SECTION – 1 IDENTIFICATION

Product Identifier
Trade Name: Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding
Product Number:
Specification: A5.18
Classification: E70C-6M, ER70S-2, ER70S-2 (Copper Free), ER70S-3, ER70S-4,ER70S-6, ER70S-6 (Copper Free)
Carbon steel electrodes and rods for gas shielded 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: Carbon steel electrodes and rods for gas shielded 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

Carcinogenicity 1A **H350** May cause cancer.
Specific Target Organ Toxicity - Repeated Exposure 1 **H372** Causes damage to organs through prolonged or repeated exposure.

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: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

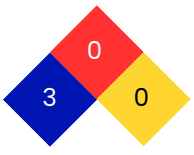
Signal word: Danger

· Hazard-determining components of labelling:
Iron, Titanium, Lithium, Silica, Nickel

· Hazard statements:
H315 Causes skin irritation.
H318 Causes serious eye damage**.**
H317 May cause an allergic skin reaction.
H350 May cause 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+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.
P363: Wash contaminated clothing before reuse.
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 refers to knowledge of known, established toxicological or ecotoxicological values. 17 % of the mixture consists of component(s) of unknown toxicity.
· Hazard description:
Lithium may explode when in contact with water. Exposure to moist air may result in fire. Lithium can react with water to produce flammable hydrogen gas, which may create a fire and explosion hazard. Spontaneous ignition can occur if Lithium is heated to its melting point. Lithium dusts may ignite spontaneously in moist air. Lithium can react with moisture to produce corrosive compounds. NEVER purge open drums with nitrogen before resealing. Store and transport under argon or mineral oil.
· Classification system: NFPA/HMIS Definitions: 0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme
NFPA ratings(scale 0 - 4)



Health= 3
Fire = 0
Reactivity = 0

HMIS-ratings (scale 0 - 4)

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

HEALTH	*3
FIRE	0
REACTIVITY	0

Health= *3
Fire = 0
Physical Hazard= 0

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

SECTION –3 COMPOSITION/INFORMATION ON INGREDIENTS

Non-hazardous components:

CAS: 1317-61-9	Iron Oxide	0-12%
CAS: 7440-62-2 RTECS: YW 1355000	Vanadium	0-1%

·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	85-99%
CAS: 7440-39-3 RTECS: CQ 8370000	Barium Water-react. 2, H261	0-10%
CAS: 13463-67-7	Titanium Dioxide Carc. 2, H351	0-10%
CAS: 1317-95-9	Silica Carc. 1A, H350; STOT SE 3, H335	0-3%
CAS: 7439-93-2 RTECS: OJ 5540000	Lithium Water-react. 1, H260; Skin Corr. 1B, H314	0-9%
CAS: 7429-90-5 RTECS: BD 0330000	Aluminium Flam. Sol. 2, H228	0-5%
CAS: 7439-95-4 RTECS: OM 2100000	Magnesium Pyr. Sol.1, H250; Water-react. 1, H260	0-3%
CAS: 7440-02-0	Nickel Carc. 2, H351;STOT RE 1, H372; Skin Sens. 1, H317	0-3%
CAS: 7440-21-3	Silicon Flam. Sol.2, H228; Acute Tox.4, H302; Eye Irrit. 2B,H320; Combustible Dust	0-1.5%
CAS: 1309-48-4	Magnesium Oxide Acute Toxicity - Oral 4, H302	0-1%
CAS: 1344-28-1 RTECS: BD 1200000	Aluminium Oxide STOT SE 3, H335	0-1%
CAS: 7439-98-7 RTECS: QA 4680000	Molybdenum	0-1%
CAS: 7440-50-8 RTECS: GL 5325000	Copper	0-1%
CAS: 7440-67-7 RTECS: ZH 7070000	Zirconium Pyr. Sol. 1, H250; Water-react. 1, H260	0-1%
CAS: 7440-03-1RTECS: QT9900000	Silicon Dioxide Skin Irritation 2, H315; Specific Target Organ Toxicity - Single Exposure 3, H335; EyeIrritation 2B, H320	0-2%

