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CLAPP & HANEY BRAZED TOOL CO. INC.

Fax

To: JEFF **From:** ALICE

JUGENHEIMER INDUSTRIAL

Fax: 330-534-8179 **Pages:** 35

Phone: **Date:** 2/16/2015

Re: MSDS SHEETS

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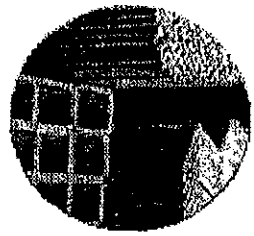
PART #

6104R10C5



Alro Steel & Metals

Contact ALRO
888.888.2576(ALRO)

- Products
- Metals Guide Catalog
- Tool And Die Handbook
- Processing Services
- Locations
- Literature
- Steel Links
- Material Safety Data Sheets
- Request a Quote/ Submit a Print
- Credit Application

Material Safety Data Sheet - Steel

I. Manufacturer/Distributor & Product Identification Distribut

Alro Steel Corporation
3100 East High Street
Jackson, MI 49204

Reviewed & Revised: 12/21/95 by Alro Steel Corporation

Manufacturer: Various manufacturers
Chemical Family: Metals
Chemical Name & Synonyms: Steel

Emergency Phone Number: (517) 787-5500

II. Chemical Components

See section II-A, "Product Description & Hazardous Ingredients/I Information"
and II-B, "Percentile of Weight by Grade and Type of Material."

III. Physical Data

Melting Point °F: Greater than 2400
Specific Gravity(H20=1): Greater than 7.0
Vapor pressure: n/a
% Volatile by Volume: n/a
Vapor Density (Air=1): n/a
Evaporation Rate: n/a
Solubility in Water: Negligible
Appearance and Odor: Grayish to silvery odorless product in vari

IV. Fire & Explosion Data

Nonflammable. Use fire-fighting methods appropriate for the surr

V. Health Hazard Information

See Section V-A, "General Health Hazard Information."

MATERIAL SAFETY DATA SHEET

Distributor	Reviewed and Revised:	Emergency Phone Number
Alro Steel Corporation 3100 East High St. Jackson, MI 49204	02/04/05 by Alro Steel Corporation	(517) 787-5500

SECTION I. MATERIAL IDENTIFICATION

Manufacturer:
Various Sources

Chemical Name: Metal & Metal Alloys of Aluminum, Copper, Lead, Nickel & Steel. Specific composition & % of ingredients outlined on specification sheets and/or material certifications.

SECTION II. HAZARDOUS INGREDIENTS

	CAS-Number	OSHA PEL	ACGH TLV
Aluminum #	7429-90-5	15 mg/m3/5mg/m3 R	10 mg/m3/5mg/m3(fume)
Antimony #	7440-36-0	0.5 mg/m3	.05 mg/m3
Arsenic #	7440-38-2	0.01 mg/m3	0.01 mg/m3
Beryllium #	7440-41-7	0.002 mg/m3	0.002 mgt/m3/0.01 mg/m3(STEL)
Cadmium #	7440-43-9	0.005 mg/m3	0.01 mg/m3/0.002 mg/m3 R
Carbon	7440-44-0		
Chromium #	7440-47-3	1 mg/m3	0.5 mg/m3
Cobalt #	7440-48-4	0.1 mg/m3	0.02 mg/m3
Columbium	7440-03-1		
Copper #	7440-50-8	1 mg/m3/0.1 mg/m3(fume)	1 mg/m3/0.2 mg/m3(fume)
Iron	7439-89-6	10 mg/m3(fume)	5 mg/m3(fume)
Lead #	7439-92-1	0.05 mg/m3	0.05 mg/m3
Magnesium	7439-95-4	15 mg/m3/5mg/m3 R	10 mg/m3(fume)
Manganese #	7439-96-5	5 mg/m3 C	0.2 mg/m3
Molybdenum	7439-98-7	15 mg/m3/5mg/m3 R	10 mg/m3/3 mg/m3 R
Nickel #	7440-02-0	1 mg/m3	105 mg/m3
Phosphorous	7723-14-0	0.1 mg/m3	0.02 mg/m3
Silicon	7440-21-3	15 mg/m3/5mg/m3 R	10 mg/m3
Silver #	7740-22-4	0.01 mg/m3	0.1 mg/m3
Sulfur	7704-34-9		
Tantalum	7440-25-7	5 mg/m3	5 mg/m3
Tellurium	13494-80-9	0.1 mg/m3	0.1 mg/m3
Tin	7440-31-5	2 mg/m3	2 mg/m3
Titanium	7440-32-6		
Tungsten	7440-33-7		
Vanadium #	7440-62-2		5 mg/m3/10 mg/m3 (STEL)
Yttrium	7440-65-5	1 mg/m3	1 mg/m3

Zinc #	7440-66-6	15 mg/m3/5 mg/m3 R	10 mg/m3/5 mg/m3 (fume)

Note: Arsenic, beryllium, cadmium, cobalt, chromium, VI compounds, lead and nickel have been listed by IARC and/or NTP as carcinogenic or potentially carcinogenic to humans. Iron oxide, magnesium oxide and zinc oxide exposure limits are referenced above C=Ceiling Limit, R=Respirable fraction. (STEL)=Short-term exposure limit. # Denotes a toxic chemical subject to reporting requirements for section 313 of Title III of S.A.R.A.

SECTION III. PHYSICAL DATA

Physical Form: Solid

Odor: None

	ALUMINUM	COPPER	LEAD	STEEL	NICKEL
Specific Gravity (H20 :	2.5+	7.5+	8+	7+	8-9
Melting Point C	480+	1000+	180+	1300+	>1400
Color	Silver	Yellow to Red	Soft Gray	Gray-Black	Silver
Solubility in H20	None	None	None	None	None

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point: Not Applicable
Flammable Limits: Not Applicable
Extinulshing Media: See Below
Auto Ignition Temp: Not Applicable
Special Fire Fighting Procedures: Solid mass form is not combustible. Fire and explosion hazard is high for aluminim and moderate for additional alloys when material is in the form of dust and is exposed to heat, flames, chemical reaction, or in contact with powerful oxidizers. Use class D extinguishing agents. Firefighters should wear self-contained breathing apparatus and protective clothing.

SECTION V. REACTIVITY DATA

Stability: Stable under normal conditions of transport and storage as shipped.
Conditions to Avoid: Strong acids and bases can produce flammable/explosive gas. Molten metal may react strongly to water.
Hazardous Decomposition or by-products: Metal fume. Welding/cutting operations may generate ozone and oxides of nitrogen.
Hazardous Polymerzation: Will not occur.

SECTION VI. HEALTH HAZARD DATA

Permissible Exposure Limits and Theshold Limit Values: See Section II.
Route(s) of Entry: Inhalation: Yes; Skin: Yes; Ingestion: Yes

Under normal handling conditions the solid metals and alloys present no significant health hazards. Processing of the metal or alloy by dust or fume producing operations (grinding, buffing, heating, welding, etc.) may result in the potential for exposure to airborne metal particulates or fume. The exposure levels in Section II are relevant to fumes and dust.

Effects of Overexposure:

Aluminum -Low health risk by inhalation.ACGIH: listed as nuisance dust.

Antimony -Overexposure to antimony can irritate the eyes and lungs and cause stomach pain, diarrhea, vomiting, stomach ulcers, heart and lung problems.

Arsenic -Arsenic compounds can be absorbed in to the body from industrial exposures, especially by inhalation and ingestion. Signs of toxicity are dermal lesions, conjunctivitis, upper respiratory tract irritation, nausea, vomiting, peripheral neuritis and occasionally anemia. Arsenic has been listed as a Group 1 carcinogen by IARC (carcinogenic to humans) and NTP (known to be human carcinogen).

Beryllium -Inhalation of beryllium dust or fume may result in the production of an acute or chronic systemic disease depending upon the level of exposure and the beryllium compound involved. Granulomatous lesions of the skin, liver, kidneys, spleen and lymph nodes have been reported. Damage to the lungs may be in both the acute and chronic forms, both of which have similar signs and symptoms. These include a relatively non-productive cough, progressive difficulty in breathing, loss of appetite, and loss of weight. In the acute form, the symptoms appear in several hours to several weeks after exposure and there is usually rapid progression of signs including dyspnea, anorexia, and extreme weight loss. Complete recovery is possible and fatal cases usually result from acute heart disease. In chronic beryllium disease, the symptoms or signs are progressive and can be fatal. In the progression of the disease, symptoms of heart disease may occur. Beryllium is listed as a Group 1 carcinogen by IARC (carcinogenic to humans) and Group 2 carcinogen by NTP (reasonably anticipated human carcinogen).

Cadmium -Inhalation of cadmium fumes may cause respiratory irritation with a sore, dry throat and a metallic taste followed by a cough, chest pain, and difficulty in breathing. Bronchitis, pneumonitis, pulmonary edema, headaches, dizziness, loss of appetite, and weight loss have been reported. Liver, kidneys and bone marrow may be injured by the presence of the metal. Continued exposure to lower levels of cadmium have resulted in chronic poisoning characterized by irreversible lung damage and kidney damage. A single, high-level exposure to cadmium can cause severe lung irritation which may be fatal. Cadmium is listed as a Group 1 carcinogen by IARC (carcinogenic to humans) and Group 2 carcinogen by NTP (reasonably anticipated human carcinogen).

