

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Boron Carbide
Chemical Formula	B ₄ C
Molecular Weight	55.255 g/mol
CAS No.	200443-95-4
Recommended Use	Neutron absorber or intermediate
Supplier Address*	ISOFLEX USA PO Box 472615 San Francisco CA 94147 United States
Telephone	+1 415-440-4433
Fax	+1 415-563-4433
Emergency Phone Number (both supplier and manufacturer)	Infotrac/ +1 800-535-5053 *May include subsidiaries or affiliate companies/divisions
Email	iusa@isoflex.com
Website	www.isoflex.com
Preparation Information	ISOFLEX USA Product Safety +1 415-440-4433

2. HAZARDS IDENTIFICATION

Hazard Classification

Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Label Elements

Signal Word Not applicable

Symbols Not applicable

Pictograms Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Product Name	Boron Carbide
Chemical Formula	B ₄ C
Molecular Weight	55.255 g/mol
CAS No.	200443-95-4
% by Weight	99-100

4. FIRST AID MEASURES

Inhalation Remove person to fresh air. If person feels unwell, seek medical attention.

<i>Skin Contact</i>	Wash with soap and water. If signs/symptoms develop, seek medical attention.
<i>Eye Contact</i>	Flush eye(s) with large amounts of water. If signs/symptoms develop, seek medical attention.
<i>If Swallowed</i>	Rinse mouth. If person feels unwell, seek medical attention.
<i>Note to Physician:</i>	Treatment is purely symptomatic. Plasma volume should be maintained by infusion of copious amounts of appropriate fluid.
<i>Most Important Symptoms/Effects (Acute and Delayed)</i>	See Section 11.1: Information on toxicological effects.
<i>Indication of Immediate Medical Attention/Special Treatment Required</i>	Not applicable

5. FIREFIGHTING MEASURES

<i>Suitable Extinguishing Media</i>	In case of fire: Use a firefighting agent (such as water or foam) suitable for ordinary combustible material to extinguish.
<i>Special Hazards Arising from the Substance or Mixture</i>	None inherent in this product.
<i>Protective Measures for Firefighters</i>	Wear full protective clothing, including helmet; self-contained, positive-pressure or pressure-demand breathing apparatus; bunker coat and pants; bands around arms, waist and legs; face mask; and protective covering for exposed areas of the head.

6. ACCIDENTAL RELEASE MEASURES

<i>Personal Precautions, Protective Equipment and Emergency Procedures</i>	Evacuate area. Ventilate area with fresh air. Refer to other sections of this document for information regarding physical and health hazards, respiratory protection, ventilation and personal protective equipment.
<i>Environmental Precautions</i>	Avoid release to the environment.
<i>Methods and Material for Containment and Cleanup</i>	Collect as much of the spilled material as possible. Use wet sweeping compound or water to avoid dusting. Sweep up. Place in a closed container approved for transportation by appropriate authorities. Clean up residue. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

7. HANDLING AND STORAGE

<i>Precautions for Safe Handling</i>	Avoid breathing dust/fume/gas/mist/vapors/spray. Do not eat, drink or smoke while using this product. Wash thoroughly after handling product. Avoid contact with oxidizing agents (chlorine, chromic acid, etc.).
<i>Conditions for Safe Storage</i>	Store away from heat. Store away from oxidizing agents.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters	<i>Occupational exposure limits:</i> No occupational exposure limit values exist for any of the components listed in Section 3 of this SDS.
Exposure Controls	<i>Engineering controls:</i> Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant

Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

Personal protective equipment (PPE): For **eye/face protection**, select and use eye/face protection to prevent contact based on the results of an exposure assessment. Safety glasses with side shields are recommended. For **skin/hand protection**, select and use gloves and/or protective clothing approved to relevant standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Gloves made from nitrile rubber are recommended. For **respiratory protection**, an exposure assessment may be needed to determine whether a respirator is required. If needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select one of the following respirator types to reduce inhalation exposure: half facepiece or full facepiece air-purifying respirator suitable for particulates. For questions about suitability for a specific application, consult with your respirator manufacturer.

