# Safety Data Sheet

According to Annex II to REACH - Regulation 2015/830

## SECTION 1. Identification of the substance/mixture and of the company/undertaking

**1.1. Product identifier**

| | |
|---|---|
| Substance name: | **Magnesium powder or raspings**<br>**"Magnesium Powder" or "Magnesium Raspings"** |
| EC number | 231-104-6 |
| CAS number | 7439-95-4 |
| Registration Number | 01-2119537203-49-0022 |
| Chemical formula: | Mg |
| Molecular weight: | 24.30 g/mol |
| Product name: | **MAGNESIUM POWDERS AND RASPINGS** |

Full substance identifiers, as per CLP Annex VI, have been provided in subsection 2.1 of this SDS

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

| | |
|---|---|
| Intended use | Melting, alloying, casting (MAC)<br>Particulates production & handling (PP&H) |
| | Fine particulates production (FPP) |
| | Metallurgical uses (MU) |
| | Solid forming processes (SFP) - incl. production of welding electrodes |
| | Corrosion protection (CP) |
| | Welding in industrial settings (W) |
| | Exposure during etching of magnesium dies |
| | Welding in professional settings (W) |
| | Professional use of magnesium powder in signal flares, signal rockets, marking ammunition, signalling and simulation ammunition and illumination<br>Consumer use of pyrotechnical products (FW) |
| | Service life of magnesium-containing articles by workers |
| | Etching of magnesium dies |
| | Service life of magnesium -containing articles by consumers |
| **Uses advised against** | Uses other than those indicated above |

Please refer to section 16 for a complete list of identified uses for which an exposure scenario is provided as an annex.

**1.3. Details of the supplier of the safety data sheet**

**Name of Manufacturer:**

| | |
|---|---|
| Name | **Société pour la Fabrication du Magnésium SA** |
| Full address | Rue des Sablons 9 |
| District and Country | 1920 Martigny Switzerland<br>tel. +41 (0) 27 721 75 90<br>fax +41 (0) 27 721 75 95 |
| e-mail address of the competent person responsible for the Safety Data Sheet | info@sfm-magnesium.ch |
| Name | **Société pour la Fabrication du Magnésium SA** |

**Name of REACH registered EU importer:**

| | |
|---|---|
| Name | **WIMEX Handelsges.m.b.H.** |
| Full address | Theresiengasse 67 |
| District and Country | 1180, Wien<br>Austria |

**1.4. Emergency telephone number.**

For urgent inquiries refer to:

Company Emergency telephone number:
**SFM SA:** Tel. +41 (0) 58 911 0200 (SOS Surveillance Company 24 hours)

## SECTION 2. Hazards identification

**2.1. Classification of the substance or mixture**

Remark: There are two entries in Regulation (EC) No 1272/2008 Annex VI existing for magnesium; one for magnesium powder (pyrophoric) and one for magnesium, powder or turnings, which are given below (section 2.1.1).
According to the current legal classification magnesium powder (pyrophoric) and magnesium, powder or turnings should be classified as follows:

**Magnesium, powder or raspings**

| **Identification** | **Classification 1272/2008 (CLP)** |
|---|---|
| | Flammable solids Category 1<br>Flam. Sol. 1 H228<br>Self-heating substances and mixtures Category 1<br>Self-heat. 2 H252<br>Substances and mixtures which in contact with water emit flammable gases Category 2<br>Water-react. 2 H261<br>Classification note according to Annex VI to the CLP Regulation: T |

According to Note T of the existing entries “magnesium powder (pyrophoric) (Index no.: 012-001-00-3)” and “magnesium powder or turnings (Index no.: 012-002-00-9)” according to Regulation (EC) 1272/2008 Annex VI: “This substance may be marketed in a form which does not have the physical hazards as indicated by the classification in the entry in Part 3. If the results of the relevant method or methods in accordance with Part 2 of Annex I of Regulation (EC) 1272/2008 show that the specific form of substance marketed does not exhibit this physical property or these physical hazards, the substance shall be classified in accordance with the result or results of this test or these tests. Relevant information, including reference to the relevant test method(s) shall be included in the safety data sheet.”
The full wording of hazard (H) phrases is given in section 16 of the sheet.

**2.2. Label elements**

**Magnesium, powder or turnings**
Hazard labelling pursuant to EC Regulation 1272/2008 (CLP) and subsequent amendments and supplements.

Hazard pictograms:

Signal words: **DANGER**

Hazard statements:

| | |
|---|---|
| **H228** | Flammable solid. |
| **H252** | Self-heating in large quantities; may catch fire. |
| **H261** | In contact with water releases flammable gases. |

Precautionary statements:

| | |
|---|---|
| **P210** | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| **P233** | Keep container tightly closed. |
| **P240:** | Ground/bond container and receiving equipment. |

### 2.3. Other hazards

No other hazards identified.
On the basis of available data, the product does not contain any PBT or vPvB in percentage greater than 0,1%.

