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

1.1 Product identifier

Trade name: VITROPERM ®, VITROLAM ®

Detailed descriptions:

VITROPERM® 400, -500, -615, -800, -850, -320
VITROLAM® 400 P8 U, -466 P8, -476 P8, -477 P8

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Remarks for information sheet

Our semi-finished and finished products constitute manufactured articles under the terms of the REACH Regulation (EC) No. 1907/2006. Articles are not subject to any legal obligation concerning production and distribution of material safety data sheets. The detailed information usually shown in a safety data sheet will be provided in the form of an 'Information sheet for articles' for specific alloys.

However, we expressly point out that these information sheets for articles are voluntarily produced data sheets which are not governed by the requirements of the REACH regulation.

Application of the article: semi-finished products and parts

1.3 Details of the supplier of the information sheet

Manufacturer/Supplier: VACUUMSCHMELZE GmbH & Co.KG
Grüner Weg 37
D-63450 Hanau
datasheet@vacuumschmelze.com

Further information obtainable from: Environmental Protection Department

1.4 Emergency telephone number:
Tel. no.: (**49) 6181/38-0
Emergency tel. no.: via (**49) 6181/38-0

SECTION 2: Composition/information on ingredients

2.2 Chemical characterization:

Description:

VITROPERM®: Metal in compact form
VITROLAM®: Layered composite foil: VITROPERM® 800 / adhesive tape with PET film backing

Components(composition):

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.

The concentration of cobalt might be ≥ 0,1% (impurities)

<table>
<thead>
<tr>
<th>CAS</th>
<th>EINECS</th>
<th>RTECS</th>
<th>boron</th>
<th>Acute Tox. 4, H302</th>
<th>&lt; 2.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-42-8</td>
<td>231-151-2</td>
<td>ED 7350000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS</th>
<th>EINECS</th>
<th>Index number</th>
<th>Index number</th>
<th>RTECS</th>
<th>cobalt</th>
<th>Resp. Sens. 1, H334; Carc. 1B, H350i; Repr. 2, H361f; Acute Tox. 4, H302; Skin Sens. 1, H317; Aquatic Chronic 4, H413</th>
<th>&lt; 1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-48-4</td>
<td>231-158-0</td>
<td>027-001-00-9</td>
<td>GF 87500000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NON-hazardous ingredients

<table>
<thead>
<tr>
<th>CAS</th>
<th>EINECS</th>
<th>RTECS</th>
<th>iron</th>
<th>rest%</th>
<th>&lt; 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>7439-89-6</td>
<td>231-096-4</td>
<td>NO 45655000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS</th>
<th>EINECS</th>
<th>silicon</th>
<th>&lt; 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-27-3</td>
<td>231-130-8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Contd. on page 2)
Information sheet for articles

Trade name: VITROPERM®, VITROLAM®

CAS: 7440-03-1  niobium  < 6%
EINECS: 231-113-5

CAS: 7440-50-8  copper  < 1%
EINECS: 231-159-6
RTECS: GL 5325000

Additional information:
The adhesive tape(s) has (have) not been classified according to the CLP Regulation by the manufacturer. Information on the adhesive tape: PET film backing - adhesive: polyacrylate.

SECTION 3: Hazards identification

3.2 Classification (substance or mixture)
Classification according to Regulation (EC) No 1272/2008 (CLP-Regulation):
Not applicable
For articles there is no obligation to classify acc. to CLP-Regulation.

3.2 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:

Hazard statements
May cause cancer by inhalation.

Precautionary statements
Do not breathe dust.
Use personal protective equipment as required.
If exposed or concerned: Get medical advice/attention.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

Additional information:
Contains cobalt, nickel. May produce an allergic reaction.

3.3 Other hazards
Danger of accident!
Always wear protective clothing, protective glasses and safety gloves when handling the bands.
- The bands have sharp edges. There is a danger of (serious) injury from cuts.
- The bands can split and cause (serious) cuts when bent excessively

SECTION 4: First aid measures

After inhalation:
If metal vapours or 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:
Foreign bodies must be removed, consult a doctor if necessary.
Beware of metal splinters - Consult a doctor immediately.

After swallowing: Consult a doctor if the symptoms persist.
SECTION 5: Firefighting measures

• Suitable extinguishing agents:
  VITROPERM®: Non-combustible. Extinguishing agents must be adapted to the environment.
  VITROLAM®: Adhesive tapes are combustible. CO2, extinguishing powder or water spray.
  - Fight larger fires with water spray or alcohol resistant foam.

• 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. Do not inhale fumes.

• Protective equipment: No special measures required.

SECTION 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.

SECTION 7: Handling and storage

• 7.1 Precautions for safe handling
  Danger of accident!
  - Always wear protective clothing, protective glasses and safety gloves when handling the bands.
  - The bands have sharp edges. There is a danger of (serious) injury from cuts.
  - The bands can split and cause (serious) cuts when bent excessively.

  No more safety precautions are necessary in the delivered form.
  The appropriate industrial and environmental safety measures must be taken for processing steps which cause dust (see also section 8):
  - Ensure good ventilation/exhaustion at the workplace.
  - Take note of emission threshold.

• Information about fire - and explosion protection: No special measures required.

• Storage:
  • 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: Not applicable
  • Storage class: Not applicable
  • 7.3 Specific end use(s) No further relevant information available.

SECTION 8: Exposure controls/personal protection

• Additional information about design of technical facilities:
  Suction and filtering and good ventilation of the working area must be provided for processes where dust is formed.
  Approved industrial vacuum cleaners of at least dust class L must be used (DIN EN 60335-2-69).

