

# SAFETY DATA SHEET

Niobium Carbide 511



## Section 1. Identification

<b>Product identifier</b>	: Niobium Carbide 511
<b>Other means of identification</b>	: NbC 511
<b>Product use</b>	: Research and Development.
<b>Supplier's details</b>	: Manufacturer Companhia Brasileira de Metalurgia e Mineração (CBMM) Córrego da Mata S/N°, Araxá, Minas Gerais 38183-903 Brazil Tel: +55 (34) 3669-3000/3201-4500 Fax: +55 (34) 3669-3100 cbmm@cbmm.com  Supplier CBMM Asia Pte. Ltd. 10 Collyer Quay #26-10 Ocean Financial Centre Singapore 049315 Tel: +65 6303-0290 Fax: +65 6303-0299 www.cbmm.sg
<b>e-mail address of person responsible for this SDS</b>	: sds@cbmm.com
<b>Emergency telephone number (with hours of operation)</b>	: ☎ 1865 407333 (NCEC, English)

## Section 2. Hazards identification

<b>Classification of the substance or mixture</b>	: Not classified.
<b><u>GHS label elements, including precautionary statements</u></b>	
<b>Signal word</b>	: No signal word.
<b>Hazard statements</b>	: No known significant effects or critical hazards.
<b><u>Precautionary statements</u></b>	
<b>Prevention</b>	: Not applicable.
<b>Response</b>	: Not applicable.
<b>Storage</b>	: Not applicable.
<b>Disposal</b>	: Not applicable.
<b>Other hazards which do not result in classification</b>	: None known.

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### Section 3. Composition/information on ingredients

**Substance/mixture** : Mixture  
**Other means of identification** : NbC 511

Ingredient name	%	CAS number
niobium carbide	45 - 57	12069-94-2
iron	35 - 45	7439-89-6
aluminium	2 - 8	7429-90-5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

### Section 4. First aid measures

#### Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
- Ingestion** : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

#### Most important symptoms/effects, acute and delayed

##### Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : No known significant effects or critical hazards.
- Ingestion** : No known significant effects or critical hazards.

##### Over-exposure signs/symptoms

- Eye contact** : No specific data.
- Inhalation** : No specific data.
- Skin contact** : No specific data.
- Ingestion** : No specific data.

#### Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

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## Section 5. Firefighting measures

### Extinguishing media

- Suitable extinguishing media** : Use approved Class D extinguisher or smother with dry sand, dry clay or dry ground limestone. Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : CO<sub>2</sub>, water.

**Specific hazards arising from the chemical** : No specific fire or explosion hazard.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide  
metal oxide/oxides

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Put on appropriate personal protective equipment.

**For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### Methods and material for containment and cleaning up

**Small spill** : Move containers from spill area. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.

**Large spill** : Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

### Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8).
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

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## Section 7. Handling and storage

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

## Section 8. Exposure controls/personal protection

### Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
aluminium	<p><b>Workplace Safety and Health Act (Singapore, 2/2006).</b></p> <p>PEL (long term): 10 mg/m<sup>3</sup> 8 hours. Form: Dust</p> <p>PEL (long term): 5 mg/m<sup>3</sup>, (AI) 8 hours. Form: Fume</p> <p>PEL (long term): 5 mg/m<sup>3</sup>, (AI) 8 hours. Form: powder</p>

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

### Skin protection

**Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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## Section 8. Exposure controls/personal protection

**Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties

### Appearance

**Physical state** : Solid.  
**Colour** : Light Grey.  
**Odour** : Not available.  
**Odour threshold** : Not available.  
**pH** : Not available.  
**Melting point** : 2000°C (3632°F)  
**Boiling point** : Not available.  
**Flash point** : Not available.  
**Evaporation rate** : Not available.  
**Flammability (solid, gas)** : Non-flammable.  
**Lower and upper explosive (flammable) limits** : Not available.  
**Vapour pressure** : Not available.  
**Vapour density** : Not available.  
**Relative density** : Not available.  
**Density** : 6 to 7 g/cm<sup>3</sup>  
**Solubility** : Not available.  
**Solubility in water** : Insoluble.  
**Partition coefficient: n-octanol/water** : Not available.  
**Auto-ignition temperature** : Not available.  
**Decomposition temperature** : Not available.  
**Viscosity** : Not available.

