OCEAN NETWORK EMERGENCY PHONE 1-800-OLIN-911

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SEC. I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT.

1. PRODUCT IDENTIFICATION

REVISION NO : 7
REVISION DATE : 3/16/90
PRODUCT CODE : CPE897655
FILE NUMBER : CPE00380.0001
PRODUCT NAME: SODIUM SILICOFLUORIDE
SYNONYMS: Sodium fluorosilicate, sodium hexafluorosilicate
CHEMICAL FAMILY: Inorganic fluoride
FORMULA: Na$_2$SiF$_6$
USE DESCRIPTION: Insecticide, glass manufacture, fluoridation of potable water, plus many others
OSHA HAZARD CLASSIFICATION: Toxic, skin irritant, irritant or corrosive to eyes, kidney toxin, nervous system toxin, lung toxin

II. COMPONENT DATA

PRODUCT COMPOSITION
CAS or CHEMICAL NAME: Sodium silicofluoride
CAS NUMBER: 16893-85-9
PERCENTAGE RANGE: 98-100
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS: None Established

CAS or CHEMICAL NAME: Water
CAS NUMBER: 7732-18-5
PERCENTAGE RANGE: 0-0.5
HAZARDOUS PER 29 CFR 1910.1200: No
EXPOSURE STANDARDS: None Established

III. PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY. AVOID CONTACT WITH SKIN, EYES AND CLOTHING. UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER.
STORAGE CONDITIONS:
DO NOT STORE AT TEMPERATURES ABOVE: 52 Deg.C (125 Deg.F)

PRODUCT STABILITY AND COMPATIBILITY
SHelf LIFE LIMITATIONS: Two years
INCOMPATIBLE MATERIALS FOR PACKAGING: Glass
INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT: Strong acids

IV. PHYSICAL DATA

APPEARANCE: White solid
MELTING POINT: None
BOILING POINT: None
DECOMPOSITION TEMPERATURE: 500 Deg.C (932 Deg.F)
SPECIFIC GRAVITY: 2.68
DENSITY: 2.68 (g/cc)
pH @ 25 DEG.C: Not Applicable
VAPOR PRESSURE @ 25 DEG.C: Not Applicable
SOLUBILITY IN WATER: 0.76 g/100 g at 25 Deg.C (77 Deg.F)
VOLATILES, PERCENT BY VOLUME: Not Applicable
EVAPORATION RATE: Not Applicable
VAPOR DENSITY: Not Applicable
MOLECULAR WEIGHT: 188.05
ODOR: None
COEFFICIENT OF OIL/WATER DISTRIBUTION: No Data

V. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:
RESPIRATORY PROTECTION: Wear a NIOSH/MSHA approved high efficiency particulate (HEPA) filter respirator.

VENTILATION: Use local exhaust ventilation to minimize employee exposure.

SKIN PROTECTIVE EQUIPMENT: Wear gloves, boots, chemical goggles, aprons or impermeable suit to avoid skin and eye contact.

OTHER: Eye wash and safety showers should be made available in the immediate work area.

EQUIPMENT SPECIFICATIONS (WHEN APPLICABLE)
RESPIRATOR TYPE: NIOSH/MSHA approved high efficiency particulate (HEPA) filter respirator
PROTECTIVE CLOTHING TYPE (This includes: gloves, boots, apron, protective suit): Impermeable
VI. FIRE AND EXPLOSION HAZARD INFORMATION

FLAMMABILITY DATA:
FLAMMABLE: No
COMBUSTIBLE: No
PYROPHORIC: No
FLASH POINT: Not Applicable
AUTOIGNITION TEMPERATURE: Not Applicable
FLAMMABLE LIMITS AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE (PERCENT VOLUME IN AIR): LEL - Not Applicable UEL - Not Applicable

NFPA RATINGS: Not Established

HHIS RATINGS:
Health: 3
Flammability: 0
Reactivity: 0

EXTINGUISHING MEDIA: Not Applicable-Choose extinguishing media suitable for surrounding materials.

FIRE FIGHTING TECHNIQUES AND COMMENTS: Use water to cool containers exposed to fire. See Section XI for protective equipment for fire fighting.

