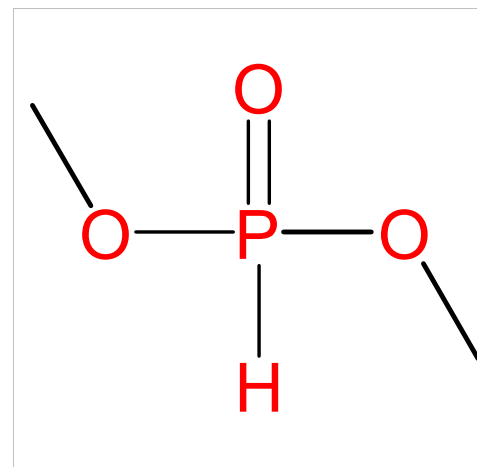
Dimethylfosfit

Phosphorous acid dimethyl ester

O,O-Dimethyl phosphonate

Dimethylester kyseliny fosforite

Chemical structure:



Commercial applications/Industrial uses

Main areas of application are in the production of phosphonic acid derivatives, insecticides, and plastic additives. Is required in the manufacture of phosphonates. Is applied in the manufacture of crop protection agents and flame-retardants, e.g. for textile fibers. Organic synthesis: lubricant additive.

Chemical name: 2-(N,N-Diethylamino)ethyl chloride hydrochloride

CAS RN: 869-24-9

Schedule: 2B10

HS Code: 2921.19

Molecular formula: C₆H₁₄ClN.HCl

Synonyms: 2-Chloro-N,N-diethylethanaminium chloride (IUPAC name)

2-(Diethylamino)ethyl chloride hydrochloric acid salt

2-Chloro-N,N-diethylethylamine hydrochloride

N-(2-Chloroethyl)diethylamine hydrochloride

β-Chloroethyldiethylamine hydrochloride

2-Chloroethyl-N,N-diethylamine hydrochloride

(2-Chloroethyl)diethylamine monohydrochloride

2-Chloroethyldiethylammonium chloride

1-Chloro-2-(diethylamino)ethane hydrochloride

2-Chlorotriethylamine hydrochloride

N,N-Diethylaminoethyl chloride hydrochloride

β-(Diethylamino)ethyl chloride hydrochloride

2-(Diethylamino)ethyl chloride hydrochloride

2-(N,N-Diethylamino)ethyl chloride hydrochloride

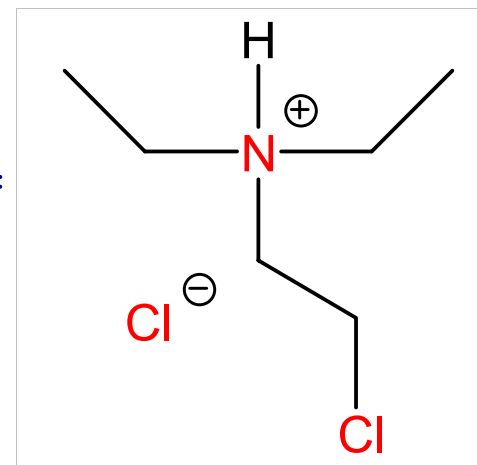
N,N-Diethyl-β-chloroethylamine hydrochloride

N,N-Diethyl-2-chloroethylamine hydrochloride

Triethylamine, 2-chloro-, hydrochloride

N-2-Chloroethyl-N,N-diethylammonium hydrochloride

Chemical structure:



Commercial applications/Industrial uses

Gasoline additive; application in the removal of acids from solutions. Production of cationic modified starch. Manufacture of a pharmaceutical product DEAE-Dextran, active ingredient for a cardiovascular medicament.

Manufacture of Tiamulin derivatives for veterinarian purposes.

Manufacture of Nafronil Oxalate and Drofenine hydrochloride

Chemical name: 2-(N,N-Diisopropylamino)ethanol

CAS RN: 96-80-0

Schedule: 2B11

HS Code: 2922.19

Molecular formula: C₈H₁₉NO

Synonyms: 2-Diisopropylaminoethanol (IUPAC name)

N,N-Diisopropylaminoethane-2-ol

Ethanol, 2-(diisopropylamino)-

N,N-Diisopropylethanolamine

2-(Diisopropylamino)ethyl alcohol

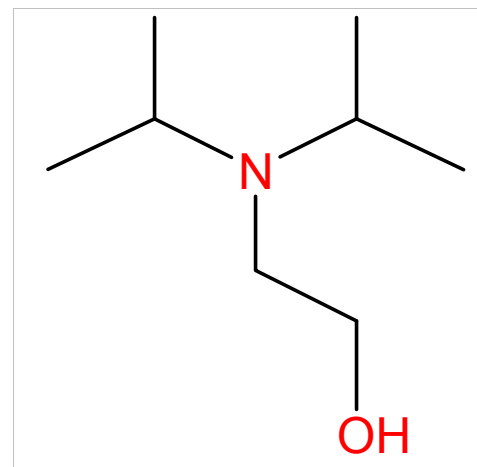
2-(Diisopropylamino)ethanol

N,N-Diisopropyl-2-aminoethanol

(N,N-Diisopropylamino)ethanol

2-diisopropylaminoethanol

Chemical structure:



