



# HARDFACING ELECTRODES

Safety Data Sheet

Jan-2021

## 1.1. Product identifier

Product name : Hardfacing Welding Electrodes for surfacing application  
Other means of identification : RATNA HF 1, HF 2, HF 3, HF 5, HF II LH, HF LH, HF 15 CM, HF MN, HF MN SPL, R-Hard alloy, R-14Mn, R-CCR 70  
AWS Specifications : None

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

Use of the substance/mixture : For welding consumables and related products

## 1.3. Details of the supplier of the safety data sheet

Raajratna Electrodes Pvt.Ltd.  
11, Sona Roopa,  
C.G. Road, Navrangpura,  
Ahmedabad-380 006. (India)  
[raajcare@raajratnaelectrodes.com](mailto:raajcare@raajratnaelectrodes.com)

## 1.4. Emergency telephone number

Emergency number : 91 7926431543

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### GHS-US classification

Acute Tox. 4 (Oral)	H302	Skin Irrit.2	H315
Carc. 1B	H350	Eyelrrit.2A	H319
Aquatic Acute 1	H400	Skin Sens. 1	H317

### 2.2. Label elements

#### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H302 – Harmful if swallowed  
H315 – Causes skin irritation  
H317 – May cause an allergic skin reaction  
H319 – Causes serious eye irritation  
H350 – May cause cancer  
H372 – Causes damage to organs through prolonged or repeated exposure  
H400 – Very toxic to aquatic life

Precautionary statements (GHS-US) :

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/vapors/spray  
P261 – Avoid breathing dust/fume/gas/mist/vapors/spray  
P264 – Wash thoroughly after handling  
P270 – Do not eat, drink or smoke when using this product  
P272 – Contaminated work clothing should not be allowed out of the workplace  
P273 – Avoid release to the environment  
P280 – Wear protective gloves/protective clothing/eye protection/face protection  
P301+P312 – IF SWALLOWED: call a POISON CENTER or doctor/physician if you feel unwell  
P302+P352 – IF ON SKIN: Wash with plenty of soap and water  
P305+P351+P338 – If in eyes: Rinse cautiously with water for several minutes. Remove contact



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lenses, if present and easy to do. Continue rinsing  
 P308+P313 – IF exposed or concerned: Get medical advice/attention  
 P314 – Get medical advice and attention if you feel unwell  
 P330 – If swallowed, rinse mouth  
 P332+P313 – If skin irritation occurs: Get medical advice/attention  
 P333+P313 – If skin irritation or rash occurs: Get medical advice/attention  
 P337+P313 – If eye irritation persists: Get medical advice/attention  
 P362 – Take off contaminated clothing and wash before reuse  
 P362+P364 – Take off contaminated clothing and wash it before reuse  
 P391 – Collect spillage  
 P405 – Store locked up  
 P501 – Dispose of contents/container in accordance with local/regional/national/international regulations.

## 2.3. Other hazards

This product present no hazards in its intrinsic form. However, several hazards are generated during welding operations that can be harmful. Electric shock can kill. Molten metal and weld spatter can burn skin & eyes. Also can fire. Arc rays can injure eyes and burn skin. Fumes and gases generated are dangerous for the health.

## 2.4. Unknown acute toxicity (GHS-US)

No data available

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Not applicable

Full text of H-phrases: see section 16

### 3.2. Typical weld metal chemical composition

Product/Type	C	Mn	Si	Cr	Ni	Nb	Mo	V	W	Fe	Other	Fluoride
HF 1/R-250	0.22	0.55	0.60	2.00						Bal		
HF 2	0.25	0.60	0.60	2.70						Bal		
HF 3	0.65	0.65	0.55	7.50						Bal		
HF 5	2.50	1.00	2.50	3.00						Bal		
HF II LH	0.20	0.55	0.60	3.25						Bal		
HF LH	0.60	0.45	0.60	7.50			0.40	0.40		Bal		
HF MN	0.90	12.50	0.65							Bal		
HF MN SPL	0.60	13.50	0.60	3.10	2.75					Bal		
HF 15 CM	0.69	14.00	0.80	15.00	1.80					Bal		
R-Hard alloy	0.70			5.50			5.20	1.00	1.02	Bal		
R-14Mn	1.00	13.20								Bal		
R-CCR 70	2.75			19.00						Bal		
R-CCR 80	3.50			31.00						Bal		
R-CCR 100	5.00			32.00						Bal		
R-CCR 100 SPL	4.50			22.50	3.50					Bal		
R-350	0.32			3.75						Bal		
R-3000D	5.00			20.00		5.75	6.00	1.00	2.50	Bal		
R-350B	3.50			4.00						Bal		
R-650B	0.70			7.73			0.41	0.51		Bal		

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures after inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
- First-aid measures after skin contact : Flush with water for at least 15 minutes. Seek medical attention if irritation develops or persists.
- First-aid measures after eye contact : Immediately flush eyes with water and continue washing for at least 15 minutes. Obtain medical attention if discomfort persists.
- First-aid measures after ingestion : Do NOT induce vomiting. Get immediate medical attention.



