1 Identification

- Product identifier
  - Trade name: BÖHLER FOX CN 29/9
  - Application of the substance / the mixture: Shielded Metal Arc Welding Electrode

- Details of the supplier of the safety data sheet
  - Manufacturer/Supplier: voestalpine Böhler Welding Austria GmbH
    Böhler-Welding-Str. 1
    8605 Kapfenberg
    Telefon: +43 (0) 3862 301-28-299
    Fax: +43 (0) 3862 301-95-299
    www.voestalpine.com/welding
  - Information department: Research and Development
    DI Stefan Schormann
    +43 3862 301 - 28291; stefan.schormann@voestalpine.com
  - Emergency telephone number: +43 3862 301-0

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 = 1
      - 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:
    | CAS: 7440-47-3  | chromium   | 12.5-25%  |
    | EINECS: 231-157-5 |            |           |

(Contd. on page 2)
Trade name: BÖHLER FOX CN 29/9

CAS: 13463-67-7  
EINECS: 236-675-5  
**titanium dioxide**  
Carc. 2, H351  
5-12.5%

CAS: 7440-02-0  
EINECS: 231-111-4  
**nickel**  
Carc. 2, H351; STOT RE 1, H372  
Skin Sens. 1, H317  
5-12.5%

CAS: 7439-96-5  
EINECS: 231-105-1  
**manganese**  
0.1-2.5%

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### 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.
8 Exposure controls/personal protection

- Control parameters

- Components with limit values that require monitoring at the workplace:

  7440-47-3 chromium
  PEL Long-term value: 1 mg/m³
  REL Long-term value: 0.5* mg/m³
    *metal-inorg.compds.as Cr;See Pocket Guide App. C
  TLV Long-term value: 0.5 mg/m³

  13463-67-7 titanium dioxide
  PEL Long-term value: 15* mg/m³
    *total dust
  REL See Pocket Guide App. A
  TLV Long-term value: 10 mg/m³ withdrawn from NIC

  7440-02-0 nickel
  PEL Long-term value: 1 mg/m³
  REL Long-term value: 0.015 mg/m³
    as Ni; See Pocket Guide App. A
  TLV Long-term value: 1.5* mg/m³
    elemental, *inhalable fraction

  7439-96-5 manganese
  PEL Ceiling limit value: 5 mg/m³
    as Mn
  REL Short-term value: 3 mg/m³
    Long-term value: 1 mg/m³
    fume, as Mn
  TLV Long-term value: 0.02* 0.1* mg/m³
    as Mn; *respirable **inhalable fraction

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

- Exposure controls

- Personal protective equipment:

- General protective and hygienic measures:
  Wash hands before breaks and at the end of work.
  The usual precautionary measures for handling chemicals should be followed.

- Breathing equipment: Filter P2

- Protection of hands:
  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
  Rubber gloves
  Acid resistant gloves
  Heat protection gloves (non-combustible)

- 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

(Contd. on page 4)


43.0.3

- **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.
  - **Vapor density** Not applicable.
  - **Evaporation rate** Not applicable.
  - **Water:** Insoluble.

- **Partition coefficient (n-octanol/water):** Not determined.
- **Dynamic:** Not applicable.
- **Kinematic:** Not applicable.
- **Organic solvents:** 0.0 %
- **VOC content:** 0.0 g/l / 0.00 lb/gl
- **Other information** No further relevant information available.

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### 10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
  - **Thermal decomposition / conditions to be avoided:** No decomposition if used and stored according to specifications.
  - **Possibility of hazardous reactions** Attacks materials containing glass and silicate.
  - **Conditions to avoid** No further relevant information available.
  - **Incompatible materials:** No further relevant information available.
  - **Hazardous decomposition products:** Reasonably expected fume constituents of this product would include:
Copper oxide.
copper oxide.
Chromoxide.
Nickel oxide.
Cobalt oxide.

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.

No dangerous decomposition products known.

