

Material Safety Data Sheet

(MSDS)

Printing date 07/20/2015

Version - No. 2

Reviewed on 07/20/2015

1: Identification

- **1.1 Product identifier**
- **Trade name:**
Permanent-Magnet, nickeled
VACOMAX®
- **Article number:**
VACOMAX® 225, -240, -262
(all qualities)
- ® registered trademark of VACUUMSCHMELZE GmbH & Co. KG
- **Material Safety Data Sheet - no.:** IB63
- **1.2 Relevant identified uses of the substance or mixture and uses advised against** Not applicable
- **Application of the substance / the mixture**
PERMANENT MAGNETS e.g. in motors, generators, sensors, E-Mobility
- **1.3 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
- **1.4 Emergency telephone number:**
Tel. no.: (**49) 6181/38-0
Emergency tel. no.: via (**49) 6181/38-0

2: Hazard(s) identification

- **2.2 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.
- **2.2 Labelling according to Regulation (EC) No 1272/2008**
Labelling according to Regulation (EC) No 1272/2008 (CLP-Regulation):
Not applicable
- **Additional VAC information:**
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.
- **Additional information:**
See also Chapter 11
- **Hazard statements**
(See also 'Other hazards' (chapter 2.3))
Harmful if swallowed.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction.
May cause cancer. Route of exposure: Inhalative.
Suspected of damaging fertility or the unborn child.
Causes damage to organs through prolonged or repeated exposure.
May cause long lasting harmful effects to aquatic life.
- **Precautionary statements**
Do not breathe dust/fume/gas/mist/vapors/spray.
In case of inadequate ventilation wear respiratory protection.
Use personal protective equipment as required.
Avoid release to the environment.
Do not eat, drink or smoke when using this product.

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If skin irritation occurs: Get medical advice/attention.

• **2.3 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

• **3.2 Chemical characterization:**

• **Description:** Nickeled permanent-magnet

• **Dangerous components:**

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

The legal classifications of the pure substances (harmonized classification according to substance list of the Annex VI of the CLP Regulation) got complemented, insofar as additional substance-specific information from accessible data sources (e.g. TRGS 905, toxicological studies) for health hazards and / or physical hazards are available.

CAS: 7440-48-4 EINECS: 231-158-0 Index number: 027-001-00-9	cobalt ☠ Resp. Sens. 1, H334; Carc. 1B, H350; Repr. 2, H361; ☠ Acute Tox. 4, H302; Skin Sens. 1, H317; Aquatic Chronic 4, H413	≤ 52%
CAS: 7440-19-9 EINECS: 231-128-7	samarium	~ 25%
CAS: 7439-89-6 EINECS: 231-096-4	iron	rest%
CAS: 7440-50-8 EINECS: 231-159-6	copper	~ 5%
CAS: 7440-67-7 EINECS: 231-176-9 Index number: 040-001-00-3	zirconium	~ 3%
CAS: 7440-02-0 EINECS: 231-111-4 Index number: 028-002-00-7	nickel ☠ Carc. 2, H351; STOT RE 1, H372; ☠ Skin Sens. 1, H317	coating%

• **Additional information:**

For the wording of the listed risk phrases refer to section 16.

Additional information for rare earth:

See also Chapter 11

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Additional information for Cobalt:
See also Chapter 11

4: First-aid measures

- **4.1 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.
- **4.2 Most important symptoms and effects, both acute and delayed**
No further relevant information available.
- **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5: Fire-fighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents:**
Non-combustible.
Extinguishing agents must be adapted to the environment.
- **5.2 Special hazards arising from the substance or mixture**
Formation of toxic smoke / fumes (metal / metal oxides) is possible during heating or in case of fire.
- **5.3 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.

- **6.1 Personal precautions, protective equipment and emergency procedures**
No special measures required.
- **6.2 Environmental precautions:** No special measures required.
- **6.3 Methods and material for containment and cleaning up:** No special measures required.
- **6.4 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

- **7.1 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

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may react pyrophorously. In this case the stored hydrogen 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.
- **7.2 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
- **7.3 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.