## SECTION 3. Composition/information on ingredients

### 3.1. Substances
Contains:

| **Main constituent** | **Conc. %** |
|---|---|
| **Magnesium** | |
| CAS 7439-95-4 | ca. 99.5 % |
| EC 231-104-6 | |
| INDEX 012-002-00-9 | |
| Reg. no. 01-2119537203-49-0022 | |

**Impurities**
No impurities relevant for classification and labelling.

## SECTION 4. First aid measures

### 4.1. Description of first aid measures

No episodes of harm to the staff authorised to use the product have been reported. The following general measures should be adopted as necessary:
INHALATION: Remove to open air. If the subject stops breathing, administer artificial respiration. Get medical advice/attention.
INGESTION: Get medical advice/attention. Induce vomiting only if indicated by the doctor. Do not give anything by mouth to an unconscious person.
EYES and SKIN: Wash with plenty of water. In the event of persistent irritation, get medical advice/attention.
PROTECTIVE MEASURES FOR THE FIRST RESCUE WORKERS: for PPE (personal protection equipment) required for first aid refer to section 8.2 of this safety data sheet.

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

The substance if ingested can cause diarrhea.

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

Advises are given in section 4.1; No special treatment needed.

## SECTION 5. Firefighting measures

### 5.1. Extinguishing media

SUITABLE EXTINGUISHING EQUIPMENT
Use dry extinguishing materials (e.g. dry sand, fluxes, iron chips, cement, class D fire extinguisher).
UNSUITABLE EXTINGUISHING EQUIPMENT
Do not use water.

**5.2. Special hazards arising from the substance or mixture**

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE
Risk of dust ignition/explosion exists. Keep away from any possible contact with water.
Avoid formation of dust also in case of handling massive objects.

**5.3. Advice for firefighters**

GENERAL INFORMATION
Avoid contact with water. Use dry extinguishing materials (e.g. dry sand, fluxes, iron chips, cement, class D fire extinguisher).
SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS
Fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

## SECTION 6. Accidental release measures

**6.1. Personal precautions, protective equipment and emergency procedures**

*6.1.1 For non-emergency personnel*
Keep away from any possible contact with water, because of violent reaction and possible flash fire. Brush off lose particles from skin.
Do not take any action that involves any personal risk or without adequate training. Evacuate the surrounding areas.
Wear appropriate protective equipment (including personal protective equipment referred to in section 8 of this safety data sheet) to prevent contamination of the skin, eyes and personal clothing. Wear appropriate respirator when ventilation is inadequate.
Do not inhale the dust. Avoid dispersion of the product in the environment. Follow the appropriate internal procedures for unauthorized personnel to intervene directly in case of accidental release.

*6.1.2 For emergency responders*
Keep away from any possible contact with water, because of violent reaction and possible flash fire. Brush off lose particles from skin.
Evacuate non-authorized personnel. Wear appropriate protective equipment. (see section 8 of this Safety Data Sheet). Follow the appropriate internal procedures for authorized personnel. Check the dust. Isolate the danger area and deny entry. Ventilate enclosed spaces before entering.
Remove unequipped persons. Eliminate all sources of ignition (cigarettes, flames, sparks, etc.) from the area in which the leak occurred.

**6.2. Environmental precautions**

The product must not penetrate into the sewer system or come into contact with surface water or ground water. No special precautions must be considered. Magnesium is abundantly present in all environmental compartments.

**6.3. Methods and material for containment and cleaning up**

Avoid dust formation. Pick up the product mechanically in a dry way. Magnesium waste should be recycled as much as possible. Make sure the leakage site is well aired. Evaluate the compatibility of the container to be used, by checking section 10. Contaminated material should be disposed of in compliance with the provisions set forth in point 13.

**6.4. Reference to other sections**

Any information on personal protection and disposal is given in sections 8 and 13.

## SECTION 7. Handling and storage

**7.1. Precautions for safe handling**

There is a risk of a dust explosion if the following conditions are met:

- The substance is given in very finely distributed form (powder, dust).
- The substance is whirled up in sufficient quantity in the air.

- An ignition source is present (flame, spark, electrostatic discharge, etc.)

Therefore it is important to ensure an adequate earthing system for the equipment and personnel. In order to avoid the risk of fires and explosions, never use compressed air when handling. Keep away from heat, sparks and naked flames; do not smoke or use matches or lighters. Avoid leakage of the product into the environment. Avoid contact with eyes and skin. Do not breathe powders. Do not eat, drink or smoke during use. Remove any contaminated clothes and personal protective equipment before entering places in which people eat.

### 7.2. Conditions for safe storage, including any incompatibilities

Store only in the original container. Keep the product in clearly labelled containers. Keep containers well sealed. Store in a ventilated and dry place, far away from sources of ignition. Avoid violent blows. Avoid overheating. Avoid contact with water.
Avoid generation of condensed water due to harsh temperature changes in-between different storages/stocks or as a consequence of thermal difference between transportation and storage conditions.

Store in a cool and well ventilated place, keep far away from sources of heat, naked flames and sparks and other sources of ignition.

### 7.3. Specific end use(s)

No use other than as indicated in section 1.2 and 16 of this safety data sheet

## SECTION 8. Exposure controls/personal protection

### 8.1. Control parameters

During the risk assessment process, it is essential to take into consideration the ACGIH occupational exposure levels for inert particulate not otherwise classified (PNOC respirable fraction: 3 mg/m3; PNOC inhalable fraction: 10 mg/m3).