Chromium -Chromium dust can cause irritation of the eyes, skin, and respiratory tract. Additional chromium compounds can be formed during processing and cause dermatitis, allergic reactions, and skin ulcers. Chronic overexposures can cause perforation of the nasal septum, respiratory sensitization, asthma, lung damage, kidney damage, and cancer. Chromium VI compounds are listed as a Group 1 carcinogen by IARC (carcinogenic to humans) and NTP (known to be human carcinogen).

Cobalt Acute and chronic overexposures can cause respiratory sensitization, asthma, scarring of the lungs, and damage to heart muscle (cardiomyopathy). IARC lists cobalt as a Group 2B carcinogen (possibly carcinogenic to humans).

Columbium Also known as Niobium, there is limited information on the toxicity of this metal or its fumes.

Copper Acute overexposures to fumes of cooper may cause metal fume fever with flu-like symptoms. Copper dust and fume can cause irritation of the upper respiratory tract, metallic taste in the mouth, and nausea. Chronic overexposures can cause reduction in red blood cells, skin abnormalities, and hair discoloration.

Iron The inhalation of iron oxide fumes or dust may cause an apparent benign pneumoconiosis which is called siderosis. Can cause irritation of gastrointestinal tract, bleeding, changes in the pH of body fluids, and liver damage.

Lead -Chronic overexposure can cause weakness in the extremities (peripheral neuropathy), gastrointestinal tract effects, kidney damage, liver damage, central nervous system damage, damage to the blood forming organs, blood cell damage, and reproductive harm. Can cause reduced fertility and fetal toxicity in pregnant woman. Inorganic lead and lead compounds are listed as Group 2B carcinogen (possibly carcinogenic to humans) by IARC.

Magnesium -Exposure to magnesium may cause metal fume fever with flu-like symptoms. Particles imbedded in the skin may cause severe lesions.

Manganese -Chronic manganese overexposures can cause inflammation of the lung tissue, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Molybdenum -Can cause irritation of mucous membranes, skin, and respiratory tract. Acute overexposures can lead to headaches, backache, and sore joints. Chronic overexposures can cause blood disorders, kidney damage, lung and liver damage.

Nickel -The most common ailment arising from nickel or its compounds is an allergic dermatitis known as 'nickel-itch'. Generally, nickel and most salts of nickel do not cause systemic poisoning, but nickel has been identified as a Group 2B carcinogen (possibly carcinogenic to humans) by IARC and Group 2 carcinogen by NIP (reasonably anticipated to be human carcinogen). There can also be adverse effects to the lungs and nasal cavities.

Phosphorus -The dusts and fumes can act as minor irritants to the eyes, throat, and respiratory tract. Long-term excessive inhalation of phosphorus compounds may lead to cough, bronchitis and pneumonia.

Silicon -Chronic overexposures can cause chronic bronchitis and narrowing of the airways. Studies with experimental animals by injection have found lesions on the lungs.

Silver -Chronic occupational exposure to silver results in argyria, a permanent pigmentation (gray to purple) of the skin and eyes. Inhalation of silver may localize the argyria in the respiratory tract with chronic bronchitis as the only symptom. Exposure to high levels has resulted in respiratory problems and stomach pains.

Sulfer - In fumes may irritate: skin, eyes, lungs and gastrointestinal tract.

Tantalum - Can cause mechanical irritation of the eyes, skin, and upper respiratory tract. Generally of low toxicity.

Tellurium - Inhalation of tellurium fume can result in a metallic taste and garlic breath, gastrointestinal disease, dry-mouth and somnolence.

Tin -The inhalation of inorganic tin fumes or dust may cause an apparent benign pneumoconiosis called stannosis which is reported to be not disabling.

Titanium - Titanium is considered a physiologically inert dust. However, high concentration of oxides can cause mechanical irritation of eyes, nose and throat. Inhalation of titanium could cause mild irritation to the respiratory tract. Inhalation of titanium dioxide dust or fume could produce lung fibrosis and chronic bronchitis.

Tungsten Inhalation of tungsten dust may cause irritation of the respiratory tract. Skin or eye contact could cause abrasion or irritation of the respective surfaces. No hazards have been identified for tungsten fume except that it may aggravate an existing chronic respiratory disease.

Vanadium - High level exposure to vanadium can irritate the eyes, throat, and lungs. Symptoms generally subside shortly after the exposure is removed.

Yttrium Short-term inhalation in large amounts could cause discomfort, coughing and nasal discharge similar to the symptoms of a bad cold. Drying of the mucous membranes might be experienced. After intratracheal administration in rats, emphysema and diffused modular fibrosis in the lungs have been reported. The oral toxicity of this material is low as it is poorly absorbed from the gastrointestinal tract. Skin and eye contact should produce no problems other than mechanical irritation.

Zinc -Zinc is low in toxicity, but inhalation of fumes/oxides may cause metal fume fever. Onset of symptoms may be delayed 4-12 hours and include irritation of the mouth and throat, coughing, stomach pain, headache, nausea, vomiting, metallic taste, chills, fever, pains in the muscles and joints, thirst, bronchitis or pneumonia and a bluish tint to the skin. These symptoms go away in 24 to 48 hours and leave no effect.

Note: Arsenic, beryllium, cadmium, cobalt, chromium VI compounds, lead and nickel have been listed by IARC and/or NTP as carcinogenic or potentially carcinogenic to humans. Arsenic, cobalt, lead, and nickel alloys contain a chemical(s) known in the state of California to cause cancer Lead containing alloys contain a chemical known in the state of California to cause reproductive effects.

Emergency First Aid Procedures:

Eye Contact -Flush for 15 minutes with running water to remove particulate. Consult a physician.

Skin Contact -Wash well with soap and water for 15 minutes. Consult a physical if irritation persists.

Inhalation -Remove individual to place of fresh air. Obtain medical attention.

Ingestion Seek medical attention if large quantities of materials have been ingested.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING OR USE

Steps to be Taken in Case Material is Released or Spilled: No special precautions are necessary for spills of bulk material. If large quantities of dust are spilled, remove by vacuuming or wet-sweeping to prevent elevated concentration of airborne dust. Vacuum systems must be designed for explosive dusts. Avoid all ignition sources.

Waste Disposal Method: Dispose of waste in accordance with federal, state and local regulations. Clean-up personnel should wear respirators and protective clothing. Local ventilation is recommended to maintain dust levels below the applicable PELs and TLV's. Ventilation systems must be designed for explosive dusts.

Precautions to be Taken in Handling and Storing: Store materials away from incompatible materials and keep dust from sources of ignition.

Other Precautions: See all other sections of this MSDS.

SECTION VIII. CONTROL MEASURES

Respiratory Protection: If exposure is above the PEL or TLM use a NIOSH-approved respirator for fume or dust as specified by an industrial hygienist or other qualified health professional.
Ventilation: Use explosion proof local exhaust ventilation to meet the limits specified in section II.

Protective Gloves: Gloves are required for melt, grind, cut, weld, or manual handling operations. Select a glove approved for the specific operation.

Eye Protection: Safety glasses with side shields/goggles are recommended. Melting and welding may require special eye protection including face shields and specially tinted glass. Grinding operations may also require face shields.

Other Protective clothing or equipment: Other protection or equipment may be required depending upon the work being done on or with the material. Consult OSHA 29 CFR 1910 for chemical specific requirements.

Work/Hygiene Practices: Observe good hygiene practices following handling. Always evaluate alloy processing activities in accordance with OSHA or relevant federal, state or local standards.

IMPORTANT LIABILITY DISCLAIMER

The information contained in this Material Safety Data Sheet (MSDS) is believed to be correct as it was obtained from sources which we believe are reliable, including: "Threshold Limit Values & Biological Exposure Indices for 2001" (American Conference of Governmental Industrial Hygienists), Air Contaminants Permissible Exposure Limits (Title 29, CFR, part 1910.1000.OSHA), International Agency for Research on Cancer (IARC), and National Toxicological Program (NTP .PHS/DHHS). However, no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle, or process the material, and hazards connected with the use of the material are solely the responsibility for the user and remain at his sole discretion.

As sold, the product(s) described in this Material Safety Data Sheet (MSDS) is considered by Alro to be an "article" within the meaning of title 29 odf the Code of Federal Regulations, section 1910, 1220 et seq. This MSDS is intended to be used solely for the purpose of satisfying informational requests made pursuant to that requirement. It is not intended to preempt, replace or expand the terms contained in Alro's Condition of Sale. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user. The user has the responsibility to provide a safe workplace, to examine all aspects of its operation, and to determine if or where precautions, in addition to those herein, are required.

Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe work place, to examine all aspects of its operations and to determine if or where precautions, in addition to those described herein, are required.

Note: Chemical analysis has not been performed by Alro corporation for actual compositions, please refer to "Certified Material Test Report" or specific grade specification sheets.

The information contained in the alloy composition sheets should not be used for ordering or specification purposes. Data supplied is referenced from alloy specification ranges/limits and is intended to provide the general chemical composition of the alloy.

