

HYDRAZINE SULPHATE

GHS Safety Data Sheet

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

HYDRAZINE SULPHATE

OTHER NAMES

N₂H₄.H₂SO₄, N₂-H₆-S-O₄, N₂-H₆-S-O₄, "hydrazine monosulphate monosulfate", "hydrazinium sulphate sulfate", "hydrazonium sulfate", "hydrazine sulphate (1:1)", "hydrazine sulfate (1:1)"

PROPER SHIPPING NAME

CORROSIVE SOLID, TOXIC, N.O.S.(contains hydrazine sulfate)

PRODUCT USE

■ Reducing agent.

Manufacture of chemicals, reducing agent in textile treatments, catalyst in making acetate fibres; component of fluxes. Analysis of minerals, determination of arsenic in metals; separation of polonium from tellurium; fungicide. Also used as germicide.

SUPPLIER

Company: S D FINE - CHEM LIMITED

Address:

315- 317, T.V.IND.ESTATE,

248 WORLI ROAD,

MUMBAI- 400 030, INDIA

technical@sdfine.com

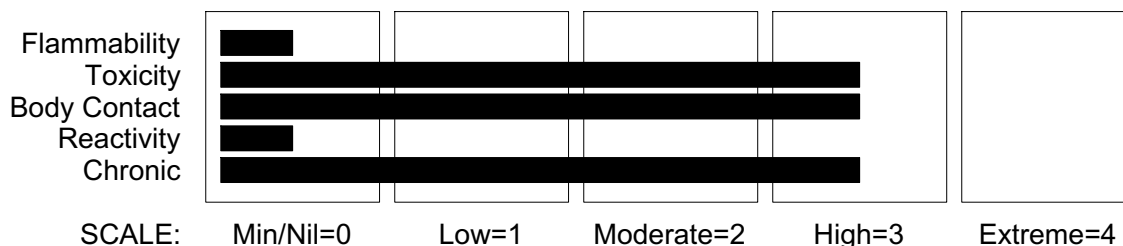
Telephone: 91- 22 24959898

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Section 2 - HAZARDS IDENTIFICATION

HAZARD RATINGS



GHS Classification

Acute Aquatic Hazard Category 1

Acute Toxicity (Dermal) Category 3

Acute Toxicity (Inhalation) Category 3

Acute Toxicity (Oral) Category 3

continued...

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Section 2 - HAZARDS IDENTIFICATION

Carcinogen Category 1B
Metal Corrosion Category 1
Respiratory Sensitizer Category 1
Serious Eye Damage Category 1
Skin Corrosion/Irritation Category 1C
Skin Sensitizer Category 1



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H301 H311 H331 H334 H317 H350 H290 H314 H318 H400

Toxic if swallowed

Toxic in contact with skin

Toxic if inhaled

May cause allergic or asthmatic symptoms or breathing difficulties if inhaled

May cause allergic skin reaction

May cause CANCER

May be corrosive to metals

Causes severe skin burns and eye damage

Causes serious eye damage

Very toxic to aquatic life

PRECAUTIONARY STATEMENTS

Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep only in original container.

Do not breathe dust/fume/gas/mist/vapours/spray.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Contaminated work clothing should not be allowed out of the workplace.

Avoid release to the environment.

Wear protective gloves/protective clothing/eye protection/face protection.

Use personal protective equipment as required.

In case of inadequate ventilation wear respiratory protection.

Response

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF ON SKIN: Wash with plenty of soap and water.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to

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Section 2 - HAZARDS IDENTIFICATION

do. Continue rinsing.
IF exposed or concerned: Get medical advice/ attention.
Immediately call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.
If skin irritation or rash occurs: Get medical advice/attention.
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
Absorb spillage to prevent material damage.
Collect spillage.

Storage

Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Store in corrosive resistant container or with a resistant inner liner.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
hydrazine sulfate	10034-93-2	> 99

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Transport to hospital or doctor without delay.

