

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46
Version No:4
CD 2011/2 Page 1 of 16

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Spirax Sarco Sulphuric Acid 35%

PROPER SHIPPING NAME

SULPHURIC ACID or BATTERY FLUID, ACID

PRODUCT USE

pH adjuster/ acidifier.

SUPPLIER

Company: Spirax Sarco Australia

Address:

14 Forge Street

Blacktown

NSW, 2148

Australia

Telephone: 1300 SPIRAX (774 729)

Telephone: +61 2 9852 3100

Emergency Tel: **24hr 0411 141 911**

Emergency Tel: **(my personal mobile number)**

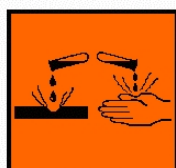
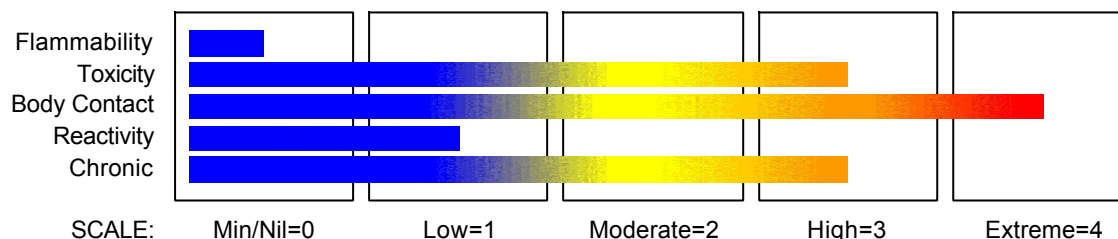
Fax: +61 2 9831 4554

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

HAZARDOUS SUBSTANCE. DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.

CHEMWATCH HAZARD RATINGS



RISK

SAFETY

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 2 of 16

Section 2 - HAZARDS IDENTIFICATION

- Toxic by inhalation.
 - Causes severe burns.
 - Risk of serious damage to eyes.
 - Cumulative effects may result following exposure*.
 - Possible cancer- causing agent following repeated inhalation*.
- * (limited evidence).
- Keep locked up.
 - Do not breathe gas/ fumes/ vapour/ spray.
 - Avoid contact with skin.
 - Avoid contact with eyes.
 - Wear suitable protective clothing.
 - In case of insufficient ventilation, wear suitable respiratory equipment.
 - Wear suitable gloves.
 - Wear eye/ face protection.
 - Use only in well ventilated areas.
 - Keep container in a well ventilated place.
 - Avoid exposure - obtain special instructions before use.
 - To clean the floor and all objects contaminated by this material, use water.
 - Keep container tightly closed.
 - This material and its container must be disposed of in a safe way.
 - Keep away from food, drink and animal feeding stuffs.
 - Take off immediately all contaminated clothing.
 - In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.
 - In case of accident or if you feel unwell, IMMEDIATELY contact Doctor or Poisons Information Centre (show label if possible).
 - This material and its container must be disposed of as hazardous waste.
 - In case of accident by inhalation: remove casualty to fresh air and keep at rest.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
sulfuric acid	7664-93-9	35
water	7732-18-5	65

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.

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 3 of 16

Section 4 - FIRST AID MEASURES

- 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.

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.

NOTES TO PHYSICIAN

- Treat symptomatically.
- For acute or short term repeated exposures to strong acids:
- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
 - Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
 - Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
 - Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. DO NOT use neutralising agents or any other additives. Several litres of saline are required.

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: EXTREME

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 4 of 16

Section 4 - FIRST AID MEASURES

- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
 - Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).
- [Ellenhorn and Barceloux: Medical Toxicology].

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 to be a significant fire risk.
 - Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
 - Heating may cause expansion or decomposition leading to violent rupture of containers.
 - May emit corrosive, poisonous fumes. May emit acrid smoke.
 - Non combustible.
 - Not considered to be a significant fire risk.
 - Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
 - Heating may cause expansion or decomposition leading to violent rupture of rigid containers.
 - May emit acrid smoke. May emit corrosive and poisonous fumes.
- Decomposition may produce toxic fumes of:
sulfur oxides (SO_x).

FIRE INCOMPATIBILITY

- None known.

