MATERIAL SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Name	Phone Number			CHEMTREC
Nu-Calgon Wholesaler, Inc.	(314) 469-7000 / (800) 554-5499			(800) 424-9300
Street Address	**City**	**State**	**Postal Code**	**Last Update**
2008 Altom Court	St. Louis	MO	63146-4151	1/20/13
Product Name	**Product Number**	**Product Use**		**EPA Registration #**
Freez-Kontr'l	4188	Closed system anti-freezing agent.		N/A

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	% By Wt.	CAS Number	TLV	PEL
Propylene Glycol	70 - 80	57-55-6	NE	NE

SECTION 3 – HAZARD IDENTIFICATION

Emergency Overview: Material is a clear, colorless solution.

Potential Health Effects

Eyes: May cause transitory stinging and tearing.

Skin: Mild irritant and defatting agent, especially on prolonged contact.

Ingestion: Relatively non-toxic. Ingestion of sizable amount (over 100 mL) may cause some gastrointestinal upset and temporary central nervous system depression. Effects appear more severe in individuals with kidney problems.

Inhalation: No adverse effects via Inhalation.

Chronic Exposure: Lactic acidosis, stupor, and seizures have been reported following chronic ingestion.

Carcinogenicity: This product has NOT been identified as a carcinogen by NTP, IARC, ACGIH, OSHA, or CA Prop 65.

Medical Conditions Aggravated be Exposure: Kidney disorders.

SECTION 4 – FIRST AID MEASURES

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

Skin: Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Ingestion: Not expected to require first aid measures. Give several glasses of water to drink and dilute. If large amounts are swallowed, seek medical advice. Note to physician: In case of ingestion, monitor for acidosis and central nervous system changes. Exposed persons with previous kidney dysfunction may require special treatment.

Inhalation: Remove to fresh air. Not expected to require first aid measures.

SECTION 5 – FIREFIGHTING MEASURES

Flash Point: 99°C/211°F

Autoignition Temp: 371°C/700°F

Hazardous Products of Combustion: No Data.

Flammable Limits in Air: (% vol. in air) -17.4

Extinguishing Media: Use extinguishing agent suitable for type of surrounding fire. Water Spray: OK Carbon Dioxide: OK Foam: OK Dry Chemical: OK Other: Any "ABC" Class

Fire and Explosion Hazards: Containers may explode in the heat of the fire. Explosion Sensitivity to Mechanical Impact: Not sensitive. Explosion Sensitivity to Static Discharge: Not sensitive.

Special Firefighting Procedures: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by the DOT Emergency Response Guidebook, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate immediate hazard area and keep unauthorized personnel out. Contain spill if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Cool equipment exposed to fire with water, if it can be done with minimal risk.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Spill or Leak: For small releases of this product, wear latex or nitrile gloves and safety glasses. Absorb spilled liquid and rinse area thoroughly with soap and water. For large or uncontrolled releases, ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal equipment and specified in section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Collect liquid in an appropriate container or absorb with an inert material (e.g. vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer.

SECTION 7 – HANDLING AND STORAGE

Handling Procedures and Equipment: Work and Hygiene Practices: As with all chemicals, avoid getting this product ON YOU or IN YOU. Do not eat, drink, smoke or apply cosmetics while handling the product. Wash hands thoroughly after handling. Protective Practices During Maintenance of Contaminated Equipment: When cleaning non-disposable equipment, wear latex or nitrile gloves (double gloving is recommended), goggles, and lab coat. Wash equipment with soap and water. All needles, syringes, vials and other disposable items contaminated with this product should be disposed of properly.

Storage Requirements: Store only in approved containers. Keep away from any incompatible materials or conditions (see Section 10). Store in a dry ventilated area at a temperature of 15°C to 30°C (59°F to 86°F). Protect from light.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: Not normally required for routine, administration of this product. A NIOSH certified air-purifying respirator may be used under conditions where airborne concentrations are expected to be excessive. Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a positive pressure air supplied respirator if there is potential for uncontrolled release, exposure levels are not known or any other circumstances where air-purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHAs 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Eye Protection: The use of chemical goggles to safeguard against potential eye contact, irritation, or injury is recommended.

Protective Clothing: Use protective gloves. Wash hands before and after using gloves. Use clean body covering.

Exposure Guidelines: No Data.

Specific Engineering Controls (such as ventilation, enclosed process): Use with adequate ventilation. Follow standard medical product handling procedures.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: Liquid	**Freezing Point:** -60°C/-76°F	**% Volatile by Weight:** No Data.%
Color: Light blue	**Vapor Density [air =1]:** 60-90° F: 2.6	**Evaporation Rate:** (ether=1): N/A
Odor: near odorless	**Vapor Pressure:** mm Hg: 0.1	**Specific Gravity:** 1.04
Boiling Point: 182°C/360°F	**Solubility in Water:** Complete	**pH (concentrate):**

SECTION 10 – STABILITY AND REACTIVITY

Chemical Stability: Stable under labeled storage conditions.

Hazardous Polymerization: Will not occur.

Incompatibilities: Strong oxidizing agents.

Reactive Conditions to avoid: Heat, ignition sources, and incompatibles

Decomposition Products: CO2, CO, aldehydes

SECTION 11 – TOXICOLOGICAL INFORMATION

Hazardous Ingredients	CAS #	EINECS #	LD 50 of Ingredient (Specify Species)	LC50 of Ingredient (Specify Species)
Propylene Glycol	No Data.	No Data.	Oral LD50 (rat) = 20 g/kg Skin LD50 (rabbit) = 20.8 g/kg	Irritation eye (rabbit) = 500 mg/24H mild
			Mutagenicity: DNA inhibition: Subcutaneous mouse = 8000mg/kg,	When propylene glycol was given at 30% in the diet, it affected reproduction rates in rats.
			Cytogenic Analysis: Subcutaneous mouse = 8000 mg/kg, Cytogenic analysis: Hamster, Fibroblast = 32 gm/L.	It has generally not affected fertility or reproduction, except at very high dosed where effects could be attributed to nutritional deficiency.

SECTION 12 – ECOLOGICAL INFORMATION

Hazardous Ingredients	Aquatic Toxicity Data
	When released into the soil, this material is expected to readily biodegrade. When released into the soil, the material is expected to leach into ground water. When released into water this material is expected to readily
	degrade. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal: Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of unused contents according to federal, state, and local regulations.

SECTION 14 – TRANSPORTATION INFORMATION

Special Shipping Information: No Hazardous

Purview	Proper Shipping Name	UN Number	Packing Group	Hazard Class
DOT (Land)	Not Regulated.			
IMO (Water)	No Data.			
ICAO (Air)	No Data.			

SECTION 15 – REGULATORY INFORMATION

WHMIS Classification: (Workplace Hazardous Material Information System)	No Data.
SARA Title III: (Superfund Amendments & Reauthorization Act)	The components of this product are not subject to the reporting requirements of Sections 302, 304 and 313 of Title II of the Superfund Amendments and Reauthorization Act.
OSHA: (Occupational Safety & Health Administration)	No Data.
TSCA: (Toxic Substance Control Act)	Propylene glycol is a “drug” as defined by the Federal Food, Drug and Cosmetic Act and is therefore not a chemical substance under TSCA.
VOC: (volatile Organic Compounds)	slightly volatile
CPR: (Canadian Controlled Products Regulations)	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.
EINECS: (European Inventory of Existing Commercial Chemical Substances)	No Data.
DSL / NDSL: (Canadian Domestic Substance List)(Non-Domestic Substance List)	No Data.
CERCLA: (Comprehensive Response Compensation & Liability Act)	Not applicable
IDL: (Canadian Ingredient Disclosure List)	No Data.
NFPA (HMIS) Rating: (Hazardous Materials Identification System)	Health: 0 Flammability: 1 Reactivity: 1

SECTION 16 – OTHER INFORMATION

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): This product does NOT contain a chemical known to the State of California to cause developmental and reproductive effects.
Other U.S. Federal Regulations: Based on this product’s use, the requirements of the OSHA Bloodborne pathogen Standard (29 CFR 1910.1030) are not applicable.
ANSI Labeling (Based on 129.1. Provided to Summarize Occupational Exposure Hazards):

MATERIAL SAFETY DATA SHEET

Product name: Safety Boosters

Description: □□, □□, a□d □□ a□□er □a□□ □ar□d□es □r □□□der a□□a□ed □as□ □□□□ □□□s

Supplier: □□□, □□□□ □□□ □□□□□ □11□□, □□sa, □□ □□1□1 □□□□□e 1□00 □□9 □000

Emergency # (Chem-Trec.): 1 □00 □□□ 9300 □□ □□, □□, □r□□ s□a□ds, □a□ada□ 001 □03 □□□ 3□□□ □□□□er □□□□□r□es□

INGREDIENTS AND EXPOSURE LIMITS

Ingredients:	CAS Number:	TLV:	PEL:	STEL:
□□r□□□□er□	000□□□3□0	0□□□ □ □□□ ^{3} □□□	□□	□ □ □□□ ^{3} □□□
□□r□e□□□se	0900□□□0□0	□□	□□	□□
□ead s□□□□a□e	1□□□□□□□□0	0□0□ □ □□□ ^{3} □	0□0□ □ □□□ ^{3} □	□□
□ar□□□ □□ra□e	100□□□31□□	0□□ □ □□□ ^{3}	0□□ □ □□□ ^{3}	□□
□e□ra□e□e	00109□□□3	□□	□□	□□

Abbreviations / Symbols: * e□□□s□re □□ □□□r □e□a□□ead□ **NE** □ □□□e □s□a□□s□ed□ **NA** □ □□□□□□□□a□e□ **(S)** □d□a□es e□□□s□re s□□□d □e □□□□r□ed □r □e □□a□e□s r□□es □□□□d□□ □□e □ □□□□s □e□ □ra□es, e□es, a□d s□□□ □r□r□e e□□□s□res as □e□as d□re□ □□□a□□ □s□e □□□s□dered□

PHYSICAL DATA

Appearance:	□a□□ □rass □ar□d□es□	**Odor:**	□□□e□
Vapor Density: (air = 1)	□□□a□□□□a□e□	**Vapor Pressure:**	□□□a□□□□a□e□
Boiling Point:	□□□a□□□□a□e□	**VOC Content:**	□□□a□□□□a□e□
Evaporation Rate:	□□□a□□□□a□e□	**Solubility in Water:**	□□□a□□□□a□e□
Specific Gravity:	□□□a□□□□a□e□	**pH:**	□□□a□□□□a□e□

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	□□□a□□□□a□e□	**Flammable Limits:**	□□□a□□□□a□e□
Extinguishing Media:	□ a□er□		
Special Fire Fighting Procedures:	□□□□d area □□□□ □a□er □r □ee□ □ar□d□es □□□□□□□□□ □a□er s□ra□□		
Unusual Fire and Explosion Hazards:	□ar□d□es □a□ □as□□□e□□□sed □□ e□ □era□□res □ 1□0□□□ Mass de□□a□□□ □□□□□□□□□□r□		

REACTIVITY DATA

Hazardous Polymerization:	□ □□□□□□□□□r□	**Stability:**	□a□e□
Incompatibility:	□r□□□ a□ds a□d □□d□□□□ a□e□s□		
Decomposition Products:	□□des □□□□r□e□, □□des □□□ar□□□, a□r□ □□□es a□d □ead □□de□		
Conditions to Avoid:	□□□ds, e□□ess□e □ea□, □r□s□□□, a□d e□e□r□a□□□re□s□		

HEALTH HAZARD DATA

Known Hazards:	□□□□ □as es□a□□s□ed a□ a□□□□ □e□e□ □□ 0□03 □ □□□ ^{3} □□r □ead□ □□□□s□res □□a□ e□□eed re□□□ □e□ded □□ □s □r □ead □a□□e □□ss□□e □□der □era□ □□□d□□□s s□□□ as e□□ess□e r□□□ □□□ □□□e ar □ □□e□e□a□d□r r□□□ □□ s□a□e□□□sed □□r areas□ □ □r□□□ □□□□□□□er□ □□□ere□□□s□re □□ □ead □a□ res□□□□da□□a□e □□ □□□□d□□r□ □□□, □er□□□s, □r□ar□a□d re□r□d□□□e s□s□e□s□
Signs and Symptoms of Exposure:	□□ess□e e□□□s□re □□ □ases □ □□□□ □a□se □r□a□□□ □□ □□e e□es, s□□□, a□d res□ra□r□ s□s□e□ □ □d□erse □ea□□ e□e□s are □□□e□□e□ed r□□ a□□e e□□□s□re □□ □□□es a□d □ases□ □□□□e□, ade□□a□e □e□□a□□, □ers□a□□r□e□□□e e□□□□e□, a□d□r □□□d □ers□a□□□□□e□e □ra□□□es are esse□□a□□□ □ee□ e□□□s□re □□ a □□□□ □□ □
Routes of Exposure:	□er□a□ □□□a□□□□□
Carcinogenicity:	□r□a□□ □ead □□□ □□□□ds are □□□□□assi□ed □□ □□□□ □r □□□□ as □ar□□□□e□s□ead s□□□□□a□e □s □□□□□er□d □□ □e□a□□ead a□d □ead □□de d□r□□ □□□□ □□s□□□□ Me□a□□ead a□d □ead □□de □a□e □□□□ □ee□ □es□ed ade□□a□e□□□
Medical Conditions Aggravated by Exposure:	□□□e a□□□□a□ed□

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	□rr□a□□□ □□□□rs, □□s □□□ □e□□ □□□a□er□ □□s□a □□s□a□ □s□□ □□□□s □ers□s□
Skin:	□ra□□e □□d □□□e□e□□e□as□ □□□s□a□a□d □a□er a□er □s□□□a□d □e□□re s□ □□□□□ea□□□□
Inhalation:	M□□e □□□□□ □□ res□a□ Ge□□ed□a□a□e□□□□ □s□□ □□□□s □ers□s□
Ingestion:	Ge□□□ □ed□a□e □ed□a□a□e□□□□□
Other:	□e□erra□□ a □□□s□□a□ s re□□□ □e□ded □□ □ere s a□□ □□es□□□□ a□□□□ □□e ser□s□ess □□ □□e □□□r□e□□□s□re□

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	Ge□era□ □□e□, □a□ra□ □r □e□a□□a□□ □d□□ed res□ ar □ □□e□e□s □a□ □a□□a□□ □a□r □□□□e□ra□□□s □e□□□ re□□□ □e□ded e□□□s□re □□ □s□□
Eye Protection:	□□□a□e sa□e□ □asses □□□ s□de s□□e□ds, □r sa□e□ □□□□□es□
Skin Protection:	□ea□□□□ □□□□der a□□a□ed □□□s □a□ res□□□□ s□□e e□□□s□re □□ lead □□□□ □□□□□ds□□ □er□ea□e □□□□es are re□□□ □e□ded□ □ as□ □a□ds □□□r□□□□□□ □□e□ □□□s□ed a□d □e□□re ea□□□ □r s□ □□□□□□□
Respiratory Protection:	□□□ □□r□a□□ re□□□red□ □ □ere ar □ □□e□e□□ s □ade□□a□e □□ □a□□a□□ e□□□s□re □e□□□ re□□□ □e□ded □e□e□s, □ear a □□□□e□□□□e□□□ □ar□□□□a□e res□ra□r□
Other:	□ear□□□ □r□e□□□□□ s□□□□d □e □□r□ □□e□ r□□□□ □□□□der a□□a□ed □□□s

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	□□re □□a □□□□dr□ □a□e□ □□ □□□□□r□s□ □r dr□□□ □ee□ a□a□ r□□ e□□ess□e □ea□, e□e□r□a□□□rre□□, s□r□□□ a□ds a□d □□d□ers□ □□□□ □9□ re□□res 1□ □ee□ se□ara□□□ □□r 1□□□□r □re□a□□ r□□ □a□ □a□e □□□□ds, □a□ □a□e s□□ds, a□d □□d□ers□ □□r □d□s□a□□se □□□□ □ee□ □□□□□□rea□□ □□ □□□dre□□ □se □□□ ade□□a□e □e□□a□□□□ □ra□□e □□□d □□□□e□e□□e□□as□ a□er s□□□ a□d □e□□re ea□□□ □r s□ □□□□□□
Other Precautions::	□se □□□□ □□ □□□□der a□□a□ed □□□s des□□□ed □□ □a□d□e □ese □□□s□ers□ □□□s□r□□□□□ □d□s□r□ e□ □□□□ees □ s□□e □r□□er□ ra□□ed as □res□r□□ed □□ □ □□□□ re□□a□□□s □9 □□□ 19□□30□ e□□□□□ e□ □□□□ees s□□□d □e a□ □ar □□□□ □□e sa□e □□era□□□ □r□□ed□res a□d re□□□re□e□s □r □□□□der □□era□ed □□□s as des□r□□ed □□ □□□□□□10□3 a□d □□□□ □9 □□□ 1910□□3 □d□□

REGULATORY INFORMATION

Hazard Communication:	□□s M□□□ □as □ee□ □re□ared □□ a□□□rda□□e □□□□ □□e □edera□□□□□ □a□ard □□□ □ □□□□a□□□ □a□dard □9 □□□ 1910□1□00□
HMIS Codes:	□ea□□ 1, □a□ □a□□□□ 1, □ea□□□□□□ 3, □□□ □ □Glasses, G□□□es□
DOT Shipping Name:	□□□ □ed □ □a□□□□ □□□□
ICAO / IATA Shipping Name:	□ar□d□es□□□er de□□e, □lass 1□□□, □□ 03□3
TSCA Inventory Status:	□□e□ □a□□□□ □□□e□s □s□ed □□ □□□□□ □□e□□□r□□
SARA Title III, Section 313:	□□s □r□d□□□□□□□a□s □ 1□ □ead s□□□□□a□e □□□□ □□□1□□□□□□□0□, □ 0□1□ □ar□□□ □□ra□e □□□□ □□□ 100□□31□□□, a□d □ □11□ □□□□□□er□ □□□□ □□□ □□□□3 0 □□□□□ are s□□e□□□ □e re□r□□□ a□□□rd□□ □□ □e□□□□ 313 □□□e □□□er□□□d □□e□d□e□s a□d □ea□□□r□a□□□ □□□□□□19□□ a□d □0 □□□□ □ar□3□□□
Waste Disposal Methods:	M□s□res s□□□d □e s□□red □□ a □□sed □□□□a□er □□□□ds□□sa□□r as □□er□□se re□□□red □□ □□a,s□a□e, a□d □edera□sa□e□, □ea□□ a□d e□□r□□□e□a□re□□a□□□s□ □□e re□□□ □e□ded ds□□sa□□e□□□d s a□ e□□□s□□es □□□□era□□r□
EPA Waste Code(s):	□00□

CONTACTS

Customer Service:	1 □00 □□9 □000
Technical Service:	1 □00 □□9 □000
Health / Safety:	1 □00 □□9 □000 □err□Me□a□ □□1003□0□□
Emergency # (Chem-Trec):	1 □00 □□□ 9300 □□□□, □□, □r□□□ s□a□ds, □a□ada□□ 001 □03 □□□□ 3□□□ □□□□er □□□□□res□

□□e □□□r□a□□□ a□d re□□□ □e□da□□□s □□□□a□□ed □ere□ are □ased □□□□ data □e□e□ed □□ □e □□rre□□□□□□e□er, □□ □□ara□□ee □r □arra□□□ □□a□ □□d e□□ressed □r □□ □□ed□s □ade □□□□ res□e□□□□ □e □□□□r□a□□□ □r□□ded□

Material Safety Data Sheet

Issuing Date 23-Nov-2011 **Revision Date** **Revision Number** 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Copper / Copper Alloys**

Synonyms Cu.

Distributor
ThyssenKrupp Materials NA, Inc.
22355 W. Eleven Mile Road
Southfield, Michigan 48034
TEL: 248-233-5681

Emergency Telephone Number 248-233-5681

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Non-combustible as supplied.
Small chips, fines and dust from processing may be readily ignitable.
Hazardous fumes can also occur in post-processing operations
Product dust may be irritating to eyes, skin and respiratory system.
Dust may form explosive mixture in air
Possibly cancer hazard by inhalation

Appearance Silver or yellow to red **Physical State** Solid. **Odor** Odorless

OSHA Regulatory Status

General Hazard Statement: Solid metallic products are generally classified as "articles" and do not constitute hazardous materials in solid form under the definitions of the OSHA Hazard Communication Standard (29 CFR 1910.1200). Any articles manufactured from these solid products would be generally classified as non-hazardous. However, some hazardous elements contained in these products can be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding.

Potential Health Effects
Principle Routes of Exposure Eye contact. Skin contact. Inhalation.

Acute Toxicity

Eyes Dust contact with the eyes can lead to mechanical irritation.

Skin Contact with dust can cause mechanical irritation or drying of the skin. Contact with oils from processing may cause irritation. Prolonged skin contact may defat the skin and produce dermatitis. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system. Inhalation of fumes may cause metal-fume fever.

Ingestion May be harmful if swallowed. May cause additional affects as listed under "Inhalation".

Chronic Effects

Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Inhalation of beryllium dust or fume may cause chronic beryllium disease (CBD) and is a cancer hazard. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

Aggravated Medical Conditions

Allergies. Skin disorders. Respiratory disorders. Central nervous system. Pre-existing eye disorders. Blood disorders. Kidney disorders. Liver disorders. Nasal cavities. Lungs.

Interactions with Other Chemicals

Irritants. Sensitizers. Epoxies. Use of alcoholic beverages may enhance toxic effects.

Environmental Hazard

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Each alloy may contain one or more of the following ingredients. Consult the Technical Data Sheet for the composition of specific alloys.

Chemical Name	CAS-No	Weight %
Copper	7440-50-8	45.00-99.00
Zinc oxide	1314-13-2	0.00-40.0
Nickel	7440-02-0	0.00-33.0
Lead	7439-92-1	0.00-16.0
Aluminum	7429-90-5	0.00-13.50
Tin	7440-31-5	0.00-13.0
Iron oxide	1309-37-1	0.00-5.50
Manganese	7439-96-5	0.00-5.0
Silicon	7440-21-3	0.01-0.5
Thallium	7440-28-0	0.00-3.4
Cobalt	7440-48-4	0.00-2.70
Beryllium	7440-41-7	0.00-2.00
Cadmium and compounds (as Cd)	7440-43-9	0.00-1.00
Arsenic	7440-38-2	0.00-0.50
Sulfur dioxide	7446-09-5	0.00-0.30
Zirconium	7440-67-7	0.00-0.25

Copper and Copper Alloys may be comprised of all or variations of the alloys shown here.

4. FIRST AID MEASURES

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Consult a physician.

Skin Contact Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion Do NOT induce vomiting. Call a physician or Poison Control Center immediately. Drink plenty of water. Never give anything by mouth to an unconscious person.

Notes to Physician May cause sensitization of susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties This product does not present fire or explosion hazards as shipped. Small chips, fines, and dust from processing may be readily ignitable.

Flash Point Not applicable.

Suitable Extinguishing Media Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and fines.

Unsuitable Extinguishing Media DO NOT use halogenated extinguishing agents on small chips or fines. DO NOT use water for fires invoving molten metal. These fire extinguishing agents will react with burning material.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Specific Hazards Arising from the Chemical Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA	**Health Hazard** 2	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard** 2*	**Flammability** 0	**Physical Hazard** 0	**Personal Protection** X

**Indicates a chronic health hazard.*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Keep people away from and upwind of spill/leak.

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Avoid dust formation. Collect scrap for recycling.

If product is molten, contain the flow using dry sand or salt flux as a dam. All tools and containers which come in contact with molten metal must be preheated or specially coated and rust free. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Handling

Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Avoid dust formation. Keep material dry. Avoid contact with sharp edges or heated material. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red.

Storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Copper 7440-50-8	TWA: 0.2 mg/m³fume	TWA: 0.1 mg/m³fume TWA: 1 mg/m³dust and mist (vacated) TWA: 0.1 mg/m³ Cu dust, fume, mist	IDLH: 100 mg/m³dust, fume and mist TWA: 1 mg/m³ dust and mist TWA: 0.1 mg/m³ fume
Aluminum 7429-90-5	TWA: 1 mg/m³respirable fraction	TWA: 15 mg/m³total dust TWA: 5 mg/m³respirable fraction (vacated) TWA: 15 mg/m³total dust (vacated) TWA: 5 mg/m³respirable fraction	TWA: 10 mg/m³ total dust TWA: 5 mg/m³ respirable dust
Antimony 7440-36-0	TWA: 0.5 mg/m³	TWA: 0.5 mg/m³ (vacated) TWA: 0.5 mg/m³	IDLH: 50 mg/m³ TWA: 0.5 mg/m³
Arsenic 7440-38-2	TWA: 0.01 mg/m³	TWA: 10 µg/m³ As Action Level: 5 µg/m³ As (vacated) TWA: 0.5 mg/m³	IDLH: 5 mg/m³ Ceiling: 0.002 mg/m³ 15 min
Beryllium 7440-41-7	TWA: 0.00005 mg/m³inhalable fraction S*	TWA: 2 µg/m³ (vacated) TWA: 2 µg/m³ (vacated) STEL: 25 µg/m³ 30 min (vacated) Ceiling: 5 µg/m³ Ceiling: 5 µg/m³ Be	IDLH: 4 mg/m³ Ceiling: 0.0005 mg/m³
Cadmium and compounds (as Cd) 7440-43-9	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³respirable fraction	TWA: 0.1 mg/m³fume applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect TWA: 0.2 mg/m³dust applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect TWA: 5 µg/m³ Action Level: 2.5 µg/m³ (vacated) STEL: 0.3 ppm fume Ceiling: 0.3 mg/m³fume applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect Ceiling: 0.6 mg/m³dust applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect	IDLH: 9 mg/m³dust
Cobalt 7440-48-4	TWA: 0.02 mg/m³	TWA: 0.1 mg/m³dust and fume (vacated) TWA: 0.05 mg/m³dust and fume	IDLH: 20 mg/m³dust and fume TWA: 0.05 mg/m³ dust and fume
Lead 7439-92-1	TWA: 0.05 mg/m³	TWA: 50 µg/m³ Action Level: 30 µg/m³Poison, See 29 CFR 1910.1025	IDLH: 100 mg/m³ TWA: 0.050 mg/m³
Iron oxide 1309-37-1	TWA: 5 mg/m³respirable fraction	TWA: 10 mg/m³fume (vacated) TWA: 10 mg/m³fume	IDLH: 2500 mg/m³ Fe dust and fume TWA: 5 mg/m³Fe dust and fume
Manganese 7439-96-5	TWA: 0.2 mg/m³	(vacated) TWA: 1 mg/m³fume (vacated) STEL: 3 mg/m³fume (vacated) Ceiling: 5 mg/m³ Ceiling: 5 mg/m³fume	IDLH: 500 mg/m³ TWA: 1 mg/m³ fume STEL: 3 mg/m³
Silicon 7440-21-3		TWA: 15 mg/m³total dust TWA: 5 mg/m³respirable fraction (vacated) TWA: 10 mg/m³total dust (vacated) TWA: 5 mg/m³respirable fraction	TWA: 10 mg/m³ total dust TWA: 5 mg/m³ respirable dust
Nickel 7440-02-0	TWA: 1.5 mg/m³	TWA: 1 mg/m³ (vacated) TWA: 1 mg/m³	IDLH: 10 mg/m³ TWA: 0.015 mg/m³
Zinc oxide 1314-13-2	STEL: 10 mg/m³respirable fraction TWA: 2 mg/m³respirable fraction	TWA: 5 mg/m³fume TWA: 15 mg/m³total dust TWA: 5 mg/m³respirable fraction (vacated) TWA: 5 mg/m³fume (vacated) TWA: 10 mg/m³total dust (vacated) TWA: 5 mg/m³respirable fraction (vacated) STEL: 10 mg/m³fume	IDLH: 500 mg/m³ Ceiling: 15 mg/m³dust TWA: 5 mg/m³ dust and fume STEL: 10 mg/m³fume

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Tellurium 13494-80-9	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³ (vacated) TWA: 0.1 mg/m³	IDLH: 25 mg/m³ TWA: 0.1 mg/m³
Silver 7440-22-4	TWA: 0.1 mg/m³dust and fume	TWA: 0.01 mg/m³ (vacated) TWA: 0.01 mg/m³	IDLH: 10 mg/m³dust TWA: 0.01 mg/m³ dust
Thallium 7440-28-0	TWA: 0.02 mg/m³inhalable fraction S*	(vacated) TWA: 0.1 mg/m³ (vacated) S*	
Tin 7440-31-5	TWA: 2 mg/m³	TWA: 2 mg/m³ Sn except oxides (vacated) TWA: 2 mg/m³	IDLH: 100 mg/m³ TWA: 2 mg/m³
Zirconium 7440-67-7	STEL: 10 mg/m³ TWA: 5 mg/m³	TWA: 5 mg/m³ Zr (vacated) TWA: 5 mg/m³ (vacated) STEL: 10 mg/m³	IDLH: 50 mg/m³ TWA: 5 mg/m³ STEL: 10 mg/m³
Sulfur dioxide 7446-09-5	STEL: 0.25 ppm	TWA: 5 ppm TWA: 13 mg/m³ (vacated) TWA: 2 ppm (vacated) TWA: 5 mg/m³ (vacated) STEL: 5 ppm (vacated) STEL: 15 mg/m³	IDLH: 100 ppm TWA: 2 ppm TWA: 5 mg/m³ STEL: 5 ppm STEL: 13 mg/m³
Phosphorus 7723-14-0		TWA: 0.1 mg/m³ (vacated) TWA: 0.1 mg/m³	IDLH: 5 mg/m³ TWA: 0.1 mg/m³

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). Hexavalent chrome may be formed during welding.

Engineering Measures Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.

Skin and Body Protection Impervious clothing. Impervious gloves.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures Do not breathe vapors/dust. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Silver or yellow to red.	**Odor**	Odorless.
Odor Threshold	No information available	**Physical State**	Solid
pH	No information available.		
Flash Point	Not applicable.	**Autoignition Temperature**	No information available.
Decomposition Temperature	No information available.	**Boiling Point/Boiling Range**	No information available
Melting Point/Range	1290 - 2260°F		
Flammability Limits in Air	No information available.		
Specific Gravity	2.5-2.9	**Water Solubility**	Insoluble in water.
Solubility	No information available.	**Evaporation Rate**	No information available
Vapor Pressure	No data available.	**Vapor Density**	No data available.

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Incompatible Products	Acids. Alkalies. Water. Moisture. Metal oxides.
Conditions to Avoid	Dust formation. Heat, flames and sparks.
Hazardous Decomposition Products	Metal fume. Copper compounds. Lead oxides. Lead and chromium compounds.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Inhalation

May cause irritation of respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Eye Contact

Dust contact with the eyes can lead to mechanical irritation.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Antimony	= 7 g/kg (Rat)		
Arsenic	= 763 mg/kg (Rat)		
Cadmium and compounds (as Cd)	= 2330 mg/kg (Rat)		= 8 mg/L (Rabbit) 4 h
Bismuth	= 5 g/kg (Rat)		
Cobalt	= 6170 mg/kg (Rat)		> 10 mg/L (Rat) 1 h
Iron oxide	> 10000 mg/kg (Rat)		
Magnesium	= 230 mg/kg (Rat)		
Manganese	= 9 g/kg (Rat)		
Silicon	= 3160 mg/kg (Rat)		
Nickel	> 9000 mg/kg (Rat)		
Zinc oxide	> 5000 mg/kg (Rat)		
Tellurium	= 83 mg/kg (Rat)		> 2420 mg/m³(Rat) 4 h
Silver	2000 mg/kg (Rat)		
Sulfur dioxide		-	Per CGA P-20: 2500 ppm/1hr (Rat)
Phosphorus	= 3.03 mg/kg (Rat)	= 100 mg/kg (Rat)	= 4.3 mg/L (Rat) 1 h

Chronic Toxicity

Chronic Toxicity

Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Inhalation of beryllium dust or fume may cause chronic beryllium disease (CBD) and is a cancer hazard. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

Carcinogenicity

This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Chemical Name	ACGIH	IARC	NTP	OSHA
Nickel		Group 2B Group 1	Reasonably Anticipated	X
Lead	A3	Group 2A	Reasonably Anticipated	X
Iron oxide		Group 3		
Cobalt	A3	Group 2A Group 2B		X
Beryllium	A1	Group 1	Known	X
Cadmium and compounds (as Cd)	A2	Group 1	Known	X
Arsenic	A1	Group 1	Known	X
Sulfur dioxide		Group 3	-	-

ACGIH: (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA: (Occupational Safety & Health Administration)
X - Present

Target Organ Effects	Blood. Central nervous system (CNS). Eyes. Kidney. Liver. Lungs. Nasal cavities. Respiratory system. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Copper	EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata)	LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: < 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus)	-	EC50 48 h: = 0.03 mg/L Static (Daphnia magna)
Zinc oxide	Selenastrum capricornutum 72-hour EC50: 0.14 mg/l	Oncorhynchus mykiss 96-hour LC50: 0.14 mg/l		Daphnia magna 48-hour EC50: 0.07 mg/l
Nickel	EC50 96 h: 0.174 - 0.311 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: = 0.18 mg/L (Pseudokirchneriella subcapitata)	LC50 96 h: = 1.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 10.4 mg/L static (Cyprinus carpio) LC50 96 h: > 100 mg/L (Brachydanio rerio)	-	EC50 48 h: = 1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna)
Lead		LC50 96 h: = 0.44 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 1.17 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 1.32 mg/L static (Oncorhynchus mykiss)		EC50 48 h: = 600 µg/L (water flea)
Cobalt	-	LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	-
Cadmium and compounds (as Cd)		LC50 96 h: 0.0004-0.003 mg/L (Pimephales promelas) LC50 96 h: = 0.002 mg/L (Cyprinus carpio) LC50 96 h: = 0.003 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.006 mg/L static (Oncorhynchus mykiss) LC50 96 h: = 0.016 mg/L (Oryzias latipes) LC50 96 h: = 0.24 mg/L static (Cyprinus carpio) LC50 96 h: = 21.1 mg/L flow-through (Lepomis macrochirus) LC50 96 h: = 4.26 mg/L semi-static (Cyprinus carpio)		EC50 48 h: = 0.0244 mg/L Static (Daphnia magna)

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of in accordance with local regulations.

Contaminated Packaging Do not re-use empty containers.

US EPA Waste Number D006
D007
D008
D011

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Nickel - 7440-02-0	(hazardous constituent - no waste number)	Included in waste streams: F006, F039		
Lead - 7439-92-1	(hazardous constituent - no waste number)	Included in waste streams: F035, F037, F038, F039, K002, K003, K005, K046, K048, K049, K051, K052, K061, K062, K064, K065, K066, K069, K086, K100, K176	= 5.0 mg/L regulatory level	
Thallium - 7440-28-0		Included in waste streams: F039, K178		
Beryllium - 7440-41-7	P015	Included in waste stream: F039		
Cadmium and compounds (as Cd) - 7440-43-9		Included in waste streams: F006, F039, K061, K069, K100	1.0 mg/L regulatory level	
Arsenic - 7440-38-2		Included in waste streams: F032, F034, F035, F039, K031, K060, K084, K101, K102, K161, K171, K172, K176	5.0 mg/L regulatory level	

Chemical Name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Beryllium - 7440-41-7		P015		

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Copper	Toxic
Zinc oxide	Toxic
Nickel	Toxic powder Ignitable powder
Lead	Toxic
Aluminum	Ignitable powder
Manganese	Ignitable powder
Cobalt	Toxic powder Ignitable powder
Zirconium	Ignitable powder

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

MEX Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Copper	7440-50-8	99.99	1.0
Aluminum	7429-90-5	13.5	1.0
Arsenic	7440-38-2	0.5	0.1
Beryllium	7440-41-7	2	0.1
Cadmium and compounds (as Cd)	7440-43-9	1	0.1
Chromium	7440-47-3	4	1.0
Cobalt	7440-48-4	2.7	0.1
Lead	7439-92-1	16	0.1
Manganese	7439-96-5	5	1.0
Nickel	7440-02-0	33	0.1
Thallium	7440-28-0	3.4	1.0
Zinc oxide	1314-13-2	40	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Copper		X	X	
Antimony		X	X	
Arsenic		X	X	
Beryllium		X	X	
Cadmium and compounds (as Cd)		X	X	
Lead		X	X	
Nickel		X	X	
Silver		X	X	
Thallium		X	X	
Phosphorus	1 lb			X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Copper	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ
Antimony	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ
Arsenic	1 lb		RQ 1 lb final RQ RQ 0.454 kg final RQ
Beryllium	10 lb		RQ 10 lb final RQ RQ 4.54 kg final RQ
Chromium			RQ 5000 lb final RQ RQ 2270 kg final RQ
Cadmium and compounds (as Cd)	10 lb		RQ 10 lb final RQ RQ 4.54 kg final RQ
Lead	10 lb		RQ 10 lb final RQ RQ 4.54 kg final RQ
Nickel	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ
Silver	1000 lb		RQ 1000 lb final RQ RQ 454 kg final RQ
Thallium	1000 lb		RQ 1000 lb final RQ RQ 454 kg final RQ
Sulfur dioxide		500 lb	
Phosphorus	1 lb	1 lb	RQ 1 lb final RQ RQ 0.454 kg final RQ

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Arsenic	7440-38-2	Carcinogen
Beryllium	7440-41-7	Carcinogen
Cadmium and compounds (as Cd)	7440-43-9	Carcinogen Developmental Male Reproductive
Cobalt	7440-48-4	Carcinogen
Lead	7439-92-1	Carcinogen Developmental Female Reproductive Male Reproductive
Nickel	7440-02-0	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Copper	X	X	X	X	X
Aluminum	X	X	X		X
Antimony	X	X	X	X	X
Arsenic	X	X	X	X	X
Beryllium	X	X	X	X	X
Chromium		X			X
Cadmium and compounds (as Cd)	X	X	X	X	X
Cobalt	X	X	X	X	X
Lead	X	X	X	X	X
Iron oxide	X	X	X		X
Magnesium	X	X	X		X
Manganese	X	X	X	X	X
Silicon	X	X	X		X
Nickel	X	X	X	X	X
Zinc oxide	X	X	X		X
Tellurium	X	X	X		X
Silver	X	X	X		X
Thallium	X	X	X		X
Tin	X	X	X		X
Zirconium	X	X	X		X
Sulfur dioxide	X	X	X		X
Phosphorus	X	X	X	X	X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Copper		Mexico: TWA= 1 mg/m³ Mexico: TWA= 0.2 mg/m³ Mexico: STEL= 2 mg/m³
Aluminum		Mexico: TWA= 10 mg/m³
Antimony		Mexico: TWA 0.5 mg/m³
Arsenic	A1	Mexico: TWA 0.01 mg/m³
Beryllium	A2	Mexico: TWA 0.002 mg/m³
Chromium		Mexico: TWA 0.5 mg/m³
Cadmium and compounds (as Cd)	A2	Mexico: TWA 0.01 mg/m³ Mexico: TWA 0.002 mg/m³
Cobalt	A3	Mexico: TWA= 0.1 mg/m³
Lead	A3	Mexico: TWA= 0.15 mg/m³
Iron oxide		Mexico: TWA 5 mg/m³ Mexico: STEL 10 mg/m³
Manganese		Mexico: TWA 0.2 mg/m³ Mexico: TWA 1 mg/m³ Mexico: STEL 3 mg/m³
Silicon		Mexico: TWA 10 mg/m³ Mexico: STEL 20 mg/m³
Nickel		Mexico: TWA 1 mg/m³
Zinc oxide		Mexico: TWA 5 mg/m³ Mexico: TWA 10 mg/m³ Mexico: STEL 10 mg/m³
Tellurium		Mexico: TWA 0.1 mg/m³
Silver		Mexico: TWA 0.1 mg/m³
Tin		Mexico: TWA 2 mg/m³ Mexico: STEL 4 mg/m³
Zirconium		Mexico: TWA 5 mg/m³ Mexico: STEL 10 mg/m³
Sulfur dioxide		Mexico: TWA 2 ppm Mexico: TWA 5 mg/m³ Mexico: STEL 5 ppm Mexico: STEL 10 mg/m³
Phosphorus		Mexico: TWA 0.1 mg/m³ Mexico: STEL 0.3 mg/m³

Canada

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

WHMIS Hazard Class
Non-controlled

Chemical Name	NPRI
Aluminum	X
Arsenic	X
Chromium	X
Cadmium and compounds (as Cd)	X
Cobalt	X
Lead	X
Nickel	X
Sulfur dioxide	X
Phosphorus	X

Legend
NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 23-Nov-2011
Revision Date

Revision Note Initial Release.

General Disclaimer
The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

Copper Alloy Composite Sheet

ThyssenKrupp Materials NA, Inc.
22355 West Eleven Mile Road
Southfield, MI 48034
248.233.5681

Rem = Remaining Percent
Nominal Amount Identified When Available
Percent Maximum, unless shown as Range or Minimum

Issued November 23, 2011

Copper Alloy UNS No.	Name	Copper %	Ag Silver %	Al Alumi-num %	As Arsenic %	Be Beryl-lium %	Bi Bismuth %	Cd Cadmium %	Co Cobalt %	Cr Chro-mium %	Fe Iron %	Mg Mag-nesium %	Mn Man-ganese %	Ni Nickel %	O Oxygen %	P Phos-phorus %	Pb Lead %	S Sulfur %	Sb Antimony %	Se Selenium %	Si Silicon %	Sn Tin %	Te Tellur-ium %	Ti Titanium %	Zn Zinc %	Zr Zirco-nium %
C10100	Oxygen Free Electronic Copper	99.99 min.	0.0025	-	0.0005	-	0.0001	0.0001	-	-	0.001	-	0.00005	0.001	0.0005	0.0003	0.0005	0.0015	0.0004	0.0003	-	0.0002	0.0002	-	-	0.0001
C10200	OF Copper	99.95 min. (a)	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
C10300	Oxygen Free Extra Low Phosphorus	99.95 min. (a), (b)	-	-	-	-	-	-	-	-	-	-	-	-	-	.001-.005	-	-	-	-	-	-	-	-	-	-
C10400	Silver Bearing OFHC Copper	99.95 min. (a)	0.027	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
C10700	Silver Bearing OFHC Copper	99.95 min. (a)	0.085	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
C10800	Oxygen Free Low Phosphorus	99.95 min. (a), (b)	-	-	-	-	-	-	-	-	-	-	-	-	-	.005-.012	-	-	-	-	-	-	-	-	-	-
C11000	Electrolytic Tough Pitch Copper	99.90 min. (a)	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-
C11020	FRHC	99.90 min. (a)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11300	Silver Bearing Copper	99.90 min. (a)	0.027 min	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11400	Silver Bearing Copper	99.90 min. (a)	0.034 min	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11500	Silver Bearing Copper	99.90 min. (a)	0.054 min	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C11600	Silver Bearing Copper	99.90 min. (a)	0.085 min	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C12000	Phosphorized Copper DLP	99.90 min. (a)	-	-	-	-	-	-	-	-	-	-	-	-	-	.004-.012	-	-	-	-	-	-	-	-	-	-
C12100	Phosphorized Copper DLP	99.90 min. (a)	.014 min	-	-	-	-	-	-	-	-	-	-	-	-	.005-.012	-	-	-	-	-	-	-	-	-	-
C12200	Phosphorized Copper	99.90 min. (a)	-	-	-	-	-	-	-	-	-	-	-	-	-	.015-.040	-	-	-	-	-	-	-	-	-	-
C12900	FRSTP	99.88 min. (a)	0.054	-	0.012	-	0.003	-	-	-	-	-	-	0.05	-	-	0.004	-	0.003	-	-	-	0.025	-	-	-
C14200	Arsenical Copper DPA	99.40 min. (a)	-	-	.15-.50	-	-	-	-	-	-	-	-	-	-	.015-.040	-	-	-	-	-	-	-	-	-	-
C14420	Cadmium Copper Deoxidized	99.90 min. (c)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.04-.15	.005-.05	-	-	-
C14500	Tellurium Copper	99.90 min. (a), (d)	-	-	-	-	-	-	-	-	-	-	-	-	-	.004-.012	-	-	-	-	-	-	.40-.7	-	-	-
C14520	DPTE	99.90 min. (a), (d)	-	-	-	-	-	-	-	-	-	-	-	-	-	.004-.020	-	-	-	-	-	-	.40-.7	-	-	-
C14530	DPTE	99.90 min. (e)	-	-	-	-	-	-	-	-	-	-	-	-	-	.001-.010	-	-	-	-	-	.003-.023	.003-.023	-	-	-
C14700	OFHC Sulfur copper	99.90 min. (a), (b), (f)	-	-	-	-	-	-	-	-	-	-	-	-	-	.002-.005	-	.20-.50	-	-	-	-	-	-	-	-
C15000	Amzirc(Zirconium Cu)AMPCO 910 EXTR	Rem (Nominal 99.9%) (a)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.10-.20
C15500	DPTE	99.75 min. (a)	.027-.10	-	-	-	-	-	-	-	-	.08-.13	-	-	-	.040-.080	-	-	-	-	-	-	-	-	-	-
C16200	Cadmium Copper	Rem (Nominal 99.0%) (a)	-	-	-	-	-	.7-1.2	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C16500	Cadmium Copper	Rem (Nominal 98.6%) (a)	-	-	-	-	-	.6-1.0	-	-	0.02	-	-	-	-	-	-	-	-	-	-	.50-.7	-	-	-	-
C17000	Beryllium Copper (g)	Rem (Nominal 98.3%) (a)	-	0.2	-	1.60-1.85	-	-	.2 min (g)	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-
C17200	Beryllium Copper (g)	Rem (Nominal 98.1%) (a)	-	0.2	-	1.80-2.00	-	-	.2 min (g)	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-
C17300	Beryllium Copper (g)	Rem (Nominal 97.7%) (a)	-	0.2	-	1.80-2.00	-	-	.2 min (g)	-	-	-	-	-	-	-	.20-.6	-	-	-	0.2	-	-	-	-	-
C17410	Beryllium Copper	Rem (Nominal 98.6%) (a)	-	0.2	-	.15-.50	-	-	.35-.6	-	0.2	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-
C17500	Beryllium Copper	Rem (Nominal 96.9%) (a)	-	0.2	-	.4-.7	-	-	2.4-2.7	-	0.1	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-
C17510	Beryllium Copper	Rem (Nominal 97.8%) (a)	-	0.2	-	.2-.6	-	-	0.3	-	0.1	-	-	1.4-2.2	-	-	-	-	-	-	0.2	-	-	-	-	-
C18000	Ni Chromium Cop. AMPCO 940 EXTR.	Remaining (Rem) (a)	-	-	-	-	-	-	-	.10-.80	0.15	-	-	1.8-3.0 (h)	-	-	-	-	-	-	-	-	-	-	-	-
C18135	High Copper Alloy	Rem (Nominal 99.2%) (a)	-	-	-	-	-	.20-.6	-	.20-.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C18140	High Copper Alloy	Remaining (Rem) (a)	-	-	-	-	-	-	-	.15-.45	-	-	-	-	-	-	-	-	-	-	.005-.05	-	-	-	-	.05-.25
C18150	High Copper AMPCO 972 EXTR.	Rem (Nominal 98.9%) (a)	-	-	-	-	-	-	-	.50-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.05-.25
C18200	Chromium Copper AMPCO 97 EXTR.	Rem (Nominal 99.1%) (a)	-	-	-	-	-	-	-	.6-1.2	0.1	-	-	-	-	-	0.05	-	-	-	0.1	-	-	-	-	-
C18700	Leaded Copper	99.5 min. (a) & (i)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.8-1.5	-	-	-	-	-	-	-	-	-
C19100	Chromium Copper	Rem (Nominal 98.2%) (a)	-	-	-	-	-	-	-	-	0.2	-	-	.9-1.3	-	.15-.35	0.1	-	-	-	-	-	.35-.6	-	0.5	-
C19150	High Copper Alloy	Rem (Nominal 97.4%) (a)	-	-	-	-	-	-	-	-	0.05	-	-	.8-1.2	-	.15-.35	.50-1.0	-	-	-	-	0.05	-	-	-	-
C19400	High Copper Alloy	97.0 min.	-	-	-	-	-	-	-	-	2.1-2.6	-	-	-	-	.015-.15	0.03	-	-	-	-	-	-	-	.05-.20	-
C19500	High Copper Alloy	96.0 min.	-	0.02	-	-	-	-	.30-1.3	-	1.0-2.0	-	-	-	-	.01-.35	0.02	-	-	-	-	-	-	-	0.2	-
C19700	High Copper Alloy	Remaining (Rem)	-	-	-	-	-	-	0.05	-	.30-1.2	.01-.20	0.05	0.05	-	.10-.40	0.05	-	-	-	-	0.2	-	-	0.2	-
C19900	High Copper Alloy	Remaining (Rem)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9-3.5	-	-
C21000	Gilding	94.0-96.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C22000	Commercial Bronze	89.0-91.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.05	-	-	-	-	-	-	-	Rem	-

Copper Alloy Composite Sheet

ThyssenKrupp Materials NA, Inc.
22355 West Eleven Mile Road
Southfield, MI 48034
248.233.5681