BELLMAN-MELCOR, INC.
BRAZING & SOLDERING PRODUCTS

MSDS Data Sheet

Revision Date: 4-1-03
Supplier: Bellman-Melcor, Incorporated
P.O. Box 188
Tinley Park, IL 60477

Products

Sil. #A40N2 (Bag-4), Sil. #A40N5, Sil. #A50N (Bag-24), Sil. #A54N (Bag-13)

Section 1: Chemical Product

Common Name:	Silver-Copper-Zinc-Nickel Brazing Alloy
Chemical Name:	Silver-Copper-Zinc-Nickel Brazing Alloy
Formula:	Ag-Cu-Zn-Ni
Product CAS No.:	CHEMICAL MIXTURE
Product Use:	Brazing

For chemical emergencies, call ***Chemtrec*** at 800.424.9300 or 703.527.3887

Section 2: Composition / Information on Ingredients

Ingredient	CAS Number	Weight %
Copper	7440-50-8	20 - 40
Silver	7440-22-4	40 - 54
Zinc (As Oxide)	7440-66-6	5 - 28
Nickel	7440-02-0	1 - 5

Ingredient Notes
The percentage by weight values reported for the ingredients in these products represent approximate formulation values.
See Section 8 for Exposure Limits and Section 11 for Toxicological Information.

Section 3: Hazardous Identification

Emergency Overview

Metallic wire, rod, strip, powder.
Odorless.
Flash Point – Not Applicable

Prolonged or repeated inhalation or ingestion may cause damage to the lungs, blood, kidneys and liver. May cause eye, skin and respiratory tract irritation. Harmful if swallowed. Causes gastrointestinal irritation, abdominal pain, nausea, vomiting and diarrhea.

Not a fire or explosion hazard in solid form. Finely divided dust may ignite and burn rapidly when mixed with air in the proper proportions. Toxic metal fumes may be released in a fire situation.

Routs Of Entry

Eyes? YES Skin? YES Inhalation? YES Ingestion? YES

Potential Health Effects

Eye Contact: May cause irritation.
Skin Contact: May cause irritation.

Inhalation may cause irritation of the respiratory tract. Short-term overexposure may cause a flu-like illness called Metal Fume Fever. Typically, 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.

Ingestion is harmful. May cause abdominal pain, nausea, vomiting and diarrhea. Copper poisoning can result in hemolytic anemia and kidney, liver and spleen damage.

Note: The potential health effects described above only apply if dust or fume is formed.

Carcinogenicity

NTP? No IARC? No OSHA? No

Chronic Health Hazard

- Overexposure may lead to copper poisoning, resulting in hemolytic anemia and liver, kidney and spleen damage.
- Prolonged or repeated inhalation may cause a benign pneumoconiosis.
- Prolonged or excessive exposure may result in Argyria; a permanent localized blue-gray discoloration of the eyes, skin or mucous membranes.
- Prolonged exposure to silver can cause damage to the nasal septum.
- Excessive zinc intake has been associated with Copper Deficiency Anemia.

Refer to Potential Health Effects.

Medical Conditions Generally Aggravated By Exposure

- May adversely affect existing medical conditions, such as eye, skin, respiratory, blood, liver and/or kidney ailments.
- Individuals with Wilson's Disease are at increased risk of copper poisoning.

Note: See Section 8 for Exposure Limits, Section 11 for Toxicological Information and Section 12 for Ecological Information.

Section 4: First Aid Measures

Eye Contact: Flush eyes with plenty of water.

Skin Contact: Immediately wash skin with soap and plenty of water. If irritation persists, call a physician.

Inhalation: If exposed to excessive levels of metal fume, remove to fresh air and seek medical attention.

Ingestion: If person is conscious and able to swallow, give large amounts of water to dilute. If vomiting occurs, keep head below hips to help prevent aspiration. Get medical attention immediately.

Section 5: Fire-Fighting Measures

Flash Point: Not Applicable
Auto-Ignition: Not Applicable
LEL: Not Applicable
UEL: Not Applicable

NFPA Hazard Classification

Health: 2 Flammable: 0 Reactivity: 0

HMIS Hazard Classification

Health: 2* Flammable: 0 Reactivity: 0 Special: B

* Indicates the possibility of chronic health effects. See Section 3 for Chronic Health Hazards.

Extinguishing Media

Use carbon dioxide, chemical foam or dry chemical. Use any means for extinguishing surrounding fire. Do not use water on metal fires.

Special Fire Fighting Procedures

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and protective clothing as specified in 29 CFR 1910.156.

Unusual Fire and Explosion Hazards

Not a fire or explosion hazard in solid form. Finely divided dust may ignite and burn rapidly when mixed with air in the proper proportions. Toxic metal fumes may be released in a fire situation.

Section 6: Accidental Release Measures

Contain spillage and scoop up or vacuum. Notification of the National Response Center (800.424.8802) may be required. Refer to EPA, DOT and applicable state and local regulations for current response information.

It is recommended that each user establish a spill prevention, control and countermeasure plan (SPCC). Such plan should include procedures applicable to proper storage, control and clean-up of spills, including reuse and disposal as appropriate – see Section 13: Disposal Considerations.

NOTE In the event of accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used – see Section 8: Exposure Control / Personal Protection, and disposal of the material should be in accordance with Section 13: Disposal Considerations.

Section 7: Handling and Storage

- Wash thoroughly after handling.
- Store in a cool, dry location away from incompatible material.
- Avoid breathing any dust, mist or fumes from the use of this product.
- Avoid contact with any dust, mist or fumes from the use of this product.
- Use only with adequate ventilation.
- Do not eat, drink, or smoke in the work area.

Section 8: Exposure Controls / Personal Protection

Ingredient	Exposure Limits PEL-OSHA	TLV-ACGIH
Copper CAS #7440-50-8	0.1 mg/m3 (Fume) 1 mg/m3 (Dust)	0.2 mg/m3 (Fume) 1 mg/m3 (Dust)
Silver CAS #7440-22-4	0.01 mg/m3	0.1 mg/m3
Zinc (As Oxide) CAS #7440-66-6	15 mg/m3 (Total Dust) 5 mg/m3 (Respirable Fraction) 5 mg/m3 (Fume)	5 mg/m3 (Fume) STEL 10 mg/m3 (Total Dust)
Nickel CAS #7440-02-0	1 mg/m3	0.3 mg/m3

Note: Both OSHA and the ACGIH list welding fumes as having an exposure limit of 5 mg.m3 (total particulate not otherwise classified). However, the ACGIH states that welding fumes must be tested frequently for individual components which are likely to be present to determine whether specific exposure limits are exceeded.

Note: The permissible exposure limits (PEL's), threshold limit values (TLV's), potential health effects statements and SARA hazard categories may not be applicable as the hazardous ingredients listed are in the solid form. If dust, powder or fume is generated then these statements will be applicable. Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWA's) and total dust

(particulates only). All ACGIH TLV's refer to the 1998 Standards. All OSHA PEL's refer to 29 CFR Part 1910 Air Contaminations: Final Rule, January 19, 1989.
Respiratory Protection

If dust or fume is generated, a NIOSH/MSHA approved respirator may be necessary. Follow all requirements for respiratory programs and selection set forth in the OSHA regulations (29 CFR 1910.139).

Ventilation

General; local exhaust ventilation as necessary to control any air contaminants to within their PEL's or TLV's during the use of this product.

Protective Equipment

Refer to ANSI/ASC Z49.1-94 (Safety In Welding, Cutting and Allied Processes), published by the American Welding Society, for further information on the selection of personal protective equipment.
Safety glasses (with side shields).
Body protection as necessary to prevent skin contact.

Personnel Sampling Procedures

Copper (dust or fume): Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition #7029.
Zinc Oxide: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition #7502.
Zinc Compounds: Refer to NIOSH Manual of Analytical Methods, 4th Edition #7030.
Silver: Refer to NIOSH Manual of Analytical Methods, 4th Edition #7300.
Tin: Refer to NIOSH Manual of Analytical Methods, 4th Edition #7300.

Section 9: Physical and Chemical Properties

Appearance: Metallic Wire, rod, strip, powder.
Odor: Odorless.
Boiling Point: Not Determined.
Specific Gravity (H2O=1): 8.70 – 8.50
Melting Point: 646 Degrees Centigrade
Vapor Pressure (mm Hg): Not Applicable.
Vapor Density (Air=1): Not Applicable.
Evaporation Rate: Not Applicable.
Percent Soluble in Water: Not Soluble.
PH: Not Applicable.

Section 10: Stability and Reactivity

Stability: Generally considered stable.
Avoid: None Expected.

Incompatibility (Materials to avoid)

Strong acids and bases, strong oxidizers, acetylene, ammonia, hydrogen peroxide, chlorine, bromine, iodine, magnesium metal, ammonium nitrate, hydrogen sulfide.

Hazardous Decomposition or By-Products

Toxic metal oxides are emitted when heated above the melting point. The amount of fume evolved increases as the temperature rises.
Polymerization: Polymerization is not expected to occur.
Avoid: Not Applicable.

Section 11: Toxicological Information

Chemical Name	% Wt.	LD50	LC50
Copper CAS #7440-50-8	20 - 40	3.5 mg/kg MOUSE Intraperitoneal	Not Available
Silver CAS #7440-22-4	40 - 54	Not Available	Not Available
Zinc (As Oxide) CAS #7440-66-6	5 - 28	7,950 mg/kg MOUSE Oral	2,500 mg/kg MOUSE
Nickel CAS #7440-02-0	1 - 5	Not Available	Not Available

Note: See Section 3, 8 and 12 for additional information.

Section 12: Ecological Information

Ecotoxicity: No data available.

Environmental Fate: No data available.

