mentrode WELDING ELECTRODES SINCE 1990

E6013 Safety Data Sheet

Rutile (titania) coated mild steel electrode · AWS A5.1 E6013 · IS 814 ER4211

SAFETY DATA SHEET
Rev. 1 · October 2026

1 IDENTIFICATION

Product name	Mentrode E6013 welding electrode
Classification	AWS A5.1 E6013 · IS 814 ER4211
Product type	Rutile (titania) coated mild steel electrode for shielded metal arc welding (SMAW / MMA)
Sizes	2.5 – 5.0 mm diameter, 350 and 450 mm length
Recommended use	Arc welding of mild and carbon steels by trained persons. For industrial and professional use.
Uses advised against	Any use other than arc welding.
Manufacturer / supplier	VAM Manufacturing Concerns, 15/154, Edathara P.O., Palakkad, Kerala 678611, India
Contact	Tel. (0491) 2856323 · +91 77362 06068 · support@vamweld.com · www.vamweld.com
Emergency telephone	(0491) 2856323 or +91 77362 06068 – Monday to Friday 9 AM – 5 PM, Saturday 9 AM – 1 PM (IST). Outside these hours, contact your local poison centre or emergency services (India: 112).

2 HAZARDS IDENTIFICATION

Classification of the product as supplied

Not classified as hazardous under UN GHS, EU CLP (Regulation (EC) No 1272/2008) or US OSHA HCS (29 CFR 1910.1200) in the form supplied. The electrode is a solid steel rod with a hardened coating; the ingredients are bound and are not released in normal handling.

Label elements: none required as supplied. Hazard pictogram: none. Signal word: none.

Hazards during use (welding)

When the electrode is used for welding, hazardous fumes and gases are produced, and the process creates other hazards:

- **Electric shock** can kill.
- **Fumes and gases** can be harmful to health. Fume contains manganese and other metal oxides. Welding fumes are classified by IARC as carcinogenic to humans (Group 1).
- **Arc rays** can injure eyes and burn skin.
- **Sparks, spatter and hot metal** can cause burns and start fires.
- **Noise** from welding and slag chipping can damage hearing.

WARNING – PROTECT YOURSELF AND OTHERS

Read and understand the manufacturer's instructions, this Safety Data Sheet and your employer's safety practices before use. Keep your head out of the fumes. Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases away from your breathing zone and the general area. Wear correct eye, ear and body protection. Do not touch live electrical parts. See ANSI Z49.1, *Safety in Welding, Cutting and Allied Processes*.

Other hazards

Not a PBT or vPvB substance. Dust from grinding the coating may irritate the eyes and respiratory tract.

3 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	CAS No.	EC No.	% by weight
Iron (core wire)	7439-89-6	231-096-4	60 – 85
Titanium dioxide	13463-67-7	236-675-5	5 – 20
Aluminosilicate minerals (mica, kaolin, feldspar)	12001-26-2 / 1332-58-7 / 68476-25-5	–	1 – 10
Calcium carbonate	471-34-1	207-439-9	1 – 5
Potassium silicate (binder, dried)	1312-76-1	215-199-1	1 – 5
Manganese	7439-96-5	231-105-1	1 – 5
Cellulose	9004-34-6	232-674-9	< 3
Quartz (crystalline silica)	14808-60-7	238-878-4	< 1

Ingredient	CAS No.	EC No.	% by weight
Other mineral and organic ingredients (not classified)	–	–	< 3

Percentages are by weight of the complete electrode (core wire plus coating). Ranges are given to cover all sizes and normal production variation, and to protect confidential formulation details. Manganese is shown as total manganese from all sources. Exact composition is not required for safe use.

