



Magnesium Alloy containing Zinc, Rare Earths and Zirconium

Safety Data Sheet

Prepared in accordance to UN GHS standards. Intended to comply with OSHA 29CFR1910.1200 ; EU REACH 453/2010, Canadian WHMIS, Japanese JIS Z7250.2009, Australian WorkSafe, Korean ISHA (Notice 2009-68), New Zealand HSNO Act, Mexican NOM-18-STPS-2000, and Singapore SS 586 Part 3

Revision date: 4/04/17

Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Massive metal alloy
Product name. : Magnesium Alloy containing Zinc, Rare Earths and Zirconium
Synonyms : Magnesium Alloy Ingot, Bar, Extrusion, Billet, Plate, Sheet or Welding Rod, ZE41, RZ5, EZ33, ZRE1, ZK60, ZK30, ZW3, Elektron 21, EV31 ,K1A, ZK51, ZK61,

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Industrial Fabrication, Casting, Welding

1.3. Details of the supplier of the safety data sheet

Manufacturer/Supplier of the Safety Data Sheet:

Aimtek, Inc.
201 Washington Street
Auburn, MA
USA
Telephone: 508-832-5035

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300: 24 hrs

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification in accordance with the Globally Harmonized Standard and regulations referenced above.

Not classified as hazardous as manufactured and shipped.

Classification in accordance with EU Directive 1999/45/EC

Not classified as hazardous as manufactured and shipped.

Classification in accordance with New Zealand HSNO Act

Not classified as hazardous as manufactured and shipped.

Classification in accordance with Canadian WHMIS

Not classified as hazardous as manufactured and shipped.

2.2. Label elements

GHS label Elements: applies to OSHA 29CFR1910.1200 ; EU REACH 453/2010, Canadian WHMIS, Japanese JIS Z7250.2009, Australian WorkSafe, Korean ISHA (Notice 2009-68), New Zealand HSNO Act, Mexican NOM-18-STPS-2000, and Singapore SS 586 Part 3

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GHS labelling

No labelling applicable

Labelling according to EU Directive 1999/45/EC

No labelling applicable.

Labelling according to Canadian WHMIS

No labelling applicable.

2.3. Other hazards

PBT: not relevant – no registration required

vPvB: not relevant – no registration required

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixture

Name	CAS Number	EINECS Number	%
Magnesium	CAS No: 7439-95-4	EINECS No: 231-104-6	87 - 99
Zinc	CAS No: 7440-66-6	EINECS No: 231-175-3	0-7
Zirconium	CAS No: 7440-67-7	EINECS No: 231-176-9	0-1
Neodymium	CAS No: 7440-00-8	EINECS No: 231-109-3	0-4
Cerium	CAS No: 7440-45-1	EINECS No: 231-154-9	0-2
Lanthanum	CAS No: 7439-91-0	EINECS No: 231-099-0	0-2
Praseodymium	CAS No: 7440-10-0	EINECS No: 231-120-3	0-1
Gadolinium	CAS No: 7440-54-2	EINECS No: 231-162-2	0-2

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation	: Machining may result in release of dust. If inhaled and if breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If dust are formed :
First-aid measures after skin contact	: Machining may result in release of dust. Gently wash with plenty of soap and water.
First-aid measures after eye contact	: Machining may result in release of dust. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if pain, blinking or redness persist.
First-aid measures after ingestion	: Not expected to present a significant ingestion hazard under anticipated conditions of normal use.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries	: No significant signs or symptoms indicative of any health hazard are expected to occur.
Symptoms/injuries after inhalation	: Machining may result in release of dust. Inhalation may cause: irritation, coughing, shortness of breath.
Symptoms/injuries after skin contact	: Mechanical injury only. Molten material may burn skin.
Symptoms/injuries after eye contact	: Mechanical injury only. Metal dust or fume may be dangerous to eye and surrounding tissue.
Symptoms/injuries after ingestion	: Ingestion is unlikely due to physical state. No significant signs or symptoms indicative of any adverse health hazard are expected to occur as a result of ingestion.

4.3. Indication of any immediate medical attention and special treatment needed

All treatments should be based on observed signs and symptoms of distress in the patient.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Smother burning magnesium by covering with an extinguishing powder approved for use on magnesium fires, such as Class D fire extinguisher, G1, METL-X, dry sand or other media for metal fires. Consult National Fire Protection Association standards for other extinguishing media which may be applicable to certain operations such as foundries or heat-treat furnaces.
Unsuitable extinguishing media	: Do not use water.