Issued November 23, 2011

Copper Alloy UNS No.	Name	Copper %	Ag Silver %	Al Alumi-num %	As Arsenic %	Be Beryl-lium %	Bi Bismuth %	Cd Cadmium %	Co Cobalt %	Cr Chro-mium %	Fe Iron %	Mg Mag-nesium %	Mn Man-ganese %	Ni Nickel %	O Oxygen %	P Phos-phorus %	Pb Lead %	S Sulfur %	Sb Antimony %	Se Selenium %	Si Silicon %	Sn Tin %	Te Tellur-ium %	Ti Titanium %	Zn Zinc %	Zr Zirco-nium %
C22600	Jewelry Bronze	86.0-89.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C23000	Red Brass	84.0-86.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C24000	Low Brass	78.5-81.5	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C26000	Cartridge Bras	68.5-71.5	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.07	-	-	-	-	-	-	-	Rem	-
C26800	Yellow Brass	64.0-68.5	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.09	-	-	-	-	-	-	-	Rem	-
C27000	Yellow Brass	63.0-68.5	-	-	-	-	-	-	-	-	0.07	-	-	-	-	-	0.09	-	-	-	-	-	-	-	Rem	-
C27200	Yellow Brass	62.0-65.0	-	-	-	-	-	-	-	-	0.07	-	-	-	-	-	0.07	-	-	-	-	-	-	-	Rem	-
C27400	Yellow Brass	61.0-64.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.09	-	-	-	-	-	-	-	Rem	-
C28000	Muntz Metal	59.0-63.0	-	-	-	-	-	-	-	-	0.07	-	-	-	-	-	0.09	-	-	-	-	-	-	-	Rem	-
C31400	Leaded Commercial Bronze	87.5-90.5	-	-	-	-	-	-	-	-	0.1	-	-	0.7	-	-	1.3-2.5	-	-	-	-	-	-	-	Rem	-
C31600	High strength Commercial Bronze	87.5-90.5	-	-	-	-	-	-	-	-	0.1	-	-	.7-1.2	-	.04-.10	1.3-2.5	-	-	-	-	-	-	-	Rem	-
C32000	Hardware Bronze	83.5-86.5	-	-	-	-	-	-	-	-	0.1	-	-	0.25	-	-	1.5-2.2	-	-	-	-	-	-	-	Rem	-
C33000	Low Leaded Tube Brass	65.0-68.0	-	-	-	-	-	-	-	-	0.07	-	-	-	-	-	.25-.7	-	-	-	-	-	-	-	Rem	-
C33200	Free Cutting Tube Brass	65.0-68.0	-	-	-	-	-	-	-	-	0.07	-	-	-	-	-	1.5-2.5	-	-	-	-	-	-	-	Rem	-
C33500	Low Leaded Brass	62.0-65.0	-	-	-	-	-	-	-	-	0.15 (j)	-	-	-	-	-	.25-.7	-	-	-	-	-	-	-	Rem	-
C34000	Medium Leaded Brass	62.0-65.0	-	-	-	-	-	-	-	-	0.15 (j)	-	-	-	-	-	.8-1.5	-	-	-	-	-	-	-	Rem	-
C34200	High Leaded Brass	62.0-65.0	-	-	-	-	-	-	-	-	0.15 (j)	-	-	-	-	-	1.5-2.5	-	-	-	-	-	-	-	Rem	-
C34500	High Leaded Brass	62.0-65.0	-	-	-	-	-	-	-	-	0.15	-	-	-	-	-	1.5-2.5	-	-	-	-	-	-	-	Rem	-
C35000	Medium Leaded Brass	60.0-63.0	-	-	-	-	-	-	-	-	0.15 (j)	-	-	-	-	-	.8-2.0	-	-	-	-	-	-	-	Rem	-
C35300	High Leaded Brass	60.0-63.0	-	-	-	-	-	-	-	-	0.15 (j)	-	-	-	-	-	1.5-2.5	-	-	-	-	-	-	-	Rem	-
C35600	Extra High Leaded Brass	60.0-63.0	-	-	-	-	-	-	-	-	0.15 (j)	-	-	-	-	-	2.0-3.0	-	-	-	-	-	-	-	Rem	-
C36000	Free Cutting Brass	60.0-63.0	-	-	-	-	-	-	-	-	0.35	-	-	-	-	-	2.5-3.0	-	-	-	-	-	-	-	Rem	-
C36500	Leaded Muntz Metal	58.0-61.0	-	-	-	-	-	-	-	-	0.15	-	-	-	-	-	.25-.7	-	-	-	-	0.25	-	-	Rem	-
C37000	Free Cutting Muntz Metal	59.0-62.0	-	-	-	-	-	-	-	-	0.15	-	-	-	-	-	.8-1.5	-	-	-	-	-	-	-	Rem	-
C37700	Forging Brass	58.0-61.0	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	1.5-2.5	-	-	-	-	-	-	-	Rem	-
C38000	Architectural Bronze Low Leaded	55.0-60.0	-	0.5	-	-	-	-	-	-	0.35	-	-	-	-	-	1.5-2.5	-	-	-	-	0.3	-	-	Rem	-
C38500	Architectural Bronze	55.0-59.0	-	-	-	-	-	-	-	-	0.35	-	-	-	-	-	2.5-3.5	-	-	-	-	-	-	-	Rem	-
C40400	Architectural Bronze	Remaining (Rem)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.35-.7	-	-	2.0-3.0	-
C40500	Architectural Bronze	94.0-96.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.05	-	-	-	-	.7-1.3	-	-	Rem	-
C41100	Bearing Bronze	89.0-92.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.09	-	-	-	-	.30-.7	-	-	Rem	-
C42500	Contact Bronze	87.0-90.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	0.35	0.05	-	-	-	-	1.5-3.0	-	-	Rem	-
C43500	Trumpet Metal	79.0-83.0	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	0.09	-	-	-	-	.6-1.2	-	-	Rem	-
C44300	Arsenical Admiralty	70.0-73.0	-	-	.02-.06	-	-	-	-	-	0.06	-	-	-	-	-	0.07	-	-	-	-	.8-1.2 (k)	-	-	Rem	-
C44400	Antimonial Admiralty	70.0-73.0	-	-	-	-	-	-	-	-	0.06	-	-	-	-	-	0.07	-	.02-.10	-	-	.8-1.2 (k)	-	-	Rem	-
C44500	Phosphorized Admiralty	70.0-73.0	-	-	-	-	-	-	-	-	0.06	-	-	-	-	.02-.10	0.07	-	-	-	-	.8-1.2 (k)	-	-	Rem	-
C46200	Naval Brass	62.0-65.0	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	0.2	-	-	-	-	.50-1.0	-	-	Rem	-
C46400	Naval Brass	59.0-62.0	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	0.2	-	-	-	-	.50-1.0	-	-	Rem	-
C46500	Arsenical Naval Brass	59.0-62.0	-	-	.02-.06	-	-	-	-	-	0.1	-	-	-	-	-	0.2	-	-	-	-	.50-1.0	-	-	Rem	-
C48200	Leaded Naval Brass	59.0-62.0	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	.40-1.0	-	-	-	-	.50-1.0	-	-	Rem	-
C48500	Leaded Naval Brass	59.0-62.0	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	1.3-2.2	-	-	-	-	.50-1.0	-	-	Rem	-
C50500	Phosphor Bronze (E)	Rem (Nominal 98.7%)	-	-	-	-	-	-	-	-	0.1	-	-	-	-	.03-.35	0.05	-	-	-	-	1.0-1.7	-	-	0.3	-
C51000	Phosphor Bronze (A)	Rem (Nominal 94.8%)	-	-	-	-	-	-	-	-	0.1	-	-	-	-	.03-.35	0.05	-	-	-	-	4.2-5.8	-	-	0.3	-
C51100	Phosphor Bronze	Rem (Nominal 95.6%)	-	-	-	-	-	-	-	-	0.1	-	-	-	-	.03-.35	0.05	-	-	-	-	3.5-4.9	-	-	0.3	-
C52100	Phosphor Bronze (C)	Rem (Nominal 92.0%)	-	-	-	-	-	-	-	-	0.1	-	-	-	-	.03-.35	0.05	-	-	-	-	7.0-9.0	-	-	0.2	-
C52400	Phosphor Bronze (D)	Rem (Nominal 90.0%)	-	-	-	-	-	-	-	-	0.1	-	-	-	-	.03-.35	0.05	-	-	-	-	9.0-11.0	-	-	0.2	-
C53400	Phosphor Bronze (B-1)	Rem (Nominal 94.2%)	-	-	-	-	-	-	-	-	0.1	-	-	-	-	.03-.35	.8-1.2	-	-	-	-	3.5-5.8	-	-	0.3	-
C54400	Phosphor Bronze (B-2)	Rem (Nominal 88.0%)	-	-	-	-	-	-	-	-	0.1	-	-	-	-	.01-.50	3.0-4.0	-	-	-	-	3.5-4.5	-	-	1.5-4.5	-
C61000	Aluminum Bronze	Rem (Nominal 92.0%) (a)	-	6.0-8.5	-	-	-	-	-	-	0.5	-	-	-	-	-	0.02	-	-	-	0.1	-	-	-	0.2	-
C61300	Aluminum Bronze	Rem (Nominal 90.3%) (a)	-	6.0-7.5	-	-	-	-	-	-	2.0-3.0	-	0.2	0.15 (h)	-	0.015	0.01	-	-	-	0.1	.20-.50	-	-	0.1 (l)	-
C61400	Aluminum Bronze (D) AMPCO 8	Rem (Nominal 91.0%) (a)	-	6.0-8.0	-	-	-	-	-	-	1.5-3.5	-	1.0	-	-	0.015	0.01	-	-	-	-	-	-	-	0.2	-
C62300	Aluminum Bronze AMPCO 15	Rem (Nominal 87.0%) (a)	-	8.5-10.0	-	-	-	-	-	-	2.0-4.0	-	0.5	1.0 (h)	-	-	-	-	-	-	0.25	0.6	-	-	-	-

Copper Alloy Composite Sheet

ThyssenKrupp Materials NA, Inc.
22355 West Eleven Mile Road
Southfield, MI 48034
248.233.5681

Issued November 23, 2011

Copper Alloy UNS No.	Name	Copper %	Ag Silver %	Al Alumi-num %	As Arsenic %	Be Beryl-lium %	Bi Bismuth %	Cd Cadmium %	Co Cobalt %	Cr Chro-mium %	Fe Iron %	Mg Mag-nesium %	Mn Man-ganese %	Ni Nickel %	O Oxygen %	P Phos-phorus %	Pb Lead %	S Sulfur %	Sb Antimony %	Se Selenium %	Si Silicon %	Sn Tin %	Te Tellur-ium %	Ti Titanium %	Zn Zinc %	Zr Zirco-nium %
C62400	Aluminum Bronze AMPCO 18 EXTR.	Rem (Nominal 86.0%) (a)	-	10.0-11.5	-	-	-	-	-	-	2.0-4.5	-	0.3	-	-	-	-	-	-	-	0.25	0.2	-	-	-	-
C62500	Aluminum Bronze	Rem (Nominal 82.7%) (a)	-	12.5-13.5	-	-	-	-	-	-	3.5-5.5	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
C63000	Aluminum Nickel Bronze AMPCO 45	Rem (Nominal 82.0%) (a)	-	9.0-11.0	-	-	-	-	-	-	2.0-4.0	-	1.5	4.0-5.5 (h)	-	-	-	-	-	-	0.25	0.2	-	-	0.3	-
C64200	Aluminum Bronze	Rem (Nominal 91.2%) (a)	-	6.3-7.6	0.09	-	-	-	-	-	0.3	-	0.1	.25 (h)	-	-	0.05	-	-	-	1.5-2.2	0.2	-	-	0.5	-
C65100	Low Silicon Bronze (B)	Rem (Nominal 98.5%) (a)	-	-	-	-	-	-	-	-	0.8	-	0.7	-	-	-	0.05	-	-	-	.8-2.0	-	-	-	1.5	-
C65500	High Silicon Bronze (A)	Rem (Nominal 97.0%) (a)	-	-	-	-	-	-	-	-	0.8	-	.50-1.3	.6 (h)	-	-	0.05	-	-	-	2.8-3.8	-	-	-	1.5	-
C66100	High Silicon Bronze A	Rem (Nominal 96.4%) (a)	-	-	-	-	-	-	-	-	0.25	-	1.5	-	-	-	.20-.8	-	-	-	2.8-3.5	-	-	-	1.5	-
C66700	Manganese Brass	Rem (Nominal 70.0%) (a)	-	-	-	-	-	-	-	-	0.1	-	.8-1.5	-	-	-	0.07	-	-	-	-	-	-	-	Rem	-
C66800	Manganese Brass	Rem (Nominal 61.5%) (a)	-	0.25	-	-	-	-	-	-	0.35	-	2.0-3.5	.25 (h)	-	-	0.5	-	-	-	.50-1.5	0.3	-	-	Rem	-
C67300	Manganese Bronze (B)	Rem (Nominal 60.5%) (a)	-	0.25	-	-	-	-	-	-	0.5	-	2.0-3.5	.25 (h)	-	-	.40-3.0	-	-	-	.50-1.5	0.3	-	-	Rem	-
C67400	Manganese Bronze (B)	Rem (Nominal 58.5%) (a)	-	.50-2.0	-	-	-	-	-	-	0.35	-	2.0-3.5	.25 (h)	-	-	0.5	-	-	-	.50-1.5	0.3	-	-	Rem	-
C68100	Bronze, Low Fuming	Rem (Nominal 58.0%) (a)	-	0.01	-	-	-	-	-	-	.25-1.2	-	.01-.50	-	-	-	0.05	-	-	-	.04-.15	.75-1.1	-	-	Rem	-
C68700	Aluminum Brass-Arsenical	Rem (Nominal 77.5%) (a)	-	1.8-2.5	.02-.06	-	-	-	-	-	0.06	-	-	-	-	-	0.07	-	-	-	-	-	-	-	Rem	-
C69400	Silicon Red Brass	Rem (Nominal 81.5%) (a)	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	0.3	-	-	-	3.5-4.5	-	-	-	Rem	-
C70200	Silicon Red Brass	Remaining (Rem)	-	-	-	-	-	-	-	-	0.1	-	0.4	2.0-3.0 (h)	-	-	0.05	-	-	-	-	-	-	-	-	-
C70600	Cupro Nickel, 10%	Rem (Nominal 88.6%) (a)	-	-	-	-	-	-	-	-	1.0-1.8	-	1.0	9-11.0 (h)	-	-	0.05	-	-	-	-	-	-	-	1.0	-
C71000	Cupro Nickel, 20%	Rem (Nominal 79.0%) (a)	-	-	-	-	-	-	-	-	1	-	1.0	19-23 (h)	-	-	0.05	-	-	-	-	-	-	-	1.0	-
C71500	Curpo Nickel, 30%	Rem (Nominal 69.5%) (a)	-	-	-	-	-	-	-	-	.4-1.0	-	1.0	29-33 (h)	-	-	0.05	-	-	-	-	-	-	-	1	-
C71581	Copper-Nickel, 30%	Remaining (Rem)	-	-	-	-	-	-	-	-	.4-.7	-	1.0	29-32 (h)	-	-	0.02	-	-	-	-	-	-	-	-	-
C72500	Curpo Nickel, 9%	Rem (Nominal 88.2%) (a)	-	-	-	-	-	-	-	-	0.6	-	0.2	8.5-10.5(h)	-	-	0.05	-	-	-	-	1.8-2.5	-	-	0.5	-
C73500	Copper-Nickel, 30%	70.5-73.5 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	16.5-19.5(h)	-	-	0.09	-	-	-	-	-	-	-	Rem	-
C74000	Copper-Nickel, 30%	69.0-73.5 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	9-11 (h)	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C74500	Nickel Silver, 10%	63.5-66.5 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	9-11 (h)	-	-	0.09 (m)	-	-	-	-	-	-	-	Rem	-
C75200	Nickel Silver, 18%	63.5-66.5 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	16.5-19.5(h)	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C75700	Nickel Silver, 12%	63.5-66.5 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	11-13 (h)	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C76200	Nickel Silver, 12%	57.0-61.0 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	11-13.5 (h)	-	-	0.09	-	-	-	-	-	-	-	Rem	-
C77000	Nickel Silver, 18%	53.5-56.5 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	16.5-19.5(h)	-	-	0.05	-	-	-	-	-	-	-	Rem	-
C77300	Nickel Silver	46.0-50.0 (a)	-	0.01	-	-	-	-	-	-	-	-	-	9-11 (h)	-	0.25	0.05	-	-	-	.04-.25	-	-	-	Rem	-
C78200	Leaded Nickel Silver	63.0-67.0 (a)	-	-	-	-	-	-	-	-	0.35	-	0.5	7-9 (h)	-	-	1.5-2.5	-	-	-	-	-	-	-	Rem	-
C79200	Leaded Nickel Silver, 12%	59.0-66.5 (a)	-	-	-	-	-	-	-	-	0.25	-	0.5	11-13 (h)	-	-	.8-1.4	-	-	-	-	-	-	-	Rem	-
C79600	Leaded Nickel Silver, 10%	43.5-46.5 (a)	-	-	-	-	-	-	-	-	-	-	1.5-2.5	9-11 (h)	-	-	.8-1.2	-	-	-	-	-	-	-	Rem	-
C79800	Nickel Silver	45.5-48.5 (a)	-	-	-	-	-	-	-	-	0.25	-	1.5-2.5	9-11 (h)	-	-	1.5-2.5	-	-	-	-	-	-	-	Rem	-
C86300	Manganese Bronze Leaded MB (Alloy)	60.0-66.0 (n)	-	5.0-7.5	-	-	-	-	-	-	2.0-4.0	-	2.5-5.0	1.0 (h)	-	-	0.2	-	-	-	-	0.2	-	-	22-28	-
C90500	Copper Tin Alloys	86.0-89.0 (n)	-	0.005	-	-	-	-	-	-	0.2	-	-	1.0 (h)	-	.05 (o)	0.3	0.05	0.2	-	0.005	9.0-11.0	-	-	1.0-3.0	-
C92200	Copper Tin Lead Alloys	86.0-90.0 (n)	-	0.005	-	-	-	-	-	-	0.25	-	-	1.0 (h)	-	.05 (o)	1.0-2.0	0.05	0.25	-	0.005	5.5-6.5	-	-	3.0-5.0	-
C92500	Copper Tin Lead Alloys	85.0-88.0 (n)	-	0.005	-	-	-	-	-	-	0.3	-	-	.8-1.5 (h)	-	.3 (o)	1.0-1.5	0.05	0.25	-	0.005	10.0-12.0	-	-	0.5	-
C93200	Bearing Bronze	81.0-85.0 (n)	-	0.005	-	-	-	-	-	-	0.2	-	-	1.0 (h)	-	.15 (o)	6.0-8.0	0.08	0.35	-	0.005	6.3-7.5	-	-	1.0-4.0	-
C94000	Lead Tin Bronze	69.0-72.0	-	0.005	-	-	-	-	-	-	0.25	-	-	.5-1.0 (h)	-	.05 (o)	14.0-16.0	.08 (p)	0.5	-	0.005	12-14	-	-	0.5	-
C95200	Aluminum Bronze	86.0 min	-	8.5-9.5	-	-	-	-	-	-	2.5-4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C95400	Aluminum Bronze AMPCO 18 Cast	83.0 min	-	10-11.5	-	-	-	-	-	-	3.0-5.0	-	0.50	1.5 (h)	-	-	-	-	-	-	-	-	-	-	-	-
C95510	Aluminum Bronze	78.0 min	-	9.7-10.9	-	-	-	-	-	-	2.0-3.5	-	1.5	4.5-5.5 (h)	-	-	-	-	-	-	-	0.20	-	-	0.30	-
C95900	Aluminum Bronze	Remaining (Rem)	-	12-13.5	-	-	-	-	-	-	3.0-5.0	-	1.5	.50 (h)	-	-	-	-	-	-	-	-	-	-	-	-
C97300	Copper Nickel Zinc Alloys	53.0-58.0	-	0.005	-	-	-	-	-	-	1.5	-	0.50	11-14 (h)	-	0.05	8.0-11.0	0.08	0.35	-	0.15	1.5-3.0	-	-	17.0-25.0	-

FOOTER NOTES:

(a) Cu value includes Ag
(b) Cu value includes P
(c) Cu value includes Te + Sn
(d) Cu value includes Te + P
(e) Cu value includes Ag + Sn + Te + Se
(f) Cu value includes S
(g) Ni + Co, 0.20% min.; Ni + Fe + Co, 0.6% max.
(h) Ni includes Co
(i) Includes Pb
(j) Fe 0.10% max. for flat products
(k) Sn 0.90% min for tubular products
(l) When the product is for subsequent welding applications and is so specificed by the purchaser, Cr, Cd, Zr, and Zn shall each be 0.05%
(m) Pb .05% max for rod, wire and tube
(n) Cu min., Cu may be calculated as Cu + Ni
(o) P 1.5% max for continous castings
(p) S .25% max for continuous castings

Material Safety Data Sheet

Issuing Date 23-Nov-2011 **Revision Date** **Revision Number** 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Aluminum Alloys**

Synonyms Al.

Distributor
ThyssenKrupp Materials NA, Inc.
22355 W. Eleven Mile Road
Southfield, Michigan 48034
TEL: 248-233-5681

Emergency Telephone Number 248.233.5681

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Non-combustible as supplied.
Small chips, fines and dust from processing may be readily ignitable.
Hazardous fumes can also occur in post-processing operations
Product dust may be irritating to eyes, skin and respiratory system.
Dust may form explosive mixture in air
Possibly cancer hazard by inhalation

Appearance Metallic, Solid **Physical State** Solid. **Odor** Odorless

OSHA Regulatory Status

General Hazard Statement: Solid metallic products are generally classified as "articles" and do not constitute hazardous materials in solid form under the definitions of the OSHA Hazard Communication Standard (29 CFR 1910.1200). Any articles manufactured from these solid products would be generally classified as non-hazardous. However, some hazardous elements contained in these products can be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding.

Potential Health Effects

Principle Routes of Exposure Eye contact. Skin contact. Inhalation.

Acute Toxicity

Eyes Dust contact with the eyes can lead to mechanical irritation.

Skin Contact with dust can cause mechanical irritation or drying of the skin. Contact with oils from processing may cause irritation. Prolonged skin contact may defat the skin and produce dermatitis. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system. Inhalation of fumes may cause metal-fume fever.

Ingestion May be harmful if swallowed. May cause additional affects as listed under "Inhalation".

Chronic Effects

Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

Aggravated Medical Conditions

Allergies. Skin disorders. Respiratory disorders. Central nervous system. Pre-existing eye disorders. Blood disorders. Kidney disorders. Liver disorders. Nasal cavities. Lungs.

Interactions with Other Chemicals

Irritants. Sensitizers. Epoxies. Use of alcoholic beverages may enhance toxic effects.

Environmental Hazard

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Each alloy may contain one or more of the following ingredients. Consult the Technical Data Sheet for the composition of specific alloys.

Chemical Name	CAS-No	Weight %
Aluminum	7429-90-5	80-99.7
Silicon	7440-21-3	10-20
Copper	7440-50-8	1-20
Cobalt	7440-48-4	0.1-10
Zinc oxide	1314-13-2	1-10
Tin	7440-31-5	1-10
Manganese	7439-96-5	1-10
Lead	7439-92-1	1-10
Nickel	7440-02-0	0-2.4
Silver	7440-22-4	0.1-1

Aluminum alloys may be comprised of all or variations of the alloys shown here.

4. FIRST AID MEASURES

Eye Contact

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Consult a physician.

Skin Contact

Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion

Do NOT induce vomiting. Call a physician or Poison Control Center immediately. Drink plenty of water. Never give anything by mouth to an unconscious person.

Notes to Physician

May cause sensitization of susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties

This product does not present fire or explosion hazards as shipped. Small chips, fines, and dust from processing may be readily ignitable.

Flash Point	Not applicable.
Suitable Extinguishing Media	Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and fines.
Unsuitable Extinguishing Media	DO NOT use halogenated extinguishing agents on small chips or fines. DO NOT use water for fires invoving molten metal. These fire extinguishing agents will react with burning material.
Explosion Data	
Sensitivity to Mechanical Impact	None
Sensitivity to Static Discharge	None
Specific Hazards Arising from the Chemical	Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.
Protective Equipment and Precautions for Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA	**Health Hazard** 2	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard** 2*	**Flammability** 0	**Physical Hazard** 0	**Personal Protection** X

**Indicates a chronic health hazard.*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Use personal protective equipment. Keep people away from and upwind of spill/leak.
Environmental Precautions	Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.
Methods for Containment	Prevent further leakage or spillage if safe to do so.
Methods for Cleaning Up	Avoid dust formation. Collect scrap for recycling. If product is molten, contain the flow using dry sand or salt flux as a dam. All tools and containers which come in contact with molten metal must be preheated or specially coated and rust free. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Handling	Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Avoid dust formation. Keep material dry. Avoid contact with sharp edges or heated material. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red.
Storage	Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Beryllium 7440-41-7	TWA: 0.00005 mg/m³inhalable fraction S*	TWA: 2 µg/m³ (vacated) TWA: 2 µg/m³ (vacated) STEL: 25 µg/m³ 30 min (vacated) Ceiling: 5 µg/m³ Ceiling: 5 µg/m³ Be	IDLH: 4 mg/m³ Ceiling: 0.0005 mg/m³
Cobalt 7440-48-4	TWA: 0.02 mg/m³	TWA: 0.1 mg/m³dust and fume (vacated) TWA: 0.05 mg/m³dust and fume	IDLH: 20 mg/m³dust and fume TWA: 0.05 mg/m³ dust and fume
Aluminum 7429-90-5	TWA: 1 mg/m³respirable fraction	TWA: 15 mg/m³total dust TWA: 5 mg/m³respirable fraction (vacated) TWA: 15 mg/m³total dust (vacated) TWA: 5 mg/m³respirable fraction	TWA: 10 mg/m³ total dust TWA: 5 mg/m³ respirable dust
Copper 7440-50-8	TWA: 0.2 mg/m³fume	TWA: 0.1 mg/m³fume TWA: 1 mg/m³dust and mist (vacated) TWA: 0.1 mg/m³ Cu dust, fume, mist	IDLH: 100 mg/m³dust, fume and mist TWA: 1 mg/m³ dust and mist TWA: 0.1 mg/m³ fume
Lead 7439-92-1	TWA: 0.05 mg/m³	TWA: 50 µg/m³ Action Level: 30 µg/m³Poison, See 29 CFR 1910.1025	IDLH: 100 mg/m³ TWA: 0.050 mg/m³
Manganese 7439-96-5	TWA: 0.2 mg/m³	(vacated) TWA: 1 mg/m³fume (vacated) STEL: 3 mg/m³fume (vacated) Ceiling: 5 mg/m³ Ceiling: 5 mg/m³fume	IDLH: 500 mg/m³ TWA: 1 mg/m³ fume STEL: 3 mg/m³
Nickel 7440-02-0	TWA: 1.5 mg/m³	TWA: 1 mg/m³ (vacated) TWA: 1 mg/m³	IDLH: 10 mg/m³ TWA: 0.015 mg/m³
Silicon 7440-21-3		TWA: 15 mg/m³total dust TWA: 5 mg/m³respirable fraction (vacated) TWA: 10 mg/m³total dust (vacated) TWA: 5 mg/m³respirable fraction	TWA: 10 mg/m³ total dust TWA: 5 mg/m³ respirable dust
Silver 7440-22-4	TWA: 0.1 mg/m³dust and fume	TWA: 0.01 mg/m³ (vacated) TWA: 0.01 mg/m³	IDLH: 10 mg/m³dust TWA: 0.01 mg/m³ dust
Tin 7440-31-5	TWA: 2 mg/m³	TWA: 2 mg/m³ Sn except oxides (vacated) TWA: 2 mg/m³	IDLH: 100 mg/m³ TWA: 2 mg/m³
Zinc oxide 1314-13-2	STEL: 10 mg/m³respirable fraction TWA: 2 mg/m³respirable fraction	TWA: 5 mg/m³fume TWA: 15 mg/m³total dust TWA: 5 mg/m³respirable fraction (vacated) TWA: 5 mg/m³fume (vacated) TWA: 10 mg/m³total dust (vacated) TWA: 5 mg/m³respirable fraction (vacated) STEL: 10 mg/m³fume	IDLH: 500 mg/m³ Ceiling: 15 mg/m³dust TWA: 5 mg/m³ dust and fume STEL: 10 mg/m³fume

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). Hexavalent chrome may be formed during welding.