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

CAS: 7440-32-6 **RTECS: XR 1700000**	**Titanium** **Skin Irrit. 2, H315; SkinSens. 1, H317;Eye Irrit. 2B,H320**	**0-1%**

· 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 Stainless 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; consult doctor in case of complaints.
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.
· **After swallowing:** Rinse out mouth and then drink plenty of water. Do not induce vomiting without medical advice.
· **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:** No further relevant information available.

SECTION –5 FIRE-FIGHTING MEASURES

·**Extinguishing media**
· Suitable extinguishing agents: CO_2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam. 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.
Amorphous or crystalline silicon both react exothermically when heated with alkali-metal carbonates attaining incandescence and evolving carbon monoxide. Mixtures of silicon, aluminium, and lead explode when heated. If incinerated, product will release the following toxic fumes: Oxides of silicon, aluminium, magnesium, manganese, iron, copper, molybdenum, carbon, titanium, nickel, niobium, vanadium, barium, lithium, and zirconium, 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:
At temperatures above 200°C Zirconium reacts exothermically with the following: fluorine, chloride, bromide, iodine, halocarbons, carbon tetrachloride, carbon, tetra fluoride and Freon's. 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.

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

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.
Dispose contaminated material as waste according to section 13.
Ensure adequate ventilation.
Dispose of the collected material according to regulations.
· **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.

PAC-1:		
7439-89-6	Iron	3.2 mg/m³
7440-39-3	Barium	1.5 mg/m³
13463-67-7	Titanium Dioxide	30 mg/m³
1317-61-9	Iron Oxide	21 mg/m³
1312-76-1	Lithium	3.3 mg/m³
7439-95-4	Magnesium	18 mg/m³
7440-02-0	Nickel	4.5 mg/m³
7440-21-3	Silicon	45 mg/m³
1309-48-4	Magnesium Oxide	30 mg/m³
1344-28-1	Aluminium Oxide	15 mg/m³
7439-98-7	Molybdenum	30 mg/m³
7440-44-0	Carbon Fibre	6 mg/m³
7440-50-8	Copper	3 mg/m³
7440-67-7	Zirconium	10 mg/m³
7631-86-9	Silicon Dioxide	18 mg/m³
7440-32-6	Titanium	30 mg/m³
7440-03-1	Niobium	30 mg/m³
7440-62-2	Vanadium	3 mg/m³

PAC-2:		
7439-89-6	Iron	35 mg/m³
7440-39-3	Barium	180 mg/m³
13463-67-7	Titanium Dioxide	330 mg/m³
1317-61-9	Iron Oxide	230 mg/m³
1312-76-1	Lithium	36 mg/m³

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

7439-95-4	**Magnesium**	**200 mg/m³**
7440-02-0	**Nickel**	**50 mg/m³**
7440-21-3	**Silicon**	**100 mg/m³**
1309-48-4	**Magnesium Oxide**	**120 mg/m³**
1344-28-1	**Aluminium Oxide**	**170 mg/m³**
7439-98-7	**Molybdenum**	**330 mg/m³**
7440-44-0	**Carbon Fibre**	**330 mg/m³**
7440-50-8	**Copper**	**33 mg/m³**
7440-67-7	**Zirconium**	**83 mg/m³**
7631-86-9	**Silicon Dioxide**	**740 mg/m³**
7440-32-6	**Titanium**	**330 mg/m³**
7440-03-1	**Niobium**	**330 mg/m³**
7440-62-2	**Vanadium**	**5.8 mg/m³**