VII. REACTIVITY INFORMATION

CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE:
TEMPERATURES ABOVE: 500 Deg.C (932 Deg.F)
MECHANICAL SHOCK OR IMPACT: No
ELECTRICAL (STATIC) DISCHARGE: No
HAZARDOUS POLYMERIZATION: Will not occur
INCOMPATIBLE MATERIALS: Strong acids
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen fluoride, silicon tetrafluoride

SUMMARY OF REACTIVITY:
OXIDIZER: No
PYROPHORIC: No
ORGANIC PEROXIDE: No
WATER REACTIVE: No
VIII. FIRST AID

EYES: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Call a physician at once.

SKIN: Immediately flush with water for at least 15 minutes. Call a physician. If clothing comes in contact with the product, the clothing should be removed immediately and should be laundered before re-use.

INGESTION: Immediately drink large quantities of water. DO NOT induce vomiting. Call a physician at once. DO NOT give anything by mouth if the person is unconscious or if having convulsions.

INHALATION: If person experiences nausea, headache or dizziness, person should stop work immediately and move to fresh air until these symptoms disappear. If breathing is difficult, administer oxygen, keep the person warm and at rest. Call a physician. In the event that an individual inhales enough vapor to lose consciousness, person should be moved to fresh air at once and a physician should be called immediately. If breathing has stopped, artificial respiration should be given immediately. In all cases, ensure adequate ventilation and provide respiratory protection before the person returns to work.

IX. TOXICOLOGY AND HEALTH INFORMATION

ROUTES OF ABSORPTION
Inhalation, ingestion, skin or eye contact

WARNING STATEMENTS AND WARNING PROPERTIES
MAY BE FATAL IF INGESTED, INHALED OR ABSORBED THROUGH SKIN. HARMFUL UPON EYE CONTACT.

HUMAN THRESHOLD RESPONSE DATA
ODOR THRESHOLD: The odor threshold has not been established.
IRRITATION THRESHOLD: The irritation threshold has not been established.
IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: The IDLH concentration has not been established.
SIGN, SYMPTOMS, AND EFFECTS OF EXPOSURE

INHALATION

ACUTE:
Irritation to lungs, respiratory tract and nose. Nosebleeds may occur. Muscular weakness, difficulty breathing, thirst, weak pulse and loss of consciousness. Kidney damage and central nervous system depression may occur.

CHRONIC:
Fluorosis may occur which is characterized by increased density of bone. Fluoride may also deposit in tendons, ligaments and muscles. Such deposition may result in crippling effects. Nausea, vomiting, loss of appetite, diarrhea, or constipation can occur. Mottling of teeth.

SKIN

ACUTE:
Muscular weakness, difficulty breathing, thirst, weak pulse and loss of consciousness. Kidney damage and central nervous system depression may occur.

CHRONIC:
Fluorosis may occur which is characterized by increased density of bone. Fluoride may also deposit in tendons, ligaments and muscles. Such deposition may result in crippling effects. Nausea, vomiting, loss of appetite, diarrhea or constipation can occur. Mottling of teeth.

EYE

Irritation with corneal epithelial damage and necrosis of the conjunctiva. The data from animal testing indicates a corrosive effect to unwashed eyes. It is non-irritating if eyes are rinsed immediately after exposure.

INGESTION

ACUTE:
Nausea, vomiting, with or without blood, and diarrhea due to formation of hydrofluoric acid which is highly irritating. Muscular weakness, central nervous depression, visual disturbances, convulsions and kidney damage may occur.

CHRONIC:
Same as those effects described under chronic inhalation exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
There are no conditions known or reported to be aggravated by exposure.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY
There are no chemicals known which enhance toxicity.

ANIMAL TOXICOLOGY
ACUTE TOXICITY:
INHALATION LC 50: No available data
DERMAL LD 50: LD 50 is reported to be 300 mg/kg (mouse) for sodium fluoride.
ORAL LD 50: 125 mg/kg (rat)
IRRITATION: Skin irritant, irritant and/or corrosive to eyes.

ACUTE TARGET ORGAN TOXICITY:
Muscle, central nervous system, kidneys, lungs, gastrointestinal tract

CHRONIC TARGET ORGAN TOXICITY:
Bone, connective tissue and muscles

REPRODUCTIVE AND DEVELOPMENTAL TOXICITY:
Although this product is not known or reported to cause fetal malformations or impair reproductive performance, it has been shown to retard the ossification of the skeleton in rats and alter development of the teeth in the mouse.

CARCINOGENICITY:
This product has not been shown to cause cancer according to any reference source including IARC, NTP, EPA or OSHA.

MUTAGENICITY:
Sodium silicofluoride is not known of reported to be mutagenic. The fluoride ion has been shown to be mutagenic; but only in vitro. In vitro investigation has also indicated a lack of mutagenic effect. It has not been shown mutagenic in vivo; in fact, the micronucleus test in vivo yielded data indicating a lack of mutagenicity.

