

1. **PRODUCT AND COMPANY IDENTIFICATION: PRODUCT NAME: Ni-based solid wire electrodes for arc welding:** C-276/ERNiCrMo-4, HAS C-22/ERNiCrMo-10, HAS X/ERNiCrMo-2, HAS W/ERNiMo-3; NA 60/ERNiCu-7, NA 61/ERNi-1, NA 62/ERNiCrFe-5, NA 65/ERNiFeCr-1; NA 67/ERCuNi, NA 82/ERNiCr-3, NA 617/ERNiCrMo-1, NA 625/ERNiCrMo-3, NA 718/ERNiFeCr-2, Ni55/ERNiFe-CI, NI 99/ERNiCI

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## 2. HAZARD IDENTIFICATION:

**Emergency Overview:** This product is normally not considered hazardous as shipped. Avoid eye contact or inhalation of dust from the product. When this product is used in a welding process, the most important hazards are welding fumes, heat, radiation and electric shock.

### Classification of the Substance/Mixture

**CLP/GHS Classification (1272/2008):**

Skin Irritation, Category 2

Eye Damage, Category 1

Carcinogenicity, Category 2

Specific Target Organ Toxicity (Repeated Exposure), Category 2

**EU Classification (67/548/EEC):**

Corrosive (C), Harmful (Xn), Irritant (Xi), Carcinogen Category 3, R34, R40, R48, R37

**Labelling:**

**Symbols:** 

**Signal Word:** Danger

**Hazard Statements:**

H315 – Causes skin irritation.

H318 – Causes serious eye damage.

H351 – Suspected of causing cancer.

H373 – May cause damage to lungs, eyes, brain & central nervous system through prolonged or repeated exposure.

**Precautionary Statements:**

P201 – Obtain special instruction before use.

P202 – Do not handle until all safety precautions have been read and understood.

P260 – Do not breathe dust/fume/gas/mist/vapours/spray.

P264 – Wash skin and hair thoroughly after handling.

P280 – Wear protective gloves/eye protection/face protection.

P281 – Use personal protective equipment as required.

P302+P352 – IF ON SKIN: Wash with plenty of soap and water.

P305+P351+P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313 – If exposed or concerned: Get medical advice/attention.

P310 – Immediately call a POISON CENTER or doctor/physician.

P314 – Get medical advice/attention if you feel unwell.

P332+P313 – IF skin irritation occurs: Get medical advice/attention.

P362 – Take off contaminated clothing and wash before reuse.

P405 – Store locked up.

P501 – Dispose of contents/container in accordance with local/regional/national/international regulations.

### 3. COMPOSITION / INFORMATION ON INGREDIENTS:

**Important** This section covers the materials of which the products manufactured. The fumes and gases produced during normal use of this product are covered in section 10. The term "Hazardous" in "Hazardous Material" should be interpreted as a term required and defined in OSHA Hazard Communication Standard 29CFR 1910-1200 and it does not necessarily imply the existence of hazard. The chemicals or compounds reportable by Section 313 of SARA are marked by the symbol #.

**Composition:** Chemical composition information is shown below for the solid wire electrodes. For the covered and cored electrodes, chemical composition data is given as a maximum weight percentage of the composite electrode, which includes fluxing ingredients. These fluxing ingredients typically consist of manganese, silicon, titanium, aluminum and/or zirconium oxides, as well as certain fluoride, carbonate and silicate compounds.

#### *Solid Wire Electrodes for Arc Welding*

Product	Ni	Cr	Mo	Fe	Mn <sup>1</sup>	Si <sup>1</sup>	C	Nb	Ti <sup>1</sup>	Cu	Co	W	Al	Fluoride	Carbonate <sup>2</sup>	Silicate <sup>3</sup>
C-276	Bal	16.5	14.5	6.0			0.02				2.5	4.5				
NA 82	Bal	22.0		3.0	3.5		0.10	3.0								
NA 92	Bal	17.0		8.0	2.7		0.08	3.5								
C-22	Bal	22.5	14.5	6.0			0.015				2.5	4.5				
NA 62	70.0	>14.0		>6.0	1.0	.35	.08	>1.5								
NA 65	Bal	13		11.0	3.5	.75	.08	1.5		.5						
NA 617	Bal	24.0	10.0	3.0	1.0	1.0	0.15				15.0		1.5			
NA 625	Bal	23.0	10.0	5.0			0.10	4.2								
NA 67	32.0			1.0						Bal						
NA 60	69.0	0.15		2.5	4.0		0.15		2.3	Bal						
NA 61	Bal			1.0	1.0		0.15		3.5		2.5	1.0	1.5			
NA 718	50		2.8-3.3	Bal	.35	.35	.08	>4.75		.30	1.0					
HAS W	Bal	>2.5	>23.0	>4.0	1.0	1.0	.1			.50		1.0				
HAS X	Bal	>20.3	>8.0	>17	1.0	1.0	0.45			.50	>.5	>.2				
Ni55	Bal			44.5	1.0		0.50									
Ni99	Bal						0.15									

(1) Total for this element and compounds, which are generally characterized as oxides.