Refer to Section 15 for additional information.

9. PHYSICAL AND CHEMICAL PROPERTIES

Odor/Appearance

This material is an odorless, metallic gray-to-black powdered or crystalline solid.

General Physical Form:	Solid
Specific Physical Form:	Powder
Odor Threshold:	No data available
pH:	Not applicable
Melting Point:	Not applicable
Boiling Point:	3500 °C
Flash Point:	No flash point
Evaporation Rate:	Not applicable
Flammability (Solid, Gas):	Not classified
Flammability Limits (LEL):	Not applicable
Flammability Limits (UEL):	Not applicable
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Density:	2.51 g/cm ³
Specific Gravity:	2.51 [Ref Std: Water=1]
Solubility in Water:	Nil
Solubility – Non-Water:	No data available
Partition Coefficient:	No data available (n-octanal / water)
Autoignition Temperature:	Not applicable
Decomposition Temperature:	No data available
Viscosity:	Not applicable

10. STABILITY AND REACTIVITY

<i>Reactivity</i>	This material may be reactive with certain agents under certain conditions. See the remaining headings in this section.
<i>Chemical Stability</i>	Stable
<i>Possibility of Hazardous Reactions Conditions to Avoid</i>	Hazardous polymerization will not occur. Heat, sparks and/or flames
<i>Incompatible Materials</i>	Strong oxidizing agents

Hazardous Decomposition Products **Substance:** Toxic vapor, gas, particulate
Condition: At elevated temperature

11. TOXICOLOGICAL INFORMATION

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

Information on Toxicological Effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

<i>Inhalation</i>	Respiratory tract irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.
<i>Skin Contact</i>	Mechanical skin irritation: Signs/symptoms may include abrasion, redness, pain and itching.
<i>Eye Contact</i>	Mechanical eye irritation: Signs/symptoms may include pain, redness, tearing and corneal abrasion.
<i>Ingestion</i>	Gastrointestinal irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.
<i>Sensitization</i>	No sensitizing effects known

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Ingestion		No data available; calculated ATE>5000 mg/kg

ATE – acute toxicity estimate

Skin Corrosion/Irritation

For the component/components, either no data are currently available or the data are not sufficient for classification.

Serious Eye Damage/Irritation

For the component/components, either no data are currently available or the data are not sufficient for classification.

Skin Sensitization

For the component/components, either no data are currently available or the data are not sufficient for classification.

Respiratory Sensitization

For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity

For the component/components, either no data are currently available or the data are not sufficient for classification.

Carcinogenicity

For the component/components, either no data are currently available or the data are not sufficient for classification.

Reproductive Toxicity: Reproductive and/or Developmental Effects

For the component/components, either no data are currently available or the data are not sufficient for classification.

Target Organs

Specific Target Organ Toxicity – Single Exposure

For the component/components, either no data are currently available or the data are not sufficient for classification.

Specific Target Organ Toxicity – Repeated Exposure

For the component/components, either no data are currently available or the data are not sufficient for classification.

Aspiration Hazard

For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of this SDS for additional toxicological information on this material and/or its components.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Please contact the address or phone number listed on the first page of this SDS for additional ecotoxicological information on this material and/or its components.

Chemical Fate Information

Please contact the address or phone number listed on the first page of this SDS for additional chemical fate information on this material and/or its components.

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of contents/container in accordance with the local/regional/national/international regulations.

Prior to disposal, consult all applicable authorities and regulations to insure proper classification. Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. If no other disposal options are available, waste product may be placed in a landfill properly designed for industrial waste.

EPA Hazardous Waste Number (RCRA): Not regulated

14. TRANSPORT INFORMATION

DOT (US) Not hazardous material/dangerous goods for transport
IMDG Not hazardous material/dangerous goods for transport
IATA Not hazardous material/dangerous goods for transport

15. REGULATORY INFORMATION

US Federal Regulations: Contact manufacturer for more information.

EPCRA 311/312 Hazard Classification: Physical/Health Hazards: Not applicable.