Section 13: Disposal Considerations

EPA Waste Number: D011

This product contains silver or silver compounds and disposal may be regulated under EPA hazardous waste regulations, waste number D011. Before disposal, this product or mixtures containing this product should be tested for toxicity characteristics (TC) under the current EPA Hazardous Waste Regulations TCLP testing procedures, 40 CFR Part 261 at seq. Disposal/recycling/reclamation requirements will vary by location and type of disposal selected. Consult with state and local regulatory authorities.

NOTE Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate. As local regulations may vary; all waste must be disposed/recycled/reclaimed in accordance with federal, state, and local environmental control regulations.

Section 14: Transport Information

International:	UN Number – Not Regulated
United Stated:	EPA Waste Number: D001
	DOT Classification: Not Regulated
Canada:	PIN Number – Not Regulated
	TDG Class – Not Regulated

EC: DGL – Not Determined

Section 15: Regulatory Information

US Federal Regulations

TSCA: In TSCA

SARA 311 and 312 Hazardous Categories

Immediate (acute) Health Hazard: Yes
Delayed (chronic) Health Hazard: Yes
Fire Hazard: No
Reactivity Hazard: No
Sudden Release of Pressure: No

SARA Section 313 Notification

This product contains toxic chemical (or chemicals) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 986 and 40 CFR Part 372.

Chemical Name	CAS Number	% Weight
Copper	7440-50-8	20 - 40
Silver	7440-22-4	40 - 54
Zinc (As Oxide)	7440-66-6	5 - 8
Nickel	7440-02-0	1 - 5

Ozone Depleting Substances (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labeling requirements of the Clean Air Act Amendments 1990 and 40 CFR Part 82.

Volitile Organic Compounds (VOC) – None.

US Regulations

Volatile Organic Compounds (CARB): Not Determined

Canadian Regulations

DSL/NDSL: DSL
WHMIS Classification: Class D, Division 2, Subdivision B

European Regulations

EINECS: Yes

Other Regulations

MITI (Japan): Yes AICS (Australia): Yes

Section 16: Other Information

Revisions

Revision Number: 4
This MSDS has been revised in the following sections:
Product Name
Label Copy

The information in this MSDS should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations, and management and for persons working with or handling this product. The information presented in this MDSD is premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this MSDS is more than three years old, please contact the supplier at the phone number listed to make certain that this sheet is current.

BELLMAN-MELCOR, INC.
BRAZING & SOLDERING PRODUCTS

www.bellmanmelcor.com *Phone: 708-532-5000/800-367-6024* *Fax: 888-272-9348 (BRAZEIT)*

KENNAMETAL

MATERIAL SAFETY DATA SHEET

MSDS # 002
K-0963-002

Revision Date: 10/11/06
Supercedes: 03/06

1. PRODUCT AND COMPANY IDENTIFICATION

Product Names/Powder Grades: K1, K2S, K2SX02, K2SX62, K4H, K4H-M, K4HX02, K400, K5H, K5HX02, K6, K6-M, K6X01 thru K6X0[illegible] K21, K21X02, K2885, K2885X02, K2885X04, K2885Y62, K40, K45, K45X01, K45X03, K68, K68X01, K68X03, K68X04, K68X62, K84, K84X02, K84X62, K84Y62, K84X[illegible]4, K85, K90, K90X02, K90X62, K91, K91X02, K91X62, K91-M, K92, K92X02, K92X62, K92SH, K94, K94X01, K94X02, K94X03, K94X63, K94Y02, K94Y22, K94X62, K95, K95X02, K95Y62, K95X62, K96, K96-M, K96X01, K96X62, K96Y02, K96Y62F, K96X03, K400, K420, K420X01, K420X03, K420X62, K600, K640, K901, K902, K2884, K2884X02, K2884Y62, K8735, K8735X01, K8735X02, K8735Y02, KC250, KC600, KC6840, KC610M, KC6920, KC620M, KC800, KC801, KC7140, KC709M, KC810, KC820, KC850, KC850X02, KC850X03, KC910, KC950, KC950X02, KC950X03, KC9010, KC9025, KC9040, KC9040X02, KC9120, KC1925, KC994M, KD050, KD081, KWH, KWHX02, KWHX62, KWH02, KWHY22, KWHY62, KWHY42, KWH-M, HG-100, PLTSEXP, PLTS001 thru PLTS050, PVN Drill, SP139, Cycloid, CycloidSH, Grinding Media, TS181B, S102, S102X01, S104, K3H, K7H, K7H-M, K7HX02,K69, K82, K3570, K3570MH, KC420, KC710, KC720, KC725M, KC740, KC792M, KC840, KC935, KC990, KC992M, KC994M, KD220, KMN-6, KW106, KWZ106, KW109, K903, KW115, KW115FL1, KW115X02, KW115Y02, KW120FL, KW120, KW125, KW125FH1,KW130FL, KZ1, KZ6, KZ21, KZ2S, KZ2884, KZ2885, KZ29, KZ3055D, KZ40, KZ45, KZ4H, KZ5H, KZ68, KZ7H, KZ82, KZ84, KZ86, KZ8735, KZ90, KZ91, KZ92, KZ944, KZ95, KZ96, KZ420, KZM, KZWH, KC721M, KC9140, KC9315, KC715M, 8H, KDF300, SP139FL, KC935M, KC8050, SP40CV, KC9125, S111X02, S111X04, S113, S113X01, CY16

Chemical Name: Tungsten Carbide product with Cobalt binder
Synonyms: Hard Metal, Cemented WC, Tungsten Carbide
Chemical Family: Metal mixture
Formula: Not applicable - mixture
Product Use: Metalworking Tools, Metallurgical Products, Powders and Inserts

COMPANY ADDRESS
Kennametal Inc.
1600 Technology Way
P.O. Box 231
Latrobe, PA 15650

TECHNICAL INFORMATION:
724-539-5066

EMERGENCY TELEPHONE NUMBER:
CHEMTREC:
Domestic Shipments 1-800-424-9300
Shipments outside the US: 703-527-3887

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	% By Weight	OSHA PEL ppm	OSHA PEL mg/m³	ACGIH TLV-TWA ppm	ACGIH TLV-TWA mg/m³
*Tungsten Carbide (WC)	12070-12-1	30 – 97	-	15	-	10
Cobalt (Co)	7440-48-4	2 - 25	-	0.1	-	0.02
*Tantalum Carbide	12070-06-3	0.1 – 15	-	15	-	10
*Titanium Carbide	12070-08-5	0.1 - 15	-	15	-	10
*Niobium Carbide	12069-94-2	0.1 - 5	-	15	-	10

NE = Not Established; *This substance is regulated by OSHA as a Particulate Not Otherwise Regulated (PNOR). The exposure limits listed for both OSHA and ACGIH refer to total dust; the OSHA PEL for the respirable fraction is 5 mg/m³.

Additional Exposure Standards: None
OSHA REGULATORY STATUS: In solid form, not hazardous. Powder, dust or fume: irritant, lung and respiratory tract toxin, sensitizer, toxic by inhalation

In solid form, this material is not hazardous (tools, inserts). Powder or dust generated from grinding of tools or inserts and fumes generated from high-temperature processes are hazardous materials.

3. HAZARDS IDENTIFICATION

WARNING!

USE ONLY WITH ADEQUATE VENTILATION. HARMFUL IF INHALED. EXPOSURE TO DUST, POWDER, OR FUMES CAN CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION. DUST OR POWDER CAN CAUSE RESPIRATORY SYSTEM DAMAGE. MAY CAUSE AN ALLERGIC SKIN AND/OR RESPIRATORY REACTION. KEEP CONTAINERS CONTAINING POWDER CLOSED. AVOID CONTACT WITH EYES, SKIN AND CLOTHING. WASH THOROUGHLY AFTER HANDLING.

HAZARD RATINGS (For powder or dust)
Hazardous Materials Identification System (HMIS)
National Fire Protection Association (NFPA)

Degree of hazard (0 = low, 4 = extreme)
Health: 3* Flammability: 0 Reactivity: 0 Personal Protection: E
Mixture. Not rated.

HUMAN THRESHOLD RESPONSE DATA

Odor Threshold: Unknown
Irritation Threshold: Unknown
Immediately Dangerous to Life or Health (IDLH) Value(s): The IDLH for this product is not known. The IDLH for cobalt is 20 mg/m³.

POTENTIAL HEALTH EFFECTS

ACUTE EFFECTS

Eye: Powder or dust can cause irritation consisting of redness, swelling, and pain. May cause conjunctivitis with repeated exposures.

Skin: Material not expected to be absorbed through the skin. Contact with dust or powder may cause irritation consisting of redness and/or swelling.

Inhalation: Harmful if inhaled. Inhalation of high concentrations of powder, dust, or fume may cause respiratory and nasal irritation, coughing, and difficulty breathing.

Ingestion: Ingestion of large amounts of dust or powder may cause nausea, diarrhea and or stomach pain.

CHRONIC EFFECTS: Prolonged or repeated skin contact with powder or dust may cause more severe irritation or dermatitis. Prolonged or repeated inhalation of powder, dust or fume may cause more severe irritation and possibly lung damage. Chronic exposure to dust or powder may also lead to the development of permanent, severe, obstructive or fibrotic lung disease characterized by coughing, wheezing, and shortness of breath. Repeated contact with powder or dust may cause an allergic skin reaction consisting of itching, redness, swelling, and rash or urticaria (hives) in sensitized individuals. Prolonged or repeated inhalation of powder, dust or fume may cause an allergic type of asthma reaction characterized by wheezing, coughing, and extreme breathing difficulty in sensitized individuals. Ingestion of large amounts of cobalt may affect the heart, but this type of exposure is not anticipated under normal occupational conditions.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
Exposure to dust or powder may aggravate an existing dermatitis, asthma, emphysema, and other respiratory disease.