PAC-1:		
7439-89-6	**Iron**	**150 mg/m³**
7440-39-3	**Barium**	**1,100 mg/m³**
13463-67-7	**Titanium Dioxide**	**2,000 mg/m³**
1317-61-9	**Iron Oxide**	**1,400 mg/m³**
1312-76-1	**Lithium**	**220 mg/m³**
7439-95-4	**Magnesium**	**1,200 mg/m³**
7440-02-0	**Nickel**	**99 mg/m³**
7440-21-3	**Silicon**	**630 mg/m³**
1309-48-4	**Magnesium Oxide**	**730 mg/m³**
1344-28-1	**Aluminium Oxide**	**990 mg/m³**
7439-98-7	**Molybdenum**	**2,000 mg/m³**
7440-44-0	**Carbon Fibre**	**2,000 mg/m³**
7440-50-8	**Copper**	**200 mg/m³**
7440-67-7	**Zirconium**	**500 mg/m³**
7631-86-9	**Silicon Dioxide**	**4,500 mg/m³**
7440-32-6	**Titanium**	**2,000 mg/m³**
7440-03-1	**Niobium**	**2,000 mg/m³**
7440-62-2	**Vanadium**	**35 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.
Wear assigned protective equipment.

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

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: No special requirements..
Information about storage in one common storage facility: The storage area for Lithium must be isolated from other areas so that water cannot enter by spray or drainage from automatic sprinkler systems or any other water source.
Further information about storage conditions: Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
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 section7.
· **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

7440-39-3 Barium

PEL	Long-term value: 0.5 mg/m³ as Ba
REL	Long-term value: 0.5 mg/m³ as Ba
TLV	Long-term value: 0.5 mg/m³ as Ba

13463-67-7 Titanium Dioxide

PEL	Long-term value: 15* mg/m³ *total dust
REL	See Pocket Guide App. A
TLV	Long-term value: 10 mg/m³

1317-95-9 Silica

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	TLV withdrawn

7429-90-5 Aluminium

PEL	Long-term value: 15*; 5** mg/m³ *Total dust; ** Respirable fraction
REL	Long-term value: 10* 5** mg/m³ as Al*Total dust**Respirable/pyro powd./welding f.
TLV	Long-term value: 1* mg/m³ as Al; *as respirable fraction

7440-03-1 Niobium

TWA	Long-term value: 6

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

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**

7440-21-3 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**

1309-48-4 Magnesium Oxide

PEL	**Long-term value: 15* mg/m³ fume; *total particulate**
TLV	**Long-term value:10* mg/m³ *as inhalable fraction**

1344-28-1 Aluminium Oxide

PEL	**Long-term value:15*; 5** mg/m³ *Total dust; ** Respirable fraction**
REL	**Long-term value: 10* 5** mg/m³ as Al*Total dust**Respirable/pyro powd./welding f.**
TLV	**Long-term value: 1* mg/m³ as Al; *as respirable 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**

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

7440-67-7 Zirconium

PEL	**Long-term value: 5 mg/m³ as Zr**
REL	**Short-term value: 10 mg/m³** **Long-term value: 5 mg/m³ as Zr**
TLV	**Short-term value: 10 mg/m³** **Long-term value: 5 mg/m³ as Zr**

7631-86-9 Silicon Dioxide

ACGH	**Short-term value: 3 mg/m³** **Long-term value: 10 mg/m³**
IDLH	**Short-term value: 3000 mg/m³** **Long-term value: 4 mg/m³** **IDLH: Immediately dangerous to life or health**
TWA	**Short-term value: 6 mg/m³** **Long-term value: 4 mg/m³**

· **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.

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

· **Eye protection:**

Tightly sealed goggles

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:	Metal Cored Wire/Rod or Solid Wire/Rod
Colour:	Copper or 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.
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.

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

Viscosity:
Dynamic: Not applicable.
Kinematic: Not applicable.
Solvent content:
VOC content: 0.00 %
Solids content: 100 %
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:
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: Oxides of silicon, aluminium, magnesium, manganese, iron, copper, molybdenum, carbon, titanium, nickel, niobium, vanadium, barium, lithium, and zirconium, and fluorides and ozone. Some elements or compounds may exceed their PELs/TLVs before the total fumes exceed 5 mg/m3.

