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Produktinformation



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Zellkultur & Verbrauchsmaterial



Diagnostik & molekulare Diagnostik



Laborgeräte & Service

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Lieferung & Zahlungsart

siehe unsere [Liefer- und Versandbedingungen](#)

Zuschläge

- Mindermengenzuschlag
- Trockeneiszuschlag
- Gefahrgutzuschlag
- Expressversand

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Boron trifluoride ethylamine complex

sc-252509



The Power is Question

Material Safety Data Sheet

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

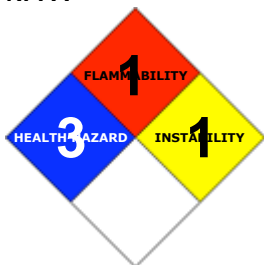
PRODUCT NAME

Boron trifluoride ethylamine complex

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY

ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C2-H7-B-F3-N, BF3.H2NCH2CH3, "ethylamine compd. with boron fluoride (1:1)", "boron trifluoride monoethylamine"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	1	1
Toxicity:	2	2
Body Contact:	4	4
Reactivity:	1	1
Chronic:	2	2

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Harmful if swallowed.
Causes severe burns.
Risk of serious damage to eyes.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- 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 acidic corrosives may produce burns around and in the mouth.
the throat and esophagus.
- Fluoride causes severe loss of calcium in the blood, with symptoms appearing several hours later including painful and rigid muscle contractions of the limbs.
Cardiovascular collapse can occur and may cause death with increased heart rate and other heart rhythm irregularities.

EYE

- The material can produce severe chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating.
- 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.

SKIN

- The material can produce severe chemical burns following direct contact with the 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.
- Skin contact is not thought to produce harmful health effects (as classified using animal models).
Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.
- Fluorides are easily absorbed through the skin and cause death of soft tissue and erode bone.
Healing is delayed and death of tissue may continue to spread beneath skin.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Solution of material in moisture on the skin, or perspiration, may markedly increase skin corrosion and accelerate tissue destruction.
- 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.
- Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.
There may be dizziness, headache, nausea and weakness.
- The severity of effects of exposure to boron trifluoride depend on concentration and duration.
Inhalation causes irritation of the throat, coughing and laboured breathing.
- 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.
- Acute effects of fluoride inhalation include irritation of nose and throat, coughing and chest discomfort.
A single acute over-exposure may even cause nose bleed.

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.
Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
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.
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.
Boron trifluoride fumes strongly (dense white mist) in moist air to form corrosive hydrogen fluoride, fluoboric acid and boric acid. The same corrosive substances are produced on contact with the human body. The kidneys are a target organ. The chronic effects are unknown.
Repeated overexposure may cause dryness of the nasal membranes, nosebleed, dental fluorosis, asthma and chemical pneumonitis.
Borate can accumulate in the testes and deplete germ cells and cause withering of the testicles, according to animal testing. Hair loss, skin inflammation, stomach ulcer and anemia can all occur.
Fluoroborates accumulate in the thyroid gland, preventing the uptake of iodine. Chronic exposure to boron trifluoride can increase levels of bone fluoride and cause dental fluorosis.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
boron trifluoride/ ethylamine complex	75-23-0	>98

hydrolysis yields	
boron trifluoride	7637-07-2
ethylamine	75-04-7

Section 4 - FIRST AID MEASURES

SWALLOWED

· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

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.

SKIN

■ If there is evidence of severe skin irritation or skin burns: · Avoid further contact. Immediately remove contaminated clothing, including footwear. · Flush skin under running water for 15 minutes. · Avoiding contamination of the hands, massage calcium gluconate gel into affected areas, pay particular attention to creases in skin. · Contact the Poisons Information Centre. · Continue gel application for at least 15 minutes after burning sensation ceases. · If pain recurs, repeat application of calcium gluconate gel or apply every 20 minutes. · If no gel is available, continue washing for at least 15 minutes, using soap if available. If patient is conscious, give six calcium gluconate or calcium carbonate tablets in water by mouth. · Transport to hospital, or doctor, urgently.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. For massive exposures: · If dusts, vapors, aerosols, fumes or combustion products are inhaled, remove from contaminated area. · Lay patient down.

NOTES TO PHYSICIAN

■ 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 cricothyrotomy if endotracheal intubation is contraindicated by excessive swelling.

