

MSDS 004
Revised 12/2005

MATERIAL SAFETY DATA SHEET

MWS Wire Industries
31200 Cedar Valley Drive
Westlake Village, CA 91362
(818) 991-8553

Trade Name: See Page 5

Chemical Family: Enamel insulated Nickel and/or Chromium bearing alloys

Chemical Formula: N/A

HAZARDOUS INGREDIENTS

| <u>Ingredient</u> | <u>CAS No.</u> | <u>TLV</u> | <u>PEL</u> | <u>STEL</u> |
|-------------------|----------------|-------------------------|-----------------|-------------|
| Aluminum | 7429-90-5 | 10 (D) / 5 (F) | NS | 20 |
| Cadmium | 7440-43-9 | 0.002 (D) | 0.005 | |
| Cobalt | 7440-48-4 | 0.1 | 0.1 | NS |
| Copper | 7440-50-8 | 1 (D) / 0.2 (F) | 1 (D) / 0.1 (F) | 2 |
| Chromium | 7440-47-3 | 0.5 | 1 | NS |
| Iron | 1309-37-1 | 5 (F) | 10 | NS |
| Manganese | 7439-96-5 | 5* (D) / 1 (F) | 5* | 3 |
| Molybdenum | 7439-98-7 | 10 | 15 | 20 |
| Nickel | 7440-02-0 | 1 | 1 | NS |
| Silicon | 7440-21-3 | 5 (D) | NS | NS |
| Titanium | 7440-32-6 | NS | NS | NS |
| Enamel Coating | N/A | See Health Hazard Data. | | |

Note: TLV - American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (mg/m³)

PEL - OSHA Permissible Exposure Level (mg/m³), 8 Hour Time Weighted Average

STEL - ACGIH Short Term Exposure Limit (mg/m³), 15 minutes maximum exposure

* Ceiling Limit (Do Not Exceed) D = Dust F = Fume NS = Not Specified

PHYSICAL DATA

Boiling Point: NA Vapor Pressure: NA Vapor Density: NA
% Volatile: NA Evaporation Rate: NA Solubility in H₂O: Insoluble
Specific Gravity & Melting Temperature: See Page 5
Appearance & Odor: Solid with no odor to mild phenol odor. Color varies with coating type.
Basic colors are red, brown, green and amber.

FIRE & EXPLOSION DATA

Flash Point: NA Fire or Explosion Hazard: NA HMIS Flammability Rating: 1

Note: Alloys are nonflammable, although sparks from welding may ignite nearby flammable or combustible materials. Enamel coatings may produce toxic fumes if exposed to high temperatures. Use extinguishing media suitable for surrounding materials. Fire fighters should use self-contained breathing apparatus as deemed necessary.

HEALTH HAZARD DATA

This Product Poses No Health Hazard As Shipped.

HMIS Health Rating: 3 (This rating is based on heating or burning the film insulation which may evolve combustion by-products that are toxic. Refer to the information in this section).

Fine powders, granules and fumes from insulation stripping, welding or other abrasive operations may pose a health hazard. When burned, soldered or hot-staked, insulation coatings may give off hazardous decomposition products that may include isocyanates such as Toluene Diisocyanate. Some individuals can develop sensitivity to isocyanates. Use with adequate local exhaust to prevent irritation and maintain isocyanate concentration below the OSHA ceiling limit of 20 parts per billion.

Effects of Overexposure:

Short Term: Dusts and fumes irritate the eyes, nose and throat. Symptoms may include cough, metallic taste in mouth, fever, fatigue and nausea.

Long Term: Watering of the eyes, headaches, difficulty in breathing, coughing, severe chest pains, and in acute cases, lung disease, lung fibrosis, pneumoconiosis or neurological damage. Prolonged skin contact with nickel may sensitize the skin and produce a rash.

HEALTH HAZARD DATA (cont.)

Emergency First Aid Procedure:

In case of fume inhalation, remove from exposure and consult a physician.

In case of eye contact, flush with large amounts of water for at least fifteen minutes. Seek medical attention.

In case of ingestion, seek immediate medical attention.

