

Revision date: 05.2015 Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name/designation:	Sulfuric acid, BDH Aristar [®] Plus Sulfuric acid, BDH Aristar [®] Ultra
Product No.:	87003-271, 87003-273 87003-232, 87003-234
Other means of identification:	EU Index # 016-020-00-8

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: For laboratory use only. Not for drug, food, or household use.

1.3. Details of the supplier of the safety data sheet

Manufactured for	VWR International, LLC Radnor Corporate Center 100 Matsonford Road Radnor, PA 19087-8660	VWR International Co 2360 Argentia Road Mississauga, ON L5N 5Z7 CANADA
Telephone	610.386.1700	800.932.5000

1.4. Emergency Telephone number

CHEMTREC	800.424.9300
CANUTEC	613.996.6666

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS) and WHMIS HPR

For the full text of the H-Statement(s) and P-Statement(s) mentioned in this Section, see Section 16.

Hazard classes and hazard categories	Hazard statements
Skin corrosion, category 1A	H314
Acute toxicity, inhalation, category 3	Supplemental

2.2. GHS Label elements, including precautionary statements

Pictograms:



Signal word: Danger

Hazard statements	
H314	Causes severe skin burns and eye damage.
Supplemental	In contact with water, releases gases which are toxic if inhaled.

Precautionary statements	
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor.
P370+P378	In case of fire: Do NOT use water to extinguish.
P501	Dispose of contents/containers in accordance with local, state and federal regulations.

2.4. Hazards not otherwise classified (HNOC) or not covered by GHS or WHIMS

None known.

SECTION 3: Composition / information on ingredients

3.1. Hazard components

Chemical name	Formula	Molecular weight	CAS#	Weight%
Sulfuric acid	H ₂ SO ₄	98.07	7664-93-9	93-98%
Water	H ₂ O	18.02	7732-18-5	Balance

SECTION 4: First aid measures

4.1. General information

In case of inhalation: This chemical is very toxic. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment, use the buddy system). Remove source of contamination or move victim to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Quickly transport victim to an emergency care facility.

In case of skin contact: Avoid direct contact. Wear chemical protective clothing, if necessary. As quickly as possible, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Immediately flush with lukewarm, gently flowing water for at least 30 minutes. DO NOT INTERRUPT FLUSHING. If necessary and it can be done safely, continue flushing during transport to emergency care facility. Quickly transport victim to an emergency care facility. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal.

In case of eye contact: Avoid direct contact. Wear chemical protective gloves, if necessary. Quickly and gently blot or brush chemical off the face. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens until flushing is done. Neutral saline solution may be used as soon as it is available. DO NOT

INTERRUPT FLUSHING. If necessary, continue flushing during transport to emergency care facility. Take care not to rinse contaminated water into the unaffected eye or onto the face. Quickly transport victim to an emergency care facility.

In case of ingestion: NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

4.2. Most important symptoms and effects, both acute and delayed

VERY TOXIC. May be fatal if inhaled. CORROSIVE to the eyes, skin and respiratory tract. May cause blindness and permanent scarring. Causes lung injury—effects may be delayed. Strong inorganic acid mists containing sulfuric acid are CARCINOGENIC.

4.3. Indication of any immediate medical attention and special treatment needed

Consult a doctor and/or the nearest Poison Control Centre for all exposures.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Sulfuric acid is not combustible. Use extinguishing agents suitable for the surrounding fire. Use water only to keep non-leaking, fire-exposed containers cool. If water is used, care should be taken, since it can generate heat and cause spattering if applied directly to sulfuric acid.

WATER REACTIVE. DO NOT use water or water-based extinguishers since it can generate heat and cause spattering if applied directly to sulfuric acid.

5.2. Special hazards arising from the substance or mixture

During a fire, irritating/toxic sulfur oxides may be generated. Sulfuric acid reacts violently with water and organic materials with the evolution of heat. Fire may result due to the heat generated by contact of concentrated sulfuric acid with combustible materials. Sulfuric acid reacts with most metals, especially when diluted with water. This reaction produces highly flammable hydrogen gas, which may explode if ignited, particularly in confined spaces. Sulfuric acid is a strong dehydrating agent, which may cause ignition of finely divided materials on contact. Containers may explode in the heat of a fire.

