

# School Material Safety Data Sheet

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SULFUR

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## SECTION 1. INTRODUCTORY INFORMATION

**MATERIAL NAME AND FORMULA:** SULFUR; S<sub>8</sub>

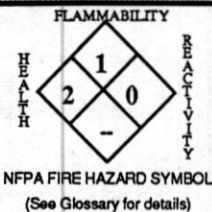
**SYNONYMS:** Flowers of Sulfur, Sulfur Flour, Sublimed Sulfur, Brimstone, Sulphur

**CAS NUMBER:** 7704-34-9

**INGREDIENTS:** Sulfur; ca 100%

**DOT CLASSIFICATION:** ORM-C

**MANUFACTURERS:** Always request Material Safety Data Sheets from your chemical supplier. These should indicate the manufacturer of the substance and include an emergency phone number to call. The Manufacturers section of this book contains a listing of some of the larger manufacturers and available emergency numbers.



**DESCRIPTION:** Pure sulfur exists in several solid forms. The common forms (S<sub>8</sub> ring) of molecular weight 256.512 are alpha and beta crystalline forms and an amorphous form.

**PRELIMINARY INFORMATION:** Sulfur is generally low in toxicity, yet irritation effects can occur. Material is most hazardous if mixed with oxidizing agents, organic materials, or burned: potentially explosive mixtures or toxic reaction products can result. Sulfur is a reagent with a variety of applications in a chemistry lab.

## SECTION 2. USE AND STORAGE INFORMATION

### -- PRELIMINARY PLANNING CONSIDERATIONS --

- Safety glasses or goggles and protective clothing (rubberized apron, etc.) should be worn for all experiments.
- Be sure eyewash station and safety shower are in good working order and readily available.
- Always provide for safe disposal of all chemical waste generated in the lab. Check applicable regulations prior to use.
- Eliminate all possible sources of ignition.

### -- USAGE PRECAUTIONS AND PROCEDURES --

- READ THE LABEL and follow all precautions.
- For safety, contact lenses should not be worn in the laboratory; soft lenses may absorb irritants and all lenses may concentrate them. Particles can also adhere to contact lenses and cause corneal damage.
- Maintain good housekeeping practices to avoid unintentional mixing with incompatible materials.
- Prevent accumulation of sulfur dust. (Dust containing 25% sulfur or more may be almost as explosive as 100% sulfur dust.)
- After working with this material, always wash hands and face before eating, drinking, or smoking.
- No smoking in storage or use area.
- Keep away from strong oxidizing agents and sources of heat or ignition.
- Avoid creating airborne dust conditions. Do not breathe sulfur dust.
- Keep body contact with sulfur dust to a minimum. Wash frequently.

### -- ADDITIONAL INFORMATION --

- Material does not polymerize. It is stable under normal storage and handling conditions.
- Incompatible with oxidizing agents: may be dangerously explosive when intimately mixed with nitrates, chlorates, chromic anhydride, potassium permanganate, and dioxide, calcium hypochlorite, etc.
- Sulfur can react as an oxidizing agent to give highly exothermic reaction, for example with P<sub>2</sub>O<sub>3</sub> or phosphorous, with carbides, and with molten metals.
- It can react with hydrocarbons and other organic material when molten to produce H<sub>2</sub>S and CS<sub>2</sub>.
- Moist sulfur is corrosive to steel.

### -- PREFERRED STORAGE LOCATION AND METHODS --

- Storage area should be cool and well ventilated. Containers should be tightly closed.
- All chemical containers should be protected from physical damage and kept out of direct sunlight.
- Purchase only amounts equivalent to one year's needs.
- Store with compatible materials on sturdy shelving.
- Should be stored away from oxidizing agents, reactive chemicals, and sources of heat or ignition.
- No smoking in storage or use area.

## SECTION 3. SPILLS AND DISPOSAL PROCEDURES

### IF MATERIAL IS SPILLED:

- Eliminate possible sources of ignition.
- Cleanup personnel should have protection against inhalation of dust or skin contact.
- Use nonsparking tools for cleanup.
- Provide ventilation, but do not stir up dust.
- Pick up carefully and completely (avoid scattering of material).
- Avoid creating airborne dust conditions.

