

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

### 1 Identification

#### Product identifier

- **Trade name:** Low-Alloy Steel Electrodes for Flux Cored Arc Welding

- **Product number:**

Specification: A5.29

Classification: E100T1-K3C, E101T1-GM, E110T5-K4C, E111T1-GM, E111T1-K3C, E111T1-K3M, E111T1-K3M-JH8, E80T5-Ni3M, E81T1-A1C/A1M, E81T1-B2C H8, E81T1-B2C/B2M, E81T1-B2LC, E81T1-B6M, E81T1-B8M, E81T1-K2M, E81T1-Ni1C/Ni1M, E81T1-Ni1C-JH4/Ni1M-JH4, E81T1-Ni2C/Ni2M, E81T1-Ni2C-JH4/Ni2M-JH4, E81T1-W2C/W2M, E91T1-B3C/B3M, E91T1-B9M, E91T1-K2C/K2M, E91T1-K2C-JH8/K2M-JH8

Low-alloy steel electrodes for flux cored 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:** Low-alloy steel electrodes for flux cored arc welding.

- **Application of the substance / the mixture:** Industry specific application.

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

- **Supplier:**

SOWESCO I, LLC

9384 Wallisville Road

Houston, TX 77013

Telephone: 800-856-9353

- **Emergency telephone number:** 713-688-9353

### 2 Hazard(s) identification

#### Classification of the substance or mixture:



GHS08 Health hazard

Resp. Sens. 1 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Carc. 1A H350 May cause cancer.

STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.



GHS07

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

- **GHS label elements**

The product is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms:**



GHS07 GHS08

- **Signal word:** Danger

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

- **Hazard-determining components of labeling:**

Iron  
Titanium Dioxide  
Nickel  
Cobalt  
Silica

- **Hazard statements:**

Causes skin irritation.  
May cause an allergic skin reaction.  
Causes serious eye irritation.  
May cause respiratory irritation.  
May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
May cause cancer.  
Causes damage to organs through prolonged or repeated exposure.

- **Precautionary statements:**

Do not handle until all safety precautions have been read and understood.  
Obtain special instructions before use.  
Do not eat, drink or smoke when using this product.  
Do not breathe dust/fume/gas/mist/vapors/spray.  
Use only outdoors or in a well-ventilated area.  
Store in a well-ventilated place. Keep container tightly closed.  
Store locked up.  
Wear respiratory protection.  
Wear protective gloves/protective clothing/eye protection/face protection.  
Wash thoroughly after handling.  
Contaminated work clothing must not be allowed out of the workplace.  
Take off contaminated clothing and wash it before reuse.  
If in eyes: Rinse cautiously with water for several minutes.  
Remove contact lenses, if present and easy to do. Continue rinsing.  
If eye irritation persists: Get medical advice/attention.  
If on skin: Wash with plenty of water.  
If skin irritation or rash occurs: Get medical advice/attention.  
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
Call a poison center/doctor if you feel unwell.  
If exposed or concerned: Get medical advice/attention.  
If experiencing respiratory symptoms: Call a poison center/doctor.  
Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).  
Avoid release to the environment.  
Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Unknown acute toxicity:**

19 percent of the mixture consists of ingredient(s) of unknown toxicity.

- **Classification system:**

**NFPA ratings (scale 0 - 4)**

Health = 1  
Fire = 0  
Reactivity = 0

**HMIS-ratings (scale 0 - 4)**

Health = \*1  
Fire = 0  
Reactivity = 0

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

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding****3 Composition/information on ingredients****Chemical characterization:** Mixtures

- **Description:** Mixture of substances listed below with nonhazardous additions.