5.3. Special protective equipment for firefighters

Sulfuric acid and its decomposition products are very corrosive and very hazardous to health. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. A full-body encapsulating chemical protective suit with positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

5.4. Hazardous combustion products

Corrosive and very toxic sulfur oxide gases.

5.5. Advice for firefighters

Evacuate area and fight fire from a safe distance or protected location. Approach fire from upwind to avoid hazardous decomposition products, particularly corrosive and very toxic sulfur oxide gases.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Restrict access to area until completion of cleanup. Ensure cleanup is conducted by trained personnel only. Wear adequate personal protective equipment. Remove or isolate incompatible materials.

6.2. Environmental precautions

Notify government occupational health and safety and environmental authorities.

6.3. Methods and material for containment and cleaning up

Do not touch spilled material. Prevent material from entering confined spaces, sewers or waterways. Keep materials that can burn away from spilled material. Stop or reduce leak if safe to do so. Contaminated absorbent material may pose the same hazards as the spilled product.

Small spills: Soak up spill with absorbent material that does not react with spilled chemical. Put material in suitable, covered, labeled containers. Flush area with water.

Large spills: Contact fire and emergency services and supplier for assistance and advice. Contain spill with dry sand, clay, diatomaceous earth, or absorbent material that does not react with spilled material. Cautiously dilute and neutralize with lime or soda ash. Remove liquid by corrosion-resistant pumps or vacuum equipment. Place in suitable, covered, labeled containers.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

This material is a CORROSIVE and VERY TOXIC liquid. Before handling, it is important that engineering controls are operating and that protective equipment requirements and personal hygiene measures are being followed. People working with this chemical should be properly trained regarding its hazards and its safe use.

Unprotected persons should avoid all contact with this chemical including contaminated equipment. Immediately report leaks, spills or ventilation failures. Avoid generating vapors or mists. Prevent the release of vapors or mists into the air. Use the smallest possible amounts in an area separate from the storage area. When handling large quantities, closed handling systems should be used.

This material is highly reactive. Prevent accidental contact with water. Do not use with incompatible materials such as alkali solutions, carbides, chlorates and nitrates. See Section 10 for more information. Never return contaminated material to its original container. Never add water to a corrosive. Always add corrosives to water. When mixing with water, stir small amounts in slowly. Use cold water to prevent excessive heat generation.

Inspect containers for leaks before handling. Secondary protective containers must be used when this material is being carried. Label containers. Avoid damaging containers. Keep containers tightly closed when not in use. Assume that empty containers contain residues which are hazardous. Use corrosion-resistant transfer equipment when dispensing. Whenever possible, use self-closing, portable containers for dispensing small amounts of this material. Never transfer liquid by pressurizing original container with air or inert gas. Have suitable emergency equipment for fires, spills and leaks readily available. Practice good housekeeping. Maintain handling equipment. Comply with applicable regulations.

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry area out of direct sunlight and away from heat and ignition sources. Keep quantities stored as small as possible. Avoid bulk storage indoors. It is very important that sulfuric acid be stored away from the many materials with which it is incompatible. See Section 10 for more information.

Inspect all incoming containers to make sure they are properly labeled and not damaged. Always store in original

labeled container. Protect the label and keep it visible. Keep containers tightly closed when not in use and when empty. Protect from damage. Store containers at a convenient height for handling, below eye level if possible. Keep empty containers in separate storage area. Assume that empty containers contain hazardous residues.

Inspect storage area regularly for evidence of leakage or corrosion. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Keep storage area separate from work areas. Post warning signs.

Contain spills or leaks by storing in trays made from compatible materials. Keep absorbents for leaks and spills readily available. Provide raised sills or ramps at doorways or create a trench which drains to a safe location. Floors should be sealed to prevent absorption. In large scale storage facilities, walls, floors, shelving, lighting and ventilation systems in storage area should be made from materials that resist attack from sulfuric acid.

