SECTION – 1 IDENTIFICATION

Product Identifier
Trade Name: ·: Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding
Product Number:
Specification: A5.11
Classification: ENi-1, ENiCrCoMo-1, ENiCrFe-2, ENiCrFe-3, ENiCrMo-10, ENiCrMo-13, ENiCrMo-3, ENiCrMo-4, ENiCu-7 Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding
Relevant identified uses of the substance or mixture and uses advised against:
For professional use only. Use according to manufacturer's specification.
Product Description: Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding
Application of the substance/the mixture : Industry specific application.
Details of the Supplier of the Safety Data Sheet:
Manufacturer/Supplier:
ROYALE WELDWELL PVT LTD
No.02, Uthiramerur Road, Malaipalayam Post, Maduranthagam, Chengelpet, Dist. Tamilnadu-603303 (INDIA)
Telephone:+91-9840441459
2Hazard(s)Identification
Emergency telephone number: +91-9840441459

SECTION – 2 HAZARD(S) IDENTIFICATION

· Classification of the substance or mixture:

Health hazard

Resp. Sens. 1 **H334** May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Carc.1A **H350** May cause cancer.
STOT RE 1 **H372** Causes damage to the lung through prolonged or repeated exposure. Route of exposure: Inhalation

Corrosion

EyeDam.1 **H318** Causes serious eye damage

Skin Irrit. 2 **H315 Causes skin irritation.**
Skin Sens. 1 **H317 May cause an allergic skin reaction.**
STOT SE 3 **H335 May cause respiratory irritation.**

·Label elements:
Hazard pictograms:

TRADE NAME: NICKEL AND NICKEL-ALLOY WELDING ELECTRODES FOR SHIELDED METAL ARC WELDING

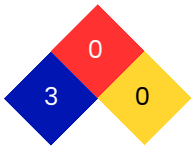
Signal word: Danger

Hazard-determining components of labelling:
Nickel, Potassium Silicate, Cobalt, Copper Titanium

· Hazard statements:
H315 Causes skin irritation.
H318 Causes serious eye damage**.**
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H350 May cause cancer.
H335 May cause respiratory irritation.
H372 Causes damage to the lung through prolonged or repeated exposure. Route of exposure: Inhalation.

· **Precautionary statements:**
P201: Obtain special instructions 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 thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P272 : Contaminated work clothing must not be allowed out of the workplace.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352: If on skin: Wash with plenty of water.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
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.
P312: Call a poison centre/doctor if you feel unwell.
P321: Specific treatment(see supplementary first aid instructions on this Safety Data Sheet).
P362+P364 Take off contaminated clothing and wash it before reuse.
P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.
P501:Dispose of contents/container in accordance with local/regional/national/international regulations
.

Unknown acute toxicity:
This value refersto knowledge of known, established toxicological or ecotoxicological values. 54 % of the mixture consists of component(s) of unknown toxicity.
· Classification system: NFPA/HMIS Definitions: 0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme
· NFPA ratings (scale0 - 4)



Health= 3
Fire = 0
Reactivity = 0

HMIS-ratings (scale 0 - 4)

Health= *3
Fire = 0
Physical Hazard= 0

Hazard(s) not otherwise classified (HNOC): None known

TRADE NAME: NICKEL AND NICKEL-ALLOY WELDING ELECTRODES FOR SHIELDED METAL ARC WELDING

SECTION –3 COMPOSITION/INFORMATION ON INGREDIENTS

·Chemical characterization: Mixtures

· Description: Mixture of substances listed below with non-hazardous additions.

Dangerous Components:

