SPECIAL METALS
Welding Products Company

MATERIAL SAFETY DATA SHEET

I. PRODUCT INFORMATION:

This MSDS covers all Special Metals Welding Products Company's products identified as:

MONEL® Welding Electrodes 187 & 187N

Primarily for welding high-nickel alloys and copper-nickel alloys.

Special Metals Welding Products Company
A Division of Huntington Alloys
1401 Burris Road
Newton, NC, 28658 , USA

EMERGENCY TELEPHONE NUMBER: (304) 526-5780
GENERAL INFORMATION: (800) 624-3411 (U.S.A.)
MSDS-K2 (828) 465-0352 (Canada)

II. HAZARDOUS INGREDIENTS:

TRADENAME AND CONCENTRATION RANGE (% WEIGHT)

Product Name	Calcium Carbonate	Calcium Fluoride	Copper	Lithium Carbonate	Manganese	Nickel	Silica	Sodium Fluoaluminate	Sodium Silicate	Titanium Dioxide
MONEL® Welding Electrodes 187 & 187N	5-10	1-5	40-70	0.7-0.9	1-5	15-40	1-5	5-10	1-5	1-5

® Registered trademark of the Special Metals group of companies. * Welding Electrode

III. PHYSICAL DATA: **Physical State:** Solid **Specific Gravity:** 4-6 gm/cc **Melting Point:** >1000 °C **Odor:** Odorless
Appearance: Welding electrodes are metallic silver colored wire with a flux coating or flux core.

IV. FIRE or EXPLOSION HAZARD: Nonflammable; however sparks from welding in user operations could ignite flammable or combustible liquids, vapors and solids.

V. REACTIVITY DATA: This material is non-reactive (stable) as shipped.

VI. HAZARD AND TOXICOLOGICAL PROPERTIES:

As shipped, these electrodes have no known (unless ingested) toxicological properties other than causing allergic reactions in individuals sensitive to the metal(s) contained in these welding products. The hazards of ingestion, if any, are discussed in the specific ingredient sections below. User generated dusts and fumes may on contact with the skin or eyes produce mechanical irritation. Chronic exposures could cause dermatitis (skin) or conjunctivitis (eyes). Excessive inhalation of user generated fumes from welding with these products may, depending on the specific features of the process used, pose a long term health hazard. The International Agency for Research on Cancer (IARC) has concluded that welding fumes are possibly carcinogenic to humans. The general PEL/TLV(1) for Welding Fume (Not Otherwise Classified) is 5 mg/m^3; however, individual constituents of fumes may have lower allowable exposure levels.

The ingredients of fumes and gases generated in user welding operations will depend on the electrode type and its flux, the base metal, and the specific process being used. Ingredients may include metals, metal oxides, chromates, fluorides, carbon monoxide, ozone, and oxides of nitrogen. Phosgene can be produced if chlorinated solvent vapors are present in user operations.

The following information is primarily directed to the ingredients that makeup the complex electrodes listed in Section II. Although it is the user's responsibility to assess end products, intermediates or fugitive emissions arising out of the use of these electrodes, information is also provided for common fume ingredients.

The State of California requires the following information : This product contains a chemical known to the state of California to cause cancer and a chemical known to the state of California to cause birth defects or other reproductive harm.

Calcium Carbonate ($CaCO_3$): Exposure Limits(1): TLV: 10 mg/m^3 PEL: 15 mg/m^3 (Total dust); 5 mg/ m^3 (Respirable fraction) CAS No.(2): 1317-65-3 LD_{50}: 6,450 mg/kg, rat, oral

This compound is considered non-toxic. Inhalation of particulates could cause mild irritation of the respiratory tract. Though used as an antacid, ingestion of large amounts could lead to intestinal blockage.

Calcium Fluoride (CaF_2): Exposure Limits(1): TLV: 2.5 mg/m^3 (Fluorides as F) PEL: 2.5 mg/m^3 (Fluorides as F) CAS No.(2): 7789-75-5 LD_{50}: 4,250 mg/kg, rat, oral

Inhalation of welding fumes containing calcium fluoride can cause irritation of the respiratory tract. Ingestion of soluble fluorides can produce symptoms of vomiting, abdominal pain, diarrhea, convulsions, muscular weakness and other signs of neurological problems. Chronic exposures may cause Fluorosis (Chronic fluoride intoxication) with symptoms of digestive disturbances such as vomiting, loss of appetite, diarrhea, or constipation.