<b>Dangerous Components:</b>		
CAS: 7439-89-6 RTECS: NO 4565500	Iron	70-98%
CAS: 7787-32-8 RTECS: CQ 9100000	Barium fluoride ⚠ Acute Tox. 4, H302; Acute Tox. 4, H332	0-12%
CAS: 13463-67-7	Titanium Dioxide ⚠ Carc. 2, H351; ⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335	0-10%
CAS: 7440-39-3 RTECS: CQ 8370000	Barium ⚠ Water-react. 2, H261	0-10%
CAS: 7429-90-5 RTECS: BD 0330000	Aluminium ⚠ Flam. Sol. 2, H228	0-5%
CAS: 7789-75-5 RTECS: EW 1760000	Calcium fluoride ⚠ Skin Irrit. 2, H315; STOT SE 3, H335; Eye Irrit. 2B, H320	0-5%
CAS: 7439-96-5 RTECS: OO 9275000	Manganese ⚠ Pyr. Sol. 1, H250; Water-react. 1, H260	0-2%
CAS: 7440-21-3	Silicon ⚠ Flam. Sol. 2, H228; ⚠ Acute Tox. 4, H302; Eye Irrit. 2B, H320	0-4%
CAS: 7440-02-0	Nickel ⚠ Carc. 2, H351; STOT RE 1, H372; ⚠ Skin Sens. 1, H317	0-4%
CAS: 1344-28-1 RTECS: BD 1200000	Aluminium Oxide ⚠ STOT SE 3, H335	0-3%
CAS: 7440-47-3 RTECS: GB 4200000	Chromium ⚠ Acute Tox. 4, H302; Acute Tox. 4, H312; Skin Irrit. 2, H315; Eye Irrit. 2B, H320	0-3%
CAS: 1317-95-9	Silica ⚠ Carc. 1A, H350; ⚠ STOT SE 3, H335	0-2%
CAS: 7439-98-7 RTECS: QA 4680000	Molybdenum	0-2%
CAS: 7440-32-6 RTECS: XR 1700000	Titanium ⚠ Skin Sens. 1, H317; Eye Irrit. 2B, H320	0-2%
CAS: 7440-67-7 RTECS: ZH 7070000	Zirconium ⚠ Pyr. Sol. 1, H250; Water-react. 1, H260	0-1%
CAS: 7440-44-0 RTECS: FF 5250100	Carbon	0-1%
CAS: 7440-50-8 RTECS: GL 5325000	Copper ⚠ STOT SE 3, H335; Aquatic Chronic 4, H413	0-2%
CAS: 1309-64-4	Antimony trioxide ⚠ Carc. 2, H351	0-1%
CAS: 7440-48-4 RTECS: GF 8750000	Cobalt ⚠ Resp. Sens. 1, H334; Carc. 2, H351; ⚠ Skin Sens. 1, H317; Aquatic Chronic 4, H413; Combustible Dust	0-1%
CAS: 554-13-2 RTECS: OJ 5800000	Lithium Carbonate ⚠ Acute Tox. 4, H302; Acute Tox. 4, H332; Eye Irrit. 2A, H319	0-2%

(Contd. on page 4)

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

CAS: 7789-24-4 RTECS: OJ 6125000	Lithium fluoride ⚠️ Acute Tox. 3, H301; ⚠️ Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335	0-2%
CAS: 12057-24-8 RTECS: OJ6360000	Lithium Oxide ⚠️ Skin Corr. 1A, H314; Eye Dam. 1, H318	≤ 2.5%
CAS: 1309-48-4	Magnesium Oxide ⚠️ Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335	0-2%
CAS: 11129-60-5	Manganese oxide	0-2%
CAS: 7440-03-1 RTECS: QT9900000	Niobium ⚠️ Flam. Sol. 1, H228; Combustible Dust	0-0.3%
CAS: 7439-95-4 RTECS: OM 2100000	Magnesium ⚠️ Pyr. Sol. 1, H250; Water-react. 1, H260	0-3%
CAS: 7440-62-2 RTECS: YW 1355000	Vanadium	0-0.3%
CAS: 7439-93-2 RTECS: OJ 5540000	Lithium ⚠️ Water-react. 1, H260; ⚠️ Skin Corr. 1B, H314	0-9%
CAS: 1317-61-9	Iron Oxide	0-12%
CAS: 1306-38-3	Cerium dioxide	0-2%

**Additional information**

Note: Certain chemical constituents listed in Section 3 may vary depending upon the Classification of the Low-Alloy Steel Electrodes for Flux Cored Arc Welding products.