CAS: 7440-50-8 RTECS: GL 5325000	Copper Flam. Sol.1, H228; STOT SE 3, H335;Aquatic Acute 3, H402; Aquatic Chronic 4, H413	0-38%
CAS: 7440-02-0	Nickel Carc. 2, H351;STOT RE 1, H372; Skin Sens. 1, H317	30-70%
CAS: 7440-47-3 RTECS: GB 4200000	Chromium	0-40%
CAS: 7439-98-7 RTECS: QA 4680000	Molybdenum	0-16.5%
CAS: 7439-89-6 RTECS: NO 4565500	Iron Flam. Sol.2, H228; Skin Irrit.2, H315; STOT SE 3, H335; EyeIrrit. 2B, H320; Combustible Dust	0.5-12%
CAS: 7440-48-4 RTECS: GF 8750000	Cobalt Resp. Sens. 1, H334;Carc. 2, H351; Skin Sens.1, H317; AquaticChronic 4, H413;Combustible Dust	0-13%
CAS: 13463-67-7	Titanium Dioxide Carc. 2, H351	0-13%
CAS: 471-34-1 RTECS: EV 9580000	Calcium Carbonate	5-15%
CAS: 7439-96-5 RTECS: OO 9275000	Manganese Pyr. Sol. 1, H250; Water-react. 1, H260	0.5-10%
CAS: 1312-76-1	Potassium Silicate Eye Dam. 1, H318; Skin Irrit. 2, H315; STOTSE 3, H335	2-8%
CAS: 7429-90-5 RTECS: BD 0330000	Aluminium Flam. Sol. 2, H228	0-5%
CAS: 7440-03-1RTECS: QT9900000	Niobium Flam. Sol. 1, H228; Combustible Dust	0-5%
CAS: 7440-32-6 RTECS: XR 1700000	Titanium Skin Irrit. 2, H315; SkinSens. 1, H317;Eye Irrit. 2B,H320	0-4%
CAS: 7440-33-7 RTECS: YO 7175000	Tungsten Flam. Sol.1, H228; Acute Tox.4, H302; AcuteTox. 4, H312;Skin Irrit. 2,H315; Eye Irrit.2A, H319	0-3.5%
CAS: 1313-59-3	Sodium oxide Ox. Sol. 1, H271; Skin Corr. 1C, H314	0-1%
CAS: 7440-21-3	Silicon Flam. Sol.2, H228; Acute Tox.4, H302; Eye Irrit. 2B,H320; Combustible Dust	0-1.5%
CAS: 12136-45-7	Dipotassium Oxide Water-react. 3, H261; Skin Corr. 1A,H314; Eye Dam.1, H318	0-1%
CAS: 12136-45-7	Quartz (SiO2) Carc. 1A, H350; STOTRE 1, H372; Acute Tox.4, H332; STOT SE 3, H335; Eye Irrit. 2B, H320	0-1%
CAS: 1302-78-9 RTECS: CT9450000	Bentonite	0.1%
CAS: 9005-38-3	Sodium alginate	0.1%

TRADE NAME: NICKEL AND NICKEL-ALLOY WELDING ELECTRODES FOR SHIELDED METAL ARC WELDING

· Additional information:
The exact percentages of the ingredients of this mixture are considered to be proprietary and are withheldin accordance with the provisions of paragraph (i) of §1910.1200 of 29 CFR 1910.1200 Trade Secrets.
Note: Certain chemical constituents listed in Section 3 may vary depending upon the Classification of the Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding products.

SECTION –4 FIRST-AID MEASURES

·**Description of first aid measures**
· General information:
Symptoms of poisoning may occur after exposure to dust, fumes or particulates; seek medical attention if feeling unwell.
· **After inhalation:** In case of unconsciousness place patient stably in the side position for transportation
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly. If skin irritation occurs, consult a doctor.
· **After eye contact:** Do NOT rub eyes. Immediately rinse opened eye(s) for at least 15 minutes under running water, lifting upper and lower lids occasionally. If symptoms persist, consult a physician.
If easy to do so, remove contact lenses if worn.
· **After swallowing:** Rinse out mouth and then drink plenty of water. Do not induce vomiting without medical advice. If swallowed and symptoms occur ,consult a doctor.
· **Information for doctor**
· Quartz: Can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death; inhaled from occupational sources is classified as carcinogenic to humans. Some studies show in workers exposed to respirable quartz excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease, chronic bronchitis and emphysema.
Indication of any immediate medical attention and special treatment needed:
No further relevant information available.

SECTION –5 FIRE-FIGHTING MEASURES

·**Extinguishing media**
· Suitable extinguishing agents: Use firefighting measures that suit the environment.
· For safety reasons unsuitable extinguishing agents: No further relevant information.
· **Special hazards arising from the substance or mixture:**
Amorphous or crystalline silicon both react exothermically when heated with alkali-metal carbonates attaining incandescence and evolving carbon monoxide.
Material in powder form, capable of creating a dust explosion. Mixture of silicon, aluminium, and lead oxide explodes when heated.
If incinerated, product will release the following toxic fumes: Oxides of iron, chromium, copper, manganese, molybdenum, nickel, silicon, titanium, niobium, cobalt, tungsten, aluminium, carbon, calcium, potassium, sodium, and fluorides and ozone.
Advice for firefighters
· Special protective equipment for firefighters:
As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear to prevent contact with skin and eyes.
· Additional information:
These items are not reactive, flammable, or explosive and essentially not hazardous at ambient temperatures. Welding arcs and sparks can ignite combustibles and flammable products. If involved in a fire, these products may generate irritating aluminium fumes and a variety of metal oxides. Emergency responders must wear personal protection equipment suitable for the situation. Use the extinguishing media recommended for the burning materials and fire situation. See ANSI Z49.1 “Safety in Welding and Cutting” and “Safe Practices” Code: SP, published by the American Welding Society

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SECTION –6 ACCIDENTAL RELEASE MEASURES