EYE

- If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If skin or hair contact occurs:
- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

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Section 4 - FIRST AID MEASURES

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.
- Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
- Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
- As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
- Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.

This must definitely be left to a doctor or person authorised by him/her.

(ICSC13719).

NOTES TO PHYSICIAN

- Treat symptomatically.

In poisonings involving hydrazine:

Correction of early hypoglycaemia, with large parenteral doses of pyridoxine appears to suppress convulsions and other neurological effects.

In man, hydrazine-induced hyperexcitability and coma may respond to massive doses of pyridoxine but there is no evidence that liver necrosis or damage can be prevented or corrected by this antidote.

GOSSELIN, SMITH & HODGE: Clinical Toxicology of Commercial Products, 5 th Ed.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Non combustible.
 - Not considered a significant fire risk, however containers may burn.
- Decomposition may produce toxic fumes of: nitrogen oxides (NO_x), sulfur oxides (SO_x).
May emit corrosive fumes.

FIRE INCOMPATIBILITY

- None known.

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Section 5 - FIRE FIGHTING MEASURES

Personal Protective Equipment

Gas tight chemical resistant suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

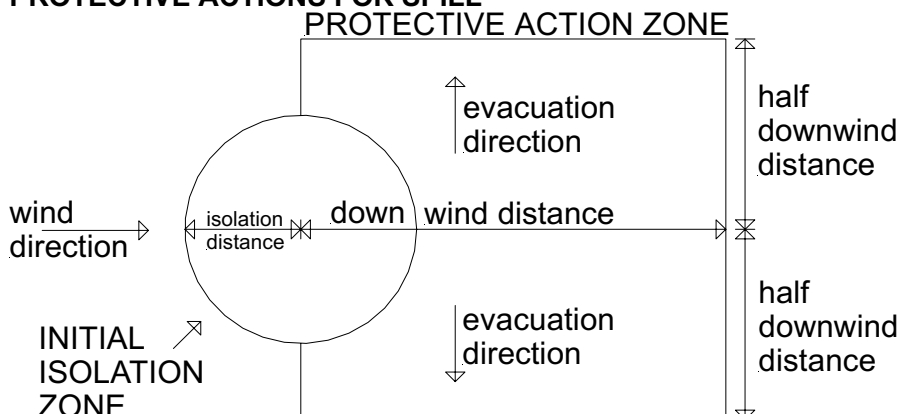
MINOR SPILLS

- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so. Water spray or fog may be used to disperse / absorb vapour.
- Contain or absorb spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance	25 metres
Downwind Protection Distance	250 metres
IERG Number	37

FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to

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the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills".

LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 154 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with moisture.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER

- Glass container is suitable for laboratory quantities.
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;
 - Cans with friction closures and
 - low pressure tubes and cartridges
- may be used.

-

Where combination packages are used, and the inner packages are of glass, porcelain or stoneware, there must be sufficient inert cushioning material in contact with inner and outer packages unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.

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Section 7 - HANDLING AND STORAGE

STORAGE INCOMPATIBILITY

- Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
- Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.
- Dangerous goods of other classes.

Avoid with alkali metals, ammonia, fluorine and metallic oxides.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- hydrazine sulfate:

CAS:10034- 93- 2

MATERIAL DATA

HYDRAZINE SULFATE:

■ Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

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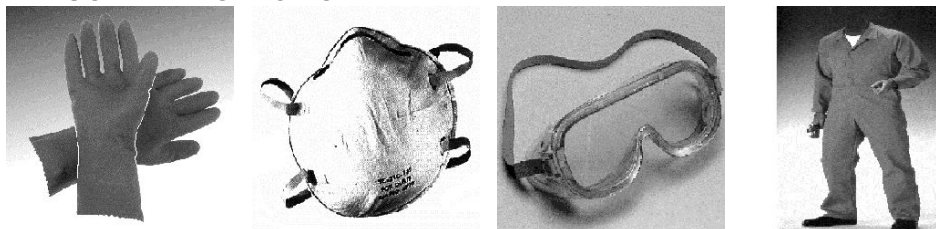
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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace. At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

PERSONAL PROTECTION



EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber.

