

ALLOY RODS CORPORATION
 MATERIAL SAFETY DATA SHEET (MSDS)
 For Welding Consumables and Related Products
 Complies with OSHA Hazard Communication Standard 29 C.F.R. 1910.1200

SECTION I - IDENTIFICATION

Identity: ATOM ARC COVERED LOW HYDROGEN ELECTRODES	
Manufacturer's Name: ALLOY RODS CORPORATION	Emergency Telephone No. - 717/637-8911
Address: P. O. Box 517, Wilson Avenue, Hanover, PA 17331	Telephone No. for Information - 717/637-8911
Product Trade Name(s): ATOM ARC 7018, 7018-1, 7018LC, 7018-M, 7018 ALPHA, 7018AC 7018Mo, 8018, 8018-C1, 8018-CM, 8018-B2L, 8018N, 8018NM, 9018, 9018CM, 10018 10018MM, 12018, T, 8018W, 9018-B3L 10018M1, 12018-M2 4130LN, 4130, 4140, 4340	Product Classification(s): AWS A5.1 (E7018); E7018-1; E7018; E7018; E7018; E7018 AWS A5.5, E7018-A1; E8018-C3; E8018-C1; E8018-B2; E8018-B2L; E8018-C2; E8018-NM; E9018M; E9018-B3; E10018-M E10018-02, E12018-M, E11018-M, E8018-W, E9018-B3L MIL-E-0022200/10A, MIL 10018-M1, MIL 12018-M2 NOT CLASSIFIED (4130LN, 4130, 4140, 4340)

SECTION II - HAZARDOUS INGREDIENTS

IMPORTANT: THIS SECTION COVERS THE MATERIALS FROM WHICH THE PRODUCT IS MANUFACTURED. THE FUMES AND GASES PRODUCED DURING WELDING WITH NORMAL USE OF THIS PRODUCT ARE COVERED IN SECTION V.

THE TERM "HAZARDOUS" IN "HAZARDOUS MATERIALS" SHOULD BE INTERPRETED AS A TERM REQUIRED AND DEFINED IN OSHA HAZARD COMMUNICATION STANDARD (29 C.F.R. 1910.1200) AND IT DOES NOT NECESSARILY IMPLY THE EXISTENCE OF ANY HAZARD.

Ingre dient	(CAS No.)	Exposure Limit mg/M3	Source	Ingre dient	(CAS No.)	Exposure Limit mg/M3	Source
Iron	(7439-84-6)	10-5	(1) (2)	Nickel (B)	(7440-02-0)	1	(1) (2)
Chremium (A)	(7440-47-3)	1-0.5	(1) (2)	Molybdenum (C)	(7439-98-7)	5	(1) (2)
Silicon (D)	(7440-21-3)	10	(2)	Potassium Silicate	(1312-76-1)	(N/A)	(3)
Cooper	(7440-50-8)	1 (Dust)	(1) (2)	Calcium Fluoride	(7784-75-5)	2.5 as F	(1) (2)
Sodium Silicate	(6834-92-0)	(N/A)	(3)	Potassium Feldspar (E)	(68476-25-5)	(N/A)	(3)
Calcium Carbonate	(1317-65-3)	10	(2)	Zirconium Silicate (E)	(7440-67-2)	5	(1) (2)
Titanium Dioxide	(13463-67-7)	10	(2)	Aluminum Oxide (F)	(1344-28-1)	10	(2)
Manganese	(7439-96-5)	5 cl	(1) (2)				

- Occupational Safety and Health Administration, 29 C.F.R. 1910.1000 Permissible Exposure Limit (PEL).
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV[R]).
- Not known; nuisance particulate concentration per OSHA 1910.1000, Table Z-3, is 5 mg/M³ respirable dust, and per ACGIH is 10 mg/M³.

- (A) In 8018CM, 9018CM, 12018, "T", 8018W, 9018-B3L, 8018-B2L, 4130LN, 4130, 4140, 4340.
 (B) In 8018, 8018C1, 8018N, 8018NM, 9018, 12018, "T", 8018W, 10018, 10018-M1, 12018-M2, 4130LN, 4130, 4140, and 4340.
 (C) In 7018Mo, 8018CM, 8018NM, 9018, 9018CM, 10018MM, 12018, "T", 9018-B3L, 8018-B2L, 10018-M1, 12018-M2, 4130LN, 4130, 4140, 4340.
 (D) In 8018W.
 (E) Not in 7018 Alpha.
 (F) In 7018AC.