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.

Skin and Body Protection Impervious clothing. Impervious gloves.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures	Do not breathe vapors/dust. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Metallic, Solid.	**Odor**	Odorless.
Odor Threshold	No information available	**Physical State**	Solid
pH	No information available.		
Flash Point	Not applicable.	**Autoignition Temperature**	No information available.
Decomposition Temperature	No information available.	**Boiling Point/Boiling Range**	No information available
Melting Point/Range	440-1215°F		
Flammability Limits in Air	No information available.		
Specific Gravity	2.5-2.9	**Water Solubility**	Insoluble in water.
Solubility	No information available.	**Evaporation Rate**	No information available
Vapor Pressure	No data available.	**Vapor Density**	No data available.

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Incompatible Products	Acids. Alkalies. Water. Halogenated compounds. Metal oxides. Iron powder and water: may cause an explosive reaction forming hydrogen gas when heated above 1470F (800C).
Conditions to Avoid	Dust formation. Heat, flames and sparks. Protect from water. Aluminum fines are attacked by strong acids and alkalis and by some halogenated organic compounds especially at elevated temperatures. Operations generating aluminum fines may produce hydrogen gas when exposed to moisture. Hydrogen gas is highly flammable and can accumulate in poorly ventilated areas. Liberates flammable hydrogen gas on contact with water, alcohols, acidic or basic materials, and metals or metalllic compounds.
Hazardous Decomposition Products	Nickel oxides. Cadmium compounds. Fumes of aluminum or aluminum oxide. Welding of aluminum alloys may generate carbon monoxide, carbon dioxide, ozone, and nitrogen oxides. Lead oxides. Lead and chromium compounds.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Inhalation May cause irritation of respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Eye Contact Dust contact with the eyes can lead to mechanical irritation.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Cobalt	= 6170 mg/kg (Rat)		> 10 mg/L (Rat) 1 h
Iron	= 984 mg/kg (Rat)		
Nickel	> 9000 mg/kg (Rat)		
Silver	2000 mg/kg (Rat)		
Zinc oxide	>5000 mg/kg (Rat)		

Chronic Toxicity

Chronic Toxicity Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

Carcinogenicity This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Chemical Name	ACGIH	IARC	NTP	OSHA
Cobalt	A3	Group 2A Group 2B		X
Lead	A3	Group 2A	Reasonably Anticipated	X
Nickel		Group 2B Group 1	Reasonably Anticipated	X

ACGIH: (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA: (Occupational Safety & Health Administration)
X - Present

Target Organ Effects Blood. Central nervous system (CNS). Eyes. Kidney. Liver. Lungs. Nasal cavities. Respiratory system. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Copper	EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata)	LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: < 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus)	-	EC50 48 h: = 0.03 mg/L Static (Daphnia magna)
Cobalt	-	LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	-
Zinc oxide	Selenastrum capricornutum 72-hour EC50: 0.14 mg/l	Oncorhynchus mykiss 96-hour LC50: 0.14 mg/l		Daphnia magna 48-hour EC50: 0.07 mg/l
Lead		LC50 96 h: = 0.44 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 1.17 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 1.32 mg/L static (Oncorhynchus mykiss)		EC50 48 h: = 600 µg/L (water flea)
Nickel	EC50 96 h: 0.174 - 0.311 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: = 0.18 mg/L (Pseudokirchneriella subcapitata)	LC50 96 h: = 1.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 10.4 mg/L static (Cyprinus carpio) LC50 96 h: > 100 mg/L (Brachydanio rerio)	-	EC50 48 h: = 1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna)
Silver		LC50 96 h: 0.00155-0.00293 mg/L static (Pimephales promelas) LC50 96 h: = 0.0062 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.064 mg/L static (Lepomis macrochirus)		EC50 48 h: = 0.00024 mg/L Static (Daphnia magna)

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of in accordance with local regulations.

Contaminated Packaging Do not re-use empty containers.

US EPA Waste Number D007
D008
D011

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Lead - 7439-92-1	(hazardous constituent - no waste number)	Included in waste streams: F035, F037, F038, F039, K002, K003, K005, K046, K048, K049, K051, K052, K061, K062, K064, K065, K066, K069, K086, K100, K176	= 5.0 mg/L regulatory level	
Nickel - 7440-02-0	(hazardous constituent - no waste number)	Included in waste streams: F006, F039		
Silver - 7440-22-4		Included in waste stream: F039	5.0 mg/L regulatory level	

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Aluminum	Ignitable powder
Copper	Toxic
Cobalt	Toxic powder Ignitable powder
Zinc oxide	Toxic
Manganese	Ignitable powder
Lead	Toxic
Nickel	Toxic powder Ignitable powder
Silver	Toxic

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

MEX Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS	Complies
ENCS	Complies
IECSC	Complies

15. REGULATORY INFORMATION

KECL	Complies
PICCS	Complies
AICS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Aluminum	7429-90-5	99.7	1.0
Chromium	7440-47-3	1	1.0
Cobalt	7440-48-4	10	0.1
Copper	7440-50-8	20	1.0
Lead	7439-92-1	10	0.1
Manganese	7439-96-5	10	1.0
Nickel	7440-02-0	2.4	0.1
Silver	7440-22-4	1	1.0
Ci 77947	1314-13-2	10	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	Yes
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Beryllium		X	X	
Copper		X	X	
Lead		X	X	
Nickel		X	X	
Silver		X	X	
Zinc oxide		X		

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Beryllium	10 lb		RQ 10 lb final RQ RQ 4.54 kg final RQ
Chromium			RQ 5000 lb final RQ RQ 2270 kg final RQ
Copper	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ
Lead	10 lb		RQ 10 lb final RQ RQ 4.54 kg final RQ
Nickel	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ
Silver	1000 lb		RQ 1000 lb final RQ RQ 454 kg final RQ

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Beryllium	7440-41-7	Carcinogen
Cobalt	7440-48-4	Carcinogen
Lead	7439-92-1	Carcinogen Developmental Female Reproductive Male Reproductive
Nickel	7440-02-0	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Aluminum	X	X	X		X
Cobalt	X	X	X	X	X
Copper	X	X	X	X	X
Lead	X	X	X	X	X
Magnesium	X	X	X		X
Manganese	X	X	X	X	X
Nickel	X	X	X	X	X
Silicon	X	X	X		X
Silver	X	X	X		X
Tin	X	X	X		X
Ci 77947	X	X	X		X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Beryllium	A2	Mexico: TWA 0.002 mg/m^3
Chromium		Mexico: TWA 0.5 mg/m^3
Cobalt	A3	Mexico: TWA= 0.1 mg/m^3
Aluminum		Mexico: TWA= 10 mg/m^3
Copper		Mexico: TWA= 1 mg/m^3 Mexico: TWA= 0.2 mg/m^3 Mexico: STEL= 2 mg/m^3
Lead	A3	Mexico: TWA= 0.15 mg/m^3
Manganese		Mexico: TWA 0.2 mg/m^3 Mexico: TWA 1 mg/m^3 Mexico: STEL 3 mg/m^3
Nickel		Mexico: TWA 1 mg/m^3
Silicon		Mexico: TWA 10 mg/m^3 Mexico: STEL 20 mg/m^3
Silver		Mexico: TWA 0.1 mg/m^3
Tin		Mexico: TWA 2 mg/m^3 Mexico: STEL 4 mg/m^3
Zinc oxide		Mexico: TWA 5 mg/m^3 Mexico: TWA 10 mg/m^3 Mexico: STEL 10 mg/m^3

Canada

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

WHMIS Hazard Class

Non-controlled

Chemical Name	NPRI

Chromium	X
Cobalt	X
Aluminum	X
Lead	X
Nickel	X
Zinc oxide	X

Legend
NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 23-Nov-2011
Revision Date

Revision Note Initial Release.

General Disclaimer
The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

Aluminum Alloy (Nominal) Composite Sheet

ThyssenKrupp Materials NA, Inc.
22355 West Eleven Mile road
Southfield, Michigan 48034
(248) 233-5681

Issued November 23, 2011

Alloy CAS No.	Name	Aluminum %	Magnesium %	Lead %	Nickel %	Arsenic %	Chromium %	Zinc %	Silicon %	Silver %	Beryllium %	Iron %	Manganese %	Copper %	Cobalt %	Misc. %
357		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1100	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
1350	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
2011	Screw Machine Stock	>83.0	<1.4	<0.8	-	-	<0.15	-	<12.6	-	-	<1.1	-	<6.1	-	-
2014	Wrought Products	>86.0	<6.6	-	<0.1	-	<0.36	<10.6	<1.5	-	<0.002	<1.5	<1.5	<5.1	-	-
2017	Fabricated Parts & Products	85-97	<2.0	-	<2.4	-	<0.3	-	<1.4	<0.71		<1.4	<1.9	<6.9	-	-
2024	Wrought Products	>86.0	<6.6	-	<0.1	-	<0.36	<10.6	<1.5	-	<0.002	<1.5	<1.5	<5.1	-	-
2219	Fabricated Parts & Products	85-97	<2.0	-	<2.4	-	<0.3	-	<1.4	<0.71		<1.4	<1.9	<6.9	-	-
2224	Wrought Products	>86.0	<6.6	-	<0.1	-	<0.36	<10.6	<1.5	-	<0.002	<1.5	<1.5	<5.1	-	-
2324	Wrought Products	>86.0	<6.6	-	<0.1	-	<0.36	<10.6	<1.5	-	<0.002	<1.5	<1.5	<5.1	-	-
3002	Fabricated Parts & Products	>92.0	<2.8	-	0-0.05	-	<0.6	<1.8	<1.9	-			<2.0	-	-	-
3003	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
3004	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
3105	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
4032	Fabricated Parts & Products	<65.0	<2.1	-	-	-	-	-	-	-	-	-	-	-	-	-
5005	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
5052	Fabricated Parts & Products	>84.9	<6.6	-	0-0.09	-	<0.6	<4.0	<1.1	-			<1.5	-	-	-
5083	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
5086	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
5182	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
5205	Fabricated Parts & Products	>84.9	<6.6	-	0-0.09	-	<0.6	<4.0	<1.1	-			<1.5	-	-	-
5454	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
5657	Fabricated Parts & Products	>84.9	<6.6	-	0-0.09	-	<0.6	<4.0	<1.1	-			<1.5	-	-	-
6005	Fabricated Parts & Products	>89.9	<2.1	-	0-0.30	-	<0.5	<2.5	<1.8	-		<1.1	<1.5	<1.3	-	-
6013	Fabricated Parts & Products	>89.9	<2.1	-	0-0.30	-	<0.5	<2.5	<1.8	-		<1.1	<1.5	<1.3	-	-
6020	Fabricated Parts & Products	>89.9	<2.1	-	0-0.30	-	<0.5	<2.5	<1.8	-		<1.1	<1.5	<1.3	-	-
6040	Fabricated Parts & Products	>89.9	<2.1	-	0-0.30	-	<0.5	<2.5	<1.8	-		<1.1	<1.5	<1.3	-	-
6061	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
6063	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
6082	Fabricated Parts & Products	>89.9	<2.1	-	0-0.30	-	<0.5	<2.5	<1.8	-		<1.1	<1.5	<1.3	-	-
6101	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
6105	Fabricated Parts & Products	>82.0	<5.0	-	-	-	<0.35	-	<1.0	-	-	<1.0	<1.5	-	-	-
6262	Screw Machine Stock	>83.0	<1.4	<0.8	-	-	<0.15	-	<12.6	-	-	<1.1	-	<6.1	-	-
7022	Fabricated Parts & Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7040	Fabricated Parts & Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7049	Fabricated Parts & Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7050	Wrought Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-

Aluminum Alloy (Nominal) Composite Sheet

ThyssenKrupp Materials NA, Inc.
22355 West Eleven Mile road
Southfield, Michigan 48034
(248) 233-5681

Issued November 23, 2011

Alloy CAS No.	Name	Aluminum %	Magnesium %	Lead %	Nickel %	Arsenic %	Chromium %	Zinc %	Silicon %	Silver %	Beryllium %	Iron %	Manganese %	Copper %	Cobalt %	Misc. %
7068	Fabricated Parts & Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7075	Wrought Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7129	Fabricated Parts & Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7150	Wrought Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7175	Wrought Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
7475	Wrought Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
ALUMEC	Wrought Products	>86.0	<6.6	-	<0.1	-	<0.36	<10.6	<1.5	-	<0.002	<1.5	<1.5	<5.1	-	-
QC-7	Wrought Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-
QC-10	Wrought Products	>84.0	<3.7	-	<0.05	-	<0.4	<12	<1.2	-	-	<1.4	<1.5	<3.3	-	-

Material Safety Data Sheet

Issuing Date 23-Nov-2011 **Revision Date** **Revision Number** 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Carbon Steel / Alloy Steel**

Recommended Use Cold Drawn Steel Bars

Distributor
ThyssenKrupp Materials NA, Inc.
22355 W. Eleven Mile Road
Southfield, Michigan 48034
TEL: 248-233-5681

Emergency Telephone Number 248-233-5681

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Non-combustible as supplied.
Small chips, fines and dust from processing may be readily ignitable.
Hazardous fumes can also occur in post-processing operations
Product dust may be irritating to eyes, skin and respiratory system.
Dust may form explosive mixture in air
Possibly cancer hazard by inhalation

Appearance Metallic, Solid **Physical State** Solid. **Odor** Odorless

OSHA Regulatory Status

General Hazard Statement: Solid metallic products are generally classified as "articles" and do not constitute hazardous materials in solid form under the definitions of the OSHA Hazard Communication Standard (29 CFR 1910.1200). Any articles manufactured from these solid products would be generally classified as non-hazardous. However, some hazardous elements contained in these products can be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding.

Potential Health Effects

Principle Routes of Exposure Eye contact. Skin contact. Inhalation.

Acute Toxicity

Eyes Dust contact with the eyes can lead to mechanical irritation.

Skin Contact with dust can cause mechanical irritation or drying of the skin. Contact with oils from processing may cause irritation. Prolonged skin contact may defat the skin and produce dermatitis. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system. Inhalation of fumes may cause metal-fume fever.

Ingestion May be harmful if swallowed. May cause additional affects as listed under "Inhalation".

Chronic Effects

Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

Aggravated Medical Conditions

Allergies. Skin disorders. Respiratory disorders. Central nervous system. Pre-existing eye disorders. Blood disorders. Kidney disorders. Liver disorders. Nasal cavities. Lungs.

Interactions with Other Chemicals

Irritants. Sensitizers. Epoxies. Use of alcoholic beverages may enhance toxic effects.

Environmental Hazard

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Each alloy may contain one or more of the following ingredients. Consult the Technical Data Sheet for the composition of specific alloys.

Chemical Name	CAS-No	Weight %
Iron	7439-89-6	97.00 - 99.00
Nickel	7440-02-0	0.01-3.75
Chromium	7440-47-3	0.01-2.50
Manganese	7439-96-5	0.25-1.65
Molybdenum	7439-98-7	0.01-1.10
Carbon	7440-40-0	0.01-1.10
Copper	7440-50-8	0.01-0.50
Silicon	7440-21-3	0.01-0.5
Tellurium	13494-80-9	0.01-0.50
Lead	7439-92-1	0.15-0.35
Sulfur dioxide	7446-09-5	0.001-0.35
Vanadium pentoxide	1314-62-1	0.01-0.25
Bismuth	7440-69-9	0.01-0.10
Aluminum	7429-90-5	0.01- 0.1
Phosphorus	7723-14-0	0.01-0.04

Iron alloys may be comprised of all or variations of the alloys shown here.

4. FIRST AID MEASURES

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Consult a physician.

Skin Contact Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion Do NOT induce vomiting. Call a physician or Poison Control Center immediately. Drink plenty of water. Never give anything by mouth to an unconscious person.

Notes to Physician May cause sensitization of susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties This product does not present fire or explosion hazards as shipped. Small chips, fines, and dust from processing may be readily ignitable.

Flash Point Not applicable.

Suitable Extinguishing Media Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and fines.

Unsuitable Extinguishing Media DO NOT use halogenated extinguishing agents on small chips or fines. DO NOT use water for fires invoving molten metal. These fire extinguishing agents will react with burning material.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Specific Hazards Arising from the Chemical Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA	**Health Hazard** 2	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard** 2*	**Flammability** 0	**Physical Hazard** 0	**Personal Protection** X

**Indicates a chronic health hazard.*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Keep people away from and upwind of spill/leak.

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Avoid dust formation. Collect scrap for recycling.

If product is molten, contain the flow using dry sand or salt flux as a dam. All tools and containers which come in contact with molten metal must be preheated or specially coated and rust free. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Handling Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Avoid dust formation. Keep material dry. Avoid contact with sharp edges or heated material. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red.

Storage Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Aluminum 7429-90-5	TWA: 1 mg/m^{3}respirable fraction	TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 15 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction	TWA: 10 mg/m^3 total dust TWA: 5 mg/m^3 respirable dust
Lead 7439-92-1	TWA: 0.05 mg/m^3	TWA: 50 µg/m^3 Action Level: 30 µg/m^{3}Poison, See 29 CFR 1910.1025	IDLH: 100 mg/m^3 TWA: 0.050 mg/m^3
Manganese 7439-96-5	TWA: 0.2 mg/m^3	(vacated) TWA: 1 mg/m^{3}fume (vacated) STEL: 3 mg/m^{3}fume (vacated) Ceiling: 5 mg/m^3 Ceiling: 5 mg/m^{3}fume	IDLH: 500 mg/m^3 TWA: 1 mg/m^3 fume STEL: 3 mg/m^3
Molybdenum 7439-98-7	TWA: 10 mg/m^{3}inhalable fraction TWA: 3 mg/m^{3}respirable fraction	(vacated) TWA: 10 mg/m^3	IDLH: 5000 mg/m^3
Nickel 7440-02-0	TWA: 1.5 mg/m^3	TWA: 1 mg/m^3 (vacated) TWA: 1 mg/m^3	IDLH: 10 mg/m^3 TWA: 0.015 mg/m^3
Silicon 7440-21-3		TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 10 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction	TWA: 10 mg/m^3 total dust TWA: 5 mg/m^3 respirable dust
Phosphorus 7723-14-0		TWA: 0.1 mg/m^3 (vacated) TWA: 0.1 mg/m^3	IDLH: 5 mg/m^3 TWA: 0.1 mg/m^3
Vanadium pentoxide 1314-62-1	TWA: 0.05 mg/m^3 V inhalable fraction		IDLH: 35 mg/m^3 V dust and fume Ceiling: 0.05 mg/m^3 V dust and fume 15 min
Tellurium 13494-80-9	TWA: 0.1 mg/m^3	TWA: 0.1 mg/m^3 (vacated) TWA: 0.1 mg/m^3	IDLH: 25 mg/m^3 TWA: 0.1 mg/m^3
Copper 7440-50-8	TWA: 0.2 mg/m^{3}fume	TWA: 0.1 mg/m^{3}fume TWA: 1 mg/m^{3}dust and mist (vacated) TWA: 0.1 mg/m^3 Cu dust, fume, mist	IDLH: 100 mg/m^{3}dust, fume and mist TWA: 1 mg/m^3 dust and mist TWA: 0.1 mg/m^3 fume
Sulfur dioxide 7446-09-5	STEL: 0.25 ppm	TWA: 5 ppm TWA: 13 mg/m^3 (vacated) TWA: 2 ppm (vacated) TWA: 5 mg/m^3 (vacated) STEL: 5 ppm (vacated) STEL: 15 mg/m^3	IDLH: 100 ppm TWA: 2 ppm TWA: 5 mg/m^3 STEL: 5 ppm STEL: 13 mg/m^3

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). Hexavalent chrome may be formed during welding.

Engineering Measures Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.

Skin and Body Protection Impervious clothing. Impervious gloves.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures Do not breathe vapors/dust. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Metallic, Solid.	**Odor**	Odorless.
Odor Threshold	No information available	**Physical State**	Solid
pH	No information available.		
Flash Point	Not applicable.	**Autoignition Temperature**	No information available.
Decomposition Temperature	No information available.	**Boiling Point/Boiling Range**	No information available
Melting Point/Range	440-1215°F		
Flammability Limits in Air	No information available.		
Specific Gravity	2.5-2.9	**Water Solubility**	Insoluble in water.
Solubility	No information available.	**Evaporation Rate**	No information available
Vapor Pressure	No data available.	**Vapor Density**	No data available.

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Incompatible Products	Acids. Alkalies. Metal oxides. Iron powder and water: may cause an explosive reaction forming hydrogen gas when heated above 1470F (800C). Moisture.
Conditions to Avoid	Dust formation. Heat, flames and sparks.
Hazardous Decomposition Products	Iron oxides. Lead oxides. Lead and chromium compounds. Metal fume.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Inhalation May cause irritation of respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Eye Contact Dust contact with the eyes can lead to mechanical irritation.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Iron	= 984 mg/kg (Rat)		
Manganese	= 9 g/kg (Rat)		
Nickel	> 9000 mg/kg (Rat)		
Silicon	= 3160 mg/kg (Rat)		
Phosphorus	= 3.03 mg/kg (Rat)	= 100 mg/kg (Rat)	= 4.3 mg/L (Rat) 1 h
Vanadium pentoxide	= 10 mg/kg (Rat)	> 2500 mg/kg (Rat)	= 2.21 mg/L (Rat) 4 h
Tellurium	= 83 mg/kg (Rat)		> 2420 mg/m^3(Rat) 4 h
Bismuth	= 5 g/kg (Rat)		
Sulfur dioxide		-	Per CGA P-20: 2500 ppm/1hr (Rat)

Chronic Toxicity

Chronic Toxicity Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

Carcinogenicity This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Chemical Name	ACGIH	IARC	NTP	OSHA
Nickel		Group 2B Group 1	Reasonably Anticipated	X
Chromium		Group 3		
Lead	A3	Group 2A	Reasonably Anticipated	X
Sulfur dioxide		Group 3	-	-
Vanadium pentoxide	A3	Group 2B		X

ACGIH: (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA: (Occupational Safety & Health Administration)
X - Present

Target Organ Effects Blood. Central nervous system (CNS). Eyes. Kidney. Liver. Lungs. Nasal cavities. Respiratory system. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Iron	-	LC50 96 h: = 0.56 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 13.6 mg/L static (Morone saxatilis)	-	-
Nickel	EC50 96 h: 0.174 - 0.311 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: = 0.18 mg/L (Pseudokirchneriella subcapitata)	LC50 96 h: = 1.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 10.4 mg/L static (Cyprinus carpio) LC50 96 h: > 100 mg/L (Brachydanio rerio)	-	EC50 48 h: = 1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna)
Copper	EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata)	LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: < 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus)	-	EC50 48 h: = 0.03 mg/L Static (Daphnia magna)
Lead		LC50 96 h: = 0.44 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 1.17 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 1.32 mg/L static (Oncorhynchus mykiss)		EC50 48 h: = 600 µg/L (water flea)
Phosphorus	-	LC50 96 h: 0.001-0.004 mg/L static (Lepomis macrochirus) LC50 96 h: 0.0017-0.0035 mg/L flow-through (Lepomis macrochirus) LC50 96 h: 0.011-0.028 mg/L static (Pimephales promelas) LC50 96 h: 0.015-0.032 mg/L static (Oncorhynchus mykiss) LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	EC50 48 h: 0.025 - 0.037 mg/L Static (Daphnia magna) EC50 48 h: = 0.03 mg/L (Daphnia magna)

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of in accordance with local regulations.

Contaminated Packaging Do not re-use empty containers.

