

# Material Safety Data Sheet

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## 1 Identification of substance and supplier:

- Product details:
- Trade name: **X-Ray Flux, Lithium tetra/meta borate, Lithium tetraborate, Lithium metaborate (Types LT100,LM100,12:22,66:34,50:50), or any of the previous combinations.**  
Manufacturer/Supplier: XRF Chemicals Pty Ltd., 88 Guthrie Street, Osborne Park, Perth, West Australia 6017  
Emergency Phone: (618) 9244-9600 Web Site: [www.xrfscientific.com](http://www.xrfscientific.com)
- Recommended use For the analysis of ores, minerals and other substances by x-ray spectrography

## 2 Composition/Data on components:

Chemical characterization:

Description: (CAS#) Lithium tetraborate (CAS# 12007-60-2), 0 - 100% Lithium metaborate (CAS#13453-69-5), 0 - 100%. Any proportional pre fused combination of the previous 2 substances.

## 3 Hazards identification

- Hazard description: Xn Harmful
- Information pertaining to particular dangers for man and environment  
R 36/37/38 Irritating to eyes, respiratory system and skin.

## 4 First aid measures

- After inhalation : Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.
- After skin contact: Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice.
- After eye contact : Rinse opened eye for several minutes under running water. Then consult a doctor.
- After swallowing: Seek immediate medical advice. The following symptoms may occur: Gastric or intestinal disorders, nausea, cramp.

## 5 Fire fighting measures

- Suitable extinguishing agents: Product is not flammable. Use water or fire-fighting measures that suit the surrounding fire.  
Protective equipment: Wear self-contained respirator and wear fully protective impervious suit.  
Hazards from combustion products: metal oxide

## 6 Accidental release measures

- Person-related safety precautions:  
Wear protective equipment. Keep unprotected persons away.  
Ensure adequate ventilation  
Measures for environmental protection:  
Do not allow material to be released to the environment without proper governmental permits.
- Measures for cleaning/collecting:  
Dispose contaminated material as waste according to item 13.  
Ensure adequate ventilation.  
Additional information:  
See Section 7 for information on safe handling  
See Section 8 for information on personal protection equipment.  
See Section 13 for disposal information.

## 7 Handling, storage and safety

- Handling
- Information for safe handling:  
Keep container tightly sealed.  
Store in cool, dry place in tightly closed containers.  
Ensure good ventilation at the workplace.
- Storage
- Requirements to be met by storerooms and receptacles:  
No special requirements.
- Information about storage in one common storage facility:  
Further information about storage conditions:  
Keep container tightly sealed.  
Store in cool, dry conditions in well sealed containers.

## 8 Exposure controls and personal protection

- Additional information about design of technical systems:  
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.  
Components with limit values that require monitoring at the workplace:  
Not required.
- Additional information: No data
- Personal protective equipment
- General protective and hygienic measures  
The usual precautionary measures for handling chemicals should be followed.  
Keep away from foodstuffs, beverages and feed.  
Remove all soiled and contaminated clothing immediately.  
Wash hands before breaks and at the end of work.  
Avoid contact with the eyes and skin.
- Breathing equipment:  
Use suitable respirator when high concentrations are present.
- Protection of hands: Impervious gloves
- Eye protection: Safety glasses
- Body protection: Protective work clothing.

## 9 Physical and chemical properties:

- Form: Crystalline powder
- Colour: White
- Odour: Odourless
- Melting point/Melting range: 825 - 925°C
- Boiling point/Boiling range: Not determined
- Sublimation temperature / start: Not determined
- Flash point: Not applicable

- Flammability (solid, gaseous)
- Contact with combustible material may cause fire.
- Ignition temperature: Not determined
- Decomposition temperature: Not determined
- Explosion limits:
- Lower: Not determined
- Upper: Not determined
- Vapour pressure: Not determined
- Density: Approximately 1.25

□ **10 Stability and reactivity**

- Thermal decomposition / conditions to be avoided:  
Decomposition will not occur if used and stored according to specifications.
- Materials to be avoided: Acids
- Dangerous reactions: No dangerous reactions known.  
Dangerous products of decomposition: Metal oxide fume

□ **11 Toxicological information**

- Primary irritant effect:
- On the skin: Irritant to skin and mucous membranes.
- On the eye: Irritating effect.
- Sensitisation: No sensitising effects known.
- Subacute to chronic toxicity:

