# *Safety Data Sheet (SDS)*

## SECTION 1: IDENTIFICATION

| | |
|---|---|
| **Trade Name & Synonyms** | **Sulfur, Granules, Pellets, Flakes, Arrow Roll** |
| **Chemical Name** | Sulfur |
| **CAS Number** | 7704-34-9 |
| **Family Name** | Element – Sulfur |
| **Chemical Formula** | $S_8$ |
| **Recommended Use** | Animal feed, metal refining, and various industrial applications |
| **Restrictions on Use** | Keep away from heat sources, sparks, or open flames |
| **Manufacturer/Supplier** | ***Sales and Technical Services***<br>**Holly Industries**<br>P. O. Box 1165<br>Valdosta, Georgia 31603<br>Tel: (229) 244-0000<br>Fax: (229) 245-1664<br>http://www.georgiagulfsulfur.com<br><br>***Shipping and Receiving***<br>**Holly Industries**<br>1300 Spring Creek Road<br>Bainbridge, Georgia, USA 39817<br>Tel: (229) 246-4552<br>Fax: (229) 246-3245<br>GPS Coordinates: 30° 54' 06" N<br>84° 36' 30" W |
| **Emergency Assistance** | CHEMTREC<br>Tel: (800) 424-9300 within the USA<br>Tel: 001-703-527-3887 outside the USA |

## SECTION 2: HAZARDS IDENTIFICATION

**GHS Classifications**

Skin irritant, Category 1
Eye irritant, Category 1
Flammability, Category 1

**KEY**
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

**GHS Label Elements**

**WARNING**

Irritant (Eye and Skin) | Flammable Solid

## SECTION 2: HAZARDS IDENTIFICATION (CONT)

| | |
|---|---|
| **Hazard Statement** | H228: Flammable solid.<br>H290: May be corrosive to metals.<br>H303: May be harmful if swallowed.<br>H316: May cause mild skin irritation.<br>H320: May cause eye irritation.<br>H335: May cause respiratory irritation. |
| **Prevention Statement** | P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.<br>P220: Keep away from oxidizing agents.<br>P424: Use non-sparking tools when available.<br>P243: Take precautionary measures against static discharge.<br>P261: Avoid breathing dust/fume/gas/mist/vapors/spray.<br>P264: Wash hands thoroughly after handling and before eating.<br>P284: In case of inadequate ventilation, wear respiratory protection. |
| **Response Statement** | P362: Take off contaminated clothing.<br>P363: Wash contaminated clothing before reuse.<br>P370+P378: In case of a fire, use water fog, spray, or regular foam to extinguish. Do not use a direct water stream.<br>P381: Eliminate all ignition sources. |
| **Storage Statement** | P402: Store in a dry place.<br>P403: Store in a well-ventilated place.<br>P404: Store in a closed container. |

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

**Chemical Characterization**

**Mixture**

| Product | Percentage Contained | CAS Number |
|---|---|---|
| Sulfur | >99.5% | 7704-34-9 |

**Hazardous Ingredient** None

## SECTION 4: FIRST AID MEASURES

**Description of First Aid Measures**

**Skin** Wash skin thoroughly with mild soap and water. Wash exposed clothing separately before reuse.

**Eye** Immediately flush eyes with plenty of water for 15 minutes, while holding upper and lower lid apart to insure rinsing of entire eye surface and lids. Do not use boric acid to rinse with. FOR SEVERE IRRITATION, SEEK MEDICAL ATTENTION, preferably an ophthalmologist.

**Inhalation** Move victim to fresh air. Watch for signs of an allergic reaction. Use a bronchodilator inhaler if directed by asthma patient. Keep victim warm and quiet. If not breathing, give artificial respiration. If heart has stopped beating, start cardiopulmonary resuscitation (CPR). SEEK MEDICAL ATTENTION.

**Ingestion** Give one tablespoon of *Syrup of Ipecac* to induce vomiting. If vomiting does occur, give fluids again. If vomiting has not occurred in twenty minutes, the same dose of *Syrup of Ipecac* may be repeated one additional time. Alternatively, vomiting may be induced by touching the back of the throat with a finger. Do not give anything by mouth to an unconscious or convulsing person. SEEK MEDICAL ATTENTION.

