

# MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards. This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these products.

**WARNING: PRODUCT COMPONENTS PRESENT HEALTH AND SAFETY HAZARDS. READ AND UNDERSTAND THIS MATERIAL SAFETY DATA SHEET (M.S.D.S.). ALSO, FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.** The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. **BE SURE TO CONSULT THE LATEST VERSION OF THE MSDS. MATERIAL SAFETY DATA SHEETS ARE AVAILABLE FROM AUFHAUSER CORPORATION.**

## STATEMENT OF LIABILITY-DISCLAIMER

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## PART I What is the material and what do I need to know in an emergency?

### 1. PRODUCT IDENTIFICATION

**TRADE NAME (AS LABELED):** NICKELROD #33 and #42  
**CHEMICAL NAME/CLASS:** Coated Nickel Base Alloy  
**SYNONYMS:** Not Applicable  
**PRODUCT USE:** Metal Welding  
**SUPPLIER/MANUFACTURER'S NAME:** Aufhauser Corporation  
**ADDRESS:** 39 West Mall, Plainview, NY 11803  
**EMERGENCY PHONE:** (516) 694-8696  
**BUSINESS PHONE:** 1-800-645-9486  
**DATE OF PREPARATION:** 07-17-2011

### 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH – TLV		OHSAs – PEL		NIOSH IDLH MG/M <sup>3</sup>	OTHER MG/M <sup>3</sup>
			TWA MG/M <sup>3</sup>	STEL MG/M <sup>3</sup>	TWA MG/M <sup>3</sup>	STEL MG/M <sup>3</sup>		

#### COMPONENT 1: METAL ELECTRODES

NICKEL	7440-02-0	BALANCE	1	NE	1	NE	10	NIOSH REL: TWA = 0.015 CARCINOGEN: EPA-A, IARC-2B, MAK-A1, NIOSH-X, NTP-2B
COPPER (EXPOSURE LIMITS ARE FOR COPPER FUME, AS COPPER)	7440-50-8	38	0.2	NE	0.1	NE	100	NIOSH REL: 0.1 DFG MAK: 0.1 (RESPIRABLE FRACTION)
SILICON	7440-21-3	2	10	NE	15 (TOTAL DUST) 5 (RESPIRABLE DUST) 10 (TOTAL DUST) (VACATED 1989 PEL)	NE	NE	NIOSH REL: TWA = 10 (TOTAL DUST), 5 (RESPIRABLE FRACTION)

## 2. COMPOSITION and INFORMATION ON INGREDIENTS (continued)

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH – TLV		OHSА – PEL		NIOSH IDLH MG/M <sup>3</sup>	OTHER  MG/M <sup>3</sup>
			TWA MG/M <sup>3</sup>	STEL MG/M <sup>3</sup>	TWA MG/M <sup>3</sup>	STEL MG/M <sup>3</sup>		

### COMPONENT 1: METAL ELECTRODES (CONTINUED)

TITANIUM DIOXIDE	13463-67-7	15	10, A4 (NOT CLASSIFIABLE AS A HUMAN CARCINOGEN)	NE	15 (TOTAL DUST) 10 (VACATED 1989 PEL)	NE	5000	NIOSH REL: LOWEST FEASIBLE CONCENTRATION (LOQ 0.2 mg/m <sup>3</sup> ) DFG MAK: TWA = 1.5 (RESPIRABLE FRACTION) DFG MAK PREGNANCY RISK CLASSIFICATION: C CARCINOGEN: IARC-3. NIOSH-CA, TLV-A4
NIObIUM	7440-03-1	5	NE	NE	NE	NE	NE	NE
CHROMIUM	7440-47-3	25	0.5, A4 (NOT CLASSIFIABLE AS A HUMAN CARCINOGEN)	NE	0.5	NE	250	NIOSH REL: TWA = 0.5 CARCINOGEN: EPA-D, EPA-CBD. IARC-3, TLV-A4
MOLYBDENUM	7439-98-7	5	10 NIC: 3 (RESPIRABLE FRACTION)	NE	15 (TOTAL DUST) 10 (VACATED 1989 PEL)	NE	5000	DFG MAK: TWA = 4 (INHALABLE FRACTION)
IRON (EXPOSURE LIMITS ARE FOR IRON OXIDE DUST AND FUME, AS FE)	7439-89-6	2	5, A4 (NOT CLASSIFIABLE AS A HUMAN CARCINOGEN)	NE	10	NE	2500	NIOSH REL: TWA = 5 DFG MAK: TWA = 6 (RESPIRABLE FRACTION) CARCINOGEN: IARC-3, TLV-A4
MANGANESE (EXPOSURE LIMITS ARE FOR MANGANESE, ELEMENTAL INORGANIC COMPOUNDS, AND FUME, AS MN)	7439-96-5	4	0.2	NE	1 (VACATED 1989 PEL)	5 (CEILING) 3 (VACATED 1989 PEL)	500	NIOSH REL: TWA = 1 STEL = 3 DFG MAKs: TWA = 0.5 (INHALABLE FRACTION) PEAK = 10•MAK 30MIN., AVERAGE VALUE DFG MAK PREGNANCY RISK CLASSIFICATION: C CARCINOGEN: EPA-D