· **Personal precautions, protective equipment and emergency procedures:**
Ensure adequate ventilation.
Avoid contact with skin, eyes and clothing.
Wear protective equipment. Keep unprotected persons away
·**Environmental precautions:** Do not allow to enter sewers/surface or ground water.
· **Methods and material for containment and cleaning up:**
Pick up mechanically.
Absorb with liquid-binding material (i.e. sand, diatomite, acid binders, universal binders, sawdust)
Dispose contaminated material as waste according to section 13.
Ensure adequate ventilation.
Dispose of the collected material according to regulations.
Flammable solid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources.
· **Reference to other sections:**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section13 for disposal information.
Protective Action Criteria for Chemicals

PAC-1:		
7440-50-8	Copper	3 mg/m³
7440-02-0	Nickel	4.5 mg/m³
7440-47-3	Chromium	1.5 mg/m³
7439-98-7	Molybdenum	30 mg/m³
7439-89-6	Iron	3.2 mg/m³
7440-48-4	Cobalt	0.18 mg/m³
13463-67-7	Titanium Dioxide	30 mg/m³
471-34-1	Calcium Carbonate	45 mg/m³
7439-96-5	Manganese	3 mg/m³
1312-76-1	Potassium Silicate	30 mg/m³
7440-03-1	Niobium	30 mg/m³
7440-32-6	Titanium	30 mg/m³
7440-33-7	Tungsten	10 mg/m³
1313-59-3	Sodium oxide	0.5 mg/m³
7440-21-3	Silicon	45 mg/m³
12136-45-7	Dipotassium Oxide	0.18 mg/m³
14808-60-7	Quartz (SiO2)	0.075 mg/m³

PAC-2:		
7440-50-8	Copper	33 mg/m³
7440-02-0	Nickel	50 mg/m³
7440-47-3	Chromium	17 mg/m³
7439-98-7	Molybdenum	330 mg/m³

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7439-89-6	Iron	35 mg/m³
7440-48-4	Cobalt	2 mg/m³
13463-67-7	Titanium Dioxide	330 mg/m³
471-34-1	Calcium Carbonate	210 mg/m³
7439-96-5	Manganese	5 mg/m³
1312-76-1	Potassium Silicate	330 mg/m³
7440-03-1	Niobium	330 mg/m³
7440-32-6	Titanium	330 mg/m³
7440-33-7	Tungsten	330 mg/m³
1313-59-3	Sodium oxide	5 mg/m³
7440-21-3	Silicon	100 mg/m³
12136-45-7	Dipotassium Oxide	2 mg/m³
14808-60-7	Quartz (SiO2)	33 mg/m³

PAC-3:		
7440-50-8	Copper	200 mg/m³
7440-02-0	Nickel	99 mg/m³
7440-47-3	Chromium	99 mg/m³
7439-98-7	Molybdenum	2,000 mg/m³
7439-89-6	Iron	150 mg/m³
7440-48-4	Cobalt	20 mg/m³
13463-67-7	Titanium Dioxide	2,000 mg/m³
471-34-1	Calcium Carbonate	1,300 mg/m³
7439-96-5	Manganese	1,800 mg/m³
1312-76-1	Potassium Silicate	2,000 mg/m³
7440-03-1	Niobium	2,000 mg/m³
7440-32-6	Titanium	2,000 mg/m³
7440-33-7	Tungsten	2,000 mg/m³
1313-59-3	Sodium oxide	50 mg/m³
7440-21-3	Silicon	630 mg/m³
12136-45-7	Dipotassium Oxide	54 mg/m³
14808-60-7	Quartz (SiO2)	200 mg/m³

SECTION –7 HANDLING AND STORAGE

Precautions for safe handling:

Open and handle receptacle with care. Ensure good ventilation/exhaustion at the workplace. Prevent formation of aerosols.

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Information about protection against explosions and fires: Keep protective respiratory device available.
Conditions for safe storage, including any incompatibilities Store away from strong acids, strong bases, strong oxidizing agents and strong reducing agents.
Storage Requirements to be met by storerooms and receptacles: Store in the original container.
Information about storage in one common storage facility: Not required.
Further information about storage conditions: Keep receptacle tightly sealed.
Specific end use(s): No further relevant information available.

