



Material Safety Data Sheet (MSDS)

Substance name: Sulfur (Elemental Sulfur, S₈)

Synonyms: Brimstone; Flowers of sulfur

Product forms covered: Granular Sulfur; Powder Sulfur; Lump Sulfur

Recommended use: Industrial feedstock for chemicals, fertilizers, rubber vulcanization, asphalt modification, and other petrochemical applications.

Restrictions on use: Not for pharmaceutical or food applications unless specifically certified.

1. Identification

Company Identification:

Basekim Kimyasal Ürünler LTD
Turan Gunes Blv. Ilkbahar Mah. Sinpas Altinoran Tower 2, Floor 1, Unit 146
Ankara, Turkey

Transportation Emergency Response:

Logistics: **88552948**

Health Emergency:

Basekim Emergency Information Center (Ankara):
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International collect calls accepted

Product Information / MSDS Requests:

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This MSDS has been prepared based on the latest technical information and in compliance with international standards. The information presented here is believed to be accurate and reliable as of the date of revision. However, no warranty is expressed or implied.

2. Hazard(s) Identification (GHS/OSHA HazCom 2012)

Classification:

- Flammable Solid, Category 2 (H228)



- Specific Target Organ Toxicity – Single Exposure (Respiratory Irritation), Category 3 (H335) — primarily relevant to **powder** and dust
- Eye Irritation, Category 2B (H320) and Skin Irritation, Category 3 (H316) — mild, due to mechanical/chemical irritation from dust

Label elements (GHS):**Signal word: Danger****Pictograms:** Flame; Exclamation mark**Hazard statements:**

- H228: Flammable solid.
- H335: May cause respiratory irritation (dust).
- H320/H316: Causes eye/skin irritation (mild).
- **Combustible Dust:** May form combustible dust concentrations in air (particularly **Powder Sulfur**).

Precautionary statements (selection):

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ventilating equipment.

P261 Avoid breathing dust.

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves/eye protection.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P370+P378 In case of fire: Use dry chemical, foam, or water spray for extinction. Do **not** use high-pressure jets that disperse dust.

P403 Store in a well-ventilated place.

Other hazards:

- Hot molten sulfur and fire decomposition generate **toxic sulfur oxides (SO₂/SO₃)**; avoid inhalation.
- **Dust explosion hazard:** Fine sulfur dust is easily ignitable; implement rigorous housekeeping and ignition control.

Form-specific notes:

- **Powder:** Highest dust explosion potential and respiratory irritation risk.
- **Granular:** Moderate dusting; maintain dust control during transfer.
- **Lump:** Lowest dusting; flammability remains relevant at elevated temperature.



3. Composition/Information on Ingredients

| Component | CAS No. | EC No. | Concentration |
|--------------------|-----------|-----------|-------------------|
| Sulfur (elemental) | 7704-34-9 | 231-722-6 | ≥ 99.5% (typical) |

Impurities (ash, moisture, acidity, organics) may vary by grade; see specification sheet.

4. First-Aid Measures

General: If symptoms persist, seek medical attention. Show this MSDS to the physician.

Inhalation (dust/SO₂): Move to fresh air. If breathing is difficult, oxygen by trained personnel. Seek medical advice if irritation persists.

Skin contact: Wash with soap and water. Remove contaminated clothing. Seek medical advice for persistent irritation or burns from molten sulfur.

Eye contact: Rinse cautiously with water for several minutes; remove contact lenses if present and easy to do. Continue rinsing. Seek medical advice if irritation persists.

Ingestion: Rinse mouth. Do **not** induce vomiting. Give water if conscious. Seek medical attention if unwell.

Most important symptoms: Mechanical irritation to eyes/skin; coughing, throat irritation from dust or SO₂ exposure.

Notes to physician: Treat symptomatically. For significant inhalation, monitor for delayed pulmonary effects from sulfur oxides exposure.

5. Fire-Fighting Measures

Suitable extinguishing media: Dry chemical, foam, water spray/fog. **Avoid** high-pressure water jets that can disperse dust or spread molten sulfur.

Specific hazards: Sulfur dust can **explode** if dispersed in air and ignited. Burning sulfur produces SO₂/SO₃, causing corrosive acidic fumes with water.