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.

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

·ALUMINUM OXIDE may cause irritation of the respiratory system.
·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.
· MAGNESIUM, MAGNESIUM OXIDE overexposure may cause metal fume fever, characterized by metallic taste, tightness of chest, and fever. Symptoms may last 24-48 hours following overexposure.
· 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.
·SILICA (amorphous) dust and 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.
· 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.
· SILICA (respirable crystalline silica) overexposure may result in silicosis. Respirable crystalline silica is a known human carcinogen. SILICA (amorphous) long term overexposure may cause pneumoconiosis. Nanocrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.
· 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.
· TITANIUM DIOXIDE may cause pulmonary irritation and slight fibrosis.

Acute toxicity:

· LD/LC50 values that are relevant for classification:

7439-89-6 Iron

Oral	**LD50**	**7,500 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)**

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

7439-93-2 Lithium

Inhalative	**LC50/4 h LC50/96 hours**	**18 mg/l (Trout) 62.21 mg/l (Trout)**

1344-28-1 Aluminium

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

7440-21-3 Silicon

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

1344-28-1 Aluminium Oxide

Oral	**LD50**	**>10,000 mg/kg (Rat)**
Inhalative	**LC50/4 h**	**>2.6 mg/l (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)**

7631-86-9 Silicon Dioxide

Oral	**LD50**	**10,000 mg/kg (Rat) (OECD 401)**
Dermal	**LD50**	**5,000 mg/kg (Rabbit) (OECD 402)**
Inhalative	**LC50/4 h**	**>140->2,000 mg/l(Rat) (OCED 403) Maximum attainable concentration, mortality does not appear. 10,000 mg/l (Zebra fish) (OECD 203)**

· **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 skin contact.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations: Irritant
·**Carcinogenic categories:**
· IARC (International Agency for Research on Cancer):
(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 1910.1200 the SDS must convey the fact that Titanium Dioxide is a potential carcinogen to rats.

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

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

13463-67-7	**Titanium Dioxide**	**2B**
1317-95-9	**Silica**	**1**
7440-02-0	**Nickel**	**2B**
7631-86-9	**Silicon Dioxide**	**3**

NTP (NationalToxicology Program):

7440-02-0	**Nickel**	**R**

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

SECTION –12 ECOLOGICAL INFORMATION

Toxicity:

Aquatic Toxicity:

13463-67-7 Titanium Dioxide

EC50	**>1,000 mg/l (Water flea)**

7439-93-2 Lithium

EC50	**153.44 mg/l (Green algae) 10 mg/l (Daphnia) (with pH-adjustment)**

7440-02-0 Nickel

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

7440-50-8 Copper

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

7631-86-9 Silicon Dioxide

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

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 ground water, water course or sewage system.
· **Results of PBT and vPvB assessment:**
· PBT: Not applicable.
· vPvB: Not applicable.
Other adverse effects: No further relevant information available

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

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):

7440-39-3	Barium
7429-90-5	Aluminium
7440-02-0	Nickel
1344-28-1	Aluminium Oxide
7440-50-8	Copper
7440-62-2	Vanadium

TSCA (Toxic Substances Control Act):

7439-89-6	Iron	ACTIVE
7440-39-3	Barium	ACTIVE
13463-67-7	Titanium Dioxide	ACTIVE
1317-61-9	Iron Oxide	ACTIVE
7439-93-2	Lithium	ACTIVE
7429-90-5	Aluminium	ACTIVE

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

7439-95-4	Magnesium	ACTIVE
7440-02-0	Nickel	ACTIVE
7440-21-3	Silicon	ACTIVE
1309-48-4	Magnesium Oxide	ACTIVE
1344-28-1	Aluminium Oxide	ACTIVE
7439-98-7	Molybdenum	ACTIVE
7440-44-0	Carbon Fibre	ACTIVE
7440-50-8	Copper	ACTIVE
7440-67-7	Zirconium	ACTIVE
7631-86-9	Silicon Dioxide	ACTIVE
7440-32-6	Titanium	ACTIVE
7440-03-1	Niobium	ACTIVE
7440-62-2	Vanadium	ACTIVE