Reasonably expected gaseous constituents would include Carbon monoxide and Carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and ANSI/AWS F1.2-1992. In order to determine and evaluation of the existing problem areas, the standards EN ISO15011 –parts 1,4 can also be applied.

11 Toxicological information

Information on toxicological effects

- Additional toxicological information:
The product is not subject to classification according to internally approved calculation methods for preparations:
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.

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 asthama, 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

- IARC (International Agency for Research on Cancer)
  7440-47-3 chromium 3
  13463-67-7 titanium dioxide 2B
  7440-02-0 nickel 2B
  7789-75-5 calcium fluoride 3
  7440-48-4 cobalt 2B

- NTP (National Toxicology Program)
  7440-02-0 nickel R

- OSHA-Ca (Occupational Safety & Health Administration)
  None of the ingredients is listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity: No further relevant information available.
  - Persistence and degradability 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

| DOT, ADR, ADN, IMDG, IATA | Void |
| DOT, ADR, ADN, IMDG, IATA | Void |
| DOT, ADR, ADN, IMDG, IATA | Void |
| IATA | Void |
| IATA | Void |
| DOT, ADR, IMDG, IATA | Void |
| 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": | Void |

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - No further relevant information available.
Trade name: BÖHLER FOX CN 29/9

### Sara

- **Section 355 (extremely hazardous substances):**
  - 7440-47-3 chromium
  - 7723-14-0 phosphorus

- **Section 313 (Specific toxic chemical listings):**
  - 7440-47-3 chromium
  - 7440-02-0 nickel
  - 7439-96-5 manganese
  - 7440-50-8 copper
  - 7723-14-0 phosphorus
  - 7440-48-4 cobalt

- **TSCA (Toxic Substances Control Act):**
  - 7439-89-6 iron
  - 7440-47-3 chromium
  - 13463-67-7 titanium dioxide
  - 7440-02-0 nickel
  - 68476-25-5 Kali-Feldspat
  - 1317-65-3 calcium carbonate
  - 7439-96-5 manganese
  - 7789-75-5 calcium fluoride
  - 1332-37-2 Iron oxide
  - 7440-21-3 silicon
  - 9004-34-6 Cellulose
  - 7439-98-7 molybdenum
  - 7440-50-8 copper
  - 7723-14-0 phosphorus
  - 9005-35-0 Protawelt

- **Proposition 65**
  - **Chemicals known to cause cancer:**
    - 13463-67-7 titanium dioxide
    - 7440-02-0 nickel
    - 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)**
  - 7440-47-3 chromium
  - 7439-96-5 manganese
  - 7440-50-8 copper
  - 7723-14-0 phosphorus

  (Contd. of page 6)
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- TLV (Threshold Limit Value established by ACGIH)
  - 7440-47-3 chromium A4
  - 13463-67-7 titanium dioxide A4
  - 7440-02-0 nickel A5
  - 7789-75-5 calcium fluoride A4
  - 7439-98-7 molybdenum A3
  - 7440-48-4 cobalt A3

- NIOSH-Ca (National Institute for Occupational Safety and Health)
  - 13463-67-7 titanium dioxide A3
  - 7440-02-0 nickel A3

- GHS label elements Void
- 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:
  Recommendations for exposure scenarios, measures for risk management and identification of working conditions under which metals, metal alloys and products made of metal can be safely worked can be found attached. Detailed information can be found on our webpage www.voestalpine.com (Environment, REACH at voestalpine).
Recommendations for Exposure Scenarios, Risk Management Measures and to identify Operational Conditions under which metals, alloys and metallic articles may be safely welded:

Welding/brazing involves fumes which can affect human health and the environment. Fumes are a varying mixture of airborne gases and fine particles which, if inhaled or swallowed, constitute a health hazard. The degree of risk will depend on the composition of the fume, the concentration of the fume and duration of exposure. The fume composition is dependent upon the material being worked, the process and consumables being used, coatings on the work such as paint, galvanizing or plating, all or combinations from cleaning and degreasing activities. A systematic approach to the assessment of exposure is necessary, taking into account the particular circumstances for the operator and auxiliary worker that can be expected.