Special protective equipment: Full PPE and self-contained breathing apparatus (SCBA).

Firefighting instructions: Isolate area. Fight fire from upwind. Use water spray to cool containers. Do not allow runoff to enter drains.

6. Accidental Release Measures



Personal precautions: Eliminate ignition sources; ground equipment. Avoid dust formation. Wear respiratory protection for dust (see Section 8).

Environmental precautions: Prevent product and fire-fighting runoff from entering waterways.

Containment/cleanup: Avoid dry sweeping of large powder spills; use gentle vacuum with HEPA/ATEX or wet methods to minimize dust. Collect mechanically for disposal or recovery in suitable containers. Maintain housekeeping to prevent dust accumulation (>1/32 inch).

7. Handling and Storage

Handling:

- Control dust at source (enclosed transfer, local exhaust).
- Use non-sparking tools; ground/bond all containers.
- Prohibit smoking/open flames in handling zones.
- Avoid breathing dust; avoid contact with eyes/skin.
- For **powder**, consider inerting (nitrogen) in confined equipment and use ATEX-rated gear.

Storage:

- Store cool, dry, well-ventilated; away from heat, sparks, oxidizers (e.g., nitrates, chlorates, permanganates), halogens, and strong acids.
- Keep containers tightly closed; protect from moisture and direct sunlight.
- Bulk storage: manage self-heating risks; monitor temperature and hotspots.

8. Exposure Controls/Personal Protection

Exposure limits:

- **OSHA PEL (Particulates Not Otherwise Regulated):** 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).
- **ACGIH TLV (Particles, Insoluble or Poorly Soluble Not Otherwise Specified – PNOS):** 10 mg/m³ (inhalable), 3 mg/m³ (respirable) – guidance.



Engineering controls: Local exhaust ventilation (LEV) at transfer points; enclosure of conveyors; dust collection/filtration; explosion venting/relief as per applicable codes.

Personal protective equipment (PPE):

- **Respiratory:** For nuisance dust: P2/P95 or better; for high concentrations or SO₂ exposure: use approved respirator.
- **Eyes/face:** Safety glasses with side shields; for high dust: goggles or face shield.
- **Skin:** Chemical-resistant gloves (nitrile/neoprene) and long-sleeved clothing.
- **Other:** Antistatic footwear; avoid synthetic fabrics prone to static in dusty areas.

9. Physical and Chemical Properties

| Property | Value |
|------------------------------|--|
| Appearance | Yellow solid (lump, granule, or powder) |
| Odor | Faint, characteristic |
| Odor threshold | Not available |
| pH | Not applicable (insoluble in water) |
| Melting point/freezing point | ~ 115 °C |
| Initial boiling point | ~ 444.6 °C |
| Flash point | ~ ≥ 160–190 °C (method dependent) |
| Auto-ignition temperature | ~ ≥ 232 °C (form dependent) |
| Flammability | Flammable solid (GHS Cat. 2) |
| Vapor pressure | Negligible at 25 °C |
| Relative density (solid) | ~ 2.0–2.1 g/cm ³ |
| Bulk density | Lump: n/a; Granular: ~ 0.9–1.3 g/cm ³ ; Powder: ~ 0.5–1.0 g/cm ³ |
| Solubility | Insoluble in water; soluble in carbon disulfide (CS ₂) |



| | |
|--|--|
| Partition coefficient n-octanol/water | Not available |
| Viscosity | Not applicable (solid) |
| Explosive properties | Dust explosion hazard (especially powder) |
| Oxidizing properties | Not oxidizing |

Form-specific particle size guidance:

- **Granular:** 2–6 mm typical ($\geq 90\%$ within range).
- **Powder:** < 0.15 mm ($\geq 90\%$ passing) or as specified.
- **Lump:** 10–200 mm (as agreed).

10. Stability and Reactivity

Reactivity: Stable under recommended conditions.

Chemical stability: Stable at ambient conditions; may undergo self-heating in large masses.

Possibility of hazardous reactions: Dust explosions; reacts vigorously with strong oxidizers; may react with halogens.

