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## School Materials Safety Manual:

### No. 320 Sodium Thiosulfate Issued 10/92

#### ◆ SECTION 1 INTRODUCTION

**Material** Sodium Thiosulfate, ca 100%

**Synonyms** Ametox, Antichlor, disodium thiosulfate, Hypo, S-Hydril, sodium hyposulfite, sodium oxide sulfide, sodium thiosulphate, Sodothiol, Sulfothiorine, thiosulfuric acid, disodium salt

**Chemical Formula**  $\text{Na}_2\text{S}_2\text{O}_3$  (anhydrous),  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$  (pentahydrate)

**CAS Number** 7772-98-7 (anhydrous), 10102-17-7 (pentahydrate)

**DOT Classification** Not listed as a Hazardous Material for Transportation (49 CFR 172.101)

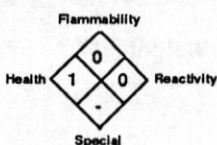
**EPA Classification** Not listed as a RCRA Hazardous Waste (40 CFR 261.33), a CERCLA Hazardous Substance (40 CFR 302.4), a SARA Extremely Hazardous Substance (40 CFR 355), or a SARA Toxic Chemical (40 CFR 372.65)

**OSHA Classification** Not listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

**NFPA Hazard Rating** Not found

**Genium Hazard Rating**

4 = Extreme  
3 = High  
2 = Moderate  
1 = Slight  
0 = Minimum



**HMS**

H 1  
F 0  
R 0

**Description** White, transparent powder or crystals; almost odorless. Derived by dissolving sulfur in sodium sulfite solution and then crystallizing it. Used as a reducer in chrome dyeing, a mordant in dyeing and printing textiles, a reagent in analytical chemistry, a photographic agent to dissolve silver halide, an agent in leather tanning, a preservative, a source of sulfur dioxide in bleaching various products, an antidote for cyanide poisoning; and in extracting silver from its ores, dechlorination of water, and bleaching of paper pulp to remove chlorine from solution.

**Overview** In the school environment, sodium thiosulfate is most commonly used as a laboratory reagent in the chemistry laboratory. It may also be used in a photography darkroom. Dust and concentrated solutions can irritate the skin, eyes, and mucous membranes. Avoid breathing dust, vapor mist, and gas. Wear gloves, safety glasses or chemical goggles, and lab coat when handling sodium thiosulfate.

**Manufacturer** Always request an up-to-date MSDS from your chemical supplier. That sheet should include the manufacturer and their emergency phone numbers. This *Manual's* Resources/Manufacturers Index lists some larger manufacturers and available emergency phone numbers.

#### ◆ SECTION 2 USE AND STORAGE DATA

**Preliminary Planning Considerations** Plan and provide for safe disposal of all school-generated chemical waste. Check applicable regulations prior to use. Whenever possible, substitute less hazardous materials. Investigate the feasibility of microscale chemistry experiments to reduce the quantity required and disposal concerns. Contact lens use when handling chemical materials is controversial. In some cases, soft lenses can actually protect eyes from chemicals.

In other cases, chemical entrapment is presumed a possible hazard. Particles adhering to contact lens surfaces can cause corneal damage. For safety, wear safety glasses or goggles and appropriate protective clothing (e.g., gloves, lab coats) to work with sodium thiosulfate. Employees and students should know the location of eyewash and shower facilities near chemical use areas. Check and document that eyewash stations and safety showers are working properly. **Usage Precautions and Procedure** Before using, read this material's container label and follow all precautions. Do not smoke in usage or storage areas. Practice good housekeeping to avoid unintentionally mixing incompatibles. Do not allow chemical residue or dust buildup in lab or work areas. Keep sodium thiosulfate away from notebooks, textbooks, and personal belongings to avoid transporting chemical residues from the lab/work area. After working with chemical materials, and before eating, drinking, or smoking, always wash hands and face. Remove and launder contaminated clothing before reusing.

**Additional Data** Sodium thiosulfate is stable at room temperature under normal handling and storage conditions. It is deliquescent (absorbs atmospheric water vapor) and efflorescent (loses water molecules) above 91.4 °F (33 °C). It does not polymerize. In solution this material may be unstable if exposed to light. It decomposes slowly at room temperature and more rapidly when heated. Its incompatibilities include sodium nitrite, metal nitrates, acids, iodine, mercury, lead, and silver salts. Sodium thiosulfate dissolves silver halides and salts. It is a strong reducing agent and can react with oxidizers. An explosion can occur if sodium thiosulfate is ground with chlorates, permanganates, or nitrates. When a mixture of sodium nitrite and thiosulfate was heated to dryness, a violent explosion occurred.

**Preferred Storage Location and Methods** Store in tightly closed and properly labeled containers in a cool, well-ventilated area out of direct sunlight and away from incompatibles. To separate incompatible chemicals, store by chemical family, not by alphabetical name. Protect all chemical containers from physical damage. Prohibit smoking in chemical storage areas. Purchase amounts sufficient for one year's use or less.