### COMPONENT 2: FLUX COATING ON ELECTRODES

POTASSIUM COMPOUND SODIUM COMPOUND		20	NE	NE	NE	NE	NE	NE
FLUORIDE COMPOUNDS (EXPOSURE LIMITS ARE FOR FLUORIDES, AS FLUORINE)		5-20	2.5, A4 (NOT CLASSIFIABLE AS A HUMAN CARCINOGEN)	NE	2.5	NE	NE	DFG MAKs: TWA = 2.5 (INHALABLE FRACTION) PEAK = 5•MAK 30MIN., AVERAGE VALUE CARCINOGEN: IARC-3, TLV-A4
CALCIUM OXIDE	1305-78-8	15-20	2	NE	5	NE	25	NIOSH REL: TWA = 2 DFG MAK: TWA = 5 (TOTAL RESPIRABLE DUST FRACTION)

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m<sup>3</sup>. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. 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.

## 2. COMPOSITION and INFORMATION ON INGREDIENTS (continued)

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH – TLV		OSHA – PEL		NIOSH IDLH MG/M <sup>3</sup>	OTHER MG/M <sup>3</sup>
			TLV MG/M <sup>3</sup>	STEL MG/M <sup>3</sup>	PEL MG/M <sup>3</sup>	STEL MG/M <sup>3</sup>		

### COMPONENT 2: FLUX COATING ON ELECTRODES (CONTINUED)

DIATOMACEOUS EARTH	61790-53-2	5-15	10 (INHALABLE PARTICULATE) 3 (RESPIRABLE PARTICULATE)	NE	20 MPPCF $\frac{80 \text{ MG/M}^3}{\% \text{ SiO}_2}$ 6 (VACATED 1989 PEL)		3000	NIOSH REL: TWA = 6 DFG MAK: TWA = 4 (INHALABLE FRACTION) DFG MAK PREGNANCY RISK CLASSIFICATION: C CARCINOGEN: IARC-3
IRON	7439-89-6	15	5, A4 (NOT CLASSIFIABLE AS A HUMAN CARCINOGEN)	NE	10	NE	2500	NIOSH REL: TWA = 5 DFG MAK: TWA = 6 (MEASURED AS THE INHALABLE FRACTION OF THE AEROSOL)
TITANIUM DIOXIDE	13463-67-7	15	10, A4 (NOT CLASSIFIABLE AS A HUMAN CARCINOGEN)	NE	15 (TOTAL DUST) 10 (VACATED 1989 PEL)	NE	5000	NIOSH REL: LOWEST FEASIBLE CONCENTRATION (LOQ 0.2 MG/M <sup>3</sup> ) DFG MAK: TWA = 1.5 (RESPIRABLE FRACTION) DFG MAK PREGNANCY RISK CLASSIFICATION: C CARCINOGEN: IARC-3. NIOSH-CA, TLV-A4
ALUMINUM OXIDE	1344-28-1	10	10, A4 (NOT CLASSIFIABLE AS A HUMAN CARCINOGEN)	NE	15 (TOTAL DUST) 10 (VACATED 1989 PEL)	NE	NE	DFG MAK: TWA = 6 (FUME)
MANGANESE TETRAOXIDE (EXPOSURE LIMITS ARE FOR MANGANESE, ELEMENTAL AND INORGANIC COMPOUNDS, AS MANGANESE)	1317-35-7	5	0.2	NE	NE	5 CEILING	500	NIOSH REL: TWA = 1 STEL = 3 DFG MAK: 0.5 (TOTAL RESPIRABLE DUST FRACTION) DFG MAK PREGNANCY RISK CLASSIFICATION: C CARCINOGEN: EPA-D

