

## 1. IDENTIFICATION OF THE SUBSTANCE AND COMPANY UNDERTAKING

General Chemical Name            CERIUM

Intended/recommended use:      Research, Pyrophoric alloys for cigarette lighters,  
Making aluminium alloys, magnesium alloys, steels and cast iron

Supplier (Distributor):            New Metals & Chemicals Ltd.  
Newmet House, Rue de St. Lawrence  
Waltham Abbey, Essex, EN9 1PF  
Telephone +44 (0)1992 711111

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

| Ingredient Name | Concentration | Classification* | CAS number | EINECS No. |
|-----------------|---------------|-----------------|------------|------------|
| Cerium          | 100%          | F, R11, 15      | 7440-45-1  | 231-154-9  |

\*see 16. OTHER INFORMATION for full text of R-phrases.

## 3. HAZARD IDENTIFICATION

Flammable.

Contact with moisture will liberate heat and may lead to ignition. Reacts with water with may cause it to inflame. When the material is cut it can form sparks and ignite. If in powder form it is potentially pyrophoric.

## 4. FIRST AID MEASURES

Inhalation                            If signs/symptoms like coughing or burning occur, remove person from exposure to fresh air immediately and administer 100 percent humidified supplement oxygen with assisted ventilation as required. If breathing has ceased DO NOT use mouth-to-mouth respiration. Apply

|              |   |
|--------------|---|
|              | artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. Seek immediate medical attention.  |
| Skin Contact | Flush skin with large amounts of water. Remove contaminated clothing. If irritation persists, seek medical attention  |
| Eye Contact  | DO NOT allow patient to rub or keep eyes closed. Irrigate with copious quantities of water for at least 15 minutes. Flush under eyelids by lifting lid. DO NOT use a static eye bath. Seek immediate medical attention. |
| Ingestion    | DO NOT induce vomiting. If patient is conscious and alert, wash out mouth with water. Give 2 cupfuls of milk with great care. Give nothing by mouth if patient is unconscious. Seek immediate medical attention.        |

## 5. FIRE FIGHTING MEASURES

### Precautions against fire and explosion

When heated, all forms of the metal will react with water or steam to produce flammable/explosive hydrogen. Oxidises in the presence of damp material.

Explosive reactions may occur when Cerium is present as a concentrated airborne dust in the presence of an open flame, or when in contact with oxidising agents at high temperatures.

### Suitable extinguishing media

Use dry sand or dry salt. Cool containers with flooding quantities of water until well after the fire is out. Do not get water inside containers.

### Extinguishing media which must not be used for safety reasons

DO NOT USE water, foam, carbon dioxide or dry powder directly on fire. See above.

### Exposure hazards arising from substance, combustion products, resulting gases

Cerium will react with water to produce flammable/explosive hydrogen and respirable cerium oxide particles.

### Special protective equipment for fire fighters

Wear full protective clothing, including self-contained breathing apparatus.

## **6. ACCIDENTAL RELEASE MEASURES**

### Personal Precautions:

Remove or extinguish all ignition sources. Evacuate all but essential authorised control personnel. Wear self-contained breathing apparatus and gloves to avoid inhalation, skin and eye contact. Provide sufficient ventilation.

### Environmental Precautions

Prevent entry into drains, surface and ground water, soil and confined areas.

### Methods for Cleaning up

Only trained, authorised personnel should be involved. Fully encapsulating protective clothing and self contained breathing apparatus should be worn for spills and leaks with no fire. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

If the material is in powder form, stop leak if you can do it without risk. Keep combustibles (wood, paper, oil etc) away from spilled material. Cover spills with dry sand, dry diatomaceous earth or dry salt followed with plastic sheet to minimise spreading or contact with water. Use clean non-sparking tools to collect material and place it into loosely covered plastic containers. In a fume cupboard or LEV room, cautiously add the absorbed material gradually to a large excess of water. Do not put water onto the absorbed material – it could ignite. Place in a closed plastic container, suitably marked, and dispose of through a licensed disposal contractor.

## **7. HANDLING AND STORAGE**

### Precautions for safe handling

To be handled by qualified and trained staff only. Avoid breathing dusts and direct contact with skin and eyes. Avoid all contact with water. Wash hands thoroughly after handling. See section 8 for personal protective equipment.