NOTE:

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
 - frequency and duration of contact,
 - chemical resistance of glove material,
 - glove thickness and
 - dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

- Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area.
- Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted.

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HYDRAZINE SULPHATE

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.
- Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood.
- Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

- Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area.
- Work should be undertaken in an isolated system such as a "glove-box" . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.
- Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.
- Open-vessel systems are prohibited.
- Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.
- Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.
- For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).
- Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.
- Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

velocity of 150 feet/ min. with a minimum of 125 feet/ min. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Odourless white crystalline powder. Very soluble in hot water, soluble at 1 part in 33 cold water. Insoluble in alcohol. Strong reducing agent.

PHYSICAL PROPERTIES

Mixes with water.

Corrosive.

Toxic or noxious vapours/gas.

State	DIVIDED SOLID	Molecular Weight	130.14
Melting Range (°C)	254	Viscosity	Not Applicable
Boiling Range (°C)	Decomposes.	Solubility in water (g/L)	Miscible
Flash Point (°C)	Not applicable	pH (1% solution)	< 7
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°C)	Not applicable	Vapour Pressure (kPa)	Not applicable
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	1.37
Lower Explosive Limit (%)	Not applicable	Relative Vapour Density (air=1)	Not applicable.
Volatile Component (%vol)	Not applicable	Evaporation Rate	Not applicable

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
- The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- Sulfates are not well absorbed orally, but can cause diarrhoea.
- In animals, hydrazine and its derivatives cause convulsions, nervous system changes, muscle spasms and seizures, fever, and other symptoms, and in severe cases, causes failure of breathing and death.

EYE

- The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.
- If applied to the eyes, this material causes severe eye damage.

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Section 11 - TOXICOLOGICAL INFORMATION

SKIN

- Skin contact with the material may produce toxic effects; systemic effects may result following absorption.
- The material can produce chemical burns following direct contact with the skin.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- If inhaled, this material can irritate the throat and lungs of some persons.
 - Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects.
 - Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
- If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
- Symptoms of inhalation of hydrazine (and some of its derivatives) may include nausea and headache. Central nervous system (CNS) excitement may lead to convulsions, and, in severe cases, breathing stoppage and death. There may also be twitching of the extremities, seizure-like movements, brisk reflexes, convulsions and fever; these may progress to lethargy, inco-ordination, confusion, coma and low blood pressure. Decreased urinary frequency, blood in the urine, high or low blood sugar, and elevated liver function tests are common. Increased white cells, pins and needles, and peripheral nerve damage may occur, but be delayed for several days.
- Respiratory and skin exposure may cause deficits in concentration, comprehension, memory, task performance and mood status.
- Irritation of the mucous membranes may produce nose inflammation, salivation, coughing, choking and dyspnoea.

CHRONIC HEALTH EFFECTS

- Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur. Chronic exposures may result in dermatitis and/or conjunctivitis.
- Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.
- There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information.
- Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
- There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.
- When given by mouth, hydrazine induced tumours in animal testing. A study of 423 men involved in the manufacture of hydrazine revealed three stomach, one prostate and one neurogenic cancer.
- When administered orally hydrazine sulfate induced pulmonary adenomas and adenocarcinomas, hepatomas and hepatocarcinomas in mice of both sexes.

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (human) TDLo: 201 mg/kg/8d

Oral (rat) LD50: 601 mg/kg

- Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger

IRRITATION

Eye (rabbit): 20 mg/24h - Moderate

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sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen

[National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

Parasthesia, tumors, nausea and vomiting, liver necrosis, kidney changes, transplacental tumorigenesis reported.

IARC Cancer Review: Animal Sufficient Evidence.

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

HYDRAZINE SULFATE:

- Very toxic to aquatic organisms.

- Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters. Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

- For hydrazine:

Environmental fate:

Hydrazines or dimethylhydrazines released to water or soil may volatilise into air or sorb onto soil. These chemicals have low vapor pressures and are miscible in water. Therefore, volatilisation is not expected to be an important removal process. Studies indicate that volatilisation of these chemicals from water increases with higher concentrations of the chemical and in the presence of sunlight (due to increased temperature of the hydrazine pool). Hydrazine and dimethylhydrazines degrade rapidly in air through reactions with ozone, hydroxyl (OH) radicals, and nitrogen dioxide. The reaction of hydrazine and 1,1-dimethylhydrazine with ozone is probably the major fate of these chemicals in the atmosphere. Hydrazine undergoes complex interactions with soils, including both reversible physical-sorption and irreversible chemisorption to colloids. In a study on the adsorption and leaching characteristics of hydrazine fuels, no adsorption of 1,1-dimethylhydrazine was observed on sand, with almost 100% of the chemical leaching with water. In three other soils, adsorption ranged from 26% to 80%. No correlation between adsorption and soil organic content or pH was observed. Hydrazine adsorption studies with clays and soils indicate that adsorption may be correlated with soil organic matter and clay content and is highly dependent on pH; hydrazine appears to be adsorbed by different mechanisms under acidic and alkaline conditions. Autooxidation appears to be the major factor contributing to disappearance of the chemical, but the study authors attributed about 20% of removal to biodegradation. Several heterotrophic soil bacteria were reported to degrade hydrazine, indicating that microbial degradation may contribute to removal of the chemical from soil.

Hydrazine and 1,1-dimethylhydrazine degrade in aqueous systems, but the rate of degradation is dependent on specific aquatic environmental factors, including pH, hardness, temperature, oxygen concentration, and the presence of organic matter and metal ions. Oxidation and biodegradation are the primary removal mechanisms. Reaction of hydrazine with dissolved oxygen is catalyzed by metal ions, particularly copper. The reaction rate is strongly influenced by pH; degradation proceeds more rapidly in alkaline solutions. Hydrazine is

continued...

HYDRAZINE SULPHATE

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Section 12 - ECOLOGICAL INFORMATION

rapidly removed from polluted waters, with less than one-third of the original concentration remaining in dirty river water after 2 hours. However, chlorinated, filtered, and softened city water contained almost the original amount of hydrazine after 4 days. Organic matter in the water and hardness were reported to be the major factors in the differing rates of degradation.

Biodegradation may be a significant removal process at low hydrazine concentrations in ambient waters, but at higher concentrations the chemical is toxic to microorganisms.

Ecotoxicity:

Based on data for a number of hydrazines, the material may be hazardous to plant life and aquatic organisms.

Hydrazine, itself, has a high acute toxicity to algae, fish and daphnids

In a study of hydrazine in aqueous systems, the chemical was reported to be absorbed by guppies from a 0.5 ug/L solution. After 96 hours, the hydrazine concentration in fish was 144 ug/g, indicating a moderate tendency to bioconcentrate. However, the bioconcentration of hydrazine and dimethylhydrazines is not expected to be important in aquatic systems because of the rapid degradation of these chemicals in water as well as their low octanol-water partition coefficients.

■ Data from tap water studies with human volunteers indicate that sulfates produce a laxative effect at concentrations of 1000 - 1200 mg/litre, but no increase in diarrhoea, dehydration or weight loss. The presence of sulfate in drinking-water can also result in a noticeable taste; the lowest taste threshold concentration for sulfate is approximately 250 mg/litre as the sodium salt. Sulfate may also contribute to the corrosion of distribution systems. No health-based guideline value for sulfate in drinking water is proposed. However, there is an increasing likelihood of complaints arising from a noticeable taste as concentrations in water increase above 500 mg/litre.

Sulfates are removed from the air by both dry and wet deposition processes. Wet deposition processes including rain-out (a process that occurs within the clouds) and washout (removal by precipitation below the clouds) contribute to the removal of sulfate from the atmosphere.

