

# DATA SHEET

This Safety Data Sheet (SDS) is intended for and can be used for welding & brazing consumables and related products. The requirements for the content and format of a safety data sheet are currently laid down in Regulation (EU) 2020/878 and have been taken into account. Furthermore, Regulation (EC) No. 1907/2006 (REACH) and Regulation (EC) No. 1272/2008 (CLP) have also been taken into account. The REACH and CLP regulations must be consulted for specific requirements. This Safety Data Sheet complies with the requirements of ISO 11014-1.

## Nickel based solid wire for Cast Iron

Rev0 date: 02.02.2024

### SECTION 1: IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

#### 1.1. Product identification

Name of the Product: **CEWELD® NiFe 60-40, Ni-Rod FM99, NiFe 44Mn (NI-ROD), NiFe 55, Ni-Rod 44, Ni-Rod FM 99 Tig, NiFe 55 Tig**

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Type: Solid wire  
Relevant identified use: Joining and rebuilding Cast Iron with globular graphite, tempered, Cast Iron and for joining Cast Iron with steel, Grey cast iron,

#### 1.3 Details of the supplier

Company name: Certilas Nederland BV  
Address: Gloxinialaan 2, 6851 TG HUISSEN, The Netherlands  
Phone: +31 (0)26 30 30 080  
Responsible for the safety data sheet: [info@certilas.com](mailto:info@certilas.com)

#### 1.4 EMERGENCY TELEPHONE NUMBER:

Emergency telephone number International: **+44 1235 239670**

Available 24 hours a day, 7 days a week. Erreichbar 24 Stunden 7 Tage die Woche.

**CZ** +420 228 882 830 / **DK** +45 8988 2286 / **FI** +358 9 7479 0199 / **FR** +33 1 72 11 00 03 / **DE** +49 69 222 25285 / **GR** +30 21 1198 3182 / **IT** +39 02 3604 2884 / **NL** +31 10 713 8195 / **NO** +47 2103 4452 / **PL** +48 22 307 3690 / **PT** +351 30880 4750 / **ZA** +27 21 300 2732 / **ES** +34 91 114 2520 / **SE** +46 8 566 42573 / **TR** +90 212 375 5231/ **US + CA** +1-866-928-0789 or +1-215-207-0061 / **MX** +52-555-004-8763  
**CL** +56 2 2582 9336 / **BR** +55-800-707-7022 / **Middle East, Africa (Arabic speaking countries):** +44 1235 239 671 / **IL** +44 (0) 1235 239 670  
**AU** +61 2801 44558 / **CN** +86 532-8388-9090 / +86 10 5100 3039 / **TW** +86 10 5100 3039 / **JP** +81 345 789 341 / **NZ** +64 9929 1483 / **IN** 000 800 100 7479 / +65 3158 1198 / **KP** +82 2 3479 8401 / **MY** +60 3 6207 4347 / **PH** +63 2 231 2149 / **Asia Pacific:** +65 3158 1074

Netherlands: **+31 30 274 88 88**

Deutschland, Österreich: Notruf (24h) Deutschland: Beratungsstelle f. Vergiftungserscheinungen, Berlin, Tel. 0049 30 19240 / 0043 1 406 4343

Internet: [www.vergiftungszentrale.de](http://www.vergiftungszentrale.de)

Schweiz: Schweizerisches Toxikologisches Informationszentrum

Tel: 01 251 5151, Fax: 01 252 8833, E-Mail: [stic@access.ch](mailto:stic@access.ch), Internet: [http://toxinfo.ch/kontakt\\_de](http://toxinfo.ch/kontakt_de)

### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1 Hazard classification of substance/mixture

##### 2.1.1 Classification according to Regulation (EG) no. 1272/2008 (CLP)

The product is not classified as hazardous pursuant to the provisions set forth in EC Regulation 1272/2008 (CLP) (and subsequent amendments and supplements).

#### 2.2 Labelling elements

The product does not require labelling

##### Note on labelling:

The product may not be sold as a product requiring labeling according to EC directives or the respective national laws.

Although this product is not subject to mandatory labelling, we recommend that you read the safety advice on note.

Metals in compact form, alloys, polymer-containing mixtures and elastomer-containing mixtures

- although they are classified as hazardous according to the criteria of this Annex (Annex I GHS)

- no identification label in accordance with this Annex, if they are used in the form in which they were no danger to human health by inhalation, swallowing or skin contact and no water hazard is involved.

Rather, the supplier must provide downstream users or distributors with the information in Announce safety data sheet.

#### 2.3 Other hazards

The following must be observed during welding:

**Welding fumes:** Excessive exposure to fumes and gases can be harmful to health.

**High temperatures:** Extreme caution must be taken with melting metals, hot spatter or slag, which can cause skin injuries and can cause fires.

**Radiation:** Arc rays can be harmful to eyes and skin.

**Electric shocks:** Can be fatal. Do not touch current-carrying equipment.

**PBT assessment:** No testing required according to Annex XIII of Regulation (EC) 1907/2006 (REACH).

**vPvB assessment:** No testing required according to Annex XIII of Regulation (EC) 1907/2006 (REACH).

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### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances

Information not relevant.

#### 3.2 Mixtures

**IMPORTANT** - This section covers the hazardous materials from which this product is manufactured. This data has been prepared in accordance with the criteria of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as defined and required by the Regulation of the European Parliament and Commission (EC) No 1907/2006 and (EC) No 1272/2008. Vapours and gases generated during normal use of this product are dealt with in section

