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

- **Product identifier**
- **Trade name:** VITROVAC ®
- **Article number:** VITROVAC 6070 K70, - 6025 I50, - 6080 L80, - 6150 N50, - 6150 B60, - 6030 D30
- **Material Safety Data Sheet - no.:** IB40
- **Relevant identified uses of the substance or mixture and uses advised against**
  - **Application of the substance / the preparation** semi-finished products and parts
- **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.
- **GHS label elements**
  - **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 allergy or asthma symptoms or breathing difficulties if inhaled.
  - May cause an allergic skin reaction.
  - May cause long lasting harmful effects to aquatic life.
- **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.
  - Get medical advice/attention if you feel unwell.
- **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**
- **Results of PBT and vPvB assessment**
  - **PBT:** Not applicable.
  - **vPvB:** Not applicable.

(Contd. on page 2)
3 Composition/information on ingredients

- Chemical characterization:
- Description: Metal in compact form
- Dangerous components:
The classifications given below reflect the classification of each pure substance respectively and are intended for information only

<table>
<thead>
<tr>
<th>CAS:</th>
<th>Ingredient</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-48-4</td>
<td>cobalt</td>
<td>Xi R42/43 R53</td>
<td>79-87%</td>
</tr>
<tr>
<td>7440-21-3</td>
<td>silicon</td>
<td>F R11</td>
<td>3-10%</td>
</tr>
<tr>
<td>7439-89-6</td>
<td>iron</td>
<td></td>
<td>1-4%</td>
</tr>
<tr>
<td>7439-96-5</td>
<td>manganese</td>
<td></td>
<td>≤ 5%</td>
</tr>
<tr>
<td>7439-98-7</td>
<td>molybdenum</td>
<td></td>
<td>≤ 3%</td>
</tr>
<tr>
<td>7440-03-1</td>
<td>niobium</td>
<td></td>
<td>~ 2%</td>
</tr>
</tbody>
</table>

- Remark to the composition:
  * The niobium concentration mentioned only applies for the alloy VITROVAC 6025 I50.

- Additional information: For the wording of the listed risk phrases refer to section 16.

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:
  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.
- 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**
    
    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):
    - Prevent formation of dust.
    - Ensure good ventilation/exhaustion at the workplace.
    - Take note of emission threshold.

- **Information about protection against explosions and fires**: No special measures required.
- **Conditions for safe storage, including any incompatibilities**
- **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**: 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**:
  
  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 M must be used (DIN EN 60335-2-69).
  
  Recommended: dust class H

  Suitable breathing apparatus must be used during repair and maintenance work on suction systems (see personal safety equipment).
• Control parameters

<table>
<thead>
<tr>
<th>Control parameters</th>
<th>Limit values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Components with limit values that require monitoring at the workplace:</strong></td>
<td><strong>0.02 mg/m³</strong></td>
</tr>
<tr>
<td>7440-48-4 cobalt</td>
<td>IARC 2B</td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>0.02 mg/m³</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>0.1 mg/m³</td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>0.1* mg/m³ as Co</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>0.05* mg/m³ inorg. compds.: *metal dust &amp; fume, as Co</td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>0.02 mg/m³ as Co; BEI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control parameters</th>
<th>Limit values</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-21-3 silicon</td>
<td><strong>10 mg/m³</strong></td>
</tr>
<tr>
<td>EL (Canada)</td>
<td><strong>10 mg/m³</strong> total dust</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td><em><em>15</em> 5</em>* mg/m³</td>
</tr>
<tr>
<td>PEL (USA)</td>
<td><em><em>10</em> 5</em>* mg/m³</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>TLV withdrawn</td>
</tr>
<tr>
<td>TLV (USA)</td>
<td><em><em>10</em> 5</em>* mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control parameters</th>
<th>Limit values</th>
</tr>
</thead>
<tbody>
<tr>
<td>7439-89-6 iron</td>
<td><strong>as iron:</strong> <strong>salts, water-soluble,</strong> <strong>welding fume</strong></td>
</tr>
<tr>
<td>EV (Canada)</td>
<td><strong>5</strong> mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control parameters</th>
<th>Limit values</th>
</tr>
</thead>
<tbody>
<tr>
<td>7439-96-5 manganese</td>
<td><strong>as Mn:</strong> <strong>water-soluble,</strong> <strong>water-insoluble</strong></td>
</tr>
<tr>
<td>EL (Canada)</td>
<td><strong>0.2 mg/m³</strong> as Mn; <strong>R</strong></td>
</tr>
<tr>
<td>EV (Canada)</td>
<td><strong>0.2 mg/m³</strong> as manganese</td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>Short-term value: <strong>C 5</strong> mg/m³ as Mn &amp; inorganic compounds <strong>fume</strong></td>
</tr>
<tr>
<td>REL (USA)</td>
<td>Short-term value: <strong>3</strong> mg/m³ as Mn &amp; inorganic compounds <strong>fume</strong></td>
</tr>
<tr>
<td>TLV (USA)</td>
<td><strong>(0.2) NIC-0.02</strong> NIC-0.2 mg/m³ as Mn; <strong>+ inorganic compds., resp. inh. fraction:</strong> NIC-A4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control parameters</th>
<th>Limit values</th>
</tr>
</thead>
<tbody>
<tr>
<td>7439-98-7 molybdenum</td>
<td><strong>as Mo:</strong> <strong>respirable,</strong> <strong>inhalable</strong></td>
</tr>
<tr>
<td>EL (Canada)</td>
<td><em><em>3</em> 10</em>* mg/m³ as Mo; <strong>respirable</strong> <strong>inhalable</strong></td>
</tr>
<tr>
<td>EV (Canada)</td>
<td><em><em>10</em> 3</em>* mg/m³ <strong>metal, insol. compds.: inh;</strong> resp. sol. compds.: <strong>resp</strong></td>
</tr>
<tr>
<td>PEL (USA)</td>
<td><em><em>5</em> 15</em>* mg/m³ as Mo; <strong>soluble compds., insol. compds.: total dust</strong></td>
</tr>
<tr>
<td>TLV (USA)</td>
<td><em><em>10</em> 3</em>* mg/m³ <strong>metal, insol. compds.: inh; resp., sol. compds.:</strong> resp</td>
</tr>
</tbody>
</table>