US EPA Waste Number D007
D008

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Nickel - 7440-02-0	(hazardous constituent - no waste number)	Included in waste streams: F006, F039		
Chromium - 7440-47-3		Included in waste streams: F032, F034, F035, F037, F038, F039	5.0 mg/L regulatory level	
Lead - 7439-92-1	(hazardous constituent - no waste number)	Included in waste streams: F035, F037, F038, F039, K002, K003, K005, K046, K048, K049, K051, K052, K061, K062, K064, K065, K066, K069, K086, K100, K176	= 5.0 mg/L regulatory level	
Vanadium pentoxide - 1314-62-1	P120			

Chemical Name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Vanadium pentoxide - 1314-62-1		P120		

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Nickel	Toxic powder Ignitable powder
Chromium	Toxic Corrosive Ignitable
Manganese	Ignitable powder
Molybdenum	Ignitable powder
Copper	Toxic
Lead	Toxic
Bismuth	Toxic Ignitable
Aluminum	Ignitable powder
Phosphorus	Toxic Ignitable Reactive

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

MEX Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Aluminum	7429-90-5	0.01- 0.1	1.0
Lead	7439-92-1	0.15-0.35	0.1
Manganese	7439-96-5	0.25-1.65	1.0
Nickel	7440-02-0	0.01-3.75	0.1
Phosphorus	7723-14-0	0.01-0.04	1.0
Vanadium pentoxide	1314-62-1	0.01-0.25	1.0
Chromium	7440-47-3	0.01-2.50	1.0
Copper	7440-50-8	0.01-0.50	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Lead		X	X	
Nickel		X	X	
Phosphorus	1 lb			X
Vanadium pentoxide	1000 lb			X
Copper		X	X	

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Lead	10 lb		RQ 10 lb final RQ RQ 4.54 kg final RQ
Nickel	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ
Phosphorus	1 lb	1 lb	RQ 1 lb final RQ RQ 0.454 kg final RQ
Vanadium pentoxide	1000 lb	1000 lb	RQ 1000 lb final RQ RQ 454 kg final RQ
Chromium			RQ 5000 lb final RQ RQ 2270 kg final RQ
Copper	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ
Sulfur dioxide		500 lb	

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Lead	7439-92-1	Carcinogen Developmental Female Reproductive Male Reproductive
Nickel	7440-02-0	Carcinogen
Vanadium pentoxide	1314-62-1	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Aluminum	X	X	X		X
Lead	X	X	X	X	X
Manganese	X	X	X	X	X
Molybdenum	X	X	X		X
Nickel	X	X	X	X	X
Silicon	X	X	X		X
Phosphorus	X	X	X	X	X
Vanadium pentoxide	X	X	X		X
Tellurium	X	X	X		X
Chromium		X			X
Copper	X	X	X	X	X
Sulfur dioxide	X	X	X		X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Aluminum		Mexico: TWA= 10 mg/m^3
Lead	A3	Mexico: TWA= 0.15 mg/m^3
Manganese		Mexico: TWA 0.2 mg/m^3 Mexico: TWA 1 mg/m^3 Mexico: STEL 3 mg/m^3
Nickel		Mexico: TWA 1 mg/m^3

Chemical Name	Carcinogen Status	Exposure Limits
Silicon		Mexico: TWA 10 mg/m^3 Mexico: STEL 20 mg/m^3
Phosphorus		Mexico: TWA 0.1 mg/m^3 Mexico: STEL 0.3 mg/m^3
Vanadium pentoxide		Mexico: TWA 0.5 mg/m^3
Tellurium		Mexico: TWA 0.1 mg/m^3
Chromium		Mexico: TWA 0.5 mg/m^3
Copper		Mexico: TWA= 1 mg/m^3 Mexico: TWA= 0.2 mg/m^3 Mexico: STEL= 2 mg/m^3
Sulfur dioxide		Mexico: TWA 2 ppm Mexico: TWA 5 mg/m^3 Mexico: STEL 5 ppm Mexico: STEL 10 mg/m^3

Canada

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

WHMIS Hazard Class
Non-controlled

Chemical Name	NPRI
Aluminum	X
Lead	X
Nickel	X
Phosphorus	X
Vanadium pentoxide	X
Chromium	X
Sulfur dioxide	X

Legend
NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 23-Nov-2011
Revision Date

Revision Note Initial Release.

General Disclaimer
The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

Material Safety Data Sheet

Issuing Date 23-Nov-2011 **Revision Date** **Revision Number** 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Magnesium Alloys**

Synonyms Mg.

Distributor
ThyssenKrupp Materials NA, Inc.
22355 W. Eleven Mile Road
Southfield, Michigan 48034
TEL: 248-233-5681

Emergency Telephone Number 248-233-5681

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Non-combustible as supplied.
Small chips, fines and dust from processing may be readily ignitable.
Hazardous fumes can also occur in post-processing operations
Product dust may be irritating to eyes, skin and respiratory system.
Dust may form explosive mixture in air
Possibly cancer hazard by inhalation

Appearance Metallic **Physical State** Solid. **Odor** Odorless

OSHA Regulatory Status

General Hazard Statement: Solid metallic products are generally classified as "articles" and do not constitute hazardous materials in solid form under the definitions of the OSHA Hazard Communication Standard (29 CFR 1910.1200). Any articles manufactured from these solid products would be generally classified as non-hazardous. However, some hazardous elements contained in these products can be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding.

Potential Health Effects

Principle Routes of Exposure Eye contact. Skin contact. Inhalation.

Acute Toxicity

Eyes Dust contact with the eyes can lead to mechanical irritation.

Skin Contact with dust can cause mechanical irritation or drying of the skin. Contact with oils from processing may cause irritation. Prolonged skin contact may defat the skin and produce dermatitis. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system. Inhalation of fumes may cause metal-fume fever.

Ingestion May be harmful if swallowed. May cause additional affects as listed under "Inhalation".

Chronic Effects

Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer.

Aggravated Medical Conditions

Allergies. Skin disorders. Respiratory disorders. Central nervous system. Pre-existing eye disorders. Blood disorders. Kidney disorders. Liver disorders. Nasal cavities. Lungs.

Interactions with Other Chemicals

Irritants. Sensitizers. Epoxies. Use of alcoholic beverages may enhance toxic effects.

Environmental Hazard

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Each alloy may contain one or more of the following ingredients. Consult the Technical Data Sheet for the composition of specific alloys.

Chemical Name	CAS-No	Weight %
Magnesium	7439-95-4	80.0-99.7
Aluminum	7429-90-5	0.01-9.0
Zinc oxide	1314-13-2	1.0-3.0
Manganese	7439-96-5	0.01-1.0

Magnesium alloys may be comprised of all or variations of the alloys shown here.

4. FIRST AID MEASURES

Eye Contact

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Consult a physician.

Skin Contact

Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion

Do NOT induce vomiting. Call a physician or Poison Control Center immediately. Drink plenty of water. Never give anything by mouth to an unconscious person.

Notes to Physician

May cause sensitization of susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties

This product does not present fire or explosion hazards as shipped. Small chips, fines, and dust from processing may be readily ignitable.

Flash Point

Not applicable.

Suitable Extinguishing Media

Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and fines.

Unsuitable Extinguishing Media

DO NOT use halogenated extinguishing agents on small chips or fines. DO NOT use water for fires invoving molten metal. These fire extinguishing agents will react with burning material.

Explosion Data

Sensitivity to Mechanical Impact	None
Sensitivity to Static Discharge	None

Specific Hazards Arising from the Chemical Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA	**Health Hazard** 2	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard** 2*	**Flammability** 0	**Physical Hazard** 0	**Personal Protection** X

**Indicates a chronic health hazard.*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Keep people away from and upwind of spill/leak.

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Avoid dust formation. Collect scrap for recycling.

If product is molten, contain the flow using dry sand or salt flux as a dam. All tools and containers which come in contact with molten metal must be preheated or specially coated and rust free. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Handling Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Avoid dust formation. Keep material dry. Avoid contact with sharp edges or heated material. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red.

Storage Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Aluminum 7429-90-5	TWA: 1 mg/m^{3}respirable fraction	TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 15 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction	TWA: 10 mg/m^3 total dust TWA: 5 mg/m^3 respirable dust
Zinc oxide 1314-13-2	STEL: 10 mg/m^{3}respirable fraction TWA: 2 mg/m^{3}respirable fraction	TWA: 5 mg/m^{3}fume TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 5 mg/m^{3}fume (vacated) TWA: 10 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction (vacated) STEL: 10 mg/m^{3}fume	IDLH: 500 mg/m^3 Ceiling: 15 mg/m^{3}dust TWA: 5 mg/m^3 dust and fume STEL: 10 mg/m^{3}fume
Manganese 7439-96-5	TWA: 0.2 mg/m^3	(vacated) TWA: 1 mg/m^{3}fume (vacated) STEL: 3 mg/m^{3}fume (vacated) Ceiling: 5 mg/m^3 Ceiling: 5 mg/m^{3}fume	IDLH: 500 mg/m^3 TWA: 1 mg/m^3 fume STEL: 3 mg/m^3

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). Hexavalent chrome may be formed during welding.

Engineering Measures Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.

Skin and Body Protection Impervious clothing. Impervious gloves.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures Do not breathe vapors/dust. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Metallic.	**Odor**	Odorless.
Odor Threshold	No information available	**Physical State**	Solid
pH	No information available.		
Flash Point	Not applicable.	**Autoignition Temperature**	No information available.
Decomposition Temperature	No information available.	**Boiling Point/Boiling Range**	No information available
Melting Point/Range	626.67°C / 1160°F		
Flammability Limits in Air	No information available.		
Specific Gravity	1.77	**Solubility**	No information available.
Evaporation Rate	No information available	**Vapor Pressure**	No data available.
Vapor Density	No data available.		

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Incompatible Products	Acids. Alkalies. Water. Halogenated compounds. Metal oxides. Iron powder and water: may cause an explosive reaction forming hydrogen gas when heated above 1470F (800C).
Conditions to Avoid	Dust formation. Heat, flames and sparks. Protect from water. Aluminum fines are attacked by strong acids and alkalis and by some halogenated organic compounds especially at elevated temperatures. Operations generating aluminum fines may produce hydrogen gas when exposed to moisture. Hydrogen gas is highly flammable and can accumulate in poorly ventilated areas. Liberates flammable hydrogen gas on contact with water, alcohols, acidic or basic materials, and metals or metalllic compounds.
Hazardous Decomposition Products	Magnesium oxides. Fumes of aluminum or aluminum oxide. Welding of aluminum alloys may generate carbon monoxide, carbon dioxide, ozone, and nitrogen oxides. Zinc oxides.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Inhalation May cause irritation of respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Eye Contact Dust contact with the eyes can lead to mechanical irritation.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Magnesium	= 230 mg/kg (Rat)		
Zinc oxide	> 5000 mg/kg (Rat)		
Manganese	= 9 g/kg (Rat)		

Chronic Toxicity

Chronic Toxicity Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer.

Carcinogenicity This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

ACGIH: (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA: (Occupational Safety & Health Administration)
X - Present

Target Organ Effects Blood. Central nervous system (CNS). Eyes. Kidney. Liver. Lungs. Nasal cavities. Respiratory system. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Zinc oxide	Selenastrum capricornutum 72-hour EC50: 0.14 mg/l	Oncorhynchus mykiss 96-hour LC50: 0.14 mg/l		Daphnia magna 48-hour EC50: 0.07 mg/l

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of in accordance with local regulations.

Contaminated Packaging Do not re-use empty containers.

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Aluminum	Ignitable powder
Zinc oxide	Toxic
Manganese	Ignitable powder

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

MEX Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Aluminum	7429-90-5	9	1.0
Manganese	7439-96-5	1	1.0
Zinc oxide	1314-13-2	3	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard Yes

Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals:

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Magnesium	X	X	X		X
Aluminum	X	X	X		X
Zinc oxide	X	X	X		X
Manganese	X	X	X	X	X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Aluminum		Mexico: TWA= 10 mg/m^3
Zinc oxide		Mexico: TWA 5 mg/m^3 Mexico: TWA 10 mg/m^3 Mexico: STEL 10 mg/m^3
Manganese		Mexico: TWA 0.2 mg/m^3 Mexico: TWA 1 mg/m^3 Mexico: STEL 3 mg/m^3

Canada

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

WHMIS Hazard Class
Non-controlled

Chemical Name	NPRI
Aluminum	X

Legend
NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

Prepared By	Product Stewardship 23 British American Blvd. Latham, NY 12110 1-800-572-6501
Issuing Date	23-Nov-2011
Revision Date	
Revision Note	Initial Release.

General Disclaimer

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

ThyssenKrupp Materials NA, Inc.

MATERIAL SAFETY DATA SHEET

SECTION I. MATERIAL IDENTIFICATION

COMPANY	RE-ISSUE DATE	IDENTIFICATION NUMBER
ThyssenKrupp Materials NA, Inc. 22355 West Eleven Mile Road Southfield, Michigan 48033	4-Dec-08	N/A
TRADE NAME	**EMERGENCY PHONE NUMBER**	**PREPARED BY:**
Micarta	(248) 233-5681	J. VanValkenburg
CHEMICAL NAME	**FORMULA DOT**	**DOT IDENTIFICATION NO.**
N/A	Glass cloth, paper, silicon, phenolic & melamine epoxy composite	N/A

SECTION II HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	CAS NUMBER	% COMPOSITION BY WEIGHT (1)	OSHA-PEL 8-HR TWA	ACGIH TLV 8-HR TWA
PHENOL	108-95-2	<8-12	5.0 ppm	5.0 ppm
			5.0 ppm	5.0 ppm
FORMALDEHYDE	50-00-0	<2	.75 ppm	.30 ppm
METHANOL	67-56-1	<10-11	200 ppm	200 ppm
MOLYBDENUM/ DISULFIDE	1317-33-5		10 mg/m3	10 mg/m3
SILICA	60676-86-0		0.1 mg/m3	0.1 mg/m3
SILICON	7440-21-3		5.0 mg/m3	10.0 mg/m3
CRESYLIC ACID	N /A	<4	5 ppm	22.0 mg/m3

This product is a thermostatic composite consisting of a cured phenol-formaldehyde on a cellulose substrate. OSHA PEL and ACGIH TLV have not been established for this material. Formaldehyde has been designated a carcinogen on the following lists: NTP/IARC/OSHA
Precautions must be taken when formaldehyde is present In the air at concentrations greater than 0.1 ppmas described in the standard.

Micarta products may be comprised of all or variations of the ingredients shown here.

PEL=PermIssIble Exposure Limit (1) % of Alloying Material Vanes with Grade of Material. Other trace elements of <1% May be in Present.

SECTION III. PHYSICAL DATA

MATERIAL (At Normal Conditions)	APPEARANCE AND ODOR
SOLID	Flat or shapes - natural in color - slight phenolic odor
MELTING POINT	**SPECIFIC GRAVITY**
N/A	1.3 -1.4

SECTION IV. FIRE AND EXPLOSIVE

SPECIAL FIRE FIGHTING PROCEDURES:

Same as for wood fire - do not breathe fumes from burning laminate.

SECTION V. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
Stable	Strong Oxidizing agents
HAZARDOUS DECOMPOSITION PRODUCTS	Carbon dioxide, carbon monoxide, phenols, methane, formaldehyde & hydrocarbons

Dust Or Fumes May Be Produced During Welding, Burning, Grinding And Possibly Machining. Refer To ANSI Z49.1

SECTION VI. Environmental

SPILL OR LEAK PROCEDURES	N/A
WASTE DISPOSAL METHODS	Disposal must comply with applicable Federal, State and Local disposal and discharge laws.

SECTION VII. HEALTH HAZARD DATA

NOTE:	MICARTA PRODUCTS IN THEIR NATURAL STATE DO NOT PRESENT AN INHALATION OR CONTACT HAZARD, HOWEVER OPERATIONS SUCH AS BURNING, WELDING, SAWING. BRAZING AND GRINDING MAY RELEASE FUMES AND/OR DUST WHICH MAY PRESENT HEALTH HAZARDS
EFFECTS OF OVEREXPOSURE:	
Acute	Dust or fume may cause irritation to the eyes, nose, or throat. Inhalation of Formaldehyde dust or fume may cause cancer.
Chronic	A very small number of exposed people may develop an allergic reaction after prolonged or repeated exposure.
Phenol	Exposure may cause skin irritation and liver and kidney damage.
Formaldehyde	Exposure may cause irritation to the eyes, skin and respiratory system. Formaldehyde is designated a carcinogen on the NTP/IARC/OSHA.
Methanol	Methanol has tested positive for carcinogenicity in rodents.
Molybdenum Disulfide	Exposure may cause skin and respiratory irritation, and liver and kidney damage.
Silica	Exposure may cause skin and respiratory Irritation. Silica crystalline as a respiratory dust has caused lung cancer in animals.
Silicon	An accumulation of Silicon in the lungs may result in benign pneumokoniosis.
Cresylic Acid	Exposure may cause skin and respiratory irritation, and liver and kidney damage.

SECTION VIII. EMERGENCY AND FIRST AID PROCEDURES

Inhalation	In the event of excessive exposure to dust or fume, remove the employee to fresh air. If breathing is difficult administer artificial respiration or oxygen. Obtain immediate medical assistance.
Skin:	Abrasions and cuts should be washed and closed by a clean compress and be immediately medically treated. Should skin irritation occur, wash affected area with mild soap and rinse with clean warm water.
Eyes:	Depending on the type and nature of exposure, relief may be obtained by fresh air or rinsing the eyes with clean water. Obtain medical assistance.
Medical Conditions Aggravated by Exposure:	
	Persons with a predisposition to respiratory disorders may be adversely affected by particulates or respiratory irritants generated during the mfg. process.

SECTION IX. SPECIAL PROTECTION INFORMATION & CONTROL MEASURES

Note:	Consult your regional codes or Code of Federal Regulations, Title 29, Part 1910. Subpart G-Occupational Health and Environmental Control, Subpart I Personal Protective Equipment. Subpart P-Welding, Cutting, and Brazing, and Subpart Z-Toxic and Hazardous Substances. Certain welding type activities may produce hazardous substances such as carbon monoxide, ozone, phosgene in the presence of certain chemicals, or produce Inert suffocating atmospheres in addition to the production of ultraviolet radiation and/or noise.
Ventilation:	Local exhaust or ventilation systems sufficient to maintain exposure levels to contaminates below prescribed limits may be required When inhalation controls are not sufficient to reduce the exposure below the applicable exposure limit then use OSHA/NIOSH approved respiratory protection within the use limitations of the respirator.
Personal Protection:	To avoid contact use appropriate protective gloves or clothing to protect against cutting edges Appropriate heat shielding garments should be used for activities using or generating heat. Eyes should be protected by using safetyglasses, goggles, helmet, face shield as appropriate to the operation
Precautions to be taken in handling and storage:	
	Be alert to sharp edges and unsecured lifts.

SECTION X. OTHER INFORMATION

SARA Section 313 Toxic Chemical List, de minimis Concentrations

This product does not contain toxic chemicals subject to the reporting requirements of Section 312 and 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NFPA Ratings (NFPA No. 704)

HEALTH	2
FLAMMABILITY	1
REACTIVITY	0

The Information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with handling, storage, use or disposal of the product. Data sheets of individual manufacturers are available upon request.

Material Safety Data Sheet

Issuing Date 23-Nov-2011 **Revision Date** **Revision Number** 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Nickel Alloys**

Synonyms Ni.

Distributor
ThyssenKrupp Materials NA, Inc.
22355 W. Eleven Mile Road
Southfield, Michigan 48034
TEL: 248-233-5681

Emergency Telephone Number 248-233-5681

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Non-combustible as supplied.
Small chips, fines and dust from processing may be readily ignitable.
Hazardous fumes can also occur in post-processing operations
Product dust may be irritating to eyes, skin and respiratory system.
Dust may form explosive mixture in air
Possibly cancer hazard by inhalation

Appearance Silver to grayish black **Physical State** Solid. **Odor** Odorless

OSHA Regulatory Status

General Hazard Statement: Solid metallic products are generally classified as "articles" and do not constitute hazardous materials in solid form under the definitions of the OSHA Hazard Communication Standard (29 CFR 1910.1200). Any articles manufactured from these solid products would be generally classified as non-hazardous. However, some hazardous elements contained in these products can be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding.

Potential Health Effects

Principle Routes of Exposure Eye contact. Skin contact. Inhalation.

Acute Toxicity

Eyes Dust contact with the eyes can lead to mechanical irritation.

Skin Contact with dust can cause mechanical irritation or drying of the skin. Contact with oils from processing may cause irritation. Prolonged skin contact may defat the skin and produce dermatitis. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system. Inhalation of fumes may cause metal-fume fever.

Ingestion May be harmful if swallowed. May cause additional affects as listed under "Inhalation".

Chronic Effects

Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer.

Aggravated Medical Conditions

Allergies. Skin disorders. Respiratory disorders. Central nervous system. Pre-existing eye disorders. Blood disorders. Kidney disorders. Liver disorders. Nasal cavities. Lungs.

Interactions with Other Chemicals

Irritants. Sensitizers. Epoxies. Use of alcoholic beverages may enhance toxic effects.

Environmental Hazard

See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Each alloy may contain one or more of the following ingredients. Consult the Technical Data Sheet for the composition of specific alloys.

Chemical Name	CAS-No	Weight %
Nickel	7440-02-0	30.0-99.0
Chromium	7440-47-3	0.01-48.0
Copper	7440-50-8	0.01-45.0
Iron	7439-89-6	0.01-44.0
Molybdenum	7439-98-7	0.01-16.0
Cobalt	7440-48-4	0.01-13.0
Niobium	7440-03-1	0.01-5.0
Aluminum	7429-90-5	0.00-5.0
Manganese	7439-96-5	0.01-5.0
Tantalum	7440-25-7	0.01-5.0
Titanium	7440-32-6	0.01-5.0
Tungsten	7440-33-7	0.00-5.0
Silicon	7440-21-3	0.01-2.0
Carbon	7440-44-0	0.01-2.0
Yttrium	7440-65-5	0.00-1.0
Boron	7440-42-8	0.001-0.004

Nickel alloys may be comprised of all or variations of the alloys shown here.

4. FIRST AID MEASURES

Eye Contact

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Consult a physician.

Skin Contact

Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion

Do NOT induce vomiting. Call a physician or Poison Control Center immediately. Drink plenty of water. Never give anything by mouth to an unconscious person.

Notes to Physician

May cause sensitization of susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties This product does not present fire or explosion hazards as shipped. Small chips, fines, and dust from processing may be readily ignitable.

Flash Point Not applicable.

Suitable Extinguishing Media Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and fines.

Unsuitable Extinguishing Media DO NOT use halogenated extinguishing agents on small chips or fines. DO NOT use water for fires invoving molten metal. These fire extinguishing agents will react with burning material.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Specific Hazards Arising from the Chemical Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA	**Health Hazard** 2	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard** 2*	**Flammability** 0	**Physical Hazard** 0	**Personal Protection** X

**Indicates a chronic health hazard.*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Keep people away from and upwind of spill/leak.

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Avoid dust formation. Collect scrap for recycling.

If product is molten, contain the flow using dry sand or salt flux as a dam. All tools and containers which come in contact with molten metal must be preheated or specially coated and rust free. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Handling Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Avoid dust formation. Keep material dry. Avoid contact with sharp edges or heated material. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red.

Storage Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Aluminum 7429-90-5	TWA: 1 mg/m^{3}respirable fraction	TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 15 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction	TWA: 10 mg/m^3 total dust TWA: 5 mg/m^3 respirable dust
Manganese 7439-96-5	TWA: 0.2 mg/m^3	(vacated) TWA: 1 mg/m^{3}fume (vacated) STEL: 3 mg/m^{3}fume (vacated) Ceiling: 5 mg/m^3 Ceiling: 5 mg/m^{3}fume	IDLH: 500 mg/m^3 TWA: 1 mg/m^3 fume STEL: 3 mg/m^3
Molybdenum 7439-98-7	TWA: 10 mg/m^{3}inhalable fraction TWA: 3 mg/m^{3}respirable fraction	(vacated) TWA: 10 mg/m^3	IDLH: 5000 mg/m^3
Nickel 7440-02-0	TWA: 1.5 mg/m^3	TWA: 1 mg/m^3 (vacated) TWA: 1 mg/m^3	IDLH: 10 mg/m^3 TWA: 0.015 mg/m^3
Silicon 7440-21-3		TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 10 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction	TWA: 10 mg/m^3 total dust TWA: 5 mg/m^3 respirable dust
Tantalum 7440-25-7		TWA: 5 mg/m^3 (vacated) TWA: 5 mg/m^3	IDLH: 2500 mg/m^{3}dust TWA: 5 mg/m^3 dust STEL: 10 mg/m^{3}dust
Tungsten 7440-33-7	STEL: 10 mg/m^3 TWA: 5 mg/m^3	(vacated) TWA: 5 mg/m^3 (vacated) STEL: 10 mg/m^3	TWA: 5 mg/m^3 STEL: 10 mg/m^3
Cobalt 7440-48-4	TWA: 0.02 mg/m^3	TWA: 0.1 mg/m^{3}dust and fume (vacated) TWA: 0.05 mg/m^{3}dust and fume	IDLH: 20 mg/m^{3}dust and fume TWA: 0.05 mg/m^3 dust and fume
Copper 7440-50-8	TWA: 0.2 mg/m^{3}fume	TWA: 0.1 mg/m^{3}fume TWA: 1 mg/m^{3}dust and mist (vacated) TWA: 0.1 mg/m^3 Cu dust, fume, mist	IDLH: 100 mg/m^{3}dust, fume and mist TWA: 1 mg/m^3 dust and mist TWA: 0.1 mg/m^3 fume
Yttrium 7440-65-5	TWA: 1 mg/m^3	TWA: 1 mg/m^3 (vacated) TWA: 1 mg/m^3	IDLH: 500 mg/m^3 TWA: 1 mg/m^3

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). Hexavalent chrome may be formed during welding.

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.