| Chem. name                    | CAS No.<br>EG No.<br>ECHA-InfoCard<br>REACH No.             | Concentration<br>Konzentration | Classification<br>Klassifikation  | H-phrase /<br>Sätze |
|-------------------------------|---|--------------------------------|---|---------------------|
| Nickel ( Ni )                 | 7440-02-0<br>231- 111-4<br>100.028.283<br>01-2119438727-29  | 1,2% - 80%                     | EU DSD/DPD: Annex VI,<br>Table 3.2: Carc. Cat. 3; R40; R43; T; R48/23<br>EU CLP: Annex VI,<br>Table 3.1: Carc. 2.; STOT<br>RE 1, ***, Skin Sens. 1,<br>OSHA HCS 2012: Carc. 2; Skin Sens. 1A;<br>Resp.Sens. 1B; STOT RE 2 (Lungs) | H351 ,H372<br>,H317 |
| Iron / ( Fe )<br>Eisen        | 7439-89-6<br>231- 096-4<br>100.028.270<br>01-21194662838-24 | 20% - 55%                      | EU DSD/DPD: Xn; R22; R53<br>EU CLP: Acute Tox. 4.; Aquatic Chronic,4<br>OSHA HCS 2012: Acute Tox. 4 (orl)   | H413, H302          |
| Copper / ( Cu )<br>Kupfer     | 7440-50-8<br>231- 159-6<br>100.028.326<br>01-2119480154-42  | 0% - 5%                        | EU DSD/DPD: Xi; R37; Repr. Cat. 3; R63<br>EU CLP: Repr. 2, H361; STOT SE 3: Resp. Irrit.,<br>OSHA HCS 2012: Repr. 2;<br>STOT SE 3: Resp. Irrit.   | H335                |
| Titanium / ( Ti )<br>Titan    | 7440-32-6<br>231-142- 3<br>100.028.311<br>01-2119484878-14  | 0% - 0,01%                     | EU DSD/DPD: Repr. Cat. 3; R63<br>EU CLP: Repr. 2,<br>OSHA HCS 2012: Repr. 2   | H361                |
| Chromium / ( Cr )<br>Chrom    | 7440-47-3<br>231-157-5<br>100.028.324<br>01-2119485652-31   | 0% -0,01%                      | EU DSD/DPD: Carc. Cat. 2; R49; R43; N; R50-53<br>EU CLP: Carc. 1B, 0; Skin Sens. 1,<br>OSHA HCS 2012: Carc. 1A; Skin Sens. 1  | H35 ,H317           |
| Aluminium ( Al )              | 7429-90-5<br>231-072-3<br>01-2119438727-29                  | 0,1% - 3,5%                    | EU DSD/DPD: F; R15-17<br>EU CLP: Water-react. 2.; Pyr. Sol. 1,<br>OSHA HCS 2012: Water-react. 2; Flam. Sol.<br>1;STOT RE 2 (Lungs, Inhl); Comb. Dust  | H261, H250          |
| Manganese / ( Mn )<br>Mangan  | 7439-96-5<br>231-105-1<br>100.028.277<br>01-2119449803-34   | 0% - 6%                        | EU DSD/DPD: T; R48/23<br>EU CLP: STOT RE 1 (CNS),<br>OSHA HCS 2012: Eye Irrit. 2; STOT RE 1 (CNS)   | H372                |
| Silicon / ( Si )<br>Silizium  | 7440-21-3<br>231-130-8<br>100.028.300<br>01-2119480401-47   | 2,5% - 5%                      | EU DSD/DPD: F; R11<br>EU CLP: Flam. Sol. 2,<br>OSHA HCS 2012: Flam. Sol. 2  | H228                |
| Carbon / ( C )<br>Kohlenstoff | 7440-44-0<br>231-153-3<br>100.028.321                       | 1% - 6%                        | -   | -                   |
| Magnesium ( Mg )              | 546-95-4<br>231-104-6<br>100.028.276<br>01-2119537203-49    | 0,1 - < 1,5%                   | Flam. Sol.:1, Water-react.:2  | H228, H261          |

You will find further information here <https://echa.europa.eu/de/information-on-chemicals>

Here you will find further leading or supplementary information

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Rev0 date: 02.02.2024

### Legend:

**N** = Not listed as human carcinogens.

**Y** = Listed as human carcinogens.

### IARC code for attestation of human carcinogenicity:

**1** = Positive; **2A** = Probable; **2B** = Possible; **3** = Not classified; **4** = Probably negative.

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

**After inhalation:** Not applicable to the product itself. In case of inhalation of welding fumes, ventilate the area. Immediately remove the patient from the contaminated area to fresh air. Call the doctor. Show the doctor this safety data sheet.

**After contact with skin:** Not applicable to the product itself. Risk of burns during the welding process.

**After contact with eyes:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Burns from radiation see doctor.

**After ingestion:** Not applicable.

### 4.2. Most important symptoms and effects, both acute and delayed

Not applicable to the product itself. Check control parameters specified in paragraph 8.1 during welding.

**Inhalation** Burning in the mouth and throat.

**Eye contact** redness and Smarting in eyes.

### 4.3. Indication of any immediate medical attention and special treatment needed

No other indication.

## SECTION 5: FIREFIGHTING MEASURES

### 5.1. Extinguishing media

**Suitable media:** Extinguish fire with: metal fire powder, dry sand, Cement or dry inert sorbent.

**Unsuitable media:** water, foam or carbon dioxide (CO2).

### 5.2. Special hazards arising from the substance or mixture

The product is non-flammable and non-combustible, no risk of material in stock.

### Special hazards arising from the mixture:

In case of fire, dangerous fumes can be formed: protect the respiratory tract.

**Risks arising from combustion:** avoid inhaling the fumes.

### 5.3 Advice for firefighters

Make sure when using that the operating area is free of flammable and / or explosive. Use personal protective equipment if necessary.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding.

### 6.2. Environmental precautions

Not applicable to the product itself. In the case of welding process, prevent the formation of dust clouds. Keep the environment clean by collecting the dust manually in order to prevent as much as possible its entry into drains, surface water or groundwater.

### 6.3. Methods and material for containment and cleaning up

Store in a dry place.

### 6.4 Reference to other sections

Please refer to sections 7 / 8 and 13.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling

MSDS Nickel based Core welding rod and wire for Cast Iron Group (DE)

The information is based on the current state of our knowledge, but does not represent any guarantee of product characteristics and do not constitute a contractual legal relationship.

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Handle in accordance with good industrial hygiene and safety practice. During welding use adequate individual protective measures. Operate in a ventilated area equipped with welding fume extractors. Do not smoke, eat or drink in areas where the product is being used.

### **7.2. Conditions for safe storage, including any incompatibilities**

No product relevant restrictions for packed material. Observe general rules for the storage of welding consumables, store in a dry place and without major temperature fluctuations.

### **7.3 Specific end use**

None.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### **8.1. Control parameters**

Read and understand the instructions and the labels on the package. Welding fumes are a variable mixture of gases and fine particles emitted into the air, which are a source of danger when inhaled or ingested. The extent of the risk depends on the composition and concentration of the vapors and the duration of exposure. The composition of the vapours depends on the material being machined, the processes and consumables used, the coatings on the workpiece (such as paint, plating or coating), and the presence of oil or residues from cleaning or degreasing. The Exposure must be systematically investigated, taking particular account of the circumstances of the worker or nearby workers who may be exposed. A recommended way to determine the composition and quantity of the vapours and gases to which workers are exposed is to take a sample of air from the welding helmet or from the breathing zone of the worker. There are no European Union (EU) specific exposure limits (OEL) for welding fumes. The lowest available 8-hour limit value (TLV) for particulate matter not otherwise regulated (PNOR) was set by Belgium at 10 mg/m<sup>3</sup> and 3 mg/m<sup>3</sup> for PNOR as an inhalable fraction. The individual complex compounds in the steam may have lower OELs than the Belgian PNOR limit. A hygiene engineer and/or the EU Member State should be consulted to determine the specific steam ingredients and their exposure limits.