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m<sup>3</sup>. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. 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.

## 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** These products consist of flux coated rods that are odorless electrodes. There are no immediate health hazards associated with the electrode form of these products. The Nickel component of these products is a carcinogen. These products are not flammable nor reactive. If involved in a fire, these products may generate irritating iron fumes, a variety of iron compounds, carbon dioxide, carbon monoxide, and metal oxides. Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** During welding operations, the most significant route of over-exposure is via inhalation of fumes.

**INHALATION:** Inhalation is not anticipated to be a significant route of over-exposure to the coated electrodes. Inhalation of copper oxide fumes, which may be generated by these products during welding operations, can cause metal fume fever. Repeated over-exposures, via inhalation, to the dusts or fumes generated by these products during welding operations may have adverse effects on the lungs with possible asthma and pneumonitis (life-threatening respiratory conditions). Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, and vomiting. Refer to Section 10 (Stability and Reactivity) for information on the specific composition of welding fumes and gases.

**CONTACT WITH SKIN or EYES:** Contact of these products with the skin is not anticipated to be irritating. Contact with these products can be physically damaging to the eye (i.e., foreign object). Fumes generated during welding operations can be irritating to the skin and eyes. Symptoms of skin over-

exposure may include irritation and redness; prolonged or repeated skin over-exposures may lead to allergic contact dermatitis. Symptoms of eye over-exposure may include irritation, redness, and conjunctivitis. Contact with hot electrodes will burn contaminated skin or eyes.

### 3. HAZARD IDENTIFICATION (continued)

**SKIN ABSORPTION:** Skin absorption is not known to be a significant route of over-exposure for any component of these products.

**INGESTION:** Ingestion is not anticipated to be a route of occupational exposure for these products.

**INJECTION:** Though not a likely route of occupational exposure for these products, injection (via punctures or lacerations in the skin) may cause local reddening, tissue swelling, and discomfort.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.** Symptoms associated with overexposure to these products and the fumes generated during welding operations are as follows:

**ACUTE:** The chief acute health hazard associated with these products would be the potential for irritation of contaminated skin and eyes when exposed to fumes during welding operations. Inhalation of copper oxide fumes can cause metal fume fever. Rare cases of allergic contact dermatitis have been reported in people working with copper dust. Severe ingestion over-exposure to Copper (a component of these products) may be fatal. Contact with the hot electrode will burn contaminated skin or eyes.

**CHRONIC:** Chronic skin over-exposure to the fumes generated during welding operations may produce dermatitis (red, inflamed skin). Repeated over-exposures, via inhalation, to the dusts or fumes generated by these products during welding operations may have adverse effects on the lungs with possible asthma and pneumonitis (life-threatening respiratory conditions). Nickel (a component of these products) is a carcinogen. Hypersensitivity to Nickel can cause allergic contact dermatitis, asthma, conjunctivitis, and inflammatory reactions around nickel-containing medical implants and prostheses. Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, vomiting, discoloration of the skin and eyes, and kidney and liver disorder.

**TARGET ORGANS:** For fumes: ACUTE: Skin, eyes, respiratory system. CHRONIC: Skin, Respiratory

## PART II *What should I do if a hazardous situation occurs?*

### 4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take a copy of label and MSDS to health professional with victim.

**SKIN EXPOSURE:** If fumes generated by welding operations involving this product contaminate the skin, begin decontamination with running water. If molten material contaminates the skin, immediately begin decontamination with cold, running water. Minimum flushing is for 15 minutes. Victim must seek medical attention if any adverse reaction occurs.