Skin and Body Protection Impervious clothing. Impervious gloves.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures Do not breathe vapors/dust. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Silver to grayish black.	**Odor**	Odorless.
Odor Threshold	No information available	**Physical State**	Solid
pH	No information available.		
Flash Point	Not applicable.	**Autoignition Temperature**	No information available.
Decomposition Temperature	No information available.	**Boiling Point/Boiling Range**	No information available
Melting Point/Range	1260°C / 2300°F		
Flammability Limits in Air	No information available.		
Specific Gravity	7.6-7.8	**Solubility**	No information available.
Evaporation Rate	No information available	**Vapor Pressure**	No data available.
Vapor Density	No data available.		

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Incompatible Products	Acids. Alkalies. Metal oxides. Oxidizing agents.
Conditions to Avoid	Dust formation. Heat, flames and sparks. Liberates flammable hydrogen gas on contact with water, alcohols, acidic or basic materials, and metals or metalllic compounds.
Hazardous Decomposition Products	Metal fume. Chromium oxides. Iron oxides. Nickel oxides.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Inhalation May cause irritation of respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Eye Contact Dust contact with the eyes can lead to mechanical irritation.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Iron	= 984 mg/kg (Rat)		
Nickel	> 9000 mg/kg (Rat)		
Cobalt	= 6170 mg/kg (Rat)		> 10 mg/L (Rat) 1 h

Chronic Toxicity

Chronic Toxicity Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer.

Carcinogenicity This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Chemical Name	ACGIH	IARC	NTP	OSHA
Nickel		Group 2B Group 1	Reasonably Anticipated	X
Chromium		Group 3		
Cobalt	A3	Group 2A Group 2B		X

ACGIH: (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA: (Occupational Safety & Health Administration)
X - Present

Target Organ Effects Blood. Central nervous system (CNS). Eyes. Kidney. Liver. Lungs. Nasal cavities. Respiratory system. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Nickel	EC50 96 h: 0.174 - 0.311 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: = 0.18 mg/L (Pseudokirchneriella subcapitata)	LC50 96 h: = 1.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 10.4 mg/L static (Cyprinus carpio) LC50 96 h: > 100 mg/L (Brachydanio rerio)	-	EC50 48 h: = 1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna)
Copper	EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata)	LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: < 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus)	-	EC50 48 h: = 0.03 mg/L Static (Daphnia magna)
Iron	-	LC50 96 h: = 0.56 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 13.6 mg/L static (Morone saxatilis)	-	-
Cobalt	-	LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	-

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of in accordance with local regulations.

Contaminated Packaging Do not re-use empty containers.

US EPA Waste Number D007

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Nickel - 7440-02-0	(hazardous constituent - no waste number)	Included in waste streams: F006, F039		
Chromium - 7440-47-3		Included in waste streams: F032, F034, F035, F037, F038, F039	5.0 mg/L regulatory level	

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Nickel	Toxic powder Ignitable powder
Chromium	Toxic Corrosive Ignitable
Copper	Toxic
Molybdenum	Ignitable powder
Cobalt	Toxic powder Ignitable powder
Aluminum	Ignitable powder
Manganese	Ignitable powder
Titanium	Ignitable powder

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

MEX Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend

15. REGULATORY INFORMATION

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Nickel	7440-02-0	99	0.1
Aluminum	7429-90-5	5	1.0
Chromium	7440-47-3	48	1.0
Cobalt	7440-48-4	13	0.1
Copper	7440-50-8	45	1.0
Manganese	7439-96-5	5	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Nickel		X	X	
Copper		X	X	

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Nickel	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ
Chromium			RQ 5000 lb final RQ RQ 2270 kg final RQ
Copper	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ

U.S. State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Nickel	7440-02-0	Carcinogen
Cobalt	7440-48-4	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Aluminum	X	X	X		X
Manganese	X	X	X	X	X
Molybdenum	X	X	X		X
Nickel	X	X	X	X	X
Silicon	X	X	X		X

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Tantalum	X	X	X		X
Titanium	X				
Tungsten	X	X	X		X
Boron	X				
Carbon			X		X
Chromium		X			X
Cobalt	X	X	X	X	X
Copper	X	X	X	X	X
Yttrium	X	X	X		X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Aluminum		Mexico: TWA= 10 mg/m^3
Manganese		Mexico: TWA 0.2 mg/m^3 Mexico: TWA 1 mg/m^3 Mexico: STEL 3 mg/m^3
Nickel		Mexico: TWA 1 mg/m^3
Silicon		Mexico: TWA 10 mg/m^3 Mexico: STEL 20 mg/m^3
Tantalum		Mexico: TWA 5 mg/m^3 Mexico: STEL 10 mg/m^3
Tungsten		Mexico: TWA 5 mg/m^3 Mexico: STEL 10 mg/m^3
Carbon		Mexico: TWA 2 mg/m^3
Chromium		Mexico: TWA 0.5 mg/m^3
Cobalt	A3	Mexico: TWA= 0.1 mg/m^3
Copper		Mexico: TWA= 1 mg/m^3 Mexico: TWA= 0.2 mg/m^3 Mexico: STEL= 2 mg/m^3
Yttrium		Mexico: TWA 1 mg/m^3 Mexico: STEL 3 mg/m^3

Canada

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

WHMIS Hazard Class
Non-controlled

Chemical Name	NPRI
Aluminum	X
Nickel	X
Chromium	X
Cobalt	X

Legend
NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

Prepared By	Product Stewardship 23 British American Blvd. Latham, NY 12110 1-800-572-6501
Issuing Date	23-Nov-2011
Revision Date	
Revision Note	Initial Release.

General Disclaimer

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

Material Safety Data Sheet

Issuing Date 23-Nov-2011 **Revision Date** **Revision Number** 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Stainless Steel and Alloys of Stainless Steel**

Distributor
ThyssenKrupp Materials NA, Inc.
22355 W. Eleven Mile Road
Southfield, Michigan 48034
TEL: 248-233-5681

Emergency Telephone Number 248-233-5681

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Non-combustible as supplied.
Small chips, fines and dust from processing may be readily ignitable.
Hazardous fumes can also occur in post-processing operations
Product dust may be irritating to eyes, skin and respiratory system.
Dust may form explosive mixture in air
Possibly cancer hazard by inhalation

Appearance Metallic, Solid **Physical State** Solid. **Odor** Odorless

OSHA Regulatory Status

General Hazard Statement: Solid metallic products are generally classified as "articles" and do not constitute hazardous materials in solid form under the definitions of the OSHA Hazard Communication Standard (29 CFR 1910.1200). Any articles manufactured from these solid products would be generally classified as non-hazardous. However, some hazardous elements contained in these products can be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding.

Potential Health Effects

Principle Routes of Exposure Eye contact. Skin contact. Inhalation.

Acute Toxicity

Eyes Dust contact with the eyes can lead to mechanical irritation.

Skin Contact with dust can cause mechanical irritation or drying of the skin. Contact with oils from processing may cause irritation. Prolonged skin contact may defat the skin and produce dermatitis. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Inhalation May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system. Inhalation of fumes may cause metal-fume fever.

Ingestion May be harmful if swallowed. May cause additional affects as listed under "Inhalation".

Chronic Effects Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer.

Aggravated Medical Conditions Allergies. Skin disorders. Respiratory disorders. Central nervous system. Pre-existing eye disorders. Blood disorders. Kidney disorders. Liver disorders. Nasal cavities. Lungs.

Interactions with Other Chemicals Irritants. Sensitizers. Epoxies. Use of alcoholic beverages may enhance toxic effects.

Environmental Hazard See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Each alloy may contain one or more of the following ingredients. Consult the Technical Data Sheet for the composition of specific alloys.

Chemical Name	CAS-No	Weight %
Iron	7439-89-6	66.0-88.0
Chromium	7440-47-3	0.01-30.0
Nickel	7440-02-0	0.01-27.0
Manganese	7439-96-5	0.01-6.0
Molybdenum	7439-98-7	0.01-6.0
Titanium	7440-32-6	0.01-6.0
Copper	7440-50-8	0.01-6.0
Sulfur dioxide	7446-09-5	0.01`-2.0
Phosphorus	7723-14-0	0.01-2.0
Cobalt	7440-48-4	0.01-2.0
Carbon	7440-44-0	0.01-2.0
Silicon	7440-21-3	0.01-2.0
Tungsten	7440-33-7	0.00-1.8
Niobium	7440-03-1	0.00-1.00
Aluminum	7429-90-5	0.01-0.5
Tantalum	7440-25-7	0.15-0.45
Selenium	7782-49-2	0.03-0.35

Stainless Steel Alloys may be comprised of all or variations of the alloys shown here.

4. FIRST AID MEASURES

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Consult a physician.

Skin Contact Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion Do NOT induce vomiting. Call a physician or Poison Control Center immediately. Drink plenty of water. Never give anything by mouth to an unconscious person.

Notes to Physician May cause sensitization of susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties This product does not present fire or explosion hazards as shipped. Small chips, fines, and dust from processing may be readily ignitable.

Flash Point Not applicable.

Suitable Extinguishing Media Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and fines.

Unsuitable Extinguishing Media DO NOT use halogenated extinguishing agents on small chips or fines. DO NOT use water for fires invoving molten metal. These fire extinguishing agents will react with burning material.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Specific Hazards Arising from the Chemical Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA	**Health Hazard** 2	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard** 2*	**Flammability** 0	**Physical Hazard** 0	**Personal Protection** X

**Indicates a chronic health hazard.*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Keep people away from and upwind of spill/leak.

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Avoid dust formation. Collect scrap for recycling.

If product is molten, contain the flow using dry sand or salt flux as a dam. All tools and containers which come in contact with molten metal must be preheated or specially coated and rust free. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Handling Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Avoid dust formation. Keep material dry. Avoid contact with sharp edges or heated material. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red.

Storage Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Aluminum 7429-90-5	TWA: 1 mg/m^{3}respirable fraction	TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 15 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction	TWA: 10 mg/m^3 total dust TWA: 5 mg/m^3 respirable dust
Manganese 7439-96-5	TWA: 0.2 mg/m^3	(vacated) TWA: 1 mg/m^{3}fume (vacated) STEL: 3 mg/m^{3}fume (vacated) Ceiling: 5 mg/m^3 Ceiling: 5 mg/m^{3}fume	IDLH: 500 mg/m^3 TWA: 1 mg/m^3 fume STEL: 3 mg/m^3
Molybdenum 7439-98-7	TWA: 10 mg/m^{3}inhalable fraction TWA: 3 mg/m^{3}respirable fraction	(vacated) TWA: 10 mg/m^3	IDLH: 5000 mg/m^3
Nickel 7440-02-0	TWA: 1.5 mg/m^3	TWA: 1 mg/m^3 (vacated) TWA: 1 mg/m^3	IDLH: 10 mg/m^3 TWA: 0.015 mg/m^3
Silicon 7440-21-3		TWA: 15 mg/m^{3}total dust TWA: 5 mg/m^{3}respirable fraction (vacated) TWA: 10 mg/m^{3}total dust (vacated) TWA: 5 mg/m^{3}respirable fraction	TWA: 10 mg/m^3 total dust TWA: 5 mg/m^3 respirable dust
Tantalum 7440-25-7		TWA: 5 mg/m^3 (vacated) TWA: 5 mg/m^3	IDLH: 2500 mg/m^{3}dust TWA: 5 mg/m^3 dust STEL: 10 mg/m^{3}dust
Tungsten 7440-33-7	STEL: 10 mg/m^3 TWA: 5 mg/m^3	(vacated) TWA: 5 mg/m^3 (vacated) STEL: 10 mg/m^3	TWA: 5 mg/m^3 STEL: 10 mg/m^3
Cobalt 7440-48-4	TWA: 0.02 mg/m^3	TWA: 0.1 mg/m^{3}dust and fume (vacated) TWA: 0.05 mg/m^{3}dust and fume	IDLH: 20 mg/m^{3}dust and fume TWA: 0.05 mg/m^3 dust and fume
Copper 7440-50-8	TWA: 0.2 mg/m^{3}fume	TWA: 0.1 mg/m^{3}fume TWA: 1 mg/m^{3}dust and mist (vacated) TWA: 0.1 mg/m^3 Cu dust, fume, mist	IDLH: 100 mg/m^{3}dust, fume and mist TWA: 1 mg/m^3 dust and mist TWA: 0.1 mg/m^3 fume
Sulfur dioxide 7446-09-5	STEL: 0.25 ppm	TWA: 5 ppm TWA: 13 mg/m^3 (vacated) TWA: 2 ppm (vacated) TWA: 5 mg/m^3 (vacated) STEL: 5 ppm (vacated) STEL: 15 mg/m^3	IDLH: 100 ppm TWA: 2 ppm TWA: 5 mg/m^3 STEL: 5 ppm STEL: 13 mg/m^3
Phosphorus 7723-14-0		TWA: 0.1 mg/m^3 (vacated) TWA: 0.1 mg/m^3	IDLH: 5 mg/m^3 TWA: 0.1 mg/m^3
Selenium 7782-49-2	TWA: 0.2 mg/m^3	TWA: 0.2 mg/m^3 Se (vacated) TWA: 0.2 mg/m^3	IDLH: 1 mg/m^3 TWA: 0.2 mg/m^3

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). Hexavalent chrome may be formed during welding.

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.

Skin and Body Protection Impervious clothing. Impervious gloves.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures Do not breathe vapors/dust. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Metallic, Solid.	**Odor**	Odorless.
Odor Threshold	No information available	**Physical State**	Solid
pH	No information available.		
Flash Point	Not applicable.	**Autoignition Temperature**	No information available.
Decomposition Temperature	No information available.	**Boiling Point/Boiling Range**	No information available
Melting Point/Range	1300°C / 2400°F		
Flammability Limits in Air	No information available.		
Specific Gravity	7.9	**Solubility**	No information available.
Evaporation Rate	No information available	**Vapor Pressure**	No data available.
Vapor Density	No data available.		

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Incompatible Products	Acids. Alkalies. Metal oxides. Iron powder and water: may cause an explosive reaction forming hydrogen gas when heated above 1470F (800C). Moisture.
Conditions to Avoid	Dust formation. Heat, flames and sparks.
Hazardous Decomposition Products	Iron oxides. Metal fume. Chromium oxides.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Inhalation May cause irritation of respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Eye Contact Dust contact with the eyes can lead to mechanical irritation.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Iron	= 984 mg/kg (Rat)		
Nickel	> 9000 mg/kg (Rat)		
Cobalt	= 6170 mg/kg (Rat)		> 10 mg/L (Rat) 1 h
Sulfur dioxide		-	Per CGA P-20: 2500 ppm/1hr (Rat)
Phosphorus	= 3.03 mg/kg (Rat)	= 100 mg/kg (Rat)	= 4.3 mg/L (Rat) 1 h
Selenium	= 6700 mg/kg (Rat)		

Chronic Toxicity

Chronic Toxicity Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer.

Carcinogenicity This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Chemical Name	ACGIH	IARC	NTP	OSHA
Chromium		Group 3		
Nickel		Group 2B Group 1	Reasonably Anticipated	X
Sulfur dioxide		Group 3	-	-
Cobalt	A3	Group 2A Group 2B		X
Selenium		Group 3		

ACGIH: (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA: (Occupational Safety & Health Administration)
X - Present

Target Organ Effects Blood. Central nervous system (CNS). Eyes. Kidney. Liver. Lungs. Nasal cavities. Respiratory system. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Iron	-	LC50 96 h: = 0.56 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 13.6 mg/L static (Morone saxatilis)	-	-
Nickel	EC50 96 h: 0.174 - 0.311 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: = 0.18 mg/L (Pseudokirchneriella subcapitata)	LC50 96 h: = 1.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 10.4 mg/L static (Cyprinus carpio) LC50 96 h: > 100 mg/L (Brachydanio rerio)	-	EC50 48 h: = 1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna)
Copper	EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata)	LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: < 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus)	-	EC50 48 h: = 0.03 mg/L Static (Daphnia magna)
Phosphorus	-	LC50 96 h: 0.001-0.004 mg/L static (Lepomis macrochirus) LC50 96 h: 0.0017-0.0035 mg/L flow-through (Lepomis macrochirus) LC50 96 h: 0.011-0.028 mg/L static (Pimephales promelas) LC50 96 h: 0.015-0.032 mg/L static (Oncorhynchus mykiss) LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	EC50 48 h: 0.025 - 0.037 mg/L Static (Daphnia magna) EC50 48 h: = 0.03 mg/L (Daphnia magna)
Cobalt	-	LC50 96 h: > 100 mg/L static (Brachydanio rerio)	-	-

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of in accordance with local regulations.

Contaminated Packaging Do not re-use empty containers.

US EPA Waste Number D007
D010

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Chromium - 7440-47-3		Included in waste streams: F032, F034, F035, F037, F038, F039	5.0 mg/L regulatory level	
Nickel - 7440-02-0	(hazardous constituent - no waste number)	Included in waste streams: F006, F039		
Selenium - 7782-49-2		Included in waste stream: F039	1.0 mg/L regulatory level	

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Chromium	Toxic Corrosive Ignitable
Nickel	Toxic powder Ignitable powder
Manganese	Ignitable powder
Molybdenum	Ignitable powder
Titanium	Ignitable powder
Copper	Toxic
Phosphorus	Toxic Ignitable Reactive
Cobalt	Toxic powder Ignitable powder
Aluminum	Ignitable powder

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

MEX Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA Complies
DSL Complies
EINECS Complies
ENCS Complies
IECSC Complies

15. REGULATORY INFORMATION

KECL Complies
PICCS Complies
AICS Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Chromium	7440-47-3	30	1.0
Cobalt	7440-48-4	2	0.1
Copper	7440-50-8	6	1.0
Manganese	7439-96-5	6	1.0
Nickel	7440-02-0	27	0.1
Phosphorus	7723-14-0	2	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Nickel		X	X	
Copper		X	X	
Phosphorus	1 lb			X
Selenium		X	X	

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Nickel	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ
Chromium			RQ 5000 lb final RQ RQ 2270 kg final RQ
Copper	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ
Sulfur dioxide		500 lb	
Phosphorus	1 lb	1 lb	RQ 1 lb final RQ RQ 0.454 kg final RQ
Selenium	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Nickel	7440-02-0	Carcinogen
Cobalt	7440-48-4	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Aluminum	X	X	X		X
Manganese	X	X	X	X	X
Molybdenum	X	X	X		X
Nickel	X	X	X	X	X
Silicon	X	X	X		X
Tantalum	X	X	X		X
Titanium	X				
Tungsten	X	X	X		X
Carbon			X		X
Chromium		X			X
Cobalt	X	X	X	X	X
Copper	X	X	X	X	X
Sulfur dioxide	X	X	X		X
Phosphorus	X	X	X	X	X
Selenium	X	X	X	X	X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Aluminum		Mexico: TWA= 10 mg/m^3
Manganese		Mexico: TWA 0.2 mg/m^3 Mexico: TWA 1 mg/m^3 Mexico: STEL 3 mg/m^3
Nickel		Mexico: TWA 1 mg/m^3
Silicon		Mexico: TWA 10 mg/m^3 Mexico: STEL 20 mg/m^3
Tantalum		Mexico: TWA 5 mg/m^3 Mexico: STEL 10 mg/m^3
Tungsten		Mexico: TWA 5 mg/m^3 Mexico: STEL 10 mg/m^3
Carbon		Mexico: TWA 2 mg/m^3
Chromium		Mexico: TWA 0.5 mg/m^3
Cobalt	A3	Mexico: TWA= 0.1 mg/m^3
Copper		Mexico: TWA= 1 mg/m^3 Mexico: TWA= 0.2 mg/m^3 Mexico: STEL= 2 mg/m^3
Sulfur dioxide		Mexico: TWA 2 ppm Mexico: TWA 5 mg/m^3 Mexico: STEL 5 ppm Mexico: STEL 10 mg/m^3
Phosphorus		Mexico: TWA 0.1 mg/m^3 Mexico: STEL 0.3 mg/m^3
Selenium		Mexico: TWA 0.2 mg/m^3

Canada

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

WHMIS Hazard Class
Non-controlled

Chemical Name	NPRI
Aluminum	X
Nickel	X
Chromium	X
Cobalt	X
Sulfur dioxide	X

Phosphorus	X
Selenium	X

Legend
NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 23-Nov-2011
Revision Date

Revision Note Initial Release.

General Disclaimer
The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

MATERIAL SAFETY DATA SHEET

ISSUE DATE: 10/30/92
REVISED DATE: 5/26/09
Supercedes: Any Previous M.S.D.S. On This Product
EMERGENCY PHONE NUMBER: CHEM-TEL INC. 1-800-255-3924

I. IDENTIFICATION

PRODUCT NAME: **Aluminum Products**
PRODUCT CLASS: Metal

DUCTMATE INDUSTRIES, INC.
210 Fifth Street
Charleroi, PA 15022

II. HAZARDOUS INGREDIENTS

Material	CAS-Number	OSHA/PEL	ACGIH/TLV
Aluminum	7429-90-5	15 mg/M3 – Total dust 5 mg/M3 – Respirable fraction	10 mg/M3 – Metal Dust 5 mg/M3 – Welding fume
Chromium*	7440-47-3	1.0 mg/M3 (Chromium metal)	0.5 mg/M3 - Chromium metal & Cr III compounds
Copper	7440-50-8	0.1 mg/M3 – Fume (as Cu) 1 mg/M3 – Dusts & mists (as Cu)	0.1 mg/M3 – Fume 1 mg/M3 – Dusts & mists (as Cu)
Iron	7439-89-6	10 mg/M3 (as Fe_2O_3 fume)	5 mg/M3 (Iron oxide dust & fume)
Magnesium	7439-95-4	15mg/M3	10mg/M3 (fume)
Manganese	7439-96-5	5 mg/M3 (C) - Fume & Mn compounds	0.2 mg/M3
Silicon	7440-21-3	15 mg/M3 -Total dust 5 mg/M3 – Respirable fraction	10 mg/M3
Zinc*	7440-66-6	5mg/M3 (as ZnO fume)	5mg/M3 (as ZnO fume)

Notes:
Chromium VI compounds have been listed by IARC and/or NTP as carcinogenic or potentially carcinogenic to humans. Zinc oxide exposure limits are referenced above.
* Denotes a toxic chemical subject to reporting requirements for section 313 of Title III of S.A.R.A.

III. SPECIAL PRECAUTIONS

APPEARANCE: Silvery ductile metal
SPECIFIC GRAVITY: 2.5+
MELTING POINT: 480-649°C

IV. HEALTH AND HAZARD DATA

ROUTE OF EXPOSURE: Inhalation of fumes or dust, skin contact or ingestion.
EFFECTS OF OVEREXPOSURE:
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 overexposure can cause perforation of the nasal septum, respiratory sensitization, asthma, lung damage kidney damage, and cancer. Chromium VI compounds are listed as a Group I carcinogen by IARC and NTP.
Cooper: Acute overexposure 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 bening pneumoconiosis which is called siderosis. Can cause irritation of gastrointestinal tract, bleeding, changes in the pH of body fluids, and liver damage.
Magnesium: Exposure to magnesium may cause metal fume fever with flu-like symptoms. Particles imbedded in the skin may cause severe lesions.
Manganese: Excessive and prolonged inhalation of manganese (generally over two years exposure) can cause damage to the central nervous system. The pathology resembles Parkinson Disease. Also, workers routinely exposed to high concentrations of manganese display an unusually high incidence of respiratory disease.
Silicon: Chronic overexposures can cause chronic bronchitis and narrowing of the airways. Studies with experimental animals by injection have found lesions of the lungs.
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 blush tint to the skin. These symptoms go away in 24 to 48 hours and leave no effect.
Under normal handling conditions the solid alloy presents no significant health hazards. Processing of the alloy by dust or fume producing operation (grinding, buffing, heating, welding, etc.) may result in the potential for exposure to airborne metal particulates or fume.

V. HEALTH AND FIRST AID

INHALATION: If acute overexposure to dust or fumes occurs, remove victim from the adverse environmental and seek medical attention.
SKIN CONTACT: Wash area of contact thoroughly with soap and water. If irritation persists, seek medical attention.
EYE CONTACT: Flush immediately with running water for fifteen minutes. If irritation persists, seek medical attention.
INGESTION: Seek medical attention if large quantities of materials have been ingested.

VI. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A
EXTINGUISHING MEDIA: Use class D extinguishing agents.
SPECIAL PROCEDURES: Firefighters should wear equipment to protect against noxious fumes and protective clothing.
EXPLOSION HAZARD: Fire and explosion hazard is high for aluminum when the material is in the form of dust and exposed to heat, flames, chemical reaction or in contact with powerful oxidizers.

VII. SPILL OR LEAK PROCEDURES

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 dust. Avoid all ignition sources. If airborne dust is generated during the clean up, use an appropriate NIOSH-approved respirator.
Waste Disposal Method: Dispose of in accordance with appropriate 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 PEL's and TLV's. Ventilation systems must be designed for explosive dusts.

VIII. SPECIAL PROTECTION

VENTILATION: Local exhaust ventilation should be provided to keep worker exposures within allowable limits. Ventilation systems must be designed for explosive dusts.
RESPIRATORY PROTECTION: Use NIOSH/MSHA approved organic vapor respirators when vapor concentrations exceed to TLV.
EYE PROTECTION: Personal protective equipment should be worn when there is a reasonable probability of injury.
PROTECTIVE GLOVES: As needed

IX. CARCINOGENIC ASSESSMENT

Aluminum has NOT been identified as a suspect carcinogen by NTP, IARC, or OSHA.