POTENTIAL ENVIRONMENTAL EFFECTS None known. Product has not been tested for environmental properties.

4. FIRST AID MEASURES

PROCEDURES

EYE CONTACT: In case of contact, flush eyes with plenty of water for at least 15 minutes. If irritation persists, get medical attention.

SKIN CONTACT: In case of contact, wash skin with plenty of water. Remove contaminated clothing and shoes and launder before reuse. If skin irritation develops and persists or recurs, get medical attention.

INHALATION: If symptoms of lung irritation occur (coughing, wheezing or breathing difficulty), remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention.

INGESTION: If swallowed, and person is conscious, immediately give person large amounts of water. Get medical attention. Never give anything by mouth to an unconscious or convulsing person. Induce vomiting only if instructed by a physician.

NOTE TO PHYSICIANS If ingested, administer medicinal absorbent charcoal. In case of respiratory difficulty, administer oxygen therapy. Check victim's state of consciousness, breathing and pulse, and administer CPR if indicated. There is no specific antidote to the active ingredients in this product; use symptomatic treatment.

5. FIRE FIGHTING MEASURES

Property	Value	Property	Value
Flash Point (°C):	Not applicable	Burning Rate of Material:	Not applicable
Lower Explosive Limit:	Not applicable	Autoignition Temp.:	Not applicable
Upper Explosive Limit:	Not applicable	Flammability Classification: (defined by 29 CFR 1910.1200)	Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS: None expected.

EXTINGUISHING MEDIA: For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash. Use fire-extinguishing media appropriate to fight surrounding fire.

SPECIAL FIREFIGHTING PROCEDURES: Move container from fire area if possible. Cool containers exposed to flame with water from side until well after fire is out. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, or withdraw and let fire burn. Use powdered sodium chloride, or other suitable dry powder. Avoid breathing fumes from burning material. Fire-fighting personnel should use proper respiratory protection and protective fire suits including self-contained breathing apparatus with a full face-piece operated in pressure-demand or other positive-pressure mode.

6. ACCIDENTAL RELEASE MEASURES

For transportation-related and large spills call 3E COMPANY: 1-800-451-8346. For small spills, using protective equipment as prescribed in Section 8, sweep up with minimum amount of dust generation and place in suitable clean, dry containers for later disposal or reclamation. Residue should be cleaned up using a high efficiency particulate filter (HEPA) vacuum or wet clean up. Dispose in accordance with Section 13.

7. HANDLING AND STORAGE

HANDLING: No smoking, eating, or drinking while using this product. Wash hands thoroughly after handling. Minimize free fall of powder and avoid dispersion of dust in air. Contents should be stored in a clean, cool area.

STORAGE: Contents should be stored in a clean, cool area.

OTHER PRECAUTIONS: Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or HEPA vacuuming.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide local exhaust ventilation or general dilution ventilation to maintain exposure levels below the PEL and

TLV.

EYE / FACE PROTECTION: Safety glasses with side shields or goggles are recommended. An eye wash fountain should be available within the immediate work area.

SKIN PROTECTION: Contact lenses should not be worn when handling these materials. Wear impervious gloves and other protective clothing (aprons, coveralls) as appropriate to prevent skin contact when using this product.

RESPIRATORY PROTECTION: Wash thoroughly after handling, especially before eating, drinking, or smoking. If exposures above the PEL/TLV are possible, use a NIOSH-approved half-face or full-face respirator equipped with High Efficiency Particulate (HEPA) filter cartridges.

GENERAL HYGIENE CONSIDERATIONS: Do not eat, drink, or smoke while using this product. Wash hands thoroughly after use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Property	Value	Property	Value
Appearance:	Gray powder or solid	*Vapor Density (air = 1):*	Not applicable
Odor:	None	*Boiling Point (°F):*	2870°C (5198°F)
Molecular Weight:	Mixture	*Melting point:*	1495°C (2723°F)
Physical State:	solid	*Specific gravity (g/cc):*	9.5 – 15.5
pH:	Not applicable	*Viscosity (cps):*	Not applicable
Vapor Pressure (mm Hg):	Not applicable	*Decomposition Temperature:*	Unknown
Solubility in Water (20 °C):	Practically Insoluble	*Evaporation Rate:*	Not Applicable
Volatiles, Percent by volume:	Not applicable	*Octanol/water partition coefficient:*	Unknown

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal temperatures and pressure

CONDITIONS TO AVOID: Avoid exposure to heat, sparks, or flame.

MATERIALS TO AVOID: Acids, bases, strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS: When heated to decomposition, may produce metal oxides and fumes. Inhalation of high concentrations of metal fumes may cause a condition known as "metal fume fever" which is characterized by flu-like symptoms.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

POTENTIAL EXPOSURE ROUTES: This product may be encountered through skin contact, eye contact, ingestion, or inhalation of dusts, fumes or powder.

ACUTE ANIMAL TOXICITY DATA:

For Product: The toxicological properties of this product have not been thoroughly investigated.		**For Components:**				
		Tungsten Carbide	Titanium Carbide	Tantalum Carbide	Cobalt	Niobium Carbide
Oral LD_{50}	No data	> 2 g/kg (rat)	No data	No data	6.171 g/kg (rat)	> 10 g/kg (rat)
Dermal LD_{50}	No data	> 2 g/kg (rabbit)	No data	No data	No data	No data
Inhalation LC_{50}	LC_{50} = 0.4 – 0.6 mg/l (4 hour, rat) Toxic	> 5 mg/l (4 hour, rat)	No data	No data	No data	No data
Irritation	No data	Mild eye and skin irritant	No data	No data	Respiratory irritant, skin and resp. sensitizer	No data

SUBCHRONIC/ CHRONIC TOXICITY DATA: No information for product.

CARCINOGENICITY: There have been some recent studies of hard metals workers (epidemiology studies) that have reported an association between exposure to hard metals and lung cancer. Because of problems in the designs of these studies, it is not possible to conclusively demonstrate that occupational exposure to hard metal dust causes lung cancer in humans. No long-term studies or cancer studies in laboratory animals exposed to hard metal have been conducted. The International Agency for Research on Cancer (IARC) lists cobalt and cobalt compounds as possibly carcinogenic to humans, group 2B.

MUTAGENICITY: Studies conducted in test tubes with white blood cells (lymphocytes) from humans that have been exposed to hard metal powder suggest that there may be a specific interaction between tungsten carbide and cobalt that may cause damage to DNA molecules within the cell's nucleus. However, when lymphocytes from workers exposed to hard metal dust were examined, no changes in the DNA were found.

REPRODUCTIVE, TERATOGENICITY, OR DEVELOPMENTAL EFFECTS: This product is not know or reported to cause reproductive or developmental effects

NEUROLOGICAL EFFECTS: This product is not known or reported to cause neurological effects.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY: None known or reported.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:	MOBILITY:	PERSISTENCE/DEGRADABILITY:	BIOACCUMULATION:
No data.	No data.	No data.	No data.

13. DISPOSAL CONSIDERATIONS:

Responsibility for proper waste disposal is with the owner of the waste.
This is a valuable material that should be sent to an appropriate reclamation facility if available. If material cannot be sent to a reclamation facility, dispose of all waste product and containers in accordance with local, state, federal, and national regulations.

14. TRANSPORT INFORMATION

DOT/IMO/IATA	Cutting Tool – Not Classifiable or regulated by DOT. Powder Form - May be classifiable or regulated by DOT as a flammable solid or toxic/poisonous substance. If a powder is resold and shipped in the same physical form it was received, appropriate labeling, marking, documenting, and placarding may be needed Contact Kennametal Corporate EHS Department at (724) 539-5066 for information on powder classification.
PROPER SHIPPING NAME	
HAZARD CLASS	
UN NO.	
PACKING GROUP	
LABEL	
REPORTABLE QUANTITY	None

15. REGULATORY INFORMATION

INVENTORY STATUS

United States (TSCA) All ingredients are on the inventory or are exempt from listing.
CERCLA: None
SARA 313: Cobalt
SARA 312 HAZARD CLASS: Health: Acute – Yes, Chronic - Yes Fire: None Reactivity: None Release of Pressure: None
SARA 302 EHS LIST: None of the components of this product are listed.
TPQ = Threshold Planning Quantity; RQ = Reportable Quantity; *No reporting of release is required if the diameter of the pieces of the solid metal released is equal to or exceeds 100 micrometers.

STATE RIGHT-TO-KNOW STATUS

Component	CA Prop. 65	Michigan	New Jersey	Pennsylvania	Massachusetts
Cobalt	X	X	X	X	X

16. OTHER INFORMATION

REVISIONS: 12/21/01
PREPARED BY: Kennametal, Inc.
NOTICE: This information is intended for industrial use only by our customers. Any use by third parties is at their own risk. This MSDS meets the regulatory requirements and standards for U.S. products. It may not meet the requirements in all other locations. Although Kennametal Inc. has attempted to provide current and accurate information herein, Kennametal Inc. makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

For free powder handling or metallurgical safety booklets write: Kennametal Inc., MSDS Coordinator, P.O. Box 231, Latrobe, PA 15650
For additional MSDSs or any other information, contact: Kennametal Corporate Compliance Office, phone 724-539-5747 or FAX: 724-539-5439
For technical information contact: Corporate EHS, phone 724-539-5445 or fax 724-539-5372
To purchase Kennametal products call: 1-800-446-7738 or visit our website at www.kennametal.com

Superior Flux & Mfg. Co.