Storage facilities should be made of fire-resistant materials. Have appropriate fire extinguishers and spill clean-up equipment in storage area. Storage tanks should be above ground and surrounded with a dike capable of holding entire contents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chemical Name	Limit Value Type	Exposure Limit Value	Source
Sulfuric acid	TLV-TWA	0.2 mg/m ³	USA ACGIH
	PEL-T-TWA, REL-TWA	1 mg/m ³	USA OSHA, USA NIOSH
	IDLH	15 mg/m ³	USA NIOSH
Water	None listed.	Not applicable	Not applicable

8.2. Exposure controls

Appropriate engineering controls: Engineering methods to control hazardous conditions are preferred. Methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions, and process modification (e.g. substitution of a less hazardous material).

Because of the high potential hazard associated with this substance, stringent control measures such as enclosure or isolation may be necessary to control mists. Use a corrosion-resistant local exhaust ventilation system separate from other exhaust ventilation systems. Cleaning of contaminated exhaust air before release to the outdoors may be necessary. Supply sufficient replacement air to make up for air removed by exhaust systems.

Personal protective equipment:

Eye/face protection: Chemical safety goggles. A face shield may also be necessary.

Skin protection: Chemical protective gloves, coveralls, boots, and/or other chemical protective clothing. A chemical protective full-body encapsulating suit and respiratory protection may be required in some operations. Have a safety shower/eye-wash fountain readily available in the immediate work area.

Respiratory protection: NIOSH/OSHA RECOMMENDATIONS FOR SULFURIC ACID CONCENTRATIONS IN AIR:

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS: Positive pressure, full face piece SCBA; or positive pressure, full face piece SAR with an auxiliary positive pressure SCBA.

ESCAPE: Any air-purifying, full face piece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having an N100, R100, or P100 filter. Any appropriate escape-type, self-contained breathing apparatus.

Hygiene measures: Remove contaminated clothing immediately. Discard or launder before re-wearing. Inform laundry personnel of contaminant's hazards. Do not eat, drink, or smoke in work areas. Wash hands thoroughly after handling this material. Maintain good housekeeping.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

a) Appearance:	
Physical state	Dense, oily liquid
Color	Clear, colorless to dark brown
b) Odor	Odorless
c) Odor threshold	Irritation is expected above the TLV
d) pH	0.3 (1N solution); 1.2 (0.1N solution); 2.1 (0.01N solution)
e) Melting point/freezing point	93% (w/w): -32 °C (-25.6 °F); 98% (w/w): 3 °C (37.4 °F); 100% (w/w): 10.4-10.5 °C (50.6-50.9 °F)
f) Boiling point/boiling range	93% (w/w): 279 °C (534.2 °F); 98% (w/w): 310-340 °C (590-644 °F); 100% (w/w): 290 °C (554.0 °F)
g) Flash point	Not combustible (does not burn).
h) Evaporation rate	Slower than ether.
i) Flammability (solid, gas)	Not applicable
j) Upper/lower flammability/explosive limits	Not applicable
k) Vapor pressure	Less than 0.04 kPa (0.3 mm Hg) at 25 °C
l) Vapor density	3.38 (air = 1) (calculated)
m) Relative density (at 15 °C)	93% (w/w): 1.835 g/cm ³ ; 98% (w/w): 1.844 g/cm ³ ; 100% (w/w): 1.839 g/cm ³
n) Solubilities	Soluble in all proportions in water with generation of much heat. Decomposes in ethanol.
o) Partition coefficient (n-Octanol/Water)	Not applicable (ionizable compounds)
p) Auto-ignition temperature	Not applicable
q) Decomposition temperature	340 °C (644 °F)
r) Viscosity (dynamic, at 25 °C)	93% (w/w): 11.0 mm ² /s (11.0 centistokes); 98% (w/w): 11.5 mm ² /s (11.5 centistokes); 100% (w/w): 13.6 mm ² /s (13.6 centistokes) (calculated)
s) Explosive properties	Not applicable
t) Oxidizing properties	Oxidizing potential (concentrated, at high temperatures)

SECTION 10: Stability and reactivity

10.1. Reactivity

Warning: It is fairly easy to produce the dangerous anhydrous perchloric acid from either its salts or its aqueous solutions by heating with high boiling acids and dehydrating agents such as sulfuric acid and phosphorus pentoxide.

