

Revision: 009

Date: 5th August 2003

1. IDENTIFICATION OF THE SUBSTANCE AND COMPANY UNDERTAKING

General Chemical Name Boron powder

Intended/recommended use: Research. In nuclear chemistry as neutron absorber, in alloys.

Supplier (Distributor): New Metals & Chemicals Ltd.
Newmet House, Rue de St. Lawrence
Waltham Abbey, Essex, EN9 1PF
Telephone +44 (0)1992 711111

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name	Concentration	Classification*	CAS number	EINECS No.
Boron powder	100%	F: R11 Xn: R20/21/22, 37	7440-42-8	231-151-2

*see 16. OTHER INFORMATION for full text of R-phrases.

3. HAZARD IDENTIFICATION

Highly flammable.
Irritating to eyes, respiratory system and skin.
Harmful by inhalation, in contact with skin and if swallowed.

4. FIRST AID MEASURES

Inhalation If signs/symptoms like coughing or burning occur, remove person from exposure to fresh air immediately and administer 100 percent humidified supplement oxygen with assisted ventilation as required. If breathing has ceased DO NOT use mouth-to-mouth respiration. Apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. Seek immediate medical attention.

Skin Contact	Flush skin with large amounts of water. Remove contaminated clothing. If irritation persists, seek medical attention
Eye Contact	DO NOT allow patient to rub or keep eyes closed. Irrigate with copious quantities of water for at least 15 minutes. Flush under eyelids by lifting lid. DO NOT use a static eye bath. Seek immediate medical attention.
Ingestion	DO NOT induce vomiting. If patient is conscious and alert, wash out mouth with water. Give 2 cupfuls of milk with great care. Give nothing by mouth if patient is unconscious. Seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Precautions against fire and explosion

Material is highly flammable. Explosive reactions may occur when present as a highly concentrated airborne dust in the presence of an open flame, or when in contact with oxidising agents.

Extinguishing media which must not be used for safety reasons

DO NOT USE water, foam or halocarbon extinguishers. Use dry sand.

Exposure hazards arising from substance, combustion products, resulting gases

Irritating boron oxides may be formed in a fire.

Special protective equipment for fire fighters

Wear full protective clothing, including self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Remove or extinguish all ignition sources. Evacuate all but essential authorised control personnel. Wear self-contained breathing apparatus and gloves to avoid inhalation, skin and eye contact. Provide sufficient ventilation.

Environmental Precautions

Prevent entry into drains, surface and ground water, soil and confined areas.

Methods for Cleaning up

Only trained, authorised personnel should be involved. Fully encapsulating protective clothing and self contained breathing apparatus should be worn for spills and leaks with no fire. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Stop leak if you can do it without risk. Keep combustibles (wood, paper, oil etc) away from spilled material. Cover spills with dry sand, dry diatomaceous earth or dry salt followed with plastic sheet to minimise spreading or contact with water. Use clean non-sparking tools to collect material and place it into loosely covered plastic containers, suitably marked, and dispose of through a licensed disposal contractor.

Wash spill site after material pick up is complete. Do not allow effluent to enter drains or water courses.

7. HANDLING AND STORAGE

Precautions for safe handling

To be handled by qualified and trained staff only. Avoid breathing dusts and direct contact with skin and eyes. Avoid all contact with water. Wash hands thoroughly after handling. See section 8 for personal protective equipment.

Ensure good ventilation/exhaustion at the workplace

Keep ignition sources away - do not smoke

Protect against electrostatic charges.

Fumes can combine with air to form an explosive mixture.

Handle under dry argon if possible.

Precautions for safe storage

Keep container cool, dry and tightly closed when not in use.

Store away from oxidisers and acidic materials and other materials listed under incompatibility (see section 10). Do not store in metal containers without a plastic lining. Store away from air.

