Sodium metabisulfite

sc-203389

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

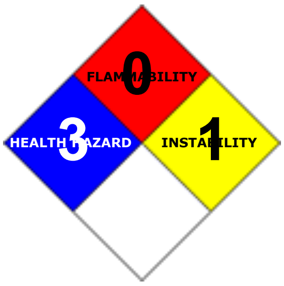
PRODUCT NAME

Sodium metabisulfite

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Company: Santa Cruz Biotechnology, Inc.
Address:
2145 Delaware Ave
Santa Cruz, CA 95060
Telephone: 800.457.3801 or 831.457.3800
Emergency Tel: CHEMWATCH: From within the US and Canada: 877-715-9305
Emergency Tel: From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

- Reducing agent. Reagent. Widely used in food as preservative; as Food Additive 223. Amounts in foods are subject to regulation. Usually only 0.01 to 0.10%. Used as a reagent and as a source of sulfur dioxide. Used to deactivate isothiazolone biocides.

SYNONYMS

Na2-S2-O5, "SBS powder", SMBS, "Food Additive 223", "disodium pyrosulphite", "pyrosulfurous acid, disodium salt", "sodium pyrosulfite", "disodium pyrosulfite", "sodium meta-bisulphite", "sodium meta-bisulfite", "anhydrous sodium bisulfite", "SMB POwder", APS, FOOD00004251, AR00000487, 04506808, 015705, "Redox SOMETA39", Nalco, "IONAC 140"

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Harmful if swallowed.
Contact with acids liberates toxic gas.
Risk of serious damage to eyes.
Irritating to respiratory system and skin.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
- Ingestion of sulfite salts may cause gastric irritation. Large doses may produce violent colic, diarrhea, circulatory disturbance, depression of vital functions and, sometimes, death.

EYE

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

SKIN

- This material can cause inflammation of the skin oncontact in some persons.
- The material may accentuate any pre-existing dermatitis condition.
- 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

- The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
- Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.
- 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.
- Sulfur dioxide irritation probably results from the action of sulfurous acid as the highly soluble gas dissolves in mucous fluid. Short-term exposure causes bronchoconstriction measurable as an increase in flow-resistance. The magnitude is concentration-dependent..

Chief effects are upper respiratory tract irritation and severe acute exposure may cause oedema of the lungs and possible respiratory paralysis. These exposures have produced severe obstructive and restrictive defects up to 3 months post-exposure; these have failed to respond to bronchodilators. Such exposures have also, on rare occasions, been associated with moderately severe obstructive illness and persistent, productive cough.

Systemic effects of acute poisoning are not known but regular exposure may deaden the sense of smell.

Symptoms include throat irritation, coughing, tightness of chest, difficulty with breathing, tear formation (lachrymation), eye smarting and suffocating feeling.

Substantial exposures produce direct respiratory tract irritation, cough, burning, lachrymation, conjunctival injection, difficulty in swallowing, and otopharyngeal erythema. Other symptoms may include vomiting, diarrhoea, abdominal pain, fever, headache, vertigo, agitation, tremor, convulsions, and peripheral neuritis. High dose acute exposure may produce immediate bronchospasm and pulmonary oedema with respiratory failure/ paralysis, inflammation of the conjunctivae and inflammation of the tongue.

CHRONIC HEALTH EFFECTS

- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

There is some evidence that inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.

There is limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Sulfites and bisulfites can cause narrowing of the airways, stomach upset, flushing, low blood pressure. tingling sensation, itchy wheal, swelling and shock, and asthmatics are especially prone. They induce allergic-like reactions which can occur on first contact with the material.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Repeated exposure of animals to airborne sulfur dioxide (SO2) can produce a thickening of the mucous layer in the trachea and an increase in goblet cells and mucous glands similar to pathological changes found in chronic human bronchitis.

Chronic exposure to sulfur dioxide (SO2) particulate complexes, present in polluted air, have been associated with the aggravation of chronic cardiovascular diseases such as asthma, chronic pulmonary disease, and coronary artery disease (this may occur at levels of 6-10 ug/m3 for 24 hours), An association exists between persistent cough and sputum production, particularly in women and non-smokers. A 10-year follow study on workers exposed to a mean sulfur dioxide concentration of up to 33 ppm did not reveal an increased prevalence of chronic respiratory disease or decreased pulmonary function.

