MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**6010, 6011, 6013, MILDSTEEL ELECTRODES**
Version #	01
Issue date	25-March-2014
Revision date	-
Supersedes date	-
CAS #	Mixture
Product type	Coated carbon steel alloys
Product use	Carbon Steel Welding
Manufacturer information	
Manufacturer/Supplier	Harris Products Group 4501 Quality Place Mason, Ohio 45040 US custservmason@jwharris.com
Telephone number	513-754-2000
Emergency Telephone Numbers	1-888-609-1762 (US, Canada, Mexico only) Please quote 333988

2. Hazards Identification

Physical state	Solid.
Appearance	Coated metal rods.
Emergency overview	WARNING May cause eye, skin and respiratory tract irritation. Toxic: danger of serious damage to health by prolonged exposure through inhalation.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Skin contact. Eye contact.
Eyes	Fumes from heated material may cause eye irritation. Dust may irritate the eyes. Exposure to hot material may cause thermal burns.
Skin	Exposure to hot material may cause thermal burns. Dust may irritate skin.
Inhalation	Inhalation of fumes may cause a flu-like illness called metal fume fever. Inhalation of dusts may cause respiratory irritation.
Ingestion	Ingestion is not likely to be a primary route of occupational exposure.
Target organs	Respiratory system. Eyes. Skin. Central nervous system.
Chronic effects	Chronic inhalation of fumes or dust may cause irritation or other respiratory conditions (e.g., bronchitis). May cause lung damage. Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Overexposure to manganese fumes may affect the brain and central nervous system, resulting in poor coordination, difficulty speaking, and arm or leg tremor. This condition can be irreversible. Refer to Section 11 Toxicological Information for more details.
Signs and symptoms	Contact may cause irritation and redness. Dust may irritate respiratory system. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Typical metal fume fever begins four to twelve hours after sufficient exposure to freshly formed fumes. The first symptoms are a metallic taste, dryness and irritation of the throat. Cough and shortness of breath may occur along with headache, fatigue, nausea, vomiting, muscle and joint pain, fever and chills. The syndrome runs its course in 24-48 hours.
Potential environmental effects	Alloys in massive forms present a limited hazard for the environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Iron	7439-89-6	70 - 90
Titanium dioxide	13463-67-7	10
Aluminum oxide	1344-28-1	5
Cellulose	9004-34-6	5
Manganese	7439-96-5	5
Mica	12001-26-2	5
Magnesium carbonate	546-93-0	2
Aluminum silicate	12141-46-7	1
Calcium carbonate	1317-65-3	1
Potassium silicate	1312-76-1	1
Potassium titanate	12030-97-6	1
Sodium silicate	1344-09-8	1
Zirconium silicate	1214-23-4	1

4. First Aid Measures

First aid procedures

Eye contact Rinse immediately with plenty of water for at least 15 minutes. Remove any contact lenses. Get medical attention if irritation develops or persists.

Skin contact Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation develops and persists.

Inhalation Remove person from contaminated area to fresh air. Apply artificial respiration if needed. Call a physician if symptoms develop or persist.

Ingestion Do NOT induce vomiting. Immediately rinse mouth and drink a cupful of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Notes to physician Treat symptomatically. Symptoms may be delayed.

General advice Show this safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

Flammable properties Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. Do not use water on molten metal: Explosion hazard could result.

Extinguishing media

Suitable extinguishing media Extinguish with foam, carbon dioxide or dry powder.

Unsuitable extinguishing media Do not use water or halogenated extinguishing media.

Protection of firefighters

Specific hazards arising from the chemical Fire or high temperatures create: Metal oxides.

Fire fighting equipment/instructions Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Move containers from fire area if you can do it without risk.

6. Accidental Release Measures

Personal precautions Keep unnecessary personnel away. Avoid inhalation of dust from the spilled material. Wear protective clothing as described in Section 8 of this MSDS. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not contaminate water.

Methods for containment Stop leak if you can do so without risk. Local authorities should be advised if significant spillages cannot be contained.

Methods for cleaning up Collect for salvage or disposal. Put material in suitable, covered, labeled containers. Avoid the generation of dusts during clean-up. For waste disposal, see Section 13 of the MSDS.

Other information Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling

Follow the recommendations in ANSI Z49.1, Safety in welding and cutting (ANSI=American National Standard Institute). Avoid inhalation of dust and fumes. Use process enclosures, local exhaust ventilation, or other engineering controls to control sources of dust and fumes. Keep formation of airborne dusts to a minimum. Avoid contact with skin and eyes. Wear appropriate personal protective equipment (See Section 8). Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Avoid release to the environment.