6615 Parkland Blvd. • Cleveland, Ohio 44139 USA • (440) 349-3000 • Fax (440) 349-3003

BRAZING PASTE FLUX
Spec Sheet

SUPERIOR NO. 601 SILVER BRAZING PASTE FLUX

DESCRIPTION

No. 601 is a white, creamy silver brazing paste flux that is active and protective to 1800°F (980°C). It was designed for the majority of brazing operations, and is recommended for use with copper and copper-based alloys, steel, stainless steel, nickel, carbides, precious metals and heat-resistant alloys. No. 601 is available in dispensable form suitable for spraying or other automatic application methods. The flux will not harden or crystallize, retaining its creamy texture up to 2 years.

APPLICATIONS

No. 601 is used in numerous industrial applications, including the following:
appliances, automotive, carbide tools, farm machinery, heat exchanges, heat equipment, maintenance, mining tools, musical instruments, plumbing fixtures, refrigeration and air-conditioning, ship repair, steel furniture and welding equipment.

PHYSICAL PROPERTIES

Form	Creamy Paste
Color	White
Specific Gravity	1.6
Water Content	Less than 35%
pH	8.3 ± 0.2
Flash Point	None
Freezing Effects	None
Active Temperature Range	1000° -1800°F (540° -980°C)

APPROPRIATE FILLER METALS

BAg, BCuP

SPECIFICATIONS

AMS 3410
AWS A5.31-91, TYPE FB3A
Federal specification 0-F-499, Type B

DIRECTIONS

No. 601 may be used in concentrated form or diluted with water to a thinner consistency. Heating the flux to 140° -180°F (60° -82°C) makes it less viscous and somewhat more reactive. Heat the flux slowly to reduce spattering or excessive bubbling. The raw flux and residues are soluble in hot water (at least 140°F/60°C). Chipping or grinding is not necessary.

SAFETY PRECAUTIONS

No. 601 contains potassium bifluoride (CAS #7789-29-9) and potassium fluoborate (CAS #14075-53-7) and should be handled with care. Avoid contact with skin, eyes or clothing, using safety goggles, rubber gloves and rubber apron. As an added precaution, wash hands thoroughly after use. Brazing should be done with adequate ventilation. Consult the Material Safety Data Sheet for further information. Disposal of raw flux and flux residues must be carried out in accordance with local and federal environmental guidelines.

SHIPPING

No. 601 comes in these container sizes:
- 1½ oz., 4 oz. and 8 oz. jars
- 6 oz. brush cap jars
- 1 lb. and 5 lb. jars
- 10 lb., 25 lb., 36 lb., 50 lb. and 60 lb. pails

Most orders are shipped within 24 hours of receipt

SUPERIOR BRAZING PASTE FLUXES

FLUX NO.	APPLICATION	DESCRIPTION	ACTIVE TEMPERATURE RANGE	RECOMMENDED FILLER METALS	SPECIFICATIONS
6	FERROUS AND NON-FERROUS METALS AND CARBIDES	LOW TEMPERATURE FLUX, CONTAINS NO POTASSIUM BIFLUORIDE	900-1600°F 485-870°C	BAg BCuP	AMS 3410 AWS A5.31-91, TYPE FB3A
66	FERROUS AND NON-FERROUS METALS AND CARBIDES	LOW TEMPERATURE FLUX, CONTAINS POTASSIUM BIFLUORIDE	900-1600°F 485-870°C	BAg BCuP	AMS 3410 AWS A5.31-91, TYPE FB3A
600B	FERROUS AND NON-FERROUS METALS AND ALLOYS	MODERATE TEMPERATURE, BLACK FLUX, CONTAINS POTASSIUM BIFLUORIDE	1050-1600°F 565-870°C	BAg BCuP	AMS 3410 AWS A5.31-91, TYPE FB3A 0-F-499, TYPE B
601	FERROUS AND NON-FERROUS METALS AND ALLOYS, STAINLESS STEELS AND CARBIDES	ALL-PURPOSE FLUX CONTAINS POTASSIUM BIFLUORIDE	1050-1600°F 566-870°C	BAg BCuP	AMS 3410 AWS A5.31-91, TYPE FB3A 0-F-499, TYPE B
601PD	FERROUS AND NON-FERROUS METALS AND ALLOYS, STAINLESS STEELS AND CARBIDES	POURABLE / DISPENSABLE FLUX, CONTAINS POTASSIUM BIFLUORIDE	1050-1600°F 565-870°C	BAg BCuP	AMS A5.31-91, TYPE FB3G
601B	FERROUS AND NON-FERROUS METALS AND ALLOYS, STAINLESS STEELS AND CARBIDES	ALL PURPOSE BLACK FLUX, CONTAINS POTASSIUM BIFLUORIDE	1050-1600°F 565-870°C	BAg BCuP	AMS 3410 AWS A5.31-91, TYPE FB3A 0-F-499, TYPE B
601B/ 3411	FERROUS METALS AND ALLOYS, STAINLESS STEELS, CARBIDES AND HIGH CHROME ALLOYS	BORON-MODIFIED ALL PURPOSE FLUX, CONTAINS POTASSIUM BIFLUORIDE	1050-1700°F 565-925°C	BAg BCuP	AMS 3411 AWS A5.31-91, TYPE FB3C
610	FERROUS METALS AND ALLOYS, STAINLESS STEELS, HIGH CHROME ALLOYS AND CARBIDES	HIGH TEMPERATURE FLUX, CONTAINS POTASSIUM BIFLUORIDE	1400-2200°F 760-1205°C	BAg, BCu BNi, BAu RBCuZn	AMS 3417 AWS A5.31-91, TYPE FB3D
606B*	FERROUS METALS AND ALLOYS, STAINLESS STEELS, HIGH CHROME ALLOYS AND CARBIDES	HIGH TEMPERATURE BLACK FLUX, CONTAINS POTASSIUM BIFLUORIDE	1150-1950°F 620-1065°C	BAg, BCu BNI RBCuZn	
609	FERROUS METALS AND ALLOYS, STAINLESS STEELS, HIGH CHROME ALLOYS AND CARBIDES	HIGH TEMPERATURE FLUX, CONTAINS NO POTASSIUM BIFLUORIDE- LOW FLUORINE CONTENT	1400-2200°F 760-1205°C	BAg, BCu BNi, BAu RBCuZn	AMS 3417 AWS A5.31-91, TYPE FB3D
609/ 3417	FERROUS METALS AND ALLOYS, STAINLESS STEELS, HIGH CHROME ALLOYS AND CARBIDES	BORON-MODIFIED HIGH TEMPERATURE FLUX, CONTAINS NO POTASSIUM BIFLUORIDE LOW FLUORINE CONTENT	1400-2200°F 760-1205°C	BAg, BCu BNi, BAu RBCuZn	AMS 3417 AWS A5.31-91, TYPE FB3D
612*	FERROUS METALS AND ALLOYS, STAINLESS STEELS, HIGH CHROME ALLOYS AND CARBIDES	HIGH TEMPERATURE FLUX, CONTAINS SOME POTASSIUM BIFLUORIDE — MODERATELY LOW FLUORINE CONTENT	1400-2200°F 760-1205°C	BAg, BCu BNI, BAu RBCuZn	AMS 3417 AWS A5.31-91, TYPE FB3D

* ALSO AVAILABLE IN BORON-MODIFIED VERSIONS.

MATERIAL SAFETY DATA SHEET
SUPERIOR NO. 601

DATE REVISED: February 26, 1998

Product Name: Superior No. 601
Manufacturer: Superior Flux & MFG. Co. 6615 Parkland Blvd. Cleveland OH, 44139
Emergency Phone Number: 1-800-424-9300 (CHEMTREC)
Other Information Calls: (440) 349-3000

To the Purchaser: This MSDS contains important environmental, health, and toxicology information for your employees who have ordered this product. Please be sure this information is given to them. If you resell this product, a copy of the MSDS should be given to the buyer.

H.M.I.S. Information:	HEALTH = 2	FLAMMABILITY = 0	REACTIVITY = 0

SECTION I – IDENTIFICATION

Common Name: Superior No. 601
CAS Number: NA
Formula: See Below
Chemical Family: Silver Brazing Paste Flux
Chemical Name: NA

SECTION II - COMPOSITION INFORMATION

Components	CAS Number	%	OSHA PEL
Potassium Fluorohydroborate	12228-71-6	30-45	2.5PPM
Potassium Tetraborate	1332-77-0	15-25	5.0PPM
Boric Acid	10043-35-3	15-30	10PPM
Potassium Fluoroborate	14075-53-7	7-15	2.5PPM

SECTION III - HEALTH HAZARDS

EMERGENCY AND FIRST AID PROCEDURES

Inhalation: Remove to Fresh Air
Eyes: Flush with Water for 10 Minutes. Call Physician.
Skin: Wash Thoroughly with Water.
Ingestion: If Patient is Fully Conscious, Give Two Glasses of Water and Induce Vomiting. Obtain Medical Attention Immediately.