**4 First-aid measures****Description of first aid measures**

- **General information:**

Symptoms of poisoning may occur after several hours; therefore medical observation is advised for at least 48 hours after the accident.

- **After inhalation:**

Supply fresh air. If required, provide artificial respiration. Consult doctor if symptoms persist. In case of unconsciousness, place patient stably in 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. 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:**

No further relevant information available.

**5 Fire-fighting measures****Extinguishing media**

- **Suitable extinguishing agents:**

CO<sub>2</sub>, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

(Contd. on page 5)

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

### Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding

#### 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. Mixtures of silicon, aluminum, and lead explode when heated. If incinerated, product will release the following toxic fumes: Oxides of iron, manganese, silicon, aluminum, nickel, niobium, magnesium, molybdenum, titanium, vanadium, barium, lithium, zirconium, carbon, copper, antimony, barium, cerium, chromium, cobalt, calcium, manganese, and fluorides and ozone.

#### Advice for firefighters

- **Protective equipment:**

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 aluminum 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.

At temperatures above 200 °C Zirconium reacts exothermically with the following: fluorine, chloride, bromide, iodine, halocarbons, carbon tetrachloride, carbon, tetra fluoride and Freon's.

### 6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures:**

Ensure adequate ventilation.  
Wear protective equipment.  
Keep unprotected persons away.  
Avoid contact with skin, eyes and clothing.

- **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.

- **Methods and material for containment and cleaning up:**

Ensure adequate ventilation.  
Pick up mechanically.  
Dispose contaminated material as waste according to Section 13.  
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 Section 13 for disposal information.

### 7 Handling and storage

#### Handling

- **Precautions for safe handling:**

Open and handle receptacle with care.  
Ensure good ventilation/exhaustion at the workplace.

- **Information about protection against explosions and fires:**

Keep protective respiratory device available.

#### Storage

- **Conditions for safe storage, including any incompatibilities:**

Store away from strong acids, strong bases, strong oxidizing agents and strong reducing agents.

- **Requirements to be met by storerooms and receptacles:** No special requirements.

- **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.

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding****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:****7787-32-8 Barium fluoride**

PEL	Long-term value: 2.5 mg/m <sup>3</sup> as F
REL	Long-term value: 2.5 mg/m <sup>3</sup> as F
TLV	Long-term value: 2.5 mg/m <sup>3</sup> as F, BEI

**13463-67-7 Titanium Dioxide**

PEL	Long-term value: 15* mg/m <sup>3</sup> *total dust
REL	See <a href="#">Pocket Guide App. A</a>
TLV	Long-term value: 10 mg/m <sup>3</sup> withdrawn from NIC

**7440-39-3 Barium**

PEL	Long-term value: 0.5 mg/m <sup>3</sup> as Ba
REL	Long-term value: 0.5 mg/m <sup>3</sup> as Ba; and soluble compounds
TLV	Long-term value: 0.5 mg/m <sup>3</sup> as Ba

**7429-90-5 Aluminium**

PEL	Long-term value: 15*; 15** mg/m <sup>3</sup> *total dust **respirable fraction
REL	Long-term value: 10* 5** mg/m <sup>3</sup> as Al; *total dust **respirable/pyro powd./welding f.
TLV	Long-term value: 1* mg/m <sup>3</sup> as Al; *respirable fraction

**7789-75-5 Calcium fluoride**

PEL	Long-term value: 2.5 mg/m <sup>3</sup> as F
REL	Long-term value: 2.5 mg/m <sup>3</sup> as F
TLV	Long-term value: 2.5 mg/m <sup>3</sup> as F, BEI