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

Symptoms/injuries after inhalation	: Short-term (acute) overexposure to the gases, fumes, and dusts may include irritation of the eyes, lungs, nose, and throat. Some toxic gases associated with welding may cause pulmonary edema, asphyxiation, and death.  Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty in breathing, frequent coughing, or chest pain. The presence of chromium/chromate in fume can cause irritation of nasal membranes and skin. The presence of nickel compounds in fume can cause metallic taste, nausea, tightness of chest, fever, and allergic reaction. Excessive inhalation or ingestion of manganese can produce manganese poisoning. Overexposure to manganese compounds may affect the central nervous system, symptoms of which are languor, sleepiness, muscular weakness, emotional disturbances, and spastic gait resembling Parkinsonism. These symptoms can become progressive and permanent if not treated. Excessive inhalation of fumes may cause "Metal Fume Fever" with Flu-like symptoms such as chills, fever, body aches, vomiting, sweating, etc.
Symptoms/injuries after skin contact	: Dusts may cause irritation.
Symptoms/injuries after eye contact	: Causes eye irritation.
Symptoms/injuries after ingestion	: Not an anticipated route of exposure during normal product handling. May be harmful if ingested.

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

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media	: Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media	: None.

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

Fire hazard	: Not flammable.
Explosion hazard	: None known.

### 5.3. Advice for firefighters

Protection during firefighting	: Firefighters should wear full protective gear.
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## SECTION 6: Accidental release measures

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

#### 6.1.1. For non-emergency personnel

No additional information available

#### 6.1.2. For emergency responders

No additional information available

### 6.2. Environmental precautions

Avoid release to the environment.

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

For containment	: No special measures required.
Methods for cleaning up	: Attempt to reclaim the product, if this is possible.

### 6.4. Reference to other sections

No additional information available

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling drink and smoke in work areas	: Avoid generating dust. Avoid inhaling welding fumes. Avoid contact with skin, eyes and clothing. Do not eat,
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### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	: Store in cool, dry and well-ventilated place. Keep away from heat and open flame
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### 7.3. Specific end use(s)

For welding consumables and related products



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## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

INGREDIENT	CAS NUMBER	EINCS	OSHA PEL	ACGIH TLV	EU OEL
IRON (Fe)+ (limits as oxide/fume)	7439-89-6	231-096-4	5 R*	5 R* (Fe <sub>2</sub> O <sub>3</sub> ) {A4}	3 R* (Aerosol as Fe <sub>2</sub> O <sub>3</sub> ) – Switzerland 7*** (as Fe <sub>2</sub> O <sub>3</sub> ) – Denmark
MANGANESE (Mn)# (limits as fume)	7439-96-5	231-105-1	5 CL ** (Fume) 1, 3 STEL ***■	0.1 I* {A4} 0.02 R*	0.02 R* (Aerosol); 0.16 R*** (Aerosol) – Germany 0.2 I* (Aerosol) – Germany 0.2; 0.4*** - Denmark
MOLYBDENUM (Mo)	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol) 0.5 R* (Sol Cpnds) {A3}	3 R* - Spain; 4; 10*** - Poland
SILICON (Si)+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
CHROMIUM (Cr)#	7440-47-3	231-157-5	1 (Metal) 0.5 (CR II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	0.5 (Metal) {A4} 0.5 (Cr III Cpnds) {A4} 0.05 (Cr VI Sol Cpnds) {A1} 0.01 (Cr VI Insol Cpnds) {A1}	0.1 I* (Aerosol) – Switzerland 0.005; 0.01*** - Denmark 0.005 (Total Aerosol); 0.015*** (Total Aerosol) -Sweden
GRAPHITE (C)	7782-42-5	231-955-3	2.5 (Fume)	2.0 (Fume)	
MICA	12001-26-2	None	3 R*	3 R*	0.8 R* (Aerosol); 10 I* (Aerosol) - UK
TITANIUM DIOXIDE (TiO <sub>2</sub> )	1317-80-2	215-280-1	15 (Dust)	10 {A4}	1.5 R* (as TiO <sub>2</sub> ) - Germany
CALCIUM FLOURIDES (CaF <sub>2</sub> )	7789-75-5	232-188-7	2.5 (as F)	2.5 (as F) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
CALCIUM CARBONATE (CaCO <sub>3</sub> )	1317-65-3	215-279-6	5 R*, 5 (as CaO)	3 R*, 2 (as CaO)	3 R* (Aerosol) – Switzerland: 10 I* (Aerosol) – UK

