SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name: BORIC ACID
Chemical Name: boric acid
Synonyms: APS TECH00005138 BP000004219 AR00000101, B(OH)3, B-H3-O3, Borofax, Redox BOACID70, UL00000942 UL00000102 TECH00000934, boracic acid, hydrogen borate, orthoboric acid, trioxoboric (III) acid
Proper shipping name:
Chemical formula: BH3O3|(C10H12BNO3)x|B-H3-O3
Other means of identification: Not Available
CAS number: 10043-35-3

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:
Used for weatherproofing and fireproofing fabrics; as a preservative; manufacture of cements, crockery, porcelain, enamels, glass, borates, leather, carpets, hats, soaps, artificial gems; in nickel plating baths. Also used in the manufacture of cosmetics; ointments and eye washes; printing and dyeing, photography; for impregnating wicks; hardening steel; in welding flux and copper brazing. Insecticide for cockroaches and carpet beetles; fungus control for citrus fruits.

Details of the supplier of the safety data sheet

Registered company name: VWR International, Pty Ltd
Address: Unit 1/31 Archimedes Place 4172 QLD Australia
Telephone: 61 7 3009 4100 ; 1300 727 696
Fax: 61 7 3009 4199 ; 1300 135 123
Website: http://au.vwr.com
Email: csaus@au.vwr.com

Emergency telephone number

Association / Organisation: Not Available
Emergency telephone numbers: 61 7 3009 4100 ; 1300 727 696
Other emergency telephone numbers: 61 7 3009 4100 ; 1300 727 696

SECTION 2 Hazards identification

Classification of the substance or mixture

HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the Model WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Toxicity</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Body Contact</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Reactivity</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Chronic</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Poisons Schedule: S5

GHS Classification:

Reproductive Toxicity Category 1B


Label elements

GHS label elements

Signal word: DANGER
Hazard statement(s):
H360 May damage fertility or the unborn child

Precautionary statement(s): Prevention
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statement(s): Response
P308+P313 IF exposed or concerned: Get medical advice/attention.

Precautionary statement(s): Storage
P405 Store locked up.

Precautionary statement(s): Disposal
P501 Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration

SECTION 3 Composition / information on ingredients

Substances

<table>
<thead>
<tr>
<th>CAS No</th>
<th>% [weight]</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>10043-35-3</td>
<td>&gt;99</td>
<td>boric acid</td>
</tr>
</tbody>
</table>

Mixtures

See section above for composition of Substances

SECTION 4 First aid measures

Description of first aid measures

Eye Contact:
If this product comes in contact with the eyes:

- Wash out immediately with fresh 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.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact:
If skin or hair contact occurs:

- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

Inhalation:

- 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.
- 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.

Ingestion:

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

Indication of any immediate medical attention and special treatment needed

The material may induce methaemoglobinaemia following exposure.

- Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue. (Cyanosis, alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 50 minutes; repeat, using the same dose, if symptoms of hypoxia fail to subside within 1 hour.
- Thorough cleansing of the entire contaminated area of the body, including the scalp and nails, is of utmost importance.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Index</th>
<th>Sampling Time</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Methaemoglobin in blood</td>
<td>1.5% of haemoglobin</td>
<td>During or end of shift</td>
<td>B, NS, SQ</td>
</tr>
</tbody>
</table>

B: Background levels occur in specimens collected from subjects NOT exposed
NS: Non-specific determinant; also observed after exposure to other materials
SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

For acute or repeated short term exposures to boron and its compounds:

- Nausea, vomiting, diarrhea and epigastric pain, haematemesis and blue-green discoloration of both faeces and vomitus characterise adult boron intoxication.
- Access and correct any abnormalities found in airway and circulation.
- A tidal volume of 10-15 mg/kg should be maintained.
- Emesis should be induced unless the patient is in coma, is experiencing seizures or has lost the gag reflex. If any of these are present, gastric lavage should be performed with a large-bore tube after endotracheal intubation or in the presence of continuous respiratory action.
- Activated charcoal is probably not of value though its use might be indicated following gastric evacuation. Catharsis might be useful to eliminate any borates remaining in the gastrointestinal tract (magnesium sulfate: adults, 30 gms; children 250 mg/hr).
- Peritoneal dialysis and haemodialysis remove some borates.