SECTION III - PHYSICAL AND CHEMICAL DATA

These products as shipped are nonhazardous, nonflammable, nonexplosive, and nonreactive.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Nonflammable: Welding arc and sparks can ignite combustibles. See 2-49.1 referenced in Section VII.

SECTION V - REACTIVITY DATA

HAZARDOUS DECOMPOSITION PRODUCTS:

Welding fumes cannot be classified simply. Their composition and quantity are dependent upon the metal being welded, the process, procedures and 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), number of welds and volume of work area, quality and amount of ventilation, position of 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). The primary route of entry of welding fumes and gases is by inhalation.

When the electrode is consumed, the fume and gas decomposition products are different in percent and form from the ingredients listed in Section II. Decomposition products include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II plus those from base metal, coating, etc. as noted above. These components are virtually always present as complex compounds and not as metals (Characterization of Arc Welding Fume: American Welding Society).

Reasonably expected fume constituents from these products would include fluorides and complex oxides of iron, manganese, silicon, and, when present, nickel, chromium, molybdenum, and copper. 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 welders 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.

SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for welding fume NOC (Not Otherwise Classified) is 5 mg/MJ. The ACGIH 1984-85 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 which may modify this TLV.

Effects of Overexposure: FUMES AND GASES can be dangerous to your health. Aggravation of preexisting respiratory or allergic conditions may occur in some workers. SHORT-TERM (ACUTE) OVEREXPOSURE to welding fumes may result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat, or eyes. LONG TERM (CHRONIC) OVEREXPOSURE may lead to siderosis (iron deposits in the lung) and is believed by some investigators to affect pulmonary function. ARC RAYS can injure eyes and burn skin. ELECTRIC SHOCK can kill. See Section VII.

Emergency & First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

CARCINOGENICITY	NTP?	IARC Monographs?	OSHA Regulated?
When present	Cr, Ni	Cr, Ni	Cr

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacturer's instructions and the precautionary label on this product. See American National Standard Z-49.1, Safety in Welding and Cutting, published by the American Welding Society P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 C.F.R. 1910), U. S. Government Printing Office, Washington, D.C. 20402 for more detail on many of 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 worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or where 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, start with a shade which is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others.

Protective Clothing: Wear head, hand and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. At a minimum, this includes welder's gloves and a protect 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 from work and ground.

Procedure for Cleanup of Spills or Leaks: NOT APPLICABLE

Waste Disposal Method: 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.

ALLOY RODS CORPORATION
MATERIAL SAFETY DATA SHEET (MSDS)
For Welding Consumables and Related Products
Complies with OSHA Hazard Communication Standard 29 C.F.R. 1910.1200

SECTION I - IDENTIFICATION

Identity: MILD STEEL COVERED ELECTRODES	
Manufacturer's Name: ALLOY RODS CORPORATION	Emergency Telephone No. - 717/637-8911
Address: P. O. Box 517, Wilson Avenue, Hanover, PA 17331	Telephone No. for Information - 717/637-8911
Product Trade Name(s): SW14, SW15, SW15IP, 7024, SW610, AP100, SW612, SW-17F, 70LA-2, XP-60, AND 6013 XP-70, XP-80, XP-90, AND SW75	Product Classification(s): AWS A5.1, <u>E6011</u>, <u>E6013</u>, E7014, E7024, E6010, E6010, E6012, E6012, E7016, E6010, AND E6013 AWS A5.5, E7010-G, E8010-G, E9010-G, AND E7010A1

SECTION II - HAZARDOUS INGREDIENTS

IMPORTANT: THIS SECTION COVERS THE MATERIALS FROM WHICH THE PRODUCT IS MANUFACTURED. THE FUMES AND GASES PRODUCED DURING WELDING WITH NORMAL USE OF THIS PRODUCT ARE COVERED IN SECTION V.

THE TERM "HAZARDOUS" IN "HAZARDOUS MATERIALS" SHOULD BE INTERPRETED AS A TERM REQUIRED AND DEFINED IN OSHA HAZARD COMMUNICATION STANDARD (29 C.F.R. 1910.1200) AND IT DOES NOT NECESSARILY IMPLY THE EXISTENCE OF ANY HAZARD.

