1 Identification

- Trade name: RADNOR 308L-16
- CAS Number: -
- EINECS Number: -
- Application of the substance / the mixture: Shielded Metal Arc Welding Electrode
- Details of the supplier of the safety data sheet
- Manufacturer/Supplier:
  voestalpine Bohler Welding USA Inc.
  1601 Gillingham Lane #110
  Sugar Land TX 77478
  Phone: (281) 499 - 1212
- Emergency telephone number: (281) 499 - 1212

2 Hazard(s) Identification

- Classification of the substance or mixture
  The product is not classified according to the Globally Harmonized System (GHS).

- Label elements
  - GHS label elements Void
  - Hazard pictograms Void
  - Signal word Void
  - Hazard statements Void
- NFPA ratings (scale 0 - 4)
  Health = 0
  Fire = 0
  Reactivity = 0
- HMIS-ratings (scale 0 - 4)
  HEALTH = 0
  FIRE = 0
  REACTIVITY = 0

- Other hazards
- Results of PBT and vPvB assessment
- PBT: Not applicable.
- vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Mixtures
- Description: Mixture of the substances listed below with nonhazardous additions.

- Dangerous components:
<table>
<thead>
<tr>
<th>CAS:</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-47-3</td>
<td>5-12.5%</td>
</tr>
<tr>
<td>EINECS: 231-157-5</td>
<td></td>
</tr>
</tbody>
</table>

(Contd. on page 2)
Safety Data Sheet
acc. to OSHA HCS

Trade name: RADNOR 308L-16

42.0.6

| CAS: 7440-02-0 | nickel | 5-12.5% |
| EINECS: 231-111-4 |
| CAS: 471-34-1 | calcium carbonate | 2.5-5% |
| EINECS: 207-439-9 |
| CAS: 7439-96-5 | manganese | 0.1-2.5% |
| EINECS: 231-105-1 |
| CAS: 7789-75-5 | calcium fluoride | 0.1-2.5% |
| EINECS: 232-188-7 |

- nonhazardous components:
  | CAS: 7439-89-6 | iron | 50-100% |
  | EINECS: 231-096-4 |
  | CAS: 1346-67-7 | Titandioxid | 5-12.5% |

4 First-aid measures

- Description of first aid measures
  - General information: No special measures required.
  - After inhalation: Supply fresh air; consult doctor in case of complaints.
  - After skin contact: Generally the product does not irritate the skin.
  - After eye contact: Rinse opened eye for several minutes under running water.
  - 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 Fire-fighting measures

- Extinguishing media
  - Suitable extinguishing agents: Suitable to surrounding conditions
- 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

- Personal precautions, protective equipment and emergency procedures
  - Ensure adequate ventilation
  - Use respiratory protective device against the effects of fumes/dust/aerosol.
- Environmental precautions: No special measures required.
- Methods and material for containment and cleaning up: Pick up mechanically.
- 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: Ensure that suitable extractors are available on processing machines
  - 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.

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

8 Exposure controls/personal protection

Control parameters

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Component</th>
<th>PEL Long-term value:</th>
<th>REL Long-term value:</th>
<th>TLV Long-term value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-47-3 chromium</td>
<td>1* 0.5** mg/m³</td>
<td>metal;**inorganic compds., as Cr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5* mg/m³</td>
<td>metal; inorg. compds. as Cr; See Pocket Guide App. C</td>
<td></td>
</tr>
<tr>
<td>7440-02-0 nickel</td>
<td>1 mg/m³</td>
<td>as Ni; See Pocket Guide App. A</td>
<td></td>
</tr>
<tr>
<td>471-34-1 calcium carbonate</td>
<td>15* 5** mg/m³</td>
<td>total dust **respirable fraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10* 5** mg/m³</td>
<td>total dust **respirable fraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 mg/m³</td>
<td>elemental, *inhaleable fraction</td>
<td></td>
</tr>
<tr>
<td>7439-96-5 manganese</td>
<td>Ceiling limit value: 5 mg/m³ as Mn</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short-term value: 3 mg/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long-term value: 1 mg/m³ fume, as Mn</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.02* 0.1* mg/m³</td>
<td>as Mn; *respirable **inhaleable fraction</td>
<td></td>
</tr>
<tr>
<td>7789-75-5 calcium fluoride</td>
<td>Long-term value: 2.5 mg/m³ as F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long-term value: 2.5 mg/m³ as F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long-term value: 2.5 mg/m³ as F, BEI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Ingredients with biological limit values:

7789-75-5 calcium fluoride

BEI 2 mg/L
  Medium: urine
  Time: prior to shift
  Parameter: Fluoride (background, nonspecific)

3 mg/L
  Medium: urine
  Time: end of shift
  Parameter: Fluoride (background, nonspecific)

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

Exposure controls

Personal protective equipment:

Breathing equipment: Filter P2

Protection of hands:
  Heat protection gloves (non-combustible)
  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
  Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Penetration time of glove material
  The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection: Safety glasses

Body protection:
  Protective work clothing
  Wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum this includes welder’s gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:
  Form: Solid
  Color: According to product specification
  Odor: Odorless
  Odor threshold: Not determined.

pH-value: Not applicable.

Flash point: Not applicable.

Flammability (solid, gaseous): Not determined.

Decomposition temperature: Not determined.

Auto igniting: Product is not selfigniting.

Danger of explosion: Product does not present an explosion hazard.