HAZCHEM

2R

Personal Protective Equipment

Breathing apparatus.
Chemical splash suit.

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46
Version No:4
CD 2011/2 Page 5 of 16

Section 6 - ACCIDENTAL RELEASE MEASURES

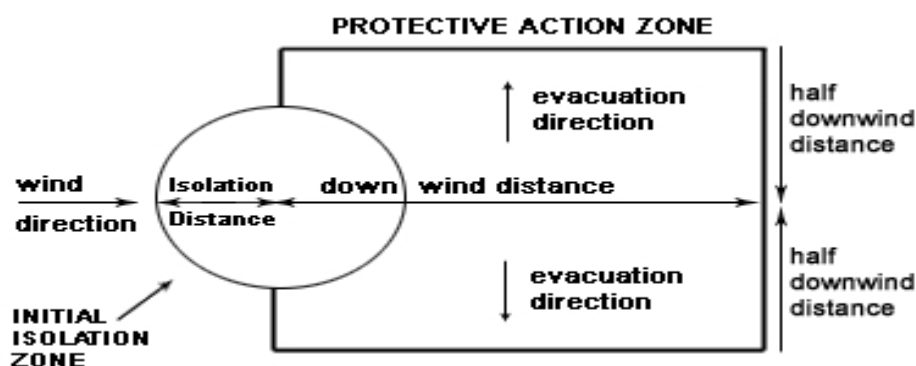
MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable, labelled container for waste 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.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue (see Section 13 for specific agent).
- 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 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

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46
Version No:4
CD 2011/2 Page 6 of 16

Section 6 - ACCIDENTAL RELEASE MEASURES

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 157 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

sulfuric acid 30mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

sulfuric acid 10mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

sulfuric acid 2mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

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.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
- Avoid smoking, naked lights or ignition sources.
- 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.

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 7 of 16

Section 7 - HANDLING AND STORAGE

- 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.
- DO NOT allow clothing wet with material to stay in contact with skin.

SUITABLE CONTAINER

- DO NOT use aluminium or galvanised containers.
- Check regularly for spills and leaks.
- 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.

STORAGE INCOMPATIBILITY

- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.
- Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0.
- Inorganic acids neutralise chemical bases (for example: amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces.
- The dissolution of inorganic acids in water or the dilution of their concentrated solutions with additional water may generate significant heat.
- The addition of water to inorganic acids often generates sufficient heat in the small region of mixing to cause some of the water to boil explosively. The resulting "bumping" can spatter the acid.
- Inorganic acids react with active metals, including such structural metals as aluminum and iron, to release hydrogen, a flammable gas.
- Inorganic acids can initiate the polymerisation of certain classes of organic compounds.
- Inorganic acids react with cyanide compounds to release gaseous hydrogen cyanide.
- Inorganic acids generate flammable and/or toxic gases in contact with dithiocarbamates, isocyanates, mercaptans, nitrides, nitriles, sulfides, and strong reducing agents. Additional gas-generating reactions occur with sulfites, nitrites, thiosulfates (to give H₂S and SO₃), dithionites (SO₂), and even carbonates.
- Acids often catalyse (increase the rate of) chemical reactions.
- Avoid strong bases.

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



X



X



+



X



X



+

+: *May be stored together*

O: *May be stored together with specific preventions*

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: EXTREME

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46
Version No:4
CD 2011/2 Page 8 of 16
Section 7 - HANDLING AND STORAGE

X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Australia Exposure Standards	sulfuric acid (Sulphuric acid)		1		3				

The following materials had no OELs on our records

• water: CAS:7732- 18- 5

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
sulfuric acid 1830	15	

MATERIAL DATA

SPIRAX SARCO SULPHURIC ACID 35%:

Not available

SULFURIC ACID:

■ 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.

NOTE: Detector tubes for sulfuric acid, measuring in excess of 1 mg/m³, are commercially available.

Based on controlled inhalation studies the TLV-TWA is thought to be protective against the significant risk of pulmonary irritation and incorporates a margin of safety so as to prevent injury to the skin and teeth seen in battery workers acclimatised to workplace concentrations of 16 mg/m³. Experimental evidence in normal unacclimated humans indicates the recognition, by all subjects, of odour, taste or irritation at 3

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46
Version No:4
CD 2011/2 Page 9 of 16

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

mg/m3 or 5 mg/m3. All subjects reported these levels to be objectionable but to varying degrees.