• **8.1 Control parameters**

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

7440-48-4 cobalt	
EL (Canada)	Long-term value: 0.02 mg/m ³ as Co; IARC 2B
EV (Canada)	Long-term value: 0.1 mg/m ³
PEL (USA)	Long-term value: 0.1* mg/m ³ as Co; *for metal dust and fume
REL (USA)	Long-term value: 0.05 mg/m ³ as Co; metal dust & fume
TLV (USA)	Long-term value: 0.02; NIC - 0.02* mg/m ³ BEI; *hard metals:thoracic ;NIC-A2,RSEN;as W
7439-89-6 iron	
EV (Canada)	Long-term value: 1* 5** mg/m ³ as iron;*salts, water-soluble;**welding fume
7440-50-8 copper	
EL (Canada)	Long-term value: 1* 0.2** mg/m ³ *dusts and mists; **fume, as Cu
EV (Canada)	Long-term value: 0.2* 1** mg/m ³ as copper, *fume;**dust and mists
PEL (USA)	Long-term value: 1* 0.1** mg/m ³ as Cu *dusts and mists **fume
REL (USA)	Long-term value: 1* 0.1** mg/m ³ as Cu *dusts and mists **fume
TLV (USA)	Long-term value: 1* 0.2** mg/m ³ *dusts and mists; **fume; as Cu

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7440-67-7 zirconium

EL (Canada)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as Zr
EV (Canada)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as zirconium
PEL (USA)	Long-term value: 5 mg/m ³ as Zr
REL (USA)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as Zr
TLV (USA)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as Zr

7440-02-0 nickel

EL (Canada)	Long-term value: 0.05 mg/m ³ ACGIH A1, IARC 2B
EV (Canada)	Long-term value: 1 mg/m ³ Inhalable fraction
PEL (USA)	Long-term value: 1 mg/m ³
REL (USA)	Long-term value: 0.015 mg/m ³ as Ni; See Pocket Guide App. A
TLV (USA)	Long-term value: 1.5* mg/m ³ elemental, *inhalable fraction

• **DNELs**

DNELs for OSH purposes

In Germany, occupational exposure limits (AGW) of the Technical Rules on Hazardous Substances (TRGS) 900 continue to constitute workplace atmospheric limit values that are binding upon employers. Should no AGW and for example no maximum workplace concentration (MAK value) of the German Research Foundation (DFG) be available, the employer must also consider the DNEL during risk assessment. (Source: Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA))

Nickel:

Long-term exposure - inhalation - local effects

DNEL: 0,05 mg/m³

Long-term exposure - inhalation - systemic effects

DNEL: 0,05 mg/m³

Registration entry of the manufacturer/importer on the ECHA website

Cobalt:

Long-term exposure - inhalation - local effects

DNEL: 0,04 mg/m³ (Industry)

6,3 µg/m³ (Consumer)

Registration entry of the manufacturer/importer on the ECHA website

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• Ingredients with biological limit values:

7440-48-4 cobalt

BEI (USA)	15 µg/L Medium: urine Time: end of shift at end of workweek Parameter: Cobalt (background)
	1 µg/L Medium: blood Time: end of shift at end of workweek Parameter: Cobalt (background, semi-quantitative)

• Additional information:

The lists that were valid during the creation were used as basis.

GESTIS International Limit Values:

<http://www.dguv.de/ifa/Gefahrstoffdatenbanken/GESTIS-Internationale-Grenzwerte-für-chemische-Substanzen-limit-values-for-chemical-agents/index.jsp>

• 8.2 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.
- Store protective clothing separately.
- Do not eat, drink, smoke or sniff while working.

• Breathing equipment:



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!

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9: Physical and chemical properties

• 9.1 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): 1220-1320 °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:

8.3 g/cm³

• Relative density

Not determined.

• Solubility in / Miscibility with

Water:

Insoluble.

• 9.2 Other information

No further relevant information available.

10: Stability and reactivity

• 10.1 Reactivity

• 10.2 Chemical stability

• Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.

• 10.3 Possibility of hazardous reactions

Hydrogen is released in contact with acid which can cause explosive gas mixtures.

• 10.4 Conditions to avoid No further relevant information available.

• 10.5 Incompatible materials: No further relevant information available.

• 10.6 Hazardous decomposition products: No dangerous decomposition products known.

11: Toxicological information

• 11.1 Information on toxicological effects

• Acute toxicity:

• LD/LC50 values:

The following applies for the pure substances (here: nickel and cobalt):

7440-48-4 cobalt		
Oral	LD50	550 mg/kg (rat)
Inhalative	LC50/4 h	--- mg/l (rat) siehe zusätzlicher toxikologischer Hinweis / see additional toxicological information
7440-02-0 nickel		
Oral	LD50	> 9000 mg/kg (rat)

• Primary irritant effect:

• on the skin:

Rare earths (see list in Section 2) cause skin irritation depending on grain size (powder) (Skin Irrit. 2)
see sensitization

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• 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 (Skin Sens. 1).