SECTION –8 EXPOSURE CONTROLS/PERSONAL PROTECTION

· Additional information about design of technical systems: No further data; see section 7.
· **Control parameters:**
All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use local exhaust at filling zones and where leakage and dust formation is probable. Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure Limits in Air below TLV & PEL limits.
· **Components with occupational exposure limits:**
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.
At this time, the other constituents have no known exposure limits

7440-50-8 Copper

PEL	Long-term value: 1* 0.1** mg/m³ as Cu *dusts and mists **fume
REL	Long-term value: 1* 0.1** mg/m³ as Cu *dusts and mists **fume
TLV	Long-term value:1* 0.2** mg/m³ *dusts and mists;**fume; as Cu

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

7440-47-3 Chromium

PEL	7440-47-3 Chromium
REL	Long-term value:0.5* mg/m³ *metal+inorg.compds.as Cr;See Pocket Guide App. C
TLV	Long-term value: 0.003* 0.5** mg/m³ inh. fraction, *as Cr(III),**metal

7439-98-7 Molybdenum

PEL	Long-term value: 15* mg/m³ *Total dust, as Mo
TLV	Long-term value:10* 3** mg/m³ as Mo; *inhalable fraction ** respirable fraction

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7440-48-4 Cobalt

PEL	**Long-term value: 0.1* mg/m³ as Co; *for metal dust and fume**
REL	**Long-term value: 0.05 mg/m³ as Co; metal dust & fume**
TLV	**Long-term value: 0.02* mg/m³ *inh. fraction; DSEN, RSEN, BEI**

471-34-1 Calcium Carbonate

PEL	**Long-term value: 15* 5** mg/m³ *total dust **respirable fraction**
REL	**Long-term value: 10* 5** mg/m³ *total dust **respirable fraction**
TLV	**TLV withdrawn**

7440-03-1 Niobium

TWA	**Long-term value: 6**

7440-33-7 Tungsten

PEL	**and insoluble compounds, as We**
REL	**Short-term value: 10 mg/m³ Long-term value: 5 mg/m³ as W**
TLV	**Long-term value: 3* mg/m³ as W; * respirable fraction**

7440-21-3 Silicon

PEL	**Long-term value: 15* 5** mg/m³ *total dust **respirable fraction**
REL	**Long-term value: 10* 5** mg/m³ *total dust **respirable fraction**
TLV	**TLV withdrawn**

14808-60-7 Quartz (SiO2)

PEL	**Long-term value: 0.05* mg/m³ *resp. dust; 30mg/m3/%SiO2+2**
REL	**Long-term value: 0.05* mg/m³ *respirable dust; See Pocket Guide App. A**
TLV	**Long-term value: 0.025* mg/m³ *as respirable fraction**

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Ingredients with biological limit values:

7440-48-4 Cobalt

BEI	**15 µg/L urine** **end of shift at end of workweek Cobalt(background)** **1 µg/L blood** **end of shift at end of workweek** **Cobalt (background, semi-quantitative)**

· **Additional information:** The lists that were valid during the creationof this SDS were used as basis.
·**Exposure controls:**
· Personal protective equipment
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed. Immediately remove all soiled and contaminated clothing and wash before reuse. Wash hands before breaks and at the end of work. Store protective clothing separately. Avoid contact with the eyes and skin.
· **Breathing equipment:**

Suitable respiratory protective device recommended

Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding, brazing, cutting, grinding, or soldering in a confined space or general work area where local exhaust and/or ventilation does not keep exposure below the limits outlined in Section 8. Monitor the air quality inside the welder's helmet, and/or worker's breathing zone to determine if a respirator is required and the type needed.

· **Protection of hands:**

Protective gloves

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.
Select glove material based on penetration times, rates of diffusion and degradation.
· **Material of gloves:**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material:**
The exact break-through time has to be determined and observed by the manufacturer of the protective gloves.

· **Eye protection:**

Tightly sealed goggles

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Wear a helmet or face shield with a filter lens around shade number 14. Adjust if needed by selecting the next lighter or darker shade number. See ANSI/ASC Z49.1 Section 4.2 or publication F2.2. Shield other workers by providing screens and flash goggles.

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Protective work clothing

Body protection:
Wear approved head, hand, and body protection, which help to prevent injury from radiation, sparks, and electrical shock. This would include wearing welder's gloves and a protective face shield and may include arm protectors, apron, hats, shoulder protection, as well as dark, non-synthetic, substantial clothing. See ANSI Z49.1. Welders should be trained not to allow electrically live parts to contact the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground and should not touch live electrical parts. Welders should not wear short sleeve shirts or short pants.
Limitation and supervision of exposure into the environment: None

SECTION –9 PHYSICAL AND CHEMICAL PROPERTIES

·**Information on basic physical land chemical properties**

General Information	
Appearance:	
Form:	Flux Coated Wire/Rod
Colour:	Silver/grey wire covered by various coloured fluxes
Odour:	Odourless until used
Odour threshold:	Not determined.
pH-value:	Not applicable.
Change in condition	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Not determined.
Flash point:	None
Flammability (solid, gaseous):	Not determined.
Ignition temperature:	Not applicable
Decomposition temperature:	Not determined.
Auto igniting:	Product is not self-igniting.
Danger of explosion:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
Vapor pressure:	Not applicable.
Density:	
Relative density:	Not determined.
Vapor density:	Not applicable.
Evaporation rate:	Not applicable.
Solubility in / Miscibility with:	
Water:	Insoluble.
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
Solvent content:	
VOC content:	0.00 %
Solids content:	100 %
10 Stability and Reactivity	
Other information:	No further relevant information available.

