

SAFETY DATA SHEETS (SDS)

1. PRODUCT IDENTIFICATION

PRODUCT NAME: **BORON CARBIDE**

SYNONYMS: B4C, Norbide, Electrobor

FORMULA: B₄C

RECOMMENDED USES: Boron carbide is used in wear parts such as blasting nozzles, various dies and ceramic body armor. As an abrasive it is ideal for lapping ceramics and ultrasonic cutting (machining). It is used as a neutron absorber in the nuclear industry and for reactor control rods. It is an anti-oxidant in carbon-bonded refractory mixes, and is used as a sintering aid in silicon carbide parts.

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2. HAZARD IDENTIFICATION

HAZARD CLASSIFICATION:

- Non-flammable black powder or grain that is non-combustible and is stable.
- Abrasive particulate may cause minor Eye Irritation and/or Skin Irritation.
- May cause damage to lungs through prolonged or repeated exposure to dust.
- Boron trioxide (B₂O₃) component may damage fertility or the unborn child (oral).



Danger

Not applicable within the EU; only for North America according to OSHA GHS USA.

HAZARD STATEMENTS:

- Harmful if swallowed.
- May cause minor skin or eye irritation. Particulate may scratch cornea or cause other mechanical eye injury.
- Inhaled; May cause respiratory irritation through single use, or cause damage to lungs through prolonged or repeated exposure to concentrations in excess of the PEL or TVL without respiratory protection. This may also decrease the ability of the lungs to clear particulate matter which may cause shortness of breath and increase susceptibility to respiratory disease.
- Boron trioxide (B₂O₃) component may damage fertility or the unborn child (Repr. 1B, H360).

PREVENTION:

- Wash hands thoroughly after use.
- Wear protective gloves and eye/face protection.
- Do not breathe dust. Do not use compressed air or dry sweeping to remove dust from work areas.
- Wear respiratory protection for concentrations in excess of the PEL or TVL.
- Store in dry area in closed containers.
- Dispose of according to applicable federal, state and local regulation.

FIRST AID:

- If Swallowed: Call doctor if you feel unwell.
- If on Skin: Wash with soap and water. Seek medical advice if symptoms persist.
- If in Eyes: Flush with warm water for 15 minutes (remove contacts if possible). Seek medical attention if symptoms persist.
- If Inhaled: If breathing is difficult - Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms or feels unwell - Seek immediate medical attention.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Typical Ingredient	CAS#	Weight(%)	PEL-OSHA (mg/m³)	TLV-ACGIH (mg/m³)	Carcinogen (Y/N)
Boron Carbide (B ₄ C)	12069-32-8	> 95	6 (dust)	10 (dust)	No
Boron trioxide (B ₂ O ₃)	1303-86-2	≤ 3	15 (total dust)	10 (dust)	No
Iron	7439-86-6	≤ 1	n/a	n/a	No

Materials are regulated under OSHA 29 CFR 1900.1200, Hazard Communication Standard.
 Source of exposure limit data; ACGIH Threshold Limit Values; (OSHA Tables Z-1-A, Z-2, Z-3)
 Ingredients are listed under TSCA.

4. FIRST-AID MEASURES

EYES: Flush eyes with lukewarm water for 15 minutes, opening and closing eyelids to ensure adequate rinsing. If redness, irritation, pain, or tearing occurs, seek medical attention.

SKIN: Wash contaminated area with soap and water. Wash contaminated clothing. Seek medical attention if symptoms persist.

INHALATION: If inhalation of high concentrations occurs, move to fresh air. If breathing has stopped, a certified professional should give CPR. Seek immediate medical attention.

INGESTION: Rinse out mouth then drink plenty of water. Do not induce vomiting unless suggested by a doctor. Seek medical attention.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not Applicable

FLAMMABLE LIMITS: LEL: Not Applicable UEL: Not Applicable

AUTO IGNITION TEMPERATURES: Not Applicable.

EXTINGUISHING MEDIA: Use media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Fines can cause dust explosions. Keep away from sources of ignition. Grit 600 size (approx. 9 microns) and finer can ignite and smoldering fire can spread.

HAZARDOUS DECOMPOSITION PRODUCTS: None

FIRE FIGHTING INSTRUCTIONS: Firefighters should wear a NIOSH/MSHA approved full-faced self-contained breathing apparatus (SCBA) operated in positive pressure mode, and full turnout or bunker gear.

NFPA CLASSIFICATION: HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0

6. ACCIDENTAL RELEASE MEASURES

Isolate hazard area and deny entry to unauthorized and/or unprotected personnel. Avoid dust generation. Do not flush with water or aqueous cleansing agents. Respiratory protection for clean-up personnel depends on the level of exposure anticipated. (See Section 8. *EXPOSURE CONTROLS/PERSONAL PROTECTION*). Gently pick up or scoop into clean dry container for later recycle or disposal. Comply with Federal, State and Local regulations regarding reporting of spills and disposal.