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5.2. Special hazards arising from the substance or mixture

- Fire hazard : When heated in air to a temperature near its melting point, magnesium alloys ignite and burn with a white flame.
Finely divided magnesium will readily ignite in the presence of any spark or flame. It will also auto ignite when heated in air even below the melting point. The finer the particle size the more readily the powder will ignite and the more intense the fire will be. As a dust magnesium has an Explosive Concentration of 20 mg/litre.
- Explosion hazard : Use of water on molten or burning magnesium will produce hydrogen gas and may cause an explosion.
- Reactivity : Water and acids may react with magnesium releasing hydrogen.

5.3. Advice for firefighters

- Firefighting instructions : Avoid contact with water. Use dry extinguishing materials (e.g. dry sand, fluxes, iron chips, cement, class D fire extinguisher or dry sand).
- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Wear fire/flammable resistant/retardant clothing. Use self-contained breathing apparatus.
Magnesium burns with a bright white flame, tinted goggles should be used.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Collect all waste in suitable and labelled containers and dispose according to local legislation. Collect contaminated fire fighting water separately. It must not enter the sewage system.

6.1.1. For non-emergency personnel

- Protective equipment : Machining may result in release of dust. If dust is formed : Dust impervious gloves.
- Emergency procedures : Machining may result in release of dust. If dust is formed : Avoid all unnecessary exposure.

6.1.2. For emergency responders

- Protective equipment : Machining may result in release of dust. Where excessive dust may result, use approved respiratory protection equipment. Wear suitable protective clothing and eye/face protection. Dust impervious gloves.
- Emergency procedures : 6.3. Methods and material for containment and cleaning up.

6.2. Environmental precautions

Machining may result in release of dust. Prevent dispersion. This product contains hazardous components for the aquatic environment. Prevent entry to sewers and public waters.

6.3. Methods and material for containment and cleaning up

- For containment : Avoid generating dust. Contain and collect as any solid.
- Methods for cleaning up : Collect spillage. Minimize generation of dust. Large spills: scoop solid spill into closing containers.

6.4. Reference to other sections

Section 7: safe handling. Section 8: personal protective equipment. Section 13: disposal information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Practice reasonable care in handling magnesium and magnesium alloy product forms to avoid product damage and/or personal injury. If operations involving this product, such as machining, produce fines, such as dust, powder, chips, or turnings, proper measures should be taken to prevent dust clouds around these operations. These fines should be collected frequently and should be stored and disposed of in accordance with National Fire Protection Agency guidelines. If these fines should become ignited, they can be extinguished using procedures described in this document.
- Hygiene measures : Always wash your hands immediately after handling this product, and once again before leaving the workplace.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : See National Fire Protection Association Bulletin NFPA 480, "Storage, Handling and Processing of Magnesium Solids and Powders", for detailed storage information.
- Storage conditions : Store in dry protected location to prevent any moisture contact.
- Prohibitions on mixed storage : Store away from combustibles.

7.3. Specific end use(s)

Not Relevant

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Magnesium					
	Target	Exposure Route	Exposure Duration	Effect	Value
DNEL	Workers	Inhalation	Long-term	Systematic	10 mg Mg/m ³
DNEL	General Population	Inhalation	Long-term	Systematic	10 mg Mg/m ³
OSHA PEL (TWA)	Workers	inhalation	Long-term	Systematic	15 mg Mg/m ³

Zinc (as oxide)		
USA OSHA	OSHA PEL (TWA) (mg/m ³)	15 mg/m ³ (total dust) 5 mg/m ³ (respirable dust)
USA NIOSH	NIOSH REL (ceiling) (mg/m ³)	15 mg/m ³ (dust)

Zirconium					
DNEL	Workers	Inhalation	Long-term	Systematic	5mg Zr/m ³
DNEL	Workers	Skin route	Long-term	Systematic	660 mg Zr/day

Neodymium	
DNEL	No hazard identified
PNEC	No hazard identified

Cerium	
DNEL	Oral DNEL system. effects 3.04 mg/kg bw/day (Human (consumer)) Dermal DNEL system. effects 3.04 mg/kg bw/day (Human (consumer)) 5.07 mg/kg bw/day (Human (worker)) Inhalative DNEL system. effects 6 mg/m ³ (Human (consumer)) 10 mg/m ³ (Human (worker))
PNEC	PNEC STP 60.9 mg/l (Microorganisms (activated sludge)) (OECD 209 (Activated Sludge, Resp. Inhibition Test)) Test material: Dicerium tricarbonat Grutzner I (2006) PNEC freshwater 0.6 mg/l (Freshwater organisms) Extrapolation method: assessment factor PNEC marine water 60.9 µg/l (Marine organisms) Extrapolation method: assessment factor

Lanthanum	
DNEL	No hazard identified
PNEC	No hazard identified

Praseodymium	
DNEL	No hazard identified
PNEC	No hazard identified

Gadolinium	
DNEL	No hazard identified
PNEC	No hazard identified

8.2. Exposure controls

Appropriate engineering controls	: Provide local exhaust or general room ventilation to minimize exposure to dust. Avoid dispersal of dust in the air (ie, clearing dust surfaces with compressed air).
Materials for protective clothing	: Machining may result in release of dust. No special clothing/skin protection equipment is recommended under normal conditions of use.
Hand protection	: If dust is formed: Wear dust impervious gloves. EN374.
Eye protection	: Safety glasses. In case of dust production: protective goggles. EN166.
Respiratory protection	: Machining may result in release of dust. In case of inadequate ventilation wear respiratory protection. Use air-purifying respirator equipped with particulate filtering cartridges. EN 136/140.
Thermal hazard protection	: Flame retardant clothing should be used when handling in molten state.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Silver solid.