**PNEC value (dissolved magnesium) for European Union/Member state, based on added Mg concentrations**

| Country | Freshwater mg Mg/l | Marine water mg Mg/l | Freshwater, intermittent releases mg Mg/l | STP mg Mg/l | Freshwater sediment mg Mg/kg dw | Marine sediment mg Mg/kg dw | Soil mg Mg/kg dw |
|---|---|---|---|---|---|---|---|
| PNECadded (Predicted No Effect Concentration) | 0.41 | 0.41 | 1.4 | ≥10.8 | 268 | 268 | 268 |
| Typical natural background concentration | 7.1 | 1290 | 7.1 | No data | 6918 | No data | 3930 |

All PNEC values are based on added magnesium concentrations (PNECadded), without taking into account the natural background in the exposure media The PNECtotal can be calculated as the sum of PNECadded and the background concentration for Mg in the corresponding environmental compartment.

**DNELs for workers**
Magnesium is a non-soluble inert powder with an MMAD of 25.6 µm and GSD of 1.72 µm, and the derived DNEL for inhalation is above 10 mg/m$^3$ for the inhalable airborne fraction which is the general dust limit for the inhalable airborne fraction. Therefore, this general dust limit will be applied for exposure scenarios with exposure to magnesium oxide dust.

**DNELs for general population**
Magnesium is a non-soluble inert powder with an MMAD of 25.6 µm and GSD of 1.72 µm, and the derived DNEL for inhalation is above 10 mg/m$^3$ for the inhalable airborne fraction which is the general dust limit for the inhalable airborne fraction. Therefore, this general dust limit will be applied for exposure scenarios with exposure to magnesium oxide dust.

### 8.2. Exposure controls

As the use of adequate technical equipment must always take priority over personal protective equipment, make sure that the workplace is well aired through effective local aspiration.

The general practice of hygiene at work involves certain measures (for example, showering and changing clothes at the end of the work shift) in order to avoid any type of third party contamination and appropriate cleaning practices (i.e. regular cleaning with suitable cleaning devices ), do not eat and smoke in the workplace. In general, inhalation and ingestion must be avoided. Unless stated otherwise, certified

work shoes and clothing must be worn. Contaminated work clothing should not be taken out of the workplace. Good ventilation in the workplace must be ensured. Local forced ventilation (LEV) is required in the case of processes that generate metal dust. The dust must not be removed (for example from dry sprays) by means of compressed air. Regular training on hygiene practices in the workplace and correct use of personal protective equipment (PPE) is required.

If the product may or must come into contact or react with water, suitable technical and/or organisational measures should be taken to prevent the development of toxic and/or inflammable gases.

HAND PROTECTION
In the case of prolonged contact with the product, protect the hands with penetration-resistant work gloves (see standard EN 374).
Currently there is no information available regading suitable glove materials.
Experience says that polychloroprene, nitrile rubber, butyl rubber, fluoro-caoutchouc, and polyvinyl chloride are suitable as glove materials for protection against un-dissolved solids.
Work glove material must be chosen according to the use process and the products that may form. Latex gloves may cause sensitivity reactions.

SKIN PROTECTION
Wear category I professional long-sleeved overalls and safety footwear (see Regulation 2016/425 and standard EN ISO 20344). Wash body with soap and water after removing protective clothing.
Consider the appropriateness of providing antistatic clothing in the case of working environments in which there is a risk of explosion.

EYE PROTECTION
Wear airtight protective goggles (see standard EN 166).

RESPIRATORY PROTECTION
Use a type P filtering facemask, whose class (1, 2 or 3) and effective need, must be defined according to the outcome of risk assessment (see standard EN 149).

ENVIRONMENTAL EXPOSURE CONTROLS
The emissions generated by manufacturing processes, including those generated by ventilation equipment, should be checked to ensure compliance with environmental standards.

## SECTION 9. Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

| | | |
|---|---|---|
| Appearance | Powder | |
| Colour | Silvery-white | |
| Odour | Odourless | |
| Odour threshold | Not available | |
| pH | Not available | |
| Melting point / freezing point | 650 °C | handbook data |
| Initial boiling point | 1095 °C | handbook data |
| Boiling range | Not available | |
| Flash point | not applicable (inorganic solid) | |
| Evaporation Rate | not applicable (inorganic solid with a melting point at 650°C) | |
| Flammability of solids and gases | highly flammable as powder (study result, EU method A.10) | |
| Lower inflammability limit | Not available | |
| Upper inflammability limit | Not available | |
| Lower explosive limit | non-explosive (the substance is void of any chemical structures commonly associated with explosive properties) | |
| Upper explosive limit | non-explosive (the substance is void of any chemical structures commonly associated with explosive properties) | |
| Vapour pressure | Not available | |
| Vapour density | Not available | |
| Relative density | 176 23°C | Method:OECD TG 109 |
| Solubility | 6.7 mg/L (21°C, pH ca. 10.8) (EU method A.6, OECD 105) | |
| Partition coefficient: n-octanol/water | not applicable | Reason for missing data:Non applicabile (inorganic substance) |
| Auto-ignition temperature | not self-heating substance (study result, UN-Test N.4) | |
| Decomposition temperature | not applicable | |
| Viscosity | not applicable (solid with a melting point at 650°C) | |
| Explosive properties | non-explosive (the substance is void of any chemical structures commonly | |

| | |
|---|---|
| | associated with explosive properties) |
| Oxidising properties | no oxidising properties (substance does not contain a surplus of oxygen or any structural groups known to be correlated with a tendency to react exothermally with combustible material) |

