

TECHNICAL DATA SHEET

Date of Issue: 2019/02/18

Zirconium Metal powder, Grade GA, dry

| | |
|-------------------|------------------|
| CAS-No. | 7440-67-7 |
| EC-No. | 231-176-9 |
| REACH No. | 01-2119490102-49 |
| Molecular Formula | Zr |
| Product Number | 453110 |

APPLICATION

In vacuum technology as a getter material; in powder metallurgy as an alloying constituent; in pyrotechnics for the manufacture of high energy igniters, fuses and thermal batteries.

FURTHER INGREDIENTS

| | |
|---------|-----------|
| Hafnium | |
| CAS-No. | 7440-58-6 |
| EC-No. | 231-166-4 |

SPECIFICATION

| | |
|----------------|-------------------------------|
| (Zr + Hf)total | min. 98.8 % |
| Hf | approx. 2 % (natural content) |
| Si | max. 0.3 % |
| H | max. 0.25 % |
| Mg | max. 0.2 % |
| Ca total | max. 0.3 % |
| Fe | max. 0.08 % |
| Al | max. 0.3 % |
| Cl | max. 0.05 % |
| Ca soluble | max. 0.03 % |

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Albemarle Corporation and its subsidiaries and affiliates. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider any health or safety hazards or information contained herein only as a guide, and should take those precautions which are necessary or prudent to instruct employees and to develop work practice procedures in order to promote a safe work environment. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein materials or processes in violation of existing or future patent.

Technical data sheets may change frequently. You can download the latest version from our website www.albemarle-lithium.com. Please contact us at www.albemarle-lithium.com/contact with questions.

METHOD OF ANALYSIS

Determination of oxidation value, particle size distribution, average particle size; specific surface area and combustion properties; gravimetric analysis of zirconium, verification of nitrogen content and accompanying impurities by special analytical methods. For specific information on Rockwood Lithium standard determination methods see our delivery program.

PHYSICAL PROPERTIES

| | |
|--------------------------------|--|
| Appearance | powder |
| Color | dark gray |
| Melting point/ range | 1,856 °C at 1,013 hPa |
| Boiling point/boiling range | 3,577 °C |
| Density | 6.434 g/cm ³ at 20 °C Method: OECD Test Guideline 109 |
| Bulk density | 1,200 - 2,300 kg/m ³ |
| Water solubility | (practically insoluble) |
| Grain Size | min. 99.9 % < 45 µm by sieving APS 4.4 - 6.5 µm acc. to Blaine |
| Additional Physical Properties | Ignition Point: 215 - 265 °C Combustion Rate: 50 - 90 sec/50 cm (Albemarle standard) Gain on Ignition: min. 33.5 % (weight increase by combustion) |

HANDLING & STORAGE

Handling Highly flammable solid. Dust explosion hazard.

A zirconium powder with maximum metal content, which burns at white heat. Compared with its relative coarse particle size it burns very fast. Keep away from flames, sparks and heat sources; use ground-connected metallic apparatus to avoid sudden ignition by electrostatic discharge; self-ignition is possible; vacuum-drying of suspensions not recommended; wear gloves, a face shield or goggles; in case of fire, cover only with sand, limestone or with a dry extinguishing powder suitable for metal fires class D.
DO NOT USE WATER!

Refer to our safety data sheet and special precautionary advice for specific safety information!

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Albemarle Corporation and its subsidiaries and affiliates. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider any health or safety hazards or information contained herein only as a guide, and should take those precautions which are necessary or prudent to instruct employees and to develop work practice procedures in order to promote a safe work environment. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein materials or processes in violation of existing or future patent.

TRANSPORT & PACKAGING

UN number 2008

| | | | |
|--------|------------|-------|------------|
| ADR | Class: 4.2 | PG: I | Label: 4.2 |
| RID | Class: 4.2 | PG: I | Label: 4.2 |
| IMDG | Class: 4.2 | PG: I | Label: 4.2 |
| IATA_C | Class: 4.2 | | |
| IATA_P | Class: 4.2 | | |

Hazard pictograms



Signal Word Danger

H&P Phrases See Safety Data Sheet

Labelling The labelling is according to EU-GHS classification ((EG) 1272/2008) and may vary in other countries. Please refer to the respective Safety Data Sheet for your country.

Packaging

In tin cans with a capacity of max. 5 kg.

OTHER INFORMATION

Further Related Safety Data Sheet
Documents

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Albemarle Corporation and its subsidiaries and affiliates. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider any health or safety hazards or information contained herein only as a guide, and should take those precautions which are necessary or prudent to instruct employees and to develop work practice procedures in order to promote a safe work environment. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein materials or processes in violation of existing or future patent.

Technical data sheets may change frequently. You can download the latest version from our website www.albemarle-lithium.com. Please contact us at www.albemarle-lithium.com/contact with questions.