**EYE EXPOSURE:** If fumes generated by welding operations involving this product enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

**INHALATION:** If fumes generated by welding operations involving this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

**INGESTION:** Ingestion is not a likely route of exposure for this product. If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Rinse mouth with water if person is conscious. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Dermatitis, other skin conditions, asthma, and other respiratory disorders may be aggravated by prolonged over-exposures to the dusts or fumes generated by these products.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate overexposure.

### 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not flammable.

**AUTOIGNITION TEMPERATURE:** Not flammable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

**FIRE EXTINGUISHING MATERIALS:**

Water Spray: YES Carbon Dioxide: YES

Halon: YES Foam: YES

Dry Chemical: YES Other: Any "ABC" Class

**UNUSUAL FIRE AND EXPLOSION HAZARDS** In the heat of a fire, the product may produce fumes containing copper, manganese, silicon and other metal oxides.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Not applicable.

### 6. ACCIDENTAL RELEASE MEASURES

**SPILL AND LEAK RESPONSE:** Not applicable.

## PART III *How can I prevent hazardous situations from occurring?*

### 7. HANDLING AND STORAGE

**WORK PRACTICES AND HYGIENE PRACTICES:** Do not eat or drink while handling these products. Use ventilation and other engineering controls to minimize potential exposure to these products.

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. Use in a properly ventilated location. Avoid breathing fumes of these products during welding or brazing operations. When these products are used during welding or brazing operations, follow the requirements of the Federal Occupational Safety and Health Welding and Cutting Standard (29 CFR 1910 Subpart Q) and the safety standards of the American National Standards Institute for welding and cutting (ANSI Z49.1). Store packages in a cool, dry location. Storage in an atmosphere that is wet, moist, or highly humid may lead to corrosion of these products. Store away from incompatible materials (see Section 10, Stability and Reactivity). Store packages in a cool, dry location. Storage in an atmosphere that is wet, moist, or highly humid may lead to corrosion of these products. Store away from incompatible materials (see Section 10, Stability and Reactivity).

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Not applicable.

### 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Prudent practice is to ensure eyewash/safety shower stations are available near areas where these products are used.

**RESPIRATORY PROTECTION:** Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed (i.e. a Weld Fume Respirator, or Air-Line Respirator for welding in confined spaces), U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Respiratory Protection is recommended to be worn during welding operations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). Respiratory protection guidelines for Copper and Nickel are provided as follows:

COPPER

<u>CONCENTRATION</u>	<u>RESPIRATORY PROTECTION</u>
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Up to 5 mg/m <sup>3</sup> :	Dust and mist respirator.
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Up to 10 mg/m <sup>3</sup> :	Dust and mist respirator except single-use and quarter-mask respirator (if not present as a fume); or Supplied Air Respirator (SAR).
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Up to 25 mg/m <sup>3</sup> :	Powered air-purifying respirator with dust and mist filter(s); or SAR operated in a continuous-flow mode.
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Up to 50 mg/m <sup>3</sup> :	Full-facepiece respirator with high-efficiency particulate filter(s); or full-facepiece Self-Contained Breathing Apparatus (SCBA); or full-facepiece SAR; or powered air-purifying respirator with tightfitting facepiece and high-efficiency particulate filter.
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Up to 100 mg/m <sup>3</sup> :	Positive pressure, full-facepiece SAR. (continued on next page)
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Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

Escape: Full-facepiece respirator with high-efficiency particulate filter(s); or escape-type SCBA.

NICKEL

<u>CONCENTRATION</u>	<u>RESPIRATORY PROTECTION</u>
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At Concentrations Above the NIOSH REL or, Where There is no REL, at any Detectable Concentration:	Positive pressure, full-facepiece SCBA or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
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Escape:	Full-facepiece respirator with high-efficiency particulate filter(s) or escape-type SCBA
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**EYE PROTECTION:** Safety glasses. When these products are used in conjunction with welding or brazing, wear safety glasses, goggles, or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, "Safety in Welding and Cutting").