Considering the emission of fumes when welding, brazing or cutting of metals, it is recommended to (1) arrange risk management measures through applying general information and guidelines provided by this exposure scenario and (2) using the information provided by the Safety Data Sheet, issued in accordance with REACH, by the welding consumable manufacturer.

The employer shall ensure that the risk from welding fumes to the safety and health of workers is eliminated or reduced to a minimum. The following principle shall be applied:
1. Select the applicable process/material combinations with the lowest danger, wherever possible.
2. Select welding process with the lowest emission parameters.
3. Select welding consumables which produce a minimum amount of dust or fume in accordance with class number. In general, the use of PPE is taken into account after all other measures is applied.
4. Wear the relevant personal protective equipment in accordance with the duty cycle.

In addition, compliance with the National Regulations regarding the exposure to welding fumes of workers and related personnel shall be verified.

In the table "Risk Management Measures for individual process / material combinations" below, reference is made to the following standards for collective and personal protection measures:

- ISO 4801:2011
- EN ISO 15012-1:2004
- EN ISO 15012-2:2008
- EN 1484:2001
- EN 1355:2000
- EN 1324:1996
- EN 143:2000
- Directive 1996/26/EC
- TRGS 528

In the table "Risk Management Measures for individual process / material combinations", reference is made to footnotes. The description of these footnotes:

1. Class: approximate ranking to mitigate risk by selecting process/material combinations with the lowest value.
2. Personal Protective Equipment (PPE) required avoiding exceeding the National Exposure Limit Value (OC: Duty cycle expressed in 8 hours).
3. General Ventilation (GV) Low. With local exhaust ventilation (LEV) and extinctor air to the outside, the GV or LEV capacity may be reduced to 1/3 of the original requirement.
4. General Ventilation (GV) Medium (double compared to Low).
5. Filtrating half mask (FFP3).
6. When an allowed consumable is used, measures from "Class I" are required.
7. General Ventilation (GV) Low. When no Local Exhaust Ventilation, the ventilation requirement is 5-fold.
8. Filtrating half mask (FFP3), helmet with power blower filters (TH12P3), or helmet with external air supply (LDNH).
9. Reduced negative pressure area: A separate ventilated area where reduced negative pressure, compared to the surrounding area, is maintained.
10. Helmet with power blower filters (TH12P3), or helmet with external air supply (LDNH).
11. Local Exhaust Ventilation (LEV) Medium, extraction at source (includes table, hood, arm or torch extraction)
12. Local Exhaust Ventilation (LEV) High, extraction at source (includes table, hood, arm or torch extraction)
13. Improved helmet, designed to avoid direct flow of welding fumes inside
14. Not applicable
15. Not recommended
Safety Data Sheet
acc. to OSHA HCS