By contrast, studies of smelter workers, exposed to concentrations below 2 ppm, suggest that chronic respiratory disease may develop and that workers exposed at concentrations exceeding 1 ppm show accelerated loss of pulmonary function.

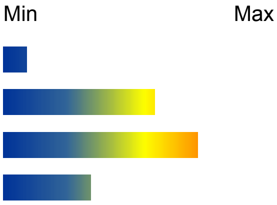
Although SO2 is not a carcinogen, the apparent increases in mortalities amongst arsenic-exposed smelter workers was greater when exposures included both high arsenic concentrations and moderate to high SO2 exposures, suggesting that SO2 might act as a promoter.

Intermittent exposure of rats to benz[a]pyrene along with inhalation of SO2 at 4-10 ppm, 1-6 hours per day, 5 days per week, produced substantial increases in respiratory tract squamous cell carcinomas compared to that associated with exposure to B[a]P or SO2 alone.

Occupational asthma has been reported in laundry workers and a vinegar worker exposed to sodium metabisulfite

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS



Flammability:	0
Toxicity:	2
Body Contact:	3
Reactivity:	1

Min/Nil=0
Low=1
Moderate=2
High=3

Chronic:	2		Extreme=4

NAME	CAS RN	%
sodium metabisulfite	7681-57-4	>95
Slowly releases toxic		
sulfur dioxide	7446-09-5	

Section 4 - FIRST AID MEASURES

SWALLOWED

■

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
- For advice, contact a Poisons Information Center or a doctor.
- Urgent hospital treatment is likely to be needed.
- If conscious, give water to drink.
- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

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 Center 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 contact occurs:

- Immediately remove all contaminated clothing, including footwear
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

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 vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g. lung edema, 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 authorized by him/her. (ICSC13719).

NOTES TO PHYSICIAN

■ for poisons (where specific treatment regime is absent):

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary edema .
- Monitor and treat, where necessary, for shock.
- Anticipate seizures .
- DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolemia are present use lactated Ringers solution. Fluid overload might create complications.

- Drug therapy should be considered for pulmonary edema.
- Hypotension with signs of hypovolemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.
EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994.
Treat symptomatically.
Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung edema often do not manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation is therefore essential. Immediate administration of an appropriate spray, by a doctor or a person authorized by him/her should be considered. (ICSC24419/24421.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not applicable.
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	1.40-1.48
Lower Explosive Limit (%):	Not applicable

EXTINGUISHING MEDIA

■

- There is no restriction on the type of extinguisher which may be used.

Use extinguishing media suitable for surrounding area.

FIRE FIGHTING

■

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- 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.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

■

- Non combustible.
- Not considered to be a significant fire risk, however containers may burn.

Decomposition may produce toxic fumes of: sulfur oxides (SOx), sulfur dioxide (SO2), metal oxides.
May emit poisonous fumes.
May emit corrosive fumes.

FIRE INCOMPATIBILITY

■ None known.

PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
Respirator:
Type E-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

■

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

MAJOR SPILLS

■

- DO NOT touch the spill material

Moderate hazard.

- CAUTION: Advise personnel in area.
- Alert Emergency Responders and tell them location and nature of hazard.
- Control personal contact by wearing protective clothing.
- Prevent, by any means available, spillage from entering drains or water courses.
- Recover product wherever possible.
- IF DRY: Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. IF WET: Vacuum/shovel up and place in labelled containers for disposal.
- ALWAYS: Wash area down with large amounts of water and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

To neutralise: Add an equivalent volume of a hypochlorite solution or diluted hydrogen peroxide. WARNING: Beware of vigorous reaction.

Neutralise oxidized solution. Collect residues and seal in drums for disposal.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

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.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- 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.

RECOMMENDED STORAGE METHODS

■ Glass container.