## SECTION 4: FIRST AID MEASURES (CONT)

**Most Important Symptoms and Effects (Long-Term and Acute)**

Refer to *Section 11: Toxicological Information*

**Indication of any Immediate Medical Attention or Special Treatment Needed**

Individuals with known allergies to sulfide drugs may also have allergic reactions to elemental sulfur.

## SECTION 5: FIREFIGHTING MEASURES

**Suitable Extinguishing Media**

Water fog, spray, or regular foam. Do not use a direct water stream.

**Unsuitable Extinguishing Media**

Do not use solid streams of water, which could create sulfur dust clouds and cause an explosion or could move burning sulfur to adjacent areas.

**Exposure Hazards**

Prevent human exposure to smoke, fumes, or products of combustion (sulfur oxide gases). Evacuate nonessential personnel from the fire area. If large fire, evacuate people downwind from fire. Consider evacuation for ½ mile in all directions.

**Advice for Firefighters**

Firemen exposed to contaminated smoke should be immediately relieved and checked for symptoms of exposure of toxic gases. This should not be mistaken for heat exhaustion or smoke inhalation. SEEK MEDICAL ATTENTION IMMEDIATELY.

**Protective Equipment**

Wear full-faced, self-contained breathing apparatus and full protective clothing.

**Fire and Explosion Hazards**

**Fire will rekindle** until mass is cooled below 310°F (154°C). Cool surrounding areas with water fog to prevent re-igniting. Sulfur dust is HIGHLY FLAMMABLE. If suspended in air, it will ignite by friction, static electricity, heat, sparks, or flames. Sulfur dust clouds may explode.

**Combustion Products**

Sulfur oxide gases.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

**Personal Precautions**

Minor spills such as torn or ruptured containers should be repaired or patched with tape if possible. Place spilled material in a disposable container. Avoid getting dust in eyes.

**Protective Equipment**

Maintain adequate ventilation. Wear a dust mask when dust is present or a respirator if smoke is present. Wear safety glasses.

**Emergency Procedures**

As an immediate precautionary measure isolate spills or leak areas. Eliminate all sources of ignition, such as flares, sparks, or flames, in the immediate area. No smoking. Ventilate closed spaces before entering.

**Environmental Precautions**

Do not allow runoff to enter lakes or waterways.

**Containment/Cleanup Measures**

Gently sweep or shovel up spilled material using a natural fiber broom and/or aluminum shovel to prevent sparking, to avoid creating a dust cloud. Place sweepings in an appropriate chemical waste container for reclaiming or disposal in an approved facility. Wash spill site after clean-up is complete.

## SECTION 7: STORAGE AND HANDLING

**Precautions for Safe Handling**

**All handling and conveying equipment should be properly grounded and bonded.** Be careful not to create dust. Avoid any conditions that might tend to create a dust explosion. Maintain good housekeeping practices to minimize dust build-up and dispersion. Eliminate sources of ignition. Keep away from heat, sparks, and flames. Use nonferrous tools, when available, to reduce sparking. Gently sweep or shovel up spilled materials using a natural fiber broom and/or aluminum shovel to prevent sparking. Maintain adequate ventilation in all areas.

**Conditions for Safe Storage, Including any Incompatibilities:**

Containers should be stored in a cool, dry, well-ventilated area. Keep container tightly closed. Store away from flammable materials, sources of heat, flames, and sparks. Separate from chlorates, nitrates, and other oxidizing agents. Exercise due caution to prevent damage to or leakage from container.

**Incompatible Materials**

Keep away from flammable materials, sources of heat, flame, sparks, chlorates, nitrates and other oxidizing agents.

## SECTION 8: EXPOSURE CONTROLS/ PERSONAL PROTECTION

**Engineering Measures/Control**

Maintain adequate ventilation in all areas. No flares or flames in area. Be careful not to create dust. Eliminate sources of ignition.