WATER:

- No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



EYE

- Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure
- Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted
- Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection.
- Alternatively a gas mask may replace splash goggles and face shields.
- 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], [AS/NZS 1336 or national equivalent].

HANDS/FEET

- Elbow length PVC gloves.
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

- Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 10 of 16

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.

Employers may need to use multiple types of controls to prevent employee overexposure.

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations.

Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25- 0.5 m/s (50- 100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5- 1 m/s (100- 200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: EXTREME

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 11 of 16

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Highly acidic liquid; mixes with water.

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Acid.

Toxic or noxious vapours/gas.

State	Liquid	Molecular Weight	Not Applicable
Melting Range (°C)	Not Available	Viscosity	Not Available
Boiling Range (°C)	Not Available	Solubility in water (g/L)	Miscible
Flash Point (°C)	Not Applicable	pH (1% solution)	Not Available
Decomposition Temp (°C)	Not Available	pH (as supplied)	1
Autoignition Temp (°C)	Not Applicable	Vapour Pressure (kPa)	Not Available
Upper Explosive Limit (%)	Not Applicable	Specific Gravity (water=1)	1.25- 1.27 @ 20C
Lower Explosive Limit (%)	Not Applicable	Relative Vapour Density (air=1)	Not Available
Volatile Component (%vol)	Not Available	Evaporation Rate	Not Available

Section 10 - STABILITY AND REACTIVITY

CONDITIONS CONTRIBUTING TO INSTABILITY

• Contact with alkaline material liberates heat.

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

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident. Swelling of the epiglottis may make it difficult to breathe which may result in suffocation. More severe exposure may result in vomiting blood and thick mucus, shock, abnormally low blood pressure, fluctuating pulse, shallow respiration and clammy skin, inflammation of stomach wall, and rupture of oesophageal tissue. Untreated shock may eventually result in kidney failure. Severe cases may result in perforation of the stomach and abdominal cavity with consequent infection, rigidity and fever. There may be severe narrowing of the oesophageal or pyloric sphincters; this may occur immediately or after a delay of weeks to years. There may be coma and convulsions, followed by death due to infection of the abdominal cavity, kidneys or lungs.

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: EXTREME

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 12 of 16

Section 11 - TOXICOLOGICAL INFORMATION

EYE

■ If applied to the eyes, this material causes severe eye damage.

Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possibly irreversible damage. The appearance of the burn may not be apparent for several weeks after the initial contact. The cornea may ultimately become deeply opaque resulting in blindness.

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

SKIN

■ Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.

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.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

INHALED

■ Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.

The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. Swelling of the lungs can occur, either immediately or after a delay; symptoms of this include chest tightness, shortness of breath, frothy phlegm and cyanosis. Lack of oxygen can cause death hours after onset.

High concentrations cause inflamed airways and watery swelling of the lungs with oedema.

The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

CHRONIC HEALTH EFFECTS

■ Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.

Chronic exposure may inflame the skin or conjunctiva.

Strong inorganic acid mists containing sulfuric acid can cause cancer.

TOXICITY AND IRRITATION

SPIRAX SARCO SULPHURIC ACID 35%:

■ Not available. Refer to individual constituents.

SULFURIC ACID:

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

TOXICITY

Oral (rat) LD50: 2140 mg/kg

Inhalation (rat) LC50: 510 mg/m³/2h

Inhalation (human) TClO: 3 mg/m³/24w

■ 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

IRRITATION

Eye (rabbit): 1.38 mg SEVERE

Eye (rabbit): 5 mg/30sec SEVERE

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: EXTREME

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 13 of 16

Section 11 - TOXICOLOGICAL INFORMATION

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.

WARNING: For inhalation exposure ONLY: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

Occupational exposures to strong inorganic acid mists of sulfuric acid:

WATER:

- No significant acute toxicological data identified in literature search.

CARCINOGEN

Strong- inorganic- acid mists containing sulfuric acid (see Acid mists)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	
Acid mists, strong inorganic	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1

Section 12 - ECOLOGICAL INFORMATION

SULFURIC ACID:

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

Sulfuric acid is soluble in water and remains indefinitely in the environment as sulfate.

