MATERIAL SAFETY DATA SHEET

MAY BE USED TO COMPLY WITH OSHA'S HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200 AND SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) OF 1986 PUBLIC LAW 99-499.
STANDARD SHOULD BE CONSULTED FOR SPECIFIC REQUIREMENTS.

SECTION I (IDENTIFICATION)

MANUFACTURER/ SUPPLIERS NAME: **EUTECTIC CORPORATION**
N94 W14355 Garwin Mace Drive
Menomonee Falls, WI 53051 USA

TELEPHONE NUMBER:
1-800-558-8524

PRODUCT NAME: **TeroMatec AN 4617**

PRODUCT CLASSIFICATION: **FCAW Electrode**

SECTION II (HAZARDOUS INGREDIENTS/IDENTITY INFORMATION)

IMPORTANT: This section covers the materials from which these products are manufactured. The fumes and gases produced during normal use of these products are covered in Section V. The term "Hazardous" in "Hazardous Ingredients" should not only be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200), but also as defined by other regulatory agencies. The chemicals or compounds subject to reporting under Title III, in Section 313, of the Superfund Amendments and Reauthorization Act (SARA) are marked by the symbol #.

WARNING: This product contains or produces a chemical known to the State of California to cause birth defects (or other reproductive harm) and cancer. (California Health & Safety Code 25249.5 et seq.)

INGREDIENTS	CAS NUMBER	Exposure Limit (mg/m^3) OSHA PEL	ACGIH-TLV	Percent Ingredients (by weight)
Iron	7439-89-6	10 (as Fe)	5 (as Fe)	60 – 100
Chromium #	7440-47-3	1	0.5	10 – 30
Carbon	7440-44-0	2.5	2	1 – 5
Manganese #	7439-96-5	5 (ceiling)	0.2	1 – 5
Graphite	7782-42-5	15 mppcf *	2	1 – 5
Silicon	7440-21-3	5	10	1 – 5
Calcium Fluoride	7789-75-5	2.5 (as F)	2.5 (as F)	1 – 5
Iron oxide	1309-37-1	10	5	0.5 – 1.5

mppcf = millions of particles per cubic foot of air

SECTION III (PHYSICAL DATA) - Welding Wire

SECTION IV (FIRE AND EXPLOSION HAZARD DATA)

Non-Flammable: Welding arc and sparks can ignite combustibles. Refer to American National Standard Z49.1 for fire prevention during welding. These products as shipped are non-hazardous, nonflammable, non-explosive, and non-reactive.
Rating under National Fire Protection 704: Health, 1: Flammability, 0: Reactivity, 0.

SECTION V (REACTIVITY DATA)

Welding fumes cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure, and the 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), the number of welders and the volume of the work area, the quality and the amount of ventilation, position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinatedhydrocarbon vapors from cleaning and degreasing activities).

When the electrode is consumed, fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Fume and decomposition products, not the ingredients in the electrode, are important. Decomposition products include those originating from the volatilization, reaction, or oxidation of materials in Section II, plus those from the base metal and coating, etc., as noted above. These components are virtually always present as complex oxides and not as metals (Characterization of Arc Welding Fume: American Welding Society). Reasonably expected fume constituents of the fume could include: complex oxides of iron and manganese. Chromium oxides may also be present. The table on page two lists reasonably expected fumes that may be generated:

Substance	CAS NUMBER	Exposure Limit (mg/m^3) OSHA PEL	ACGIH-TLV
Iron Oxide	1309-37-1	10 (as Fe)	5 (as Fe)
Nitric Oxide	10102-43-9	30	31
Chromium (VI)	not listed	0.005	0.05 (as Cr VI)
Manganese fume #	7439-96-5	5	0.2 (NIC 0.03)

NIC = notice of intended change

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may also be formed by radiation from the arc. The fume limit for Cr VI (5 micrograms/m³) may be reached before the ACGIH recommended general welding fume limit of 5 mg/m³ is reached. Monitor fume levels and Cr VI level. Train workers about the hazards of Cr (VI). **Read and comply with the OSHA permissible exposure limits for hexavalent chromium (CrVI),** ***Fed. Reg. 71 – 10099 (specifically 29 CFR 1910.1026, 29 CFR 1915.1026, and 29 CFR 1926.1126).*** For CrVI, OSHA requires: "The employer shall perform initial monitoring to determine the 8-hour TWA exposure for each employee on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area". Specialized equipment is required for monitoring Cr (VI) concentration in the workplace. OSHA Analytical Method Number ID-215 for area and breathing zone sampling and OSHA Analytical Method Number W4001 for wipe samples are listed on the OSHA website - www.osha.gov -as methods for measuring Cr(VI). This standard is complex and the employer should contact an occupational health professional for doing the Cr(VI) monitoring and all other fume monitoring.