#### ◆ SECTION 3 SPILL/DISPOSAL PROCEDURES

**If Spilled** Ventilate spill area. Promptly and thoroughly clean up spilled material. Cleanup personnel should protect against dust inhalation and skin or eye contact. If dusting is excessive, an approved dust respirator may be necessary. For liquid (solution) spills, cover with an inert solid absorbent (vermiculite, dry sand, etc.) and scoop into appropriate containers (with secure lid) for disposal in accordance with existing regulations. As needed, dike spill area with inert absorbent material to contain spill. For dry spills, carefully collect spilled material and scoop into secure disposal or reclamation containers. Avoid creating airborne dust conditions. Vacuum (with appropriate filter) or wet mop to minimize dust dispersion.

**Disposal of Small Quantities** Handle emptied containers carefully since residues may remain. Always check regula-

tions before disposal. Investigate recycling or reclamation rather than landfill disposal. Before disposal, it is recommended that sodium thiosulfate be safely reacted in a weak basic solution such as sodium carbonate to destroy sodium thiosulfate's reducing power. Dissolve sodium thiosulfate in water, then make it basic with sodium carbonate, and react with calcium hypochlorite. Adjust the pH to neutral and flush down the drain. If these methods are not practical, feasible, or in accord with existing regulations, contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.

**Disposal of Larger Amounts** Contact your supplier or a licensed disposal company.

*Follow all applicable local, state, and Federal regulations for all waste disposal.*

#### ◆ SECTION 4 HEALTH HAZARDS

In the solid form, sodium thiosulfate is a mild irritant, but has a low order of toxicity. Dust and concentrated solutions can irritate the eyes and mucous membranes. Skin contact can cause allergic dermatitis. Ingestion can cause gastrointestinal disturbances.

**1991 OSHA PEL** 8-hr TWA: None established

**1992-93 ACGIH TLV** 8-hr TWA: None established

**1990 NIOSH REL** 10-hr TWA: None established

**1985-6 Toxicity Data** Rat, intravenous, LD<sub>50</sub>: >2500 mg/kg;  
Rabbit, subcutaneous, LD<sub>50</sub>: 4000 mg/kg.

**Carcinogenicity** Not listed by the IARC, NTP, or OSHA

**Acute Effects** Inhalation can irritate the mucous membranes, eyes, and upper respiratory tract. Ingesting large amounts can cause nausea, vomiting, abdominal cramping, diarrhea, and gastrointestinal irritation. Concentrated solutions and dust can irritate the skin and cause allergic contact dermatitis.

**Chronic Effects** Repeated skin contact may cause chronic dermatitis.

#### ◆ SECTION 5 FIRST AID PROCEDURES

**Eye Contact** Promptly flush eyes with plenty of running water for at least 15 min, including under eyelids. Get prompt medical attention.

**Skin Contact** After flushing with large amounts of water, wash exposed areas with soap and water. For reddened or blistered skin or signs of dermal hypersensitivity reactions, get prompt medical attention.

**Inhalation** Remove victim from exposure to fresh air and support breathing as necessary.

**Ingestion** Contact a poison control center, \* especially if large amounts are ingested. Never give anything by mouth to an unconscious or convulsing person. Unless otherwise advised, give that conscious and alert person 1 or 2 glasses of water or milk to drink and induce vomiting with ipecac syrup. Get prompt medical attention.

*Get proper in-school, paramedic, or community medical attention and support.*

\* See listings on pages 2-8 of *Resources/Manufacturers Index*.

#### ◆ SECTION 6 FIRE PROCEDURES AND DATA

**Fire Hazards** For major fires, or for fires involving large quantities, firefighters should wear appropriate protective clothing and respirators. Because fire may produce toxic thermal decomposition products, a self-contained breathing apparatus (SCBA) is recommended.

**Flash Point and Method** Noncombustible

**Autoignition Temperature** None reported

**Flammability Limits in Air (vol. %)** None reported

**Hazardous Decomposition Products** Thermal oxidative decomposition of sodium thiosulfate can produce sodium oxide (Na<sub>2</sub>O) and sulfur oxides (SO<sub>x</sub>).

**Extinguishing Media** Use water fog, carbon dioxide (CO<sub>2</sub>), dry chemical, foam, or other media appropriate to surrounding fire conditions.

#### ◆ SECTION 7 PHYSICAL DATA

**Melting Point** decomposes above 212 °F (100 °C)(anhydrous), 118 °F (48 °C) (pentahydrate)

**Solubility in Water** Soluble in 0.5 part water

**pH of Aqueous Solution** 6.5 to 8 (neutral: neither basic or acidic)

**Molecular Weight** 158.13 (anhydrous form), 248.2 (pentahydrate)

**Density** 1.69

**References** 1, 101, 132, 136, 140, 149, 168, 530

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