### DISPOSAL OF SMALL QUANTITIES:

- Bury in approved landfill after mixing with 3 parts by weight of CaCO<sub>3</sub> (to neutralize slow generation of sulfuric acid), regulations permitting.
- Supplier may be able to provide other disposal options.

**DISPOSAL OF LARGER AMOUNTS:** Contact a licensed disposal company.

\*\*\* FOLLOW ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS FOR ALL WASTE DISPOSAL \*\*\*

## SECTION 4: HEALTH HAZARDS

Sulfur is not listed as a carcinogen by OSHA, IARC, and NTP.

- No TLV established: The Nuisance Dust TLV should govern exposure to solid in the absence of other standards.
- Current ACGIH TLV for nuisance dust is 10 mg/m<sup>3</sup> (total dust) or 5 mgm<sup>3</sup> (respirable dust).
- Sulfur is very low in toxicity and very low in vapor pressure. Consider as a nuisance dust as noted above.
- Health hazards can arise from reaction products of sulfur such as SO<sub>2</sub>, H<sub>2</sub>S, and CS<sub>2</sub>.
- Sulfur dust can irritate the mucous membranes of the respiratory tract and the inner surface of the eyelids. Sensitive persons can experience skin irritation from repeated exposure to sulfur dust. Allergic responses can occur.

## SECTION 5: FIRST AID PROCEDURES

**Eye contact:**

- Flush eyes promptly with plenty of running water for at least 15 minutes, including under the eyelids.
- Get medical attention if irritation persists.\*

**Skin contact:**

- Any person who shows allergic reaction to sulfur should discontinue contact with it.
- Wash exposed areas of skin with soap and water.
- Remove contaminated clothing.

**Inhalation:**

- Remove victim to fresh air.
- Get medical help for coughing or breathing difficulty.\*

\* Get medical help (in school, paramedic, or community) for further treatment, observation, and support after first aid.

## SECTION 6: FIRE PROCEDURES AND DATA

- Bulk sulfur is a slight fire hazard when exposed to heat or flame. Powdered sulfur dust is a moderate explosion hazard when dispersed in air. In contact with oxidizing agents it is a greater explosion hazard.
- Extinguishing media: water spray or fog is the most satisfactory. Steam and CO<sub>2</sub> may be useful in special cases.
- For major fires, or if quantities of this material are involved, fire fighters should wear appropriate protective clothing and use respiratory protection. Self-contained breathing apparatus is recommended.
- Use of a direct water stream may scatter fire or send sulfur dust into the air.
- A water spray may be used to cool fire-exposed containers and disperse vapors.

THERMAL OXIDATIVE DEGRADATION PRODUCTS INCLUDE: Sulfur dioxide. H<sub>2</sub>S and CS<sub>2</sub> can also be produced from certain reactions.

FLASH POINT AND METHOD(S) ... >335°F (168°C) (CC)

AUTOIGNITION TEMPERATURE ... dust cloud: 374°F (190°C) (undispersed ≥ 428°F [220°C])

FLAMMABILITY LIMITS IN AIR (dust, g/m<sup>3</sup>):  
Lower ... 35 Upper ... 1400

## SECTION 7: PHYSICAL DATA

BOILING POINT (@ 1 atm.) ... 832°F (444.6°C)

VAPOR PRESSURE (@ 20°C, mm Hg) ... <0.0001

SOLUBILITY IN WATER ... Insoluble

SPECIFIC GRAVITY (20°/4°C) ... 1.92 - 2.07\*

MELTING POINT ... 235 - 246°F (112.8 - 119.0°C)

MOLECULAR WEIGHT ... 256.5 (S<sub>8</sub>)

ATOMIC WEIGHT ... 32.066

\* Property depends on allotropic form(s) present and the measurement technique. The transition temperature is about 95°C (slow conversion) between alpha and beta-crystalline forms.

DATA SOURCES: Genium's Industrial MSDS #56 (10/79) and references 1-10, 24, 25, 501-3, 509-10.  
(see glossary for titles)

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Medical Review

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