



EQ WELDING SDN. BHD.

SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to OSHA Hazard Communication Standard 29 CFR 1910.1200(G) and GHS Rev 03.

SECTION I : IDENTIFICATION

Supplier Name	:	EQ WELDING SDN. BHD.
Address	:	16, JALAN SUNGAI BATU 11/KU6, KAWASAN PERINDUSTRIAN SUNGAI PULOH, 42100 KLANG. SELANGOR. MALAYSIA.
Telephone No.	:	+60 12 628 2809
Email	:	sales@eqwelding.com
Website	:	www.eqwelding.com
Product Type	:	Carbon Steel Welding Electrodes
Trade Name	:	EQ6013 Premium
Classification	:	AWS A5.1 E6013

SECTION II : HAZARD(S) IDENTIFICATION

Route(s) of Entry: Inhalation, Skin, Ingestion

Health Hazards:

Electric ARC-welding may create: fumes and gases can be dangerous. Arc rays can injure eyes and burn skin. Electric shock can kill.

Carcinogenicity: The state of California requires the following information:

Warning: This product contains chemicals known to the State of California to cause cancer.

Signs and Symptoms of Exposure: See Below.

Medical Conditions from Exposure:

Short term to Welding fumes-dizziness nausea, dryness & irritation of nose, eyes and throat, chest tightness, fever, allergic reaction, long term-siderosis, believed to affect pulmonary function. Nickel and Chromium compounds are required by OSHA to be considered carcinogenic.

Emergency and First Aid Procedures:

Remove to fresh air, obtain medical attention. Employ first aid techniques recommended by AM Red Cross.

NOTE: If welding is performed on plated or coated materials such as galvanised steel, excessive fume may be produced which contains additional hazardous components, and may result in metal fume fever and other health effects.

SECTION III : COMPOSITION / INFORMATION ON INGREDIENTS

These electrodes consist of a mild steel inner core with a flux coating. The mild steel inner core is an uncoated solid steel rod. The flux coatings vary depending on the type of electrode, and contain varying amounts of metal powders, ferro-alloy powders, mineral ores, inorganic oxides, carbonates and fluorides, cellulosic compounds and other siliceous materials mixed together with liquid silicate binders.

Specific details of the contents of the core wire and flux coating for the electrode types covered by this data sheet are given below.

TABLE 1: CORE WIRE COMPOSITION DATA (WT %)

Mild steel core	Fe	Mn	C	Ni	Cu	Si
Typical	98-99	<0.6	<0.1	<0.1	<0.2	<0.1

TABLE 2: COATING COMPOSITION DATA (WT %)

Flux coating	High Cellulose E6010, 6011	Rutile E6012, 6013	Basic Low Hydrogen E7016, 7018	Rutile Iron Powder E7024	Basic Iron Powder E7028	Cas No.
Limestone and/or Calcium Carbonate	-	<10	20-30	<10	10-20	1317-65-3
Magnesite (total inhalable dust) (respirable dust)	5-10	<5	-	-	-	546-93-0
Cellulose (total inhalable dust) (respirable dust)	25-60	<15	-	-	-	9004-34-6
Iron Oxides (as Fe)	<10	<10	<10	<10		1309-37-6
Inorganic Fluorides (as F)	-	<10	10-30	<10	5-15	16984-48-8
Iron powder	-	<10	10-35	10-60	10-60	7439-89-6
Manganese and its Inorganic compounds (as Mn)	5-15	5-15	<15	<15	<10	7439-96-5 and others
Rutile/Titanium Dioxide (total inhalable dust) (respirable dust)	10-35	15-60	<10	10-30	<10	13463-67-7
Silicon and Silicon Alloys, (as Si)	-	-	<5	<5	<5	7440-21-3
Silicate Binders	<5	<5	<5	<5	<5	1344-09-8
Mica (total inhalable dust) (respirable dust)	<5	<20	<5	<5	<5	12001-26-2
Quartz/Silica Respirable crystalline	<10	<15	5-60	<10	<5	14808-60-7
Kaolin (respirable dust)	-	<20	-	<5	<5	1332-58-7
Other Mineral Silicates	5-30	5-30	5-10	5-30	5-10	1332-58-7

SECTION IV : FIRST-AID MEASURES

No first aid measures should be required for the unused electrode consumables. During welding:

Inhalation

If breathing is difficult, bring the patient in fresh air; breathe in fresh air deeply.

For skin burns

Submerge affected area in cold water until burning sensation ceases and refer for immediate medical attention.

For eye effects such as arc eye and dusts

Irrigate eye with sterile water, cover with damp dressing and refer for immediate medical attention if irritation persists.

Ingestion

Ingestion is considered unlikely due to product form. However, if detached flux coating is swallowed do not induce vomiting. Seek medical attention. Advice to doctor: treat symptomatically.