(2) Carbonate compounds consist of calcium carbonate and magnesium carbonate

(3) Silicate compounds consist of sodium and potassium silicates

### 4. FIRST AID MEASURES:

**Inhalation:** Remove to fresh air immediately or administer oxygen. Get medical attention immediately.

**Skin:** Flush skin with large amounts of water. If irritation develops and persists, get medical attention.

**Eye:** Flush eyes with water for at least 15 minutes. Get medical attention.

**Ingestion:** Obtain medical attention immediately if ingested. Rinse mouth.

**Electric Shock:** Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. Immediately contact a physician.

### 5. FIRE-FIGHTING MEASURES:

**Suitable Extinguishing Media:** Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning material

and fire situation.

**Unsuitable Extinguishing Media:** Do not use water on molten metal. Large fires may be flooded with water from a distance.

**Specific Hazards Arising From Chemical:** Keep away from heat/spark/open flames/hot surfaces – No smoking.

Iron oxides, Manganese/manganese oxides, Sodium oxides, Silicon oxides

**Protective Equipment:** Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

## 6. ACCIDENTAL RELEASE MEASURES:

**Personal Precautions:** Refer to section 8.

**Environment Precautions:** Refer to section 13.

**Cleaning Measures:** Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

## 7. HANDLING AND STORAGE:

**Precautions for Safe Handling:** Handle with care to avoid stings or cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

**Conditions for Safe Storage:** Store in dry place in closed packages. Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions. Ground/Bond container and receiving equipment.

## 8. EXPOSURE CONTROLS/ PERSONAL PROTECTION:

**Engineering Controls:** Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust. Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep work place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

**Exposure limits:** Use industrial hygiene equipment to ensure that exposure does not exceed applicable national exposure limits. The limits defined under section 3 can be used as guidance. Unless noted, all values are for 8 hour time weighted average. For information about welding fume analysis refer to section 10.

**Biological limits:** No available data

**Personal protection:**

**Respiratory protection:** Use an air purifying dust respirator when welding or brazing in a confined space, or when local exhaust or ventilation is not sufficient to keep exposure values within safe limits.

**Hands protection:** Wear appropriate gloves to prevent skin contact.

**EN 12477: Protection gloves for welders**

Requirements (EN Levels)	Type A	Type B
Abrasion (Cycles)	2 (500)	1 (100)
Cut (Factor)	1 (1.2)	1 (1.2)
Tear (Newton)	2 (25)	1 (10)
Puncture (Newton)	2 (60)	1 (20)
Burning Behavior	3	2
Contact Heat	1	1
Convective Heat	2	-
Small Splashes	3	2
Dexterity	1 (11)	4 (6.5)

Type B gloves are recommended when high dexterity is required as for TIG welding, while type A gloves are recommended for other welding processes. The contact temp (°C) is 100 and the threshold time (seconds) >15.

**Eyes protection:** Welder's helmet or face shield with colour absorbing lenses. Shield and filter to provide protection from harmful UV radiation, infra red and molten metal approved to standard EN379. Filter shade to be a minimum of

shade **Skin protection:** Heat-resistant protective clothing. Wear safety boots, apron, arm and shoulder protection.

Keep protective clothing clean and dry. Clothing should be selected to suit the level, duration and purpose of the welding activity.

Class 1	
Impact of Spatter	15 Drops
Heat Transfer (radiation)	RHTI 24 $\geq$ 7 seconds
Process	Manual welding with light formation of spatter and drops <ul style="list-style-type: none"> <li>• Gas Welding</li> <li>• TIG Welding</li> <li>• MIG Welding</li> <li>• Micro plasma welding</li> <li>• Brazing</li> <li>• Spot Welding</li> <li>• MMA Welding (with rutile-covered electrode)</li> </ul>
Environmental Conditions	Operation of machines <ul style="list-style-type: none"> <li>• Oxygen cutting machines</li> <li>• Plasma cutting machines</li> <li>• Resistance welding machines</li> <li>• Machines for thermal spraying</li> <li>• Bench welding</li> </ul>

