

# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

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

- **Product identifier**
- **Trade name:**  
**Permanent-Magnet, nickeled**  
**VACODYM®**
- **Article number:**  
VACODYM 100-199, 300-399, 400-499, 500-599, 710-799, 810-899, 900-999, 4317 und 4514  
(all qualities)
- ® registered trademark of VACUUMSCHMELZE GmbH & Co. KG
- **Material Safety Data Sheet - no.:** IB57
- **Relevant identified uses of the substance or mixture and uses advised against** Not applicable
- **Application of the substance / the preparation**  
PERMANENT MAGNETS e.g. in motors, generators, sensors, E-Mobility
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**  
VACUUMSCHMELZE GmbH & Co.KG  
Grüner Weg 37  
D-63450 Hanau
- datasheet@vacuumschmelze.com
- **Information department:** Environmental Protection Department
- **Emergency telephone number:**  
Tel. no.: (\*\*49) 6181/38-0  
Emergency tel. no.: via (\*\*49) 6181/38-0

## 2 Hazards identification

- **Classification (substance or mixture)**  
Classification according to Regulation (EC) No 1272/2008 (CLP-Regulation):  
Not applicable  
Our semi-finished and finished products constitute manufactured articles under the terms of the REACH Regulation (EC) No. 1907/2006.  
For articles there is no obligation to classify acc. to CLP -Regulation.
- **Labelling according to Regulation (EC) No 1272/2008**  
Labelling according to Regulation (EC) No 1272/2008 (CLP-Regulation):  
Not applicable  
The product is classified and labelled according to the CLP regulation.
- **Additional VAC information:**  
The following applies to the permanent magnet:  
Contains Cobalt. May produce an allergic reaction.  
**In the case of dust-producing processing, we recommend observance of the following warnings :**  
The hazard statements result from the ingredients (composition) of the permant magnets and the applied coating.
- **Hazard statements**  
See also 'Other hazards'  
Causes skin irritation.  
Causes serious eye irritation.  
May cause an allergic skin reaction.  
Suspected of causing cancer.  
May cause damage to organs through prolonged or repeated exposure.
- **Precautionary statements**  
Do not breathe dust/fume/gas/mist/vapours/spray.  
In case of inadequate ventilation wear respiratory protection.  
Use personal protective equipment as required.  
Avoid release to the environment.  
Do no eat, drink or smoke when using this product.  
If skin irritation occurs: Get medical advice/attention.

(Contd. on page 2)

# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

Trade name: **VACODYM®**

(Contd. of page 1)

**• Other hazards**

**Dry mechanical processing** of rare earth permanent magnet alloys is only permitted under special safety precautions because dusts which are capable of self-heating or pyrophorous dusts with a tendency to explode may be produced.

**In the case of wet mechanical processing** the watery processing medium reacts with the magnet wear and may form hydrogen already at room temperature.

Attention: Formation of Ex-atmospheres possible!

Part of the resulting hydrogen is stored in the material.

The resulting processing sludges must be kept under a protective liquid because drying out sludges are capable of self-heating or

may react pyrophorously. In this case the stored hydrogen volume burns off with flames.

Attention:

Magnetized parts generate magnetic fields and are able to attract magnetizable materials. This may result in injury during handling of magnets.

Electronic devices and measuring tools may be changed in calibration or damaged by the high magnetic field strength.

Please keep magnetized magnets away from computers, displays and magnetic storage devices. Especially people with heart pacemakers must keep away from magnetic fields.

**• Results of PBT and vPvB assessment**

**• PBT:** Not applicable.

**• vPvB:** Not applicable.

### 3 Composition/information on ingredients

**• Chemical characterization:**

**• Description:** **Nickel** permanent-magnet

**• Dangerous components:**

The classifications given below reflect the classification of each pure substance respectively and are intended for information only