AQUATIC TOXICITY:
The LC 50 for trout has been reported from 2 to 7 mg/l.
The LC 50 (96 hours) to mosquito fish is 419 mg/l.

X. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT REGULATED AS A DOT HAZARDOUS MATERIAL.

XI. SPILL AND LEAKAGE PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.
REPORTABLE QUANTITY: Not Applicable

SPILL MITIGATION PROCEDURES:
Hazardous concentrations in air may be found in local spill area.
Utilize emergency response personal protective equipment prior to the
start of any response. Stop source of spill as soon as possible and
notify appropriate personnel.

AIR RELEASE: Dust may be suppressed by the use of water fog. Contain
all liquid for treatment or neutralization.

WATER RELEASE: This material is heavier than and slightly soluble in
water. Notify all downstream water users of possible
contamination. Divert water flow around spill if possible
and safe to do so. If unable to divert, create an
overflow/underflow dam to contain material. Remove with
a vacuum system or pumping device for treatment and/or
disposal. Continue to handle as described in land spill.

LAND SPILL: Create a dike or trench to contain materials. Do not place
spill materials back in their original container.
Containerize and label all spill materials properly.
Decontaminate all clothing and the spill area using a
detergent and flush with large amounts of water.
Material may be removed using a vacuum system or network
of pumps.

SPILL RESIDUES:
Dispose of per guidelines under Section XII, WASTE DISPOSAL.

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE-FIGHTING SITUATIONS:
In case of fire, use normal fire fighting equipment.

Additional respiratory protection is necessary when a spill or fire
involving this product occurs. You are recommended to use a
self-contained breathing apparatus (SCBA) positive pressure unit.

Additional protective clothing must be worn to prevent personal contact
with this material. These items include but are not limited to boots,
gloves, hard hat, splash-proof goggles and impervious clothing, i.e.,
chemically impermeable suit.
Compatible materials for response to this material are neoprene, chlorinated polyethylene, polyvinyl chloride, butyl rubber, viton, polyvinyl alcohol and saranex.

Protection concerns must also address the potential of the physical characteristics of this product as corrosive.

XII. WASTE DISPOSAL

If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

As a nonhazardous solid waste it should be disposed of in accordance with local, state, and federal regulations by disposal in a secure chemical landfill.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

XIII. ADDITIONAL REGULATORY STATUS INFORMATION

TOXIC SUBSTANCES CONTROL ACT:
This substance is listed on the Toxic Substances Control Act inventory.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT TITLE III:
HAZARD CATEGORIES, PER 40 CFR 370.2:
HEALTH:
Immediate (Acute)
Delayed (Chronic)
PHYSICAL:
None

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:
EXTREMELY HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:
None Established
SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:
None Established

XIV. ADDITIONAL INFORMATION

No Additional Information
XV. MAJOR REFERENCES

17. Medline, U.S. National Library of Medicine, Bethesda, MD.
THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. OLIN BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MATERIAL SAFETY DATA SHEET IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT OLIN AT THE PHONE NUMBER LISTED BELOW TO MAKE CERTAIN THAT THIS SHEET IS CURRENT.

OLIN MSDS CONTROL GROUP
Olin Corporation
120 Long Ridge Road
Stamford, CT 06904
Phone Number: (203) 356-3449

OLIN CORPORATION SUBSIDIARIES AND AFFILIATED ENTITIES: ASAHI-OLIN LTD., BRIDGEPORT BRASS CORPORATION, INDY ELECTRONICS, INC., OLIN CHLORATE CORPORATION, OLIN FABRICATED METAL PRODUCTS INC., OLIN HUNT SPECIALTY PRODUCTS INC., OLIN ELECTRONICS TECHNOLOGY, OLIN MESA CORP., OLIN SPECIALTY METALS CORPORATION, PACIFIC ELECTRO DYNAMICS, INC., PHYSICS INTERNATIONAL COMPANY, ROCKETFIRE COMPANY, OCC MICROELECTRONIC MATERIALS, INC.
The information in the Material Safety Data Sheet (MSDS) is organized into fifteen sections which are as follows:

I Product Identification  
II Component Data  
III Precautions for Safe Handling and Storage  
IV Physical Data  
V Personal Protective Equipment Requirements  
VI Fire and Explosion Hazard Information  
VII Reactivity Information  
VIII First Aid  
IX Toxicology and Health Information  
X Transportation Information  
XI Spill and Leak Procedures  
XII Waste Disposal  
XIII Additional Regulatory Information  
XIV Additional Information  
XV Major References

Section I — Product Identification

The product name and product code are used to identify the product. The file number and revision number identify the Material Safety Data Sheet (MSDS) itself. The chemical family or name and synonyms are given with formula where applicable. A brief use description of the product is presented along with the OSHA Hazard Classifications.