Storage

Store in tightly closed original container in a dry, cool and well-ventilated place. Store in a closed container away from incompatible materials. Keep away from food, drink and animal feedingstuffs.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.
Cellulose (CAS 9004-34-6)	TWA	10 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Mica (CAS 12001-26-2)	TWA	3 mg/m3	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	
Zirconium silicate (CAS 1214-23-4)	STEL	10 mg/m3	
	TWA	5 mg/m3	

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Calcium carbonate (CAS 1317-65-3)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Cellulose (CAS 9004-34-6)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Magnesium carbonate (CAS 546-93-0)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Titanium dioxide (CAS 13463-67-7)	PEL	15 mg/m3	Total dust.
Zirconium silicate (CAS 1214-23-4)	PEL	5 mg/m3	

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value
Mica (CAS 12001-26-2)	TWA	20 mppcf

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	10 mg/m3	
Calcium carbonate (CAS 1317-65-3)	TWA	10 mg/m3	
Cellulose (CAS 9004-34-6)	TWA	10 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Mica (CAS 12001-26-2)	TWA	3 mg/m3	Respirable.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	
Zirconium silicate (CAS 1214-23-4)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	1 mg/m3	Respirable.
Calcium carbonate (CAS 1317-65-3)	STEL	20 mg/m3	Total dust.
	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Cellulose (CAS 9004-34-6)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Mica (CAS 12001-26-2)	TWA	3 mg/m3	Respirable.
Titanium dioxide (CAS 13463-67-7)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Zirconium silicate (CAS 1214-23-4)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.
Cellulose (CAS 9004-34-6)	TWA	10 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Mica (CAS 12001-26-2)	TWA	3 mg/m3	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	
Zirconium silicate (CAS 1214-23-4)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.
Cellulose (CAS 9004-34-6)	TWA	10 mg/m3	
Magnesium carbonate (CAS 546-93-0)	TWA	10 mg/m3	Total dust.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Mica (CAS 12001-26-2)	TWA	3 mg/m3	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	
Zirconium silicate (CAS 1214-23-4)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	10 mg/m3	Total dust.
Calcium carbonate (CAS 1317-65-3)	TWA	10 mg/m3	Total dust.
Cellulose (CAS 9004-34-6)	TWA	10 mg/m3	Total dust.
Magnesium carbonate (CAS 546-93-0)	TWA	10 mg/m3	Total dust.
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	5 mg/m3	Dust.
		1 mg/m3	Fume.
Mica (CAS 12001-26-2)	TWA	3 mg/m3	Respirable dust.
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	Total dust.
Zirconium silicate (CAS 1214-23-4)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Mexico. Occupational Exposure Limit Values

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	10 mg/m3	
Calcium carbonate (CAS 1317-65-3)	STEL	20 mg/m3	
	TWA	10 mg/m3	
Cellulose (CAS 9004-34-6)	STEL	20 mg/m3	
	TWA	10 mg/m3	
Magnesium carbonate (CAS 546-93-0)	STEL	20 mg/m3	
	TWA	10 mg/m3	
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	Fume.
		0.2 mg/m3	
Mica (CAS 12001-26-2)	TWA	3 mg/m3	
Titanium dioxide (CAS 13463-67-7)	STEL	20 mg/m3	
	TWA	10 mg/m3	
Zirconium silicate (CAS 1214-23-4)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Engineering controls Provide adequate ventilation. Observe occupational exposure limits and minimize the risk of inhalation of dust and fumes. Shower, hand and eye washing facilities near the workplace are recommended.

Personal protective equipment

Eye / face protection Wear safety glasses with side shields (or goggles). When welding, it is recommended that safety glasses, goggles, or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, “Safety in Welding and Cutting”) be worn.

Skin protection Protective clothing is recommended. When welding, wear protective clothing that protects from sparks and flame (per ANSI Z49.1-1988, “Safety in Welding and Cutting”).

Respiratory protection Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the TLV. In a confined space a supplied respirator may be required. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical & Chemical Properties

Appearance	Coated metal rods.
Physical state	Solid.
Form	Solid.
Color	Not available.
Odor	Odorless.
Odor threshold	Not available.
pH	Not applicable.
Vapor pressure	Not applicable
Vapor density	Not applicable.
Boiling point	5432 °F (3000 °C) as Iron
Melting point/Freezing point	2795 °F (1535 °C) as Iron
Solubility (water)	Insoluble.
Specific gravity	7.86 @20°C as Iron
Flash point	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Auto-ignition temperature	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Strong acids. Strong bases. Acetylene. Ammonia. Hydrogen peroxide (H_2O_2). Chlorine. Bromine, iodine, turpentine, magnesium metal. Hydrogen sulfide. Ammonium nitrate.
Hazardous decomposition products	Toxic metal oxides are emitted when heated above the melting point. Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure 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), the number of welders and the volume of the worker 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.) Fumes can be reasonably expected to include: Metal oxides.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components	Species	Test Results
Iron (CAS 7439-89-6)		
Acute		
Oral		
LD50	Rat	30 g/kg
Manganese (CAS 7439-96-5)		
Acute		
Oral		
LD50	Rat	9000 mg/kg

Components	Species	Test Results
Sodium silicate (CAS 1344-09-8)		
Acute		
Oral		
LD50	Mouse	1100 mg/kg
	Rat	1.1 g/kg

Sensitization This product is not expected to cause skin sensitization.

Acute effects When heated, the vapors/fumes given off may cause respiratory tract irritation. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever.

