

**KOBE STEEL, LTD.**  
**MATERIAL SAFETY DATA SHEET (MSDS)**  
 For Welding Consumables and Related Products

Complies with OSHA Hazard Communication Standard 29 C.F.R. 1910-1200 and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499.

**SECTION I - IDENTIFICATION**

Identity: KOBELCO ELECTRODES FOR FLUX CORED ARC WELDING  
 Manufacturer's Name: KOBELCO STEEL, LTD. Emergency Telephone No. (713)974-5774  
 Supplier's Name: KOBELCO WELDING OF AMERICA INC.  
 Supplier's Address: 7478 Harwin Drive, Houston TX.77036 Telephone No. for Information: (713)974-5774  
 Facsimile No. (713)974-6543

Product Trade Name(s):	Product Classification(s):
DW-308, DW-308H	AWS A5.22 E308T0-1 E308T0-4
DW-308L, DW-308LT, DW-308LP	E308LT0-1 E308LT0-4 E308LT1-1 E308LT1-4
DW-309L, DW-309LP	E309LT0-1 E309LT0-4 E309LT1-1 E309LT1-4
DW-309LMo	E309LMoT0-1 E309LMoT0-4
DW-310	Does not conform
DW-312	E312T0-1 E312T0-4
DW-316L, DW-316LP	E316LT0-1 E316LT0-4 E316LT1-1 E316LT1-4
DW-317L	E317LT1-1 E317LT1-4
DW-347	E347T0-1 E347T0-4
DW-2209	E2209T1-1 E2209T1-4

**SECTION II - HAZARDOUS INGREDIENTS**

**IMPORTANT:** THIS SECTION COVERS THE MATERIALS FROM WHICH THE PRODUCT IS MANUFACTURED. THE FUMES AND GASES PRODUCED DURING WELDING WITH NORMAL USE OF THIS PRODUCT ARE COVERED IN SECTION V.

THE TERM "HAZARDOUS" IN "HAZARDOUS MATERIALS" SHOULD BE INTERPRETED AS A TERM REQUIRED AND DEFINED IN OSHA HAZARD COMMUNICATION STANDARD (29 C.F.R. 1910.1200) AND IT DOES NOT NECESSARILY IMPLY THE EXISTENCE OF ANY HAZARD.

THE CHEMICALS OR COMPOUND WHICH ARE REPORTABLE BY SECTION 313 OF SARA ARE MARKED BY THE SYMBOL #

Ingredient	(CAS No.)	approx wt %	(2) TLV mg/m3	(1) PEL mg/m3	Ingredient	(CAS No.)	approx wt %	(2) TLV mg/m3	(1) PEL mg/m3
Iron	(7439-89-6)	50-70	(N/A)	5	Titanium Dioxide	(13463-67-7)	0-10	10	15
#Manganese	(7439-96-5)	0-4	5C	5C	Feldspar	(N/A)	0-5	(N/A)	(N/A)
#Chromium	(7440-47-3)	17-30	0.5	1	ZirconiumSilicate(C)	(14940-68-2)	0-5	5	(N/A)
#Nickel	(7440-02-0)	7-22	1	1	#AluminumOxide(D)	(1344-28-1)	0-3	10	(N/A)
Molybdenum(A)	(7439-98-7)	0-4	10	15	Sodium Fluoride	(N/A)	0-2	2.5	2.5
Niobium(B)	(7440-03-1)	0-1	5	5					

(1) Occupational Safety and Health Administration, 29 C.F.R. 1910.1000 Permissible Exposure Limit (PEL).

(2) American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV [CR]).

(3) Not known; nuisance particulate concentration per ACGIH is 10 mg/M3.

(A) Present in DW-309MoL, DW-309LMo, DW-316, DW-316L, DW-317L, DW-329M, DW-329A, DW-2209

(B) Present in DW-347

(C) Present in DW-308, DW-308L, DW-308LP, DW-309L, DW-309LP, DW-309MoL, DW-309LMo, DW-310, DW-312, DW-316L, DW-316LP, DW-316EL, DW-2209

(D) Present in DW-308H, DW-308LT, DW-308LP, DW-308EL, DW-309LP, DW-310, DW-316LP, DW-347

(\*) None of the above materials come in contact with lead or lead-containing compound, mercury or mercury-containing compound.

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**SECTION III - PHYSICAL DATA**  
NOT APPLICABLE

**SECTION IV - FIRE AND EXPLOSION HAZARD DATA**  
Non-Flammable: Welding arc and sparks can ignite combustibles. See Z-49.1 referenced in Section VU.

**SECTION V - REACTIVITY DATA**

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Welding fumes cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), number of welds and volume of work area, quality and amount of ventilation, position of welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, the fume and gas decomposition products are different in percent and form the ingredients listed in Section O. Fume and gas decomposition products, not the ingredients in the electrode, are important. Decomposition products include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II plus those from base metal, coating, etc. as noted above. These components are virtually always present as complex compounds and not as metals (Characterization of Arc Welding Fume: American Welding Society).

Reasonably expected fume constituents from these products would include fluorides and complex oxides of iron, manganese, silicon and, when present, nickel, chromium, molybdenum, and copper. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welders helmet, if worn, or in the worker's breathing zone. ANSI/AWS F1.1, available from the American Welding Society, P.O. Box 351040, Miami, FL 33135.

**SECTION VI - HEALTH HAZARD DATA**

**Threshold Limit Value :** The ACGIH recommended general Limit for welding fume NOC (Not Otherwise Classified) is **5 mg/m<sup>3</sup>**. The ACGIH 1988-1989 preface states: 'The TLV-TWA should be used as guides in the control of health hazards and should not be used as firm lines between safe and dangerous concentrations.' See Section V for specific fume constituents which may modify this TLV.

**Effects of Overexposure:** FUMES AND GASES can be dangerous to your health.

**SHORT-TERM (ACUTE) EXPOSURE** to welding fumes may result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

**LONG TERM (CHRONIC) OVEREXPOSURE** may lead to siderosis (iron deposits in the lung) and is believed by some investigators to affect pulmonary function.

**ARC RAYS** can injure eyes and burn skin.

**ELECTRIC SHOCK** can kill. See Section VII.

**Emergency & First Aid Procedures:-** Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

Carcinogenicity	NTP ?	IARC Monograph ?	OSHA Regulated ?
When present	NI, Cr	Ni, Cr	Cr only

## SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacturer's instructions and the precautionary label on this product. See American National Standard Z-49.1, Safety in Welding and Cutting, published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 C.F.R. 1910), U. S. Government Printing Office, Washington, D.C. 20402 for more detail on many of the following:

**Ventilation:** Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below the TLV's in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

**Respiratory Protection:** Use respirable fume respirator or air supplies respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

**Eye Protection:** Wear helmet or use face shield with filter lens. As a rule of thumb, start with a shade which is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others.

**Protective Clothing:** Wear head, hand and body protection which helps to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. 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 welder not to touch live electrical parts and to insulate himself from work and ground.

**Procedure for Cleanup of Spills or Leaks:** NOT APPLICABLE

**Waste Disposal Method:** Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with Federal, State and Local regulations.

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