10.2. Chemical stability

Normally stable.

10.3. Possibility of hazardous reactions

Although concentrated sulfuric acid is referred to as an oxidizing agent in some sources, it is not a very strong oxidizing agent. The 98% acid has some oxidizing ability when hot. Sulfuric acid does not polymerize and does not

form peroxides. See Section 10.5 for incompatible materials.

10.4. Conditions to avoid

Contact with water.

10.5. Incompatible materials

Sulfuric acid is a very reactive substance. The concentrated acid dehydrates, or sulfonates most organic compounds. Sulfuric acid reacts vigorously, violently or explosively with many organic and inorganic chemicals including water, acrylonitrile, alkali solutions, carbides, chlorates, fulminates, nitrates, perchlorates, permanganates, picrates, powdered metals, metal acetylides or carbides, epichlorohydrin, aniline, ethylenediamine, alcohols with strong hydrogen peroxide, chlorosulfonic acid, cyclopentadiene, hydrofluoric acid, nitromethane, 4-nitrotoluene, phosphorus(III) oxide, potassium, sodium, ethylene glycol, isoprene, styrene. Acetaldehyde and allyl chloride may polymerize violently in the presence of sulfuric acid. Hazardous gases, such as hydrogen, hydrogen cyanide, hydrogen sulfide and acetylene, are evolved on contact with chemicals such as metals, cyanides, sulfides and mercaptans and carbides respectively.

10.6. Hazardous decomposition products

Decomposes at 340 °C into sulfur trioxide and water.

SECTION 11: Toxicology

11.1. Information on toxicological effects

Acute toxicity

Oral LD50: 2140 mg/kg (rat)

Inhalation LC50: 510 mg/m³/2H (rat)

Dermal LD50: No information available.

Other information on acute toxicity: RTECS# WS5600000

Skin corrosion/irritation: Sulfuric acid is corrosive. Corrosive materials are capable of producing severe burns, blisters, ulcers and permanent scarring, depending on the concentration of the solution and the duration of contact. Extensive acid burns can result in death. High mist or aerosol concentrations may cause redness, irritation and burns to the skin if contact is prolonged.

Serious eye damage/eye irritation: Sulfuric acid is corrosive. Corrosive materials are capable of producing severe eye burns, and permanent injury, including blindness, depending on the concentration of the solution and the duration of contact. Sulfuric acid mists and aerosols are expected to be irritating.

Respiratory or skin sensitization: Sulfuric acid is corrosive and can cause severe irritation or corrosive damage if inhaled. It is not very volatile, and therefore workplace exposures are primarily to mists or aerosols. The degree and severity of respiratory effects are influenced by factors such as the physical state and particle size of the aerosol, deposition site, concentration and humidity. Sulfuric acid can cause severe lung damage with a life-threatening accumulation of fluid (pulmonary edema). The symptoms of pulmonary edema include coughing, chest pain and shortness of breath and can be delayed for up to 24 or 48 hours after exposure. These symptoms are aggravated by physical exertion. Long-term lung damage may result from a severe short-term exposure.

Germ cell mutagenicity: No information available.

Carcinogenicity: Occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans. The information located is insufficient to conclude that sulfuric acid itself is a carcinogen.

Reproductive toxicity: No information available.

Specific target organ toxicity-single exposure: No information available.

Specific target organ toxicity-repeated exposure: No information available.

Aspiration hazard: No information available.

Additional information: Although sulfuric acid is widely used, there is little information on the effects of long-term exposure. Long-term exposure to corrosive materials like sulfuric acid can cause chronic respiratory irritation. Repeated exposure to sulfuric acid aerosols has caused dental erosion. Repeated skin contact with low concentrations can cause dry, red, cracked skin (dermatitis).