SECTION VI (HEALTH HAZARD DATA)

Threshold Limit Value (TLV): The **ACGIH** recommended general limit for welding fume NOS (not otherwise specified) is 5 mg/m³. The **ACGIH 1999** 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 that may modify the **TLV**.

EFFECTS OF OVEREXPOSURE - Electric arc welding may create one or more of the following health hazards:

FUMES AND GASES can be dangerous to your health.
PRIMARY ROUTES OF ENTRY are the respiratory system. Other possible routes are eyes, ingestion, and/or skin contact.
PREEXISTING respiratory or allergic conditions may be aggravated in some individuals (i.e. asthma, emphysema).

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. **PRIMARY ROUTE OF ENTRY** is the respiratory system. **IRON, IRON OXIDE, MANGANESE** - Remove from overexposure and apply artificial respiration if needed. **CHROMIUM**- Inhalation of chromium can cause irritation of nasal membranes and skin. **FLUORIDES** - Fluoride compounds produced may cause eye and skin burns, and pulmonary edema bronchitis. 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 may lead to siderosis (iron deposits in lungs) and is believed by some investigators to affect pulmonary functions. **PRIMARY ROUTE OF ENTRY** is the respiratory system. **IRON, IRON OXIDE** - Long term overexposure to iron fumes can cause deposits of iron in the lungs (siderosis). Lungs will clear in time when exposure to iron and its compounds cease. **MANGANESE** - Long term exposure may lead to "Manganism." Central nervous system is affected and symptoms include muscular weakness, impaired speech, impaired movement, and tremors. Exposed workers should get quarterly medical examinations for manganism. Bronchitis and some lung fibrosis have been reported. **FLUORIDES** - Overexposure to fluorides can cause serious bone erosion, excessive calcification of the bone and calcification of the ribs, pelvis and spinal column. May cause skin rash. Long term overexposure to **HEXAVALENT CHROMIUM (CrVI)** is reported to cause lung cancer in humans.

ARC RAYS can injure eyes and burn skin. *SKIN CANCER HAS BEEN REPORTED.*
ELECTRIC SHOCK can kill! **IN CASE OF ELECTRICAL SHOCK:** turn off power and follow recommended treatment. Call a physician.
See Section VII for precautions.

EMERGENCY & FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by The American Red Cross.
INHALATION: Remove to fresh air. If breathing is difficult, administer oxygen. If not breathing, begin artificial respiration.
If no detectable pulse, begin Cardiopulmonary Resuscitation. (CPR). Call for medical aid.
SKIN: Wash affected area with soap and water. If rash develops, see a physician.
EYES: Flush with a large amount of fresh water for at least 15 minutes. Get medical attention.
INGESTION: Seek medical attention.

CARCINOGENICITY
CHROMIUM - Chromium VI is listed as being carcinogenic to humans on **IARC** and **NTP** lists, and is listed by **NIOSH** as being a potential occupational carcinogen (with no further categorization).
WELDING FUMES (not otherwise specified) are considered to be carcinogenic defined with no further categorization by **NIOSH** and **IARC**.

SECTION VII (PRECAUTION FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES)

Read and understand the manufacturer's instructions and precautionary label on this product.
See American National Standard Z49.1, Safety in Welding and Cutting, published by the "American Welding Society," 550 N.W. LeJeune Road, Miami, FL 33126 and OSHA Publication 2206 (29CFR 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more detail on 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 workers breathing zone and the general area. Train the welder to keep his head out of the fumes. Monitor fume levels and do not exceed permissible exposure limits or values.
Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in a confined space or where local exhaust or ventilation does not keep exposure below the TLV's.
Eye Protection: Wear a helmet or face shield with a filter lens of shade 12 or darker. Provide screens and flash goggles to shield others.
Protective Clothing: Wear head, hand, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum, this includes welders' 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 (or herself) from work and ground, especially if clothing and gloves are wet.
Waste: Dispose of any grinding dust and waste residues in accordance with EPA or local regulations. Plastic containers and cardboard packaging can be recycled.
Storage: Keep material sealed and dry before use. Keep remaining product sealed and dry.

SUPPLEMENTAL INFORMATION
IARC: International Agency for the Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
PEL: Permissible Exposure Limit
OSHA: U.S. Occupational Safety and Health Administration
TLV: Threshold Limit Value
CAS: Chemical Abstracts Service Registry Number

Exposure limits are subject to change. Contact ACGIH, OSHA, NIOSH, and IARC for current values.

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