Electric shock

If necessary resuscitate and seek immediate medical attention.

SECTION V : FIRE-FIGHTING MEASURES

Flash point:

This product is not flammable.

Suitable extinguishing media:

Use extinguishing measures that are appropriate to the surrounding environment.

Potential hazard when contact with acids:

Avoid contact with any kind of acids as the reaction of acids with iron content will release hydrogen gas. Accumulation of hydrogen in an enclosed environment may post a fire or explosion hazards.

Potential hazard during welding:

Welding arc and sparks can ignite combustibles and flammable products. Welding ray will cause skin burn for prolonged exposure.

SECTION VI : ACCIDENTAL RELEASE MEASURES

No specific actions for welding consumable prior to use.

Welding in proximity to stored or used halogenated solvents may produce toxic and irritant gases. Prohibit welding in areas where these solvents are used.

SECTION VII : HANDLING AND STORAGE

Spill and Leak Procedure : N/A

Waste and Disposal Method :

Prevent waste from contaminating surrounding environment. Discard any product residue, disposable container or liner in environmentally acceptable manner. In full compliance with federal, state and local regulations

Precautions to be taken in Handling and Storing : None

Other Precautions:

Use product in accordance with ANSI Standard Z49.1, Safety in welding and cutting available from AWS, 550 NW. Lejnue Rd., POB 351040, Miami, FI33135 Phone 305-443-9353

Good practice for handling and storage should be adopted to prevent physical injuries.

SECTION VIII : EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Prevention

Welders should not touch live electrical parts, and should insulate themselves from the work and the ground. Manufacturer's guidelines for the use of electrical welding machines should be observed at all times.

Welders and co-workers should be educated about the health hazards associated with welding fume, and trained to keep their heads out of the fume plume.

During welding, fumes and gases will be produced and emitted from the welding process. The content of the fume is dependent on the electrode type and base material being welded. The amount and concentration of fume generated is dependent on factors such as current, voltage, welding practices and number of welders in a given area. By following recommended welding practices, fume production can sometimes be minimised.

For carbon steel electrodes, the main constituents of the fume will be iron, manganese, sodium, potassium and calcium oxides, fluorides and silicates, mainly in the form of complex oxides and other compounds. There will also be smaller amounts of other complex metal oxides and silicates.

Gaseous ozone and nitrous oxides are also formed by arc radiation, and carbon monoxide and carbon dioxide can also be present due to dissociation of some of the flux constituents.

Fume Composition data for the major carbon steel electrodes are given below, and the individual exposure limits for the constituents (when specified) are also given.

Fume exposure should be controlled to below the recognised exposure limit for each of the individual constituents, and to below 5 mgm/m³ for the total particulate fume.

TABLE 3: FUME COMPOSITION DATA (WT%)

Electrode Type	%Fe	%Mn	%Si	%Mg	%Ti	%Cu	%Na	%K	%Ca	%F
C-steel, cellulosic E6010, E6011	35-55	3-8	5-10	0.1	1	0.2	5-10	5-10	2-5	0-2
C-steel, rutile E6012, E6013	15-65	4-9	2-11	0.3	3-6	0.1	0-3	5-20	0-5	0-1
C-steel, basic E7016, E7018	10-30	3-9	1-8	<1	0.7	0.1	5-15	2-20	8-20	5-25
C Steel, iron powder Rutile E 7024	25-55	4-15	1-15	0.1	1.1	0.1	5-10	1-5	5-10	0-2
C Steel, iron powder Basic E 7028	10-30	5-10	4-8	<1	0.1	0.1	5-10	10-20	0-5	5-25

TABLE 4: HAZARDOUS FUME COMPONENTS

Welding fume component	CAS No.	TLV 8hr TWA	¹ STEL ² 15min TWA
Total welding fume (particulate)	-	5	
Iron oxide fume (as Fe)	1309-37-1	5	
Manganese and its inorganic compounds (as Mn)	7439-96-5	0.2	
Silica, amorphous -FUME	-	2.0	
Magnesium oxide -FUME	1309-48-4	10	
Titanium dioxide (total inhalable dust)	13463-67-7	10	
Calcium Oxide	1305-78-8	2	

¹ Threshold Limit Value (TLV) based on ACGIH in the USA and Local Occupational Safety and Health Act and Regulations 1994

² Short Term Exposure Limit (STEL) based on ACGIH in the USA

Calcium Silicate	1344-95-2	10	
Fluoride, inorganic (as F)	16984-48-8	2.5	
Nitrogen dioxide (NO ₂)	10102-44-0	3ppm	5ppm
Ozone (O ₃)	10028-15-6	0.05-0.1ppm	0.2ppm*
Nitrogen monoxide (NO)	10102-43-9	25ppm	

Units are in mg/m³, except when stated otherwise

*Based on short work period

The fume analyses for the carbon steel electrodes covered by this data sheet, and used for welding clean, uncoated plain carbon steels indicate that as long as the 5 mgm/m₃ total fume exposure limits are met, fume levels of the other constituents will generally be below their respective exposure limits.