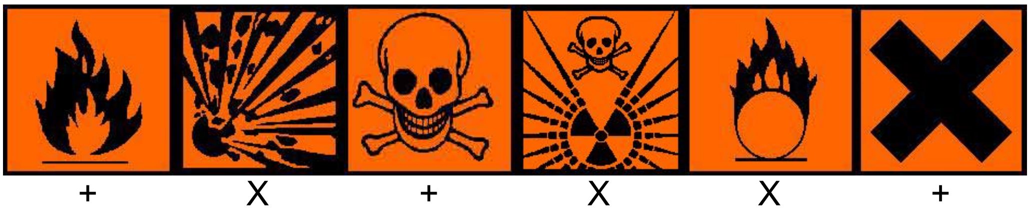
- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

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: Must not be stored together
O: May be stored together with specific preventions
+: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - British Columbia Occupational Exposure Limits	sodium metabisulfite (Sodium metabisulfite)		5						
Canada - Ontario Occupational Exposure Limits	sodium metabisulfite (Sodium metabisulfite)		5						
US NIOSH Recommended Exposure	sodium metabisulfite		5						

Limits (RELs)	(Sodium metabisulfite)							
Canada - Alberta Occupational Exposure Limits	sodium metabisulfite (Sodium metabisulfite)		5					
US - Minnesota Permissible Exposure Limits (PELs)	sodium metabisulfite (Sodium metabisulfite)		5					
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	sodium metabisulfite (Sodium metabisulfite)		5					
US - California Permissible Exposure Limits for Chemical Contaminants	sodium metabisulfite (Sodium metabisulfite)		5					
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	sodium metabisulfite (Sodium metabisulphite)		5					
US ACGIH Threshold Limit Values (TLV)	sodium metabisulfite (Sodium metabisulfite)		5					TLV Basis: upper respiratory tract irritation
US - Hawaii Air Contaminant Limits	sodium metabisulfite (Sodium metabisulfite)		5					
US - Alaska Limits for Air Contaminants	sodium metabisulfite (Sodium metabisulfite)		5					
US - Washington Permissible exposure limits of air contaminants	sodium metabisulfite (Sodium metabisulfite)		5		10			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	sodium metabisulfite (Sodium metabisulphite)		5		10			
US - Michigan Exposure Limits for Air Contaminants	sodium metabisulfite (Sodium metabisulfite)		5					
Canada - Prince Edward Island Occupational Exposure Limits	sodium metabisulfite (Sodium metabisulfite)		5					TLV Basis: upper respiratory tract irritation
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	sodium metabisulfite (Sodium metabisulfite)		5					
Canada - Northwest Territories Occupational Exposure Limits (English)	sodium metabisulfite (Sodium metabisulphite)		5		10			
Canada - Nova Scotia Occupational Exposure Limits	sodium metabisulfite (Sodium metabisulfite)		5					TLV Basis: upper respiratory tract irritation
Canada - British Columbia Occupational Exposure Limits	sulfur dioxide (Sulfur dioxide Under review. See G5.48-13)	2		5				
Canada - Ontario Occupational Exposure Limits	sulfur dioxide (Sulfur dioxide)	2	5.2	5	10.4			
US - Minnesota Permissible Exposure Limits (PELs)	sulfur dioxide (Sulfur dioxide)	2	5	5	13			
US ACGIH Threshold Limit Values (TLV)	sulfur dioxide (Sulfur dioxide)			0.25				TLV Basis: pulmonary function; lower respiratory tract irritation
US NIOSH Recommended Exposure Limits (RELs)	sulfur dioxide (Sulfur dioxide)	2	5	5	13			
Canada - Alberta Occupational Exposure Limits	sulfur dioxide (Sulphur dioxide)	2	5.2	5	13			
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	sulfur dioxide (SULFUR DIOXIDE)	0.01						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	sulfur dioxide (Sulfur dioxide)	2	5	5	10			
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	sulfur dioxide (Sulfur dioxide)	5	13					
US - Vermont Permissible Exposure	sulfur dioxide (Sulfur							