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

<b>7439-96-5 Manganese</b>	
PEL	Ceiling limit value: 5 mg/m <sup>3</sup> as Mn
REL	Short-term value: 3 mg/m <sup>3</sup> Long-term value: 1 mg/m <sup>3</sup> as Mn; fume
TLV	Long-term value: 0.02* 0.1* mg/m <sup>3</sup> as Mn; *respirable **inhalable fraction
<b>7440-21-3 Silicon</b>	
PEL	Long-term value: 15* 5** mg/m <sup>3</sup> *total dust **respirable fraction
REL	Long-term value: 10* 5** mg/m <sup>3</sup> *total dust **respirable fraction
TLV	TLV withdrawn
<b>7440-02-0 Nickel</b>	
PEL	Long-term value: 1 mg/m <sup>3</sup>
REL	Long-term value: 0.015 mg/m <sup>3</sup> as Ni; See <a href="#">Pocket Guide App. A</a>
TLV	Long-term value: 1.5* mg/m <sup>3</sup> elemental, *inhalable fraction
<b>1344-28-1 Aluminium Oxide</b>	
PEL	Long-term value: 15*; 15** mg/m <sup>3</sup> *total dust **respirable fraction
REL	Long-term value: 10* 5** mg/m <sup>3</sup> as Al; *total dust **respirable/pyro powd./welding f.
TLV	Long-term value: 1* mg/m <sup>3</sup> as Al; *respirable fraction
<b>7440-47-3 Chromium</b>	
PEL	Long-term value: 1* 0.5** mg/m <sup>3</sup> as Cr; *metal **inorganic compds.
REL	Long-term value: 0.5* mg/m <sup>3</sup> as Cr; *metal+inorg.compds.; See <a href="#">Pocket Guide App. C</a>
TLV	Long-term value: 0.5 mg/m <sup>3</sup>
<b>1317-95-9 Silica</b>	
PEL	see Quartz listing
REL	Long-term value: 0.05* mg/m <sup>3</sup> *respirable dust; See <a href="#">Pocket Guide App. A</a>
TLV	TLV withdrawn
<b>7440-67-7 Zirconium</b>	
PEL	Long-term value: 5 mg/m <sup>3</sup> as Zr
REL	Short-term value: 10 mg/m <sup>3</sup> Long-term value: 5 mg/m <sup>3</sup> as Zr
TLV	Short-term value: 10 mg/m <sup>3</sup> Long-term value: 5 mg/m <sup>3</sup> as Zr

(Contd. on page 8)

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

<b>7439-98-7 Molybdenum</b>	
PEL	Long-term value: 15* mg/m <sup>3</sup> *Total dust
TLV	Long-term value: 10* 3** mg/m <sup>3</sup> as Mo; *inhalable fraction ** respirable fraction
<b>7440-44-0 Carbon</b>	
PEL	Short-term value: 10 A mg/m <sup>3</sup> Long-term value: 5 A mg/m <sup>3</sup>
<b>7440-50-8 Copper</b>	
PEL	Long-term value: 1* 0.1** mg/m <sup>3</sup> as Cu *dusts and mists **fume
REL	Long-term value: 1* 0.1** mg/m <sup>3</sup> as Cu *dusts and mists **fume
TLV	Long-term value: 1* 0.2** mg/m <sup>3</sup> *dusts and mists; **fume; as Cu
<b>1309-64-4 Antimony trioxide</b>	
PEL	Long-term value: 0.5 mg/m <sup>3</sup>
REL	Long-term value: 0.5 mg/m <sup>3</sup> as Sb
TLV	Long-term value: 0.5 mg/m <sup>3</sup> as Sb; Production: L
<b>7440-48-4 Cobalt</b>	
PEL	Long-term value: 0.1* mg/m <sup>3</sup> as Co; *for metal dust and fume
REL	Long-term value: 0.05 mg/m <sup>3</sup> as Co; metal dust & fume
TLV	Long-term value: 0.02 mg/m <sup>3</sup> BEI
<b>7789-24-4 Lithium fluoride</b>	
PEL	Long-term value: 2.5 mg/m <sup>3</sup> as F
REL	Long-term value: 2.5 mg/m <sup>3</sup> as F
TLV	Long-term value: 2.5 mg/m <sup>3</sup> as F, BEI
<b>1309-48-4 Magnesium Oxide</b>	
PEL	Long-term value: 15* mg/m <sup>3</sup> fume; *total particulate
TLV	Long-term value: 10* mg/m <sup>3</sup> *as inhalable fraction
<b>11129-60-5 Manganese oxide</b>	
PEL	Ceiling limit value: 5 mg/m <sup>3</sup> as Mn
REL	Short-term value: 3 mg/m <sup>3</sup> Long-term value: 1 mg/m <sup>3</sup> as Mn
TLV	Long-term value: 0.02* 0.1* mg/m <sup>3</sup> as Mn; *respirable **inhalable fraction