Trade name: BÖHLER FOX CN 29/9

Risk Management Measures for Individual Process / Base Material Combinations

<table>
<thead>
<tr>
<th>Class</th>
<th>Process</th>
<th>Base Materials</th>
<th>Remarks</th>
<th>Ventilation / Extraction / Filtration</th>
<th>PPE EC&gt;1%</th>
<th>PPE EC&gt;1%</th>
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<tbody>
<tr>
<td>I</td>
<td>GTAW</td>
<td>All</td>
<td>Except Aluminum</td>
<td>GV low</td>
<td>n.r.</td>
<td>n.r.</td>
</tr>
<tr>
<td></td>
<td>GMAW</td>
<td>All</td>
<td>Stainless, Ni-alloy, and stainless steel</td>
<td>GV high</td>
<td>LEV medium</td>
<td>I, II, III</td>
</tr>
<tr>
<td></td>
<td>SMAW</td>
<td>All</td>
<td>Stainless and Ni-alloy, and stainless steel</td>
<td>GV high</td>
<td>LEV medium</td>
<td>I, II, III</td>
</tr>
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<td></td>
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<td>LEV medium</td>
<td>I, II, III</td>
</tr>
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<td>All</td>
<td>Stainless, Ni-alloy, and stainless steel</td>
<td>GV high</td>
<td>LEV medium</td>
<td>I, II, III</td>
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<td>Powder Plasma Arc</td>
<td>All</td>
<td>Stainless, Ni-alloy, and stainless steel</td>
<td>GV high</td>
<td>LEV medium</td>
<td>I, II, III</td>
</tr>
<tr>
<td>IV</td>
<td>All processes class I</td>
<td>Painted / primed / coated</td>
<td>No Pb containing primer</td>
<td>GV low</td>
<td>FF0.2</td>
<td>FF0.2</td>
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<tr>
<td></td>
<td>All processes class II</td>
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<td>V</td>
<td>MMAW</td>
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<td>ThSP, LDH3</td>
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<td></td>
<td>FCRAW</td>
<td>Stainless, Ni-alloy, and stainless steel</td>
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<td>Reduced (negative) pressured area</td>
<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
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<td>GMAW</td>
<td>Co-alloys</td>
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<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
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<tr>
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<td>ThSP, LDH3</td>
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<td>VI</td>
<td>GMAW</td>
<td>Steel, Ni-alloy, and stainless steel</td>
<td>n.a.</td>
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<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
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<td>Reduced (negative) pressured area</td>
<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
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<td>Co-alloys</td>
<td>n.a.</td>
<td>Reduced (negative) pressured area</td>
<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
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<tr>
<td></td>
<td>Powder Plasma Arc</td>
<td>Co-alloys</td>
<td>n.a.</td>
<td>Reduced (negative) pressured area</td>
<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
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<tr>
<td>VII</td>
<td>Self shielded FCRAW</td>
<td>Un-, Ni-, and stainless steel</td>
<td>Coated wire, not containing Br</td>
<td>Reduced (negative) pressured area</td>
<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
</tr>
<tr>
<td></td>
<td>Self shielded FCRAW</td>
<td>Un-, Ni-, and stainless steel</td>
<td>Coated wire, not containing Br</td>
<td>Reduced (negative) pressured area</td>
<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>Painted / primed</td>
<td>Painted / Primer containing Br</td>
<td>ThSP, LDH3</td>
<td>ThSP, LDH3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Art Gouging and Cutting</td>
<td>All</td>
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<td>n.a.</td>
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<td>n.a.</td>
<td>n.a.</td>
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<td>Co-alloys</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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</table>

Closed system or Confined space

- **Training hints**
- **Department issuing SDS**: Research and Development
- **Contact**: DI Stefan Schormann
- **Date of preparation / last revision**: 07/26/2016 / 3
- **Abbreviations and acronyms**:
  - 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
  - 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

(Contd. on page 11)
Trade name: **BÖHLER FOX CN 29/9**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELINCS</td>
<td>European List of Notified Chemical Substances</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstracts Service (division of the American Chemical Society)</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Association (USA)</td>
</tr>
<tr>
<td>HMIS</td>
<td>Hazardous Materials Identification System (USA)</td>
</tr>
<tr>
<td>TRGS</td>
<td>Technische Regeln für Gefahrstoffe (Technical Rules for Dangerous Substances, BAuA, Germany)</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile Organic Compounds (USA, EU)</td>
</tr>
<tr>
<td>PBT</td>
<td>Persistent, Bioaccumulative and Toxic</td>
</tr>
<tr>
<td>vPvB</td>
<td>very Persistent and very Bioaccumulative</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety &amp; Health</td>
</tr>
<tr>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
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<tr>
<td>REL</td>
<td>Recommended Exposure Limit</td>
</tr>
<tr>
<td>Skin Sens. 1</td>
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</tr>
<tr>
<td>Carc. 2</td>
<td>Carcinogenicity – Category 2</td>
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<tr>
<td>STOT RE 1</td>
<td>Specific target organ toxicity (repeated exposure) – Category 1</td>
</tr>
</tbody>
</table>