The [GESTIS international database of limit values on the website http://limitvalue.ifa.dguv.de/WebForm\\_gw2.aspx](http://limitvalue.ifa.dguv.de/WebForm_gw2.aspx) can be used for international OELs for chemical reagents. European Union OELs are listed for EU countries.

As there is no specific limit values for welding operation, for information refer guideline values proposed by ACGIH (2010) for dust:

#### **Notes:**

TLV = Threshold Limit Values - American Conference of Governmental Industrial Hygienists

PEL = Permissible Exposure Limit - OSHA 29 CFR 1910.1000 C = Ceiling value

STEL = Short Term Exposure Limit - a time-weighted 15-minute exposure limit, not to be exceeded at any time during a workday.

|  | TLV-TWA<br>ppm mg/m <sup>3</sup> | TLV-STEL<br>ppm mg/m <sup>3</sup> | Value guidance<br>ppm mg/m <sup>3</sup> | Notes |
|--|----------------------------------|-----------------------------------|---|-------|
| Insoluble particles<br>Not otherwise classified<br>(PNOC)                                  |                                  |                                   |   |       |
| Inhalable particles (*1, *2)   | - -                              | - -                               | - 10                                    | (*4)  |
| Pirable particles (*1, *3)   | - -                              | - -                               | - 3                                     | (*4)  |
| *1 for particles which have not TLV apply, insoluble or poorly water-soluble, low-toxicity |                                  |                                   |   |       |
| *2 inhalable fraction  |                                  |                                   |   |       |
| *3 respirable  |                                  |                                   |   |       |
| *4 recommendation provided as a guideline rather than as TLV                               |                                  |                                   |   |       |

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| National occupational exposure limits | Ingredient             | CAS No.    | EG No.                  | Exposure limit mg/m3-ppm Eu/G NIOSH OSHA   | Short-term Exposure limit mg/m3-ppm | Remake               | Source |
|---------------------------------------|------------------------|------------|-------------------------|--|-------------------------------------|----------------------|--------|
|                                       | Cobalt                 | 7440-48-4  | 231-185-0               | 0,1  |                                     |                      | GESTIS |
|                                       | Manganese              | 7439-96-5  | 231-105-1               | -0,5<br>-1<br>-5                           |                                     | - inhalable aerosol  | GESTIS |
|                                       | Manganese              | 7439-96-5  | 231-105-1               | -0,02                                      | 0,16                                | - respirable aerosol | GESTIS |
|                                       | Manganese              | 7439-96-5  | 231-105-1               | -0,2                                       | 1,6                                 | - inhalable aerosol  | GESTIS |
|                                       |                        |            |                         |  | -                                   |                      |        |
|                                       | Aluminium – inhalable  | 7429-90-5  | 231-072-3               | -4   | -                                   | -                    | GESTIS |
|                                       | Aluminium – respirable | 7429-90-5  | 231-072-3               | -1,5                                       | -                                   | -                    | GESTIS |
|                                       | Titanium dioxide       | 13463-67-7 | 236-675-5               | -10  | -                                   | inhalable aerosol    | GESTIS |
|                                       | Titanium dioxide       | 13463-67-7 | 236-675-5               | -4   | -                                   | - respirable aerosol | GESTIS |
|                                       | Chromium               | 7440-47-3  | 231-157-5               | - 2<br>- 0,5<br>- 1,0                      | -                                   |                      | GESTIS |
|                                       | Nickel                 | 7440-02-0  | 231- 111-4              | - 0,03<br>- 0,015<br>-1,0                  | -                                   |                      | GESTIS |
|                                       | Copper                 | 7440-50-8  | 231- 159-6              | -0,02 (0,01)                               | -                                   | -                    | GESTIS |
|                                       | Tantalum               | 7440-25-7  | 231-135-5               | 1.5 dust and fume                          | 4,0 dust and fume                   |                      | GESTIS |
|                                       | Cobalt                 | 7440-48-4  | 231- 158-0              | -0,05 dust and fume<br>-0,10 dust and fume | -                                   | -                    | GESTIS |
|                                       | Tungsten               | 7440-33-7  | 231-143-9               | -10 (5 dust)<br>-15 (5)                    | -                                   | -                    | GESTIS |
| Silicon                               | 7440-21-3              | 231-130-8  | -10 (5 dust)<br>-15 (5) | -  | -                                   | GESTIS               |        |
| Carbon                                | 7440-44-0              | 231-153-3  | - 10<br>- 4             | -  | -                                   | GESTIS               |        |

**Please check the limits on the website** [https://limitvalue.ifa.dguv.de/WebForm\\_gw2.aspx](https://limitvalue.ifa.dguv.de/WebForm_gw2.aspx) **on your own responsibility for your country itself.**

### 8.2. Exposure controls

Provide adequate local ventilation. If there is a risk of dust formation, install the devices to be able to comply with the exposure limit values.

#### 8.2.1 Appropriate engineering controls

- Provide appropriate ventilation in the workplace
- Apply technical measures necessary to avoid exceeding limit values for occupational exposure
- Respect the rules of hygiene. Do not eat or drink in the workplace. Do not smoke

#### 8.2.2 Personal protective equipment

- a) Protection Eye / Face: Wear safety mask with lenses inattiniche of proper protective equipment in the welding technology used (not less than 5 DIN)
- b) Skin protection: work clothes that cover completely: apron, gaiters and gloves crust. Replace them at the first sign of wear
- c) Respiratory protection: Avoid inhalation of welding fumes. Provide an adequate intake.

#### 8.2.3 Control of environmental exposure

Avoid release to the environment. Observe all local and national rules.

#### ENVIRONMENTAL EXPOSURE CONTROLS.

The emissions generated by manufacturing processes, including those generated by ventilation equipment, should be checked to ensure compliance with environmental standards.