NICKEL AND CHROMIUM HAVE BEEN LISTED BY EITHER THE INTERNATIONAL AGENCY FOR CANCER RESEARCH (IACR) MONOGRAPH OR THE NATIONAL TOXICOLOGY PROGRAM (NTP) ANNUAL REPORTS AS POTENTIAL CARCINOGENS.

REACTIVITY DATA

HMIS Reactivity Rating: 0

Stability: Stable. Further processing such as grinding or welding can generate various metallic oxides, complex metallic compounds and gases such as carbon monoxide, ozone and nitrogen.

Hazardous Decomposition Product: When subjected to temperatures in excess of 200° C, toxic fumes may be evolved from insulation coatings. Refer to Health Hazard Data.

SPILL, LEAK, DISPOSAL PROCEDURES

Scrap metal may have reclamation value. Where this is not practical it may be disposed in accordance with local, state and federal regulations, which may require specific packaging, labeling, transportation and disposal procedures.

In solid form these materials pose no special cleanup problems. If material is in powdered or dust form, clean up should be conducted to minimize generation of airborne powder and dust to avoid contamination of air and water.

If greater than one pound of metal dust or powder is released into the environment, report the spill immediately to the National Response Center at (800) 424-8802.

SARA TITLE III SECTION 313

Products listed in this material safety data sheet contain toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR Part 372 of the Federal Register. Additional information can be obtained from the Emergency Planning and Community Right-To-Know Hotline, U.S. EPA, at (800) 535-0202.

CALIFORNIA PROPOSITION 65 WARNING

Nickel and Chromium are known by the State of California to cause cancer, birth defects or other reproductive harm. See preceding data for health hazard information.

EC RoHS DIRECTIVE COMPLIANCE

The products listed on pages 4 and 5 of this MSDS are in compliance with Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Chromium contained in these products is chromium metal, not hexavalent chromium. There may be trace lead content ranging from zero to 200 ppm, below the RoHS threshold of 1000 ppm for lead.

SPECIAL PROTECTION

Wear safety glasses when the risk of eye injury is present, particularly during machining, grinding, welding, powder handling, etc. Gloves and other protective equipment may be required during handling operations as appropriate to the circumstances of exposure.

Use with adequate ventilation to meet the exposure limits, to prevent irritation and to maintain isocyanate exposure below 20 parts per billion. If these limits are exceeded, use NIOSH approved respiratory protection based on airborne contaminants present.

Burning, soldering or hot staking should be done under a fume hood with adequate exhaust that pulls fumes away from the individual.

SPECIAL PRECAUTIONS

When welding, melting, casting, grinding, sanding or otherwise abrading the surface of nickel chromium alloys in a manner which generates finely divided particles, an exposure to airborne nickel or chromium in excess of the occupational standard can occur. Use with adequate ventilation to meet listed exposure limits. Processes generating airborne nickel or chromium must be air sampled to determine exposure levels. Where exposure data indicate, medical surveillance should be conducted.

D.O.T. Shipping Name: Not regulated

Hazard Class: NA

MWS has attempted to provide current, accurate information in this data sheet, however MWS makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage or injury of any kind which may arise out of the use or reliance on the information by any person. Contact person: Ken Goss, (818) 991-8553.