Section II — Component Data

All Olin products are evaluated to determine if they are hazardous. According to the Occupational Safety and Health Administration (OSHA), a hazardous chemical refers to any chemical that presents a physical hazard or a health hazard. A chemical may be a physical hazard if it is combustible, flammable, pyrophoric, chemically unstable, water reactive or explosive, a compressed gas, an organic peroxide or other oxidizer.

A chemical may present a health hazard if exposure could result in acute or chronic adverse health effects. This definition of a hazardous material has been adapted from the OSHA Hazardous Communication Standard (29 CFR 1910.1200). The reader should refer to the Standard for further details. If it has been determined that a product is not hazardous, then this is stated. If it has been determined that the product is a health hazard then all components that present a health hazard and that comprise 1% or more of the material are listed in this section. Also, any component that is a carcinogen is listed if it comprises 0.1% or more of the product. If it has been determined that the product is a physical hazard, then any component that presents a physical hazard is listed.

Normally, the chemical name and Chemical Abstracts Service (CAS) Number are used to identify a component. CAS numbers are assigned to chemicals and mixtures by the Chemical Abstracts Service (published by the American Chemical Society) as a specific identification. CAS numbers are not always available for mixture but are stated where available. Where the identity of a component is a trade secret, a descriptive name is used instead of the chemical name and a trade secret access number is given to that component. Disclosure of the identity of the trade secret component will be made to health professionals upon request, subject to the conditions specified in the Standard.

Exposure limits are given for each component where these have been established. Definitions of these exposure limits follow:

- ACGIH TLV (Threshold Limit Value): a term used by American Conference of Governmental Industrial Hygienists to express the airborne concentration of a material to which nearly all persons can be exposed day after day without adverse effects. ACGIH expresses TLVs in three ways:
  - TLV-TWA: The allowable Time Weighted Average concentration for a normal 8 hour workday of a 40-hour work week.
  - TLV-STEL: The Short-Term Exposure Limit, or maximum concentration for a continuous 15-minute exposure period. A maximum of four such periods per day, with at least 60 minutes between exposure periods are allowed, and provided that the daily TLV is not exceeded.
  - TLV-C: The Ceiling exposure limit; the concentration that should not be exceeded even instantaneously.

- SKIN: A notation used to indicate that the stated substance may be absorbed by the skin, mucous membranes and eyes, either by air or direct contact, and that this additional exposure must be considered part of the total exposure to avoid exceeding TLV for that substance.

- The value quoted is the TWA unless another category is stated.

- OSHA PEL (Permissible Exposure Limit): an exposure limit established by the Occupational Safety and Health Administration. May be a time weighted average (TWA) limit or ceiling (C) exposure limit. A skin notation has the same meaning as for the TLV.

Section III — Precautions for Safe Handling and Storage

This section provides vital information for handling and storing a product. It is important that all recommendations be followed.

Section IV — Physical Data

Knowledge of the physical properties of a substance is necessary for all safety and industrial hygiene decisions. Definitions of terms that apply to the physical data presented in this section are given below:

- Freezing Point/Melting Point: The temperature at which a substance changes state from liquid to solid or solid to liquid. For mixtures, a range may be given.

- Boiling Point: The temperature at which a liquid changes to a vapor state at a given pressure. (Usually 760 mmHg or one atmosphere.) For mixtures, the initial boiling point or the boiling range may be given. Flammable materials with low boiling points generally present special fire hazards.

- Decomposition Temp: The temperature at which a substance will break down, or decompose, into smaller fragments.

- Specific Gravity: The weight of a material compared to
the weight of an equal volume of water; an expression of the density (or heaviness) of the material. Example: if a volume of material weighs 8 pounds, and an equal volume of water weighs 10 pounds, the material has a specific gravity of 0.8:

\[
\frac{8 \text{ lbs}}{10 \text{ lbs}} = 0.8
\]

Insoluble materials with a specific gravity of less than 1.0 may float in (or on) water. Insoluble materials with a specific gravity greater than 1.0 may sink in water. Most insoluble flammable liquids having a specific gravity of less than 1.0 will float on water, an important consideration for fire suppression.