### 9.2. Other information

The substance is legally classified as being self-heating (magnesium powder or turnings) and to be flammable in contact with air (magnesium powder (pyrophoric)), respectively according to Regulation (EC) 1272/2008 Annex VI.
The provider of this eSDS likes to note that this current legal classification does not reflect the long-time experience of the magnesium industry. Therefore, new studies have been conducted at BAM (Bundesanstalt für Materialforschung und –prüfung) in accordance to the current valid transport regulation "UN recommendations on transport of dangerous good, manual of tests and criteria, part III" which show that magnesium powder is neither flammable in contact with air nor auto-flammable (measured for magnesium powder samples up to a particle size of $D_{50}$ 40 µm).
Nevertheless, the current legal classification of magnesium according to Regulation (EC) No 1272/2008 Annex VI is obligatory until further notice of ECHA.

## SECTION 10. Stability and reactivity

### 10.1. Reactivity

In the course of hydrolysis slowly releases flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles.

### 10.2. Chemical stability

Under normal conditions of use and storage (closed in original container and under dry conditions) magnesium is stable.

### 10.3. Possibility of hazardous reactions

See point 10.1 "Reactivity".

### 10.4. Conditions to avoid

Keep away from any possible contact with water.
Avoid generation of condensed water.

### 10.5. Incompatible materials

Incompatible materials:
Chips, fines, dust and molten metal are considerably more reactive with the following:
• Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten.
• Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
• Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminum.
• Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation. Molten aluminum can react violently with iron oxide without external ignition source.
• Iron powder and water: Explosive reaction forming hydrogen gas when heated above 1470°F (800°C).

### 10.6. Hazardous decomposition products

In contact with water hydrogen is formed which is a highly flammable gas.

## SECTION 11. Toxicological information

### 11.1. Information on toxicological effects

The information provided in this section is consistent with the information provided in the REACH chemical safety report (CSR) for magnesium. During development of the CSR all available toxicological data have been considered and evaluated for relevance and reliability. Non-reliable data have not been considered in the assessment.

| Toxicity endpoints | Outcome of the effects assessment |
|---|---|
| **a. Acute toxicity** | Magnesium powder is not acutely toxic via the oral, dermal, or inhalation route.<br><br>Oral, rat, gavage<br>(Read-across - $MgCl_2$ * $6H_2O$)<br>$LD_{50}$ > 2000 mg/kg bw (OECD 423)<br><br>Dermal<br>Following the HERAG guidance for metals and metal salts, a dermal absorption rate in the range of maximally 0.1-1.0 % can be anticipated. Dermal absorption in this order of magnitude is not considered to be "significant".<br><br>Inhalation:<br>(Read-across - MgO)<br>No acute inhalation toxicity. Exposure to respirable MgO did not produce any measurable pulmonary inflammation. |
| **b. Skin corrosion / irritation** | Based on available data, the classification criteria for skin irritation are not met.<br><br>(Read across - $MgCl_2$ hexahydrate)<br><br>Skin irritation: not irritating (in vitro study, equivalent or similar to EU method B.46, reconstructed human epidermis) |
| **c. Serious eye damage / irritation** | Based on available data, the classification criteria for eye irritation are not met.<br><br>(Read across - $MgCl_2$ hexahydrate)<br><br>Eye irritation: not irritating (OECD 405, rabbit) |
| **d. Respiratory or skin sensitisation** | Based on available data, the classification criteria for sensitisation are not met.<br><br>(Read across - magnesium alloys (with a total magnesium content between 89.2 – 96.8%)).<br><br>Skin sensitisation: not sensitising (OECD 406, GMPT) |
| **e. Germ cell mutagenicity** | Based on available data, the classification criteria for mutagenicity are not met. Read across to various magnesium substances.<br><br>(i) Bacterial reverse mutation assay (S.typhimurium, E.coli): (Ames test; OECD 471) **negative**<br>(ii) Gene mutation (OECD 476, mouse lymphoma): **negative**<br>(iii) in vitro mammalian chromosome aberration test (Chinese hamster lung fibroblast cell line) (OECD 473): **negative** |
| **f. Carcinogenicity** | Based on available data, the classification criteria for carcinogenicity are not met.<br><br>(Read across - $MgCl_2$ hexahydrate)<br><br>oral, mice, 96 weeks<br>No evidence of a carcinogenic potential was found |
| **g. Reproductive toxicity** | Based on available data, the classification criteria for reporductive toxicity are not met.<br><br>Data published by the opinion of the Scientific Committee on Food, 2001 stated a lack of effects during the intake of high amounts of magnesium on the reproductive function in humans. The information are sufficient for risk characterisation. |
| **h. STOT-single exposure** | Based on available data, the classification criteria for STOT-single exposure are not met. The classification criteria according to regulation (EC) 1272/2008 as specific target organ toxicant (STOT) – single exposure, oral, inhalation are not met since no reversible or irreversible adverse health effects were observed immediately or delayed after exposure. |