R\*-Respirable Fraction R\*\*\*-Respirable Fraction-Short Term Exposure Limit I\*-Inhalable Fraction I\*\*\*-Inhalable Fraction-Short Term Exposure Limit \*-Ceiling Limit \*\*\*- Short Term Exposure Limit +-As a nuisance particulate covered under “Particulates Not Otherwise Regulated” by OSHA or “Particulates Not Otherwise Classified” by ACGIH +- Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (non-crystalline) form #- Reportable material under Section 313 of SARA ### -Reportable material under Section 313 of SARA as dust or fume ■- NIOSH REL TWA (Time Weighted Average) and STEL (Short Term Exposure Limit. Ele-Element Sol-Soluble Insol-Insoluble Inorg-Inorganic Cpnds-Compounds NOS-Not Otherwise Specified {A1}-Confirmed Human Carcinogen per ACGIH {A2}-Suspected Human Carcinogen per ACGIH {A3}-Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4}-Not Classifiable as a Human Carcinogen per ACGIH {A5}-Not Suspected as a Human Carcinogen per ACGIH (non-crystalline) form. See Section 16 for more definitions

### 8.2. Exposure controls

Appropriate engineering controls	: Local exhaust and general ventilation must be adequate to meet exposure standards.
Hand protection	: Wear welding gloves.
Eye protection	: Wear helmet or face shield with filter lens of appropriate shade number. See ANSI/ASC Z49.1 Section 4.2. Provide protective screens and flash goggles, if necessary, to shield others.
Skin and body protection	: Wear head and body protection, which help to prevent injury from radiation, sparks, flame and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the employee not to touch live electrical parts and to insulate him/herself from work and ground. Welders should not wear short sleeve shirts or short pants.
Respiratory protection	: If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn.

## SECTION 9: Physical and chemical properties

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

Physical state	: Solid
Appearance	: Rods
Color	: Black / Red / Various
Odor	: No data available



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Odor threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: 850-1110°C
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: No data available
Relative vapour density at 20 °C	: No data available
Relative density	: 6-9 g/cm <sup>3</sup>
Solubility	: No data available
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: No data available

## 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No additional information available

### 10.2. Chemical stability

The product is stable at normal handling and storage conditions.

### 10.3. Possibility of hazardous reactions

Will not occur.

### 10.4. Conditions to avoid

Protect products from moisture and contamination

### 10.5. Incompatible materials

No data available

### 10.6. 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 process, procedure and welding consumables used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coating on the metal being welded (i.e. paint, painting, galvanizing), the number of welders, the volume of the work area, the quality and the amount of ventilation, the position of the welders head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from the cleaning and degreasing activities).

When an electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. 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. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in Section 3, plus those from the base metal coating, etc., as noted above. Reasonable expected fume constituents of this product would include: Complex oxides of iron, manganese, silicon, chromium, nickel, columbium, molybdenum, copper, carbon dioxide, carbon monoxide, ozone and nitrogen oxides. Some products will also contain antimony, barium, molybdenum, aluminum, columbium, magnesium, strontium, tungsten, and or zirconium. Fume limit for chromium, nickel and or manganese may be reached before limit of 5 mg/m<sup>3</sup> of general welding fumes is reached.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.



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## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Oral: unknown health effects, but this exposure is unlikely to occur

Inhalation: inhalation of welding fumes may lead to acute and/or chronic health hazards

Skin: Arc rays can burn the skin. Weld fumes on skin can cause irritation.

Eye: Arc rays can injure eyes. Weld fumes can cause eye irritation.

Acute toxicity : Harmful if swallowed.