**HAND PROTECTION:** Wear welding gloves for routine industrial use. When these products are used in conjunction with welding or brazing, wear gloves that protect from sparks and flame (per ANSI Z49.1-1988, "Safety in Welding and Cutting").

**BODY PROTECTION:** Wear body protection appropriate for task.

### 9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for elemental nickel:

**RELATIVE VAPOR DENSITY (air = 1):** Not Applicable

**SPECIFIC GRAVITY @ 20°C (water = 1):** 8.9

**SOLUBILITY IN WATER:** Insoluble

**VAPOR PRESSURE, mm Hg @ 20°C:** Approximately 0.

**ODOR THRESHOLD:** Not Applicable

**COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT):** Not established

The following information is for these products:

**APPEARANCE AND COLOR:** These products consist of flux coated rods that are odorless, electrodes.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** The appearance is a distinctive characteristic of these products.

**EVAPORATION RATE (nBuAc = 1):** 1.5

**FREEZING/MELTING POINT:** : 1455 °C (2651 °F)

**pH:** Not Applicable

**BOILING POINT:** : 2900 °C (5252°F)

## 10. STABILITY and REACTIVITY

**STABILITY:** Stable.

**DECOMPOSITION PRODUCTS:** Nickel fumes, a variety of nickel compounds, carbon dioxide, carbon monoxide, metal oxides.

**NOTE:** The composition and quality of welding fumes and gases are dependent upon the metal being welded, the process, the procedure, and the electrodes used. Other conditions that could also influence the composition and quantity of fumes and gases to which workers may be exposed include the following: any coatings on metal being welded (e.g., paint, plating, or galvanizing), the number of welders and the volume of the work area, the quality of ventilation, the position of the welder's head with respect to the fume plume, and the presence of other contaminants in the atmosphere. 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 (Composition and Information on Ingredients). Fume and gas decomposition products, and not the ingredients in the electrode, are important. Concentration of the given fume or gas component may decrease or increase by many times the original concentration. New compounds in the electrode may form. Decomposition products of normal operations include not only those originating from volatilization, reaction, or oxidation of the product's components but also those from base metals and any coating (as noted previously). The best method to determine the actual composition of generated fumes and gases is to take an air sample from inside the welder's helmet if worn or in breathing zone. For additional information, refer to the American Welding Society Publication, "Fumes and Gases in the Welding Environment".

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Strong acids, strong oxidizers, sulfur.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Avoid uncontrolled exposure to extreme temperatures and incompatible materials.

## PART IV *Is there any other useful information about this material?*

### 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** Presented below are human toxicological data available for the components of this product present in concentration greater than 1%. Other data for animals are available for the components of this product, but are not presented in this Material Safety Data Sheet.

**COPPER:**

TDLo (oral, human) = 1200  $\mu$ g/kg; gastrointestinal tract effects

**IRON:**

TDLo (oral, child) = 77 mg/kg; BAH, gastrointestinal tract, blood effects

**MANGANESE:**

TCLo (inhalation, man) = 2300  $\mu$ g/m<sup>3</sup>; BRN, central nervous system effects

**TITANIUM DIOXIDE:**

Skin Irritancy (human) = 300  $\mu$ g/ 3 days/ intermittent; mild

**SUSPECTED CANCER AGENT:** Components of this product are listed as follows:

**CHROMIUM:** ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); EPA-D (Not Classifiable as to Human Carcinogenicity); EPA-CBD (Cannot Be Determined); IARC-3, TLV-A4 IARC-3 (Not Classifiable as to carcinogenicity to Humans)

**COPPER:** EPA-D (Not Classifiable as to Human Carcinogenicity)

**DIATOMACEOUS EARTH:** IARC-3 (Not Classifiable as to carcinogenicity to Humans)

**FLUORIDE COMPOUND:** ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-3 Unclassifiable as to Carcinogenicity in Humans)

**IRON (as Iron Oxide):** IARC-3 Possibly Carcinogenic to Humans); ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen)

**MANGANESE:** EPA-D (Not Classifiable as to Human Carcinogenicity-(inadequate human and animal evidence of carcinogenicity or no data available).