X. REACTIVITY DATA

STABILITY: Stable under normal conditions of handling and use.
CONDITIONS TO AVOID: Strong acids and bases can produce flammable/explosive gas. Molten metal may react violently with water.
INCOMPATIBILITY: Acids, bases and oxidizers.
HAZARDOUS DECOMPOSITION PRODUCT: Metal fume. Welding/cutting operations may generate ozone and oxides of nitrogen.
HAZARDOUS POLYMERIZATION: Will not occur.

XI. SPECIAL PRECAUTIONS

HANDLING AND STORAGE: Use good housekeeping practices to avoid excessive dust accumulation.

This information is taken from sources or based upon data believed to be reliable; however, DUCTMATE INDUSTRIES, INC. makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.

CertainTeed
SAINT-GOBAIN

MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATERIAL NAME: MECHANICAL/OEM

[illegible]

[illegible]

[illegible]

[illegible]	M[illegible]re
[illegible]	[illegible]e [illegible]ss[illegible]ed
[illegible]	[illegible]e [illegible]ss[illegible]ed
M[illegible]	[illegible]

Company Identification

[illegible]

[illegible]0

[illegible] 19[illegible]

[illegible]ed [illegible]a[illegible]es

[illegible]

Phone Numbers

[illegible]

Emergency: (800) 424-9300 - EMERGENCY TELEPHONE: CHEMTREC
Emergency: (703) 527-3887 - OUTSIDE OF THE U.S. CHEMTREC

[illegible] 3[illegible]00[illegible]

[illegible]1[illegible]1[illegible]010

SECTION 2 - HAZARDS IDENTIFICATION

Emergency Overview

[illegible]

WARNING

□a□ses ser□□s e□e □rr□a□□□□a□ses s□□ □rr□a□□□□□s□e□ed □□a□s□□ □a□□er □a □□a□a□□□□

Prevention □□□d □rea□□□□ d□s, □□□e, □as, □ s□, □a□□rs a□d□r s□ra□□ □□ □□□□a□de □□□□a□sa□e□ □re□a□□□s □a□e □ee□ read a□d □□ders□□d□□ □a□□ s□e□a□□s r□□□□□s □e□re □se□□se □ers□□a□□r□e□□□e e□□□□□e□□as re□□red□□ as□ □□□r□□□□□□a□er □a□d□□□□□ ear □r□e□□□e □□□□es, □□□□□□□□, a□d e□e□a□e □r□e□□□□□

Response □□ □□ □□□□□□□□se □a□□□□s□□□ □□□ □a□er □r se□era□□ □□□es□□e□ □□e □□□□a□□e□ses, □□rese□□ a□d eas□ □□d□□□ □□□□□e r□s□□□□□□e□e □rr□a□□□ □ers□s□s□Ge□□ed□a□ad□□e□a□e□□□□□□

□□ □ □ □□□□□ as□ □□□□ □e□□□ □□s□a□ a□d □a□er□□s□□□ □rr□a□□□ □□□□rs□Ge□□ed□a□ ad□□e□a□e□□□□□□□a□e □□□□□□□a□ □a□ed □□□□□□□□ a□d □as□ □e□re re□se□

□□e□□□sed □r □□□□er□ed□Ge□□ed□a□ad□□e□a□e□□□□□□

Storage/Disposal □s□□se □□□□□□e□□a□d□r □□□□a□er □□a□□□rda□□e □□□□ □□□a□, re□□□□a□, □a□□□□a□, a□d□r □□er□a□□□a□re□□□a□□□s□□□re □□□□ed □□□□

□□□□□□M□□ □□□□□G□□

	Health	Fire	Reactivity
□□□□ □□□□□G□	1	0	0
□M□□ □□□□□G□	1□	0	0

□e□ree □□□a□ard
0 □M□□□□ a□□□s□□□□□□a□□□
1 □□□□□□□□
□ □M□dera□e
3 □□er□□□s □□□□□□□
□ □□e□ere □□□□re□ e□
□□□□r□□□□ □ea□□□ □□□e□□s□

□□□□□□□□ □□□M□□□□d

□□□□□□e□□□□

□□□□□a□□□res□□ □d□r

□□□□□□□□rr□a□, Me□□a□□□a□rr□a□□

□□□□□rr□a□, □□s□e□ed □ar□□□□□e□

□ □M□□□□□ass □ □□□□s□□□□s a□d □□e□□□□s Ma□er□a□s □□□□s□□□ □ □□□□d□s□□□ □, □ass □ □□□□s□□□□s a□d □□e□□□□s Ma□er□a□s □□□□s□□□ □ □□□□d□s□□□ □

[illegible] a a , er a, e ar

M [illegible] GG [illegible] re e s d s a e a ra a ed e a a rr a s a a r s a

[illegible]

[illegible]
[illegible] MM [illegible] e rar rr a se a d r a a r
[illegible] se ese r d s as ee s a se a er a s er ass s a ss e a er a ard er ass as a sed a er a a s as r d ed a er a a a s

[illegible]
[illegible] MM [illegible] e rar rr a e s a r s e d d a s
[illegible] da a a a a e

[illegible]
[illegible] MM [illegible] e rar rr a r red ess a r
[illegible] da a a a a e

G [illegible]
[illegible] MM [illegible] es s r d e
[illegible] da a a a a e

M G [illegible] da a a a a e

[illegible] G [illegible] s r d a s a r de a a se a er ased s e a a da a s r d a s ass s a ers a r re e a e ed a s e da a a a a e a a ee er 001, e a e ered e ass a r ass s a ers r a Gr ass a " ss ar e a s" a Gr 3 ass a " ass a e as ar e a s" sa d a ere s " e de e reased r s s a er r es e a r a e s res d r a a r ese a er a s, a d ade a e e de e er a a a er r s "

[illegible] da a a a a e

[illegible] da a a a a e
[illegible] da a a a a e

[illegible] M [illegible] da a a a a e

See Section 12 for Ecological Information

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Composition/Information on Ingredients

Product(s) Containing Component	Chemical Name	CAS	%(weight)	UN;EINECS	LD50/LC50
□□□ □er□a□□a□□e□□□ □ □□□ □e□ □era□re□□a□□e□□ □□□ □er□a□□ard □□a□□, □□□, □□□, □□□□□ □r□□ □ □ ra□ □□□□, □□□□ □r□□ □□□s□a□□□ □□r □e□ □□□□Me□a□□ □□d□□□ □s□a□□□ □0□9□□□a□ad□a□ Me□a□□ □□d□□□ □s□a□□□□ □□M □□ard□□ □□□□□□□□□ □□□□□ ra□ □□a□□, □□□, □□□□□□ □□□□ra□ □□□□□ra□□ Mar□e □□□□□ra□□ □□□□□Gard □□□d □□er □□ard □□□□ □□□a□□ed □□r□a□e□□□□□□Gard □□□d □□er □□ard □□□□ □□□a□□ed □□r□a□e□□□□□□Gard □ □□□□ □□er □□□□ □□□a□□ed □□r□a□e□□ □ra □□□□G□d□ □□□ersa□□a□□e□□□a□□, □□□□□□□□□□Gard □□□□ □□ard □□□□ □□□a□□ed □□r□a□e□□□□□□Gard □□ □□□□□Gard □	□□r□□s □ass	□□99□□1□□3	□0□ □□ 100□	□□□□0□□□0	□□□
□□□ □er□a□□a□□e□□□ □ □□□ □e□ □era□re□□a□□e□□ □□□ □er□a□□ard □□a□□, □□□, □□□, □□□□□ □r□□ □ □ ra□ □□□□, □□□□ □r□□ □□□s□a□□□ □□r □e□ □□□□Me□a□□ □□d□□□ □s□a□□□ □0□9□□□a□ad□a□ Me□a□□ □□d□□□ □s□a□□□□ □□M □□ard□□ □□□□□□□□□ □□□□□ ra□ □□a□□, □□□, □□□□□□ □□□□ra□ □□□□□ra□□ Mar□e □□□□□ra□□ □□□□□Gard □□□d □□er □□ard □□□□ □□□a□□ed □□r□a□e□□□□□□Gard □□□d □□er □□ard □□□□ □□□a□□ed □□r□a□e□□□□□□Gard □ □□□□ □□er □□□□ □□□a□□ed □□r□a□e□□ □ra □□□□G□d□ □□□ersa□□a□□e□□□a□□, □□□□□□□□□□Gard □□□□ □□ard □□□□ □□□a□□ed □□r□a□e□□□□□□Gard □□ □□□□□Gard □	□□e□□□, □□□□□□er □□□□ □□r□a□de□□de a□d □rea	□□10□□□□□□□	10□ □□ 30□	□□□	□r□ra□□□□0□□ □□ □□□
□□□□□Gard □□□□□□□Gard □	□□e□□□□□res□□ □□□der □□□red□	*Proprietary*	0□ □□ 30□	□□□	□□□
□□□ □er□a□□□ard □□□□, □□□, □□□□□□□ra □□□□G□d□ □□□□□Gard □ □□□□□□ard □□□□ □□□a□□ed □□r□a□e	□□e□□□a□d, □□□□□es□er, □□□□□ er	9003□□0□□	0□ □□ □□	□□□	□r□ra□□□□0□□□□ □□ □□□ □r□ra□□□□0□□□□ □□ □□□
□□□□□Gard □ □□□□□□□er □□□ □□□a□□ed □□r□a□e	□□r□□□□□ased □□□□□er	*Proprietary*	0□ □□ □□	□□□	□□□
□□□ □er□a□□□ard □□□□, □□□, □□□□□□□r□□ □ □ ra□ □□□□□□□□□□□□□□□ □□□□ □ ra□ □□□□, □□□□□ □□□□□□ra□ □□□□□□ra□ □□□□□□ Mar□e □□□□□ra□ □□□□□□ □□□□□Gard □□□d □□er □□ard □□□□ □□□a□□ed □□r□a□e□□□□□□Gard □□□d □□er □□ard □□□□ □□□a□□ed	□□□□ □□□ □□de	1309□□□□□	0□ □□ □□	□1□□1□□□0	□r□ra□□□□0□□3□□00 □ □□□□ □r□ra□□□□0□□3□ □□ □□□

[illegible]					
[illegible]	[illegible]	*Proprietary*	0[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]03[illegible]9[illegible]9	0[illegible]	[illegible]	[illegible]

This product is considered Hazardous under United States Regulations (29 CFR 1900.1200 - Hazard Communication Standard). In Canada, this product is considered Hazardous under the Workplace Hazardous Materials Information System (WHMIS). According to the Globally Harmonized Standard for Classification and Labeling (GHS) this product is considered Hazardous.

See Section 11 for Toxicological Information

SECTION 4 - FIRST AID MEASURES

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

See Section 2 for Potential Health Effects

SECTION 5 - FIRE FIGHTING MEASURES

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

□□ □□□□ea□e a□□□□ e□□□sed □□e□ □□r□□□ □□se □□ a□ □□e□ □a□e□ □□□□r□ed, □□e □a□er□a□s □□□d re□ease □□□□□ □□□□es□

□□□□□□□□□ □□M□□□□□□□ □□□□□□□□□ □□es □□□s□□□□r□□□□ □□s□□□□□ □□□□□r□ed, □□e □a□er□a□s □□□d re□ease □□□□□ □□□□es a□d s□ □□e□
□□□ □□s□□□□ r□d□□□s □a□ □□□□□□de □□des □□□ar□□□, s□□□r a□d □□□er □□□e□a□□ □□a□e □r a□□□ □□□□ □□□□ds, □□des □□arse□□□, □□des □□□□r□□e□, □□dr□□e□ □□□□r□de, a□□□□ □□□□, □r□□ de □as, □□dr□□e□ r□□ de, □□r□a□de□□de, a□d ra□e □□dr□□e□ □□a□de□

□□□□□ □□□□□□□
□□□□□ □□□□□ □□□□□ □□□□□□□□□
□□□□□□□□□□ □M□□□
□□□□□□□□□□ □□□ □□□□□□□□

SECTION 6 - ACCIDENTAL RELEASE MEASURES

□□□□□□□□ □□□□□□□□□□□□□□□d □□□a□□□□□□□s□□□ a□d e□es d□r□□□ □ea□□□□□□□a□e □r□□er □re□a□□□□s □□ □ □□□□□ □□e e□□□s□re □□ □s□□□□ a□□r□□r□a□e □ers□a□□r□e□□□e e□□□□□ e□□□□

□M□□G□□□□ □□□□□□□□□□□□□□ers□□s □□□□□ear□□□ a□□r□□r□a□e □r□e□□□e e□□□□□□ e□□s□□□□d □e e□□□□ded r□□□ area □□ s□□□□□□□□□□□□ea□□□□ □as □ee□ □□□□ □□e□ed□□e□□a□e □□e □□□□a□ □a□ed area□

□□□□□□□M□□□□□□ □□□□□□□□□□□□□□□□d r□□ □□□□□□ □a□er□a□s a□d se□ers□

□□□□□□□M□□□□□□□□□□□□□□ M□□□□□□□□□

□□□a□□□e e□□□□□□□s □a□er□a□s□□□d □□□□□e □e□essar□□□e□ □□e s□□r□es □□□□□□□□□□□□□□□□□□e□d s□□r □ar□□□□a□es □s□□□□a □a□□□□□ □□ea□er □□□□a □□□□□ □□□er□□□□□d □□e □e□era□□□ □□d□s□s d□r□□□ □ea□□□□□□

□□□□□□□□□□ M□□□□□□□□□□□□□ da□a a□a□a□□e□

SECTION 7 - HANDLING AND STORAGE

□□□□□□□G□□□ □□□□□rea□□e d□s□r□□ □□□s □a□er□a□□□ee□ □□□s □r□d□□□r□□ □ea□, s□ar□s, □r □□e□ □a□e□se □□□s □r□d□□□□□□□ade□a□e □e□□a□□□□□□□a□s □as□ □□r□ □□□□□es se□ara□e□□r□□ □□□er □□□□□□□□□□□ □□e □□□□□e □as□er □r s□□□□ □□ □re□e□□□□se □ass □□ers r□□ □e□□□□ □□ □□□er □□□□□□□□□□□□ as□ □□□r□□□□□□a□er □a□d□□□□□se □ers□□a□ □r□e□□□e e□□□□□e□□as des□r□□ed □□ □e□□□□ □□

□□□□□G□□□□re □□a dr□ □a□e a□d □□der □□□er □□ □r□e□□□r□d□□□□

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

□□□□

□□□□□□□□□□ □□□□□□□□□□□□□ □r□□er□□□□□ed □□□ □□ a□□r□□ed □ 9□ ser□es d□s□□sa□e d□s□res□ra□r s□□□ as a 3M □ra□d □□□10, □□□11, □□□33 □r e□□□a□e□, □□ □□□□ □□□□ d□□e□□r□□□ e□s s□□□d □e □sed □□e□□□□□□ d□s□e□s are e□□□□□□ered□□□e □e□e□□□□ass □□ers □□ □□e ar e□□eeds □□e □□□□□a□□□a□e□□□s□re □□□ s□□r □rr□a□□□ □□□□rs□

□□□□□□□□ □□□□□□□□□□□□□a□e□□ □asses □□□□s□de s□e□ds s□□□d □e □□r□a□a □ □□□□ □□□ □□□d□s□□e□□r□□□e□s □□e□ □a□□□□□□es s□□□d □e □□r□

[illegible] s[illegible]e[illegible] [illegible]re[illegible]e[illegible]a[illegible]s[illegible] [illegible]a[illegible]s[illegible]d [illegible]e [illegible]r[illegible], s[illegible] as [illegible]era[illegible]s, [illegible] s[illegible]ee[illegible]es a[illegible]d [illegible]a[illegible]

G[illegible] [illegible]se [illegible]d [illegible]d[illegible]s[illegible]ra[illegible]e[illegible]e [illegible]ra[illegible]es [illegible] [illegible]a[illegible]d[illegible] [illegible]s [illegible]a[illegible]er[illegible]a[illegible] [illegible]a[illegible]a[illegible]e[illegible]e [illegible]as[illegible] [illegible]a[illegible]s [illegible]s re[illegible] [illegible]e[illegible]ded[illegible]

[illegible]G[illegible]G M[illegible] [illegible]se [illegible]e[illegible]era[illegible]e[illegible]a[illegible] a[illegible]d [illegible]se [illegible]a[illegible]e[illegible]a[illegible]s, [illegible]ere [illegible]ss[illegible]e, [illegible]ed [illegible]r e[illegible]sed s[illegible]a[illegible]es [illegible]d s[illegible]read [illegible]er [illegible]ass d[illegible]s[illegible]

[illegible] [illegible]M[illegible]

Mexico

- [illegible]de [illegible]1309 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible]a[illegible]d[illegible] a[illegible]d [illegible]se, [illegible]1 [illegible]3 [illegible]r[illegible]d[illegible] **Carcinogens:** [illegible]s[illegible]e[illegible]ed [illegible]a[illegible] [illegible]ar[illegible]e[illegible] [illegible]se, [illegible]a[illegible]d[illegible], a[illegible]d [illegible]r[illegible]d[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible]

US State California

United States - ACGIH

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3 **TWAs:** [illegible]1 [illegible]e[illegible] [illegible]re[illegible]s [illegible]ers [illegible]s [illegible]a[illegible]e[illegible]ass [illegible]ers[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible] **TLV Basis - Critical Effects:** [illegible]s[illegible]a[illegible]d [illegible]er res[illegible]ra[illegible]r[illegible]ra[illegible] [illegible]rr[illegible]a[illegible]

United States – OSHA

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3 **TWA:** [illegible]1[illegible]3 [illegible]a[illegible]sa[illegible]e d[illegible]s[illegible]3 [illegible]res[illegible]ra[illegible]e [illegible]sa[illegible]e d[illegible]s **NAIMA PEL** [illegible]1 [illegible]s [illegible]a[illegible]e[illegible]ass [illegible]ers[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs (Final PELs):** [illegible]0[illegible]3 [illegible] **TWAs (Vacated PELs):** [illegible]0[illegible]3 [illegible]

United States - NIOSH

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3 **REL/TWA:** [illegible]3 [illegible]a[illegible]ass d[illegible]s[illegible]3 [illegible]res[illegible]ra[illegible]e [illegible]ers[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible]

Canada – British Columbia

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3[illegible]1 [illegible]er[illegible]3 [illegible]ers [illegible]er [illegible]a[illegible], [illegible]a[illegible]as[illegible]e[illegible]ra[illegible]e[illegible]a[illegible]rea[illegible]er [illegible]a[illegible]3[illegible]1 [illegible]re[illegible]a[illegible]ed [illegible]G[illegible]ass [illegible]ers[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible]

Canada – Manitoba

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3[illegible]1 [illegible]er[illegible]3 [illegible]res[illegible]ra[illegible]e [illegible]ers, [illegible]e[illegible], as[illegible]e[illegible]ra[illegible]3[illegible]1, as de[illegible]er[illegible]ed [illegible]e [illegible]e[illegible]ra[illegible]e [illegible]er [illegible]e[illegible]d a[illegible]00[illegible]0[illegible] [illegible]a[illegible]a[illegible]e[illegible]e[illegible], [illegible]s[illegible] [illegible]ase[illegible]ras[illegible]a[illegible]re[illegible]a[illegible]ed [illegible]G[illegible]ass [illegible]ers[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible]

Canada – New Brunswick

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3[illegible]1 [illegible]re[illegible]3 [illegible]ers [illegible]er [illegible]a[illegible] [illegible]a d[illegible]a[illegible]e[illegible]er [illegible]ess [illegible]a[illegible]3 [illegible], as[illegible]e[illegible]ra[illegible]rea[illegible]er [illegible]a[illegible]1[illegible]re[illegible]a[illegible]ed [illegible]G[illegible]ass [illegible]ers[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible]

Canada – Northwest Territories

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3[illegible]3 [illegible]res[illegible]3 [illegible]a d[illegible]a[illegible]e[illegible]er [illegible]3[illegible] a[illegible]d a [illegible]e[illegible]10 [illegible]3 [illegible]a[illegible]ass[illegible]re[illegible]a[illegible]ed [illegible] M[illegible]era[illegible]er[illegible]
- [illegible]de [illegible]1309 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible], [illegible]r[illegible]d[illegible], [illegible]a[illegible]d[illegible] a[illegible]d [illegible]se[illegible] **STELs:** [illegible]1[illegible]3 [illegible], [illegible]r[illegible]d[illegible], [illegible]a[illegible]d[illegible] a[illegible]d [illegible]se[illegible]

Canada – Nova Scotia

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3[illegible]1 [illegible]er[illegible]3 [illegible]res[illegible]ra[illegible]e [illegible]ers, [illegible]e[illegible], as[illegible]e[illegible]ra[illegible]3[illegible]1, as de[illegible]er[illegible]ed [illegible]e [illegible]e[illegible]ra[illegible]e [illegible]er [illegible]e[illegible]d a[illegible]00[illegible]0[illegible] [illegible]a[illegible]a[illegible]e[illegible]e[illegible], [illegible]s[illegible] [illegible]ase[illegible]ras[illegible]a[illegible]re[illegible]a[illegible]ed [illegible]G[illegible]ass [illegible]ers[illegible]
- Me[illegible]a[illegible]a[illegible] [illegible]M [illegible]00 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible] **STELs:** [illegible]1[illegible]3 [illegible]

Canada – Nunavut

- [illegible]r[illegible]s G[illegible]ass [illegible]99[illegible]1[illegible]3[illegible]3 [illegible]re[illegible]3 [illegible]a d[illegible]a[illegible]e[illegible]er [illegible]3[illegible] a[illegible]d a [illegible]e[illegible]10 [illegible]3 [illegible]a[illegible]ass[illegible]re[illegible]a[illegible]ed [illegible] M[illegible]era[illegible]er[illegible]
- [illegible]de [illegible]1309 [illegible] **TWAs:** [illegible]0[illegible]3 [illegible], [illegible]r[illegible]d[illegible], [illegible]a[illegible]d[illegible] a[illegible]d [illegible]se[illegible] **STELs:** [illegible]1[illegible]3 [illegible], [illegible]r[illegible]d[illegible], [illegible]a[illegible]d[illegible] a[illegible]d [illegible]se[illegible]

Canada – Ontario
- □□r□□s G□ass □□□99□1□3□□1 □□res□□□ 3 □□ □□□□ □res□ra□□e, e□□□□□□ □ □r□□s, as□e□□ra□□□□□ 3 1 □re□a□ed □□ G□ass □□□□□□□ers□
- □□□□□ □□□□ □□□de □1309□□□□□□□□**TWAEVs:** □0□□□ □ □□□□ 3 □□ □□□□ □□a□d□□□□ a□d □se, □□□□□

Canada – Quebec
- □□r□□s G□ass (6□99□7□17□3): 2 □□□res/□□3 □WAEV □res□ra□□e) □re□a□ed to □□s□a□□□□ wool □□ers, □ass woo□)
- An□imony □□□de □1309□□4-4) **TWAEVs:** □0.□ mg/m 3 TWAEV (Sb □□

Canada – Yukon
- □□r□□s G□ass (6□99□7□17□3) □30 mppcf TWA; □ 10 mg/□3 TWA □res□ra□□e □ass) (e□a□ed □□ M□□era□ woo□ □□□er)
- Me□a□□a□□□ M□□□□00□□□□□□□□**TWAs:** □0□□□ □ □□□□ 3 □□ □ □□□□□□**TWAs:** □0□□□ □ □□□□ 3 □□ □ □□□□□□**STELs:** □0□□□□ □ □□□□ 3 □□□□ □□□□□□

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYS □□□L □□□M: □□□d

APPEARANCE □□ESCR □PT □□□: □e□□□□ □□□ers asse□ □□ed □□□□□ □a□□e□s □r □□□se □□□□□□□□ □□□ a□□□res□□ d□r. □□e □a□□e□s m□y □□e □a□□ed □□□□ □□ra□□, a□□□ □□□□□ □□□□□r □□□er □a□□□□s.

□□LOR □□e□□□□□		ODOR: □a□□□res□□ d□r	
TASTE: No da□a a□a□a□□e		ODOR TH □E □□OLD: NDA	
□□ □□□□□G PO□NT:	> 255 □ F(> 1398.888 9 C)	VAPOR PRES □URE:	NDA
M□□□□□G □□□□/ □□□□□□G PO□NT:	255 □ F(1398.88 □9 C)	VAPOR DE □S□TY:	NDA
□□□□□□□□ G□□□□□□:	2□5	EVAPORAT □□□ RAT □:	NDA
D□NS□TY:	2□.8625 □□s/□a□	VOC □WT.):	NDA
BULK □□□□□□□:	NDA	VOC □VOL.):	NDA
□ □□□□ □□□□□□□□□□:	Slightly Solub □e	□□□□□□□□□ (□ □.):	NDA
SOLVENT □□□□□□□□□□:	NDA	VOL □TILES □□OL □□□	NDA
VISCOS □TY:	NDA	FLASH □□□□□:	NDA
H□LF-LIFE:	NDA	FLASH □□□□□ TEST TYPE:	NDA
OCTANOL/WATER □□□□□□□□□ C□EFF □C□□NT:	NDA	UEL:	NDA
□□□□□□□□□□□ OF WA□□R/OI □ □□□□□□□□□□□□:	NDA	LEL:	NDA
BIOACCU MULA □□□N □□□□□: NDA		□□□□G□□□□□□:	NDA
PH:	NDA		

SECTION 10 - STABILITY AND REACTIVITY

STAB □L□□Y: □□a□□e □□der no□m□l con□ition□s.