Copper (Cu): Exposure Limits(1): TLV: 1 mg/m^3 (Dusts & mists, as Cu), 0.2 mg/m^3 (Fume) PEL: 1 mg/m^3 (Dusts & mists, as Cu), 0.1 mg/m^3 (Fume as Cu)
CAS No.(2): 7440-50-8 LD_{50}: 35 mg/kg, mouse, intraperitoneal

Copper metal dust and fume may be irritating to the respiratory tract. In user operations where copper fume is generated, inhalation of the fume can result in symptoms of "Metal Fume Fever" such as chills, fever and sweating. A few instances of allergic skin rashes have been reported in workers with skin exposure to metallic copper. In the eyes, copper metal as a foreign body can provoke an inflammatory reaction resulting in pus formation in the conjunctiva, cornea or sclera. Ingestion of copper metal may cause gastrointestinal upset. Wilson's disease can occur in certain individuals with a rare, inherited metabolic disorder characterized by retention of excessive amounts of copper in the liver, brain, kidneys and corneas. These deposits eventually lead to tissue necrosis and fibrosis, causing a variety of clinical effects, especially liver disease and neurologic changes. Wilson's disease is progressive and, if untreated, leads to fatal liver failure.

Lithium Carbonate ($LiCO_3$): Exposure Limits(1): TLV: No limit set PEL: No limit set CAS No.(2): 554-13-2 Oral LD_{50}: 525 mg/kg, rat Dermal LD $_{50}$, > 2000 mg/kg, rat

Contact with skin or eyes may cause irritation. Ingestion may cause acute local tissue damage. Some studies of pregnant mice and rats indicated an association between lithium ingestion and birth defects but only at dose levels large enough to produce signs of severe maternal toxicity. Although data for the 1970's and early 1980's suggested an increase in cardivascular defects in babies born in women on lithium carbonate therapy, more recent studies have not found any association between lithium exposure and birth defects. Exposure to lithium in industrial settings is not considered to pose a risk to human health. NIOSH studied 25 workers exposed to lithium-containing dust at air concentrations exceeding 10 Mg/M^3 (nuisance dust limit) and found that typical industrial exposure to lithium will not result in blood levels sufficiently high to produce toxicity in either adults or their offspring.

Manganese (Mn): Exposure Limits(1): TLV: 0.2 mg/m^3 elemental and inorganic compounds, as Mn PEL: 5 mg/m^3 Ceiling, as Mn compounds; 1 mg/m^3 Fume, as Mn; STEL 3 mg/m^3 Fume, as Mn
CAS No.(2): 7439-96-5 LD_{50}: 9,000 mg/kg, rat, oral

Excessive inhalation or ingestion of manganese can produce manganese poisoning. Chronic exposures can lead to neurological problems such as apathy, drowsiness, weakness, spastic gait, paralysis, and other neurological problems resembling Parkinsonism. These symptoms can become progressive and permanent if not treated. Excessive inhalation of fumes may cause "Metal Fume Fever" with its flu like symptoms, such as chills, fever, body aches, vomiting, sweating, etc.

Nickel (Ni): Exposure Limits(1): TLV: 1.5 mg/m^3 as metal (Inhalable Fraction) PEL: 1 mg/m^3 for metal and insoluble compounds as Ni CAS No.(2): 7440-02-0 LD_{50}: >9,000 mg/kg, rat, oral

The U.S. National Toxicology Program has listed nickel and seven nickel compounds as reasonably anticipated to be a carcinogen based on the production of injection-site tumors in experimental animals. The International Agency for Research on Cancer (IARC) concluded that nickel compounds were carcinogenic to humans and that metallic nickel is possibly carcinogenic to humans. Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard.

The inhalation of nickel powder has not resulted in an increased incidence of malignant tumors in rodents. Repeated intratracheal instillation of nickel powder produced an increased incidence of malignant lung tumors in rats, but did not produce an increased incidence in hamsters when administered at the maximum tolerated dose. However, single intratracheal instillations of nickel powder in hamsters at doses near the LD_{50} have produced an increased incidence of fibrosarcomas, mesotheliomas and rhabdomyosarcomas. Inhalation of nickel powder at concentrations 15 times the PEL irritated the respiratory tract in rodents. Nickel is a known sensitizer and may produce allergic reactions.

Silica (SiO_2): Exposure Limits[1]: TLV: 0.1 mg/m³ (Respirable dust) PEL: 6 mg/m³ as amorphous (Precipitated, gel, or diatomaceous earth); 0.1 mg/m³ as crystalline (quartz or tripoli) and fused respirable dust; 0.05 mg/m³ as crystalline (cristobalite or tridymite) respirable dust. CAS No.[2]: 60676-86-0 LD_{50}: 3,160 mg/kg, rat, oral in amorphous form

No information was found on the hazards of ingestion of crystalline silica as the material seems to be relatively inert. Acute exposures to this material will irritate the respiratory tract. Chronic inhalation (after 10 - 20 years) can produce silicosis (a pneumoconiosis of the lungs) with symptoms of dyspnea, cough, wheezing and repeated, non-specific chest illnesses. Impairment of pulmonary function may be progressive. In 1997, the International Agency for Research on Cancer (IARC) concluded that crystalline silica is a class 1 carcinogen. IARC states that a number of studies have shown that persons diagnosed as having silicosis have an increased risk of dying from lung cancer

Sodium Fluoaluminate (Na_3AlF_6): Exposure Limits[1]: TLV: No limit set PEL: No limit set CAS No.[2]: 15096-52-3 LD_{50}: 200 mg/kg, rat, oral

Excessive inhalation of dust may cause irritation of the nose, throat and respiratory tract. Ingestion causes severe gastrointestinal distress with salivation, nausea, vomiting, diarrhea, and pain. Also may cause muscular weakness, tremors, convulsions, loss of consciousness, and death. Prolonged exposure to fluorides can cause skeletal abnormalities and digestive tract disturbances. Prolonged or repeated skin contact can produce dermatitis.