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SECTION –10 STABILITY AND REACTIVITY

·**Reactivity:** Stable under normal conditions.
· Chemical stability: Stable under normal conditions.
· Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
· Possibility of hazardous reactions: Contact with acids or strong bases may cause generation of gas.
· Conditions to avoid: No further relevant information available.
· **Incompatible materials:**
Contact with fluorine, oxygen difluoride, and chlorine trifluoride will cause fire. Strong acids, strong bases, strong oxidizing agents and strong reducing agents.
Hazardous decomposition products:
Toxic chromium oxide fumes**.**
Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the processes and procedures followed, and the welding consumables used. Other conditions that also influence the composition and quantity of fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders in operation and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, and the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapours from cleaning and degreasing procedures). When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 8. Fume and gas decomposition, and not the ingredients in the electrode, are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration. Also, new compounds not in the electrodes may form. The known gases and fumes that may form during welding or cutting and their exposure limits are noted in the list in Section 11 below. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 8, plus those from the base metal and coating, etc. as noted above. Chlorinated solvents may be decomposed into toxic gases such as phosgene.
It is understood, however, that the elements and/or oxides to be mentioned are virtually always present as complex oxides and not as metals (See "Characterization of Arc Welding Fume", from the American Welding Society). The elements or oxides listed Section 8 correspond to the ACGIH categories found in "Threshold Limit Values for Chemical Substances and Physical Agents" listed in Section 8. Some products will also contain: iron, chromium, copper, manganese, molybdenum, nickel, silicon, titanium, niobium, cobalt, tungsten, aluminium, carbon, calcium, potassium, sodium, and fluorides and ozone. Some elements or compounds may exceed their PELs/TLVs before the total fumes exceed5 mg/m3.
· Additional information:
Niobium metal is rapidly dissolved by hydrofluoric acid or hydrofluoric-nitric acid mixtures. Niobium ignites in cold fluorine and above 200^{0}C will react exothermically with chlorine, bromide and halocarbons such as carbon tetrachloride, carbon tetra fluoride and Freon's.

SECTION –11 TOXICOLOGICAL INFORMATION

Information on toxicological effects:
Effects of Over-Exposure: Electric arc welding may create one or more of the following health hazards:
· ARC RAYS can injure eyes and burn skin. Incidences of skin cancer have been reported.
· ELECTRIC SHOCK can kill.
· FUMES AND GASES GENERATED FROM WELDING can be dangerous to your health.
· PRIMARY ROUTESOF ENTRY are the respiratory system, eyes, skin, and/or indigestion.
· NOISE can damage hearing
Short-term (acute) over-exposure effects:
· WELDING FUMES may result in discomfort, such as dizziness, nausea, or dryness or irritation of the nose, throat, or eyes.
·ALUMINUM OXIDE may cause irritation of the respiratory system.
·CALCIUM OXIDE dust or fumes may cause irritation of the respiratory system, skin, and eyes.
·FLUORIDES, FLUORIDE COMPOUNDS may cause skin and eye burns, pulmonary edema, and bronchitis.
IRON, IRON OXIDE have no known effects. Treat as a nuisance dust or fume.

· MANGANESE, MANGANESE COMPOUNDS may cause metal fume fever, characterized by irritation of the throat, vomiting, nausea, fever, body aches, and chills. Recovery is generally complete within 48 hours of overexposure.
·MOLYBDENUM may cause irritation of the eyes, nose, and throat.
· NICKEL, NICKEL COMPOUNDS may cause metallic taste, nausea, tightness in chest, fever, and allergic reactions.
·POTASSIUM OXIDE dust or fumes may cause irritation of the respiratory system, skin, and eyes.
·TITANIUM DIOXIDE may cause irritation of the respiratory system.
· COPPER may cause capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure.