Substance	Short Term Effect	Long Term Effect	Toxicity Measure	Carcinogenicity
Aluminum oxide	May cause eye & respiratory irritation	May cause effect on central nervous system	LC50(Rat, oral, Exposure) >5000 mg/kg	Not classified
Chromium as Cr+3	May cause eye, skin & respiratory irritation	May cause chronic bronchitis, sinusitis, rhinitis & asthma	LC50 (Rat 14 days oral exposure) >5000 mg/kg	Not classified
Chromium as Cr+6	May cause eye, skin & respiratory irritation	May cause lung, nasal & sinus cancer, ulceration, and perforation of nasal septum and skin rash	LC50 (Rat oral exposure) = 29 mg/kg	IARC-1 NTP-known OSHA
Copper Oxide	May cause metal fume fever with upper respiratory irritation, chills and aching muscles.	Prolonged contact may cause skin sensitization	LC50 (Rat oral exposure) = 470 mg/kg	Not classified
Fluorides	May cause eye, skin & respiratory irritation	May cause bone erosion & mottling of teeth	LD50 (Rat oral exposure) = 31 mg/kg	Not classified
Iron Oxide	May respiratory irritation	May cause siderosis	LD50 (Rat oral exposure) >10000 mg/kg	Not classified
Magnesium oxide	May cause eye & respiratory irritation	May cause decreased lung function	LD50 (Rat oral exposure) = 3870 mg/kg	Not classified
Manganese oxide	May cause respiratory irritation, metal fume fever with chills, fever, upset stomach, vomiting	May cause brain and central nervous system effects resulting in arm & legs tremors, slurred & poor coordination	LD50 (Rat 4 hour inhalation exposure) =19 mg/kg	Not classified
Molybdenum	May cause eye & respiratory irritation	Not found	Not found	Not classified
Nickel Oxide	May cause respiratory irritation, inhalation of fumes may cause pneumonitis	Prolonged exposure may lead to asthma. May cause lung and nasal cancer	LD50 (Rat Inhalation Exposure) >5000 mg/kg	IARC-1 NTP-known
Niobium	May cause respiratory irritation	Not found	Not found	Not classified
Silica	May cause eye & respiratory irritation	Crystalline silica is a known carcinogen. Overexposure may also result in silicosis	Not found	IARC-1 NTP-known
Vanadium Oxide	May cause eye, skin & respiratory irritation	Exposure to high concentration of fume may lead to chronic nasal hyperplasia	LD50 (Rat Oral Exposure) =10 mg/kg	Not classified
CO2	At low level may cause headache, dizziness, loss of coordination, nausea. At high level can cause coma and possibility death	Long term exposure body's metabolism	LC50 (human inhalation exposure) =100,000 ppm/min	Not classified
Carbon Monoxide	May cause effect on blood, resulting in carboxyhaemoglobinemia and cardiac disorder. High level may result in death	May have effect on cardiovascular system and central nervous system may cause toxicity to human reproduction or development	LC50 (Rat 4 hour inhalation exposure) =1807 ppm	Not classified
Nitric Oxide	May cause respiratory irritation. Inhalation may cause lung oedema. Exposure far above the OEL may result in death	May cause decreased lung function.	LC50 (Rat inhalation exposure) = 150 mg/m <sup>3</sup>	Not classified
Titanium Dioxide	May cause respiratory irritation	May be carcinogenic	LD50 (Rat oral exposure) >10 g/kg	IARC-2B



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Skin corrosion/irritation	: Causes skin irritation.
Serious eye damage/irritation	: Causes serious eye irritation.
Respiratory or skin sensitisation	: May cause an allergic skin reaction.
Germ cell mutagenicity	: Not classified
Carcinogenicity	: May cause cancer.
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard	: Not classified

## SECTION 12: Ecological information

### 12.1 Toxicity: very toxic to aquatic life

INGREDIENT	CAS NUMBER	EINCS	Aquatic Toxicity Values
IRON (Fe)	7439-89-6	231-096-4	• 96 hr. LC50 Cyprinus carpio 0.56 mg/L
MANGANESE (Mn)	7439-96-5	231-105-1	• 48 hr EC50 Daphnia magna > 1.6 mg/L; • 72 hr EC50 desmodesmus subspicatus 4.5 mg/L • 96 hr LC50 Oncorhynchus mykiss >3.6 mg/L
MOLYBDENUM (Mo)	7439-98-7	231-107-2	• 48 hr LC50 Daphnia magna 2729.4 mg/L • 96 hr LC50 Pimephales promelas 609.1 mg/L;

### 12.2. Persistence and degradability

No additional information available

### 12.3. Bioaccumulative potential

Sodium silicate (1344-09-8)	
BCF fish 1	(no bioaccumulation expected)
Potassium silicate (1312-76-1)	
BCF fish 1	(no bioaccumulation expected)
Potassium hydroxide (1310-58-3)	
Log Pow	0.65

### 12.4. Mobility in soil

No additional information available

### 12.5. Other adverse effects

No additional information available

## SECTION 13: DISPOSAL CONSIDERATION

### 13.1. Waste treatment methods

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations.

