



MSDS NUMBER	REL - 001
TRADE NAME	RASI - MS& LOW ALLOYS
SIZES	2.00 mm - 6.3 mm
REV	00/01.06.09

## MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to OSHA Hazard Communication Standard 29CFR 1910.1200 Rev. October 1988  
Standard Must Be verified for Specific Requirements

### Section I – Identification

Manufacturer/ Supplier : RASI ELECTRODES LTD UPPARAPALAYAM VILLAGE ALAMATHI POST REDHILLS, CHENNAI – 52.	Specification : AWS / SFA 5.1  Classification : E 6010, E6011, E 6012, E6013, E7016 E7018, E7018-1  Product Group: SMAW – Electrodes
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### Section II – Hazardous Materials \*

IMPORTANT : Thus section covers the materials for which the product was manufactured. The fumes and gases produced during welding with the normal use of this product are covered.

\* The terms 'Hazardous Materials' should be interpreted as a term required and defined in OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200); however, the use of this term does not necessarily imply the existence of any hazard.

Flux or other Ingredients	% Of Weight	CAS No.	Exposure Limit (mg/ms)	
			OSHA PEL mg/m³	ACGIH TLV mg/m³
Manganese (Mn)	0.45 – 1.75	7439 – 96 – 5	15 OF	10
Silicon (Si)	0.12 - 0.80	7440 – 21 – 3	5 OF	3 OF
Iron (Fe)	55.0 – 70.0	7439 – 89 – 6	5	10 OF
Calcium Carbonate (CaCO <sub>3</sub> )	5.0 – 12.0	1317 – 65 – 3	5 OF	10
Titanium Di Oxide (TiO <sub>2</sub> )	0.0 – 3.0	13463 – 67 – 7	15	10
Fluorspar (CaF <sub>2</sub> )	Trace	7789 – 78 – 5	2.5	2.5
Potassium Silicate (K <sub>2</sub> O <sub>3</sub> SiO <sub>3</sub> )	0.0 – 3.0	1312 – 76 – 1	NE	5
Sodium Silicate (Na <sub>2</sub> O-NSiO <sub>2</sub> )	0.0 – 5.0	1344 – 09 – 8	NE	5
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	0.0 – 1.0	1344 – 28 – 1	5	10
Magnesite (MgCO <sub>3</sub> )	0.0 – 2.0	546 – 93 – 0	15 (as MgO)	10
Cellulose	<5.06	5996 – 61 – 4	NE	10
Mineral Silicates	<5.0	1332 – 58 – 7	10**	10**
Aluminum (Al) <sup>a</sup>	0.0 – 5.0	7429 – 90 – 5	10 T / 5 F	15 T / 5 F
Zinc Oxides (ZrO <sub>2</sub> )	Trace	1314 – 13 – 2	NE	5°F
Iron oxides (E6011 only)	0.5	65996-74-9	10	5
Metallic carbonates (E6011 only)	0.5	563-71-3	10*	10*
Alkali carbonates (E6011 only)	<0.5	584-08-7	10*	10*
Graphite (E6011 only)	<0.5	7782-42-5	2.5	2.0
Quartz (SiO <sub>2</sub> )	0.15 – 0.2	14808 – 60 – 7	.01R	.01
Alkali I Metallic Carbonates	<1.0	584 – 08 – 7	NE	10
Magnesium Oxides (MgO <sub>2</sub> )	Trace	1309 – 48 – 4	15	10
Carbonsteel core wire	60 – 80	7439 – 89 – 6	10	10

\* = Exposure limits for oxides, dust, fume and mists where applicable, T=Total dust OF=Oxide Fume \*=Ceiling limit \*\*=Short Term Exposure Limit, F=Fumes, NE = Not established.

### Section III – Physical

Welding consumables applicable to this sheet as shipped, consist of odorless, solid rods or wire, which have a metallic luster. As shipped, these products are nonflammable, non-explosive, non-reactive, and non-hazardous.

### Section IV – Fire and Explosion Hazard

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, P.O.

### Section V – Health Hazard Data

Threshold Limit Value (TLV) the ACGIH recommended general limit for Welding Fume NOS – (Not Otherwise Specified) is 5 mg/m<sup>3</sup> ACGIH – 1999 preface states that the TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations, See Section VI for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists. Units are milligrams per cubic meter of air.

Effects of Over exposure : Electric arc welding may create one or more of the following health hazards :  
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness and convulsions. In extreme cases it can cause loss of consciousness and death.

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese over exposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash. WARNING : This product, when used for welding or cutting, products fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases cancer (California Health & Safety Code Section 25249, 5 et seq.)

Arc Rays can injure eyes and burn skin. Skin cancer has been reported. Electric shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment : Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

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## Section VI – Reactivity Data (HAZARDOUS DECOMPOSITION PRODUCTS)

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Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. **Most fume ingredients are present as complex oxides and compounds and not as pure metals.**

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), the number of welders 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, 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 2. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in Section 2, plus those from the base metal and coating, etc... as noted above. Reasonably expected constituents of the fume would include : Primarily – complex iron oxides and fluorides. Secondarily – complex oxides of calcium, manganese, aluminum, chromium, nickel, silicon, molybdenum, magnesium and titanium.

Monitor for the materials identified in Section 2. Fumes from the use of this product may contain fluorides, manganese, calcium oxide, chromium and nickel compounds, mica and amorphous silica fume whose exposure limits are lower than the 5 mg/m<sup>3</sup> PEL/TLV for general welding fume.

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 welder's helmet if worn or in the worker's breathing zone.(See ANSI / AWS F1.1, available from the "American Welding Society", P.O.Box 351040, Miami, FL 33135)

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## Section VII (PRECAUTIONS FOR SAFE HANDLING & USE/APPLICABLE CONTROL MEASURES)

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Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1; Safety in Welding and Cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910), U.S Government Printing Office, Washington, DC 20402 for more detail on any of the following.

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

**RESPIRATORY PROTECTION :** Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when 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 begin with Shade Number 14. Adjust if needed by selecting the next lighter and / or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others.

**PROTECTIVE CLOTHING :** Wear hand, head and body protection which help to prevent injury from radiation, sparks 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 nonsynthetic 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 :** 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.

**SPECIAL PRECAUTIONS (IMPORTANT) :** Maintain exposure below the PEL/ TLVs. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLVs. Always use exhaust ventilation. Refer to the following sources for important additional information : ANSI Z49.1 from the American Welding Society, P.O Box 351040, Miami, FL 33135 and OSHA (29CFR 1910) from the U.S. department of Labor, Washington, DC 20210.

**RASI ELECTRODES LIMITED believes this data to accurate and to reflect qualified expert opinion regarding current research. However cannot make any expressed or implied warranty as to this information.**