**Personal Protective Equipment Pictograms**

**Respiratory**

Wear dust masks and use NIOSH/MSHA approved dust respirator if airborne concentrations exceed exposure limits.

**Eyes/Face**

Wear suitable, protective safety glasses to prevent eye irritation from dust.

**Hands**

Wash hands thoroughly after handling and before eating or smoking.

**Skin/Body**

Wear suitable, protective clothing to prevent skin irritation from dust. Wash skin thoroughly after handling and before eating or smoking. Wash contaminated clothing separately before reuse.

**Environmental Exposure Controls**

Follow best practice for site management and disposal of waste. Avoid release to the environment.

**General Industrial Hygiene Considerations**

Protective equipment should be used in any situation that may result in hazardous exposure. Maintain good housekeeping practices to minimize dust build-up and dispersion. Eliminate sources of ignition. Use nonferrous tools to reduce sparking. Sweep or shovel up spilled material using a natural fiber broom and/or aluminum shovel to prevent sparking. Maintain adequate ventilation in all areas.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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|---|---|
| **Physical State** | Solid |
| **Appearance** | Yellow colored lumps, crystals, powder, or formed shape |
| **Formula** | $S_8$ (Rhombic or monoclinic) |
| **Odor** | Odorless, or faint odor of rotten eggs |
| **Odor Threshold** | No data available |
| **pH** | No data available |
| **Boiling Point** | 832° F (444° C) |
| **Melting/Freezing Point** | 118-120°C (244-248°F) |
| **Flash Point** | 207°C (405°F) Closed Cup |
| **Evaporation Rate** | No data available |
| **Flammability** | May form combustible dust concentrations in air |
| **Flammable/Explosion Limits** | Upper: 6.38% (v) Lower: 0.17% (v) |
| **Vapor Pressure** | 8 mmHg at 246°C (475°F) 1 mmHg at 183.8°C (362.8°F) |
| **Vapor Density** | No data available |
| **Purity** | 99.5% Min. |
| **Auto-Ignition Temperature** | 240°C (464°F) |
| **Decomposition Temperature** | Does not decompose |
| **Viscosity** | Not applicable |
| **Specific Gravity** | 2.07 @ 70° F |
| **Solubility in Water** | Insoluble |
| **Bulk Density** | Lumps: 75-115 lbs. /$ft^3$; Pellets, Flake: 65-75 lbs. /$ft^3$ |

## SECTION 10: STABILITY AND REACTIVITY

| | |
|---|---|
| **Chemical Stability** | Stable |
| **Conditions to Avoid** | Keep from heat sources, sparks, and open flames. |
| **Incompatible Materials** | Oxidizing agents, copper, copper alloys, steel, chlorates, nitrates. |
| **Possibility of Hazardous Reactions** | Oxidizing agents may react violently. |
| **Hazardous Decomposition Products** | Oxides of sulfur gases produced by burning sulfur. |
| **Hazardous Polymerization** | Will not occur. |

## SECTION 11: TOXICOLOGICAL INFORMATION

| | |
|---|---|
| **Likely Routes of Exposure** | Inhalation, ingestion, skin contact, and eye contact. |
| **Signs and Symptoms of Overexposure** | Nose or throat irritation, coughing, chest discomfort, asthma, difficulty breathing, skin irritation, nausea, vomiting, stinging eye irritation, and hives. |
| **Exposure Limits** | No exposure limits have been established. |
| **Acute Symptoms and Effects** | |
| **Inhalation** | Prolonged inhalation may cause irritation of respiratory tract. Breathing of dust may aggravate asthma and other pulmonary diseases. |
| **Eye Contact** | Sulfur dust is an eye irritant. |
| **Skin Contact** | No adverse effects. Skin irritation may be aggravated in persons with existing skin lesions. |
| **Ingestion** | Ingested sulfur is converted to sulfides in the gastrointestinal tract (GI), and ingestion of 10 to 20 grams has caused irritation of the GI tract and renal injury. Swallowing large amounts may cause nausea and vomiting. |