An exception is manganese, as this has a low exposure limit, and additional controls to this limit may be required.

THE FUME LEVELS GIVEN ABOVE WERE GENERATED UNDER LABORATORY CONDITIONS WHEN WELDING CLEAN, PLAIN CARBON STEEL UNDER THE MANUFACTURERS RECOMMENDED WELDING PARAMETERS, AND ARE INDICATIVE OF REASONABLY EXPECTED FUME LEVELS. ACTUAL FUME LEVELS WILL VARY IN PRACTICE, DEPENDING ON THE WELDING PARAMETERS AND OTHER CONDITIONS, AND MAY BE HIGHER OR LOWER THAN THOSE LISTED ABOVE.

ADDITIONAL FUME MAY ARISE WHEN THESE ELECTRODES ARE USED TO WELD CONTAMINATED BASE MATERIALS, COATED OR PLATED STEELS, OTHER METALS AND ALLOYS, OR WHEN INCORRECT WELDING CONDITIONS ARE USED.

THE ONLY ACCURATE WAY TO DETERMINE THE COMPOSITION AND QUANTITY OF FUMES AND GASES TO WHICH WORKERS ARE EXPOSED IS TO TAKE AIR SAMPLES FROM INSIDE THE WELDERS HELMET, IF WORN, OR IN THE WORKER'S BREATHING ZONES.

Individual fume measurements should be made in these cases using recognised sampling and analysis standards. Based on the results of these measurements, additional fume controls may be required to ensure that all the fume constituents are controlled below their exposure limits.

Control

Respiratory Measures:

Use restorable fume respiratory or air supplied respirator when in confined space or local exhaust does not keep exposure below recommended exposure limit.

Ventilation:

Use enough local ventilation, and local exhaust at ARC to keep fumes and gases from workers breathing zone and general area. Train worker to keep head out of fumes.

Local Exhaust	--	Special	--
Mechanical (General)	--	Other	--

Protective Gloves:

See other protective equipment.

Eye Protection:

Wear helmet, face shield with filter lens, protective screens, flash goggles to shield others, start with shade too dark then go to lighter shade which gives sufficient view of weld zone.

Other Protective Equipment:

Hand, head, body protection to prevent injury from radiation, sparks and electrical shock.

Work / Hygienic Practices:

Do not touch live electrical parts and insulate from work and ground. For maximum safety: be certified for, and wear a respirator at all times when welding or brazing.

SECTION IX : PHYSICAL AND CHEMICAL PROPERTIES

Physical State	: Solid	Odour	: Odourless
Boiling Point	: N/A	Specific Gravity (H₂O=1)	: N/A
Vapor Pressure (mm Hg)	: N/A	Melting Point	: ~1,500°C
Vapor Density (Air=1)	: N/A	Evaporation Rate	: N/A
Solubility in Water	: Insoluble	(Butyl Acetate=1)	
Appearance	: Generally greyish, but other colour can be present		

SECTION X : STABILITY AND REACTIVITY

Stability	:	Stable
Condition to Avoid	:	None unless otherwise specified
Incompatibility (Metal to Avoid)	:	None

Hazardous Decomposition Products:

The composition and quality of welding fumes and gases are dependent upon the metal being welded. The process, procedure and electrodes used. Other conditions which also influence the composition and quantity of fumes and gases to which workers may be exposed include: coatings on metal being welded (such as paint, plating, or galvanizing). The number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the 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 generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II, plus those from the base metal and coating, etc. as noted below.

Reasonably expected fume constituents of this product would include. Primarily iron oxide and manganese oxides; secondarily complex oxides of chromium, potassium, silicon and sodium.

Maximum fume exposure guideline for this product (based on manganese content) is 0.5 milligrams per cubic meter.

SECTION XI : TOXICOLOGICAL INFORMATION

Welding fumes if inhaled can potentially produce several differing health effects caused by the metal containing particles and the gases produced during the welding process, both of which are present in the 'fumes'. The exact nature of any likely health effect is dependent on the consumable, material being welded, weld process, all of which affect fume quantity and composition, as well as the use of adequate ventilation, respirators, or breathing equipment as circumstances require.

Inhalation of the fumes/gases produced during welding may lead to irritation to the nose throat and eyes. The range of health effects include respiratory effects with symptoms such as asthma, impaired respiratory and lung function, chronic bronchitis, metal fume fever, pneumoconiosis, possible emphysema and acute pulmonary oedema.