|   |  |          |
|---|--|----------|
| CAS: 7439-89-6<br>EINECS: 231-096-4                               | iron   | rest%    |
| CAS: 7440-00-8<br>EINECS: 231-109-3                               | neodymium (powder)<br>☒ Xi R36/38; ☒ F R11<br>R53<br>⚠ Flam. Sol. 2, H228; ⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319    | *%       |
| CAS: 7429-91-6<br>EINECS: 231-073-9                               | dysprosium (powder)<br>☒ Xi R36/38; ☒ F R11<br>R53<br>⚠ Flam. Sol. 2, H228; ⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319   | *%       |
| CAS: 7440-10-0  | praseodymium (powder)<br>☒ Xi R36/38; ☒ F R11<br>R53<br>⚠ Flam. Sol. 2, H228; ⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319 | *%       |
| CAS: 7440-27-9<br>EINECS: 231-137-6                               | terbium (powder)<br>☒ Xi R36/38; ☒ F R11<br>R53<br>⚠ Flam. Sol. 2, H228; ⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319      | *%       |
| CAS: 7440-02-0<br>EINECS: 231-111-4<br>Index number: 028-002-00-7 | nickel<br>☒ T R48/23; ☒ Xn R40; ☒ Xi R43<br>Carc. Cat. 3<br>⚠ Carc. 2, H351; STOT RE 1, H372; ⚠ Skin Sens. 1, H317       | coating% |

**• Remark to the composition:**

\* The total maximum proportion of rare earths (neodymium, dysprosium, praseodymium and/or terbium) is 35%.

**• Additional information:**

For the rare earths listed here, the following apply:

- Classification as per CLP notification (VAC).

(Contd. on page 3)

# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

**Trade name: VACODYM®**

(Contd. of page 2)

- The classifications listed refer exclusively to powder form.
- The rare earths specified are classified as NON-hazardous in solid form.

## 4 First aid measures

- **Description of first aid measures**
- **After inhalation:**  
If metal vapours or solid dusts have been inhaled:  
Get the affected person out in the fresh air and call a doctor.
- **After skin contact:**  
Foreign bodies which have penetrated the skin must be removed and the wound cleaned thoroughly.
- **After eye contact:**  
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:** Consult a doctor if the symptoms persist.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**  
No further relevant information available.

## 5 Firefighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**  
Non-combustible.  
Extinguishing agents must be adapted to the environment.
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** No special measures required.

## 6 Accidental release measures

Accidental release of dusts and vapours which are damaging to health can be ruled out.

- **Personal precautions, protective equipment and emergency procedures** No special measures required.
- **Environmental precautions:** No special measures required.
- **Methods and material for containment and cleaning up:** No special measures required.
- **Reference to other sections**  
See Section 7 for information on safe handling.  
See Section 8 for information on personal protection equipment.  
See Section 13 for disposal information.

## 7 Handling and storage

- **Handling:**
- **Precautions for safe handling**  
No protective measures are required in the provided form.  
**Dry mechanical processing** of rare earth permanent magnet alloys is only permitted under special safety precautions because dusts which are capable of self-heating or pyrophorous dusts with a tendency to explode may be produced.  
**In the case of wet mechanical processing** the watery processing medium reacts with the magnet wear and may form hydrogen already at room temperature.  
Attention: Formation of Ex-atmospheres possible!  
Part of the resulting hydrogen is stored in the material.  
The resulting processing sludges must be kept under a protective liquid because drying out sludges are capable of self-heating or may react pyrophorously. In this case the stored hydrogen

(Contd. on page 4)

# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

Trade name: **VACODYM®**

(Contd. of page 3)

volume burns off with flames.  
Also see section 8.

• **Information about protection against explosions and fires:**

No particular measures are required in the provided form.

• **Conditions for safe storage, including any incompatibilities**

• **Storage:**

Keep magnetized magnets away from computers, displays and magnetic storage devices. Especially people with heart pacemakers must keep away from magnetic fields.

• **Requirements to be met by storerooms and receptacles:** No special requirements.

• **Information about storage in one common storage facility:** Not required.

• **Further information about storage conditions:** None.

• **Storage class:** Not applicable

• **Specific end use(s):** No further relevant information available.

## 8 Exposure controls/personal protection

• **Additional information about design of technical systems:**

Provide a suitable suction with filter and good ventilation of the working area for all processing steps.

Suitable breathing apparatus must be used (see personal safety equipment) for repair and maintenance work on suction systems, especially when changing the filters.

• **Control parameters**

• **Components with limit values that require monitoring at the workplace:**

| 7439-89-6 iron   |  |
|------------------|--|
| EV (Canada)      | 1* 5** mg/m <sup>3</sup><br>as iron;*salts, water-soluble;**welding fume                 |
| 7440-02-0 nickel |  |
| EL (Canada)      | 0.05 mg/m <sup>3</sup><br>as Ni; ACIGH A1, IARC 1  |
| EV (Canada)      | 1* 0.2** 0.1*** mg/m <sup>3</sup><br>inh.;*metal;**insol. compds.;***soluble compds.     |
| PEL (USA)        | 1 mg/m <sup>3</sup>  |
| REL (USA)        | 0.015 mg/m <sup>3</sup><br>as Ni; See Pocket Guide App. A                                |
| TLV (USA)        | 1.5* 0.2** 0.1*** mg/m <sup>3</sup><br>inhal.fraction;*elemental;**insol.,***sol.compds. |

• **Additional information:** The lists that were valid during the creation were used as basis.