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### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1. Information on basic physical and chemical properties

|  |                              |
|--|------------------------------|
| appearance:                            | Solid tube with flux filling |
| Color:                                 | Metalic to Copper            |
| Odour:                                 | odourless                    |
| Odour threshold.                       | Not applicable               |
| pH value.                              | Not applicable               |
| Melting point/freezing point.          | 1500°C                       |
| Initial boiling point.                 | Not applicable.              |
| Boiling range.                         | Not applicable               |
| Flash point.                           | Not applicable               |
| Evaporation rate                       | Not applicable               |
| Flammability (solid, gaseous)          | Not applicable               |
| Lower flammability limit.              | Not applicable.              |
| Upper flammability limit.              | Not applicable               |
| Lower flammability limit.              | Not applicable               |
| Upper flammability limit.              | Not applicable               |
| Vapour pressure.                       | Not applicable               |
| Vapour density/ relative density       | Not applicable.              |
| Density.                               | Not applicable               |
| Solubility                             | Not applicable               |
| Partition coefficient: n-octanol/water | Not applicable               |
| Auto-ignition temperature.             | Not applicable               |
| Decomposition temperature.             | Not applicable.              |
| Viscosity                              | Not applicable               |
| Explosion Properties                   | Not applicable.              |
| Oxidizing properties                   | Not applicable               |

#### 9.2. Other information

|                              |         |
|------------------------------|---------|
| Solid content.               | 99,75 % |
| VOC (Directive 1999/13/EC) : | 0       |
| VOC (volatile carbon) :      | 0       |

### SECTION 10: STABILITY AND REACTIVITY

#### 10.1. Reactivity

No hazardous reactions known.

#### 10.2. Chemical stability

The product is stable in normal conditions of use and storage.

#### 10.3. Possibility of hazardous reactions

No reference to the product itself.

#### 10.4. Conditions to avoid

No reference to the product itself.

#### 10.5. Incompatible materials

Molten aluminum can react violently with water giving rise to oxides.

#### 10.6. Hazardous decomposition products

In case of fire, vapors can be harmful to health.

Welding fumes and gases. Coating of surfaces, e.g. paints/primers, oils and others. You can rely on the composition of the gases and odours to which the user is exposed.

See the respective national limit values for welding fumes and substances in welding fumes.

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### SECTION 11. TOXICOLOGICAL INFORMATION

**According to currently available data, this product has not yet produced health damages. Anyway, it must be handled according to good industrial practices.**

#### 11.1 Information on toxicological effects

Conditions to avoid: none in the form supplied.

When welding, fumes and gases generated can be dangerous to health.

|  |   |
|--|---|
| Acute toxicity   | Not applicable  |
| Irritation   | Not applicable  |
| Corrosive effects  | Not applicable  |
| Sensitisation  | Not applicable  |
| Mutagenicity   | Not applicable  |
| Carcinogenicity  | Certain chromium and nickel compounds, like Cr (VI) are suspected of being cancer-causing agents. Welding fumes are possibly carcinogenic to humans.  |
| Repeated dose toxicity   | Not applicable  |
| Reproductive toxicity  | Not applicable  |
| LD50 Oral  | iron: 30000 mg/kg ( rat )<br>Maganese: 9000 mg/kg ( rat )<br>Chromium: 19,8 mg/kg ( rat )<br>Silicon: 3160 mg/kg ( rat )<br>zinc: 0,4 mg/kg ( rat )   |
| Delayed and immediate effects as well as chronic effects from short and long-term exposure | Short-term overexposure can cause dizziness, nausea and irritation of the nose, throat or eyes. Overexposure to manganese may affect the nervous system. Certain chromium and nickel compounds, like Cr(VI) are suspected of being cancer-causing agents. |
| Toxicity in case of inhalation   | Long-term overexposure may effect the lungs.  |

### SECTION 12: ECOLOGICAL INFORMATION

#### 12.1 Toxicity

The welding process can effect the enviroment if fume is released directly into the atmosphere. Residues from welding consumables could degrade and accumulate into soils and ground water

|                           |   |
|---------------------------|---|
| Aquatic                   | Cr(VI) is suspected of being very toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.  |
| Acute fish toxicity       | LC50 Fish 96h:<br>Manganese: 2,91 mg/l<br>Chromium: 3,4 mg/l Rainbow trout<br>copper: 0,017 mg/l Rainbow trout<br>Magnesium: 1355 mg/l zinc: 1,1 mg/l Rainbow trout   |
| Acute algae toxicity      | IC50 Algae 72h:<br>iron: 0,1 mg/l<br>Manganese: 0,55 mg/l<br>Chromium: 0,001 mg/l<br>copper: 0,392 mg/l Selenastrum capricornutum (green algae)<br>Magnesium: 240 mg/l  |
| Acute crustacean toxicity | EC50 Daphnia 48h:<br>iron: 5,2 mg/l<br>Manganese: 5,2 mg/l<br>Chromium: 0,02 mg/l Daphnia pulex (Water flea)<br>copper: 0,0065 mg/l Daphnia magna (Water flea) Magnesium: 67,7 mg/l<br>zinc: 24,6 mg/l Daphnia magna (Water flea) |

#### 12.2 Persistence and degradability

Not applicable

#### 12.3 Bioaccumulation

Bioconcentration factor (BCF):

iron: 140000

Maganese: 59052

Cas 7440-48-4: 4000

# DATA SHEET

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## Nickel based solid wire for Cast Iron

Rev0 date: 02.02.2024

### 12.4 Mobility in soil

Mobility in soil: immobile

### 12.5 Results of PBT and vPvB assessment

This preparation contains no substance considered to be persistent, bio accumulating nor toxic (PBT). This preparation contains no substance considered to be very persistent nor very bio accumulating (vPvB).

### 12.6 Additional information

Information not available.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

#### **Disposal considerations**

Dispose of any product, residue or packing material according to national and local regulations.

Spent fume extraction filters shall be disposed of as dangerous waste.

Do not dispose together with domestic waste. Do not empty into drains.

#### **Waste code (EWC)**

Waste code (EWC): 12 01 13 - welding waste

The waste code (EWC) is a recommendation. In the event of non-compliant handling, the end user is personally responsible for a suitable EWC code.

## SECTION 14: TRANSPORT INFORMATION

### 14.1 UN number

Not applicable.

### 14.2 Proper shipping name in accordance to UN-standards

Not applicable.

### 14.3 Transport hazard class(es)

Not applicable.

### 14.4 Packaging group

Not applicable.

### 14.5 Environmental hazards

Not applicable.

### 14.6 Special precautions to the user

Not applicable.

### 14.7 Transport in bulk according to Annex II to MARPOL and the IBC Code

Information not relevant.

## SECTION 15: REGULATORY INFORMATION

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### **EU regulations**

The product does not need to be labelled in accordance with EC directives or respective national laws. Regulation (EC) No 1907/2006 of the European Parliament and of the Council, (REACH).