**Lithium**

Large amounts of lithium compounds may cause vomiting, diarrhea, ataxia, intestinal irritation, kidney injury, central nervous system depression and a drop in blood pressure. Central nervous system effects may include slurred speech, blurred vision, dizziness, sensory loss, convulsions and stupor. Chronic intake may cause neuromuscular effects such as tremor, ataxia, weakness, clonus and hyperactive reflexes. Lithium can cause kidney damage, gastrointestinal disturbances, fatigue, dehydration, weight loss, dermatological effects and thyroid damage. Lithium ion has shown teratogenic effects in rats and mice. Lithium carbonate LD50 oral rat is 525mg/kg.

**Boron**

Boron affects the central nervous system. Boron poisoning causes depression of the circulation, persistent vomiting and diarrhea, followed by profound shock and coma. The temperature may become subnormal and a scarlatina form rash may cover the entire body.

Additional toxicological information:

If small amounts of boron (4.1mg.cu metre) are inhaled it can cause irritation to the nose, throat and eyes.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 10 mg/cu metre for boron oxide and sodium tetraborate in the workplace air for 8 hour/day exposures over a 40 hour week.

**Lethal effects:**

Human studies have shown that boron can be lethal following short-term exposure. The minimal lethal dose of ingested boron (as boric acid) was reported to be 2 – 3 g in infants, 5 – 6 g in children and 15 – 20 g in adults (Locatelli et al. 1987; Wong et al. 1964). There appears to be a differential susceptibility with regard to death in adults. It has been postulated that increased competence of the adult kidney accounts for increased adult tolerance to boron.

**Hepatic effects:**

Acute oral exposure in humans caused congestion, fatty changes, and parenchymatous degeneration (Wong et al. 1964). It is not clear how boron affects the liver, however, limited animal data suggest impaired electron transfer and macrometabolism.

**Reproductive effects:**

Male workers exposed to borate aerosols during the production of boric acid revealed low sperm counts in 6 out of 28 workers (Tarasenko et al. 1972).

**Summary:**

Information exists on the adverse health effects of boron compounds in humans. Studies of workers exposed to boron compounds demonstrated that boron can cause mild irritation of the eyes and respiratory tract ( Garabrant et al. 1984, 1985 ). Other human studies involve case reports of accidental or intentional ingestion of large quantities of boron compounds ( Litovitz et al. 1988; Locatelli et al. 1987). The studies identified key health effects ( lung, kidney, brain, and liver) associated with boron exposure (Wong et al. 1984). Animal studies of the birth rate of occupationally exposed workers is currently underway at a major U.S. borate production facility.

**References for boron:**

Agency for Toxic Substances and Disease Registry ( 1992 ). Toxicological profile for boron. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.( Updated June 22, 2001 )

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

□ **12 Ecological information:**

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

□ **13 Disposal considerations**

- Product: X-ray Flux
- Recommendation : Consult state, local or national regulations for proper disposal.
- Uncleaned packagings: Recommendation: Disposal must be made according to official regulations.

□ **14 Transport information**

- |   |      |
|---|------|
| Not a hazardous material for transportation. DOT regulations: | None |
| ● Land transport ADR/RID (cross-border)                       | None |
| ● Maritime transport IMDG:                                    | None |
| ● Air transport ICAO-TI and IATA-DGR:                         | None |

Transport/Additional information:

Not dangerous according to the above specifications.

□ **15 Regulations**

- Product related hazard information:
- Hazard symbols: Xn Harmful  
36/37/38 Irritating to eyes, respiratory system and skin.  
Safety phrases: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- 36/37 Wear suitable protective clothing and gloves. In case of insufficient ventilation, wear suitable respiratory equipment.
- 45 In case of accident or if you feel unwell, seek medical advice immediately.
- National regulations All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. Information about limitation of use: For use only by technically qualified individuals.

□ **16 Other information:**

Main use: For the analysis of ores, cement, steel and other products. Employers should use this information only as a supplement to other information gathered by them and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty and as a guide only to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user. XRF Chemicals Pty Ltd makes no representations or warranties, either express or implied, including without limitation any warranties or merchantability, fitness for a particular purpose with respect to the information set forth herein or the product to which the information refers. Accordingly, XRF Chemicals Pty Ltd will not be responsible for damages resulting from use of or reliance upon this information

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