Explosion limits:
  Lower: Not determined.
  Upper: Not determined.
  Relative density: Not determined.
42.0.6

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vapor density</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>Insoluble.</td>
</tr>
<tr>
<td><strong>Partition coefficient (n-octanol/water):</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Dynamic:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Kinematic:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Organic solvents:</strong></td>
<td>0.0 %</td>
</tr>
<tr>
<td><strong>Other information</strong></td>
<td>No further relevant information available.</td>
</tr>
</tbody>
</table>

### 10 Stability and reactivity

- **Reactivity**: No further relevant information available.
- **Chemical stability**: No decomposition if used and stored according to specifications.
- **Thermal decomposition / conditions to be avoided**: No dangerous reactions known.
- **Conditions to avoid**: No further relevant information available.
- **Incompatible materials**: No further relevant information available.
- **Hazardous decomposition products**: Chromoxide.

The present OSHA PEL (Permissible Exposure Limit) - published in the U.S. Federal Register 71, pages: 10099-10385 - for hexavalent Chromium (Cr+6) is 0.005 mg/m³ which will result in a significant reduction from the 5 mg/m³ general welding fume (NOC) level. It applies to soluble chromates of the types found in covered stainless electrode fumes.

### 11 Toxicological information

- **Information on toxicological effects**

Workers exposed to hexavalent chrome (CrVI) are at an increased risk of developing lung cancer. It is also possible that occupational exposure to (CrVI) may result in asthma, and damage to the nasal epithelia and skin. To avoid any risk follow the requirements of the OSHA rule for hexavalent chromium published on February 28, 2006 in the U.S. Federal Register, pages:10099-10385 which established an 8-hour time-weighted average (TWA) exposure limit of 5 micrograms of hexavalent chrome per cubic meter of air (5 µg/m³). This is a considerable reduction from the previous PEL of 1 milligram per 10 cubic meters of air (1 mg/10 m³, or 100 µg/m³) reported as Probably Chromium(VI)oxide, which is equivalent to a limit of 52 µg/m³ as (Cr+6)). This rule also contains ancillary provisions for worker protection such as requirements for exposure determination, preferred exposure control methods, including a compliance alternative for a small sector for which the new PEL is infeasible, respiratory protection, protective clothing and equipment, hygiene areas and practices, medical surveillance, recordkeeping, and start-up dates that include four years for the implementation of engineering controls to meet the PEL.

- **Carcinogenic categories**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Substance</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>IARC (International Agency for Research on Cancer)</td>
<td>7440-47-3 chromium</td>
<td>3</td>
</tr>
<tr>
<td>IARC (International Agency for Research on Cancer)</td>
<td>7440-02-0 nickel</td>
<td>1</td>
</tr>
<tr>
<td>IARC (International Agency for Research on Cancer)</td>
<td>7789-75-5 calcium fluoride</td>
<td>3</td>
</tr>
<tr>
<td>NTP (National Toxicology Program)</td>
<td>7440-02-0 nickel</td>
<td>R</td>
</tr>
<tr>
<td>OSHA-Ca (Occupational Safety &amp; Health Administration)</td>
<td>None listed.</td>
<td></td>
</tr>
</tbody>
</table>
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.
- **Additional ecological information:**
  - General notes: Generally not hazardous for water
- **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: Must be specially treated adhering to official regulations.
- **Uncleaned packagings:**
  - Recommendation: Disposal must be made according to official regulations.

14 Transport information

- **Transport hazard class(es)**
  - Class: -
- **Environmental hazards:**
  - Marine pollutant: No
- **Special precautions for user**
  - Not applicable.
- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**
  - Not applicable.
- **Transport/Additional information:**
  - Not dangerous according to the above specifications.
- **UN "Model Regulation":**
  - -

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - No further relevant information available.
- **Sara**
  - **Section 355 (extremely hazardous substances):**
    - 7440-47-3 chromium
  - **Section 313 (Specific toxic chemical listings):**
    - 7440-47-3 chromium
    - 7440-02-0 nickel
    - 7439-96-5 manganese
- **TSCA (Toxic Substances Control Act):**
  - 7439-89-6 iron
  - 7440-47-3 chromium
42.0.6

7440-02-0 nickel
471-34-1 calcium carbonate
7439-96-5 manganese
7789-75-5 calcium fluoride

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.

- Chemicals known to cause developmental toxicity:

None of the ingredients is listed.

Cancerogenity categories

- EPA (Environmental Protection Agency)

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-47-3</td>
<td>chromium</td>
<td>D</td>
</tr>
<tr>
<td>7439-96-5</td>
<td>manganese</td>
<td>D</td>
</tr>
</tbody>
</table>

- TLV (Threshold Limit Value established by ACGIH)

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-47-3</td>
<td>chromium</td>
<td>A4</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>nickel</td>
<td>A5</td>
</tr>
<tr>
<td>7789-75-5</td>
<td>calcium fluoride</td>
<td>A4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-02-0</td>
<td>nickel</td>
<td></td>
</tr>
</tbody>
</table>

GHS label elements

- Hazard pictograms: Void
- Signal word: Void
- Hazard statements: Void

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

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.

- Additional information:
Detailed information can be found on our webpage www.voestalpine.com (Environment, REACH at voestalpine).

- Department issuing SDS: R&D
- Contact: (281) 499 - 1212
- Date of preparation / last revision: 01/13/2016

Abbreviations and acronyms:

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)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
TRGS: Technische Regeln für Gefahrstoffe (Technical Rules for Dangerous Substances, BAuA, Germany)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
BEI: Biological Exposure Limit

* Data compared to the previous version altered.