[Ellenhorn and Barcelou: Medical Toxicology]
SECTION 5 Firefighting measures

Extinguishing media
- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility:
None known.

Advice for firefighters

Fire Fighting:
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves in the event of a fire.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.

Fire/Explosion Hazard:
- Non combustible.
- Not considered a significant fire risk, however containers may burn.
- May emit poisonous fumes, is a fire retardant.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Minor Spills:
- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.

Major Spills:
Moderate hazard.
- CAUTION: Advise personnel in area.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe 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.

Other information
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry area protected from environmental extremes.
- Store away from incompatible materials and foodstuff containers.

Conditions for safe storage, including any incompatibilities

Suitable container:
for boric acid:
Storage bins should have a 60-degree sloping cone bottom with a provision to prevent the entry of water.
For DRY storage:
- Plastic drum

Storage incompatibility:
Boric acid:
- is a weak acid
- is incompatible with alkali carbonates, hydroxides (forming borate salts), strong reducing agents and alkali metals
- reacts violently with potassium metal

Package Material Incompatibilities:

SECTION 8 Exposure controls / personal protection

Control parameters
Occupational Exposure Limits (OEL)

INGREDIENT DATA

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TEEL-0</th>
<th>TEEL-1</th>
<th>TEEL-2</th>
<th>TEEL-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>boric acid</td>
<td>2(ppm)</td>
<td>6(ppm)</td>
<td>100(ppm)</td>
<td>125(ppm)</td>
</tr>
</tbody>
</table>
### Exposure controls

**Appropriate engineering controls**

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

The basic types of engineering controls are:

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

**Personal protection**

- **Eye and face protection:** Safety glasses with side shields, Chemical goggles.
- **Skin protection:** See Hand protection below.
- **Hand protection:** The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
- **Body protection:** See Other protection below.
- **Thermal hazards:**

### SECTION 9 Physical and chemical properties

#### Information on basic physical and chemical properties

**Appearance**

Colourless, odourless, transparent crystals, or white granules or powder; mixes with water, glycerol, ether, alcohol, methanol, liquid ammonia; slightly soluble in acetone. Boric acid is a weak acid.

Loses chemically combined water upon heating, forming: metaboric acid (HBO₂) @ 100-105 deg.C pyroboric acid (H₂-B₄-O₇) @ 140-160 deg.C and boric anhydride (B₂-O₃) at higher temperatures. Solubility in water @ 30 deg.C: 6.35 g/100 cc; @ 100 deg.C: 27.6 g/100 cc.

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Odour</th>
<th>Odour threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divided Solid</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>pH (as supplied)</td>
<td>3.9 @ 4% 20 degC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Melting point / freezing point (°C)</th>
<th>Initial boiling point and boiling range (°C)</th>
<th>Flash point (°C)</th>
<th>Evaporation rate</th>
<th>Flammability</th>
<th>Upper Explosive Limit (%)</th>
<th>Lower Explosive Limit (%)</th>
<th>Vapour pressure (kPa)</th>
<th>Solubility in water (g/L)</th>
<th>Vapour density (Air = 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>169 (decomposes)</td>
<td>Not applicable</td>
<td>Non flammable</td>
<td>Not applicable</td>
<td>Not Available</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Miscible</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative density (Water = 1)</th>
<th>Partition coefficient n-octanol / water</th>
<th>Auto-ignition temperature (°C)</th>
<th>Decomposition temperature</th>
<th>Viscosity (cSt)</th>
<th>Molecular weight (g/mol)</th>
<th>Taste</th>
<th>Explosive properties</th>
<th>Oxidising properties</th>
<th>Surface Tension (dyn/cm or mN/m)</th>
<th>Volatile Component (%/vol)</th>
<th>Gas group</th>
<th>pH as a solution(1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.44-1.5128</td>
<td>Not Available</td>
<td>Not Available</td>
<td>169</td>
<td>Not Available</td>
<td></td>
<td></td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not applicable</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

### SECTION 10 Stability and reactivity

**Reactivity:**

See section 7

**Chemical stability:**

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

**Possibility of hazardous reactions:**

See section 7

**Conditions to avoid:**
SECTION 11 Toxicological information

Information on toxicological effects

Inhaled:
The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless, inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. 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.