Specific use

Research, nuclear chemistry and alloys.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit values

Ingredient name	OES LTEL (8 hr TWA)	OES STEL (15 min)	MEL(LT)	MEL(ST)
No exposure limits are given for this material. Comparison is given for: Respirable dust				
	5 mg/m ³			

The usual precautionary measures should be adhered to in handling chemicals. Keep away from foodstuffs, beverages and food. Instantly remove any soiled and impregnated garments. Wash hands during breaks and at end of the work. Avoid contact with the eyes and skin.

Occupational exposure controls

Eye Protection	Wear appropriate protective eyeglasses, chemical safety goggles or full face shield to European Standard EN 166.
Hand protection	Wear appropriate gloves when handling this material. Suitable material is butyl rubber. However, due regard must be taken that heavy gloves will interfere with the wearer's sense to touch and may contribute to a dangerous situation. Thinner gloves of nitrile and PVC may be used as disposable gloves and must be discarded immediately after use. Gloves should comply with European Standard EN 465-3 class 3.
Skin Protection	Use one or more of the following personal protection items as necessary to prevent skin contact: Full chemical protective suit to EN 465 standard, PVC apron, helmet and boots.
Respiratory Protection	Avoid inhalation of dust. Select the following respirator based on airborne concentration of contaminants: Full face dust respirator. Half -mask air-supplied respirator to EN 147. Full-face high efficiency filter respirator to EN 147 or EN 12941/12942. Full-face or hood compressed air breathing apparatus to EN 139 or EN 270/271. Use appropriate local exhaust ventilation, to maintain airborne exposure below control limits.
Ingestion:	Do not eat, drink or smoke when using this product. Do not ingest. Exhibit the strictest hygiene control.

10. STABILITY AND REACTIVITY

Stability	Stable. No decomposition if used and stored according to specification.
Conditions to avoid	Avoid creating dusts.
Materials to avoid	A mixture of boron and a strong oxidiser may explode if subject to heat or impact. Boron has been reported to react so vigorously with certain materials that incandescence occurs; examples are fluorine, boron trifluoride, nitrosyl fluoride and nitric acid. Vigorous or violent reactions have been reported with caesium, rubidium, carbides and copper oxide. Explosions or self ignition have been reported with bromine, chlorine, silver fluoride, nitrous and nitric oxides and lead oxide.
Hazardous Decomposition Products	May produce irritating fumes of boron oxides in a fire.

11. TOXICOLOGICAL INFORMATION

Effects from eye contact	May cause severe irritation and damage to the eyes. Symptoms include irritation, redness and conjunctivitis.
Effects from skin contact	May cause skin irritation. Prolonged exposure may cause allergic dermatitis.
Effects from inhalation	May cause irritation to mucous membranes and upper respiratory tract. Symptoms include irritation of the eyes, nose and upper respiratory tract.
Effects from ingestion	Irritating to digestive tract. Symptoms include abdominal pain, nausea, vomiting soreness/redness of the mouth and throat and dysphagia Prolonged absorption causes anorexia, weight loss, vomiting, mild diarrhoea, skin rash, alopecia, convulsions and anemia.
(a) Acute toxicity (oral, inhalation, dermal)	LD ₅₀ Oral 300mg/kg (mam), LD ₅₀ Oral 2000mg/kg (mus)
(b) Corrosive/irritation (eye, skin, respiratory tract)	Irritant for eyes, skin and mucous membranes

- | | |
|---------------------------------------|--------------------|
| (c) Sensitisation (skin, respiratory) | |
| No sensitising effects known | |
| (d) Repeated-dose toxicity | not tested/no data |
| (e) Mutagenicity | not tested/no data |
| (f) Carcinogenicity | not tested/no data |
| (g) Reproductive toxicity | not tested/no data |

Additional toxicological information

Only a few human studies have been conducted to assess health effects associated with exposure to boron. The available data shows that exposure is associated with short-term irritant effects on the upper respiratory tract, nasopharynx and eye. These effects appear to be short term and reversible. Bases on the lack of human data and the limited animal data, boron is not classifiable as to its human carcinogenicity. Limited animal studies indicate that boron may induce fetotoxicity and genotoxicity.