European Parliament and Council Regulation (EC) No. 1272/2008, CLP.

#### **National regulations**

EH40/2005 Workplace exposure limits

Waste Ordinance (2011:927)

Local laws and regulations should be carefully observed.

### 15.2. Chemical safety assessment

No chemical safety assessment has been processed for the mixture and the substances it contains.



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**Nickel based solid wire for Cast Iron**

Rev0 date: 02.02.2024

## SECTION 16: OTHER INFORMATION



### Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 1 of 6

#### Guidance and Recommendations for Exposure Scenarios, Risk Management Measures and to identify Operational Conditions under which metals, alloys and metallic articles and mixtures may be safely welded regarding welding fumes and gases exposure

Welding/Brazing produces fumes, which can affect human health.

Welding and allied processes generate a varying mixture of fumes (airborne particles) and gases, 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, oil or contaminants from cleaning and degreasing activities.

The amount of fumes generated is dependent on the welding process, the welding parameters, the shielding gas, the type of consumable and the potential coating on the work.

A systematic approach to the assessment of exposure is necessary, taking into account the particular circumstances for the operator and ancillary worker that can be exposed.

#### General Rules to reduce exposure to welding fumes and gases

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 document 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. Start every new work with an Occupational Safety & Health Risk Inventory.

The following principles shall be applied, unless local regulation say otherwise:

- 1. Substitution:**  
Select the applicable process/base material combinations with the lowest emission, whenever possible  
Set welding process with the lowest emission parameters (e.g. welding parameters/arc mode transfer, shielding gas composition) \*
- 2. Technological Means:**  
Apply the relevant collective protective measures (general ventilation, local exhaust ventilation) in accordance with class number.
- 3. Organizational Measures:**  
Limit the time a worker is exposed to welding fumes,  
Establish and apply Welding Procedure Specifications
- 4. Personal Protective Equipment:**  
To protect the worker, wear the relevant personal protective equipment in accordance with the duty cycle

In addition, compliance with the National Regulations regarding the exposure of welders and related personnel to welding fumes, their components with specific occupational exposure limit, and gaseous substances with specific occupational exposure limits shall be verified. It is therefore strongly recommended to seek clarification of specific national legislation that may apply.

\* In MIG / MAG process, innovative waveform controlled processes generate less welding fumes and particles than conventional processes - The use of such processes can be an additional measure to reduce the exposure of the welder and or workers

# DATA SHEET

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## Nickel based solid wire for Cast Iron

Rev0 date: 02.02.2024



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 2 of 6

### Risk Management Measures for Individual process/base material combinations

According to the welding or allied process and the base material to be welded, a general guidance on *Technological means* is proposed in the table below.

An approximate ranking to mitigate the risk of welding fumes and gases exposure is given for each welding or allied process/base material combination.

The individual process/base material combinations are ranked from the lowest emission ones (Class I) to the highest emission ones (Class VIII).

*NOTE: The International Institute of Welding (IIW) assessed the publication of IARC Monograph 118. Based on the current state of knowledge, IIW confirms its statement from 2011 on "Lung cancer and welding" and encourages all those responsible to reduce the exposure to welding fume to a minimum. It also recommends that to eliminate the excess risk of lung cancer, welders and their managers must ensure that exposure to welding fume is minimized, at least to national guidelines. This IIW statement is posted both on IIW and EWA website.*

For each class, general recommendations on Ventilation/Extraction/Filtration and Personal Protection Equipment are proposed.

| Class <sup>1</sup>                     | Process (according to ISO 4063) | Base Materials                        | Remarks  | Ventilation / Extraction / Filtration <sup>14</sup> | PPE <sup>2</sup> DC<15%       | PPE <sup>2</sup> DC>15%             |
|--|---------------------------------|---------------------------------------|--|---|-------------------------------|-------------------------------------|
| <b>Non-confined space<sup>15</sup></b> |                                 |                                       |  |   |                               |                                     |
| I                                      | GTAW 141                        | All                                   | Except Aluminum  | GV low <sup>3</sup>                                 | n.r.                          | n.r.                                |
|  | SAW 12                          |                                       |  |   |                               |                                     |
|  | Autogenous 3                    |                                       |  |   |                               |                                     |
|  | PAW 15                          |                                       |  |   |                               |                                     |
|  | ESW/EGW 72/73                   |                                       |  |   |                               |                                     |
|  | Resistance 2                    |                                       |  |   |                               |                                     |
|  | Stud welding 78                 |                                       |  |   |                               |                                     |
|  | Solid state 521                 |                                       |  |   |                               |                                     |
| Gases Brazing 9                        | All                             | Except Cd- alloys                     | GV low <sup>3</sup>  | n.r.  | n.r.                          |                                     |
| II                                     | GTAW 141                        | Aluminum                              | n.a.   | GV medium <sup>4</sup>                              | n.a.                          | FFP2 <sup>6</sup>                   |
| III                                    | MMAW 111                        | All                                   | Except Be-, V-, Mn-, Ni- alloys and Stainless <sup>6</sup>     | GV low <sup>7</sup><br>LEV low <sup>12</sup>        | Improved helmet <sup>18</sup> | FFP2 <sup>6</sup>                   |
|  | FCAW 136/137                    | All                                   | Except Stainless and Ni- alloys <sup>6</sup>                   |   |                               |                                     |
|  | GMAW 131/135                    | All                                   | Except Cu-, Be-, V- alloys <sup>6</sup>                        |   |                               |                                     |
|  | Powder Plasma Arc 152           | All                                   | Except Be-, V-, Cu-, Mn-, Ni-alloys and Stainless <sup>6</sup> |   |                               |                                     |
| IV                                     | All processes class I           | Painted / primed / oiled / galvanized | No Pb containing primer  | GV low <sup>3</sup>                                 | FFP2 <sup>6</sup>             | FFP3 <sup>6</sup> , TH2/P2, or LDH3 |
|  | All processes class III         | Painted / primed / oiled / galvanized | No Pb containing primer  | GV low <sup>7</sup><br>LEV low <sup>12</sup>        |                               |                                     |
| V                                      | MMAW 111                        | Stainless, Ni-, Be-, and V- alloys    | n.a.   | LEV high <sup>16</sup>                              | TH3/P3, LDH3 <sup>11</sup>    | TH3/P3, LDH3 <sup>11</sup>          |
|  | FCAW 136/137                    | Stainless, Mn- and Ni-alloys          |  |   |                               |                                     |
|  | GMAW 131                        | Cu-alloys                             |  |   |                               |                                     |
|  | Powder Plasma Arc 152           | Stainless, Mn-, Ni-, and Cu- alloys   |  |   |                               |                                     |