Primary Routes of Entry into Body: Fume Inhalation, Ingestion, Skin, and Eyes.
Symptoms of Overexposure: Salivation, Coughing, Choking, Chills, May Cause Weight Loss, Brittle Bones, Anemia, and Stiff Joints.
Medical Conditions Generally Aggravated by Exposure: Any Weakness of the Lungs, Kidneys or Liver will be Aggravated..
Chemical Listed as Carcinogen or Potential Carcinogen: None
OSHA Permissible Exposure Limit (PEL): 2.5PPM
ACGIH Threshold Limit Value (TLV): 2.5PPM

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: (Method Used): None
Flammable Limits: Lower-NA, Upper-NA
Extinguishing Media: Not Needed
Auto Ignition Temperature: None
Special Fire Fighting Procedures: Normal Caution When Using Chemicals
Unusual Fire and Explosion Hazards: Fluorides

SECTION V - ACCIDENTAL RELEASE MEASURES

Steps to be Taken in Case Material is Spilled: Clean up Paste and Flush Remaining Material with Lots of Water.

SECTION VI - STABILITY AND REACTIVITY

Stability: Product is Stable
(Conditions to Avoid): Excess Heat
Incompatibility: Glass or Porcelain
Hazardous Decomposition Products: Fluorides with High Heat.
Hazardous Polymerization: Will Not Occur
(Conditions to Avoid): NA

SECTION VII - CONTROL MEASURES

Ventilation: Yes
Local Exhaust: Yes
Protective Gloves: Recommend, NIOSH Approved
Eye Protection: Safety Goggles
Mechanical (General): Yes
Respiratory Protection (Type): NIOSH Approved Respirator.
Other Protective Clothing or Equipment: Rubber Apron

SECTION VIII - HANDLING AND STORAGE

Precautions to be Taken in Handling and Storage: Store in Plastic Containers in Cool Area. Do Not Store in Glass or Porcelain Container. Wash Thoroughly After Use.
Work/Hygienic Practices: Avoid Contact with Skin, Eyes and Clothing.
Other Precautions: Keep Container Away From Excessive Heat.

SECTION IX - PHYSICAL AND CHEMICAL CHARACTERISTICS

Boiling Point: NA
Specific Gravity (Water = 1): 1.6
Vapor Pressure (mm Hg): NA
Percent Volatile by Volume: 30%
Vapor Density (Air = 1): NA
Evaporation Rate (Butyl Acetate = 1): 0.3
Melting Point: 500 C
Solubility in Water: Moderate
Reactivity in Water: None
Appearance and Odor: White Odorless Paste

SECTION X - TRANSPORTATION AND DISPOSAL CONSIDERATIONS

D.O.T. Proper Shipping Name: Non-Hazardous
Hazard Class: NA
Identification Number: NA
Packing Group: NA
Type D.O.T Label Required Information: NA
Waste Disposal Method: Dispose in Accordance with EPA Regulations.

MATERIAL SAFETY DATA SHEET
UPDATED 04/01/10

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME: **DS 99K**

MANUFACTURER: DIP SEAL PLASTICS, INC. TELEPHONE: 815-398-3533
2311 23RD AVE
ROCKFORD, IL 61104

2. COMPOSITION / INGREDIENTS

Ingredient Name	CAS Number	Concentration	Exposure Limits / Health Hazards
Styrene-Ethylene/ Butylene/Styrene	66070-58-4	30-60	
USP Oil	mixture	30-60	
Wax	8002-74-2	0-10	None
Hydrocarbon Resin	63231-60-7 68441-38-3	0-10	None

3. HAZARDS IDENTIFICATION

NON TOXIC
MELTED MATERIAL EXTREMELY HOT! MAY CAUSE SEVERE BURNS!

4. FIRST AID MEASURES

SKIN
IF MOLTEN PLASTIC CONTACTED SKIN, REMOVE IMMEDIATELY AND APPLY COLD WATER, ICE, OR COLD COMPRESS. SEEK MEDICAL ATTENTION IF BURNS ARE SEVERE.

EYE
Burns due to contact with heated material require immediate medical attention.

INHALATION
NON-TOXIC FUMES

INGESTION
SMALL AMOUNTS ARE ESSENTIALLY HARMLESS

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA—CO2, DRY CHEMICAL
Firefighters must wear MSHA/NIOSH approved positive pressure breathing apparatus with full face mask and full protective equipment.
Do not use water on molten plastic to avoid splattering of fire.

6. SPILLS / ACCIDENTAL RELEASE MEASURES

Allow material to solidify and scrape up.

7. DISPOSAL CONSIDERATIONS

Waste Disposal-Not listed as a material banned from landfill disposal according to RCRA.

8. HANDLING & STORAGE

Storage: Store in cool dry place
Handling: No special handling required when product is cold. Use appropriate protective equipment when product is hot (molten).

9. STABILITY & REACTIVITY

Stability/Incompatibility-Stable under normal conditions of use.
If product is burned, carbon monoxide, carbon dioxide, and other unknown product may be produced.
Avoid the addition of water or any other volatile material to molten product.
Hazardous Polymerization will not occur.

10. REGULATORY INFORMATION

HMIS RATINGS: Health - 1 Flammability - 1 Reactivity - 0 PERSONAL PROT. Equip. - B

11. TOXICOLOGICAL INFORMATION

Carcinogenicity – None of the components of this material are listed by IARC, NTP, OSHA, TSCA, OR ACIGH as carcinogens.
All materials contained in this product are listed or are exempt from listing on the Toxic Substance Control Act Inventory (TSCA).

Date: Sep 27, 2010 11:12:13 AM EDT

Attention: dick
Subject: MSDS and Product Data Pages

Sender: JAMES W KOPRAS
Sender Phone: (330) 364-5591
Sender Fax: (330) 364-5599

	Sales Number	REX	UPC	Data Page	MSDS
1.	522-5800 Opex? Production Lacquer	L61S00018	0-35777-27031-8	Attached	Attached

SHERWIN WILLIAMS.

Chemical Coatings

CC-C1

OPEX® Production Lacquers

Flamboyant Aluminum	L61S18	Semi-Gloss Soft White	L61W38	Tinting White	L61W19
Red	L61R44	Gloss Black	L61B21	Gloss White	L61W34
Blending Clear	T82C100	Yellow	L61Y36	Blending White	L61W100

DESCRIPTION

OPEX® Production Lacquer is a nitrocellulose alkyd lacquer for industrial product finishing

Advantages:

- Fast air drying
- Full gloss
- Interior and exterior use on metal
- Non-photochemically reactive
- No critical recoat time
- Non-bleeding pigments
- USDA acceptable for use in areas of incidental food contact
- All colors comply with heavy metals and lead restrictions
- A full gloss range is available using Opex® Lacquer Flatting Agent (see data page CC-S2 for details)
- May be tinted with 844 colorants up to 4 ounces

CHARACTERISTICS

Gloss: Full
Semi-gloss White: 40-45 units
Aluminum: 25-35 units

Volume Solids: 25 ± 2% at 100% reduction with R7K120 except T82C100, L61W100, and L61S18 varies by color

Viscosity:
20-25 seconds #2 Zahn Cup at 100% reduction with R7K120

Recommended film thickness at 100% reduction with R7K120:
Interior applications (achieved with multiple coats) :

Mils Wet:	6.0 - 8.0
Mils Dry:	0.8 - 1.0

Exterior applications (achieved with multiple coats) :

Mils Wet:	8.0 - 10.0 primed 11.0 - 16.0 unprimed
Mils Dry:	1.0 - 1.2 primed 1.4 - 2.0 unprimed

Spreading Rate (no application loss)
100-250 sq ft/gal @ 0.8-2.0 mils DFT

Drying (1.0 mils dft, 77°F, 45% RH):

Tack Free:	5-10 minutes
To Topcoat:	no critical recoat time
To Pack:	2-4 hours
Force Dry:	10-15 minutes at 180°F

Good air movement is more important than heat.

Flash Point: 21-35°F, Pensky-Martens Closed Cup

Package Life: 2 years, unopened

Air Quality Data:
Non-photochemically reactive
Volatile Organic Compounds (VOC) as packaged, maximum
6.19 lb/gal, 742 g/L
reduced 100% with R7K120, maximum
6.39 lb/gal, 767 g/L

SPECIFICATIONS

General: Substrate should be free of grease, oil, dirt, fingerprints, drawing compounds, any contamination, and surface passivation treatments to ensure optimum adhesion and coating performance properties. Consult Metal Preparation Brochure CC-T1 for additional details.

Aluminum: Prime with Kem Aqua® Wash Primer, E61G520.

Galvanized Steel: Prime with Kem Aqua® Wash Primer, E61G520.

Steel or Iron: Remove rust, mill scale, and oxidation products. For best results, treat the surface with a proprietary surface chemical treatment of zinc or iron phosphate to improve corrosion protection. Opex® Lacquers are self priming on steel. For optimum exterior durability, prime with Opex® Lacquer Primer Surfacer.

Wood (interior only): Must be clean, dry, and finish sanced. Prime with Sher-Wood® Primer, P65W1 or P65W4.

Testing: Due to the wide variety of substrates, surface preparation methods, and application methods and environments, the customer should test the complete system for adhesion and compatibility prior to full scale application.

An Environmental Data Sheet is available from your local Sherwin-Williams facility.

continued on back

APPLICATION

Typical Setup

With high humidity, it may be necessary to use Lacquer Thinner, R7K27 to reduce or eliminate blushing.

Conventional Spray:
Reducer R7K120
Reduction Rate 50-100%
Warm Spray:
Reducer R7K22
Reduction Rate 50-75%
Dip:
Reducer ..... R7K22 or R7K27
Reduction Rate 50-75%
Excessive agitation or turbulence on part immersion or withdrawal may cause foaming.
Tank maintenance (agitation, turnover rate, viscosity control, and stability) is required.