## Section 10. Stability and reactivity

**Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**Chemical stability** : The product is stable.

**Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

**Conditions to avoid** : Avoid dust generation.

**Incompatible materials** : Reactive or incompatible with the following materials: acids, alkalis.

**Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
niobium carbide	LC50 Inhalation Dusts and mists	Rat - Male, Female	>5.45 mg/l	4 hours
	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
iron	LC50 Inhalation Dusts and mists	Rat - Male	>250 mg/m <sup>3</sup>	6 hours
	LD50 Oral	Rat - Male	98.6 g/kg	-
aluminium	LC50 Inhalation Dusts and mists	Rat	>888 mg/m <sup>3</sup>	4 hours
	LD50 Oral	Rat - Female	>2000 mg/kg	-

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
niobium carbide	Skin - Non-irritating to the skin.	Rabbit	-	4 hours	72 hours
	Eyes - Non-irritating to the eyes.	Rabbit	-	-	72 hours
iron	Skin - Non-irritating to the skin.	Rabbit	-	4 hours	7 days
	Eyes - Non-irritating to the eyes.	Rabbit	-	168 hours	168 hours
aluminium	Skin - Non-irritating to the skin.	Rabbit	-	24 hours	72 hours
	Eyes - Non-irritating to the eyes.	Rabbit	-	-	7 days

#### Conclusion/Summary

**Skin** : Based on available data, the classification criteria are not met.

**Eyes** : Based on available data, the classification criteria are not met.

#### Sensitisation

Product/ingredient name	Route of exposure	Species	Result
iron	skin	Guinea pig	Not sensitizing
aluminium	skin	Guinea pig	Not sensitizing
	Respiratory	Mouse	Not sensitizing

#### Conclusion/Summary

**Skin** : Based on available data, the classification criteria are not met.

#### Mutagenicity

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## Section 11. Toxicological information

Product/ingredient name	Test	Experiment	Result
niobium carbide	OECD 471	Experiment: In vitro Subject: Bacteria	Negative
	OECD 476	Experiment: In vivo Subject: Mammalian-Animal Cell: Somatic	Negative
iron	OECD 471	Experiment: In vitro Subject: Bacteria	Negative
	OECD 476	Experiment: In vitro Subject: Mammalian-Animal Cell: Somatic	Negative
aluminium	OECD 476	Experiment: In vitro Subject: Mammalian-Animal Cell: Somatic	Negative
	OECD 474	Experiment: In vivo Subject: Mammalian-Animal Cell: Somatic	Negative

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

### Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
aluminium	Negative - Inhalation	Rat - Male, Female	15 mg/m <sup>3</sup> LOAEC	6 months; 5 days per week

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

### Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Developmental toxin	Species	Dose	Exposure
niobium carbide	Negative	Negative	Negative	Rat - Male, Female	Oral: 1000 mg/ kg	54 days; 7 days per week
aluminium	Negative	Negative	-	Rat - Male, Female	Oral: >90 mg Al/kg NOAEL	7 days per week

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

### Teratogenicity

**Conclusion/Summary** : Not available.

### Specific target organ toxicity (single exposure)

Not available.

### Specific target organ toxicity (repeated exposure)

Not available.

### Aspiration hazard

Not available.

**Information on likely routes of exposure** : Not available.

### Potential acute health effects

**Eye contact** : No known significant effects or critical hazards.

**Inhalation** : No known significant effects or critical hazards.

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## Section 11. Toxicological information

- Skin contact** : No known significant effects or critical hazards.  
**Ingestion** : No known significant effects or critical hazards.

### Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : No specific data.  
**Inhalation** : No specific data.  
**Skin contact** : No specific data.  
**Ingestion** : No specific data.

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

#### Short term exposure

- Potential immediate effects** : Not available.  
**Potential delayed effects** : Not available.

#### Long term exposure

- Potential immediate effects** : Not available.  
**Potential delayed effects** : Not available.

#### Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
niobium carbide	Sub-acute NOAEL Oral	Rat - Male, Female	1000 mg/kg	54 days; 7 days per week
iron	Sub-chronic LOAEL Oral	Mouse - Male	1500 µg/kg	12 weeks; 7 days per week
aluminium	Sub-acute NOAEL Inhalation Dusts and mists	Rat - Male	5 mg/m <sup>3</sup> NOAEC	28 days; 5 days per week
	Chronic NOAEL Oral	Rat - Male, Female	30 mg Al/kg	364 days; 7 days per week
	Sub-chronic LOAEL Inhalation Dusts and mists	Rat	50 mg Al/m <sup>3</sup> LOAEC	6 months; 5 days per week

- Conclusion/Summary** : Based on available data, the classification criteria are not met.  
**General** : No known significant effects or critical hazards.  
**Carcinogenicity** : No known significant effects or critical hazards.  
**Mutagenicity** : No known significant effects or critical hazards.  
**Teratogenicity** : No known significant effects or critical hazards.  
**Developmental effects** : No known significant effects or critical hazards.  
**Fertility effects** : No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Not available.

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## Section 12. Ecological information

### Toxicity

Product/ingredient name	Result	Species	Exposure
niobium carbide	EC50 >1000 mg/l Fresh water	Micro-organism	3 hours
	Acute LC50 >100 mg/l Fresh water	Fish - Danio rerio	96 hours
iron	EC50 ≥10000 mg/l	Micro-organism	3 hours
	Acute EC50 >100 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 >10000 mg/l Fresh water	Fish - Danio rerio	96 hours
aluminium	Acute LC50 1.16 mg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute NOEC 100 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Chronic NOEC 100 mg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Chronic NOEC 0.076 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 56.476 mg/l Fresh water	Fish - Pimephales promelas	7 days

**Conclusion/Summary** : Based on available data, the classification criteria are not met.

### Persistence/degradability

**Conclusion/Summary** :  Not applicable.

### Bioaccumulative potential

Not available.

### Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**Mobility** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

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## Section 14. Transport information

	UN	ADR/RID	ADN	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-
Transport hazard class (es)	-	-	-	-	-
Label					
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	Marine Pollutant: No	No.

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of Marpol and the IBC Code** : Not available.

## Section 15. Regulatory information

### Singapore - hazardous chemicals under government control

None.

### International regulations

#### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

#### Montreal Protocol (Annexes A, B, C, E)

Not listed.

#### Stockholm Convention on Persistent Organic Pollutants

Not listed.

#### Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

#### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

### Inventory list

**Canada** : All components are listed or exempted.

**China** : All components are listed or exempted.

**Europe** : All components are listed or exempted.

**Japan** : **Japan inventory (ENCS):**  
All components are listed or exempted.

**Japan inventory (ISHL):**  
All components are listed or exempted.

**Republic of Korea** : All components are listed or exempted.

**Taiwan** : All components are listed or exempted.

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**Section 15. Regulatory information****United States** : All components are listed or exempted.**Section 16. Other information****History****Date of printing** : 20/06/2018**Date of issue/Date of revision** : 20/06/2018**Date of previous issue** : 23/04/2018**Version** : 5

**Key to abbreviations** :

- ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway
- ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail
- UN = United Nations

**Procedure used to derive the classification**

<b>Classification</b>	<b>Justification</b>
Not classified.	

**References** : Not available.

✔ Indicates information that has changed from previously issued version.

**Notice to reader**

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.