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Colour	: silver.
Odour	: Odorless.
Odour threshold	: Not applicable
pH	: Not applicable
Relative evaporation rate	: Not applicable
Melting point	: 450 - 650 °C
Freezing point	: No data available
Boiling point	: 1095 °C
Flash point	: Not applicable
Self ignition temperature	: Not applicable
Decomposition temperature	: Not applicable
Flammability (solid, gas)	: Highly flammable as powder
Vapour pressure	: Not applicable
Relative vapour density at 20 °C	: Not applicable
Relative density	: 1.76 - 1.81
Relative density of saturated gas/air mixture	: Not applicable
Solubility	: 6.7 mg/L (21°C, pH ca. 10.8)
Log Pow	: Not applicable
Log Kow	: Not applicable
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: Not applicable
Explosive properties	: Not applicable
Oxidising properties	: Not applicable
Explosive limits	: Not applicable

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Hazardous polymerization will not occur.

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No additional information available.

10.4. Conditions to avoid

Exposure to extremely high temperatures. Build up of finely divided dust on surfaces.

10.5. Incompatible materials

Acid. Reacts with acid to form hydrogen gas. In finely divided form, will react with water or acids to release hydrogen.

10.6. Hazardous decomposition products

See incompatibility statement and fire and explosion hazard data for special situations.

SECTION 11: Toxicological information

11.1 Likely Routes of Exposure

Most likely routes of exposure: dermal.

11.2 Symptoms Related to Physical, Chemical and Toxicological Characteristics

Symptoms/injuries after inhalation	: Machining may result in release of dust. Inhalation may cause: irritation, coughing, shortness of breath.
Symptoms/injuries after skin contact	: Mechanical injury only. Molten material may burn skin.
Symptoms/injuries after eye contact	: Mechanical injury only. Metal dust or fume may be dangerous to eye and surrounding tissue.

11.3 Effects from Exposure

No significant signs or symptoms indicative of any health hazard are expected to occur.

11.4 Information on toxicological effects

Acute toxicity	: Not classified. Based on available data, the classification criteria are not met
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Magnesium (as Magnesium Oxide)	
LD50 oral rat	3990 mg/kg
Zinc (as Zinc Oxide)	
LD50 oral rat	> 5000 mg/kg no adverse signs of toxicity
Zirconium	
LD50 oral rat	> 5000 mg/kg no adverse signs of toxicity
Neodymium	
LD50 oral rat	Not Determined
Cerium	
LD50 oral rat	> 5000 mg/kg (rat (Sprague-Dawley)) (EPA OPPTS 870.1100 (Acute Oral Toxicity))
Lanthanum	
LD50 oral rat	10648 ppm (rat (wistar)) (OECD Guideline 408; EU Method B.7) read-across from supporting substance(structural analogue or surrogate)
Praseodymium	
LD50 oral rat	Not Determined
Gadolinium	
LD50 oral rat	Not Determined

Skin corrosion/irritation	: Not classified. Based on available data, the classification criteria are not met
Serious eye damage/irritation	: Not classified. Based on available data, the classification criteria are not met
Respiratory or skin sensitisation	: Not classified. Based on available data, the classification criteria are not met
Germ cell mutagenicity	: Not classified. Based on available data, the classification criteria are not met
Carcinogenicity	: Not classified. Based on available data, the classification criteria are not met
Reproductive toxicity	: Not classified. Based on available data, the classification criteria are not met
Specific target organ toxicity (single exposure)	: Not classified. Based on available data, the classification criteria are not met
Specific target organ toxicity (repeated exposure)	: Not classified. Based on available data, the classification criteria are not met
Aspiration hazard	: Not classified. Based on available data, the classification criteria are not met

11.5. Carcinogenicity Lists

No components are found on OSHA, NTP or IARC lists.