Long-term (chronic) over-exposure effects:
• WELDING FUMES in excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis, or 'siderosis.' Overexposure to air contaminants may lead to their accumulation in the lungs, a condition which may be seen as dense areas on chest x-rays. The severity of the change is proportional to the length of exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on X-rays may be caused by non-work factors such as smoking, etc.
· ALUMINUM OXIDE may cause pulmonary fibrosis and emphysema.
· CALCIUM OXIDE prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis, and pneumonia.
· FLUORIDES may cause serious bone erosion (osteoporosis) and mottling of teeth.
· IRON, IRON OXIDE may cause siderosis or deposits of iron in the lungs, which is believed to affect pulmonary function. Lungs will clear Intime when exposure to iron fumes and its compounds ceases. Iron and magnetite (Fe3O4) are not regarded as fibro genic materials.
· MANGANESE, MANGANESE COMPOUNDS may cause central nervous system effects referred to as 'manganism.' Symptoms include languor, sleepiness, muscular weakness, emotional disturbances, spastic gait, and tremors. Behavioural changes and changes in handwriting may also appear. These effects are irreversible. Employees overexposed to manganese should receive regular medical examinations for early detection of manganism.
· MOLYBDENUM prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing, and anaemia.
· NICKEL, NICKEL COMPOUNDS may lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.
· POTASSIUM OXIDE prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis, and pneumonia.
· TITANIUM DIOXIDE may cause pulmonary irritation and slight fibrosis.
· QUARTZ can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death; inhaled from occupational sources is classified as carcinogenic to humans. Some studies show in workers exposed to respirable quartz excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease, chronic bronchitis and emphysema.
· COPPER may cause hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has led to haemolytic anaemia and accelerates arteriosclerosis.

Acute toxicity:

· LD/LC50 values that are relevant for classification:

7440-47-3 Chromium

Inhalative	**LC50/96 hours**	**14.3 mg/l (Cyprinus carpio)**

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7439-98-7 Molybdenum

Oral	**LD50**	**>5,000 mg/kg (Rat)**
Dermal	**LD50**	**>2,000 mg/kg (Rat)**
Inhalative	**LC50/4 h**	**800 mg/l (Trout) >5.84 mg/l (Rat)**

7439-89-6 Iron

Oral	**LD50**	**7,500 mg/kg (Rat)**

7440-48-4 Cobalt

Oral	**LD50**	**6,170 mg/kg (Rat)**

13463-67-7 Titanium Dioxide

Oral	**LD50**	**>10,000 mg/kg (Rat)**
Dermal	**LD50**	**>10,000 mg/kg (Rabbit)**
Inhalative	**LC50/4 h**	**>6.82 mg/l (Rat)**

471-34-1 Calcium Carbonate

Oral	**LD50**	**6,450 mg/kg (Rat)**

7439-96-5 Manganese

Oral	**LD50**	**9,000 mg/kg (Rat)**

1344-28-1 Aluminium

Oral	**LD50**	**>2,000 mg/kg (Rat)**
nhalative	**LC50/4 h**	**888 mg/l (Rat)**

7440-03-1 Niobium

Oral	**Toxic Dose Low**	**>10,000,000 µg/kg (Mouse) >10,000,000 µg/kg (Rat)**

7440-33-7 Tungsten

Oral	**LD50**	**2,000 mg/kg (Rat)**
Dermal	**LD50**	**2,000 mg/kg (Rat)**
Inhalative	**LC50/4 h**	**5.4 mg/l (Rat)**

7440-21-3 Silicon

Oral	**LD50**	**3,160 mg/kg (Rat)**

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14808-60-7 Quartz (SiO2)

Oral	**LD50**	**>22,500 mg/kg (Rat)mg/kg (Rabbit)**
Inhalative	**LC50/96 hours**	**1,033 mg/l (Trout)**

· **Primary irritant effect:**
· **On the skin:**
Irritant to skin and mucous membranes.
May cause an allergic skin reaction.
· **On the eye:**
Strong irritant with the danger of severe eye injury. Corrosive effect. Causes serious eye irritation.
· **Sensitization:** Sensitization possible through inhalation. Sensitization possible through skin contact.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Harmful Irritant Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to haemolytic anaemia and accelerates arteriosclerosis.
·**Carcinogenic categories:**
· IARC (International Agency for Research on Cancer):
"In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However in making the overall evaluation, IARC noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicate dust and organic fibres,1997, Vol. 68, IARC, Lyon, France.) In June 2003, SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis.
"There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk." (SCOEL SUM Doc 94-final, June 2003) According to the current state of the art, worker protection against silicosis can be consistently assured by respecting the existing regulatory occupational exposure limits. May cause cancer. Occupational exposure to respirable dust and respirable crystalline silica should be monitored and controlled"
(a)Although IARC has classified titanium dioxide as possible carcinogenic to human (2B), their summary concludes: "No significant exposure to titanium dioxide is thought to occur during the use of products which titanium dioxide is bound to other materials, such as in cosmetics or in paints."
(b)OSHA does not regulate Titanium Dioxide as a carcinogen. However, under 29 CFR 1910.1200the SDS must convey the fact that Titanium Dioxides a potential carcinogen to rats.
Group 1 - Carcinogenic to humans
Group 2A - Probably carcinogenic to humans
Group 2B - Possibly carcinogenic to humans
Group 3 - Not classifiable as to its carcinogenicity to humans
Group4 - Probably not carcinogenic to humans