7. HANDLING AND STORAGE

HANDLING: Prevent formation of dust, and avoid dust inhalation. Use only in well ventilated areas. Any deposit of dust that cannot be avoided must be regularly removed. DO NOT use compressed air or dry sweeping to remove dust from work area. Wash thoroughly with plenty of water.

STORAGE: Store in dry area in closed/sealed containers. Protect from high humidity and water. Store receptacle in a well ventilated area.

Store away from oxidizing agents. Store away from foodstuffs. Do not store together with acids.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: Under normal working conditions, below acceptable exposure guidelines, none is required. For spills or concentrations above the PEL but less than 10X the PEL, a NIOSH/MSHA approved dust mist respirator should be worn. Appropriate respirator selection will be dependent upon the magnitude of exposure and should be selected in accordance with 29 CFR 1910.134. (See Section 3. *COMPOSITION* for PEL's and TWA's).

Pregnant women should avoid inhalation or skin contact.

SKIN PROTECTION: Protective gloves, as needed, to prevent skin contact.

EYE PROTECTION: Safety-glasses with side shields or goggles to prevent dust and particles from entering the eye. See OSHA 29 CFR 1910.133.

OTHER: Under dusty conditions, employees should wear coveralls or other suitable work clothing. Contaminated clothing must be vacuumed before removal. DO NOT REMOVE dust from clothing by blowing or shaking. Keep away from foodstuff, beverages and feed.

ENGINEERING CONTROLS: Use general ventilation. Local exhaust may be necessary for processes which generate large quantities of airborne dust. Keep exposures below applicable OSHA PEL's and ACGIH-TLV's.

9. PHYSICAL AND CHEMICAL PROPERTIES

Formula	B ₄ C
Boiling Point	Not Applicable
Melting Point	2350 °C
Specific Gravity (H ₂ O = 1)	2.51 - 2.52
Density at 20°C	2.52 g/cc
Percent Volatile	0
Flash point	Not Applicable
Evaporation Rate	None
Solubility in Water	Insoluble
Solubility in Alcohol	Insoluble
pH – value	Neutral
Appearance/Odor	Black /odorless

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal ambient conditions of temperature and pressure.

THERMAL DECOMPOSITION: No decomposition if used and stored to specifications.

POSSIBLE HAZARDOUS REACTIONS: Reacts with strong acids, oxidizing agents, and with strong alkali.

CONDITIONS TO AVOID & INCOMPATIBLE MATERIALS: No further relevant information available.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide and carbon dioxide..

11. TOXICOLOGICAL INFORMATION

EYE: Particulate matter may cause physical injury to the eye.
SKIN: May cause minor irritation.
INHALATION: May cause respiratory irritation through single use.
May cause damage to lungs or pulmonary disease through prolonged/repeated exposure to dust.
INGESTION: May be harmful if swallowed.
SENSITIZATION: No effects known.
OTHER INFO: Product is suspected to cause damage to fertility.
Product is suspected to cause birth defects.
The substance is NOT subject to classification according to the latest version of the EU lists.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: No further relevant information is available.
Persistence & Degradability: No further relevant information is available.
Bioaccumulative Potential: No further relevant information is available.
Mobility In Soil: No further relevant information available
Additional Information: **General Notes:**
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water.
Danger to drinking water if even small quantities leak into the ground.
Due to available data on elimination/decomposition and bioaccumulation potential prolonged term damage of the environment cannot be excluded.

13. DISPOSAL CONSIDERATIONS

Dispose of according to applicable federal, state, and local regulations. Dispose per 40 CFR 261 and 262.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (D.O.T.): **Not Regulated as a Hazardous Material**

D.O.T. HAZARD CLASS (49 CFR 172.101): N/A

D.O.T. PROPER SHIPPING NAME (49 CFR 172.101): N/A

D.O.T. LABELS REQUIRED (49 CFR 172.101): N/A

D.O.T. PLACARDS REQUIRED: N/A

IMDG: **Not Regulated under IMDG (is not hazardous cargo for sea transportation).**

15. REGULATORY INFORMATION

TSCA: All ingredients are listed on the TSCA (Toxic Substance Control Act) inventory.

SERA Section 355 (extremely hazardous substances): None of the ingredients are listed.

SARA 313 (specific toxic chemical listings): None of the ingredients are listed.

California Proposition 65: None of the ingredients are listed.

EPA: Boron trioxide CAS# 1303-86-2 (oral).

Canadian Domestic Substance List (DSL): All ingredients are listed

16. OTHER INFORMATION & LAST REVISION DATE

KEY:

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstracts Service
DOT	Department of Transportation
EPA	Environment Protection Agency
IARC	International Agency for Research on Cancer
IMDG	International Maritime Dangerous Goods
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendment and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act

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