### Precautions for safe storage

Keep container dry and tightly closed when not in use. Air and moisture sensitive. Store away from oxidisers and other materials listed under incompatibility (see section 10). Do not store in metal containers without a plastic lining. Material in powder form should be stored under nitrogen in a sealed glass ampoule.

Specific use

Research, pyrophoric alloys for cigarette lighters

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Exposure limit values

| Ingredient name  | OES LTEL<br>(8 hr TWA) | OES STEL<br>(15 min) | MEL(LT) | MEL(ST) |
|--|------------------------|----------------------|---------|---------|
| For cerium particles no exposure limits are given. Comparison is given for:<br>Respirable dust | 5 mg/m <sup>3</sup>    |                      |         |         |

### Occupational exposure controls

|                        |   |
|------------------------|---|
| Eye Protection         | Wear appropriate protective eyeglasses, chemical safety goggles or full face shield to European Standard EN 166.  |
| Hand protection        | Wear appropriate gloves when handling this material. Suitable material is butyl rubber. However, due regard must be taken that heavy gloves will interfere with the wearer's sense to touch and may contribute to a dangerous situation. Thinner gloves of nitrile and PVC may be used as disposable gloves and must be discarded immediately after use. Gloves should comply with European Standard EN 465-3 class 3.                    |
| Skin Protection        | Use one or more of the following personal protection items as necessary to prevent skin contact: Full chemical protective suit to EN 465 standard, PVC apron, helmet and boots.   |
| Respiratory Protection | Avoid inhalation of dust. Select the following respirator based on airborne concentration of contaminants: Full face dust respirator. Half -mask air-supplied respirator to EN 147. Full-face high efficiency filter respirator to EN 147 or EN 12941/12942. Full-face or hood compressed air breathing apparatus to EN 139 or EN 270/271. Use appropriate local exhaust ventilation, to maintain airborne exposure below control limits. |
| Ingestion:             | Do not eat, drink or smoke when using this product. Do not ingest. Exhibit the strictest hygiene control.   |

### Environmental exposure controls

No specific environmental legislation applies, however in accordance with best practise only use in a fume cupboard or with local exhaust ventilation, ventilated to a scrubbing system. In case of fire, spillage, or leakage, prevent material from entering water courses, sewers or soil. Material will hydrolyse or oxidise in air forming cerium oxide. This material is non-toxic and would not present an environmental hazard.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### General information

|            |           |
|------------|-----------|
| Appearance | Silver    |
| Odour      | Odourless |

### Important health, safety and environmental information

|                             |   |
|-----------------------------|---|
| pH                          | N/A   |
| Boiling point/boiling range | 6204 °C   |
| Melting point/melting range | 1470 °C   |
| Flash point                 | N/A   |
| Flammability (solid, gas)   | Flammable   |
| Autoignition temperature    | N/A   |
| Explosive properties        | N/A   |
| Oxidising properties        | Not oxidising   |
| Vapour Pressure             | N/A   |
| Relative density            | 6.65  |
| Solubility                  | Water - insoluble/reacts<br>Fat - virtually insoluble |
| Partition coefficient:      | n-octanol/water: Cerium-oxide does not react          |

|                  |     |
|------------------|-----|
| Viscosity        | N/A |
| Vapour density   | N/A |
| Evaporation rate | N/A |

## 10. STABILITY AND REACTIVITY

|                                  |   |
|----------------------------------|---|
| Stability                        | Stable, but may decompose if exposed to moist air or water.   |
| Conditions to avoid              | Avoid creating dusts. Air and moisture sensitive.   |
| Materials to avoid               | Avoid water, strong acids, strong bases, strong oxidising materials. The reaction with antimony or bismuth is exothermic, the reaction with zinc may be pyrophoric. |
| Hazardous Decomposition Products | All forms will react with water at room temperature to produce flammable/explosive hydrogen.  |

## 11. TOXICOLOGICAL INFORMATION

Cerium will oxidise immediately under normal conditions (under air). The following information is therefore given for Cerium oxides.

|                           |   |
|---------------------------|---|
| Effects from eye contact  | May cause eye irritation.   |
| Effects from skin contact | May cause skin irritation. Low toxicity potential due to poor skin absorption.  |
| Effects from inhalation   | May be harmful if inhaled (depending on particle size – particles smaller than 10 microns are considered to be respirable). |
| Effects from ingestion    | Low toxicity potential due to poor absorption by the oral route.  |

|   |                    |
|---|--------------------|
| (a) Acute toxicity (oral, inhalation, dermal) | not tested/no data |
|---|--------------------|