Sodium Silicate ($Na_2Si_4O_9$): Exposure Limits[1]: TLV: Not Established PEL: Not Established CAS No.[2]: 1344-09-8 LD_{50}: 1153 mg/kg, oral, rat

Silicates are generally considered to have low systemic toxicity, however due to their alkaline nature they may cause corrosive effects on mucous membranes. Eye exposure can cause severe irritation, redness, tearing and blurred vision. Skin exposure may cause slight irritation. Inhalation of mist or fume can cause irritation of the nasal and respiratory passages. Ingestion may produce gastrointestinal irritation, nausea, vomiting, diarrhea and abnormal kidney function. No known chronic effects have been noted.

Titanium Dioxide (TiO_2): Exposure Limits[1]: TLV: 10 mg/m³ PEL: 10 mg/m³ Total dust CAS No.[2]: 13463-67-7 LD_{50}: Not Available

Considered a nuisance dust that is inert, practically non-toxic and chemically non-irritating. Skin contact has shown no problems other than possible drying and mechanical abrasion. Eye contact can produce particulate irritation. Does not seem to be absorbed by the body through ingestion. Excessive inhalation can produce mild pulmonary irritation and possible non-disabling slight fibrosis of the lungs.

VII. PREVENTIVE MEASURES:

Respiratory Protection: Respiratory protection is necessary when exposure limits for airborne contaminants are exceeded during welding with these electrodes. Use air-supplied respirator in confined spaces. Use only NIOSH approved respirators in accordance with 29 CFR 1910.134 - Respiratory Protection.

Ventilation: Use local exhaust when welding. Maintain exposures below acceptable exposure limits. Confined spaces require special attention to provision of adequate ventilation and/or air-supplied respirators.

Eye Protection and Protective Clothing: Protective equipment is required when welding. Wear gloves, face protection and flame retardant clothing. Do not expose skin or eyes to the heat and radiation from welding operations. Select welding lens shade from the American Welding Society publication F2.2.

IMPORTANT

Maintain exposures below the acceptable exposure limits. Use industrial hygiene air monitoring to ensure that your use of this material does not create exposures which exceed the recommended exposure limits. Always use exhaust ventilation in user welding operations. Refer to the following sources for important additional information:

ANSI Z49.1 The American Welding Society P.O. Box 351040, Miami, FL 33135	In USA:	29 CFR 1910 OSHA - Dept. of Labor Washington, D.C. 20210	In Canada:	CAN/CSA - W17.2-M87 Canadian Standards Association Toronto, Ontario	

SPILL AND DISPOSAL PROCEDURES:

Vacuum or shovel any spilled material into a suitable container. Alloy wastes are normally collected to recover metal values. However, if disposal is necessary, dispose in accordance with federal, state or local regulations.

VIII. FIRST AID MEASURES:

Eye contact: Flush particles from the eyeballs with clean water for at least 15 minutes. If irritation persists, seek medical help.

Skin contact: Wash skin with soap and water to remove any metallic particles. If a rash develops, seek medical attention.

Inhalation: Remove from exposure. If severe respiratory irritation persists, seek medical help. Excessive inhalation of some metal fumes can produce an acute reaction known as "Metal Fume Fever" with symptoms of chills and fever similar to flu symptoms. These symptoms appear within a few hours of exposure; however, long term effects have not been noted from isolated instances of excessive exposure.

Ingestion: If symptoms of ingestion arise, seek medical help.

IX. OTHER REGULATORY INFORMATION (U.S.A. Only)

SARA SECTION 313 SUPPLIER NOTIFICATION:

Individual electrodes covered by this MSDS may contain the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372: Copper, Manganese, and Nickel. Refer to Section II of this MSDS for the electrode name and the percent by weight, and Section VI for the CAS Number for each chemical.

X. PREPARATION INFORMATION:

Prepared By:	Industrial Hygiene Department Special Metals Corporation Huntington, WV USA 25705 (304) 526-5100	Date of Preparation: January 2005

Notes: (1) TLV = Threshold Limit Values - American Conference of Governmental Industrial Hygienists; PEL = Permissible Exposure Limit - OSHA 29 CFR 1910.1000; C = Ceiling value; STEL = Short Term Exposure Limit - a time-weighted 15-minute exposure limit, not to be exceeded at any time during a workday.

(2) CAS No. = Chemical Abstracts Services Number