Class 2	
Impact of Spatter	25 Drops
Heat Transfer (radiation)	RHTI 24 $\geq$ 16 seconds
Process	Manual welding with heavy formation of spatter and drops <ul style="list-style-type: none"> <li>• MMA welding (with basic or cellulose-covered electrodes)</li> <li>• MAG welding (with CO<sub>2</sub> or mixed gases)</li> <li>• MIG Welding (with high current)</li> <li>• Self shielded flux core arc welding</li> <li>• Plasma cutting</li> <li>• Gouging</li> <li>• Oxygen cutting</li> <li>• Thermal spraying</li> </ul>
Environmental Conditions	Operation of machines <ul style="list-style-type: none"> <li>• In confined spaces</li> <li>• At overhead welding/cutting or in comparable constrained positions</li> </ul>

## 9. PHYSICAL AND CHEMICAL PROPERTIES:

**Appearance:** Solid or tubular wire.

**Color:** Varies

**Odor:** Odorless

**Odor Threshold:** Not Available

**pH Value:** Not Available

**Melting Point/Melting Range:** 1560 - 2000° F

**Freezing Point:** Not Available

**Boiling Point/Boiling Range:** Not Available

**Flash point:** Not Available

**Evaporation Rate:** Not Available

**Self-in flammability:** Not Available  
**Explosion limits:** Not Available  
**Vapour pressure:** Not Available  
**Vapour density:** Not Available  
**Density at 20°C:** Not Available  
**Relative density:** 0.2-0.3 lbs/in<sup>3</sup>  
**Solubility:** Insoluble in water.  
**Partition coefficient:** Not Available  
**Auto-ignition temperature:** Not Available  
**Decomposition temperature:** Not Available  
**Other Information:** No available data.

## 10. STABILITY AND REACTIVITY:

**Chemical Stability:** This product is stable under normal conditions.

**Hazardous Reactions:** Contact with chemical substances like acids or strong bases cause generation of gas.

**Conditions to Avoid:** Not applicable.

**Incompatible Materials:** Reacts with acid.

**Hazardous Decomposition Products:** When this product is used in a welding process, hazardous decomposition product would include those from volatilization, reaction or oxidation of the material listed in section 3 and those from the base metal and coating. The amount of fumes generated from this product varies with welding parameters and dimensions.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in section 3. Manganese has a low exposure limit, in some countries that may be easily exceeded. Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quality of fumes and gases produced.

## 11. TOXICOLOGICAL INFORMATION:

**Signs and Symptoms of Overexposure:** Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contaminants and processes. The Internal Agency for Research on Cancer has classified welding fumes as possible carcinogenic to humans (Group 2B).

**Acute Effects:** Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Prolonged inhalation of crystalline silica may result in silicosis, a disabling pulmonary fibrosis characterized by fibrotic changes and military nodules in the lungs, a dry cough, shortness of breath, emphysema, decreased chest expansion and increased susceptibility to tuberculosis. May cause sensitisation by skin contact.

LD/LC50 Values that are relevant for classification		
Cellulose 9004-34-6		
Oral	LD50	>5000 mg/kg (rat)
Dermal	LD50	>2000 mg/kg (rabbit)

LD/LC50 Values that are relevant for classification		
Iron Oxide 1317-61-9		
Oral	LD50	>10000 mg/kg (rat)

LD/LC50 Values that are relevant for classification		
Manganese 7439-96-5		
Oral	LD50	9000 mg/kg (rat)

LD/LC50 Values that are relevant for classification		
Titanium Dioxide 13463-67-7		
Oral	LD50	>10000 mg/kg (rat)
Dermal	LD50	>10000 mg/kg (rabbit)

LD/LC50 Values that are relevant for classification		
Iron 7439-89-6		
Oral	LD50	30000 mg/kg (rat)

LD/LC50 Values that are relevant for classification		
Calcium Carbonate 1317-65-3		
Oral	LD50	>2000 mg/kg (rat)
Inhalation	LC50	>3 mg/L/4hr. (rat)
Dermal	LD50	>2000 mg/kg (rat)

**Chronic Effects:** Overexposure to welding fumes may affect pulmonary function and eyes. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Prolonged inhalation of titanium dioxide (Classified 2B by IARC) above safe exposure limits can cause cancer. Prolonged inhalation of crystalline silica (Classified 1 by IARC and K by NTP) above safe exposure limits can cause cancer.

## 12. ECOLOGICAL INFORMATION:

**Toxicity:** Welding rods contain metals which are considered to be very toxic towards aquatic organisms. Finely divided welding rods are therefore considered harmful to aquatic organisms.

**Persistence and Degradability:** The welding rods consist of elements that can not degrade any further in the environment.