• 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.
**Material Safety Data Sheet**

**Trade name:** VITROVAC®

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**9 Physical and chemical properties**

- **Information on basic physical and chemical properties**
  - **General Information**
  - **Appearance:**
    - Form: Strip
    - Color: Metallic
  - **Odor:** Odourless
  - **pH-value:** Not applicable.

- **Change in condition**
  - Melting point/Melting range (approx): 1000-1200°C

- **Auto igniting:** Not applicable

- **Danger of explosion:** Not applicable

- **Vapor pressure:** Not determined.

- **Density (approx) at 20°C:** 7.8 g/cm³
  - **Relative density:** Not determined.

- **Solubility in / Miscibility with**
  - Water: Insoluble.
  - **Other information:** No further relevant information available.

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**10 Stability and reactivity**

- **Reactivity**
- **Chemical stability**
  - **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
11 Toxicological information

- **Information on toxicological effects**

  - **Acute toxicity:**
    - **LD/LC50 values:**

      The following applies for the pure substance (here cobalt):
      
      | 7440-48-4 cobalt |
      |----------------|
      | Oral LD50 6170 mg/kg (rat) |

  - **Primary irritant effect:**
    - **on the skin:** see sensitization
    - **on the eye:**
      Iritation of the eyes in the case of massive direct contact will be mainly due to mechanical effects depending on the grain size.
      - **Sensitization:**
        In the case of repeated and prolonged contact with the skin with metallic cobalt there is a possibility of sensitization.
        Cobalt in the form of inhalable dust can lead to hypersensitisation when inhaled.

  - **Subacute to chronic toxicity:**

    In Germany, cobalt in the form of inhalable dust is classified as category 3 carcinogenic.

  - **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.

12 Ecological information

- **Toxicity**
  - **Acquatic 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.
  - **Other adverse effects** No further relevant information available.

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
  - **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

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):**
      - 7440-48-4 cobalt
      - 7439-96-5 manganese
    - **TSCA (Toxic Substances Control Act):**
      All ingredients are listed.
    - **Proposition 65**
      - **Chemicals known to cause cancer:**
        - 7440-48-4 cobalt
      - **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.
      - **Chemicals known to cause developmental toxicity:**
        None of the ingredients is listed.
    - **Cancerogenity categories**
      - **EPA (Environmental Protection Agency)**
        - 7439-96-5 manganese D
      - **IARC (International Agency for Research on Cancer)**
        - 7440-48-4 cobalt 2B, 2A
      - **NTP (National Toxicology Program)**
        None of the ingredients is listed.
      - **TLV (Threshold Limit Value established by ACGIH)**
        - 7440-48-4 cobalt A3
        - 7439-98-7 molybdenum A3
      - **MAK (German Maximum Workplace Concentration)**
        - 7440-48-4 cobalt 2
      - **NIOSH-Ca (National Institute for Occupational Safety and Health)**
        None of the ingredients is listed.
      - **OSHA-Ca (Occupational Safety & Health Administration)**
        None of the ingredients is listed.
    - **National regulations:**
      - **Other regulations, limitations and prohibitive regulations**
        - guidelines 67/548/ECC, 1999/45/EC
Trade name: **VITROVAC®**

- 1272/2008/EG (CLP)
- 1907/2006/EG (REACH)
- German Hazardous Substances

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

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**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:
    - H228 Flammable solid.
    - H317 May cause an allergic skin reaction.
    - H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
    - H413 May cause long lasting harmful effects to aquatic life.
    - R11 Highly flammable.
    - R42/43 May cause sensitization by inhalation and skin contact.
    - 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

- **Abbreviations and acronyms:**
  - 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
  - BIA-Gefahrstoffdatenbank