Limits Table Z-1-A Final Rule Limits for Air Contaminants	sulfur dioxide (Sulfur dioxide)	2	5	5	10				
US - California Permissible Exposure Limits for Chemical Contaminants	sulfur dioxide (Sulfur dioxide)	2	5	5	10				
US - Idaho - Limits for Air Contaminants	sulfur dioxide (Sulfur dioxide)	5	13						
US OSHA Permissible Exposure Levels (PELs) - Table Z1	sulfur dioxide (Sulfur dioxide)	5	13						
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	sulfur dioxide (Sulphur dioxide)	2		5					
US - Hawaii Air Contaminant Limits	sulfur dioxide (Sulfur dioxide)	2	5	5	10				
US - Alaska Limits for Air Contaminants	sulfur dioxide (Sulfur dioxide)	2	5	5	10				
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	sulfur dioxide (Sulphur dioxide)	5	13	5	13				
Canada - Yukon Carcinogens with a Permitted Exposure	sulfur dioxide (Arsenic trioxide production - (SO)2)	C5							
US - Washington Permissible exposure limits of air contaminants	sulfur dioxide (Sulfur dioxide)	2		5					
US - Michigan Exposure Limits for Air Contaminants	sulfur dioxide (Sulfur dioxide)	2	5	5	10				
Canada - Prince Edward Island Occupational Exposure Limits	sulfur dioxide (Sulfur dioxide)			0.25					TLV Basis: pulmonary function; lower respiratory tract irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	sulfur dioxide (Sulfur dioxide)	5	13						
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	sulfur dioxide (Sulfur dioxide)	2	5.2	5	13				
US - Oregon Permissible Exposure Limits (Z1)	sulfur dioxide (Sulfur dioxide)	5	13						
Canada - Northwest Territories Occupational Exposure Limits (English)	sulfur dioxide (Sulphur dioxide)	2	5	5	13				
Canada - Nova Scotia Occupational Exposure Limits	sulfur dioxide (Sulfur dioxide)			0.25					TLV Basis: pulmonary function; lower respiratory tract irritation

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
sulfur dioxide		100 [Unch]

MATERIAL DATA

SODIUM METABISULFITE:
SULFUR DIOXIDE:
■ NOTE: Detector tubes for sulfur dioxide, measuring in excess of 0.1 ppm, are commercially available.
Sulfur dioxide is termed a "mild" respiratory irritant.
Odour threshold (detection) is 0.5 ppm with irritation reported above 2 ppm; at 8-12 ppm eyes and nose are strongly irritated. 150 ppm is only tolerable for about a minute because of extreme irritation. At 500 ppm
there is a sense of suffocation. Human bronchoconstriction occurs with inhalation at 5 ppm or more and the recommended TLV-TWA, for sulfur dioxide, is thought to provide a reduction of significant risk of adverse respiratory effects such as coughing, increase in sputum production and bronchoconstriction.
The reported effects of SO2 in humans exposed to levels below 2 ppm, together with the potentiation of SO2 toxicity by soot and other particulates, may require a review of exposure standards.
A worker inhaling 4 ppm for 8 hours and doing light-work would absorb about 150 mg of SO2. By comparison, average dietary intake for a 70 kg man has been established at only 50 mg.
Odour Safety Factor(OSF)
OSF=1.8 (sulfur dioxide).
SODIUM METABISULFITE:
■ Inorganic sulfites, bisulfites and metabisulfites (sodium, potassium and ammonium salts) liberate sulfur dioxide under certain conditions. Therefore the officially tabled exposure limits for these chemicals normally correspond to the yield of liberated sulfur dioxide. Dithionites may also produce sulfur dioxide
Sulfites have been placed on the U.S. Food and Drug Administration generally recognised as safe (GRAS) list. Sulfur dioxide is an irritant gas and occupational exposure may produce irritation under certain circumstances. Airborne sodium bisulfite, for

example, is described by the ACGIH as an irritant to the eyes, skin and mucous membranes of animals; acute exposures by workers produce mild eye and respiratory effects. Inhalation of the dust produces high local concentrations in contact with small areas of sensitive tissue.
The mean daily ingestion of dietary sulfite ranges from 0.0011 to 0.14 mmol/kg (to 14 mg/day) and the accepted maximum daily intake (ADI) by the World Health Organisation is 0.7 mg sulfite (as sulfur dioxide)/ kg body weight. The recommended TLV-TWA for sodium bisulfite is thought to be protective against the significant risk of irritant effects associated with higher levels.
An accepted daily intake (ADI) for sodium metabisulfite is 0.7 mg/sulfite/kg body weight.

PERSONAL PROTECTION




Consult your EHS staff for recommendations

EYE

■

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. DO NOT wear contact lenses.