**Bio accumulative Potential:** Welding rods contain heavy metals which bio accumulates in the food chain. The following figures are the bio concentration factor (BCF) for the substances on their own.

BCF:

Iron, BCF: 140000

Manganese, BCF: 59052

**Mobility in Soil:** Welding rods are not soluble in water or soil. Particles formed by working welding rods can be transported in the air.

**Other Adverse Effects:** In massive form, welding rods present no hazards to the aquatic environment.

Welding materials could degrade into components originating from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

## 13. DISPOSAL CONSIDERATIONS:

**Product:** For product elimination, consult recycling companies or appropriate local authority.

**USA RCRA:** This product is not considered hazardous waste if discarded. Residue from welding consumables and processes could degrade and accumulate in soils and groundwater.

**Package:** May be disposed in approved landfills provided local regulations are observed.

## 14. TRANSPORT INFORMATION:

**UN-number:** Welding rods are not classified as dangerous goods for transport and has no UN number.

**UN proper shipping name:** Welding rods are not classified as dangerous goods for transport and has no UN proper shipping name.

**Transport hazard class:** Welding rods are not classified as dangerous goods for transport.

**Packing group:** There are not any special precautions with which a user should or must comply or be aware of in connection with transport or conveyance either within or outside premises.

**Environmental hazards:** Welding rods are not environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID and AND) and/or a marine pollutant to the IMDG Code.

**Special precautions for users:** There are not any special precautions which a user should or must comply or be aware of in connection with transport or conveyance either within or outside premises of the welding rod.

**Transport in Bulk According to Annex III MARPOL 73/78 and the IBC Code:** Welding rods in massive form do not subject under MARPOL 73/78 and the IBC Code. Not applicable – product is transported only in packaged form.

## 15. REGULATORY INFORMATION:

**Safety, health and environment regulations/legislation specific for the substance or mixture:** Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

**Warning:** Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation. Electric shock can kill. Arc rays and sparks can injure eyes and burn skin. Wear correct hand, head, eye and body protection.

**Chemical safety assessment:** No

USA: Under the OSHA Hazard Communication Standard, this product is considered hazardous. This product contains or produces a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.) United States EPA Toxic Substance Control Act: All constituents of this product are on the TSCA inventory list or are excluded from listing.

### EPCRA/SARA Title III Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA reporting. See Section 3 for weight percentage.

Section 313 Hazardous Chemicals:

Aluminum, Aluminum Oxide, Barium and Barium Compounds, Chromium, Copper, Lithium Carbonate, Manganese, Nickel, Silicon & Silica, Iron & Iron Oxide, Magnesium, Zirconium and Vanadium.

Superfund Amendments and Reauthorization Act of 1986 (SARA): Hazard categories – Acute (Immediate) and Chronic (Delayed)

Toxic Substances Control Act (TSCA) Inventory:

Iron – Listed  
Silicon – Listed

### U.S. State Laws:

California Proposition 65:

Titanium Dioxide – Carcinogenic  
Silica (Quartz) - Carcinogenic

**Warning:** These products contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm

New Jersey Community Worker and Right-to-Know Act

Titanium Dioxide – Listed  
Manganese – Listed

Massachusetts Right-to-Know Act Substance List

Titanium Dioxide – Listed  
Manganese – Listed  
Silica (Quartz) – Listed

Pennsylvania Right-to-Know Act Hazardous Substances List

- Titanium Dioxide – Listed
- Manganese – Listed

Rhode Island Right-to-Know Act Substance List

- Manganese – Listed

Minnesota Right-to-Know Act Hazardous Substances List

- Titanium Dioxide – Listed
- Manganese – Listed
- Silica (Quartz) – Listed

**Canadian Regulations:**

This product is classified according to the requirements of the Canadian Controlled Products Regulations Section 33, and this SDS contains all required information

**16. OTHER INFORMATION:**

**DISCLAIMER:** Users should take all standard and reasonable precautions when using this product for its intended use. The manufacturer does not recommend this product for any uses other than that described. The manufacturer makes no claims and provides no warranty for non-standard use.

<b>NFPA 704:</b>	<b>HEALTH:</b>	<b>2</b>	<b>FLAMMABILITY:</b>	<b>0</b>	<b>REACTIVITY:</b>	<b>0</b>
<b>HMIS:</b>	<b>HEALTH:</b>	<b>2</b>	<b>FLAMMABILITY:</b>	<b>0</b>	<b>PHYSICAL HAZARD:</b>	<b>0</b>

**SDS Revisions**

Preparation date:	5/12/2015	Revision date:	--	Revision number:	0
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