Ingredient	(CAS No.)	Exposure Limit	Source	Ingredient	(CAS No.)	Exposure Limit	Source
Iron	(7439-89-6)	10-5	(1) (2)	Cellulose	(9004-34-6)	10	(2)
Potassium Titanate	(12030-97-6)	(N/A)	(3)	Calcium Carbonate	(1317-65-3)	10	(2)
Magnesium Carbonate	(546-93-0)	10	(2)	Titanium Dioxide	(13463-67-7)	10	(2)
Manganese	(7439-96-5)	5 cl	(1) (2)	Sodium Silicate	(6834-92-0)	(N/A)	(3)
Potassium Silicate	(1312-76-1)	(N/A)	(3)	Aluminum Silicate	(68476-25-5)	(N/A)	(3)
Aluminum Oxide	(1344-28-1)	10	(2)	Bentonite	(1302-78-9)	(N/A)	(3)
Magnesium Oxide	(1309-48-4)	15-10	(1) (2)	Calcium Fluoride	(7789-75-5)	2.5 as F	(1) (2)
Silicon	(7440-21-3)	10	(2)	Zirconium Dioxide	(1314-23-4)	5	(1) (2)
Nickel	(7440-02-0)	1	(1) (2)	Molybdenum	(7439-98-7)	5	(1) (2)
Chromium	(7440-47-3)	1-0.5	(1) (2)	Mica	(12001-21-2)	3	(2)
Zirconium Silicate	(1314-23-4)	5	(1) (2)				

1. Occupational Safety and Health Administration, 29 C.F.R. 1910.1000 Permissible Exposure Limit (PEL).
2. American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV[R]).
3. Not known; nuisance particulate concentration per OSHA 1910.1000, Table Z-3, is 5 mg/M³ respirable dust, and per ACGIH is 10 mg/M³.

(A) In all electrodes. (B) IN SW14, SW15, SW15IP, 7024, SW75, SW610, AP100, XP-60, XP-70, XP-80, XP-90 and 6013. (C) In SW14 only. (D) In SW14, 7024, SW612 and 70LA-2. (E) In SW14, SW75 and SW612. (F) In all electrodes except 70LA-2 and 6013. (G) In SW15, SW612, 70LA-2 and 6013. (H) In SW15 and 7024. (I) In SW15IP and 7024. (J) In SW15IP, SW612, and 70LA-2. (K) In 70LA-2. (L) In XP-60, XP-70, XP-80 and XP-90. (M) In XP-80, and XP-90. (N) In 6013 only. (O) In SW75 only.

SECTION III - PHYSICAL AND CHEMICAL DATA

These products as shipped are nonhazardous, nonflammable, nonexplosive, and nonreactive.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Nonflammable: Welding arc and sparks can ignite combustibles. See Z-49.1 referenced in Section VII.

SECTION V - REACTIVITY DATA

HAZARDOUS DECOMPOSITION PRODUCTS:

Welding fumes cannot be classified simply. Their composition and quantity are dependent upon the metal being welded, the process, procedures and 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), number of welds and volume of work area, quality and amount of ventilation, position of 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). The primary route of entry of welding fumes and gases is by inhalation.

When the electrode is consumed, the fume and gas decomposition products are different in percent and form from the ingredients listed in Section II. Decomposition products include those originating from the volatilization, reaction, or oxidation of the materials shown in Section II plus those from base metal, coating, etc. as noted above. These components are virtually always present as complex compounds and not as metals (Characterization of Arc Welding Fume: American Welding Society).

Reasonably expected fume constituents from these products would include: fluorides (70LA-2 only) and complex oxides containing iron manganese, silicon, nickel (XP-60, XP-70, XP-80 and XP-90), chromium (XP-80 and XP-90) and molybdenum (XP-80 and XP-90). 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 welders 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.

SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value: The ACGIH recommended general limit for welding fume NOC (Not Otherwise Classified) is 5 mg/M3. The ACGIH 1984-85 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 which may modify this TLV.

Effects of Overexposure: FUMES AND GASES can be dangerous to your health. Aggravation of preexisting respiratory or allergic conditions may occur in some workers. SHORT-TERM (ACUTE) OVEREXPOSURE to welding fumes may result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat, or eyes. LONG TERM (CHRONIC) OVEREXPOSURE may lead to siderosis (iron deposits in the lung) and is believed by some investigators to affect pulmonary function. ARC RAYS can injure eyes and burn skin. ELECTRIC SHOCK can kill. See Section VII.

Emergency & First Aid Procedures: Call for medical aid. Employ first aid techniques recommended by the American Red Cross.