**MANGANESE TETRAOXIDE:** EPA-D (Not Classifiable as to Human Carcinogenicity-(inadequate human and animal evidence of carcinogenicity or no data available).

**NICKEL, ELEMENTAL, METAL:** IARC-2B (Possibly Carcinogenic to Humans), MAK-1 (Substances which Cause Cancer in Man), NIOSH-X, (Carcinogen Defined with no Further Categorization); NTP-R (Reasonably Anticipated to be a Human Carcinogen), ACGIH TLV-A5 (Not Suspected as a Human Carcinogen)

**TITANIUM DIOXIDE:** IARC Group 3 (Not Classifiable as to Carcinogenicity to Humans), NIOSH-X (Carcinogen defined with no further categorization),

ACGIH-TLV-A4 (Not Classifiable as a Human Carcinogen)

The other components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

**IRRITANCY OF PRODUCT:** Dusts or fumes of these products may be irritating to contaminated skin and eyes. Fumes may be irritating to the respiratory system.

**SENSITIZATION TO THE PRODUCT:** Hypersensitivity to the Nickel component of these products can cause allergic contact dermatitis, asthma, and conjunctivitis. Rare cases of allergic contact dermatitis have been reported in people working with copper dust.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of these products and its components on the human reproductive system.

**Mutagenicity:** These products are not reported to produce mutagenic effects in humans. Animal mutation data are available for Molybdenum and Nickel (components of these products); these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

**Embryotoxicity:** These products are not reported to produce embryotoxic effects in humans.

**Teratogenicity:** These products are not reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of Copper, Molybdenum, and Nickel (components of these products) indicate teratogenic effects.

**Reproductive Toxicity:** These products are not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of Copper, Manganese Tetraoxide, and Molybdenum (components of these products) indicate adverse reproductive effects.

*A **mutagen** is a chemical, which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An **embryotoxin** is a chemical, which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical, which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance, which interferes in any way with the reproductive process.*

**BIOLOGICAL EXPOSURE INDICES:** Currently, there are Biological Exposure Indices (BEIs) associated with the proprietary Fluoride Compound component of this product.

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
FLUORIDES •fluorides in urine	<ul style="list-style-type: none"> <li>• Prior to shift</li> <li>• End of shift</li> </ul>	<ul style="list-style-type: none"> <li>• 3 mg/g creatinine</li> <li>• 10 mg/g creatinine</li> </ul>

## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

**ENVIRONMENTAL STABILITY:** The metal components of these products occur naturally in the environment and are expected to persist in the environment for an extended period of time. Iron will react with water and air to form a variety of stable iron oxides. The other components of these products will degrade over time. Additional environmental data are available as follows:

**NICKEL:** Water solubility: Insoluble. Nickel is stable in air at ordinary temperature and is not affected by water. No data were found to suggest that nickel is involved in any biological transformation in the aquatic environment.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** These products are not expected to cause adverse effects on plant or animal life. Specific data on test animals are available but are not presented in this Material Safety Data Sheet.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** These products are not expected to cause adverse effects on aquatic life.

## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations. These products, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

**EPA WASTE NUMBER:** Wastes of these products should be tested per the Toxicity Characteristic Leaching Procedures requirements of RCRA to determine if such wastes meet the following characteristic: D007 (Chromium) 5.0 mg/L (Regulated Level).

## 14. TRANSPORTATION INFORMATION

**THIS MATERIAL IS NOT HAZARDOUS (Per 49 CFR 172.101) BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Not Applicable

**HAZARD CLASS NUMBER and DESCRIPTION:** Not Applicable

**UN IDENTIFICATION NUMBER:** Not Applicable

**PACKING GROUP:** Not Applicable

**DOT LABEL(S) REQUIRED:** : Not Applicable

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2000:** Not Applicable

**MARINE POLLUTANT:** The Department of Transportation (49 CFR 172.101, Appendix B), lists Copper, metal powder as a Marine Pollutant. This component is not present in the specific form listed and therefore, this product does not meet the marking requirement of 49 CFR 172.322.

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** This material is not considered as dangerous goods, per regulations of Transport Canada.