4 FIRST-AID MEASURES

Inhalation of fumes	Move the person to fresh air. If breathing is difficult, give oxygen if trained to do so. Get medical attention if symptoms such as coughing, breathlessness, dizziness or fever persist.
Skin contact	For burns, cool the area with clean running water for at least 10 minutes and get medical help for serious burns. Wash coating dust off with soap and water.
Eye contact	For dust or particles, rinse with plenty of water for several minutes, holding the eyelids open. For arc eye (flash burn), rest the eyes in a dark place and get medical advice.
Ingestion	Unlikely route of exposure. Rinse the mouth; do not induce vomiting. Get medical advice if unwell.
Electric shock	Switch off the power before touching the person. Call for medical help immediately. Give CPR if trained and the person is not breathing.
Most important symptoms	Short-term: irritation of eyes, nose and throat; metal fume fever (flu-like symptoms) after high fume exposure. Long-term overexposure: possible effects on lungs; manganese may affect the nervous system.
Note to physician	Treat symptomatically.

5 FIRE-FIGHTING MEASURES

Flammability	The electrode is not flammable as supplied. Welding arcs and sparks can ignite flammable and combustible materials nearby.
Extinguishing media	Use media suitable for the surrounding fire (water spray, foam, dry chemical, CO_2). Do not use water on live electrical equipment.
Special hazards	Packaging (cardboard, plastic) burns. Fire may release irritating gases.
Advice for fire-fighters	Wear self-contained breathing apparatus and full protective clothing in large fires.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions	No special measures for the solid product. Avoid creating dust from broken coating.
Environmental precautions	Prevent large quantities of dust or slag from entering drains or water.
Clean-up	Pick up electrodes and broken pieces; sweep up coating fragments without creating dust and place in a container for recycling or disposal.

7 HANDLING AND STORAGE

Safe handling	Follow the precautions in Sections 2 and 8. Handle with clean, dry gloves. Do not eat, drink or smoke while welding. Wash hands after use.
Storage	Store in the original packets in a dry, covered area, off the floor, ideally below 60% relative humidity. Protect from water, oil and chemicals.
Re-drying	If damp: 100–150 °C for 1 hour. Normally used straight from the packet.
Incompatible materials	Strong acids, strong alkalis and strong oxidising agents may react with the coating.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits (mg/m³ unless stated, 8-hour time-weighted average)

Substance	ACGIH TLV	US OSHA PEL	EU (Directive)
Manganese (fume, as Mn)	0.02 (R) · 0.1 (I)	5 (ceiling)	0.05 (R) · 0.2 (I)
Iron oxide (fume, as Fe_2O_3)	5 (R)	10	–
Titanium dioxide	–	15 (total dust)	–
Calcium carbonate	–	15 (T) · 5 (R)	–
Cellulose	10	15 (T) · 5 (R)	–
Silicon	–	15 (T) · 5 (R)	–
Quartz (respirable crystalline silica)	0.025 (R)	0.05 (R)	0.1 (R)
Ozone	0.05 ppm (heavy work)	0.1 ppm	–
Nitrogen dioxide	0.2 ppm	5 ppm (ceiling)	0.5 ppm
Carbon monoxide	25 ppm	50 ppm	20 ppm

R = respirable fraction, I = inhalable fraction, T = total dust. Limits for the ingredients as supplied are not normally relevant; the limits that matter in use are those for the welding fume and gases. In India, follow the permissible limits in the Second Schedule of the Factories Act, 1948 and the applicable State Factories Rules. Keep exposure to welding fume as low as reasonably practicable. Check the latest local limits before use.

Engineering controls	Use local exhaust ventilation at the arc and general ventilation to keep fume and gas below the limits. Take special care in confined spaces.
Respiratory protection	Where ventilation is not enough, use an approved particulate respirator suitable for welding fume (for example EN 149 FFP2/FFP3, NIOSH N95 or better), or a powered air-purifying respirator.
Eye and face	Welding helmet or face shield with the correct filter shade (generally shade 10 – 13 for stick welding, EN 169 / ANSI Z87.1), with safety glasses underneath.
Hands	Dry, insulated welding gauntlets (for example EN 12477).
Body	Flame-resistant clothing covering all skin, leather apron where needed, safety shoes with insulated soles.
Hearing	Use ear protection in noisy areas and during chipping or grinding.
Monitoring	Fume sampling in the welder's breathing zone (inside the helmet) shows actual exposure – see ISO 10882-1 or AWS F1.1.

