MATERIAL SAFETY DATA SHEET (MSDS)

REVISED 10-2011

For Welding Consumables and Related Products
Conforms to OSHA Hazard Communication Standard 29 CFR 1910.1200
And Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499
Standard Must Be Consulted for Specific Requirements

SECTION I – IDENTIFICATION

Manufacturer/Supplier Name: American Filler Metals Company	Telephone No.: 713-649-8785
Address: 6015 Murphy Street, Houston, TX 77033	Emergency No.: Chemtrec: 800-424-9300
Trade Name: A-2, O-1, S-7, M-2, H-12, H-13, D-2, P-20, W-1, M-42, MARAGING 250	Classification: Heat Treatable Tool & Die Alloys

SECTION II – HAZARDOUS MATERIALS*

IMPORTANT: This section covers the materials from which the product is manufactured. *The term "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	% Weight	CAS No.	Exposure Limit (mg/m³)	
			OSHA PEL	ACGIH TLV
Carbon	.05-1.60	7782-42-5	55ppm	55ppm
Manganese	.15-1.30	7439-96-5	5.0	1.0
Silicon	.15-1.60	7440-21-3	5.0	3.0
Chromium	.40-6.00	7440-47-3	1.0	0.5
Nickel	.25-2.00	7440-02-0	1.0	1.0
Molybdenum	.15-10.0	7439-98-7	15.0	10.0
Tungsten	.45-7.00	7440-33-7	NA	5.0
Vanadium	.15-2.50	1314-62-1	0.1	0.05
Iron	BAL	7439-89-6	5.0	NA

Occupational Safety and Health Administration 29 CFR 1910.1000 Permissible Exposure Limit (PEL). American Conference of Governmental industrial Hygienists (ACGIH) Threshold Limit Value (TLV[R]).

SECTION III – PHYSICAL DATA

Material is a solid steel core rod. NO HAZARD EXISTS UNTIL THIS PRODUCT IS USED IN WELDING.

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

Non-Flammable: Welding arc and sparks can ignite combustibles. See Z-49.1 referenced in Section VI

SECTION V – REACTIVITY DATA

Hazardous Decomposition Products

Welding fumes and gases cannot be classified simply. The composition and quantity of these fumes and gases are dependent upon the metal being welded, the procedures followed and the electrodes used.

Workers should be aware that the composition and quantity of fumes and gases to which they may be exposed, are influenced by coatings which may be present on the metal being welded (such as paint, plating, or galvanizing), the number of welders in operation 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 procedures). When the electrode is consumed, the fumes and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. The composition of these fumes and gases are the concerning matter and not the composition of the electrode itself. Decomposition products include those originating from the volatilization, reaction, or oxidation of the ingredients shown in Section II, plus those from the base metal, coating and the other factors noted above.

Reasonable expected fume constituents of this product would include: Complex oxides of iron, manganese, silicon, chromium, nickel, molybdenum, calcium, magnesium, and titanium.

SECTION VI – HEALTH HAZARD DATA

Route of Entry: The primary routes of entry are the respiratory system, eyes, and skin.

Effects of exposure to welding fumes: Short term overexposure to welding fumes may result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat, lungs, or eyes (see section V and VII).

Effects of chromic exposure to product: Long term overexposure to welding fumes can result in: chronic respiratory problems, iron build-up in the lungs, bone erosion, reduced pulmonary functions and nervous disorders.

Exposure limits: Below are the LD50 and LC50 values available for some of the fumes and gases given off during welding:

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Material	CAS #	LD50 or LC50	Route of Entry	Species
Chromium VI Oxide	1333-82-0	LD50=80mg/kg	oral	rat
Cobalt Oxide	1307-96-6	LD50=202mg/kg	oral	rat
Copper Oxide	1317-39-1	LD50=470mg/kg	oral	rat
Iron Oxide	1309-37-1	LD50=5500mg/kg	intraperitoneal	rat
Vanadium pentoxide	1314-62-1	LD50=23mb/kg	oral	rat
Molybdenum oxide	18868-43-4	LD50=125mg/kg	oral	rat
Nickel oxide	1313-99-1	LD50=50mg/kg	subcutaneous	mouse
Tungsten oxide	1314-35-8	LD50=840mg/kg	oral	rat
Ozone	10028-15-6	LC50=34.5ppm/3H	inhalation	cat
Carbon monoxide	630-08-0	LC50=2444ppm/4H	inhalation	mouse
Fluorine	7782-41-4	LC50=185ppm/1H	inhalation	rat

Note: LC50 and LD50 values are the amount of a substance given to the stated species that causes 50% of the species to die.

Irrtancy of product: Aggravation of pre-existing respiratory or allergetic conditions may occur in some workers even if the concentration of the fumes is maintained below the recommended limits. Some studies have shown a higher level of lung related problems among older welders who smoke than those who did not smoke.
Sensitization to product: none known
Carcinogenicity: Nickel and Chromium must be considered possible carcinogens under OSHA (29CFR1910.1200). The International Agency for Research on Cancer (IARC) has indicated that nickel and certain nickel compounds are probably carcinogenic for humans, but that the specified compounds which may be carcinogenic cannot be specified precisely. This conclusion was based on experience in certain nickel refining operations. Chromium has also been listed by IARC because of "sufficient evidence for the carcinogenicity of chromium and certain chromium compounds." The studies forming the basis for the conclusion were from operations different from production or welding of nickel and chromium alloys. Recent epidemiological studies of workers melting and working alloys containing nickel/chromium have found no increased risk of cancer. Nevertheless, exposure limits for these and all others must be maintained below the levels specified in sections II and V.
Reproductive Toxicity: none known
Teratogenicity: none known
Mutagenicity: none known
Name of Toxicologically Synergistic Products: none known

SECTION VII – CONTROL MEASURES AND PRECAUTIONS FOR SAFE HANDLING AND USE

Read and understand the manufacturer's instructions and precautionary label on this product. See American Standard Z-49.1 Safety in Welding and Cutting published by the AMERICAN WELDING SOCIETY, 550 N.W. LeJeune Road, Miami, Florida 33126 and OSHA Publication 2206 (29 CFR 1910). U.S. Government Printing Office, Washington D.C. 20402 for more details on the following topics.
Exposure Monitoring: Maintain all exposures below the limits in section V. Monitor the air to ensure that the levels are below the above mentioned limits. See AWS F1.1: "Method for Sampling Airborne Particulates Generated by Welding and Allied Processes" and AWS F1.3 "Evaluating Contaminants in the Welding Environment: A Sampling Strategy Guide."
Ventilation: Use plenty of ventilation and/or local exhaust at the arc, to keep the fumes and gases below the threshold limit value within the worker's breathing zone and the general work area. Welders should be advised to keep their head out of the fumes.
Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in a confined space or general work area where local exhaust and/or ventilation does not keep exposure below the threshold limit value.
Eye Protection: Wear a helmet or face shield with a filter lens shade number 12-14 or darker. Shield other workers by providing screens and flash goggles.
Protective Clothing: Wear approved head, hand and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z-49.1. This would include wearing welder's gloves and a protective face shield and may include arm protectors, apron, hats, shoulder protection, as well as dark substantial clothing. Welders should be trained not to allow electrically live parts to contact the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground.
Waste Disposal Method: Discard any product, residue, disposal container, or liner in an environmentally acceptable manner approved by Federal, State and Local regulations.