12. ECOLOGICAL INFORMATION

(1) Ecotoxicity

(a) Aquatic toxicity

- | | |
|---|--------------------|
| (i) acute and chronic for fish | not tested/no data |
| (ii) acute and chronic for daphnia | not tested/no data |
| (iii) acute and chronic for algaefish | not tested/no data |
| (iv) acute and chronic for other aquatic plants | not tested/no data |

(b) Soil toxicity

- | | |
|----------------------|--------------------|
| (i) macro organisms | not tested/no data |
| (ii) micro organisms | not tested/no data |
| (iii) birds | not tested/no data |
| (iv) bees | not tested/no data |
| (v) plants | not tested/no data |
| (vi) fauna | not tested/no data |

(2) Mobility

Not tested/no data

(3) Persistence and degradability

Not tested/no data

(4) Bioaccumulation potential

Boron has been detected in contaminated shrimp.

(5) Other adverse effects

No other effects are known.

Do not allow material to be released to the environment without proper control.

13. DISPOSAL CONSIDERATIONS

All waste material to be contained in a plastic sealed bin, duly marked, and disposed of as special waste through a licensed waste contractor in accordance with “The Special Waste Regulations 1996”. See sections 6 and 7.

14. TRANSPORT INFORMATION

(a)	UN number	3178
(b)	class	4.1
(c)	proper shipping name:	Flammable solid, inorganic, n.o.s. (boron powder)
(d)	packing group	III
(e)	marine pollutant (if applicable)	N/A
(f)	other applicable information	N/A

15. REGULATORY INFORMATION

EC Supply: Chip-3 regulations 2002

F: Highly Flammable
Xn: Harmful

Risk Phrases:

11: Highly Flammable.
20/21/22: Harmful by inhalation in contact with skin and if swallowed.
37: Irritating to respiratory system.

Safety Phrases:

- 3/7/9: Keep container tightly closed in a cool, well-ventilated place.
- 16: Keep away from sources of ignition - No smoking.
- 36: Wear suitable protective clothing.

This material is subject to the COSHH regulations 2002. See COSHH Essentials for further information.

16. OTHER INFORMATION

R Phrases Full Text:

- 11: Highly Flammable.
- 20/21/22: Harmful by inhalation in contact with skin and if swallowed.
- 37: Irritating to respiratory system.

Abbreviations used:

CAS	Chemical Abstracts Service Registry Numbers
EINECS	European Inventory of Existing Commercial Chemical Substances
MSDS	Material Safety Data Sheet
HSE	Health and Safety Executive
TWA	Time Weighted Average
OES	Occupational Exposure Standards

This material should only be handled by qualified, trained persons, fully familiar with its dangerous properties. During use or handling, a minimum of two persons should always be available.

References:

Chemicals (Hazard Information and Packaging for Supply) Regulations 2002

Approved classification and labelling guide. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 Guidance on Regulations L131

Approved Supply List. Information Approved for the Classification and labelling of Substances and Preparations Dangerous for Supply. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. Approved List L129

Control of Substances Hazardous to Health Regulations 2002

Health and Safety at Work Act 1974

COSHH Essentials: Easy Steps to Control Chemicals. Control of Substances Hazardous to Health Regulations

Occupational Exposure Limits 2001/2002 EH40

European Inventory of Existing Commercial Substances (EINECS) available on the European Chemicals Bureau website at www.ecb.jrc.it/existing-chemicals

First Aid at Work. The Health and Safety (First Aid) Regulations 1981. Approved Code of Practice and Guidance L74

Personal Protective Equipment (EC Directive) Regulations 1992

The Selection, Use and Maintenance of Respiratory Protective Equipment: A Practical Guide HSG53

Cost and Effectiveness of Chemical Protective Gloves for the Workplace.

Guidance for Employers and Health and Safety Specialists. HSG206

Environmental Protection Act 1990 c43

Environmental Act 1995 c25

The Special Waste Regulations 1996

The Dangerous Substances and Explosive Atmospheres Regulations 2002