• **Exposure controls**

• **Personal protective equipment:**

• **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.  
Wash hands before breaks and at the end of work.  
Avoid contact with the eyes and skin.

• **Breathing equipment:**

(Contd. on page 5)

**Material Safety Data Sheet**  
(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

Trade name: **VACODYM**<sup>®</sup>

(Contd. of page 4)



In the case of dust formation (limit value exceeded), breathing apparatus must be worn. Time limits for wearing must be observed.

Breathing mask, apparatus with particle filter P2 or P3, for example:

- Full face mask (EN 136)
- Breathing mask (EN 149) FFP2 or FFP3
- 10 times the limit value (FFP2)
- 30 times the limit value (FFP3)
- Recommendation: P3

• **Protection of hands:**



Avoid repeated and prolonged contact with the skin, use protective gloves.

Preventive skin protection by use of skin-protecting agents is recommended.

• **Material of gloves**

Experience has shown glove materials polychloroprene, nitrile caoutchouc, butyl caoutchouc, fluoride caoutchouc and polyvinylchloride to offer sufficient protection.

• **Penetration time of glove material -**

• **Eye protection:**



Safety goggles / EN 166, with side shields if necessary, must be worn in dusty environments and when working with magnetised magnets (> 50 g).

• **Limitation and supervision of exposure into the environment**

The legal issue values and limitations are to be paid attention!

**9 Physical and chemical properties**

• **Information on basic physical and chemical properties**

**General Information**

The physical and chemical properties of this section refer to the unplated permanent magnet alloy.

No values are available for the coating itself.

• **Appearance:**

**Form:**

Parts

**Color:**

Metallic

• **Odor:**

Odourless

• **pH-value:**

Not applicable.

• **Change in condition**

**Melting point/Melting range (approx):** 1180 °C

• **Auto igniting:**

Omitted (in the provided form).  
Also see section 2 and/or 7.

• **Danger of explosion:**

Omitted (in the provided form).  
Also see section 2 and/or 7.

• **Vapor pressure:**

Not determined.

• **Density (approx) at 20 °C:**

7.5 g/cm<sup>3</sup>

• **Relative density**

Not determined.

• **Solubility in / Miscibility with**

**Water:**

Insoluble.

• **Other information**

No further relevant information available.

USA

(Contd. on page 6)

# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

Trade name: **VACODYM®**

(Contd. of page 5)

## 10 Stability and reactivity

- **Reactivity**
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions**  
Hydrogen is released in contact with acid which can cause explosive gas mixtures.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

## 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **LD/LC50 values:**

The following applies for the pure substance (here: nickel):

|                         |                    |
|-------------------------|--------------------|
| <b>7440-02-0 nickel</b> |                    |
| Oral LD50               | > 9000 mg/kg (rat) |

- **Primary irritant effect:**
- **on the skin:**  
Irritant to skin and mucous membranes.  
Rare earths (see list in Section 2) cause skin irritation depending on grain size (powder) (Skin Irrit. 2)  
see sensitization
- **on the eye:**  
Rare earths (see list in Section 2) cause eye irritation depending on grain size (powder) (Eye Irrit. 2)
- **Sensitization:**  
In the case of repeated and prolonged contact with the skin with metallic nickel there is a possibility of sensitization.  
The following applies to the permanent magnet:  
Contains Cobalt. May produce an allergic reaction.
- **Subacute to chronic toxicity:**  
Nickel in the form of a respirable dust is under suspicion as a possible cause of cancer in humans (Carc.2 (Cat. 2) / CLP-Verordnung)
- **Additional toxicological information:**  
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

- **Carcinogenic categories**

|   |   |
|---|---|
| <b>• IARC (International Agency for Research on Cancer)</b> |   |
| 7440-02-0 nickel  | 1 |
| <b>• NTP (National Toxicology Program)</b>                  |   |
| 7440-02-0 nickel  | R |

## 12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

(Contd. on page 7)

# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

Trade name: **VACODYM®**

• **Other adverse effects** No further relevant information available.