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7440-02-0	**Nickel**	**2B**
7440-47-3	**Chromium**	**3**
7440-48-4	**Cobalt**	**2B**
13463-67-7	**Titanium Dioxide**	**2B**
14808-60-7	**Quartz (SiO2)**	**1**

NTP (NationalToxicology Program):

7440-02-0	**Nickel**	**R**
7440-48-4	**Cobalt**	**R**
14808-60-7	**Quartz (SiO2)**	**K**

OSHA-Ca (Occupational Safety & Health Administration):
None of the ingredients are listed

SECTION -12 ECOLOGICAL INFORMATION

Toxicity:

Aquatic Toxicity:

7440-50-8 Copper

EC50	**0.04-0.05 mg/l (Water flea)**

7440-02-0 Nickel

EC50	**1 mg/l (Water flea)**

7440-47-3 Chromium

EC50	**0.07 mg/l (Water flea)**

13463-67-7 Titanium Dioxide

EC50	**>1,000 mg/l (Waterflea)**

7439-96-5 Manganese

EC50	**40 mg/l (Water flea)**

14808-60-7 Quartz (SiO2)

EC50	**218 mg/l (Green algae)**

Persistence and degradability: No further relevant information available.
Behaviour in environmental systems:
Bio accumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.
Additional ecological information:

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General notes:
Do not allow product to reach groundwater, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground
• **Results of PBT and vPvB assessment:**
• **PBT:** Not applicable.
• **vPvB:** Not applicable.
Other adverse effects: No further relevant information available

SECTION –13 DISPOSAL CONSIDERATIONS

·Waste treatment methods
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
Observe all federal, state and local environmental regulations when disposing of this material.
·Uncleaned packaging
Recommendation : Disposal must be made according to official regulations

SECTION –14 TRANSPORT INFORMATION

·UN-Number:
· DOT, ADR/ADN, ADN, IMDG, IATA — Non-Regulated Material
· UN proper shipping name:
· DOT, ADR/ADN, ADN, IMDG, IATA — Non-Regulated Material
· Transport hazard class(es):
·DOT, ADR/ADN, ADN, IMDG, IATA
· Class: — Non-Regulated Material
· Packing group:
· DOT, ADR/ADN, IMDG, IATA — Non-Regulated Material
· Environmental hazards: — Not applicable.
· Special precautions for user: — Not applicable.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: — Not applicable
UN "Model Regulation": — Non-Regulated Material

SECTION –15 REGULATORY INFORMATION

·Safety, health and environmental regulations/legislation specific for the substance or mixture:
·SARA (Superfund Amendments and Reauthorization):

Section 355 (extremely hazardous substances):
None of the ingredients are listed.

Section 313 (Specific toxic chemical listings):

7440-50-8	**Copper**
7440-02-0	**Nickel**
7440-47-3	**Chromium**
7440-48-4	**Cobalt**
7439-96-5	**Manganese**
7429-90-5	**Aluminium**

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TSCA (Toxic Substances Control Act):
All components have the value ACTIVE

Hazardous Air Pollutants

7440-48-4	**Cobalt**
7439-96-5	**Manganese**

CaliforniaProposition 65

WARNING: This product can expose you to chemicals including the listed chemicals which are known to the State of California to cause cancer, birth defects and other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

Chemicals known to cause cancer:

7440-02-0	**Nickel**
7440-48-4	**Cobalt**
13463-67-7	**Titanium Dioxide**
14808-60-7	**Quartz (SiO2)**

Chemicals known to cause reproductive toxicityfor females:
None of the ingredients are listed

· Chemicals knownto cause reproductive toxicity for males:
None of the ingredients are listed.

· Chemicals known to cause developmental toxicity:
None of the ingredients are listed.

New Jersey Right-to-Know List:

7440-50-8	**Copper**
7440-02-0	**Nickel**
7440-47-3	**Chromium**
7439-98-7	**Molybdenum**
7440-48-4	**Cobalt**
13463-67-7	**Titanium Dioxide**
7439-96-5	**Manganese**
7429-90-5	**Aluminium**
7440-32-6	**Titanium**
7440-33-7	**Tungsten**

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7440-21-3	**Silicon**
12136-45-7	**Dipotassium Oxide**
14808-60-7	**Quartz (SiO2)**

New Jersey Special Hazardous Substance List:

7440-02-0	**Nickel**	**CA**
7440-47-3	**Chromium**	**F3**
7440-48-4	**Cobalt**	**CA, F3**
7439-96-5	**Manganese**	**F3, R1**
7429-90-5	**Aluminium**	**F3, R1**
7440-32-6	**Titanium**	**F3, R1**
7440-33-7	**Tungsten**	**F3**
7440-21-3	**Silicon**	**F3**
12136-45-7	**Dipotassium Oxide**	**CO, R2**
14808-60-7	**Quartz (SiO2)**	**CA**