SECTION 12: Ecological information

12.1. Ecotoxicity: Zebra fish (*Brachydanio rerio*): LC50 = 82 mg/L/24H; Shrimp: LC50 = 80-90 mg/L/48H (aerated water)

12.2. Persistence and degradability: Sulfuric acid will ultimately react with calcium and magnesium in water to form sulfate salts.

12.3. Bioaccumulative potential: Bioaccumulation is not anticipated for inorganic compounds that are miscible with water.

12.4. Mobility in soil: The presence of water in the soil influences the rate of chemical movement. Sulfuric acid can dissolve some of the soil material, in particular carbonate-based materials.

12.5. Results of PBT and vPvB assessment: Not applicable for inorganic substances.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Review federal, provincial and local government requirements prior to disposal. Store material for disposal as indicated in Storage Conditions.

SECTION 14: Transport information

Land Transport DOT (U.S.)

UN Number	UN1830
Proper Shipping Name	SULFURIC ACID with more than 51 percent acid
Class(es)	8
Hazard Label(s)	Corrosive
Packing Group	II
Environmental Hazard(s)	--

Sea Transport IMDG

UN Number	UN1830
Proper Shipping Name	SULFURIC ACID with more than 51% acid
Class(es)	8
Hazard Label(s)	Corrosive
EMS- No.	F-A, S-B
Packing Group	II
Environmental Hazard(s)	--
Segregation Group	Category C

Air Transport IATA

UN Number	UN1830
Proper Shipping Name	Sulfuric acid with more than 51% acid
Class(es)	8
Hazard Label(s)	Corrosive
Packing Group	II

SECTION 15: Regulatory information

OSHA Hazards: CAS #7664-93-9 meets criteria for hazardous material, as defined by 29 CFR 1910.1200.

SARA 302 Extremely Hazardous Substances: This material contains Sulfuric acid (CAS# 7664-93-9), which is subject to the reporting requirement of 1,000 lbs RQ.

SARA 313 (TRI reporting): This material contains Sulfuric acid (CAS# 7664-93-9), which is subject to the reporting requirements of Section 313 of SARA Title III (aerosol forms).

SARA 311/312 Hazardous Chemicals: This material contains Sulfuric acid (CAS# 7664-93-9).

Massachusetts Right-To-Know Substance List: CAS# 7664-93-9 is listed, 50 lbs RQ.

Pennsylvania Right-To-Know Hazardous Substances: CAS# 7664-93-9 is listed, E (environmental hazard).

New Jersey Worker and Community Right-To-Know Components: CAS# 7664-93-9 is listed, RTK# 1761.

California Proposition 65: CAS# 7664-93-9 is subject to this act (Strong inorganic mists containing sulfuric acid, type of toxicity: cancer). CAS# 7732-18-5 is not subject to this act.

Inventory Status:

Canada DSL/NDSL Inventory List: CAS# 7664-93-9 is listed. CAS# 7732-18-5 is listed.

US TSCA Inventory List: CAS# 77664-93-9 is listed. CAS# 7732-18-5 is listed.

EINECS, ELINCS or NLP: CAS# 7664-93-9 is listed, EC# 231-639-5. CAS# 7732-18-5 is listed, EC# 231-791-2.

SECTION 16: Other information

Full text of H-Statement(s) and P-Statement(s)

H314	Causes severe skin burns and eye damage.
Supplemental	In contact with water, releases gases which are toxic if inhaled.
P260	Do not breathe fumes/gas/mist/vapours/spray.
P264	Wash thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370+P378	In case of fire: Do NOT use water to extinguish.
P310	Immediately call a POISON CENTER or doctor.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/containers in accordance with local, state and federal regulations.

Canadian Carcinogenicity hazard class: Not applicable.
PHNOC hazard class: Not applicable.
HHNOC hazard class: Not applicable.
Biohazardous Infectious Materials hazard class: Not applicable.

NFPA Rating:

Health: 3
Flammability: 0
Reactivity: 2
Special Hazard: Water reactive



DISCLAIMER

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. VWR International and its Affiliates shall not be held liable for any damage resulting from handling.