| Toxicity endpoints | Outcome of the effects assessment |
|---|---|
| **i. STOT-repeated exposure** | Based on available data, the classification criteria for STOT-repeated exposure are not met.<br>The only effect observed is that magnesium causes diarrhoea if ingested in high doses. According to the scientific committee on food, 2001 it can be assumed that the no-effect level of daily magnesium intake is 250 mg/day. It is explicitly note that this value does not include Mg normally present in foods and beverages. This effect could be regarded as non "significant" or non "severe", and does not indicate functional disturbance or morphological changes of toxicological relevance. |
| **j. Aspiration hazard** | No hazard expected. |
| **Further remarks** | |
| **Summary CMR effects** | Magnesium does not fulfil the criteria for CMR (carcinogen, mutagen, toxic to reproduction) Cat. 1 and Cat. 2 according to regulation (EC) 1272/2008. |
| **Information on the likely route of exposure** | The primary routes of human exposure to magnesium are from inhalation of aerosols and ingestion of food and drinking water containing magnesium. |

## SECTION 12. Ecological information

Use this product according to good working practices. Avoid littering. Inform the competent authorities, should the product reach waterways or contaminate soil or vegetation.

### 12.1. Toxicity

**Acute toxicity**

No data are available on ecotoxicity of Mg metal. Read-across from MgSO4 and MgCl2 (and their hydrated forms). All tests were conducted according to international test guidelines (e.g., OECD) or scientifically acceptable methods.

| Test Organism | End-point | Value | Reference |
|---|---|---|---|
| Freshwater fish:<br>*Pimephales promelas* | 96h-$LC_{50}$ | 541 mg Mg/l | Mount et al. 1997 |
| Freshwater invertebrates:<br>*Daphnia magna* | 48h-$LC_{50}$ | 140 mg Mg/l | Pillard et al. 2000 |
| Freshwater algae:<br>*Scenedesmus subspicatus* | 72h-$ErC_{50}$ (growth rate) | >12 mg Mg/l | Biesinger and Christensen 1972 |
| Marine fish:<br>*Menidia beryllina* | 48h-$LC_{50}$ | 2800 mg Mg/l | Dengler 2010a |
| Marine invertebrates:<br>*Mysidopsis bahia* | 48h-$LC_{50}$ | 2650 mg Mg/l | Dengler 2010a |

**Chronic toxicity**
No data are available on ecotoxicity of Mg metal. Read-across from $MgSO_4$ and $MgCl_2$ (and their hydrated forms).
All tests were conducted according to international test guidelines (e.g., OECD) or scientifically acceptable methods.

| Test organisms | End-point | Value | Reference |
|---|---|---|---|
| **Aquatic toxicity data** | | | |
| Freshwater invertebrates:<br>*Daphnia magna* | 21-day $EC_{16}$ for reproduction | 82 mg Mg/l | Pillard et al. 2000 |
| Freshwater algae:<br>*Scenedesmus subspicatus* | 72h-NOEC for growth rate | ≥12 mg Mg/l | Biesinger and Christensen 1972 |
| No reliable data are available for chronic toxicity of Mg to fish. According to the available toxicity data for aquatic organisms, there is no need for classification of Mg as dangerous to the aquatic environment, and based on the acute toxicity data, fish are less sensitive compared to aquatic invertebrates. The low toxic potential of Mg to aquatic organisms is also illustrated by the fact that Mg is a major essential element for aquatic organisms and that Mg is abundantly present in the aquatic environment with typical natural background concentrations of 7.1 mg Mg/l and 1290 mg Mg/l for freshwater and marine water, respectively. | | | |
| **Chronic sediment toxicity** | | | |

| |
|---|
| No reliable data are available for the acute or chronic toxicity of magnesium to sediment organisms. PNEC derivation was based on the equilibrium partitioning method, taking into account the PNEC for freshwater or marine water and the sediment Kd-value given in section 12.4. |
| **Chronic terrestrial toxicity** |
| No reliable data are available for the acute or chronic toxicity of magnesium to soil organisms. PNEC derivation was based on the equilibrium partitioning method, taking into account the PNEC for freshwater and the sediment Kd-value given in section 12.4. |

**Toxicity to micro-organisms e.g. bacteria**

No data are available on toxicity of Mg metal. Read-across from $MgCl_2$ hexahydrate.

| Test Organism | End-point | Value | Reference |
|---|---|---|---|
| Domestic activated sludge population | 3h-$EC_{10}$ for respiration inhibition (according to OECD 209) | ≥108 mg Mg/l | Dengler 2010b |

**Toxicity to birds**

There is no potential for bioaccumulation and no risk of secondary poisoning for magnesium below the PNEC for direct toxicity in the various environmental compartments.

**Conclusion on environmental classification and labelling**

Magnesium is not hardous to the aquatic environment as:

- The lowest acute reference values for fish, invertebrates and algae are > 100 mg Mg/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.

**12.2. Persistence and degradability**

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.

**12.3. Bioaccumulative potential**

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.

