SECTION – 1 IDENTIFICATION

Product Identifier
Trade Name: Bare Stainless Steel Welding Electrodes and Rods
Product Number:
Specification: A5.9
Classification: ER16-8-2, ER2209, ER2594, ER307, ER308H, ER308L, ER308LSi, ER309H, ER309LSi, ER310, ER312,ER316H, ER316L, ER316LSi, ER317L, ER320LR, ER347,ER385, ER409Nb, ER410,ER420, ER430, ER630
Bare stainless-steel welding electrodes and rods
Relevant identified uses of the substance or mixture and uses advised against:
For professional use only. Use according to manufacturer's specification.
Product Description: Bare stainless-steel welding electrodes and rods
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.2	**H351 Suspected of causing cancer.**
STOT RE 1	**H372 Causes damage to organs through prolonged or repeated exposure.**

Skin Irrit. 2	**H315 Causes skin irritation.**
Eye Irrit. 2A	**H319 Causes serious eye irritation.**
Skin Sens. 1	**H317 May cause an allergic skin reaction.**
STOT SE 3	**H335 May cause respiratory irritation**

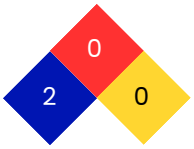
·Label elements:
Hazard pictograms:

TRADE NAME: BARE STAINLESS-STEEL WELDING ELECTRODES AND RODS

Signal word: Danger

· **Hazard-determining components of labelling**:
Nickel
Iron
Cobalt
Copper
Hazard statements:
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317: May cause an allergic skin reaction.
H351: Suspected of causing cancer.
H335: May cause respiratory irritation.
H372: Causes damage to organs through prolonged or repeated exposure.
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+P312: If INHALED: Call a POISON CENTER/doctor if you feel unwell.
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.
P337+P313: If eye irritation persists: Get medical advice/attention.
P342+P311: If experiencing respiratory symptoms: Call a poison enter/doctor.
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.
40.8 % of the mixtureconsists 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= 2
Fire = 0
Reactivity = 0

HMIS-ratings (scale 0 - 4)

TRADE NAME: BARE STAINLESS-STEEL WELDING ELECTRODES AND RODS

HEALTH	*2
FIRE	0
REACTIVITY	0

Health= *2
Fire = 0
Physical Hazard= 0

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

SECTION –3 COMPOSITION/INFORMATION ON INGREDIENTS

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

Dangerous Components:

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**	**15-35%**
CAS: 7440-47-3 **RTECS: GB 4200000**	**Chromium**	**15-35%**
CAS: 7440-02-0	**Nickel** **Carc. 2, H351; STOTRE 1, H372; Skin Sens.1, H317**	**15-35%**
CAS: 7439-96-5 **RTECS: OO 9275000**	**Manganese** **Pyr. Sol.1, H250; Water-react. 1, H260**	**15-35%**
CAS: 7439-98-7 **RTECS: QA 4680000**	**Molybdenum**	**2-12%**
CAS: 7440-50-8 **RTECS: GL 5325000**	**Copper** **Flam. Sol.1, H228; STOT SE 3, H335;Aquatic Acute 3, H402; Aquatic Chronic 4, H413**	**2-12%**
CAS: 7440-21-3	**Silicon** **Flam. Sol.2, H228; Acute Tox. 4, H302; Eye Irrit. 2B,H320; Combustible Dust**	**2-12%**
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**	**≤2.5%**
CAS: 7440-03-1 RTECS: QT9900000	**Niobium** **Flam. Sol. 1, H228; Combustible Dust**	**≤2.5%**
CAS: 7440-48-4 **RTECS: GF 8750000**	**Cobalt** **Resp. Sens.1, H334; Carc.2, H351; Skin Sens.1, H317; AquaticChronic 4, H413;Combustible Dust**	**≤2.5%**

· Additional information:
the exact percentages of the ingredients of this mixture are considered to be proprietary and are withheld in 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 Carbon Steel 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:** Supply fresh air. If required, provide artificial respiration. Consult doctor if symptoms persist. 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**
· Most important symptoms and effects, both acute and delayed: No further relevant information available.
· Indication of any immediate medical attention and special treatment needed:

SECTION –5 FIRE-FIGHTING MEASURES

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting 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.
Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame.
Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulphur dioxide.