For acute or short term repeated exposures to fluorides:

· Fluoride absorption from gastro-intestinal tract may be retarded by calcium salts, milk or antacids.
· Fluoride particulates or fume may be absorbed through the respiratory tract with 20-30% deposited at alveolar level.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA

· DO NOT use water.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible.

· Slight fire hazard when exposed to heat or flame.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen fluoride, nitrogen oxides (NO_x), metal oxides, other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:

Safety Glasses.

Full face- shield.

Gloves:

Respirator:

Type AG 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.
 - Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
 - Check regularly for spills and leaks.
- MAJOR SPILLS**
- Clear area of personnel and move upwind.
 - Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
 - Wear protective clothing when risk of exposure occurs.
- Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
- Do NOT cut, drill, grind or weld such containers.
 - In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- DO NOT use aluminum or galvanized containers.
- Check regularly for spills and leaks.
- Glass container.
- Lined metal can, Lined metal pail/drum
 - Plastic pail.
- For low viscosity materials
- Drums and jerricans must be of the non-removable head type.
 - Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.

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
Canada - Alberta Occupational Exposure Limits	boron trifluoride/ethylamine complex (Boron trifluoride)					1	2.8		
Canada - British Columbia Occupational Exposure Limits	boron trifluoride/ethylamine complex (Boron trifluoride)					1			
US NIOSH Recommended Exposure Limits (RELs)	boron trifluoride/ethylamine complex (Boron trifluoride)					1	3		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	boron trifluoride/ethylamine complex (Boron trifluoride)					1	3		
US ACGIH Threshold Limit Values (TLV)	boron trifluoride/ethylamine complex (Boron trifluoride)					1			TLV Basis: lower respiratory tract irritation; pneumonitis
US - Minnesota Permissible Exposure Limits (PELs)	boron trifluoride/ethylamine complex (Boron trifluoride)					1	3		

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)	(C)1	(C)3			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3
US - California Permissible Exposure Limits for Chemical Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)	1	3			C
US - Idaho - Limits for Air Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		2,8
US - Hawaii Air Contaminant Limits	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3
US - Alaska Limits for Air Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	boron trifluoride/ ethylamine complex (Boron trifluoride)	1	3	-	-	
US - Washington Permissible exposure limits of air contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		
US - Michigan Exposure Limits for Air Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3
Canada - Prince Edward Island Occupational Exposure Limits	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		
						TLV Basis: lower respiratory tract irritation; pneumonitis

US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3		
Canada - Nova Scotia Occupational Exposure Limits	boron trifluoride/ ethylamine complex (Boron trifluoride)			1				TLV Basis: lower respiratory tract irritation; pneumonitis
US - Oregon Permissible Exposure Limits (Z-1)	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		3		
Canada - Northwest Territories Occupational Exposure Limits (English)	boron trifluoride/ ethylamine complex (Boron trifluoride)			1		2.8		
US - Oregon Permissible Exposure Limits (Z-2)	boron trifluoride/ ethylamine complex (Fluoride as dust (Z37.28-1969))		2.5					
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	boron trifluoride/ ethylamine complex (Fluoride as dust (Z37.28-1969))		2.5					
US OSHA Permissible Exposure Levels (PELs) - Table Z2	boron trifluoride/ ethylamine complex (Fluoride as dust (Z37.28-1969))		2.5					
Canada - Alberta Occupational Exposure Limits	ethylamine (Ethylamine)	5	9.2	15	28			
Canada - British Columbia Occupational Exposure Limits	ethylamine (Ethylamine)	5		15				Skin
US NIOSH Recommended Exposure Limits (RELs)	ethylamine (Ethylamine)	10	18					
US OSHA Permissible Exposure Levels (PELs) - Table Z1	ethylamine (Ethylamine)	10	18					
US ACGIH Threshold Limit Values (TLV)	ethylamine (Ethylamine)	5		15				TLV Basis: eye irritation; eye damage; skin irritation
US - Minnesota Permissible Exposure Limits (PELs)	ethylamine (Ethylamine)	10	18					