In the case of repeated and prolonged contact with the skin with metallic cobalt there is a possibility of sensitization (Skin Sens. 1).

Cobalt in the form of inhalable dust can lead to hypersensitisation when inhaled (Resp. Sens. 1)

• 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)

Additional Information for Cobalt:

Currently in the EU cobalt metal is not classified as carcinogenic according to Annex VI of the CLP regulation (EC No. 1272/2008). German law classified cobalt metal in the form of respirable dusts/aerosols within Category 3 (DSD; RL 67/548/EWG). At the time of EU regulations becoming effective the positive results of the cobalt metal study carried out by the NTP 1* were not available.

A new classification within EU regulations based on the results of that study is deemed necessary by German authorities. Since this will be a time consuming process cobalt metal in the form of respirable dusts/aerosols has been classified within German national regulations (TRGS 905) as category 2 (DSD) and category 1B (CLP) in the meanwhile.

* <http://ntp.niehs.nih.gov/ntp/about/ntp/trpanel/2013/october/draft-tr-581.pdf>

• Additional toxicological information:

Subsequent users should be aware of the fact that Co-metal fine powder are classified as "acute toxic if inhaled, Category 1" (no legal classification); LC50 4hr ≤0,05 mg/l.

In case the subsequent use of product generates fine Co-metal particles (e.g. dust), protection measures such as described in Chapter 7 and 8 of this information sheet must be applied.

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

• IARC (International Agency for Research on Cancer)		
7440-48-4	cobalt	2B
7440-02-0	nickel	1
• NTP (National Toxicology Program)		
7440-02-0	nickel	R
• OSHA-Ca (Occupational Safety & Health Administration)		
None of the ingredients is listed.		

12: Ecological information

• 12.1 Toxicity

• Aquatic toxicity: No further relevant information available.

• 12.2 Persistence and degradability No further relevant information available.

• 12.3 Bioaccumulative potential No further relevant information available.

• 12.4 Mobility in soil No further relevant information available.

• Additional ecological information:

• General notes: Not known to be hazardous to water.

• 12.5 Results of PBT and vPvB assessment

• PBT: Not applicable.

• vPvB: Not applicable.

• 12.6 Other adverse effects No further relevant information available.

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13: Disposal considerations

- **13.1 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 953)
 - **Remarks:** -
- If test is positive, the following apply:
ICAO/IATA class: Class 9
UN/ID number: 2807
Correct technical name: Magnetised materials

15: Regulatory information

- **15.1 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):**

7440-48-4	cobalt
7440-50-8	copper
7440-02-0	nickel

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

All ingredients are listed.

• **Proposition 65**

• **Chemicals known to cause cancer:**

7440-48-4	cobalt
7440-02-0	nickel

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

None of the ingredients is listed.

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

None of the ingredients is listed.

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

None of the ingredients is listed.

• **Carcinogenicity categories**

• **EPA (Environmental Protection Agency)**

7440-50-8	copper	D
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• **TLV (Threshold Limit Value established by ACGIH)**

7440-48-4	cobalt	A3
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7440-67-7	zirconium	A4
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7440-02-0	nickel	A5
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• **MAK (German Maximum Workplace Concentration)**

7440-48-4	cobalt	2
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7440-02-0	nickel	1
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• **NIOSH-Ca (National Institute for Occupational Safety and Health)**

7440-02-0	nickel	
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• **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.

• **15.2 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):

H302 Harmful if swallowed.

H317 May cause an allergic skin reaction.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H350 May cause cancer. Route of exposure: Inhalative.

H351 Suspected of causing cancer. Route of exposure: Inhalative.

H361 Suspected of damaging fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

H413 May cause long lasting harmful effects to aquatic life.

• **Department issuing MSDS:**

Department HT-F

Tel. 06181/38-2045

• **Contact:**

Environmental Protection Department

Tel. 06181/38-2359

• **Date of preparation / last revision 07/20/2015 / 1**

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• Abbreviations and acronyms:

ICAO: International Civil Aviation Organisation
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
DNEL: Derived No-Effect Level (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
Acute Tox. 4: Acute toxicity, Hazard Category 4
Resp. Sens. 1: Sensitisation - Respirat., Hazard Category 1
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
Carc. 1B: Carcinogenicity, Hazard Category 1B
Carc. 2: Carcinogenicity, Hazard Category 2
Repr. 2: Reproductive toxicity, Hazard Category 2
STOT RE 1: Specific target organ toxicity - Repeated exposure, Hazard Category 1
Aquatic Chronic 4: Hazardous to the aquatic environment - Chronic Hazard, Category 4

• Sources

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