- **Bulk Density**: Weight of material per unit volume.

- **pH**: A value presenting the acidity or alkalinity of an aqueous solution.

<table>
<thead>
<tr>
<th>Acidic</th>
<th>Neutral</th>
<th>Alkaline</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>14</td>
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- **Vapor Pressure**: The pressure (usually expressed in millimeters of mercury) characteristic at any given temperature of a vapor in equilibrium with its liquid or solid form.

- **Solubility in Water**: A term expressing the percentage of a material (by weight) that will dissolve in water at ambient temperature. Solubility information may be useful in determining spill cleanup methods and fire-extinguisher agents.

- **Volatiles, Percent by Volume**: The percentage of a liquid or solid (by volume) that will evaporate at an ambient temperature of 70°F (unless some other temperature is stated).

- **Evaporation Rate**: The rate at which a particular material will vaporize (evaporate) when compared to the rate of vaporization of a known material. The evaporation rate can be useful in evaluating the health and fire hazards of a material. The known material is usually either normal butyl acetate or water, with a vaporization rate designated as 1.0.

- **Vapor Density (Air = 1)**: A relative comparison of the density of the vapor compared to the density of air (Air = 1). If the vapor density is greater than 1.0, then the vapor is heavier than air.

- **Molecular Weight**: The molecular weight of a chemical is the sum of the atomic weights of the atoms making up one molecule of the chemical.

- **Coefficient of Oil/Water Distribution**: If a substance which is soluble both in oil and in water is added to a two-phase oil/water system, then the ratio of the concentration of that substance in oil to its concentration in water is called the Coefficient of Oil/Water distribution.

### Section VI — Fire and Explosion Hazard Information

The recommended extinguishing media to be used in the event of a fire are given, together with any unusual fire and explosion hazards.

The following definitions are applicable to this section:

- **Pyrophoric**: A substance that burns spontaneously in air at a temperature of 130°F or below.

- **Flammable**: A flammable liquid is defined by NFPA and DOT as a liquid with a flash point below 100°F (37.8°C). The OSHA definition is substantially the same. Solids, other than explosives that will ignite readily or are liable to cause fires under ordinary conditions of transportation through friction or retained heat from manufacturing or processing, and which burn so vigorously and persistently as to create a serious transportation hazard, are classified by DOT as "flammable solids."

- **Combustible**: A term used by NFPA, DOT and OSHA to classify liquids on the basis of a flash point range of 100°F to below 200°F.

- **Flash Point**: The temperature at which a liquid will give off enough flammable vapor to ignite in the presence of an ignition source.

There are several flash point test methods. Because flash points may vary for the same material depending on the method used, the test method is indicated when the flash point is given. The methods most frequently quoted are:

- PMCC: Pensky-Martens Closed Cup — ASTM D93
- Seta: Setaflash Closed Cup — ASTM D3278
- HCL: Tag (Tagliabue) Closed Cup — ASTM D56

Details of these methods can be found in Section V of the Annual Book of ASTM Standards.

- **Autoignition Temperature**: The lowest temperature at which a liquid will give off enough flammable vapors and heat energy to ignite spontaneously and maintain combustion.

- **UEL and LEL**: Upper Explosive Limit and Lower Explosive Limit are the highest concentration and lowest concentration respectively that will produce a flash of fire when an ignition source is present. At higher concentrations than the UEL, the mixture is too "rich" to burn. At concentrations lower than the LEL, the mixture is too "lean" to burn.


The NFPA ratings provide a general idea both of the hazards and of the degree of the hazards associated with a material relative to fire protection and control. The Standard addresses the hazards under the three categories of "Health," "Flammability" and "Reactivity" and assigns numeric ratings using a scale of 0 to 4 with 0 indicating no
Section VIII — First Aid

First aid procedures are described for each of the normal routes of exposure. It is important that first aid be administered as soon as possible after exposure has occurred. If in any doubt regarding the victim’s condition, a physician should be called.

In case of emergency call Olin’s OCEAN Network (1-800-OLIN-971). OCEAN, which stands for Olin Corporation Emergency Action Network, is accessible 24 hours a day.