SECTION 12: Ecological information

12.1. Toxicity

Magnesium	Magnesium is not hazardous to the aquatic environment as: - The lowest acute reference values for fish, invertebrates and algae are > 100 mgMg/l. - The lowest aquatic NOEC for these three trophic levels is > 1 mg Mg/l (i.e., 41 mg Mg/l for Daphnia magna; no data are available for fish but based on the acute toxicity data, fish are less sensitive compared to aquatic invertebrates).- There is no evidence for bioaccumulation or biomagnification in the environment.
Zinc	Effects on fish: Danio rerio LL50 (96 hrs) 1.793 mg/L
Zirconium	Effects on fish: Danio rerio LL50 (96 hrs) >100 mg ZrO2/L
Neodymium	Not Determined
Cerium	Not Determined
Lanthanum	Not Determined
Praseodymium	Not Determined
Gadolinium	Not Determined

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12.2. Persistence and degradability

Magnesium	Magnesium is naturally occurring and ubiquitous in the environment. Upon contact with water, magnesium metal dissolves and behaves as magnesium naturally present in the environment. Biodegradation is not relevant for Mg metal, which is considered as not biodegradable.
Zinc	Not Determined
Zirconium	Non-Biodegradable
Neodymium	Not Determined
Cerium	Not Determined
Lanthanum	Not Determined
Praseodymium	Not Determined
Gadolinium	Not Determined

12.3. Bioaccumulative potential

Magnesium	Bioaccumulation of magnesium in aquatic/terrestrial organisms is considered to be of no concern since magnesium is an essential element for aquatic and terrestrial organisms. The uptake of essential elements is generally under strict homeostatic control. Under these conditions, the internal concentration of these elements is maintained over a wide concentration range in the environment and rises only dramatically under conditions that are toxic for aquatic and terrestrial organisms
Zinc	Not expected to bioaccumulate.
Zirconium	Non Bioaccumulative
Neodymium	Not Determined
Cerium	Not Determined
Lanthanum	Not Determined
Praseodymium	Not Determined
Gadolinium	Not Determined

12.4. Mobility in soil

Magnesium	Magnesium metal is soluble in water. A log K _d value of 2.82 l/kg dw has been determined for freshwater sediment and no data are available for soil. Based on this relatively low K _d value, the Mg ²⁺ ions can leach through normal soil and are relatively mobile in sediment. Results of PBT and vPvB assessment
Zinc	Not Determined
Zirconium	Insoluble in water
Neodymium	Not Determined
Cerium	Not Determined
Lanthanum	Not Determined
Praseodymium	Not Determined
Gadolinium	Not Determined

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods	: Dispose in a safe manner in accordance with local/national regulations.
Waste disposal recommendations	: Depending on the local regulations it may be disposed of as solid waste or incinerated in a suitable installation.
EURLW code	: For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

SECTION 14: Transport information

In accordance with DOT / ADR / RID / ADNR / IMDG / ICAO / IATA

14.1. UN number

Not a dangerous good for transport regulations

14.2. UN proper shipping name

Not applicable

14.2 Additional information

Overland transport

No additional information available

Transport by sea

No additional information available

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Air transport

No additional information available

SECTION 15: Regulatory information

USA Regulations	
SECTION 313 SUPPLIER NOTIFICATION	This product contains no chemicals in concentrations subject to the requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (Title III of SARA) and of 40 CFR 372

EU Classification	
WARNING SYMBOL	None
WARNING WORD	None
RISK PHRASES	None
SAFETY PHRASES	None

SECTION 16: Other information

Indication of changes	: Revised format. GHS classification information.
Data sources	: Chemical Inspection & Regulation Service; accessed at: http://www.cirs-reach.com/Inventory/Global_Chemical_Inventories.html . European Chemicals Agency (ECHA) C&L Inventory database. Accessed at http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database . European Chemicals Agency (ECHA) Registered Substances list. Accessed at http://echa.europa.eu/ . Ind. Exposure & Control Techn. for OSHA Regulated Substances - MgO (fume), March, 1989, pp. 1181-1184. Krister Forsberg and S.Z. Mansdorf, "Quick Selection Guide to Chemical Protective Clothing", Fifth Edition. New Zealand Government Information Sheet: Correlation between GHS and New Zealand HSNO Hazard Classes and Categories . REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006. TSCA Chemical Substance Inventory. Accessed at http://www.epa.gov/oppt/existingchemicals/pubs/tscainventory/howto.html . US National Library of Medicine National Institutes of Health Haz-Map. Accessed at http://hazmap.nlm.nih.gov .
Abbreviations and acronyms	: ACGIH (American Conference of Government Industrial Hygienists). ATE: Acute Toxicity Estimate. CAS (Chemical Abstracts Service) number. EC50: Environmental Concentration associated with a response by 50% of the test population. GHS: Globally Harmonized System (of Classification and Labeling of Chemicals) . LD50: Lethal Dose for 50% of the test population. NOEC: No Observable Effect Concentration. OSHA: Occupational Safety & Health Administration. PBT: Persistent, Bioaccumulative, Toxic . STEL: Short Term Exposure Limits. TSCA: Toxic Substances Control Act. TWA: Time Weighted Average.

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.