Additional TSCA Information:

Components	CAS No.	Additional Information
Boron 10B Carbide	200443-95-4	Allowed use(s): Neutron absorber in nuclear shielding for advanced nuclear power plants, control rods for nuclear power plants. Use full face respirator (respirator with protection factor >50) P100 cartridge.

State Regulations: Contact manufacturer for more information.

Chemical Inventories: The components of this product are in compliance with the chemical notification requirements of TSCA. One or more of the components in this material is not listed on the TSCA inventory, but is approved for specific commercial use(s) under a US EPA low volume exemption.

Contact manufacturer for more information.

International Regulations: Contact manufacturer for more information.

This SDS has been prepared to meet the US OSHA Hazard Communication Standard, 29 CFR 1910.1200.

16. OTHER INFORMATION**NFPA Hazard Classification****Health: 1****Flammability: 1****Instability: 0****Special Hazards: 0**

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification

Health: 1

Flammability: 1

Physical Hazard: 0

Personal Protection: X

HEALTH HAZARD	1
FLAMMABILITY	1
PHYSICAL HAZARD	0

Hazardous Material Identification System (HMIS® IV) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® IV ratings are to be used with a fully implemented HMIS® IV program. HMIS® is a registered mark of the American Coatings Association (ACA).

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ISOFLEX USA's Commonly Used Abbreviations and Acronyms*

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
ALARA	As Low As Is Reasonably Achievable
AMU	Atomic Mass Unit
ANSI	American National Standards Institute
BLS	Basic Life Support
CAM	Continuous Air Monitor
CAS	Chemical Abstracts Service (division of the American Chemical Society)
CEN	European Committee for Standardization
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLP	Classification, Labelling and Packaging (European Union)
CPR	Controlled Products Regulations (Canada)
CWA	Clean Water Act (USA)
DAC	Derived Air Concentration (USA)
DOE	United States Department of Energy (USA)
DOT	United States Department of Transportation (USA)
DSL	Domestic Substances List (Canada)
EC50	Half Maximal Effective Concentration
EINECS	European Inventory of Existing Commercial Chemical Substances
EHS	Environmentally Hazardous Substance
ELINCS	European List of Notified Chemical Substances
EMS	Emergency Response Procedures for Ships Carrying Dangerous Goods
EPA	Environmental Protection Agency (USA)
EPCRA	Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986
GHS	Globally Harmonized System
HMIS	Hazardous Materials Identification System (USA)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IBC	Intermediate Bulk Containers
ICAO	International Civil Aviation Organization
IDLH	Immediately Dangerous to Life or Health

IMDG	International Maritime Code for Dangerous Goods
LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
LDLO	Lethal Dose Low
LOEC	Lowest-Observed-Effective Concentration
MARPOL	International Convention for the Prevention of Pollution from Ships
MSHA	Mine Safety and Health Administration (USA)
NCRP	National Council on Radiation Protection & Measurements (USA)
NDSL	Non-Domestic Substances List (Canada)
NFPA	National Fire Protection Association (USA)
NIOSH	National Institute for Occupational Safety and Health (USA)
NOEC	No Observed Effect Concentration
N.O.S.	Not Otherwise Specified
NRC	Nuclear Regulatory Commission (USA)
NTP	National Toxicology Program (USA)
OSHA	Occupational Safety and Health Administration (USA)
PBT	Persistent Bioaccumulative and Toxic Chemical
PEL	Permissible Exposure Limit
PIH	Poisonous by Inhalation Hazard
RCRA	Resource Conservation and Recovery Act (USA)
RCT	Radiation Control Technician
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe)
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act (USA)
TDG	Transportation of Dangerous Goods (Canada)
TIH	Toxic by Inhalation Hazard
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
UN	United Nations (Number)
VOC	Volatile Organic Compound
vPvB	Very Persistent Very Bioaccumulative Chemical
WGK	Wassergefährdungsklassen (Germany: Water Hazard Classes)
WHMIS	Workplace Hazardous Materials Information System

*One or more of the above-listed items may not appear in this document.

General Disclaimer

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