In soil, the inorganic sulfates can adsorb to soil particles or leach into surface water and groundwater.

Sulfates can be taken up by plants and be incorporated into the parenchyma of the plant.

Sulfate in water can also be reduced by sulfate bacteria (Thiobacilli) which use them as a source of energy.

■ Prevent, by any means available, spillage from entering drains or water courses.

■ DO NOT discharge into sewer or waterways.

Section 13 - DISPOSAL CONSIDERATIONS

• Containers may still present a chemical hazard/ danger when empty.

• Return to supplier for reuse/ recycling if possible.

Otherwise:

• If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.

• Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

• Reduction

• Reuse

• Recycling

• Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

• DO NOT allow wash water from cleaning or process equipment to enter drains.

• It may be necessary to collect all wash water for treatment before disposal.

• In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.

• Where in doubt contact the responsible authority.

• Recycle wherever possible or consult manufacturer for recycling options.

• Consult State Land Waste Management Authority for disposal.

continued...

HYDRAZINE SULPHATE

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Section 13 - DISPOSAL CONSIDERATIONS

- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE, TOXIC

HAZCHEM:

□ 2X

Land Transport UNDG:

Class or division:	8	Subsidiary risk:	6.1
UN No.:	2923	UN packing group:	III
Shipping Name: CORROSIVE SOLID, TOXIC, N.O.S. (contains hydrazine sulfate)			

Air Transport IATA:

ICAO/IATA Class:	8 (6.1)	ICAO/IATA Subrisk:	None
UN/ID Number:	2923	Packing Group:	III
Special provisions:	A3		
Shipping Name: CORROSIVE SOLID, TOXIC, N.O.S. *(CONTAINS HYDRAZINE SULFATE)			

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	6.1
UN Number:	2923	Packing Group:	III
EMS Number:	F- A, S- B	Special provisions:	223 274 944
Limited Quantities:	5 kg		
Shipping Name: CORROSIVE SOLID, TOXIC, N.O.S.(contains hydrazine sulfate)			

Section 15 - REGULATORY INFORMATION

REGULATIONS

hydrazine sulfate (CAS: 10034-93-2) is found on the following regulatory lists;

"Australia Inventory of Chemical Substances (AICS)"

Section 16 - OTHER INFORMATION

MSDS SECTION CHANGES

The following table displays the version number of and date on which each section was last changed.

Section Name	Version	Date	Section Name	Version	Date	Section Name	Version	Date
First Aid (skin)	4	7- Oct- 2008	Storage (storage)	4	7- Oct- 2008	Acute Health (eye)	4	7- Oct- 2008

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Section 16 - OTHER INFORMATION

Fire Fighter (extinguishing media)	4	7- Oct- 2008	incompatibility)	4	7- Oct- 2008	Acute Health (inhaled)	4	7- Oct- 2008
Fire Fighter (fire fighting)	4	7- Oct- 2008	Storage (storage requirement)	4	7- Oct- 2008	Acute Health (skin)	4	7- Oct- 2008
Fire Fighter (fire incompatibility)	4	7- Oct- 2008	Storage (suitable container)	4	7- Oct- 2008	Acute Health (swallowed)	4	7- Oct- 2008
Fire Fighter (fire/explosion hazard)	4	7- Oct- 2008	Engineering Control	4	7- Oct- 2008	Chronic Health	4	7- Oct- 2008
Spills (major)	4	7- Oct- 2008	Exposure Standard	4	7- Oct- 2008	Environmental	4	7- Oct- 2008
Spills (minor)	4	7- Oct- 2008	Personal Protection (eye)	4	7- Oct- 2008	Disposal	4	7- Oct- 2008
Handling Procedure	4	7- Oct- 2008	Personal Protection (hands/feet)	4	7- Oct- 2008			
			Personal Protection (other)					

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by Classification committee using available literature references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

The above information is believed to be accurate and represent the best information currently available to us, but doesnot represent any warranty expressed or impliedof the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 7-Oct-2017