Large discharges may contribute to the acidification of water and be fatal to aquatic life and soil micro-organisms. Large discharges may also contribute to the acidification of effluent treatment systems and injure sewage treatment organisms.

In water, sulfuric acid dissociates, and the sulfate anion may combine with other cations. In soil, the ions from sulfuric acid 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.

The ions (sulfate, hydrogen) can adsorb to soil particles or be converted to gases. Anaerobic bacteria in sediments and soil can reduce sulfate to sulfur and hydrogen sulfide.

Sulfates, including sulfuric acid, 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 the stratosphere, sulfuric acid aerosols have lifetimes of about 14 and 2.4 days at altitudes of 15 and 20 km, respectively. At cloud level, the residence time is about 6 days, with shorter residence times in surface air.

DO NOT discharge into sewer or waterways.

Sulfuric acid is soluble in water and remains indefinitely in the environment as sulfate.

Large discharges may contribute to the acidification of water and be fatal to aquatic life and soil micro-organisms.

Large discharges may contribute to the acidification of effluent treatment systems and injure sewage treatment organisms. [ICI UK]

WATER:

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: **EXTREME**

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46
Version No:4
CD 2011/2 Page 14 of 16
Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
Spirax Sarco Sulphuric Acid 35%	No Data Available	No Data Available		
sulfuric acid	No Data Available	No Data Available	LOW	

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible.
 - Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
 - Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material).
 - Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.
 - 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.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE

HAZCHEM:

2R (ADG7)

Land Transport UNDG:

Class or division:	8	Subsidiary risk:	None
UN No.:	2796	UN packing group:	II

Shipping Name: SULPHURIC ACID or BATTERY FLUID, ACID with not more than 51% acid

Air Transport IATA:

UN/ID Number:	2796	Packing Group:	II
Special provisions:	None		

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: EXTREME

Spirax Sarco Sulphuric Acid 35%

Issue Date: 21-Jan-2011

NC317TCP

CHEMWATCH 4821-46

Version No:4

CD 2011/2 Page 15 of 16

Section 14 - TRANSPORTATION INFORMATION

Cargo Only

Packing Instructions: 855 Maximum Qty/Pack: 30 L

Passenger and Cargo Packing Instructions: Y840 Maximum Qty/Pack: 1 L

Passenger and Cargo Limited Quantity Packing Instructions: 851 Maximum Qty/Pack: 0.5 L

Shipping Name: BATTERY FLUID, ACID

Maritime Transport IMDG:

IMDG Class: 8 IMDG Subrisk: None

UN Number: 2796 Packing Group: II

EMS Number: F-A,S-B Special provisions: None

Limited Quantities: 1 L

Shipping Name: SULPHURIC ACID with not more than 51% acid or BATTERY FLUID, ACID

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE None

REGULATIONS

Regulations for ingredients

sulfuric acid (CAS: 7664-93-9) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Illicit Drug Reagents/Essential Chemicals - Category III", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Air Transport Association (IATA) Dangerous Goods Regulations", "International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List", "International Council of Chemical Associations (ICCA) - High Production Volume List", "United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - Table II", "United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control (Red List) - Table II"

water (CAS: 7732-18-5) is found on the following regulatory lists;

"Australia Inventory of Chemical Substances (AICS)", "IMO IBC Code Chapter 18: List of products to which the Code does not apply", "International Fragrance Association (IFRA) Survey: Transparency List"

No data for Spirax Sarco Sulphuric Acid 35% (CW: 4821-46)

Section 16 - OTHER INFORMATION

EXPOSURE STANDARD FOR MIXTURES

■ "Worst Case" computer-aided prediction of spray/ mist or fume/ dust components and concentration:

continued...

Spirax Sarco Sulphuric Acid 35%

Hazard Alert Code: EXTREME

Spirax Sarco Sulphuric Acid 35%
Issue Date: 21-Jan-2011
NC317TCP

CHEMWATCH 4821-46
Version No:4
CD 2011/2 Page 16 of 16
Section 16 - OTHER INFORMATION

-
- Composite Exposure Standard for Mixture (TWA) :100 mg/m³.
 - Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/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.

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This is the end of the MSDS.