(Contd. on page 9)



**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

<b>Ingredients with biological limit values:</b>	
<b>7787-32-8 Barium fluoride</b>	
BEI	2 mg/L urine prior to shift Fluoride (background, nonspecific)
	3 mg/L urine end of shift Fluoride (background, nonspecific)
<b>7789-75-5 Calcium fluoride</b>	
BEI	2 mg/L urine prior to shift Fluoride (background, nonspecific)
	3 mg/L urine end of shift Fluoride (background, nonspecific)
<b>7440-48-4 Cobalt</b>	
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)
<b>7789-24-4 Lithium fluoride</b>	
BEI	2 mg/L urine prior to shift Fluoride (background, nonspecific)
	3 mg/L urine end of shift Fluoride (background, nonspecific)

**Additional information:** The lists that were valid during the creation of 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.

(Contd. on page 10)

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding****· Breathing equipment:**

Suitable respiratory protective device recommended.

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

**· Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture. Select glove material based on penetration times, rates of diffusion and degradation.

**· Material of gloves:**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

**· Penetration time of glove material:**

The exact break-through time has to be determined and observed by the manufacturer of the protective gloves.

**· Eye protection:**

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:**

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.

**9 Physical and chemical properties****Information on basic physical and chemical properties****General Information****· Appearance:****Form:**

Flux Cored Wire/Rod

**Color:**

Silver/gray metallic color

**· Odor:**

Odorless until used

**Odor threshold:**

Not determined.

**· pH-value:**

Not applicable.

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding****Change in condition**

- **Melting point/Melting range:** Not determined.
- **Boiling point/Boiling range:** Not determined.
- **Flash point:** Not applicable.
- **Flammability (solid, gaseous):** Not determined.
- **Ignition temperature:** Not determined.
- **Decomposition temperature:** Not determined.
- **Auto igniting:** Product is not self-igniting.
- **Danger of explosion:** Product does not present an explosion hazard.
- **Explosion limits:**
  - Lower:** Not determined.
  - Upper:** Not determined.
- **Vapor pressure:** Not applicable.
- **Density:**
  - Relative density:** Not determined.
  - Vapor density:** Not applicable.
- **Evaporation rate:** Not applicable.
- **Solubility in / Miscibility with Water:** Insoluble.
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
  - Dynamic:** Not applicable.
  - Kinematic:** Not applicable.
- **Solvent content:**
  - Organic solvents:** 0.0 %
  - Solids content:** 100.0 %
- **Other information:** No further relevant information available.

**10 Stability and reactivity**

- **Reactivity:** Stable under normal conditions.
- **Chemical stability:** Stable under normal conditions.
- **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 vapors 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.

(Contd. on page 12)

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

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 iron, manganese, silicon, aluminum, nickel, niobium, magnesium, molybdenum, titanium, vanadium, barium, lithium, zirconium, carbon, copper, antimony, barium, cerium, chromium, cobalt, calcium, manganese, and fluorides and ozone. Some elements or compounds may exceed their PELs/TLVs before the total fumes exceed 5 mg/m<sup>3</sup>.

**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 ROUTES OF 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.
- 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.
- 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.

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.
- 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 hemolytic anemia and accelerates arteriosclerosis.
- 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 in time when exposure to iron fumes and its compounds ceases. Iron and magnetite (Fe<sub>3</sub>O<sub>4</sub>) are not regarded as fibrogenic materials.