CARCINOGENICITY	NTP?	IARC Monographs?	OSHA Regulated?
When present	Cr, N1	Cr, N1	Cr

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE/APPLICABLE CONTROL MEASURES

Read and understand the manufacturer's instructions and the precautionary label on this product. See American National Standard Z-49.1, Safety in Welding and Cutting, published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 C.F.R. 1910), U. S. Government Printing Office, Washington, D.C. 20402 for more detail on many of 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 worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or where 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, start with a shade which is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others.

Protective Clothing: Wear head, hand and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. 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 substantial 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 Method: 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.

MATERIAL SAFETY DATA SHEET

For U.S. Manufactured or Distributed Welding Consumables and Related Products.

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 must be consulted for specific requirements.

SECTION 1 - IDENTIFICATION

Manufacturer/Supplier Name:	ITW HOBART BROTHERS	Telephone No:	(937) 332-4000
Address:	400 TRADE SQUARE EAST, TROY, OH 45373	Emergency No:	(800) 424-9300
Trade Name:	AWS WELDING ELECTRODE CLASSIFICATIONS ER70S-3, ER70S-6, AND ER80S-D2		
Product Type For:	GAS METAL ARC WELDING (GMAW) SOLID WIRE		

SECTION 2 - HAZARDOUS INGREDIENTS**IMPORTANT**

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are covered by Section 5. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENTS	CAS NO.	WEIGHT %	EXPOSURE LIMIT (mg/m3)	
			OSHA PEL	ACGIH TLV
IRON+	7439-89-6	95	5 R*	3 R*
#MANGANESE	7439-96-5	1-5	10 (Oxide Fume)	5 (Oxide Fume) {A4}
			5 CL** (Dust)	0.2
SILICON	7440-21-3	0.5-1.5	1,3 STEL *** (Fume)	(Dust & Fume)
	7440-50-8	0.1-1	5 R*	10
#COPPER	7440-50-8	0.1-1	1 (Dust)	1 (Dust) ♦
MOLYBDENUM (1)	7439-98-7	0.1-1	0.1 (Fume)	0.2 (Fume) ♦
			5 R*	5 (Soluble Compounds)

+ - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA, or "Particulates Not Otherwise Classified" by ACGIH.

- Respirable Fraction.

- Reportable material under Section 313 of SARA.

* - Ceiling Limit.

*** - Short Term Exposure Limit.

(1) - Present in ER80S-D2.

{A4} - Not classifiable as a human carcinogen per ACGIH.

♦ - 1997 ACGIH listed under Notice of Intended Changes. Limits of 0.05 mg/m3 for fume and 1 mg/m3 for dust are proposed and should be considered as trial limits.

The exposure limit for welding fume has been established at 5 mg/m3 with OSHA's PEL and ACGIH's TLV. The individual complex compounds within the fume may have lower exposure limits than the general welding fume PEL/TLV. An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be considered to determine the specific fume constituents present and their respective exposure limits.

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

Welding consumables applicable to this sheet are solid and nonvolatile as shipped.

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. See American National Standard Z49.1 referenced in Section 7.

SECTION 5 - REACTIVITY DATA**HAZARDOUS DECOMPOSITION PRODUCTS**

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 oxides of iron; Secondly - complex oxides of manganese, silicon and copper. Molybdenum compounds may be present in ER80S-D2.

Monitor for the materials identified in Section 2. Fumes from the use of this product may contain copper and manganese compounds whose exposure limits are lower than the 5 mg/m3 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. Also, from AWS is F1.3 "Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide", which gives additional advice on sampling.]

SECTION 6 - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE:

Electric arc welding may create one or more of the following health hazards:
ARC RAYS can injure eyes and burn skin.
ELECTRIC SHOCK can kill. See Section 7.
FUMES AND GASES can be dangerous to your health.
PRIMARY ROUTES OF ENTRY are the respiratory system, eyes and/or skin.

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS:

WELDING FUMES - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes.
IRON, IRON OXIDE - None are known. Treat as nuisance dust or fume.
MANGANESE - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure.
SILICA (AMORPHOUS) - Dust and fumes may cause irritation of the respiratory system, skin and eyes.
COPPER - Metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure.
MOLYBDENUM - Irritation of the eyes, nose and throat.

LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS:

WELDING FUMES - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis".
IRON, IRON OXIDE FUMES - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe₃O₄) are not regarded as fibrogenic materials.
MANGANESE - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's Disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems.
SILICA (AMORPHOUS) - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.
COPPER - Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia and jaundice. High levels of copper may cause central nervous system damage characterized by nerve fiber separation and cerebral degeneration.
MOLYBDENUM - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Persons with pre-existing impaired lung functions (asthma-like conditions).

EMERGENCY AND FIRST AID PROCEDURES:

Call for medical aid. Employ first aid techniques recommended by the American Red Cross.
Eyes and Skin: If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY:

Welding fumes must be considered as possible carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65:

These products do not contain chemicals listed under Proposition 65.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING & USE/APPLICABLE CONTROL MEASURES

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 of the fumes.

RESPIRATORY PROTECTION: Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below PEL/TLVs.

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 (29 CFR 1910) from the U.S. Department of Labor, Washington, DC 20210.

ITW Hobart Brothers believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, ITW Hobart Brothers cannot make any expressed or implied warranty as to this information.

INCO ALLOYS INTERNATIONAL, INC.
Material Safety Data Sheet
Welding Products

MSDS No. Ni Rod

Inco Alloys International, Inc.
Welding Products Company
1401 Burris Road
Newton, N. C. 28658

NI-ROD®

FOR ADDITIONAL INFORMATION
Industrial Hygiene (304) 526-5436
Emergency Number (304) 526-5780

SECTION 1 - Product Identification

This MSDS covers all Inco Alloys International, Inc., welding products identified as:

NI-ROD® Welding Electrodes and Cored Wire

Trade name and nominal composition are listed in Section 2-A

SECTION 2 - Hazardous Ingredients*

IMPORTANT

This section covers the materials contained in the product as shipped.
The fumes and gases produced during welding are covered in Section 6.

Ingredient	CAS No.	PEL(1)	TLV(2)	Ingredient	CAS No.	PEL(1)	TLV(2)
Aluminum (Al)	7429-90-5	NONE	10	Iron (Fe)	7439-89-6	NONE	NONE
Barium Carbonate (BaCO ₃)	513-77-9	0.5	0.5	Iron Oxide (Fe ₂ O ₃)	1309-37-1	10	5
Barium Fluoride (BaF ₂)	7787-32-8	0.5	0.5	Manganese (Mn)	7439-96-5	C5	C5
Calcium Carbonate (CaCO ₃)	1317-65-3	NONE	10	Sodium Aluminum Fluoride (Na ₃ AlF ₆)	15096-52-3	2.5(as F)	2.5(as F)
Calcium Fluoride (CaF ₂)	7789-75-5	2.5(as F)	2.5(as F)	Nickel (Ni)	7440-02-0	1	1
Carbon (C)	7440-44-0	3.5	3.5	Silicon Dioxide (SiO ₂)	60676-86-0	0.1	0.1
Copper (Cu)	7440-50-8	1	1	Strontium Carbonate (SrCO ₃)	1633-05-2	NONE	NONE

SECTION 2-A - Tradename and Nominal Composition

Wt. % of combined wire and flux
1% or greater - NI & Cr 0.1%

PRODUCT NAME	1-10%-A 31-60%-C 11-30%-B 61-100%-D										
	Al	BaCO ₃	BaF ₂	CaCO ₃	CaF ₂	C	Cu	Fe	Fe ₂ O ₃	Mn	Na ₃ AlF ₆
NI-ROD® Welding Electrode	A	A	A			A		A			
NI-ROD® 44 Welding Electrode			A	A		A	A	C		A	
NI-ROD® 55 Welding Electrode			A	A		A	A	C			
NI-ROD® 55X Welding Electrode	A		A	A		A	A	C			
NI-ROD® 60 Welding Electrode			A	A		A	A	C	A		
NI-ROD® 99X Welding Electrode			A	A		A	A	A		A	
NI-ROD® FC55 Cored Wire				A	A			C		A	A

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SECTION 3 - Physical Data

Welding electrodes are solid alloy wire which is flux coated or may have a flux core.

SECTION 4 - Fire and Explosion Data

Nonflammable; however, welding arcs and sparks can ignite flammable liquids and vapors and combustible solids.

Notes: *As defined by OSHA (29CFR1910.1200) or certain state regulations.

1 Permissible Exposure Limit - (mg/m³) - OSHA (29CFR1910.)

2 Threshold Limit Value - (mg/m³) - American Conference of Governmental Industrial Hygienists (current as of MSDS revision date).