HANDS/FEET

■ NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
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.
Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocaoutchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

OTHER

■

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

■

- 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.

RESPIRATOR

■

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	E P1	-	E PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	E P2 E	PAPR-P2
100 x PEL	-	E P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	E PAPR-P3

* - Negative pressure demand ** - Continuous flow

Explanation of Respirator Codes:
Class 1 low to medium absorption capacity filters.
Class 2 medium absorption capacity filters.
Class 3 high absorption capacity filters.
PAPR Powered Air Purifying Respirator (positive pressure) cartridge.
Type A for use against certain organic gases and vapors.
Type AX for use against low boiling point organic compounds (less than 65ºC).
Type B for use against certain inorganic gases and other acid gases and vapors.
Type E for use against sulfur dioxide and other acid gases and vapors.
Type K for use against ammonia and organic ammonia derivatives
Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.
Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.
Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.
The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator. Correct fit is essential to obtain 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, vapors, 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 favorable 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 more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Contact with acids liberates toxic gas.

State	Divided solid	Molecular Weight	190.13 pure
Melting Range (°F)	>572 dec.120-150	Viscosity	Not Applicable
Boiling Range (°F)	Not available	Solubility in water (g/L)	Reacts
Flash Point (°F)	Not applicable	pH (1% solution)	3.5-5.0 @ 50%
Decomposition Temp (°F)	248- 302	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Not applicable.
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	1.40-1.48
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not applicable.
Volatile Component (%vol)	Not applicable.	Evaporation Rate	Not applicable

APPEARANCE

White crystals or powder with a pungent sulfur dioxide odour. Freely soluble in water, glycerol and slightly soluble in alcohol. The material slowly releases sulfur dioxide at ambient temperatures. Acts as a reducing agent. Available as Technical, Pure and Food Grades.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

■

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

STORAGE INCOMPATIBILITY

■

- Contact with acids produces toxic fumes

Metals and their oxides or salts may react violently with chlorine trifluoride. Chlorine trifluoride is a hypergolic oxidizer. It ignites on contact (without external source of heat or ignition) with recognized fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. The state of subdivision may affect the results.

- 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.

Metabisulfites:

- decompose with heat
- are slowly oxidised on exposure to air and water
- hydrates are bisulfites; conversely when dehydrated they become metabisulfites - a maximum strength of about 40% bisulfite solution is attainable with certain counter-ions
- may produce corrosive acids when mixed with water dependent on the counter-ion
- react with acids to produce sulfur dioxide (SO2)

Segregate from alcohol, water.

Sulfur dioxide:

- reacts with water or steam forming sulfurous acid; reaction may be violent
- reacts with acrolein, alcohols, aluminium powder, alkali metals, amines, bromine, pentafluoride, caustics, caesium, acetylene carbide, chlorates, chlorine trifluoride, chromium powder, copper or its alloy powders, diethylzinc, fluorine, lead dioxide, lithium acetylene carbide, metal powders, monolithium acetylide-ammonia, nitryl chloride, potassium acetylene carbide, potassium acetylide, potassium chlorate, rubidium carbide, silver azide, sodium, sodium acetylide, stannous oxide; reaction may be violent
- decomposes above 60 deg. C releasing oxides of sulfur
- Incompatible with alkalis, alkylene oxides, ammonia, aliphatic amines, alkanolamines, amides, organic anhydrides, caesium monoxide, epichlorohydrin, ferrous oxide, halogens, interhalogens, isocyanates, lithium nitrate, manganese, metal acetylides, metal oxides, perbromyl fluoride, red phosphorus, potassium azide, rubidium acetylide, sodium hydride, sulfuric acid
- attacks some plastics, coatings and rubber
- attacks metals, especially chemically active metals, in the presence of moisture.

Sulfites and hydrosulfites (dithionites) :

- may react explosively with strong oxidising agents.
- react with water or steam to produce corrosive acid solutions and sulfur oxide fumes - aqueous solutions are incompatible with oxidisers, strong acids, alkalis, ammonia, aliphatic amines, alkanolamines, alkylene oxides, amides, epichlorohydrin, organic anhydrides, isocyanates, nitromethane, vinyl acetate
- aqueous solutions attack metals in presence of moisture
- generate gaseous sulfur dioxide in contact with oxidising and nonoxidising acids
- NOTE: May develop pressure in containers; open carefully. Vent periodically.