(Contd. of page 6)

## 13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:** Observe official regulations.
- **Uncleaned packagings:** Not applicable

## 14 Transport information

• **Transport/Additional information:**

• **Land transport DOT / TDG**

• **Remarks:**

Non-hazardous goods from the standpoint of the specified regulations

**Attention:**

Packing boxes with magnetized parts inside generate magnetic fields and are able to attract magnetizable materials.

• **Maritime transport IMDG:**

• **Remarks:**

Non-hazardous goods from the standpoint of the specified regulations

**Attention:**

Packing boxes with magnetized parts inside generate magnetic fields and are able to attract magnetizable materials.

• **Air transport ICAO-TI and IATA-DGR Non-magnetised parts:**

Not classified as hazardous goods as understood in the ordinance given

**Magnetised parts in packaging units:**

Conduct test for classification as per IATA regulations (see Class 9 / Packing Instruction 902)

If test is positive, the following apply:

**ICAO/IATA class:** Class 9 / Page 172

**UN/ID number:** 2807

**Correct technical name:** Magnetised materials

• **Remarks:**

## 15 Regulatory information

• **Safety, health and environmental regulations/legislation specific for the substance or mixture**

• **Sara**

• **Section 355 (extremely hazardous substances):**

None of the ingredient is listed.

• **Section 313 (Specific toxic chemical listings):**

7440-02-0 | nickel

• **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

• **Proposition 65**

• **Chemicals known to cause cancer:**

7440-02-0 | nickel

• **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

• **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

(Contd. on page 8)

# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

**Trade name: VACODYM®**

(Contd. of page 7)

**• Chemicals known to cause developmental toxicity:**

None of the ingredients is listed.

**• Cancerogenity categories**

**• EPA (Environmental Protection Agency)**

None of the ingredients is listed.

**• TLV (Threshold Limit Value established by ACGIH)**

|                    |    |
|--------------------|----|
| 7440-02-0   nickel | A5 |
|--------------------|----|

**• MAK (German Maximum Workplace Concentration)**

|                    |   |
|--------------------|---|
| 7440-02-0   nickel | 1 |
|--------------------|---|

**• NIOSH-Ca (National Institute for Occupational Safety and Health)**

|                    |  |
|--------------------|--|
| 7440-02-0   nickel |  |
|--------------------|--|

**• OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

**• National regulations:**

**• Other regulations, limitations and prohibitive regulations**

- e.g.
- guidelines 67/548/ECC, 1999/45/EC
  - 1272/2008/EG (CLP)
  - 1907/2006/EG (REACH)
  - German Hazardous Substances

**• please note:**

Attention:  
Magnetized parts generate magnetic fields and are able to attract magnetizable materials. This may result in injury during handling of magnets.  
Electronic devices and measuring tools may be changed in calibration or damaged by the high magnetic field strength.

Please keep magnetized magnets away from computers, displays and magnetic storage devices. Especially people with heart pacemakers must keep away from magnetic fields.

**• Chemical safety assessment:** Void (for articles)

## 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

**• Relevant phrases**

Wording of safety instructions quoted (Section 3) concerning pure substances (powder):

- H228 Flammable solid.
- H315 Causes skin irritation.
- H317 May cause an allergic skin reaction.
- H319 Causes serious eye irritation.
- H351 Suspected of causing cancer.
- H372 Causes damage to organs through prolonged or repeated exposure.
- R11 Highly flammable.
- R36/38 Irritating to eyes and skin.
- R40 Limited evidence of a carcinogenic effect.
- R43 May cause sensitization by skin contact.
- R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- R53 May cause long-term adverse effects in the aquatic environment.

**• Department issuing MSDS:**

Department HT-F  
Tel. 06181/38-2045

**• Contact:**

Environmental Protection Department  
Tel. 06181/38-2359

(Contd. on page 9)



# Material Safety Data Sheet

(MSDS)

Printing date 04/05/2013

Version - No. 2

Reviewed on 04/05/2013

Trade name: **VACODYM**<sup>®</sup>

(Contd. of page 8)

• **Abbreviations and acronyms:**

ICAO: International Civil Aviation Organization  
IMDG: International Maritime Code for Dangerous Goods  
DOT: US Department of Transportation  
IATA: International Air Transport Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
LC50: Lethal concentration, 50 percent  
LD50: Lethal dose, 50 percent

• **Sources**

- KÜHN-BIRETT-Merkblätter gefährlicher Arbeitsstoffe  
- Technische Regeln für Gefahrstoffe

• \* **Data compared to the previous version altered.**

USA