Hazardous Air Pollutants

None of the ingredients are listed

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
13463-67-7	Titanium Dioxide

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:

7440-39-3	Barium
13463-67-7	Titanium Dioxide
1317-95-9	Silica
7439-93-2	Lithium
7429-90-5	Aluminium
7439-95-4	Magnesium

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

7440-02-0	**Nickel**
7440-21-3	**Silicon**
1309-48-4	**Magnesium Oxide**
7440-33-7	**Aluminium Oxide**
7439-98-7	**Molybdenum**
7440-50-8	**Copper**
7440-67-7	**Zirconium**
7440-32-6	**Titanium**
7440-62-2	**Vanadium**

New Jersey Special Hazardous Substance List:

7440-39-3	**Barium**	**F3**
1317-95-9	**Silica**	**CA**
7439-93-2	**Lithium**	**F2, R2**
7429-90-5	**Aluminium**	**F3, R1**
7440-02-0	**Nickel**	**CA**
7440-21-3	**Silicon**	**F3**
7440-67-7	**Zirconium**	**F4, R1**
7440-32-6	**Titanium**	**F3, R1**

Pennsylvania Right-to-Know List:

7440-39-3	**Barium**
13463-67-7	**Titanium Dioxide**
1317-95-9	**Silica**
7439-93-2	**Lithium**
7429-90-5	**Aluminium**
7439-95-4	**Magnesium**
7440-02-0	**Nickel**
7440-21-3	**Silicon**
1309-48-4	**Magnesium Oxide**
7440-33-7	**Aluminium Oxide**
7439-98-7	**Molybdenum**
7440-50-8	**Copper**
7440-67-7	**Zirconium**
7631-86-9	**Silicon Dioxide**
7440-62-2	**Vanadium**

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

Pennsylvania Special Hazardous Substance List:

7440-39-3	**Barium**	**E**
7429-90-5	**Aluminium**	**E**
7440-02-0	**Nickel**	**ES**
1344-28-1	**Aluminium Oxide**	**E**
7440-50-8	**Copper**	**E**
7440-62-2	**Vanadium**	**E**

Carcinogenic categories:

EPA (Environmental Protection Agency):

7440-39-3	**Barium**	**D, CBD(inh), NL(oral)**
7440-50-8	**Copper**	**D**

· TLV (Threshold Limit Value established by ACGIH):

7440-39-3	**Barium**	**A4**
13463-67-7	**Titanium Dioxide**	**A4**
1317-95-9	**Silica**	**A2**
7429-90-5	**Aluminium**	**A4**
7440-02-0	**Nickel**	**A5**
1309-48-4	**Magnesium Oxide**	**A4**
1344-28-1	**Aluminium Oxide**	**A4**
7439-98-7	**Molybdenum**	**A3**
7440-67-7	**Zirconium**	**A4**

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

13463-67-7	**Titanium Dioxide**
1317-95-9	**Silica**
7440-02-0	**Nickel**

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

Hazard pictograms:

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

Signal word: Danger

· Hazard-determining components of labelling:
Iron, Titanium, Lithium, Silica, Nickel

· Hazard statements:
H315 Causes skin irritation.
H318 Causes serious eye damage**.**
H317 May cause an allergic skin reaction.
H350 May cause 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+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.
P363: Wash contaminated clothing before reuse.
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: 04/27/2022 / 3

TRADE NAME: CARBON STEEL ELECTRODES AND RODS FOR GAS SHIELDED ARC WELDING

·· 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. 2: Substances and mixtures which in contact with water emit flammable gases – Category 2
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
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
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
· * Data compared to the previous version altered.