Local effects Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract.

Chronic effects Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Overexposure to manganese fumes may affect the brain and central nervous system, resulting in poor coordination, difficulty speaking, and arm or leg tremor. This condition can be irreversible

Carcinogenicity Titanium Dioxide is listed by IARC as possibly carcinogenic to humans (Group 2B). This listing is based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals. Titanium dioxide is considered carcinogenic only when in an inhalable powdered form.

ACGIH Carcinogens

Aluminum oxide (CAS 1344-28-1)	A4 Not classifiable as a human carcinogen.
Aluminum silicate (CAS 12141-46-7)	A4 Not classifiable as a human carcinogen.
Manganese (CAS 7439-96-5)	A4 Not classifiable as a human carcinogen.
Titanium dioxide (CAS 13463-67-7)	A4 Not classifiable as a human carcinogen.
Zirconium silicate (CAS 1214-23-4)	A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

Titanium dioxide (CAS 13463-67-7)	2B Possibly carcinogenic to humans.

Epidemiology Based on epidemiological studies, pre-existing pulmonary disorders may be aggravated by prolonged exposure to high concentrations of metal dust or fumes.

Mutagenicity No data available.

Reproductive effects This product is not reported to cause reproductive effects in humans. Manganese metal may damage the reproductive system and has shown teratogenic effects in laboratory animals.

Further information No other specific acute or chronic health impact noted.

12. Ecological Information

Ecotoxicological data

Components		Species	Test Results
Iron (CAS 7439-89-6)			
Aquatic			
Fish	LC50	Channel catfish (Ictalurus punctatus)	> 500 mg/l, 96 hours
Sodium silicate (CAS 1344-09-8)			
Aquatic			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	0.28 - 0.57 mg/l, 48 hours
Fish	LC50	Western mosquitofish (Gambusia affinis)	1800 mg/l, 96 hours

Ecotoxicity Alloys in massive forms present a limited hazard for the environment.

Environmental effects Significant environmental persistence and bioaccumulation can be expected.

Persistence and degradability The product is not biodegradable.

Bioaccumulation / Accumulation The product contains potentially bioaccumulating substances.

Mobility in environmental media Alloys in massive forms are not mobile in the environment.

13. Disposal Considerations

Waste codes	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal instructions	Dispose in accordance with all applicable regulations.
Waste from residues / unused products	Scrapped material should be sent for refining to recover precious metal content. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

TDG

Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Manganese (CAS 7439-96-5)

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Aluminum oxide (CAS 1344-28-1)	1.0 %
Manganese (CAS 7439-96-5)	1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Aluminum oxide (CAS 1344-28-1)	Listed.
Manganese (CAS 7439-96-5)	Listed.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

None

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15) Not controlled

Canadian regulations This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status Controlled

WHMIS classification D2A - Other Toxic Effects-VERY TOXIC

WHMIS labeling

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

State regulations WARNING: This product contains chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

Aluminum oxide (CAS 1344-28-1)	Listed.
Iron (CAS 7439-89-6)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Mica (CAS 12001-26-2)	Listed.
Zirconium silicate (CAS 1214-23-4)	Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Titanium dioxide (CAS 13463-67-7)	Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Titanium dioxide (CAS 13463-67-7)	Listed: September 2, 2011 Carcinogenic.

US. Massachusetts RTK - Substance List

Aluminum oxide (CAS 1344-28-1)	Listed.
Calcium carbonate (CAS 1317-65-3)	Listed.
Cellulose (CAS 9004-34-6)	Listed.
Magnesium carbonate (CAS 546-93-0)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Mica (CAS 12001-26-2)	Listed.
Titanium dioxide (CAS 13463-67-7)	Listed.

US. New Jersey Worker and Community Right-to-Know Act

Aluminum oxide (CAS 1344-28-1)
Calcium carbonate (CAS 1317-65-3)
Cellulose (CAS 9004-34-6)
Magnesium carbonate (CAS 546-93-0)
Manganese (CAS 7439-96-5)
Mica (CAS 12001-26-2)
Titanium dioxide (CAS 13463-67-7)

US. Pennsylvania Worker and Community Right-to-Know Law

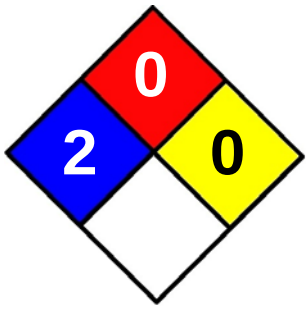
Aluminum oxide (CAS 1344-28-1)
Calcium carbonate (CAS 1317-65-3)
Cellulose (CAS 9004-34-6)
Manganese (CAS 7439-96-5)
Mica (CAS 12001-26-2)
Titanium dioxide (CAS 13463-67-7)

16. Other Information

Further information HMIS® is a registered trade and service mark of the NPCA.
A HMIS® Health rating including an * indicates a chronic hazard.

HMIS® ratings Health: 2*
Flammability: 0
Physical hazard: 0

NFPA Ratings



Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.