Cleanup:
Clean tools/equipment immediately after use with Lacquer Thinner R7K120. Follow manufacturer's safety recommendations when using any solvent.

SPECIFICATIONS

Product Limitations:
- This nitrocellulose quality will show yellowing upon aging, especially in whites. Topcoating with clear wood finish lacquers may cause unacceptable yellowing over time.
- Yellow, L61Y36 has limited exterior durability.
- Saturated colors provide better color retention than very light tints on exterior exposure.
- After force drying, cool articles to prevent sticking.
- High humidity may cause blushing with lacquers, use Retarder Thinner to reduce blushing.
- Do not use on exterior wood products.
- Do not use over Industrial Wash Primer, P60G2 as poor adhesion may result. Use Kem Aqua® Wash Primer, E61G520 over untreated aluminum and galvanized metal.
- Does not meet KCMA performance specifications.
- To avoid yellowing on cabinets/furniture, Sher-Wood® Pigmented Conversion Varnish or Sher-Wood® White Vinyl Sealer, P63W2, and Sher-Wood® CAB-Acrylic Lacquer should be recommended.

Performance Tests

Hardness:
With one hour drying, this will withstand one psi with no marring or film transfer.

Note: Product Data Sheets are periodically updated to reflect new information relating to the product. It is important that the customer obtain the most recent Product Data Sheet for the product being used. The information, rating, and opinions stated here pertain to the material currently offered and represent the results of tests believed to be reliable. However, due to variations in customer handling and methods of application which are not known or under our control, The Sherwin-Williams Company cannot make any warranties as to the end result.

CAUTIONS

Thoroughly review product label for safety and cautions prior to using this product.
A Material Safety Data Sheet is available from your local Sherwin-Williams facility. Please direct any questions or comments to your local Sherwin-Williams facility.

LABEL CAUTIONS

SEE CONTENTS STATEMENT ON LABEL.
Contents are FLAMMABLE. Vapors may cause flash fires. Keep away from heat, sparks, and open flame. During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
VAPOR HARMFUL. Use only with adequate ventilation. Wear an appropriate properly fitted vapor/particulate respirator (NIOSH approved) during and after application, unless air monitoring demonstrates vapor/mist levels are below applicable limits. Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: If INHALED: If affected, remove from exposure. Restore breathing, Keep warm and quiet. If on SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing. Launder before re-use. If in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention. If SWALLOWED: Call Poison Control Center, hospital emergency room, or physician immediately.
SPILL AND WASTE: Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE.
Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
FOR INDUSTRIAL USE ONLY.
SEE MATERIAL SAFETY DATA SHEET, 28873-100606.

DANGER: Rags, steel wool, other waste soaked with this product, and sanding residue may spontaneously catch fire if improperly discarded. Immediately place rags, steel wool, other waste soaked with this product, and sanding residue in a sealed, water-filled, metal container. Dispose of in accordance with local fire regulations.

L61S18

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

HMIS Codes	
Health	2*
Flammability	3
Reactivity	1

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.
Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the hematopoietic (blood-forming) system
- the cardiovascular system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
35 °F PMCC	1.0	12.7	RED LABEL -- Flammable, Flash below 100 °F (38 °C)

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

- Remove all sources of ignition. Ventilate the area.
- Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.
Keep out of the reach of children.

MATERIAL SAFETY DATA SHEET

L61S18
20 00

DATE OF PREPARATION
Apr 4, 2010

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
L61S18

PRODUCT NAME
OPEX® L61 Production Lacquer, Flamboyant Aluminum

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
12	64742-89-8	**Lt. Aliphatic Hydrocarbon Solvent**		
		ACGIH TLV	100 PPM	53 mm
		OSHA PEL	100 PPM	
2	64742-88-7	**Mineral Spirits**		
		ACGIH TLV	100 PPM	2 mm
		OSHA PEL	100 PPM	
13	108-88-3	**Toluene**		
		ACGIH TLV	20 PPM	22 mm
		OSHA PEL	100 ppm (Skin)	
		OSHA PEL	150 ppm (Skin) STEL	
0.2	100-41-4	**Ethylbenzene**		
		ACGIH TLV	100 PPM	7.1 mm
		ACGIH TLV	125 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	125 PPM STEL	
1	1330-20-7	**Xylene**		
		ACGIH TLV	100 PPM	5.9 mm
		ACGIH TLV	150 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	150 PPM STEL	
12	67-63-0	**2-Propanol**		
		ACGIH TLV	200 PPM	33 mm
		ACGIH TLV	400 PPM STEL	
		OSHA PEL	400 PPM	
5	78-83-1	**2-Methyl-1-propanol**		
		ACGIH TLV	50 PPM	8.7 mm
		OSHA PEL	50 PPM	
3	111-76-2	**2-Butoxyethanol**		
		ACGIH TLV	20 PPM	0.88 mm
		OSHA PEL	25 PPM	
11	78-93-3	**Methyl Ethyl Ketone**		
		ACGIH TLV	200 PPM	70 mm
		ACGIH TLV	300 PPM STEL	
		OSHA PEL	200 PPM	
		OSHA PEL	300 PPM STEL	
22	110-19-0	**Isobutyl Acetate**		
		ACGIH TLV	150 PPM	12.5 mm
		OSHA PEL	150 PPM	

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SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	7.48 lb/gal	896 g/l
SPECIFIC GRAVITY	0.90	
BOILING POINT	174 - 395 °F	78 - 201 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	91%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

6.19 lb/gal	742 g/l	Less Water and Federaliy Exempt Solvents
6.19 lb/gal	742 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

Contamination with Water, Acids, or Alkalis can cause evolution of hydrogen, which may result in dangerously increased pressures in closed containers.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Methyl Ethyl Ketone may increase the nervous system effects of other solvents.
Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.
Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

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TOXICOLOGY DATA

CAS No.	Ingredient Name			
64742-89-8	Lt. Aliphatic Hydrocarbon Solvent			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
64742-88-7	Mineral Spirits			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
108-88-3	Toluene			
		LC50 RAT	4HR	4000 ppm
		LD50 RAT		5000 mg/kg
100-41-4	Ethylbenzene			
		LC50 RAT	4HR	Not Available
		LD50 RAT		3500 mg/kg
1330-20-7	Xylene			
		LC50 RAT	4HR	5000 ppm
		LD50 RAT		4300 mg/kg
67-63-0	2-Propanol			
		LC50 RAT	4HR	Not Available
		LD50 RAT		5045 mg/kg
78-83-1	2-Methyl-1-propanol			
		LC50 RAT	4HR	Not Available
		LD50 RAT		2460 mg/kg
111-76-2	2-Butoxyethanol			
		LC50 RAT	4HR	Not Available
		LD50 RAT		470 mg/kg
78-93-3	Methyl Ethyl Ketone			
		LC50 RAT	4HR	Not Available
		LD50 RAT		2740 mg/kg
110-19-0	Isobutyl Acetate			
		LC50 RAT	4HR	Not Available
		LD50 RAT		13400 mg/kg

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

US Ground (DOT)

1 Gallon and Less may be Classed as CONSUMER COMMODITY, ORM-D
Larger Containers are Regulated as:
UN1263, PAINT, 3, PG II, (ERG#128)

DOT (Dept of Transportation) Hazardous Substances & Reportable Quantities

Toluene 1000 lb RQ
Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):

UN1263, PAINT, 3, PG II, (ERG#128)

Canada (TDG)

UN1263, PAINT, CLASS 3, PG II, (ERG#128)

IMO

UN1263, PAINT, CLASS 3, PG II, MARINE POLLUTANT, (2 C c.c.), (TRICRESYL PHOSPHATE), EmS F-E, S-E, ADR (D/E)

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
108-88-3	Toluene	13	
100-41-4	Ethylbenzene	0.2	
1330-20-7	Xylene	1	
	Glycol Ethers	3	

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

VI. Reactivity Data

STABILITY: Stable
INCOMPATIBILITY: Not incompatible
HAZARDOUS POLYMERIZATION: n/a
HAZARDOUS DECOMPOSITION PRODUCTS: n/a
CONDITIONS TO AVOID: May liberate metal fumes & metal oxic
welded.

VII. Spill & Leak Procedures/Environmental

Residue from cutting or grinding should be swept or vacuumed a
suitable containers for disposal in accordance with federal, state,
disposal regulations. This material may be reclaimed for reuse. S
for "Information concerning materials subject to SARA Title III rep
requirements."

VIII. Special Protection Respiratory Protection

When exposure limits are exceeded, use proper approved respir
OSHA and/or state or local codes)

VENTILATION: Use local exhaust when cutting, grinding or weld

EYE PROTECTION AND PROTECTIVE CLOTHING: Proper pro
and appropriate face and eye protection should be used when cu
or welding. (Consult OSHA and/or state or local rules and regulat

IX. Special Precautions

PEL/TLV exposures should be controlled to remain below OSHA
specifications to ensure proper health protection of workers. The
this MSDS was obtained from sources believed to be reliable. Ho
information is provided without any representation or warranty, e:
implied regarding the accuracy or correctness. The conditions or
handling, storage use and disposal of the product are beyond ou
knowledge. For this and other reasons, we do not assume respo
expressly disclaim liability for loss, damage or expense arising ou
way connected with the handling, storage, use, or disposal of the