**12.4. Mobility in soil**

Magnesium metal is soluble in water. A log Kd 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 Kd value, the Mg2+ ions can leach through normal soil and are relatively mobile in sediment. Results of PBT and vPvB assessment

**12.5. Results of PBT and vPvB assessment**

On the basis of available data, the product does not contain any PBT or vPvB in percentage greater than 0,1%.

**12.6. Other adverse effects**

Information not available

## SECTION 13. Disposal considerations

**13.1. Waste treatment methods**

Reuse, when possible. Product residues shall be considered special hazardous waste. The hazards of the wastes containing this product shall be evaluated according to applicable regulations. (Directive 2008/98/EC and subsequent amendments and supplements).
Disposal must be performed by an authorised waste management enterprise in compliance with national and local regulations.
The legal responsible for disposal is the producer / holder of the waste.
Different EWC codes could be applied to this mixture according to the European Waste Catalogue based on the specific circumstances that generated the waste, possible alterations and / or possible contamination.

The product as such, contained in the original packaging, or poured into in an appropriate recipient for disposal, or contained in a damaged packaging after an accidental leakage, shall be classified with a EWC code that is matching the description of the use shown at section 1.2.

The suitable final destination of the waste shall be evaluated by the producer on the basis of the chemical-physical characteristics of the waste, the compatibility with the authorized facility to which it will be provided for recovery, and the definitive treatment or disposal according to the procedures established by regulations in force.
Disposal through wastewater discharge is not permitted.

For hazardous substances registered according to Regulation EC 1907/2006 (REACH), for which a chemical safety report has been drawn up, refer to the specific information contained in the exposure scenarios attached to the Safety Data Sheets.

**CONTAMINATED PACKAGING**
Contaminated packaging, properly labeled, shall be sent to recovery or disposal in compliance with national waste management regulations and they shall be classified with the following EWC code: **15 01 10***: packaging containing residues of or contaminated by hazardous substances

## SECTION 14. Transport information

The transport regulation for magnesium powder (pyrophoric and powder or turnings) is given in the following:

### 14.1. UN number

**Magnesium Powder**

ADR / RID, IMDG, IATA: 1418

**Magnesium Raspings**

ADR / RID, IMDG, IATA: 1869

### 14.2. UN proper shipping name

**Magnesium Powder**

| | |
|---|---|
| ADR / RID: | MAGNESIUM POWDER |
| IMDG: | MAGNESIUM POWDER |
| IATA: | MAGNESIUM POWDER |

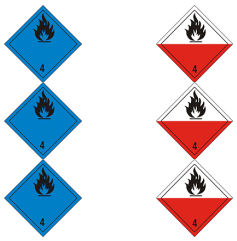
**Magnesium Raspings**

| | |
|---|---|
| ADR / RID: | MAGNESIUM RASPINGS |
| IMDG: | MAGNESIUM RASPINGS |
| IATA: | MAGNESIUM RASPINGS |

### 14.3. Transport hazard class(es)

**Magnesium Powder**

| | | |
|---|---|---|
| ADR / RID: | Class: 4.3 | Label: 4.3 (4.2) |
| IMDG: | Class: 4.3 | Label: 4.3 (4.2) |
| IATA: | Class: 4.3 | Label: 4.3 (4.2) |



**Magnesium Raspings**

| | | |
|---|---|---|
| ADR / RID: | Class: 4.1 | Label: 4.1 |
| IMDG: | Class: 4.1 | Label: 4.1 |
| IATA: | Class: 4.1 | Label: 4.1 |

**14.4. Packing group**

**Magnesium Powder**

| | |
|---|---|
| ADR / RID, IMDG, IATA: | PG II |

**Magnesium Raspings**

| | |
|---|---|
| ADR / RID, IMDG, IATA: | PG III |

**14.5. Environmental hazards**

**Magnesium Powder**

| | |
|---|---|
| ADR / RID: | NO |
| IMDG: | NO |
| IATA: | NO |

**Magnesium Raspings**

| | |
|---|---|
| ADR / RID: | NO |
| IMDG: | NO |
| IATA: | NO |

**14.6. Special precautions for user**

**Magnesium Powder**

| | | | |
|---|---|---|---|
| ADR / RID: | HIN - Kemler: --<br>Special Provision: - | Limited Quantities: - | Tunnel restriction code: (E) |

| | | | |
|---|---|---|---|
| IMDG: | EMS: F-G, S-O | Limited Quantities: - | |
| IATA: | Cargo: | Maximum quantity: 15 Kg | Packaging instructions: 488 |
| | Pass.: | Maximum quantity: Forbidden | Packaging instructions: Forbidden |
| | Special Instructions: | A3 | |

**Magnesium Raspimgs**

| | | | |
|---|---|---|---|
| ADR / RID: | HIN - Kemler: 40 | Limited Quantities: 5 kg | Tunnel restriction code: (E) |
| | Special Provision: - | | |
| IMDG: | EMS: F-G, S-G | Limited Quantities: 5 kg | |
| IATA: | Cargo: | Maximum quantity:100 Kg | Packaging instructions: 449 |
| | Pass.: | Maximum quantity: 25 Kg | Packaging instructions: 446 |
| | Special Instructions: | A15 | |

### 14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Information not relevant

## SECTION 15. Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Seveso Category - Directive 2012/18/EC:
P7 - PYROPHORIC LIQUIDS AND SOLIDS

Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006
None

Substances in Candidate List (Art. 59 REACH)
On the basis of available data, the product does not contain any SVHC in percentage ≥ than 0,1%.