In accordance with DOT / ADR / RID / ADNR / IMDG / ICAO / IATA



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## SECTION 14: Transport information

### 14.1. UN number

Not a dangerous good in sense of transport regulations

### 14.2. UN proper shipping name

Not applicable

## SECTION 15: Regulatory information

### US FEDERAL REGULATIONS:

**OSHA:** Listed as air contaminants and hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

**TSCA:** Toxic Substance Control Act – All ingredients of this SDS are listed on the TSCA inventory.

**CERCLA:** The ingredients listed on this SDS are not subject to CERCLA reporting requirements.

**SARA HAZARD CATEGORY (311/312):** Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard

### SARA Title III Section 313 Toxic Chemicals:

MANGANESE (Mn)*	7439-96-5	231-105-1	8-13%
CHROMIUM (Cr)*	7440-47-3	231-157-5	12-20%

\*Includes all compounds of these ingredients.

### SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (TPQ): None

#### STATE REGULATIONS

**CALIFORNIA PROPOSITION 65:** WARNING: The products covered by this SDS may contain chromium and titanium dioxide. These products, when used for welding or cutting produces fumes or gases which contain chemicals known to the State of California to cause cancer and birth defects (or other reproductiveharm). (California Health & Safety Code Section 25249.5 et seq.).

INGREDIENT	CAS NUMBER	Massachusetts Right to know (RTK) List	Minnesota Hazardous Substance List	New Jersey RTK Hazardous Substance List	Pennsylvania RTK List
MANGANESE (Mn)	7439-96-5	Yes	Yes	Yes	Yes
SILICON (Si)	7440-21-3	Yes	Yes	Yes	Yes
CHROMIUM (Cr)	7440-47-3	Yes	Yes	Yes	Yes
MOLYBDENUM (Mo)	7439-98-7	Yes	Yes	Yes	Yes
TITANIUM DIOXIDE (TiO <sub>2</sub> )	13463-67-7	Yes	Yes	Yes	Yes
CALCIUM CARBONATE (CaCO <sub>3</sub> )	1317-65-3	Yes	Yes	Yes	Yes

#### INTERNATIONAL REGULATIONS

**CANADIAN WHMIS CLASSIFICATION:** Class D, Division 2, Subdivision A.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):** All constituents of these products are on the Domestic Substance List (DSL).





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## SECTION 16: Regulatory information

Other information

: We believe that the information contained herein is current as of the date of this SDS. As the condition or methods of use are beyond Raajratna Electrodes Pvt.Ltd. control. Raajratna Electrodes pvt.ltd. does not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without any warranty, expressed or implied, regarding the accuracy of the information, the hazard connected with the use of this material or the results to be obtained for use thereof. It is the user's obligation to determine the conditions of safe use of these products..

Full text of H-phrases:

Acute Tox. 3 (Oral)	Acute toxicity (oral), Category 3
Acute Tox. 4 (Inhalation)	Acute toxicity (inhal.), Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Acute Tox. Not classified (Oral)	Acute toxicity (oral) Not classified
Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
Aquatic Chronic 2	Hazardous to the aquatic environment — Chronic Hazard, Category2
Carc. 1B	Carcinogenicity, Category 1B
Carc. 2	Carcinogenicity, Category 2
Eye Irrit. 2A	Serious eye damage/eye irritation, Category 2A
Skin Corr. 1A	Skin corrosion/irritation, Category 1A
Skin Irrit. 2	Skin corrosion/irritation, Category 2
Skin Sens. 1	Sensitization — Skin, category 1
STOT RE 1	Specific target organ toxicity — Repeated exposure, Category 1
H301	Toxic if swallowed
H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H332	Harmful if inhaled
H350	May cause cancer
H351	Suspected of causing cancer
H372	Causes damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

NFPA health hazard

: 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard

: 0 - Materials that will not burn.

NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

### HMIS III Rating

Health

: 2 Moderate Hazard - Temporary or minor injury may occur

Flammability

: 0 Minimal Hazard

Physical

: 0 Minimal Hazard