Other potential health effects at elevated levels of exposure include central nervous effects possible lung cancer, bone disease, skin and fertility effects. Which of these health effects is potentially likely

is related to the fume composition, and this needs to be consulted with the specific toxicity data below to assess the health risk when using any particular welding process.

Unprotected skin exposed to UV and IR radiation from the welding arc may burn or redden, and UV radiation is potentially a carcinogen. UV radiation can affect the unprotected eye by producing an acute condition known as 'arc eye'.

Specific effects relevant to major particulate and gaseous fume constituents produced when welding with these electrodes

Iron

The chief component of fume generated by welding carbon steels is iron oxide. Iron oxide is generally considered a nuisance material and unlikely to cause any significant health effects. The fume particles however accumulate in the lungs and lead to a benign pneumoconiosis called siderosis.

Manganese

Manganese compounds are also found in carbon steel welding fumes. Manganese is mainly a systemic chronic toxin, although exposure to high particulate concentrations can cause some respiratory irritation.

Overexposure or inhalation of excessive amounts of manganese has been shown to affect pulmonary function, blood and may cause irreversible central nervous system damage (manganism) which resembles Parkinsons disease. Symptoms of manganism include tremors, impaired speech, facial expression changes, slow clumsy movements and eventually impaired walking. The symptoms are typically not apparent for several years.

Fluorides

The main source of fluorides is from the flux coatings on some welding electrodes such as basic types (E7016, 7018, 7028), and this produces mainly fluoride particulate fume. Fluorides are respiratory irritants and if absorbed through inhalation can lead to bone disease known as fluorosis.

Silica

Silica is found in welding fumes produced by fluxes and flux coatings and is produced mainly as amorphous silica. This form of silica has not been associated to any significant degree with lung pneumoconiosis which is associated with crystalline forms of silica.

Rutile sand

Mainly present as Titanium dioxide which is a respiratory irritant but in effect mainly a nuisance material of low toxicity.

Ozone and Nitrogen oxides

These gases are formed due to interactions of the arc with the surrounding air of the welding arc. Both gases can produce eye, respiratory and lung irritation and also can produce longer term lung effects such as decreased lung capacity, chronic bronchitis, and emphysema. Of particular concern with both gases is that exposure to high levels (eg due to build up in confined spaces) can result in acute lung effects such as delayed pulmonary oedema.

Carbon monoxide and carbon dioxide

Carbon monoxide (CO) is a chemical asphyxiant and its toxicity is due to its affinity for oxygen carrying blood haemoglobin causing fatigue, weakness, dizziness and eventual unconsciousness and possible death. Carbon dioxide (CO₂) is mainly an asphyxiant but can exert some toxic properties by increasing pulse and heart rate. These gases are mainly formed through decomposition of some electrodes components (cellulose and carbonates).

SECTION XII : ECOLOGICAL INFORMATION

The welding process produces particulate fumes and gases which may cause long term adverse effects in the environment if released directly into the atmosphere. Welding fumes from basic electrodes covered by this data sheet can produce carbon dioxide gas, which is dangerous to the ozone layer.

SECTION XIII : DISPOSAL INFORMATION

Packaging, stub ends and slag residue should be disposed of as general waste or recycled. No special precautions are required for this product.

SECTION XIV : TRANSPORT INFORMATION

Follow local Department of Transport regulation.
Product is usually heavy and they must be securely fastened during transportation and covered from rain water.

SECTION XV : REGULATORY INFORMATION

MS 949: 1984: Code of Practice for Safety in Welding and Cutting
Occupational Safety and Health (Classification, Packaging, And Labeling of Hazardous Chemicals)
Regulations 1997

Risk Phrase

R48/20/22: Harmful – danger of serious damage to health by prolonged exposure through inhalation of welding fume and if product is swallowed.

Safety Phrase

S24/25: Avoid contact with skin and eyes when during welding
S36/37/39: Wear suitable protective clothing, gloves and eye/face protection when during welding.

SECTION XVI : OTHER INFORMATION

Training:

Workers should be informed and trained in the proper use and handling of this product as required under the respective local regulations.

Liability:

The information furnished here was gathered with the greatest care, and the knowledge available on the date of issue. It does not include any warranties or responsibility regarding the suitability of the information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

The information contained in this Safety Data Sheet relates only to specific materials designated and may not be valid for such material used in combination with any other material or in any process.

The product is supplied on the condition that the user accepts the responsibility to satisfy himself/herself as to the suitability and completeness of such information for himself / herself own particular use.

The customer should provide this Safety Data Sheet to any person involved in the usage of this materials.

Prepared by : Chang Lih Heng
Issuing date : 01.01.2019
Reason for revision : Company Name Change