Substances subject to authorisation (Annex XIV REACH)
None

Substances subject to exportation reporting pursuant to (EC) Reg. 649/2012:
None

Substances subject to the Rotterdam Convention:
None

Substances subject to the Stockholm Convention:
None

### 15.2. Chemical safety assessment

A chemical safety assessment has been carried out for this substance and is provided within the technical dossier, submitted to ECHA in October 2010.

## SECTION 16. Other information

**Proposed alternative classification and labelling according to Regulation (EC) No 1272/2008**

**Remarks: The current legal classification of magnesium according to Regulation (EC) No 1272/2008 Annex VI is obligatory until further notice of ECHA.**
**It is noted that a CLH report was submitted to a national authority to ask for inclusion into Regulation (EC) 1272/2008 Annex VI. One additional entry is proposed based on new test results (see subsection 9.2 for details)**

Magnesium powder (non-pyrophoric, non-self heating):
- D50 > 50 µm - < 2,000 µm or
- D50 ≥ 2,000 µm but D1 < 500 µm
Flammable solids Category 1, Flam. Sol 1
Substances and mixtures which in contact with water emit flammable gases Category 2 Water-react. 2

Signal word: Danger

Hazard pictogram:

GHS02

Hazard statements:
H228: Flammable solid.
H261: In contact with water releases flammable gases

Precautionary statements:
P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P223: Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P240: Ground/bond container and receiving equipment.

Text of hazard (H) indications mentioned in section 2-3 of the sheet:

| | |
|---|---|
| **Flam. Sol. 1** | Flammable solid, category 1 |
| **Self-heat. 1** | Self-heating substance or mixture, category 1 |
| **Self-heat. 2** | Self-heating substance or mixture, category 2 |
| **Water-react. 2** | Substance or mixture which in contact with water emits flammable gas, category 2 |
| **H228** | Flammable solid. |
| **H252** | Self-heating in large quantities; may catch fire. |
| **H261** | In contact with water releases flammable gases. |
| **Pyr. Sol. 1** | Pyrophoric solid Category 1 |
| **Water-react. 1** | Substance or mixture which in contact with water emits flammable gas, category 1 |
| **H250** | Catches fire spontaneously if exposed to air. |
| **H260** | In contact with water releases flammable gases which may ignite spontaneously. |

LEGEND:
- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- CAS NUMBER: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE NUMBER: Identifier in ESIS (European archive of existing substances)
- CLP: EC Regulation 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization

- INDEX NUMBER: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as REACH Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: EC Regulation 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA STEL: Short-term exposure limit
- TWA: Time-weighted average exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation
- WGK: Water hazard classes (German).

**ABBREVIATIONS**

AC Article category
ADR European agreement concerning the international carriage of dangerous goods by road
AND European agreement concerning the international carriage of dangerous goods by inland waterways
BSAF Bio soil accumulation factor
BCF Bio concentration factor
CAS Chemical Abstracts Service
CLP Classification, labelling and packaging
CMR Carcinogenic, mutagenic or toxic for reproduction
CSA/CSR Chemical safety assessment / Chemical safety report
D50 Median particle size
DNEL Derived no effect level
DSD Dangerous Substance Directive
EC10 Concentration of a substance where 10% of the population is affected
EC50 Concentration of a substance where 50% of the population is affected
ECHA European chemicals agency
EINECS EU list of existing chemical substances
EmS Emergency schedule
ERC Environmental release category
ES Exposure scenario
eSDS Extended safety data sheet
FOREGS Forum of European Geological Surveys
GHS Globally harmonised system
HERAG Health risk assessment guidance for metals
IATA-DGR International air transport association - dangerous goods regulations
ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air
IU Identified use
IUPAC International Union of Pure and Applied Chemistry
IBC code International code for the construction and equipment of ships carrying dangerous chemicals in bulk
IMDG International maritime dangerous goods
KP Partition coefficient
LC10 Lethal concentration of a substance that can be expected to cause death in 10% of the population
LC50 Lethal concentration of a substance that can be expected to cause death in 50% of the population
LD50 Lethal dose of a substance that can be expected to cause death in 50% of the population
MARPOL 73/78 International convention for the prevention of pollution from ships, 1973 as modified by the protocol of 1978
MMAD Mass median aerodynamic diameter
NO(A)EC No observed (adverse) effect concentration
NO(A)EL No observed (adverse) effect level
OECD Organisation for economic co-operation and development
OEL Occupational exposure limit
PBT Persistent, bioaccumulative, and toxic
PC Product category
PNEC Predicted no-effect concentration
PROC Process category
REACH Registration, evaluation, authorisation and restriction of chemicals (i.e. Regulation (EC) No. 1907/2006)
RID International rule for transport of dangerous substances by railway
SDS Safety data sheet
STOT Specific target organ toxicant
STP Sewage treatment plant
SU Sector of end use