## 15. REGULATORY INFORMATION

**ADDITIONAL U.S. REGULATIONS:**

**U.S. SARA REPORTING REQUIREMENTS:** The components of this product are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Aluminum Oxide (fibrous forms)	No	No	Yes
Chromium	No	Yes	No
Copper	No	Yes	Yes
Manganese	No	No	Yes
Manganese Tetraoxide (Manganese Compound Category)	No	Yes	Yes
Nickel	No	Yes	Yes

**U.S. SARA THRESHOLD PLANNING QUANTITY:** There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.

**U.S. TSCA INVENTORY STATUS:** The components of these products are listed on the TSCA Inventory.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** Chromium = 5000 lb (2270 kg); Copper = 5000 lb (2270 kg); Manganese Tetraoxide = 1 lb 0.45 kg); Nickel = 100 lb (45.5 kg). RQs for Chromium, Copper, and Nickel are applicable to particles 100 micrometers or less in diameter.

**OTHER U.S. FEDERAL REGULATIONS:** If these products are used during welding operations, follow the requirements of the Federal Occupational Safety and Health Welding and Cutting Standard (29 CFR 1910 Subpart Q).

## 15. REGULATORY INFORMATION (continued)

**STATE REGULATORY INFORMATION:** The components of this product are covered under specific State regulations, as denoted below:

**Alaska-Designated Toxic and Hazardous Substances:** Aluminum Oxide, Chromium, Copper Fume, Manganese Tetraoxide, Molybdenum, Nickel, Tin, and Titanium Dioxide.

**California-Permissible Exposure Limits for Chemical Contaminants:** Aluminum Oxide, Chromium, Copper, Manganese, Manganese Tetraoxide, Nickel, Tin, Silicon, and Titanium Dioxide.

**Florida-Substance List:** Chromium, Copper Fume, Manganese, Manganese Tetraoxide, Molybdenum, Nickel, Silicon, and Tin.

**Illinois-Toxic Substance List:** Aluminum Oxide, Chromium, Copper, Diatomaceous Earth, Manganese, Nickel, Molybdenum, and Titanium Dioxide.

**Kansas-Section 302/313 List:** Aluminum Oxide, Chromium, Copper, Manganese, Nickel, and Titanium Dioxide.

**Massachusetts-Substance List:** Chromium, Copper, Manganese, Manganese Tetraoxide, Molybdenum, Nickel, and Tin.

**Michigan-Critical Materials Register:** Chromium, Copper, Nickel,

**Minnesota-List of Hazardous Substances:** Aluminum Oxide, Chromium, Diatomaceous Earth, Manganese, Manganese Tetraoxide, Nickel, Tin, Silicon, and Titanium Dioxide.

**Missouri-Employer Information/Toxic Substance List:** Aluminum Oxide, Chromium, Copper, Silicon, Manganese, Molybdenum, Nickel, Tin, and Titanium Dioxide.

**New Jersey-Right to Know Hazardous Substance List:** Aluminum Oxide, Chromium, Copper, Diatomaceous Earth, Manganese, Molybdenum, Nickel, Tin, and Titanium Dioxide.

**North Dakota-List of Hazardous Chemicals, Reportable Quantities:** Chromium, Copper, and Nickel.

**Pennsylvania-Hazardous Substance List:** Aluminum Oxide, Silicon, Chromium, Copper, Manganese, Manganese Tetraoxide, Molybdenum, Nickel, Tin, and Titanium Dioxide.

**Rhode Island-Hazardous Substance List:** Aluminum Oxide, Chromium, Copper Fume, Manganese, Silicon, Manganese Tetraoxide, Molybdenum, Nickel, Tin, and Titanium Dioxide.

**Texas-Hazardous Substance List:** Chromium, Copper Fume, Manganese, Molybdenum, Nickel, and Titanium Dioxide.

**West Virginia-Hazardous Substance List:** Chromium, Copper Fume, Manganese, Molybdenum, Nickel, and Titanium Dioxide.

**Wisconsin-Toxic and Hazardous Substances:** Chromium, Copper Fume, Manganese, Molybdenum, Nickel, and Titanium Dioxide.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** The Nickel and Chromium components of these products are on the California Proposition 65 list. **WARNING: This product may contain chemicals, and when used for welding may produce fumes or gases containing chemicals, known to the State of California to cause cancer, and/or birth defects (or other reproductive harm.)**

### LABELING (Precautionary Statements):

PROTECT yourself and others. Read and understand this information.