If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk.

Ingestion:
Accidental ingestion of the material may be damaging to the health of the individual. The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen. This condition, known as “methaemoglobinemia”, is a form of oxygen starvation (anoxia). Symptoms include cyanosis (a bluish discolouration of skin and mucous membranes) and breathing difficulties.

Skin Contact:
The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

Boric acid is not absorbed through intact skin but is readily absorbed through areas of damaged, abraded, burned skin, areas of active dermatitis. Irritation and skin reactions are possible with sensitive skin.

Eye:
Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

Chronic:
There is sufficient evidence to provide a strong presumption that human exposure to the material may result in impaired fertility on the basis of:
- clear evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.

There is sufficient evidence to provide a strong presumption that human exposure to the material may result in developmental toxicity, generally on the basis of:
- clear results in appropriate animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.

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

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>boric acid</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50:</td>
<td>Skin (human): 15</td>
</tr>
<tr>
<td>2660 mg/kg</td>
<td>mg/3d:       mild</td>
</tr>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>* Value obtained</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances

BORIC ACID

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epithelium. Histologically there may be intercellular oedema of the spongoy layer (spongiosis) and intracellular oedema of the epidermis.

<table>
<thead>
<tr>
<th>Acute Toxicity:</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Irritation/Corrosion:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Serious Eye Damage/Irritation:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Respiratory or Skin sensitisation:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Mutagenicity:</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

| Carcinogenicity:     | Not Applicable |
| Reproductivity:      | Reproductive Toxicity Category 1B |
| STOT - Single Exposure: | Not Applicable |
| STOT - Repeated Exposure: | Not Applicable |
| Aspiration Hazard:   | Not Applicable |

SECTION 12 Ecological information

Toxicity

For boron and borates:

Environmental fate:
Boron is generally found in nature bound to oxygen and is never found as the free element. Atmospheric boron may be in the form of particulate matter or aerosols as borides, boron oxides, borates, boranes, organoboron compounds, thallobor compounds, or borazines.

Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>
SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal:
- Containers may still present a chemical hazard/danger when empty.
- Return to supplier for reuse/recycling if possible.
- Otherwise:
  - If container cannot be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.

SECTION 14 Transport information

Labels Required:
- Marine Pollutant: NO
- HAZCHEM: None

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS
Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

Boric acid (10043-35-3) is found on the following regulatory lists:
- "Australia Hazardous Substances Information System - Consolidated Lists";
- "OECD List of High Production Volume (HPV) Chemicals";
- "Australia High Volume Industrial Chemical List (HVICL)";
- "International Chemical Secretariat (ChemSec) SIN List ("Substitute It Now!")";
- "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5";
- "Australia Therapeutic Goods Administration (TGA) Substances that may be used as active ingredients in Listed medicines";
- "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)";
- "Australia Inventory of Chemical Substances (AICS)";
- "Australia FAISD Handbook - First Aid Instructions, Warning Statements, and General Safety Precautions";
- "GESAMP/EHS Composite List - GESAMP Hazard Profiles";
- "Sigma-Aldrich Transport Information";
- "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs";
- "United Nations Consolidated List of Products Whose Consumption and/or Sale Have Been Banned, Withdrawn, Severely Restricted or Not Approved by Governments";
- "Australia National Pollutant Inventory";
- "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4";
- "Australia - Victoria Occupational Health and Safety Regulations - Schedule 9: Materials at Major Hazard Facilities (And Their Threshold Quantity) Table 2";
- "International Air Transport Association (IATA) Dangerous Goods Regulations";

SECTION 16 Other information

Other information

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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