Pennsylvania Right-to-Know List:

7440-50-8	**Copper**
7440-02-0	**Nickel**
7440-47-3	**Chromium**
7439-98-7	**Molybdenum**
7440-48-4	**Cobalt**
13463-67-7	**Titanium Dioxide**
7439-96-5	**Manganese**
7429-90-5	**Aluminium**
7440-33-7	**Tungsten**
7440-21-3	**Silicon**
14808-60-7	**Quartz (SiO2)**

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Pennsylvania Right-to-Know List:

7440-50-8	**Copper**	**E**
7440-02-0	**Nickel**	**ES**
7440-47-3	**Chromium**	**ES**
7440-48-4	**Cobalt**	**E**
7439-96-5	**Manganese**	**E**
7429-90-5	**Aluminium**	**E**

Carcinogenic categories:

EPA (Environmental Protection Agency):

7440-50-8	**Copper**	**D**
7440-47-3	**Chromium**	**D**
7439-96-5	**Manganese**	**D**

· TLV (Threshold Limit Value established by ACGIH):

7440-02-0	**Nickel**	**A5**
7440-47-3	**Chromium**	**A4**
7439-98-7	**Molybdenum**	**A3**
7440-48-4	**Cobalt**	**A3**
13463-67-7	**Titanium Dioxide**	**A4**
7429-90-5	**Aluminium**	**A4**
14808-60-7	**Quartz (SiO2)**	**A2**

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

7440-02-0	**Nickel**
13463-67-7	**Titanium Dioxide**
14808-60-7	**Quartz (SiO2)**

· GHS label elements
The product is classified and labelled according to the Globally Harmonized System(GHS).
·

Hazard pictograms:

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Single Word Danger:
Hazard-determining components of labelling:
Nickel, Potassium Silicate, Cobalt, Copper Titanium

· **Hazard statements:**
H315 Causes skin irritation.
H318 Causes serious eye damage**.**
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H350 May cause cancer.
H335 May cause respiratory irritation.
H372 Causes damage to the lung through prolonged or repeated exposure. Route of exposure: Inhalation.

· **Precautionary statements:**
P201: Obtain special instructions 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 thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P272 : Contaminated work clothing must not be allowed out of the workplace.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352: If on skin: Wash with plenty of water.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
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.
P312: Call a poison centre/doctor if you feel unwell.
P321: Specific treatment(see supplementary first aid instructions on this Safety Data Sheet).
P362+P364 Take off contaminated clothing and wash it before reuse.
P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.
P501:Dispose of contents/container in accordance with local/regional/national/international regulations

National regulations:
None of the ingredients are listed.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out

SECTION –16 OTHER INFORMATION

ROYALE WELD WELL urges each end user and recipient of this SDS to study it carefully. If necessary, consult an industrial hygienist or other expert to understand this information and safeguard the environment and protect workers from potential hazards associated with the handling or use of this product. This information is believed to be accurate as of the revision date shown above. However, no warranty, expressed or implied, is given. Because the conditions or methods of use are beyond **ROYALE WELDWELL's** control, we assume no liability resulting from the use of this product. Regulatory requirements are subject to change and may differ between various locations. Compliance with all applicable Federal, State, Provincial, and Local laws and regulations remain the responsibility of the user.
· **Date of last revision/ revision number:** 09/18/2019 / 2

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·· **Abbreviations and acronyms:**
ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road
ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
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
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulate and Toxic
vPvB: very Persistent and very Bioaccumulate
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Safety & Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
BEI: Biological Exposure Limit
Flam. Sol. 1: Flammable solids – Category 1
Flam. Sol. 2: Flammable solids – Category 2
Pyr. Sol. 1: Pyrophoric solids – Category 1
Water-react. 1: Substances and mixtures which in contact with water emit flammable gases – Category 1
Water-react. 3: Substances and mixtures which in contact with water emit flammable gases – Category 3
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Skin Corr. 1C: Skin corrosion/irritation – Category 1C
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
Eye Irrit. 2B: Serious eye damage/eye irritation – Category 2B
Resp. Sens. 1: Respiratory sensitisation – Category 1
Skin Sens. 1: Skin sensitisation – Category 1
Carc. 1A: Carcinogenicity – Category 1A
Carc. 2: Carcinogenicity – Category 2
STOT SE 3: Specific target organ toxicity(single exposure) – Category3
STOT RE 1: Specific target organ toxicity(repeated exposure) – Category 1
Aquatic Acute 3: Hazardous to the aquatic environment - acute aquatic hazard – Category 3
Aquatic Chronic 4: Hazardous to the aquatic environment - long-term aquatic hazard – Category 4
· * Data compared to the previous version altered.