(Contd. on page 13)

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

- 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. Behavioral 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 anemia.
- 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. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.
- TITANIUM DIOXIDE may cause pulmonary irritation and slight fibrosis.

· **Acute toxicity:**

<b>LD/LC50 values that are relevant for classification:</b>		
<b>7439-89-6 Iron</b>		
Oral	LD50	7500 mg/kg (rat)
<b>7787-32-8 Barium fluoride</b>		
Oral	LD50	250 mg/kg (rat)
<b>13463-67-7 Titanium Dioxide</b>		
Oral	LD50	>10000 mg/kg (rat)
Dermal	LD50	>10000 mg/kg (rabbit)
Inhalative	LC50/4 h	>6.82 mg/l (rat)
<b>7429-90-5 Aluminium</b>		
Oral	LD50	>2000 mg/kg (rat)
Inhalative	LC50/4 h	888 mg/l (rat)
<b>7789-75-5 Calcium fluoride</b>		
Oral	LD50	4250 mg/kg (rat)
<b>7439-96-5 Manganese</b>		
Oral	LD50	9000 mg/kg (rat)
<b>7440-21-3 Silicon</b>		
Oral	LD50	3160 mg/kg (rat)
<b>7439-98-7 Molybdenum</b>		
Oral	LD50	>5000 mg/kg (rat)
Dermal	LD50	>2000 mg/kg (rat)
Inhalative	LC50/4 h	800 mg/l (trout) >5.84 mg/l (rat)
<b>1309-64-4 Antimony trioxide</b>		
Oral	LD50	>20000 mg/kg (rat)
<b>7440-48-4 Cobalt</b>		
Oral	LD50	6170 mg/kg (rat)
<b>554-13-2 Lithium Carbonate</b>		
Oral	LD50	525 mg/kg (rat)
Dermal	LD50	>2000 mg/kg (rabbit)
Inhalative	LC50/4 h	>2.17 mg/l (rat)

(Contd. on page 14)

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding****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.

**Additional toxicological information**

The product shows the following danger according to internally approved calculation methods for preparations: Harmful, Irritant.

**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
- Group 4 - Probably not carcinogenic to humans

7787-32-8	Barium fluoride	3
13463-67-7	Titanium Dioxide	2B
7789-75-5	Calcium fluoride	3
7440-02-0	Nickel	1
7440-47-3	Chromium	3
1317-95-9	Silica	1
1309-64-4	Antimony trioxide	2B
7440-48-4	Cobalt	2B
7789-24-4	Lithium fluoride	3
· <b>NTP (National Toxicology Program):</b>		
7440-02-0	Nickel	R
1317-95-9	Silica	K
· <b>OSHA-Ca (Occupational Safety &amp; Health Administration):</b>		
None of the ingredients are listed.		

**12 Ecological information****Toxicity**· **Aquatic toxicity:****13463-67-7 Titanium Dioxide**

EC50 &gt;1000 mg/l (Water flea)

**7439-96-5 Manganese**

EC50 40 mg/l (Water flea)

**7440-02-0 Nickel**

EC50 1.0 mg/l (Water flea)

**7440-47-3 Chromium**

EC50 0.07 mg/l (Water flea)

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

<b>7440-50-8 Copper</b>	
EC50	0.04-0.05 mg/l (Water flea)
<b>554-13-2 Lithium Carbonate</b>	
EC50	>400 mg/l (Green algae) 33.2 mg/l (daphnia)

**Persistence and degradability:** No further relevant information available.**Behavior in environmental systems:**

- **Bioaccumulative 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.**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 packagings:**

- **Recommendation:** Disposal must be made according to official regulations.