- |   |                    |
|---|--------------------|
| (b) Corrosive/irritation (eye, skin, respiratory tract)   | not tested/no data |
| (c) Sensitisation (skin, respiratory)   | not tested/no data |
| (d) Repeated-dose toxicity  | not tested/no data |
| (e) Mutagenicity  |                    |
| Mutagenicity studies were carried out on Ames Salmonella Typhimurium and E. Coli. Various Strain Indicators were used, all tests were negative. |                    |
| (f) Carcinogenicity   | not tested/no data |
| (g) Reproductive toxicity   | not tested/no data |

## 12. ECOLOGICAL INFORMATION

### (1) Ecotoxicity

#### (a) Aquatic toxicity

- |   |                    |
|---|--------------------|
| (i) acute and chronic for fish                  | not tested/no data |
| (ii) acute and chronic for daphnia              | not tested/no data |
| (iii) acute and chronic for algaefish           | not tested/no data |
| (iv) acute and chronic for other aquatic plants | not tested/no data |

#### (b) Soil toxicity

- |                      |                    |
|----------------------|--------------------|
| (i) macro organisms  | not tested/no data |
| (ii) micro organisms | not tested/no data |
| (iii) birds          | not tested/no data |
| (iv) bees            | not tested/no data |
| (v) plants           | not tested/no data |
| (vi) fauna           | not tested/no data |

### (2) Mobility

The product's mobility is limited because it will react with water or air-moisture at room temperature.

### (3) Persistence and degradability

Cerium oxide may persist in soil or water but it is not considered to be eco-toxic.

### (4) Bioaccumulation potential

Cerium cannot enter the food chain because it will immediately oxidise and form non-toxic cerium oxide.

(5) Other adverse effects

No other effects are known.

### 13. DISPOSAL CONSIDERATIONS

All waste material to be contained in a plastic sealed bin, duly marked, and disposed of as special waste through a licensed waste contractor in accordance with “The Special Waste Regulations 1996”. See sections 6 and 7.

### 14. TRANSPORT INFORMATION

**As slabs, ingots or rods**

|     |                                  |                       |
|-----|----------------------------------|-----------------------|
| (a) | UN number                        | 1333                  |
| (b) | class                            | 4.1 (flammable solid) |
| (c) | proper shipping name:            | Cerium                |
| (d) | packing group                    | II                    |
| (e) | marine pollutant (if applicable) | N/A                   |
| (f) | other applicable information     | N/A                   |

### 15. REGULATORY INFORMATION

EC Supply: Chip-3 regulations 2002

F Highly Flammable

Risk Phrases:

- 11: Highly Flammable.
- 15: Contact with water liberates highly flammable gases.

Safety Phrases:

- 7/8: Keep container tightly closed and dry.
- 43: In case of fire, use dry chemical extinguisher. Never use water.

This material is subject to the COSHH regulations 2002. See COSHH Essentials for further information.

## 16. OTHER INFORMATION

R Phrases Full Text:

- 11: Highly Flammable.
- 15: Contact with water liberates highly flammable gases.

Abbreviations used:

|        |   |
|--------|---|
| CAS    | Chemical Abstracts Service Registry Numbers                   |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| MSDS   | Material Safety Data Sheet                                    |
| HSE    | Health and Safety Executive                                   |
| TWA    | Time Weighted Average   |
| OES    | Occupational Exposure Standards                               |

*References:*

*Chemicals (Hazard Information and Packaging for Supply) regulations 2002*

*Approved classification and labelling guide. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 Guidance on Regulations L131*

*Control of Substances Hazardous to Health Regulations 2002*

*Health and Safety at Work Act 1974*

*COSHH Essentials: Easy Steps to Control Chemicals. Control of Substances Hazardous to Health Regulations.*

*European Inventory of Existing Commercial Substances (EINECS) available on the European Chemicals Bureau website [www.ecb.jrc.it/existing-chemicals](http://www.ecb.jrc.it/existing-chemicals)*

*First Aid at Work. The Health and Safety (First Aid) Regulations 1981. Approved Code of Practice and Guidance L74.*

*Personal Protective Equipment (EC Directive) Regulations 1992*

*Respiratory Protective Equipment – A practical guide (ISBN 0-7176-1537-5)*