Conditions to avoid: Heat, sparks, open flames, static discharges, dust accumulation, prolonged sunlight.

Incompatible materials: Strong oxidizers (nitrates, chlorates, permanganates), halogens, metals in finely divided form, strong acids.

Hazardous decomposition products: SO_2 , SO_3 , H_2S (trace) upon heating/combustion.

11. Toxicological Information

Likely routes of exposure: Inhalation of dust; eye/skin contact.

Acute toxicity: Low acute toxicity; primary effects are irritation.

Skin corrosion/irritation: Mild irritant (mechanical/chemical).

Serious eye damage/irritation: May cause transient irritation/redness.

Respiratory or skin sensitization: Not expected to be a sensitizer.

STOT – single exposure: Respiratory tract irritation (dust).

Carcinogenicity/Mutagenicity/Reproductive toxicity: Not classified.

Aspiration hazard: Not applicable (solid).

Additional hazards: Molten sulfur can cause thermal burns.



12. Ecological Information

Ecotoxicity: Not classified as hazardous to the aquatic environment in solid form. Large releases may alter local pH upon oxidation to sulfate/sulfuric acid.

Persistence and degradability: Inorganic; gradually oxidizes to sulfate.

Bioaccumulative potential: Low.

Mobility in soil: Low (insoluble); particle migration possible as dust.

Other adverse effects: None known when handled per instructions.

13. Disposal Considerations

Dispose of contents/containers in accordance with local/regional/national regulations. Recover/recycle when practical. Do not discharge to drains or waterways. For contaminated absorbents/soil, follow hazardous waste guidance if applicable (especially after fires producing sulfur oxides).

14. Transport Information

UN Number: UN 1350

Proper Shipping Name: Sulfur

Hazard Class: 4.1 (Flammable solid)

Packing Group: III

Marine pollutant: No

Special provisions/notes: Some jurisdictions provide exceptions for formed, non-dusting solid sulfur; verify carrier and modal rules (ADR/RID/IMDG/IATA) for the shipped **form** (granular/lump vs. powder). Prevent dusting and control ignition sources during loading/unloading.

15. Regulatory Information

- Classified and labeled in accordance with **GHS / OSHA HazCom 2012**.
- REACH: Substance subject to general requirements; ensure registration/uses as applicable to placing on the EU market.
- No ingredients listed on major carcinogen lists at typical concentrations (IARC, NTP, OSHA) for elemental sulfur.



(Insert additional local regulatory statements as applicable to destination markets.)

16. Other Information

Key references: Standard industrial guidance for elemental sulfur; specification sheets for granular/powder/lump sulfur grades.

Revision date: (fill in)

Prepared by: Basekim Petrochemical – HSE/QA

Disclaimer: The information herein is believed to be accurate as of the date of issue and is provided in good faith for guidance. It does not constitute a warranty of specification. Users must ensure suitability for their specific application and comply with applicable laws and regulations.

Appendix A – Grade-Specific Specifications (Typical)

- **Granular Sulfur:** Purity $\geq 99.5\%$; Ash $\leq 0.05\%$; Moisture $\leq 0.5\%$; Acidity (as H_2SO_4) $\leq 0.02\%$; Particle size 2–6 mm ($\geq 90\%$).
- **Powder Sulfur:** Purity $\geq 99.5\%$; Ash $\leq 0.05\%$; Moisture $\leq 0.5\%$; Acidity $\leq 0.02\%$; Particle size < 0.15 mm ($\geq 90\%$ passing).
- **Lump Sulfur:** Purity $\geq 99.5\%$; Ash $\leq 0.05\%$; Moisture $\leq 0.5\%$; Acidity $\leq 0.02\%$; Particle size 10–200 mm (as specified).

Highlight of differences by form:

- Hazard emphasis: **Powder > Granular > Lump** (for dust explosion/respiratory irritation).
- Handling/controls: Powder requires stricter dust control and possible inerting; granular typically needs enclosure/local exhaust; lump focuses on thermal controls and safe fragmentation.
- Transport/packaging: All under **UN 1350, Class 4.1, PG III** unless exempted for non-dusting forms by specific modal/jurisdiction rules.