**14 Transport information****UN-Number:**

- **DOT, ADR, ADN, IMDG, IATA** Non-Regulated Material

**UN proper shipping name:**

- **DOT, ADN, IMDG, IATA** Non-Regulated Material

**Transport hazard class(es):**

- **DOT, ADR, ADN, IMDG, IATA** Non-Regulated Material

**Packing group:**

- **DOT, ADR, 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

**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.

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

<b>· Section 313 (Specific toxic chemical listings):</b>	
7787-32-8	Barium fluoride
7440-39-3	Barium
7429-90-5	Aluminium
7439-96-5	Manganese
7440-02-0	Nickel
1344-28-1	Aluminium Oxide
7440-47-3	Chromium
7440-50-8	Copper
1309-64-4	Antimony trioxide
7440-48-4	Cobalt
554-13-2	Lithium Carbonate
11129-60-5	Manganese oxide
7440-62-2	Vanadium
<b>· TSCA (Toxic Substances Control Act):</b>	
7439-89-6	Iron
1317-61-9	Iron Oxide
7787-32-8	Barium fluoride
13463-67-7	Titanium Dioxide
7440-39-3	Barium
7429-90-5	Aluminium
7789-75-5	Calcium fluoride
7439-96-5	Manganese
7440-21-3	Silicon
7440-02-0	Nickel
1344-28-1	Aluminium Oxide
7439-95-4	Magnesium
7440-47-3	Chromium
7439-98-7	Molybdenum
7440-32-6	Titanium
<b>California Proposition 65:</b>	
<b>· Chemicals known to cause cancer:</b>	
13463-67-7	Titanium Dioxide
7440-02-0	Nickel
1309-64-4	Antimony trioxide
7440-48-4	Cobalt
<b>· Chemicals known to cause reproductive toxicity for females:</b>	
None of the ingredients are listed.	
<b>· Chemicals known to cause reproductive toxicity for males:</b>	
None of the ingredients are listed.	
<b>· Chemicals known to cause developmental toxicity:</b>	
554-13-2	Lithium Carbonate

(Contd. on page 17)



**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding****Carcinogenic categories**

<b>· EPA (Environmental Protection Agency):</b>		
7787-32-8	Barium fluoride	D, CBD(inh), NL(oral)
7440-39-3	Barium	D, CBD(inh), NL(oral)
7439-96-5	Manganese	D
7440-47-3	Chromium	D
7440-50-8	Copper	D
1306-38-3	Cerium dioxide	II
11129-60-5	Manganese oxide	D
<b>· TLV (Threshold Limit Value established by ACGIH):</b>		
7787-32-8	Barium fluoride	A4
13463-67-7	Titanium Dioxide	A4
7440-39-3	Barium	A4
7429-90-5	Aluminium	A4
7789-75-5	Calcium fluoride	A4
7440-02-0	Nickel	A5
1344-28-1	Aluminium Oxide	A4
7440-47-3	Chromium	A4
1317-95-9	Silica	A2
7439-98-7	Molybdenum	A3
7440-67-7	Zirconium	A4
1309-64-4	Antimony trioxide	A2
7440-48-4	Cobalt	A3
7789-24-4	Lithium fluoride	A4
1309-48-4	Magnesium Oxide	A4
<b>· NIOSH-Ca (National Institute for Occupational Safety and Health):</b>		
13463-67-7	Titanium Dioxide	
7440-02-0	Nickel	
1317-95-9	Silica	

**· GHS label elements**

The product is classified and labeled according to the Globally Harmonized System (GHS).

**· Hazard pictograms:**

GHS07 GHS08

**· Signal word: Danger****· Hazard-determining components of labeling:**

Iron  
Titanium Dioxide  
Nickel  
Cobalt  
Silica

**Safety Data Sheet (SDS)**

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding****· Hazard statements:**

- Causes skin irritation.
- May cause an allergic skin reaction.
- Causes serious eye irritation.
- May cause respiratory irritation.
- May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- May cause cancer.
- Causes damage to organs through prolonged or repeated exposure.