9 PHYSICAL AND CHEMICAL PROPERTIES

Physical state / form	Solid. Steel rod with a hard mineral coating.
Colour	Coating grey to off-white
Odour	Odourless
Melting point	Approx. 1,500 °C (steel core)
Flash point / flammability	Not applicable; not flammable
Solubility in water	Insoluble (core); coating binder slightly soluble
Vapour pressure, pH, viscosity	Not applicable

10 STABILITY AND REACTIVITY

Stability	Stable under normal storage and handling conditions.
Conditions to avoid	Moisture (damages the coating).
Incompatible materials	Strong acids, strong alkalis, strong oxidisers.
Hazardous decomposition products	During welding: fume containing iron oxides, manganese oxides, titanium dioxide, silicon dioxide (amorphous) and potassium and sodium compounds; gases such as carbon monoxide, carbon dioxide, ozone and nitrogen oxides. The exact fume composition depends on the base metal, any coatings on it, the welding current and the ventilation.

11 TOXICOLOGICAL INFORMATION

Acute effects (fume)	Irritation of the eyes, nose, throat and skin. High exposure can cause metal fume fever – chills, fever, aching and a metallic taste – usually resolving within 24 – 48 hours.
Chronic effects	Repeated overexposure to welding fume may affect the lungs (bronchitis, siderosis). Manganese overexposure over a long period may affect the central nervous system, causing symptoms such as tremor, slow movement and changes in speech or handwriting.
Carcinogenicity	IARC classifies welding fumes as carcinogenic to humans (Group 1, 2017). Crystalline silica is bound in the coating and is not released as respirable dust in normal use; it is converted to amorphous forms in the arc.
Product as supplied	No acute toxicity, irritation or sensitisation is expected from handling the solid electrode.

12 ECOLOGICAL INFORMATION

Ecotoxicity	The product is not expected to be harmful to aquatic life in the form supplied. No specific ecotoxicity data available.
Persistence / bioaccumulation	Inorganic and metallic ingredients are not biodegradable. Not expected to bioaccumulate.
Other	Avoid release of dust, slag and fume residues into the environment.

13 DISPOSAL CONSIDERATIONS

Product and stubs	Electrode stubs and unused electrodes can be recycled as steel scrap.
Slag and dust	Dispose of in line with local regulations. Not normally classed as hazardous waste; check with local authorities.
Packaging	Recycle cardboard and plastic where facilities exist.

14 TRANSPORT INFORMATION

UN number / shipping name	Not applicable
Classification	Not regulated as dangerous goods for road, rail, sea (IMDG) or air (IATA).
Marine pollutant	No
Special precautions	Keep dry during transport. Protect cartons from rain and sea spray.

15 REGULATORY INFORMATION

India	Factories Act, 1948 and State Factories Rules (welding fume control, PPE); Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 – the product is not a listed hazardous chemical. Product standard IS 814.
European Union	Regulation (EC) No 1907/2006 (REACH) and Regulation (EC) No 1272/2008 (CLP): not classified as hazardous. SDS format follows REACH Annex II as amended by Regulation (EU) 2020/878. No SVHC substances above 0.1%.
United States	OSHA Hazard Communication Standard 29 CFR 1910.1200: not classified as supplied. Follow ANSI Z49.1 and OSHA 29 CFR 1910 Subpart Q (Welding, Cutting and Brazing).
Other	Prepared in the 16-section format of the UN Globally Harmonized System (GHS) and ISO 11014.

16 OTHER INFORMATION

Revision	Rev. 1 · October 2026 – first issue
Abbreviations	ACGIH TLV – American Conference of Governmental Industrial Hygienists Threshold Limit Value; OSHA PEL – US Permissible Exposure Limit; IARC – International Agency for Research on Cancer; GHS – Globally Harmonized System; PBT / vPvB – persistent, bioaccumulative, toxic substances; SVHC – substance of very high concern.
Further information	Technical data sheet and Welding Safety Guide: www.vamweld.com/downloads.
Disclaimer	The information in this Safety Data Sheet is based on our present knowledge and is given in good faith. It describes the product for safety purposes only and does not guarantee specific properties. Users are responsible for assessing the risks in their own workplace and for following all applicable laws and regulations.