  Suitable breathing apparatus must be used during repair and maintenance work on suction systems (see personal safety equipment).
• **Ingredients with limit values that require monitoring at the workplace:**
For International Limit Values see Additional information below.

• **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))

<table>
<thead>
<tr>
<th>Substance</th>
<th>Inhalative Long-term exposure - inhalation - local effects</th>
<th>Inhalative Long-term exposure - inhalation - systemic effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-48-4 cobalt</td>
<td>0.04 mg/m³ (Ind)</td>
<td>0.0063 mg/m³ (Consumer)</td>
</tr>
<tr>
<td>7440-02-0 nickel</td>
<td>0.05 mg/m³ (Ind)</td>
<td>0.05 mg/m³ (Ind)</td>
</tr>
</tbody>
</table>

• **Additional Occupational Exposure Limit Values for possible hazards during processing:**
Compliance with the general dust limit value(s) (lung penetrating and/or inhalable fraction) must be ensured.
If the occurrence of Boric acid/ Boron oxide cannot be ruled out, the appropriate workplace-related limit values must also be monitored!

• **Additional information:**
- The lists valid during the making were used as basis.
- GESTIS International Limit Values:

• **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.

• **Respiratory protection:**
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** Omitted
  **Penetration time of glove material** Omitted

• **Eye protection:**
In the event of larger quantities of dust:
Wear protective glasses / EN 166, poss. with side protection.
SECTION 9: Physical and chemical properties

- General Information
  The physical and chemical properties of this section refer to the alloy VITROPERM®.

- Appearance:
  - Form: Strip
  - Colour: Metallic
  - Odour: Odourless

- pH-value:
  Not applicable.

- Change in condition
  - Melting point/Melting range (approx.): 1100-1200 °C

- Auto-ignition temperature:
  Not applicable

- Explosive properties:
  Not applicable

- Vapour pressure:
  Not determined.

- Density (approx.) at 20 °C: 7.1 g/cm³
  - Relative density: Not determined.

- Solubility in / Miscibility with water:
  Insoluble.

- 9.2 Other information
  No further relevant information available.

SECTION 10: Stability and reactivity

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

- 10.5 Incompatible materials:
  No further relevant information available.

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

SECTION 11: Toxicological information

- Acute toxicity
  Based on available data, the classification criteria are not met.

- LD/LC50 values:
  The following applies for the pure substances:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Oral LD50</th>
<th>Inhalative LD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-42-8 boron</td>
<td>650 mg/kg (rat)</td>
<td>--- mg/l (rat)</td>
</tr>
<tr>
<td>7440-48-4 cobalt</td>
<td>550 mg/kg (rat)</td>
<td>--- mg/l (rat)</td>
</tr>
<tr>
<td>7440-02-0 nickel</td>
<td>&gt; 9000 mg/kg (rat)</td>
<td>--- mg/l (rat)</td>
</tr>
</tbody>
</table>

- Primary irritant effect:

- Skin corrosion/irritation
  Based on available data, the classification criteria are not met.

- Serious eye damage/irritation
  Irritation of the eyes in the case of massive direct contact will be mainly due to mechanical effects depending on the grain size.
• Respiratory or skin sensitisation
  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:

  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.

  • Germ cell mutagenicity Based on available data, the classification criteria are not met.
  • Carcinogenicity
    May cause cancer by inhalation.
  • Reproductive toxicity Based on available data, the classification criteria are not met.
  • STOT-single exposure Based on available data, the classification criteria are not met.
  • STOT-repeated exposure Based on available data, the classification criteria are not met.
  • Aspiration hazard Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

• 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.
• Additional ecological information:
  • General notes: Not known to be hazardous to water.

SECTION 13: Disposal considerations

• 13.1 Waste treatment methods
  • Recommendation Observe official regulations.
  • Uncleaned packaging: Not applicable

SECTION 14: Transport information

• Transport/Additional information:
  • Land transport ADR/RID (cross-border):
    • Remarks: Non-hazardous goods from the standpoint of the specified regulations
  • Maritime transport IMDG:
    • Remarks: Non-hazardous goods from the standpoint of the specified regulations
  • Air Transport ICAO-TI and IATA-DGR:
    • Remarks: Non-hazardous goods from the standpoint of the specified regulations
SECTION 15: Regulatory information

- Directive 2012/18/EU
- Named dangerous substances - ANNEX I None of the ingredients is listed.
- National regulations:
  - Other regulations, limitations and prohibitive regulations
    - guidelines 67/548/ECC, 1999/45/EC
    - 1272/2008/EG (CLP)
    - 1907/2006/EG (REACH)
    - German Hazardous Substances

SECTION 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 the hazard warnings mentioned (Chapter 3) for pure substances:
    - H302 Harmful if swallowed.
    - H317 May cause an allergic skin reaction.
    - H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
    - H350i May cause cancer by inhalation.
    - H361f Suspected of damaging fertility.
    - H413 May cause long lasting harmful effects to aquatic life.

- Department issuing SDS:
  Department HT-F
  Tel. 06181/38-2045

- Contact:
  Environmental Protection Department
  Tel. 06181/38-2359

- Abbreviations and acronyms:
  RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
  ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  IMDG: International Maritime Code for Dangerous Goods
  IATA: International Air Transport Association
  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 – Category 4
  Resp. Sens. 1: Respiratory sensitisation – Category 1
  Skin Sens. 1: Skin sensitisation – Category 1
  Carc. 1B: Carcinogenicity – Category 1B
  Repr. 2: Reproductive toxicity – Category 2
  Aquatic Chronic 4: Hazardous to the aquatic environment - long-term aquatic hazard – Category 4

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

* Data compared to the previous version altered.