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

Section 11 - TOXICOLOGICAL INFORMATION

sodium metabisulfite

TOXICITY AND IRRITATION

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

TOXICITY	IRRITATION
Intravenous (rat) LD50: 115 mg/kg	Eye (rabbit): Irritant *
Oral (rat) TDLo: 75 mg/kg *CCInfo. No. 1478367 [BASF]	
Oral (rat) LD50: 1540 mg/kg * [ICI UK]	
Oral (rat) LD50: 2480 mg/kg [Sigma/Aldrich]	
Oral (rat) LD50: 500 mg/kg	

■ 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.

The substance is classified by IARC as Group 3:
NOT classifiable as to its carcinogenicity to humans.
Evidence of carcinogenicity may be inadequate or limited in animal testing.

CARCINOGEN

Sulfites	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
Sodium metabisulfite	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4
Sulfur dioxide	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
Sulfur dioxide	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:
SULFUR DIOXIDE:
SODIUM METABISULFITE:
■ DO NOT discharge into sewer or waterways.
■ Sulfur dioxide is oxidised rapidly by both homogeneous and heterogeneous reactions and is removed from the atmosphere by precipitation and by dry deposition on surfaces, mainly as sulfuric acid. Because of its high vapor pressure (3,000 mm Hg at 20°C), sulfur dioxide is typically present in a gaseous phase Some of the sulfur dioxide emitted into the air moves unchanged to various surfaces including soil, water, grass, and vegetation in general.
In the atmosphere, sulfur dioxide can be transformed into sulfuric acid or sulfates by a variety of processes. Sulfur dioxide may be oxidised to sulfur trioxide (SO_3) and sulfate in air photochemically or catalytically. The oxidations generally involve homogeneous-phase reactions (oxidation in the gas phase) and heterogeneous gas-solid reactions (oxidation on the surface of particles). Gas-phase reactions include direct photochemical oxidation of sulfur dioxide and oxidation by reacting with other gases and substances, including O, O_2, O_3 NO, NO_2NO_3 N_2O_5 OH, hydrocarbons, or some heavy metal ions. In the direct oxidation pathway, sulfur dioxide gas molecules (at different electronically excited states due to solar irradiation) react with each other, forming SO_3, which may be further oxidised by other gases or water drops to form sulfate. Reaction pathways with other gases all result in similar end products: SO_3, or sulfate. Rate constants for sulfur dioxide oxidation by these gases vary from 2x 10-24 to 4x10-3 cm3 per molecule per second, with the reaction with N_2O_5 being the fastest. Heterogeneous gas-solid reactions include oxidation of sulfur dioxide on the surfaces of activated carbons, metal oxides, and other particles.
Sulfur dioxide may be photochemically or catalytically oxidized to SO_3 and sulfate in air. The oxidations generally involve homogeneous-phase reactions (oxidation in gas or liquid phase) and heterogeneous gas-solid reactions (oxidation on the surface of particles). The atmospheric residence time of sulfur dioxide is about 10 days. Photochemical oxidation involves the reaction of sulfur dioxide with reactive molecules and free radical species, and with products of O_3 and alkene gases. Photochemical oxidation is thought to be initiated by absorption of solar irradiation energy.
Sulfur dioxide can be oxidized by OH radicals in the gas phase relatively quickly, making it a major mechanism for sulfur dioxide conversion. The conversion rates have been characterized to be >l% per hour.
In the atmosphere, aqueous-phase oxidation of sulfur dioxide can occur in cloud, fog, rain, deliquescent aerosol particles, and in surface liquid films on these particles. Once dissolved in these droplets, sulfur dioxide may be oxidised to sulfate via a variety of mechanisms, thus forming "acid rain". Such a removal mechanism is commonly termed "wet deposition".
Sulfur dioxide can also be removed from air by uptake of plant leaves. It is reported that direct surface uptake of sulfur dioxide is the most significant dry removal process for atmospheric sulfur.
Sulfur dioxide is very soluble in water, and oceans are generally considered to be a sink for sulfur dioxide. It is also possible that oceans can be a source of sulfur dioxide if the equilibrium pressure of sulfur dioxide in surface water exceeds the partial pressure of sulfur dioxide in the air immediately above it. Any potential releases of sulfur dioxide from water would be expected to partition to the atmosphere.
Dissolved sulfur dioxide in the surface layer of the ocean may be slowly oxidised to the sulfate anion (SO_4^{2-}) by the combined presence of dissolved O_2 and trace amounts of transition metal salts as catalysts. At ocean depths, dispersed sulfate may be reduced to sulfur dioxide, sulfur, and hydrogen sulfide by the action of bacteria. Sulfur dioxide absorbed by freshwater lakes is less rapidly oxidized than seawater because of the much lower salt content of freshwater.
Soil can absorb sulfur dioxide, with uptake being dependent on the pH and moisture content of the soil.
Acid rain is the leading cause in an increase in heavy metal mobility in soil. When soil is basic pH, heavy metals will form insoluble oxides or hydroxides of sulfate, and when soil is acidic, soluble sulfates will form.
Sulfur dioxide can be reduced to H_2S in heat- and alkali-treated sewage sludge by the sulfate-reducing bacteria, Desulfovbrio desulfuricans or Desulfotomaculum orientis.
SODIUM METABISULFITE:
log Pow (Octanol/water partition coefficient): -3.7
Risk of bioaccumulation in aquatic species is low.
Inorganic product which cannot be eliminated from effluent treatment plants by biological purification processes. The product may lead to a high chemical consumption of oxygen in biological sewage works or natural waters and have a negative effect on aquatic organisms.
Toxicity to fish- LC50: 15-220 mg/L/96Hr (Salmo gairdneri)
Toxicity to bacteria- EC/LC50: 56 mg/L/17Hr (Pseudomonas putida)
COD: 165 mg O_2/g product. [BASF Aust.]
SULFUR DIOXIDE:
Toxicity Fish: LC50(96)>12.5mg/L
Toxicity invertebrate: LC50(48)802-2241ppm