| <u>ALLOY NAME</u> | <u>COMPOSITION</u> | <u>SPECIFIC GRAVITY</u> | <u>MELTING TEMP °C</u> |
|-------------------------|--------------------------------------|-------------------------|------------------------|
| MWS 875 | 22.5 Cr, 5.5 Al, .5 Si, .1 C, bal Fe | 7.10 | 1520 |
| MWS 800 | 75 Ni, 20 Cr, 2.5 Al, 2.5 Cu | 8.10 | 1350 |
| MWS 675 | 61 Ni, 15 Cr, balance Fe | 8.247 | 1350 |
| MWS 650 | 80 Ni, 20 Cr | 8.412 | 1400 |
| Stainless Steel 302 | 18 Cr, 9 Ni, bal Fe | 7.90 | 1421 |
| Stainless Steel 304 | 18.5 Cr, 9.5 Ni, | 7.90 | 1454 |
| Stainless Steel 316 | 17 Cr, 12 Ni, 2.3 Mo, bal Fe | 7.90 | 1399 |
| Stainless Steel 17-7 PH | 17 Cr, 7 Ni, 1.1 Al, bal Fe | 7.81 | No data |
| Stainless Steel 321 | 18 Cr, 11 Ni, .4 Ti, bal Fe | 7.90 | 1427 |
| Alloy 42 | 42 Ni, bal Fe | 8.10 | 1425 |
| Alloy 52 | 50 Ni, bal Fe | 8.25 | 1425 |
| MWS 294 | 55 Cu, 45 Ni | 8.90 | 1210 |
| MWS 294R | 29 Ni, 17 Co, bal Cu | 8.36 | 1450 |
| Manganin | 13 Mn, 4 Ni, bal Cu | 8.192 | 1020 |
| MWS 180 | 22 Ni, bal Cu | 8.90 | 1100 |
| MWS 120 | 70 Ni, bal Fe | 8.46 | 1425 |
| MWS 90 | 12 Ni, bal Fe | 8.90 | 1100 |
| MWS 60 | 6 Ni, bal Cu | 8.90 | 1100 |
| MWS 30 | 2 Ni, bal Cu | 8.90 | 1100 |
| Nickel 200 | 99.5 Ni | 8.90 | 1446 |
| Nickel 205 | 99.5 Ni | 8.90 | 1446 |
| Nickel 270 | 99.98 Ni | 8.90 | 1454 |

| <u>ALLOY NAME</u> | <u>COMPOSITION</u> | <u>SPECIFIC GRAVITY</u> | <u>MELTING TEMP °C</u> |
|----------------------------|---|-------------------------|------------------------|
| Nickel Plated Copper | 90-96 Cu, 4-10 Ni | 8.90 | 1083 |
| Nickel Clad Copper | 73 Cu, 27 Ni | 8.90 | 1440 |
| Monel [®] 400 | 70 Ni, 30 Cu | 8.90 | 1350 |
| Inconel [®] 600 | 76 Ni, 15 Cr, 8 Fe, .5 Mn | 8.43 | 1413 |
| Inconel [®] X 750 | 73 Ni, 15.5 Cr, 7 Fe, 2.5 Ti, 1 Cb, .7 Al | 8.25 | 1427 |
| Nickel Silver | 55-72 Cu, 12-18 Ni, bal Zn | 8.70 | 1100 |
| Dumet | 42 Ni, 1 Mn, 32-37 Fe, bal Cu (cladding) | No data | No data |
| Chromel P [®] | 90 Ni, 10 Cr | 8.73 | 1430 |
| Alumel [®] | 2 Al, 2 Mn, bal Ni | 8.60 | 1400 |
| Cu Alloy 135 (CDA 18135) | 99.2 Cu, .4 Cr, .4 Cd | 8.94 | 1080 |

INSULATION GLOSSARY

| Name | NEMA Temperature Class | Description |
|------|------------------------|-------------|
|------|------------------------|-------------|

Insulation coatings constitute 1-8% of total product weight.

| | | |
|---------------------------|-------------|--|
| Formvar ^a | 105 C | Polyvinyl Formal |
| Polyurethane | 155 / 180 C | Modified Polyurethane |
| Polyurethane Nylon | 155 / 180 C | Modified Polyurethane with Polyamide overcoat |
| Solderable Polyesterimide | 180 C | Polyesterimide |
| Polyester 200 | 180 C | Modified Polyester |
| Armored Polyester | 200 C | Modified Polyester or Polyesterimide with Amide-Imide overcoat |
| ML ^b | 240 C | Polyimide |

All insulations may be supplied with a bondable overcoat.

| | |
|-------------------------|-------------------------|
| Butvar Bond | Polyvinyl Butyral |
| Polyester Bond | Polyester |
| Epoxy Bond | Epoxy |
| Modified Polyester Bond | Modified Polyester Bond |
| Polyamide Bond | Polyamide |

^a Chisso Corp. Registered Trademark

^b IST (USA) Corp. Registered Trademark