TWA Time weighted average
vPvB Very persistent, very bioaccumulative

GENERAL BIBLIOGRAPHY
1. Regulation (EC) 1907/2006 (REACH) of the European Parliament
2. Regulation (EC) 1272/2008 (CLP) of the European Parliament
3. Regulation (EU) 790/2009 (I Atp. CLP) of the European Parliament
4. Regulation (EU) 2015/830 of the European Parliament
5. Regulation (EU) 286/2011 (II Atp. CLP) of the European Parliament
6. Regulation (EU) 618/2012 (III Atp. CLP) of the European Parliament
7. Regulation (EU) 487/2013 (IV Atp. CLP) of the European Parliament
8. Regulation (EU) 944/2013 (V Atp. CLP) of the European Parliament
9. Regulation (EU) 605/2014 (VI Atp. CLP) of the European Parliament
10. Regulation (EU) 2015/1221 (VII Atp. CLP) of the European Parliament
11. Regulation (EU) 2016/918 (VIII Atp. CLP) of the European Parliament
12. Regulation (EU) 2016/1179 (IX Atp. CLP)
13. Regulation (EU) 2017/776 (X Atp. CLP)
14. Regulation (EU) 2018/669 (XI Atp. CLP)
15. Regulation (EU) 2018/1480 (XIII Atp. CLP)
16. Regulation (EU) 2019/521 (XII Atp. CLP)
- The Merck Index. - 10th Edition
- Handling Chemical Safety
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- IFA GESTIS website
- ECHA website
- Database of SDS models for chemicals - Ministry of Health and ISS (Istituto Superiore di Sanità) - Italy

**Key literature references**
The information provided in this eSDS is consistent with the information provided in the REACH chemical safety report (CSR) for magnesium. The CSR contains a complete reference list for all data used. Non confidential data from the REACH registration dossier is published by the European Chemicals Agency ECHA, see http://apps.echa.europa.eu/registered/registered-sub.aspx.

Changes to previous review:
The following sections were modified:
01 / 02 / 03 / 04 / 05 / 06 / 07 / 08 / 09 / 10 / 11 / 12 / 13 / 14 / 15 / 16.

**Note for the recipient of the Safety Data Sheet (SDS):**

The recipient of this SDS shall make sure of reading and understanding the information included by all people who handle, store, use, or otherwise come into contact in any way with the substance or mixture to which this SDS is referred to. In particular, the recipient shall provide adequate training to the personnel for the use of hazardous substances and/or mixtures. The recipient shall verify the suitability and completeness of the provided information according to the specific use of the substance or mixture.

However, the substance or mixture referred to by this SDS shall not be used for uses other than those specified in Section 1. The Supplier don't assume responsibility for improper uses. Since the use of the product does not fall under the direct control of the Supplier, the user shall, under his own responsibility, fulfill national and EU regulations concerning health and safety.

The information included in this SDS are provided in good faith and are based on the current state of scientific and technical knowledge, at the revision date indicated, available to the Supplier indicated in Section 1 of this SDS. It shall not be meant that the SDS is a guarantee of any specific property of the substance or mixture. The information concern only to the substance or mixture specifically designated in Section 1 and it could not be valid for the substance or mixture used in combination with other materials or in any process not specified in the text.

**Identified uses**
To demonstrate the safe use of magnesium, occupational exposure scenarios (attached to this e-SDS; Annex) have been developed to serve as generic scenarios based on the degree of dustiness of the handled substance. Each scenario includes all processes related to the production and the reported identified uses of magnesium. Each scenario includes the exposure assessment and risk characterisation of occupational/worker exposure, the occupational exposure of downstream users and references to the environmental exposure scenarios.
Each scenario includes the exposure assessment and risk characterisation of occupational/worker exposure, the occupational exposure of downstream users and references to the environmental exposure scenarios.

# EXPOSURE SCENARIOS

| Name of the substance | Registration number | Identified uses |
|---|---|---|
| **Magnesium powder**<br><br>**Magnesium Raspings** | 01-2119537203-49-0076 | **ES1** Manufacture and recycling of massive metal and metal powder (for Melting, alloying, casting & Corrosion protection) |
| | | **ES 2** Manufacture of metal compounds (for Melting, alloying, casting & Corrosion protection) |
| | | **ES 3:** Formulation of massive metal and metal powder (Alloying) (for Melting, alloying, casting & Particulates production and handling & Fine particulates production) |
| | | **ES 4:** Formulation of metal compounds – incl. production of fireworks (for Particlulates production and handling & Fine particulates production) |
| | | **ES 5:** Use of massive metal (for Solid forming processes – incl. production of welding electrodes) |
| | | **ES 6:** Industrial use of metal compounds |
| | | **ES 7:** Etching of magnesium dies |
| | | **ES 8**: Welding in industrial and/or professional settings (environmental and occupational exposure) |
| | | **ES 9:** Professional use of magnesium powder in signal flares, signal rockets, marking ammunition, signalling and simulation ammunition and illumination |
| | | **ES10:** Consumer use of fireworks |
| | | **ES 11:** Service life/ Handling of massive objects containing magnesium at ambient temperature |