Special Remarks on Explosion Hazards:
Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.
If incinerated, product will release the following toxic fumes: Oxides of carbon, chromium, copper, iron, manganese, molybdenum, nickel, niobium, silicon, tungsten and cobalt.
· 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

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.

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Methods and material for containment and cleaning up:
Pick up mechanically. 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:		
7439-89-6	**Iron**	**3.2 mg/m³**
7440-47-3	**Chromium**	**1.5 mg/m³**
7440-02-0	**Nickel**	**4.5 mg/m³**
7439-96-5	**Manganese**	**3 mg/m³**
7439-98-7	**Molybdenum**	**30 mg/m³**
7440-50-8	**Copper**	**3 mg/m³**
7440-21-3	**Silicon**	**45 mg/m³**
7440-33-7	**Tungsten**	**10 mg/m³**
7440-03-1	**Niobium**	**30 mg/m³**
7440-44-0	**Carbon Fibre**	**30 mg/m³**
7440-48-4	**Cobalt**	**0.18 mg/m³**

PAC-2:		
7439-89-6	**Iron**	**35 mg/m³**
7440-47-3	**Chromium**	**17 mg/m³**
7440-02-0	**Nickel**	**50 mg/m³**
7439-96-5	**Manganese**	**5 mg/m³**
7439-98-7	**Molybdenum**	**330 mg/m³**
7440-50-8	**Copper**	**33 mg/m³**
7440-21-3	**Silicon**	**100 mg/m³**
7440-33-7	**Tungsten**	**330 mg/m³**
7440-03-1	**Niobium**	**330 mg/m³**
7440-44-0	**Carbon Fibre**	**330 mg/m³**
7440-48-4	**Cobalt**	**330 mg/m³**

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PAC-3:		
7439-89-6	**Iron**	**150 mg/m³**
7440-47-3	**Chromium**	**99 mg/m³**
7440-02-0	**Nickel**	**99 mg/m³**
7439-96-5	**Manganese**	**1,800 mg/m³**
7439-98-7	**Molybdenum**	**2,000 mg/m³**
7440-50-8	**Copper**	**200 mg/m³**
7440-21-3	**Silicon**	**630 mg/m³**
7440-33-7	**Tungsten**	**2,000 mg/m³**
7440-03-1	**Niobium**	**2,000 mg/m³**
7440-44-0	**Carbon Fibre**	**2,000 mg/m³**
7440-48-4	**Cobalt**	**20 mg/m³**

SECTION –7 HANDLING AND STORAGE

Precautions for safe handling:
Avoid creating and breathing dust/fume/gas/mist/vapours/spray. Ensure good ventilation/exhaustion at the workplace. Prevent formation of dust.
Information about protection against explosions and fires: No special measures required.
· **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

7440-47-3 Chromium

PEL	**Long-term value: 1 mg/m³**
REL	**Long-term value:0.5* mg/m³** ***metal+inorg.compds.as Cr;See Pocket Guide App. C**
TLV	**Long-term value: 0.003* 0.5**mg/m³** **inh. fraction, *as Cr(III),**metal**

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7440-02-0 Nickel

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

7439-96-5 Manganese

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

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**

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**

7440-21-3 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**

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**

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7440-03-1 Niobium

TWA	**Long-term value: 6**

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**

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.

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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:**

Goggles with face-shield

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.
· **Body protection:**

Protective work clothing

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 metallic colour
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.

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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.

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: 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: carbon, chromium, copper, iron, manganese, molybdenum, nickel, niobium, silicon, tungsten and cobalt. Some elements or compounds may exceed their PELs/TLVs before the total fumes exceed 5 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°C will react exothermically with chlorine, bromide and halocarbons such as carbon tetrachloride, carbon tetra fluoride and Freon's.