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**Nickel based solid wire for Cast Iron**

Rev0 date: 02.02.2024



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 3 of 6

| Class <sup>1</sup>                                  | Process<br>(according to ISO 4063)  | Base Materials                      | Remarks                          | Ventilation /<br>Extraction / Filtration <sup>14</sup>                     | PPE <sup>2</sup><br>DC<15%    | PPE <sup>2</sup><br>DC>15%    |
|---|-------------------------------------|-------------------------------------|----------------------------------|--|-------------------------------|-------------------------------|
| <b>Non-confined space<sup>16</sup></b>              |                                     |                                     |                                  |  |                               |                               |
| VI  | GMAW<br>131                         | Be-, and V-<br>alloys               | n.a.                             | Reduced (negative) pressured area <sup>9</sup><br>LEV low <sup>12</sup>    | TH3/P3,<br>LDH3 <sup>11</sup> | TH3/P3,<br>LDH3 <sup>11</sup> |
|   | Powder Plasma Arc<br>152            |                                     |                                  |  |                               |                               |
| VII   | Self shielded FCAW<br>114           | Un-, high<br>alloyed steel          | Cored wire, not<br>containing Ba | Reduced (negative) pressured area <sup>9</sup><br>LEV medium <sup>13</sup> | TH3/P3,<br>LDH3 <sup>11</sup> | TH3/P3,<br>LDH3 <sup>11</sup> |
|   | Self-shielded FCAW<br>114           | Un-, high<br>alloyed steel          | Cored wire,<br>containing Ba     |  |                               |                               |
|   | All                                 | Painted /<br>primed /<br>galvanized | Paint / Primer<br>containing Pb  | Reduced (negative) pressured area <sup>9</sup><br>LEV high <sup>10</sup>   |                               |                               |
|   | Arc Gouging and<br>Cutting<br>8     | All                                 | n.a.                             |  |                               |                               |
|   | Thermal Spray<br>Gases Brazing<br>9 | All                                 | n.a.                             |  |                               |                               |
| <b>Closed system or Confined space<sup>15</sup></b> |                                     |                                     |                                  |  |                               |                               |
| I   | Laser Welding<br>52                 | All                                 | Closed system                    | GV medium <sup>4</sup>   | n.a.                          | n.a.                          |
|   | Laser Cutting<br>84                 |                                     |                                  |  |                               |                               |
|   | Electron Beam<br>51                 |                                     |                                  |  |                               |                               |
| VIII  | All                                 | All                                 | Confined space                   | LEV high <sup>10</sup> External air supply                                 | LDH3 <sup>11</sup>            | LDH3 <sup>11</sup>            |

**Notes:**

- <sup>1</sup> Class: approximate ranking to mitigate risk by selecting process/material combinations with the lowest value. Identified collective and individual risk management measures shall be applied
  - <sup>2</sup> Personal Protective Equipment (PPE) required avoiding exceeding the National Exposure Limit Value (DC: Duty cycle expressed on 8 hours)
  - <sup>3</sup> General Ventilation (GV) Low. With additional Local Exhaust Ventilation (LEV) and extracted air to the outside, the GV or LEV capacity may be reduced to 1/5 of the original requirement.
  - <sup>4</sup> General Ventilation (GV) Medium (double compared to Low)
  - <sup>5</sup> Filtrating half mask (FFP2)
  - <sup>6</sup> When an alloyed consumable is used, measures from "Class V" are required
  - <sup>7</sup> General Ventilation (GV) Low. When no Local Exhaust Ventilation, the ventilation requirement is 5-fold
  - <sup>8</sup> Filtrating half mask (FFP3), helmet with powered filters (TH2/P2), or helmet with external air supply (LDH2)
  - <sup>9</sup> Reduced (negative) pressured Area: A separate, ventilated area where reduced (negative) pressure, compared to the surrounded area, is maintained
  - <sup>10</sup> Local Exhaust Ventilation (LEV) High, extraction at source (includes table, hood, arm or torch extraction)
  - <sup>11</sup> Helmet with powered filters (TH3/P3), or helmet with external air supply (LDH3)
  - <sup>12</sup> Local Exhaust Ventilation (LEV) Low, extraction at source (includes table, hood, arm or torch extraction)
  - <sup>13</sup> Local Exhaust Ventilation (LEV) Medium, extraction at source (includes table, hood, arm or torch extraction)
  - <sup>14</sup> Recommended measures to comply with national maximum allowable limits. Extracted fumes, for all materials except unalloyed steel and aluminum, shall be filtered before release in the outside environment.
  - <sup>15</sup> A confined space, despite its name, is not necessarily small. Examples of confined spaces include ship, silos, vats, utility vaults, tanks, etc.
  - <sup>16</sup> Improved helmet, designed to avoid direct flow of welding fumes inside
- n.a. Not applicable  
n.r. Not recommended

### International Standards & EU Regulations

The following ISO standards and European Union Directives address general information for risk assessments of exposure to welding fumes and gases released by welding and allied processes. In addition, national regulations and recommendations need to be consulted and applied.

# DATA SHEET

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**Nickel based solid wire for Cast Iron**

Rev0 date: 02.02.2024



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 4 of 6

|                       |   |
|-----------------------|---|
| ISO 4063:2009         | Welding and allied processes -- Nomenclature of processes and reference numbers   |
| ISO EN 21904-1:2020   | Health and safety in welding and allied processes -- Equipment for capture and separation of welding fume -- Part 1: General requirements   |
| ISO EN 21904-2:2020   | Health and safety in welding and allied processes -- Equipment for capture and separation of welding fume -- Part 2: Requirements for testing and marking of separation efficiency                                    |
| ISO EN 21904-3:2018   | Health and safety in welding and allied processes -- Requirements, testing and marking of equipment for air filtration -- Part 3: Determination of the capture efficiency of on-torch welding fume extraction devices |
| ISO EN 21904-4:2020   | Health and safety in welding and allied processes -- Equipment for capture and separation of welding fume -- Part 4: Determination of the minimum air volume flow rate of capture devices                             |
| ISO 15607:2003        | Specification and qualification of welding procedures for metallic materials -- General rules   |
| EN ISO 15609:         | Specification and qualification of welding procedures for metallic materials - Welding procedure specification part1 -> part 6  |
| ISO 17916:2016        | Safety of thermal cutting machines  |
| EN 149:2001+A1:2009   | Respiratory protective devices. Filtering half masks to protect against particles. Requirements, testing, marking   |
| EN 14594:2018         | Respiratory protective devices. Continuous flow compressed air line breathing devices. Requirements, testing and marking  |
| EN 12941:1998+A2:2008 | Respiratory protective devices. Powered filtering devices incorporating a helmet or a hood. Requirements, testing, marking  |
| EN 143:2000           | Respiratory protective devices. Particle filters. Requirements, testing, marking  |
| Directive 98/24/EC    | on the protection of the health and safety of workers from the risks related to chemical agents at work   |
| Directive 2004/37/EC  | on the protection of workers from the risks related to exposure to carcinogens or mutagens at work  |
| Directive 2017/2398   | Amending Directive 2004/37/EC on chromium VI exposure limit   |
| Directive 2017/164/EU | indicative occupational exposure limit values (for nitrogen oxides)   |
| Directive 2019/130    | Amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work  |