Section IX — Toxicology and Health Information

The consequences of exposure, if any, by inhalation, skin or eye contact, or ingestion are outlined in this section. The signs, symptoms, and effects that the exposure could produce are described so that any exposure would be recognized as quickly as possible and the appropriate action taken. The organs that are most susceptible to attack are referred to as target organs. The effects and damage that exposure could produce on these organs are given together with the symptoms. Some of the terms used that may be less familiar or which may have a specific inference in MSDSs are defined below:

(a) Acute Effect: An adverse effect on a human or animal body resulting from a single exposure with symptoms developing almost immediately or shortly after exposure. The effect is usually of short duration.

(b) Chronic Effect: An adverse effect on a human or animal body resulting from repeated low level exposure, with symptoms that develop slowly over a long period of time or that recur frequently.

(c) Corrosive: A liquid or solid that causes visible destruction or irreversible alterations in human skin tissue.

(d) Irritation: An inflammatory response or reaction of the eye, skin or respiratory system.

(e) Allergic Sensitization: A process whereby on first exposure a substance causes little or no reaction in humans or test animals, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form of sensitization in the industrial setting, although respiratory sensitization is also known to occur.

(f) Teratogen: A substance or agent to which exposure of a pregnant female can result in malformations to the skeleton and or soft tissue of the fetus.

(g) Mutagen: A substance or agent capable of altering the genetic material in a living organism.

(h) Carcinogen: A substance or agent capable of causing or producing cancer in humans or animals. Authorities/organizations that have evaluated whether or not a substance is a carcinogen are the International Agency for Research on Cancer (IARC), the U.S. National Toxicology Program (NTP) and OSHA.

To evaluate the potential human effects from exposure to hazardous chemicals, studies in laboratory animals are performed. The terms most commonly used to define the results of the studies are as follows:

- LD₅₀ (Lethal Dose Fifty) — The dose of a substance expected to cause the death of 50% of an experimental
animal population. This dose may be from oral, dermal or other routes of exposure. The units given for the LD₅₀ are usually milligrams per kilogram body weight of the tested animal (mg/kg).

- **LC₅₀ (Lethal Concentration Fifty)** — A calculated concentration of a substance in air, exposure to which for a specified length of time is expected to cause the death of 50% of a laboratory animal population. This concentration is usually in units of milligrams per cubic meter of air (mg/m³) or milligrams per liter of air (mg/l) and is given for some time period (usually one or four hours).

Other terms occasionally used are:

- **LD₅₀ (Lethal Dose Low)** — The lowest dose of a substance introduced by any route other than inhalation reported to have caused death in humans or animals.

- **LC₅₀ (Lethal Concentration Low)** — The lowest concentration of a substance in air that has been reported to have caused death in humans or animals.

- **TD₅₀ (Toxic Dose Low)** — The lowest dose of a substance to which humans or animals have been exposed and reported to produce a toxic effect other than cancer.

Based on these values, an estimate of human health effects potential is obtained.

**Section X — Transportation Information**

In the event the material is regulated as hazardous by the Department of Transportation (DOT), the Hazardous Materials Regulations as described in the Code of Federal Regulations, 49 Chapter 1 subchapter C are outlined in this section. In the event of an emergency, CHEMTREC (Chemical Transportation Emergency Center) should be contacted.

CHEMTREC is a national center established by the Chemical Manufacturer Association (CMA) in Washington, DC, to relay pertinent emergency information concerning specific chemicals on request. CHEMTREC has a 24-hour toll-free telephone number (1-800-424-9300), intended primarily for use by those who respond to chemical transportation emergencies.

**Section XI — Spill and Leak Procedures**

During cleanup of spills or leaks, it may be necessary to use extra personal protective equipment as compared to normal operations. Recommendations for equipment use additional to what is described in Section V are given.

Procedural recommendations relative to air, land and water are described.

**Section XII — Waste Disposal**

This section gives guidelines for disposing of a product if it becomes a waste. Recommendations are based upon the physical state and hazardous properties of the material. If the material is designated as hazardous by 40 CFR Part 261, it must be disposed of in a permitted hazardous waste treatment, storage, or disposal facility in accordance with local, state, and Federal regulations. If the material is non-hazardous, recommendations for disposal are made depending on the physical state and known characteristics of the material.

**Section XIII — Additional Regulatory Information**

This section contains information relevant to compliance with other Federal and/or state laws such as TSCA, FIFRA and FDA.

**Section XIV — Additional Information**

Any relevant additional information is given in this section.

**Section XV — Major References**

This section lists some of the major references that have been consulted in preparing the Material Safety Data Sheet.

Olin CORPORATION
120 LONG RIDGE ROAD, P.O. BOX 1355, STAMFORD, CT 06904-1355