**· Precautionary statements:**

- Do not handle until all safety precautions have been read and understood.
- Obtain special instructions before use.
- Do not eat, drink or smoke when using this product.
- Do not breathe dust/fume/gas/mist/vapors/spray.
- Use only outdoors or in a well-ventilated area.
- Store in a well-ventilated place. Keep container tightly closed.
- Store locked up.
- Wear respiratory protection.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Wash thoroughly after handling.
- Contaminated work clothing must not be allowed out of the workplace.
- Take off contaminated clothing and wash it before reuse.
- If in eyes: Rinse cautiously with water for several minutes.
- Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists: Get medical advice/attention.
- If on skin: Wash with plenty of water.
- If skin irritation or rash occurs: Get medical advice/attention.
- If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- Call a poison center/doctor if you feel unwell.
- If exposed or concerned: Get medical advice/attention.
- If experiencing respiratory symptoms: Call a poison center/doctor.
- Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).
- Avoid release to the environment.
- Dispose of contents/container in accordance with local/regional/national/international regulations.

**· National regulations:**

The product is subject to be classified according with the latest version of the regulations on hazardous substances.

**· State Right to Know:**

CAS: 7439-89-6 RTECS: NO 4565500	Iron	70-98%
CAS: 1317-61-9	Iron Oxide	0-12%
CAS: 7787-32-8 RTECS: CQ 9100000	Barium fluoride ⚠ Acute Tox. 4, H302; Acute Tox. 4, H332	0-12%
CAS: 13463-67-7	Titanium Dioxide ⚠ Carc. 2, H351; ⚠ Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H33	0-10%
CAS: 7440-39-3 RTECS: CQ 8370000	Barium ⚠ Water-react. 2, H261	0-10%
CAS: 7429-90-5 RTECS: BD 0330000	Aluminium ⚠ Flam. Sol. 2, H228	0-5%

All ingredients are listed.

**Information about limitation of use**

- Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

(Contd. on page 19)

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 08/04/2015

Reviewed on 09/04/2015

**Trade name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding**

### 16 Other information

SOWESCO 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 SOWESCO'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 preparation - last revision:** 08/04/2015 – 09/04/2015

- **Abbreviations and acronyms:**

ACGIH: American Conference of Governmental Industrial Hygienists  
 Acute Tox. 3: Acute toxicity, Hazard Category 3  
 Acute Tox. 4: Acute toxicity, Hazard Category 4  
 ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways  
 ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road  
 Aquatic Chronic 4: Hazardous to the aquatic environment - Chronic Hazard, Category 4  
 Carc. 1A: Carcinogenicity, Hazard Category 1A  
 Carc. 2: Carcinogenicity, Hazard Category 2  
 CAS: Chemical Abstracts Service (division of the American Chemical Society)  
 DOT: US Department of Transportation  
 EINECS: European Inventory of Existing Commercial Chemical Substances  
 ELINCS: European List of Notified Chemical Substances  
 Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1  
 Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A  
 Eye Irrit. 2B: Serious eye damage/eye irritation, Hazard Category 2B  
 Flam. Sol. 1: Flammable solids, Hazard Category 1  
 Flam. Sol. 2: Flammable solids, Hazard Category 2  
 HMIS: Hazardous Materials Identification System (USA)  
 IATA: International Air Transport Association  
 IMDG: International Maritime Code for Dangerous Goods  
 LC50: Lethal concentration, 50 percent  
 LD50: Lethal dose, 50 percent  
 NFPA: National Fire Protection Association (USA)  
 PBT: Persistent, Bioaccumulative and Toxic  
 Pyr. Sol. 1: Pyrophoric Solids, Hazard Category 1  
 Resp. Sens. 1: Sensitisation - Respirat., Hazard Category 1  
 Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A  
 Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B  
 Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2  
 Skin Sens. 1: Sensitization - Skin, Hazard Category 1  
 STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3  
 STOT RE 1: Specific target organ toxicity - Repeated exposure, Hazard Category 1  
 vPvB: very Persistent and very Bioaccumulative  
 Water-react. 1: Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 1  
 Water-react. 2: Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 2

**\*All data compared to the previous MSDS version has been altered.**

SDS created by MSDS Authoring Services    www.msdsauthoring.com    +1-877-204-9106