## SECTION 11: TOXICOLOGICAL INFORMATION (CONT)

| | | |
|---|---|---|
| **Long-Term Effects** | | None known to humans |
| **Toxicity** | **$LD_{50}$** | Oral: >5050 mg/kg (rats)<br>Dermal: >2020 mg/kg (rats) |
| | **$LC_{50}$** | Inhalation @ 90%: >5.49-mg/L air concentration (rats) |
| | **Skin** | Slightly irritating (rabbits) |
| | **Eye** | Minimal irritation in non-washed eyes (rabbits) |

| Sensitization | Reproductive Effects | Developmental Effects | Endocrine Disruptor |
|---|---|---|---|
| Not Established | Not Established | Not Established | Not Established |

| Carcinogenicity | Teratogenicity | Mutagenicity |
|---|---|---|
| This product does not contain any ingredient designated by NTP, IARC, or OSHA as a probable human carcinogen. | | |

## SECTION 12: ECOLOGICAL INFORMATION

| | | |
|---|---|---|
| **Toxicity** | | |
| **Toxicity to Fish** | **$LC_{50}$** | *Oncorhynchus mykiss* (rainbow trout) -> 180 mg/l -96h |
| | **$LC_{50}$** | Other fish- 866 mg/l -96h |
| **Toxicity to Daphnia and Other Aquatic Invertebrates** | **$EC_{50}$** | Daphnia magna (Water flea) -> 5,000 mg/l -48h |
| **Ecotoxicity** | No data available | |
| **Mobility** | No data available | |
| **Degradation** | No data available | |
| **Bioaccumulation** | No data available | |
| **Results of PBT and vPvB Assessment** | PBT/vPvB assessment not available as chemical safety assessment not required/not conducted. | |

## SECTION 13: DISPOSAL CONSIDERATIONS

**Waste Treatment Methods**

| | |
|---|---|
| **Product Waste** | Dispose of content and/or container in accordance with local, regional, national and/or international regulations. |
| **Packaging Waste** | Dispose of content and/or container in accordance with local, regional, national and/or international regulations. |

## SECTION 14: TRANSPORTATION INFORMATION

*According to the US Department of Transportation, Office of Hazard Materials Standards 49 CFR, sulfur is not subject to the requirements of this subchapter if transported in a non-bulk packaging or* ***if formed to a specific shape (for example, prills, granules, pellets, pastilles, or flakes)****. A bulk packaging containing sulfur is not subjected to the placarding requirements of subpart F of this part, if it is marked with the appropriate identification number as required by subset D of this part.*

## SECTION 14: TRANSPORTATION INFORMATION (CONT)

**DOT DOMESTIC:**

| | |
|---|---|
| **Shipping Name:** | Sulfur Granules, Sulfur Pellets, Sulfur Flake, Arrow Roll |
| **Hazard Class:** | Not regulated |
| **ID Number:** | None |
| **Packing Group:** | Not applicable |
| **Label:** | None required |
| **Placard:** | None required |
| **Hazardous Substance/Rq:** | Not applicable |

**This product is not a Marine Pollutant as defined in 40 CFR part 172.**

## SECTION 15: REGULATORY INFORMATION

**TSCA** This product is listed on the TSCA Inventory at CAS Registry Number 7704-34-9.

**CERCLA** *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*

- If this product is accidentally spilled, it is not subject to any special reporting. We recommend that you contact state and local authorities to determine if there are other local reporting requirements.

**SARA TITLE III** *Superfund Amendments and Reauthorization Act, Title III*

- Sections 311/312: None. Section 313: None. Section 302: None.

**RCRA** *Resource Conservation and Recovery Act*

- Not subject to reporting because sulfur is not identified as a hazardous waste.

## SECTION 16: OTHER INFORMATION

**Last Revision Date** 05/01/2015 **Preparation Date** 05/01/2014

**Additional Information** For additional information, contact your technical sales representative. For additional health and safety information, call Georgia Gulf Sulfur Corporation at 229-244-0000.

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