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**Nickel based solid wire for Cast Iron**

Rev0 date: 02.02.2024



## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 5 of 6

### Use Descriptor System according to REACH Regulation

REACH use descriptor system is a system developed by ECHA<sup>1</sup> to facilitate chemical risk assessment and supply chain communication.

Welding fumes and gases are secondary non-intentional byproducts generated during welding operations. As such, they are not considered as substances or mixtures under REACH definition. They are not intended to be used by workers or consumers.

However, occupational exposure to welding fumes and gases may represent a risk similar to the ones of the substances and mixtures regulated by REACH.

The identification of hazards, the evaluation of their risks and the putting in place of control measures to secure the health and safety can be implemented with REACH methodology. This system has been applied to welding fumes and gases.

The system firstly describes the Life Cycle Stage. The EWA welding consumable manufacturers define 2 life cycle stages: a) manufacture of the product and b) the application at an industrial site.

In addition, REACH uses five descriptors:

Sector of use (SU), [NOTE: previously listed SU3 and SU10 have been removed by ECHA<sup>1</sup>]

Process category (PROC),

Product category (PC),

Article category (AC) and

Environmental release category (ERC)

to describe identified uses.

The applicable descriptors for welding consumables are:

Manufacture of consumables:

SU14 SU15 PC7 PC38 PROC5 PROC21 PROC22 PROC23 PROC24 PROC25 ERC 2 ERC3 AC7

Industrial and Professional welding:

SU15 SU17 PC7 PC38 PROC21 PROC22 PROC23 PROC24 PROC25 ERC5 ERC8c ERC8f AC1 AC2 AC7

|        |   |
|--------|---|
| SU14   | Manufacture of basic metals, including alloys   |
| SU15   | Manufacture of fabricated metal products, except machinery and equipment                                  |
| SU17   | General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment                     |
| PC7    | Base metals and alloys  |
| PC38   | Welding and soldering products, flux products   |
| PROC5  | Mixing or blending in batch processes   |
| PROC21 | Low energy manipulation of substances bound in materials and/or articles                                  |
| PROC22 | Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting |
| PROC23 | Open processing and transfer operations with minerals/metals at elevated temperature                      |
| PROC24 | High (mechanical) energy work-up of substances bound in materials and/or articles                         |
| PROC25 | Other hot work operations with metals   |
| ERC2   | Formulation of preparations   |
| ERC3   | Formulation into solid matrix   |
| ERC5   | Industrial use resulting in inclusion into or onto a matrix   |
| AC1    | Vehicles  |
| AC2    | Machinery, mechanical appliances, electrical/electronic articles  |
| AC7    | Metal articles  |

<sup>1</sup> Guidance on Information Requirements and Chemical Safety Assessment, Chapter R.12: Use description, Version 3.0 December 2015 ([https://echa.europa.eu/documents/10162/13632/information\\_requirements\\_r12\\_en.pdf](https://echa.europa.eu/documents/10162/13632/information_requirements_r12_en.pdf))

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**Nickel based solid wire for Cast Iron**

Rev0 date: 02.02.2024

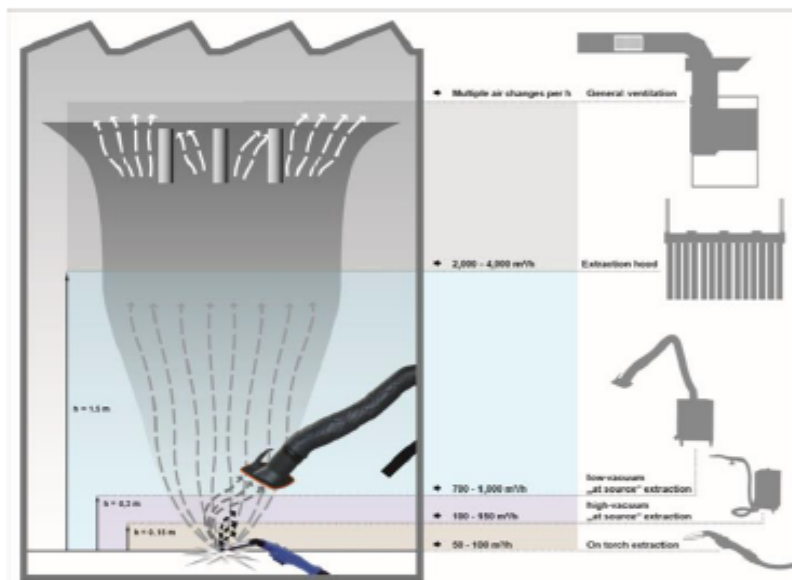


## Welding Exposure Scenario WES - ENGL

Doc -5-2021

Page 6 of 6

### Annex: Illustration of welding fume extraction systems (optional)



Note: Illustration of welding fume extraction systems is only an example. Compliance, with national country legislation, is needed if different

*This document has been prepared by the members of EWA technical committees. These members are working for different European producers of welding equipment and welding consumables ( which are members of EWA). All EWA technical information documents are based on EWA members' experience and technical knowledge at the time of publication. Such technical information documents provide voluntary guidance and are not binding.*

*EWA hereby disclaims any liability that may arise from the use of such technical information documents, including, but not limited to, non-performance, mis-interpretation, and improper use of the technical information".*

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## Nickel based solid wire for Cast Iron

Rev0 date: 02.02.2024

### References to key literature and data sources

Regulation (EC) No 1907/2006 of the European Parliament and of the Council, (REACH).  
 Regulation (EC) No 1272/2008 of the European Parliament and of the Council.  
 Regulation (EU) 2020/878 of the European Parliament and of the Council.  
 EH40/2005 Workplace exposure limits  
 Waste Ordinance (2011:927)  
 www.prevent.se  
 C&L Inventory database