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	ethylamine (Ethylamine)	10	18		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	ethylamine (Ethylamine)	10	18		
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	ethylamine (Ethylamine)	10	18		
US - California Permissible Exposure Limits for Chemical Contaminants	ethylamine (Ethylamine)	5	9.2		C
US - Idaho - Limits for Air Contaminants	ethylamine (Ethylamine)	10	18		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	ethylamine (Ethylamine)	10	18		
US - Hawaii Air Contaminant Limits	ethylamine (Ethylamine)	10	18		
US - Alaska Limits for Air Contaminants	ethylamine (Ethylamine)	10	18		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	ethylamine (Ethylamine)	5		15	Skin
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	ethylamine (Ethylamine)	10	18	10	18
US - Washington Permissible exposure limits of air contaminants	ethylamine (Ethylamine)	10		20	
US - Michigan Exposure Limits for Air Contaminants	ethylamine (Ethylamine)	10	18		
Canada - Prince Edward Island Occupational Exposure Limits	ethylamine (Ethylamine)	5		15	TLV Basis: eye irritation; eye damage; skin irritation
US - Wyoming Toxic and Hazardous Substances Table	ethylamine (Ethylamine)	10	18		

Z1 Limits for Air Contaminants

Canada - Nova Scotia Occupational Exposure Limits	ethylamine (Ethylamine)	5	15			TLV Basis: eye irritation; eye damage; skin irritation
US - Oregon Permissible Exposure Limits (Z-1)	ethylamine (Ethylamine)	10	18			
Canada - Northwest Territories Occupational Exposure Limits (English)	ethylamine (Ethylamine)	10	18	20	37	

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

- type ag filter of sufficient capacity.

EYE

- Chemical goggles.
- Full face shield.

HANDS/FEET

- Elbow length PVC gloves.

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.

OTHER

- Overalls.
- PVC Apron.

ENGINEERING CONTROLS

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Corrosive.
Acid.

State	DIVIDED SOLID	Molecular Weight	112.89
Melting Range (°F)	185- 192	Viscosity	Not Applicable
Boiling Range (°F)	Not available	Solubility in water (g/L)	Reacts
Flash Point (°F)	315	pH (1% solution)	Not available

Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

White crystalline powder; hydrolyses in water.

log Kow -0.27 - -0.08 Terrestrial fate Based on an estimated Koc value of 20, determined from a log Kow of -0.13 equation(3), ethylamine is expected to have very high mobility in soil. The pKa of ethylamine is 10.87, indicating that this compound will primarily exist in the cation form in the environment and cations generally adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts. Volatilisation of ethylamine from moist soil surfaces is not expected to be an important fate process given its cationic state. Ethylamine is expected to volatilise from dry soil surfaces based upon a vapor pressure of 1,048 mm Hg. Activated and non-activated sludge cultures were observed to rapidly degrade ethylamine; activated sludge acclimated to aniline resulted in a 34% theoretical BOD in 130 hours, indicating ethylamine is readily biodegraded in soil. Aquatic fate The estimated Koc value indicates that ethylamine is not expected to adsorb to suspended solids and sediment in water. Volatilization from water surfaces is expected based upon a Henry's Law constant of 1.23×10^{-5} atm-cu m/mole. Using this Henry's Law constant and an estimation method, volatilization half-lives for a model river and model lake are 2 and 17 days, respectively. The pKa indicates ethylamine will exist almost entirely in the cation form at pH values of 5 to 9 and therefore volatilisation from water surfaces is not expected to be an important fate process. An estimated BCF of 3, derived from the log Kow suggests the potential for bioconcentration in aquatic organisms is low. Ethylamine should be degraded by biological sewage treatment provided suitable acclimation has been achieved. In one study, activated sludge acclimated to aniline resulted in 34% of theoretical BOD in 130 hours, with an initial ethylamine concentration of 500 mg/L.

Material	Value
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Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Contact with alkaline material liberates heat.
- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

■ Boron trifluoride:

- reacts with moist air, water, steam, producing hydrogen fluoride, boric acid and fluoboric acid
- reacts violently with allyl chloride, alkyl nitrate, benzyl nitrate, calcium oxide, ethyl ether, iodine, magnesium tetrahydroaluminate, active metals (except magnesium)
- may explode on contact with monomers
- corrodes most metals in the presence of moisture.

Reacts with mild steel, galvanized steel / zinc producing hydrogen gas which may form an explosive mixture with air.

Salts of inorganic fluoride:

- react with water forming acidic solutions.
- are violent reactive with boron, bromine pentafluoride, bromine trifluoride, calcium disilicide, calcium hydride, oxygen difluoride, platinum, potassium.
- in aqueous solutions are incompatible with sulfuric acid, alkalis, ammonia, aliphatic amines, alkanolamines, alkylene oxides, amides, epichlorohydrin, isocyanates, nitromethane, organic anhydrides, vinyl acetate.
- corrode metals in presence of moisture
- may be incompatible with glass and porcelain.

Segregate from alcohol, water.