**FUMES AND GASES** can be hazardous to your health.

**ARC RAYS** can injure your eyes and burn skin.

**ELECTRIC SHOCK** can kill.

- Before use, read and understand the manufacturer's instructions. Material Safety Data Sheets (MSDSs), and your employer's safety policies.
- Keep your head out of the fumes.
- Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area.
- Wear correct eye, ear, and body protection.
- See American National Standard Z49.1 *Safety in Welding, Cutting, and Allied Processes*, published by the American Welding Society, 550 N.W. LeJeune Road, Miami, Florida 33126. OSHA Safety and Health Standards, 29 CFR 1910, available from the U.S. Government Printing Office, Washington, DC 20402.

### DO NOT REMOVE THIS INFORMATION.

#### ADDITIONAL CANADIAN REGULATIONS:

**CANADIAN DSL/NDSL INVENTORY STATUS:** The components of these products are on the DSL Inventory.

**OTHER CANADIAN REGULATIONS:** Not applicable.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The Nickel and Chromium components of these products are on the CEPA Priorities Substances Lists. In addition, the Fluoride Compound (as an Inorganic Fluoride) is classified as Toxic on the CEPA First Priorities Substance Lists.

#### ADDITIONAL CANADIAN REGULATIONS (continued):

##### CANADIAN WHMIS SYMBOLS:

**D2A and D2B:** Materials Causing Other Toxic Effects



## 16. OTHER INFORMATION

**PREPARED BY:**

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July 17, 2008

**DATE OF PRINTING:**

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these products. The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. To the best of the Aufhauser Corporation's knowledge, the information and recommendations contained in this publication are reliable and accurate as of the date of issue. However, accuracy, suitability, or completeness are not guaranteed, and no warranty, guarantee, or representation, expressed or implied, is made by Aufhauser Corporation as to the absolute correctness or sufficiency of any representation contained in this and other publications; Aufhauser Corporation assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures may not be required under particular or exceptional conditions or circumstances. Data may be changed from time to time. Be sure to consult the latest edition.

## DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

**CAS #:** This is the Chemical Abstract Service Number which uniquely identifies each constituent.

### EXPOSURE LIMITS IN AIR:

**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration.

**PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order. **IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30- minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called Recommended Exposure Levels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

### HAZARD RATINGS:

#### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:

**Health Hazard:** **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). **Flammability Hazard:** **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. **Reactivity Hazard:** **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

#### NATIONAL FIRE PROTECTION ASSOCIATION:

**Health Hazard:** **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure causes death or major residual injury). **Flammability Hazard and Reactivity Hazard:** Refer to definitions for "Hazardous Materials Identification System".

### FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). **Flash Point** - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature:** The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

### TOXICOLOGICAL INFORMATION:

**Human and Animal Toxicology:** Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m<sup>3</sup>** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. **Ecological Information:** **EC** is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in life forms which consume contaminated plant or animal matter. Coefficient of Oil/Water Distribution is represented by **log K<sub>ow</sub>** or **log K<sub>oc</sub>** and is used to assess a substance's behavior in the environment.

### REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **U.S.:** **EPA** is the U.S. Environmental Protection Agency. **DOT** is the U.S. Department of Transportation. **SARA** is the Superfund Amendments and Reauthorization Act. **TSCA** is the U.S. Toxic Substance Control Act. **CERCLA (or Superfund)** refers to the Comprehensive Environmental Response, Compensation, and Liability Act. Labeling is per the American National Standards Institute (**ANSI Z129.1**).

#### CANADA:

**CEPA** is the Canadian Environmental Protection Act. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **TC** is Transport Canada. **DSL/NDL** are the Canadian Domestic/Non-Domestic Substances Lists. **The CPR is the Canadian Product Regulations.** This section also includes information on the precautionary warnings, which appear on the materials package label.