### Phrase meaning

Acute Tox. 3 - oral - Acute toxicity, oral, hazard category 3  
 Acute Tox. 4 - inhalation - Acute toxicity, inhalation, hazard category 4  
 Aquatic Chronic 1 - Hazardous to the aquatic environment — Chronic hazard category 1  
 Eye Irrit. 2 - Eye irritation, hazard category 2  
 Pyr. Sol. 1 - Pyrophoric solids, hazard category 1  
 Skin Irrit. 2 - Skin irritation, hazard category 2

### Hazard statements General:

#### H-Phrase.

| 2xx: Physical hazards |   | 3xx: Health hazards |   | 4xx: Environmental |                            |
|-----------------------|---|---------------------|---|--------------------|----------------------------|
| 20x                   | Explosion hazard  | 30x                 | Acute toxicity by ingestion                             | 40x                | Acute aquatic toxicity     |
| 21x                   |   | 31x                 | Acute toxicity by skin contact,                         | 41x                | Chronic aquatic toxicity   |
| 22x                   | Flammability  | 32x                 | irritation, burns                                       | 42x                | Hazards to the ozone layer |
| 23x                   | Explosion hazard in the absence of air                  | 33x                 | Acute toxicity, irritation, sensitization by inhalation |                    |                            |
| 24x                   | Explosion hazard when heated                            | 34x                 | Mutagenicity  |                    |                            |
| 25x                   | Spontaneous ignitability                                | 35x                 | Carcinogenicity   |                    |                            |
| 26x                   | Reaction with water liberating flammable gases          | 36x                 | Reproductive toxicity                                   |                    |                            |
| 27x                   | Oxidizing agent   | 37x                 | Specific organ toxicity                                 |                    |                            |
| 28x                   | Deep freezing gases, gases and chemicals under pressure |                     |   |                    |                            |
| 29x                   | Corrosion hazard to metals                              |                     |   |                    |                            |

#### P-Phrase

| Reihe | Designation           |
|-------|-----------------------|
| 1xx   | General               |
| 2xx   | Prevention            |
| 3xx   | Reaction to accidents |
| 4xx   | Storage               |
| 5xx   | Disposal              |

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## Nickel based solid wire for Cast Iron

Rev0 date: 02.02.2024



### Hazard statements •

- H228 - Flammable solid.
- H250 - Catches fire spontaneously if exposed to air.
- H290 - May be corrosive to metals.
- H301 - Toxic if swallowed
- H302 - Harmful if swallowed
- H311 - Toxic in contact with skin
- H314 - Causes severe skin burns and eye damage
- H317 - May cause an allergic skin reaction
- H318 - Causes serious eye damage
- H319 - Causes serious eye irritation
- H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H335 - May cause respiratory irritation
- H341 - Suspected of causing genetic defects
- H350 - May cause cancer.
- H361(d/f) - Suspected of damaging the unborn child.
- H372 - Causes damage to organs through prolonged or repeated exposure.
- H373 - May cause damage to organs through prolonged or repeated exposure.
- H402 - Harmful to aquatic life

### Precautionary statements

#### Prevention •

- P201 - Obtain special instructions before use.
- P202 - Do not handle until all safety precautions have been read and understood.
- P260 - Do not breathe dust.
- P264 - Wash thoroughly after handling.
- P270 - Do not eat, drink or smoke when using this product.
- P271 - Use only outdoors or in a well-ventilated area.
- P281 - Use personal protective equipment as required.
- P285 - In case of inadequate ventilation, wear respiratory protection.

#### Response •

- P304+P341 - IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P342+P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
- P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
- P321 - Specific treatment, see supplemental first aid information.
- P363 - Wash contaminated clothing before reuse.
- P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
- P308+P313 - IF exposed or concerned: Get medical advice/attention.

#### Storage/Disposal •

- P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
- P402 -
- P405 - Store locked up.
- P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.



## DATA SHEET

This Safety Data Sheet (SDS) is intended for and can be used for welding & brazing consumables and related products. The requirements for the content and format of a safety data sheet are currently laid down in Regulation (EU) 2020/878 and have been taken into account. Furthermore, Regulation (EC) No. 1907/2006 (REACH) and Regulation (EC) No. 1272/2008 (CLP) have also been taken into account. The REACH and CLP regulations must be consulted for specific requirements. This Safety Data Sheet complies with the requirements of ISO 11014-1.

### Nickel based solid wire for Cast Iron

Rev0 date: 02.02.2024

#### LEGEND:

- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- CAS NUMBER: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE NUMBER: Identifier in ESIS (European archive of existing substances)
- CLP: EC Regulation 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX NUMBER: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as REACH Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: EC Regulation 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA STEL: Short-term exposure limit
- TWA: Time-weighted average exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation
- WGK: Water hazard classes (German).

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### GENERAL BIBLIOGRAPHY

1. Directive 1999/45/EC and following amendments
2. Directive 67/548/EEC and following amendments and adjustments
3. Regulation (EU) 1907/2006 (REACH) of the European Parliament
4. Regulation (EU) 1272/2008 (CLP) of the European Parliament
5. Regulation (EU) 790/2009 (I Atp. CLP) of the European Parliament
6. Regulation (EU) 453/2010 of the European Parliament
7. Regulation (EU) 286/2011 (II Atp. CLP) of the European Parliament
8. Regulation (EU) 618/2012 (III Atp. CLP) of the European Parliament
9. Regulation (EU) 487/2013 (IV Atp. CLP) of the European Parliament
10. Regulation (EU) 944/2013 (V Atp. CLP) of the European Parliament
11. Regulation (EU) 605/2014 (VI Atp. CLP) of the European Parliament

- The Merck Index. - 10th Edition
- Handling Chemical Safety
- Niosh - Registry of Toxic Effects of Chemical Substances
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- ECHA website

- [https://ec.europa.eu/taxation\\_customs/dds2/SAMANCTA/DE/Safety/HP\\_DE.htm](https://ec.europa.eu/taxation_customs/dds2/SAMANCTA/DE/Safety/HP_DE.htm)
- <https://www.msds-europe.com/h-statements/>
- <http://www.reach-compliance.ch/>
- <https://echa.europa.eu/de/information-on-chemicals>

### Note for users:

The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product. This document must not be regarded as a guarantee on any specific product property. The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses. Provide appointed staff with adequate training on how to use chemical products.

### Changes to previous review:

The following sections were modified:

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*(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)*

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