Segregate from alkalis, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

- Avoid strong bases.

Avoid strong 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

boron trifluoride/ ethylamine complex

TOXICITY AND IRRITATION

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

■ 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.

ETHYLAMINE:

BORON TRIFLUORIDE/ ETHYLAMINE COMPLEX:

■ 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.

BORON TRIFLUORIDE/ ETHYLAMINE COMPLEX:

■ The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

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

No significant acute toxicological data identified in literature search.

BORON TRIFLUORIDE:

TOXICITY IRRITATION

Inhalation (rat) LC50: 1180 mg/m³/4h Nil Reported

Inhalation (rat) LCLo: 750 ppm/5.5 h

TOXICITY

IRRITATION

ETHYLAMINE:

Oral (rat) LD50: 400 mg/kg

Skin
(rabbit):500
mg/24hr -
Mild

Inhalation (rat) LCLo: 3000 ppm/4h

Eye (rabbit): 5 mg - SEVERE

Dermal (rabbit) LD50: 390 mg/kg

Eye
(rabbit): 50
ppm/10d-
I-SEVERE

Intravenous (Rabbit) LD: 350 mg/kg

Eye (rabbit):0.25 mg/24 hr-SEVERE

■ The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

CARCINOGEN

boron trifluoride

US - Rhode Island Hazardous Substance List

IARC

ethylamine

US - Rhode Island Hazardous Substance List

IARC

SKIN

ethylamine

Canada - Alberta Occupational Exposure
Limits - Skin

Substance Interaction

1

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
boron trifluoride/ ethylamine complex	No Data Available	No Data Available		
boron trifluoride	No Data Available	No Data Available		
ethylamine	HIGH	No Data Available	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

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.

· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

For small quantities:

- Cautiously dissolve in water.

- Neutralize with sodium carbonate or if product does not dissolve.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols: None Hazard class or Division: 8

Identification Numbers: UN3261 PG: II

Label Codes: 8 Special provisions: IB8, IP2,

IP4, T3,

TP33

Packaging: Exceptions: 154 Packaging: Non- bulk: 212

Packaging: Exceptions: 154 Quantity limitations: 15 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 50 kg Vessel stowage: Location: B

aircraft only:

Vessel stowage: Other: None

Hazardous materials descriptions and proper shipping names:

Corrosive solid, acidic, organic, n.o.s.

Air Transport IATA:

ICAO/IATA Class: 8 ICAO/IATA Subrisk: None

UN/ID Number: 3261 Packing Group: II

Special provisions: A3

Cargo Only

Packing Instructions: 50 kg Maximum Qty/Pack: 863

Passenger and Cargo Passenger and Cargo

Packing Instructions: 15 kg Maximum Qty/Pack: 859

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 5 kg Maximum Qty/Pack: Y844

Shipping Name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.

*(CONTAINS BORON TRIFLUORIDE/ ETHYLAMINE COMPLEX)

Maritime Transport IMDG:

IMDG Class: 8 IMDG Subrisk: None

UN Number: 3261 Packing Group: II

EMS Number: F-A , S-B Special provisions: 274

Limited Quantities: 1 kg

Shipping Name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (contains boron trifluoride/ ethylamine complex)

Section 15 - REGULATORY INFORMATION

boron trifluoride/ ethylamine complex (CAS: 75-23-0) is found on the following regulatory lists;

"Canada Domestic Substances List (DSL)", "US Toxic Substances Control Act (TSCA) - Inventory"

Regulations for ingredients

boron trifluoride (CAS: 7637-07-2,13319-75-0) 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 - Prince Edward Island Occupational Exposure Limits", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "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 - 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 (Z-1)", "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 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 (AEGs) - Interim","US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA 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"

ethylamine (CAS: 75-04-7) 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 - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Industrial Hazardous Substances","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","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 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 - Florida Precursor Chemicals","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 (Z-1)","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 CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGs) - Interim","US EPA High Production Volume Program Chemical List","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA 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 Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 8 (d) - Health and Safety Data Reporting","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Section 16 - OTHER INFORMATION

ND

Substance CAS Suggested codes boron trifluoride/ ethylamine complex 75- 23- 0 Xn; R22 boron trifluoride 7637- 07- 2 Xn; R22 boron trifluoride 13319- 75- 0 Xn; R22 ethylamine 75- 04- 7 Xn; R22

Ingredients with multiple CAS Nos

Ingredient Name CAS boron trifluoride 7637-07-2, 13319-75-0

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■ 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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