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
sulfur dioxide	LOW		LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Reactivity characteristic: use EPA hazardous waste number D003 (waste code R).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
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 equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury residue in an authorized landfill.
- Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION

■ Air transport may be forbidden if this material is flammable, corrosive or toxic gases may be released under normal conditions of transport.
NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION

sodium metabisulfite (CAS: 7681-57-4) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Ontario Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe as used","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA High Production Volume Chemicals Additional List","US EPA Master Testing List - Index I Chemicals Listed","US FDA Direct Food Substances Generally Recognized as Safe","US Food Additive Database","US NIOSH Recommended Exposure Limits (RELs)","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List","US TSCA Section 8 (d) - Health and Safety Data Reporting"
Regulations for ingredients

sulfur dioxide (CAS: 7446-09-5) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Ontario Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Carcinogens with a Permitted Exposure","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Environmental Protection Act (CEPA) 1999 - Schedule 1 Toxic Substances List","Canada Environmental Quality Guidelines (EQGs) Air","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Hazardous Materials","US - Oregon Permissible Exposure Limits (Z1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Wyoming List of Highly Hazardous Chemicals, Toxics and Reactives","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGLs) - Interim","US EPA High Production Volume Chemicals Additional List","US FDA Direct

Food Substances Generally Recognized as Safe","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act","US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases","US NIOSH Recommended Exposure Limits (RELs)","US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Inventory","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation may produce health damage*.
- Cumulative effects may result following exposure*.
- Limited evidence of a carcinogenic effect*.
- Possible respiratory and skin sensitizer*.

* (limited evidence).

REPRODUCTIVE HEALTH GUIDELINES

- Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
sulfur dioxide	2.3 mg/m3	100	D	NA	-

- These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise. CR = Cancer Risk/10000; UF = Uncertainty factor: TLV believed to be adequate to protect reproductive health: LOD: Limit of detection Toxic endpoints have also been identified as: D = Developmental; R = Reproductive; TC = Transplacental carcinogen Jankovic J., Drake F.: A Screening Method for Occupational Reproductive Health Risk: American Industrial Hygiene Association Journal 57: 641-649 (1996).

- Classification of the mixture 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.

Issue Date: Mar-16-2010

Print Date:Apr-21-2010