Commercial applications/Industrial uses

Pharmaceuticals: Benzamide preparation; treatment digestive tract disorder

Chemicals by Schedule

| <i>Schedule</i> | <i>CAS</i> | <i>IUPAC name</i> |
|-----------------|-------------|---|
| 1A07 | 35523-89-8 | Saxitoxin |
| 2A01 | 78-53-5 | O,O-Diethyl S-2-diethylaminoethyl phosphorothiolate |
| 2A02 | 382-21-8 | 1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)-1-propene |
| 2A03 | 6581-06-2 | 3-Quinuclidinyl benzilate |
| 2B04 | 170836-68-7 | Mixture of CAS RN 41203-81-0 and CAS RN 42595-45-9 |
| 2B04 | 294675-51-7 | Phosphonic acid, methyl-, polyglycol ester |
| 2B04 | 41203-81-0 | Phosphonic acid, methyl-, (5-ethyl-2-methyl-2-oxido-1,3,2-dioxaphosphorinan-5-yl) methyl methyl ester |
| 2B04 | 42595-45-9 | Phosphonic acid, methyl-, bis[(5-ethyl-2-methyl-2-oxido-1,3,2-dioxaphosphorinan-5-yl)methyl] ester |
| 2B04 | 6172-80-1 | Butyl methylphosphinate |
| 2B04 | 676-83-5 | Methylphosphonous dichloride |
| 2B04 | 676-97-1 | Methylphosphonic dichloride |
| 2B04 | 68957-94-8 | 2,4,6-Tripropyl-1,3,5,2,4,6-trioxatriphosphinane 2,4,6-trioxide |
| 2B04 | 70715-06-9 | Mixture of Dimethyl methylphosphonate, Oxirane and Phosphorus oxide(P2O5) |
| 2B04 | 756-79-6 | Dimethyl methylphosphonate |
| 2B04 | 78-38-6 | Diethyl ethylphosphonate |
| 2B04 | 84402-58-4 | Mixture: 50% Methylphosphonic acid / 50% (Aminoiminomethyl)urea |
| 2B04 | 84962-98-1 | Sodium 3-(trihydroxysilyl)propyl methylphosphonate |
| 2B08 | 76-93-7 | 2,2-Diphenyl-2-hydroxyacetic acid |

| <i>Schedule</i> | <i>CAS</i> | <i>IUPAC name</i> |
|-----------------|------------|--|
| 2B10 | 4261-68-1 | 2-(N,N-Diisopropylamino)ethyl chloride hydrochloride |
| 2B10 | 4584-46-7 | 2-(N,N-Dimethylamino)ethyl chloride hydrochloride |
| 2B10 | 869-24-9 | 2-(N,N-Diethylamino)ethyl chloride hydrochloride |
| 2B11 | 96-80-0 | 2-(N,N-Diisopropylamino)ethanol |
| 2B12 | 100-38-9 | 2-(N,N-Diethylamino)ethanethiol |
| 2B13 | 111-48-8 | Bis(2-hydroxyethyl)sulfide |
| 3A01 | 75-44-5 | Carbonyl dichloride |
| 3A02 | 506-77-4 | Cyanogen chloride |
| 3A03 | 74-90-8 | Hydrogen cyanide |
| 3A04 | 76-06-2 | Trichloronitromethane |
| 3B05 | 10025-87-3 | Phosphorous oxychloride |
| 3B06 | 7719-12-2 | Phosphorous trichloride |
| 3B07 | 10026-13-8 | Phosphorous pentachloride |
| 3B08 | 121-45-9 | Trimethyl phosphite |
| 3B09 | 122-52-1 | Triethyl phosphite |
| 3B10 | 868-85-9 | Dimethyl phosphite |
| 3B11 | 762-04-9 | Diethyl phosphite |
| 3B12 | 10025-67-9 | Sulfur monochloride |
| 3B13 | 10545-99-0 | Sulfur dichloride |
| 3B14 | 7719-09-7 | Thionyl chloride |
| 3B15 | 139-87-7 | Ethyldiethanolamine |

| <i>Schedule</i> | <i>CAS</i> | <i>IUPAC name</i> |
|-----------------|------------|----------------------|
| 3B16 | 105-59-9 | Methyldiethanolamine |
| 3B17 | 102-71-6 | Triethanolamine |