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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.
·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 allergicreactions.
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 changes 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.
· IRON, IRON OXIDE may cause siderosis or deposits of iron in the lungs, which is believed to affect pulmonary function. Lungs will clear in time 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.
· TITANIUM DIOXIDE may cause pulmonary irritation and slight fibrosis.
· 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:

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7439-89-6 Iron

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

7440-47-3 Chromium

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

7439-96-5 Manganese

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

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)**

7440-21-3 Silicon

Oral	**LD50**	**3,160 mg/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)**

7440-03-1 Niobium

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

7440-48-4 Cobalt

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

· **Primary irritant effect:**
· **On the skin:**
Irritant to skin and mucous membranes. May cause an allergic skin reaction.
· **On the eye:** Irritating effect.
· **Sensitization**: Sensitization possible through inhalation. Sensitization possible through skin contact.

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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):
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

7440-47-3	**Chromium**	**3**
7440-02-0	**Nickel**	**2B**
7440-48-4	**Cobalt**	**2B**

NTP (NationalToxicology Program):

7440-02-0	**Nickel**	**R**
7440-48-4	**Cobalt**	**R**

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

SECTION -12 ECOLOGICAL INFORMATION

Toxicity:

Aquatic Toxicity:

7440-47-3 Chromium

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

7440-02-0 Nickel

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

7439-96-5 Manganese

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

7631-86-9 Silicon Dioxide

EC50	**>1,000 mg/l (Daphnia) (OECD 202)**

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· **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:**
· **General notes:**
Do not allow undiluted product or product that has not been neutralized to reach groundwater, water courseor sewage system.
· 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 hazardoussubstances):

None of the ingredients are listed

Section 313 (Specific toxic chemical listings):

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

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

Hazardous Air Pollutants

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

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**

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

Chemicals known to 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:

7440-47-3	**Chromium**
7440-02-0	**Nickel**
7439-96-5	**Manganese**
7439-98-7	**Molybdenum**
7440-50-8	**Copper**
7440-21-3	**Silicon**
7440-33-7	**Tungsten**
7440-48-4	**Cobalt**

New Jersey Special Hazardous Substance List:

7440-47-3	**Chromium**	**F3**
7440-02-0	**Nickel**	**CA**
7439-96-5	**Manganese**	**F3, R1**

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7440-21-3	**Silicon**	**F3**
7440-33-7	**Tungsten**	**F3**
7440-48-4	**Cobalt**	**CA, F3**

Pennsylvania Right-to-Know List:

7440-47-3	**Chromium**
7440-02-0	**Nickel**
7439-96-5	**Manganese**
7439-98-7	**Molybdenum**
7440-50-8	**Copper**
7440-21-3	**Silicon**
7440-33-7	**Tungsten**
7440-48-4	**Cobalt**

Pennsylvania Special Hazardous Substance List:

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

Carcinogenic categories:

EPA (Environmental Protection Agency):

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

TLV (Threshold Limit Value established by ACGIH):

7440-47-3	**Chromium**	**A4**
13463-67-7	**Nickel**	**A5**
7439-98-7	**Molybdenum**	**A3**
7440-48-4	**Cobalt**	**A3**

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

7440-02-0	**Nickel**

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

Single Word Danger
Hazard-determining components of labelling:
Nickel
Iron
Cobalt
Copper
Hazard statements:
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317: May cause an allergic skin reaction.
H351: Suspected of causing cancer.
H335: May cause respiratory irritation.
H372: Causes damage to organs through prolonged or repeated exposure.
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+P312: If INHALED: Call a POISON CENTER/doctor if you feel unwell.
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.
P337+P313: If eye irritation persists: Get medical advice/attention.
P342+P311: If experiencing respiratory symptoms: Call a poison enter/doctor.
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.

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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 WELDWELL urges each end user and recipient of this SDS to study it carefully. If necessary, consultan 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
· **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, Bio accumulative and Toxic
vPvB: very Persistent and very Bio accumulative
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. 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
Ox. Sol. 1: Oxidizing solids – Category 1
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. 2B: Serious eye damage/eye irritation – Category 2B
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
· * Data compared to the previous version altered.