H□ZARDOU □ POLY MER □□ATION: □a□ard□□s polym eri□ation not □□d□□a□ed.

[illegible]: Keep away from heat, ignition sources and incompatible materials.

Incompatible Materials: Hydrofluoric acid ([illegible]-39-3).

Hazardous Decomposition Products: Hazardous decomposition products may include oxides of carbon, sulfur and other [illegible] organic compounds, oxides of arsenic, oxides of [illegible], hydrogen [illegible]ride, a[illegible], [illegible]de gas, hydrogen [illegible]de, formaldehyde, and trace hydrogen halides.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity: Temporary irritation may be observed in the upper respiratory system, eyes, and skin. This product has not been tested as a separate entity. Therefore, the hazards must be evaluated on the basis of the individual ingredients, and these hazards must be assumed to be additive in the absence of other information.

Chronic Health Effects: This product contains a [illegible] which may cause cancer based on scientific animal data. This product contains glass [illegible] fibers. [illegible] a [illegible] review [illegible] available medical and scientific data available at a meeting in October 2001, the IARC has reconsidered the classification for glass wool insulation fibers from a Group 2B classification "possibly carcinogenic to humans" to a Group 3 classification "not classifiable as to carcinogenicity in humans". IARC also said that there is "no evidence of increased risk of lung cancer or mesothelioma from occupational exposures during manufacturing of these materials, and inadequate evidence over all of any cancer risk".

Carcinogenicity Classification:

Fiber glass wool, which is made from either [illegible] is also called fiber glass [illegible] fibrous glass (65997-17-3).

ACGIH	A3 [illegible] ed animal carcinogen with [illegible] relevance to humans related to Glass wool fibers.
[illegible]	Reasonably anticipated to be a carcinogen (respirable size) related to Glass wool fibers (possible to be a carcinogen).
[illegible]	Monograph 81 (2002) listed under Man-Made Vitreous Fibers; Monograph 43 (1988) related to insulation glass wool Group 3 (not classifiable).

[illegible] [illegible] r[illegible]de (1309-[illegible])

ACGIH	[illegible] suspected as a human carcinogen [illegible]
[illegible]	Monograph [illegible] (19[illegible]9) Group [illegible] possibly carcinogenic to humans.

SECTION 12 - ECOLOGICAL INFORMATION

[illegible]: [illegible]dered inert fiber glass is [illegible]. Therefore, no adverse environmental effects would be expected if this product were accidentally released to the water or soil. [illegible] materials [illegible] expected to be [illegible].

[illegible]: No information available for the product.

[illegible]: No information available for the product.

SECTION 13 - DISPOSAL CONSIDERATIONS

[illegible]: Dispose of waste material at an approved landfill in accordance with federal, state, and local regulations. [illegible] are [illegible] regulations, [illegible] health department, or the [illegible] office [illegible]

Protective Measures: See Section 7 for Handling Procedures, see Section 8 for Personal Protective Equipment recommendations.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT (49 CFR 172.101):

[illegible]: Not Classified as a Hazardous Material for Transport.

TDG (Canada) [illegible]:

[illegible]: Not Classified as a Dangerous Good for Transport.

SECTION 15 - REGULATORY INFORMATION

[illegible]:

Acute Health: Yes Chronic Health: Yes Fire: No Pressure: No Reactive: No

US Federal:

General Federal TSCA Status:

All components of this product have been checked against the EPA TSCA Inventory. The components of this product are either [illegible] using the polymers, hydrates or are listed on the TSCA inventory as declared by the supplier.

SARA 313:

This material contains the following chemicals required to be identified under SARA Section 313 (40 CFR 30[illegible]):

- Iron oxide (1309-37-1) [illegible] 1% 1000 [illegible]

State Regulations:

US State Right to Know Laws:

The following chemicals appear on one or more of the following state hazardous substances lists or reporting lists:

Component	CAS #	CA	MA	MN	NJ	PA	RI
Fiberglass mat, which is made from either continuous filament fiber glass (textile glass) or fibrous glass (referred to as Mineral wool fiber)	65997-17-3	Yes	Yes	Yes	No	Yes	Yes
Iron oxide	1309-37-1	Yes	Yes	Yes	Yes	Yes	Yes

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65):

The following statements are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING!

This product contains a chemical known to the state of California to cause cancer.

□□□□□□□□ □ □M□□ □□□□ M□□□□□

G□□□□□□□ □□□□□□□ □□□□ M□□□□□

□lass □ □□□s□□□□s a□d □□e□□□□s Ma□erials □□□□s□□□□ □ □□□□d□□s□□□ □, □lass □ □□□s□□□□s a□d □□e□□□□s Ma□erials □□□□s□□□□ □ □□□□d□□s□□□ □

□□M□□□□□□ □□□□□□□□ □□ □M□□ □□□□

□□e □□□□□□□□□ □□□□ □□□e□s are de□□□□ed □□der □□e □a□ad□a□ □a□ard□□s □r□d□□s □□□□□□□red□e□□ □s□□□s□re □s□□

- □□□□ □□□□ □□de 1309□□□□□□□□ □□ 1□ 1 □

□□□□□□□ □□□□ □□G□□□□□□□ □□□□ M□□□□□

G□□□□□□□ □□□□□□□ □□□□ M□□□□□

□e□ □□rar□ □rr□a□□□ □a□□e □□ser□ed □□ □□e □□□er res□ra□□r□s□s□e□, e□es, a□d s□□□□ □se □□□□ese □r□d□□s □as □□□□□ee□s□□□□ □ □□ a□se □a□□er □□ □□□□ a□s□□□□er □lass □ □□□□s a □□ssi□□e □a□□er □a□ard□ □□□er □lass □ □□□□□as □a□sed □a□□er □□ a□□□a□s □□□□□as □□□□r□d□□ed □a□□er □□ □□□□a□a□□□□ □□ □□□□ a□s□ □□M□□□□□□ □□□□□□□□ □□ □□□□□□□□□□

Component	CAS #	TSCA	DSL	EINECS
□□er□lass □a□, □□□□□□s □ade □□□ e□□er□□ □□□□□□□□□□s □a□ e□□□□er □lass □e□a□s□a□ed□□r □□r□□s □lass	□□99□1□3	□es	□es	□es
□□e□□□, □□□□□□er □□□□ □□r□a□de□□de a□d □rea	□□10□□□□□□□	□es	□es	□□
□□e□□□a□d, □□□□□es□er, □□□□□□er	9003□□0□□	□es	□es	□□
□□□□□□□□e□□□e□e□□□□ere□□□□a□□□□□	□□03□□□9□9	□es	□es	□□
□□□□□ □□□□ □□de	1309□□□□□□	□es	□es	□es

SECTION 16 - OTHER INFORMATION

□□□□□□□□□□□ □□□□□3□□□□□00□

□□□□ □□□□□□□□ □□□□□□1□□□010

□□□□□□M□□□□eas□□a□e □are □as □ee□ □a□e□ □□ □□e □re□ara□□□□ □□□□□s □□□□r□a□□□, □□□□□□e s□□□□□er □□□es □□ □arra□□□ □□□□er□□a□□a□□□□□□ □r □□□□□□ess □□r a □ar□□□□□ar □□r□□se□ □□□□ r□d□□□□□□r□□ased s s□d □□ □□e ass□□ □□□□□□ □□e □□r□□aser □□□□□□a□e □s □□□□ □es□s □□ de□er□ □□e □□e □□a□□□□a□d s□□a□□□□□ □□□□□e r□d□□□□ □□□□□□□er e□□ress□□ d□s□a□□s a□□a□d a□□a□□□□□□□□ □r □□□de□a□a□d□r □□□se□□e□a□□r□er□□da□a□e ar□s□□□ □□□□□□□□□e □se □□□□□s □r□d□□□□ □□ □□□□r□a□□□□ □r□□□ded s□a□□e dee□ed □□ □e a re□□□ □e□da□□□□ □□ □se a□□ □r□d□□□□□ □□□□□□□□□□□□□□ a□□ e□s□□□□ □a□e□□r□□□s□ □ead □□e Ma□er□a□□a□e□□ □a□a □□ee□□e□□re □a□d□□□□ □r□d□□□□

□□r re□ere□□e □□ □□e a□r□□□□ s□de□□□□□□□□s □sed □□ □□s M□□□ □□ease □s□□□ □□□□□er□a□□eed□□□□ □

M□□□ □□□□□□□

M□□□ □□□□□□□ □□MM□□□□

Date	MSDS No.	Changes
1□1□□□010	□□□10101□□	• M□□□ □□r□a□□□a□□e □□e□ □□□□□□□00□□00□□ G□□ □□□00□ □□r□a□□ □e□□□□□ □ □G□□ □□□□□00□□□□ass□□□a□□□s
□□1□□□010	□□□10101□□	• □dd □□ □□□□□ □e□ □era□□re□□□a□□e, □ □□□□□□ra□ □□□□□ra□, Mar□□e □□□□□□ra□, □a□ad□a□ Me□a□□□□d□□□ □□s□a□□□□ • □□□□□ □□a□□e

This is the end of MSDS CT 10101-3.

1

Spectrum Group
Division of United Industries Corp.
P. O. Box 142642
St. Louis, MO 63114-0642

Material Safety Data Sheet

Complies with OSHA's Hazard Communication Standard, 29 CFR 1910.1200

Hazardous Material Identification System – (HMIS)	
HEALTH – 1	REACTIVITY – 0
FLAMMABILITY – 2	PERSONAL –

I Trade Name: Spectracide Wasp & Hornet Killer$_3$

Product Type: Aerosol insecticide

Product Item Number: 95715-1

Formula Code Number: 21-0666/21-0815

EPA Registration Number	Manufacturer	Emergency Telephone Numbers
9688-190-8845	Chemsico Division of United Industries Corporation 8494 Chapin Industrial Drive St. Louis, MO 63114	**For Chemical Emergency:** 1-800-633-2873 **For Information:** 1-800-917-5438 **Prepared by:** Charlie Duckworth **Date Prepared:** November 3, 2011

II Hazards Ingredient/Identity Information

Chemical	%	OSHA PEL	ACGIH TLV
Mineral spirits CAS# 8012-95-1	4.00	100 ppm	100 ppm
Propylene glycol monobutyl ether CAS# 5131-66-8	6.00	None	None
Lambda-cyhalothrin CAS# 91465-08-6	0.01	NA	2000 mg/kg (skin)
Prallethrin CAS# 23031-36-9	0.025	NE	NE
Hydrocarbon Propellant blend CAS #75-28-5/106-97-8/ 74-98-6	3.50	NE	NE

III Physical and Chemical Characteristics

Appearance & Odor: Wet narrow fan spray with clear wet film and glycol ether odor.
Boiling Point: NA
Melting Point: NA
Vapor Pressure: 110 psig at 54° C/130° F
Specific Gravity: 0.993 (H_2O = 1)
Vapor Density: Greater than 1 (Air = 1)

Solubility in Water: Greater than 87%
Evaporation Rate: Less than 1 (Butyl Acetate = 1)

IV Fire and Explosive Hazards Data

Flash Point: 119° F (TCC) (liquid portion)
Flame Extension: 0-inches (Level 1 Aerosol)
Flammable Limits: NA
Autoignition Temperature: NA
Fire Extinguishing Media: Water fog, Carbon dioxide, Dry chemical
Decomposition Temperature: NA
Special Fire-Fighting Procedures: Keep cans cool. Use equipment or shielding to protect personnel against bursting, rupturing or venting cans.
Unusual Fire & Explosion Hazards: At elevated temperatures (over 54° C/130° F), cans may vent, rupture or burst. Also see Section V.

V Reactivity Data

Stability: Stable
Polymerization: Will not occur
Conditions to Avoid: Temperatures over 130° F
Incompatible Materials: NA
Hazardous Decomposition or Byproducts: Carbon dioxide, carbon monoxide

VI Health Hazard Data

Skin Contact: Avoid contact with skin and clothing. ***First Aid***: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a Poison Control Center or doctor for treatment advice.
Ingestion: First Aid: Immediately call a Poison Control Center or doctor. Do not induce vomiting unless told to do so by a Poison Control Center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.
Special Notes: Have the product container with you when calling a Poison Control Center or doctor, or going for treatment.
Health conditions Aggravated by Exposure: None known
Ingredients listed by NTP, OSHA, or IARC as Carcinogens or Potential Carcinogens: None

VII Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released or Spilled:
Avoid breathing vapors. Avoid contact with liquid. Remove ignition sources. Soak up spills with absorbent material.

Waste Disposal:
Do not puncture or incinerate containers. If empty: Place in trash or offer for recycling if available. If partly filled: Call local solid waste agency for disposal instructions.

Handling & Storage Precautions:
Do not store where temperatures can exceed 54° C/130° F.

VIII Control Measures

Read and follow label directions. They are your best guide to using this product effectively, and give necessary safety precautions to protect your health.

IX Transportation Data

DOT: Consumer Commodity, ORM-D, UN-1950
IMDG: UN-1950, Aerosols, 2.1
IATA: UN-1950, Aerosols, Flammable, 2.1

Material Safety Data Sheet

1. Product and company identification

Product name ARCO Unleaded Gasoline

MSDS # APPC306

Code APPC306

Product use USE AS MOTOR FUEL ONLY.

Synonyms ARCO Unleaded Regular, Midgrade and Premium gasolines; ARCO EC Unleaded Regular, Midgrade and Premium gasolines, CARB Gasoline

Supplier
BP Products North America Inc.
150 West Warrenville Road
Naperville, Illinois 60563-8460
USA

EMERGENCY HEALTH INFORMATION:
1 (800) 447-8735

Outside the US: +1 703-527-3887 (CHEMTREC)

EMERGENCY SPILL INFORMATION:
1 (800) 424-9300 CHEMTREC (USA)

OTHER PRODUCT INFORMATION
1 (866) 4 BP - MSDS
(866-427-6737 Toll Free - North America)
email: bpcares@bp.com

2. Hazards identification

Physical state Liquid.

Color Clear

Emergency overview DANGER !

EXTREMELY FLAMMABLE.
VAPOR MAY CAUSE FLASH FIRE.
INHALATION OF VAPOR/AEROSOL CONCENTRATIONS ABOVE THE RECOMMENDED EXPOSURE LIMITS CAUSES HEADACHES, DIZZINESS, DROWSINESS, AND NAUSEA, AND MAY LEAD TO UNCONSCIOUSNESS OR DEATH.
HARMFUL IF SWALLOWED.
HARMFUL OR FATAL IF LIQUID IS ASPIRATED INTO LUNGS.
CAUSES EYE AND SKIN IRRITATION.
PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION.
LONG-TERM EXPOSURE TO VAPORS HAS CAUSED CANCER IN LABORATORY ANIMALS.

Extremely flammable liquid. Do not ingest. If ingested, do not induce vomiting. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Keep away from heat, sparks and flame. Keep container tightly closed and sealed until ready for use. Use only with adequate ventilation. Wash thoroughly after handling. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Routes of entry Dermal contact. Eye contact. Inhalation. Ingestion.

Potential health effects

Eyes Causes eye irritation.

Skin Causes skin irritation. Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis. See toxicological information (Section 11)

Inhalation Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. See toxicological information (Section 11)

Ingestion Aspiration hazard if swallowed. Can enter lungs and cause damage. See toxicological information (Section 11)

See toxicological information (Section 11)

3. Composition/information on ingredients

Ingredient name	CAS #	%
Gasoline	Mixture	90 - 100
Ethanol	64-17-5	0 - 10
Contains:		
Benzene	71-43-2	0 - 3
n-hexane	110-54-3	1 - 2
Cyclohexane	110-82-7	0 - 1
Ethylbenzene	100-41-4	0 - 2
Toluene	108-88-3	4 - 11
1,2,4-Trimethylbenzene	95-63-6	0 - 3
xylene	1330-20-7	4 - 11
Naphthalene	91-20-3	0 - 0.5

4. First aid measures

Eye contact In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin contact Immediately wash exposed skin with soap and water. Remove contaminated clothing and shoes. Clean shoes thoroughly before reuse. Wash contaminated clothing before reuse. Get medical attention.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. Get medical attention immediately.

Ingestion Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

5. Fire-fighting measures

Flammability of the product Extremely flammable liquid.

Flash point Closed cup: -42.778°C (-45°F)

Explosion limits Lower: 1.3%
Upper: 7.6%
(Estimated.)

Fire/explosion hazards Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Unusual fire/explosion hazards Extremely explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.

Extinguishing media

Suitable Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable Do not use water jet.

Fire-fighting procedures Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous combustion products Combustion products may include the following:
carbon oxides (CO, CO_2) (carbon monoxide, carbon dioxide)

Protective clothing (fire) Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards Do not use water jet.

6. Accidental release measures

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Personal protection in case of a large spill

Chemical splash goggles. Chemical-resistant protective suit. Boots. Chemical-resistant gloves. Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Suggested protective clothing might not be adequate. Consult a specialist before handling this product.

Methods for cleaning up

Large spill

Stop leak if without risk. Eliminate all ignition sources. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Small spill

Stop leak if without risk. Eliminate all ignition sources. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling

Put on appropriate personal protective equipment (see Section 8). Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

Never siphon by mouth.
For use as a motor fuel only. Do not use as a cleaning solvent, thinner or for other non-motor fuel uses. Do not use as a portable heater or appliance fuel.
Warning! Customers should not re-enter vehicle during the re-fueling process as this can generate static electricity and cause a spark and flash fire hazard if sufficient vapors are present. The flow of gasoline through a pump nozzle can produce static electricity, which may cause a fire if gasoline is pumped into an ungrounded container. To avoid static spark hazard when filling portable containers:
- Fill only containers approved to hold gasoline
- Place container on the ground while dispensing fuel.
- Do not fill container in or on a vehicle or on a truck or trailer bed.
- Keep nozzle in contact with container while filling.

"Empty" containers retain liquid and vapor residues and can be dangerous. Do not pressurize, cut, weld, drill, grind or expose to heat, flame, sparks, static electricity, or other sources of ignition, containers with ANY residue; they may explode and cause injury or death.

Storage

Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Other information

Do not enter storage tanks without breathing apparatus unless the tank has been well ventilated and the tank atmosphere has been shown to contain hydrocarbon vapor concentrations of less than 1% of the lower flammability limit and an oxygen concentration of at least 20% volume.

Light hydrocarbon vapors can build up in the headspace of tanks. These can cause flammability/ explosion hazards even at temperatures below the normal flash point (note: flash point must not be regarded as a reliable indicator of the potential flammability of vapor in tank headspaces).

Tank headspaces should always be regarded as potentially flammable and care should be taken to avoid static electrical discharge and all ignition sources during filling, ullaging and sampling from storage tanks. When the product is pumped (e.g. during filling, discharge or ullaging) and when sampling, there is a risk of static discharge. Ensure equipment used is properly earthed or bonded to the tank structure. Electrical equipment should not be used unless it is intrinsically safe (i.e. will not produce sparks).

8. Exposure controls/personal protection

Occupational exposure limits

Ingredient name	Occupational exposure limits
Gasoline	**ACGIH TLV (United States).** TWA: 300 ppm 8 hour(s). Issued/Revised: 5/1996 TWA: 890 mg/m³ 8 hour(s). Issued/Revised: 5/1996 STEL: 500 ppm 15 minute(s). Issued/Revised: 5/1996 STEL: 1480 mg/m³ 15 minute(s). Issued/Revised: 5/1996
Ethanol	**ACGIH TLV (United States).** STEL: 1000 ppm 15 minute(s). Issued/Revised: 11/2008 **OSHA PEL (United States).** TWA: 1900 mg/m³ 8 hour(s). Issued/Revised: 6/1993 TWA: 1000 ppm 8 hour(s). Issued/Revised: 6/1993
Benzene	**ACGIH TLV (United States). Absorbed through skin.** STEL: 8 mg/m³ 15 minute(s). Issued/Revised: 5/1997 STEL: 2.5 ppm 15 minute(s). Issued/Revised: 5/1997 TWA: 1.6 mg/m³ 8 hour(s). Issued/Revised: 5/1997 TWA: 0.5 ppm 8 hour(s). Issued/Revised: 5/1997 **OSHA PEL (United States).** STEL: 5 ppm 15 minute(s). Issued/Revised: 6/1993 TWA: 1 ppm 8 hour(s). Issued/Revised: 6/1993 **OSHA PEL Z2 (United States).** AMP: 50 ppm 10 minute(s). Issued/Revised: 6/1993 CEIL: 25 ppm Issued/Revised: 6/1993 TWA: 10 ppm 8 hour(s). Issued/Revised: 6/1993
n-hexane	**OSHA PEL (United States). Absorbed through skin.** TWA (States of California & Washington): 50 ppm 8 hour(s). Form: Vapor TWA: 1800 mg/m³ 8 hour(s). Issued/Revised: 6/1993 TWA: 500 ppm 8 hour(s). Issued/Revised: 6/1993 STEL (State of Washington): 75 ppm 15 minute(s). **ACGIH TLV (United States). Absorbed through skin.** TWA: 50 ppm 8 hour(s). Issued/Revised: 9/1998
Cyclohexane	**ACGIH TLV (United States).** TWA: 100 ppm 8 hour(s). Issued/Revised: 1/2002 **OSHA PEL (United States).** TWA: 1050 mg/m³ 8 hour(s). Issued/Revised: 6/1993 TWA: 300 ppm 8 hour(s). Issued/Revised: 6/1993
Ethylbenzene	**ACGIH TLV (United States).** TWA: 20 ppm 8 hour(s). Issued/Revised: 12/2010 **OSHA PEL (United States).** TWA: 435 mg/m³ 8 hour(s). Issued/Revised: 6/1993 TWA: 100 ppm 8 hour(s). Issued/Revised: 6/1993
Toluene	**OSHA PEL Z2 (United States).** AMP: 500 ppm 10 minute(s). Issued/Revised: 6/1993 CEIL: 300 ppm Issued/Revised: 6/1993 TWA: 200 ppm 8 hour(s). Issued/Revised: 6/1993 **ACGIH TLV (United States).** TWA: 20 ppm 8 hour(s). Issued/Revised: 11/2006
1,2,4-Trimethylbenzene	**ACGIH TLV (United States).** TWA: 123 mg/m³ 8 hour(s). Issued/Revised: 9/1994 TWA: 25 ppm 8 hour(s). Issued/Revised: 9/1994
xylene	**ACGIH TLV (United States).** STEL: 651 mg/m³ 15 minute(s). Issued/Revised: 5/1996 STEL: 150 ppm 15 minute(s). Issued/Revised: 5/1996 TWA: 434 mg/m³ 8 hour(s). Issued/Revised: 5/1996 TWA: 100 ppm 8 hour(s). Issued/Revised: 5/1996 **OSHA PEL (United States).** TWA: 435 mg/m³ 8 hour(s). Issued/Revised: 6/1993 TWA: 100 ppm 8 hour(s). Issued/Revised: 6/1993

Naphthalene	**ACGIH TLV (United States). Absorbed through skin.** STEL: 79 mg/m³ 15 minutes. Issued/Revised: 5/1996 STEL: 15 ppm 15 minutes. Issued/Revised: 5/1996 TWA: 52 mg/m³ 8 hours. Issued/Revised: 5/1996 TWA: 10 ppm 8 hours. Issued/Revised: 5/1996 **OSHA PEL (United States).** TWA: 50 mg/m³ 8 hours. Issued/Revised: 6/1993 TWA: 10 ppm 8 hours. Issued/Revised: 6/1993

While specific OELs for certain components may be shown in this section, other components may be present in any mist, vapor or dust produced. Therefore, the specific OELs may not be applicable to the product as a whole and are provided for guidance only.

Some states may enforce more stringent exposure limits.

Control Measures

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Personal protection

Eyes

Avoid contact with eyes. Safety glasses with side shields or chemical goggles.

Skin and body

Do not get on skin or clothing. Wear clothing and footwear that cannot be penetrated by chemicals or oil.

Respiratory

Use only with adequate ventilation. Avoid breathing vapor or mist. If ventilation is inadequate, use a NIOSH certified respirator with an organic vapor cartridge and P95 particulate filter.

CAUTION: The protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, if exposure levels are not known, or if concentrations exceed the protection limits of air-purifying respirator.

Hands

Wear gloves that cannot be penetrated by chemicals or oil.

The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Consult your supervisor or Standard Operating Procedure (S.O.P) for special handling instructions.

9. Physical and chemical properties

Physical state

Liquid.

Color

Clear

Odor

Hydrocarbon.

Flash point

Closed cup: -42.778°C (-45°F)

Explosion limits

Lower: 1.3%
Upper: 7.6%
(Estimated.)

Density

750 kg/m³ (0.75 g/cm³)

Boiling point / Range

26.67 to 221°C (80 to 430°F)

Vapor pressure

48.134 to 103.146 kPa (361.97 to 775.66 mm Hg)

Volatility

100% (v/v)

Solubility

Very slightly soluble in water

10. Stability and reactivity

Stability and reactivity The product is stable.

Possibility of hazardous reactions Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid Keep away from heat, sparks and flame. Avoid all possible sources of ignition (spark or flame).

Incompatibility with various substances Reactive or incompatible with the following materials: oxidizing materials.
Chlorine and Fluorine

Hazardous decomposition products carbon oxides (CO, CO_2) (carbon monoxide, carbon dioxide)

Hazardous polymerization Will not occur.

11. Toxicological information

Classification

Product/ingredient name	IARC	NTP	OSHA
xylene	3	-	-
Toluene	3	-	-
Benzene	1	Proven.	+
Ethylbenzene	2B	-	-
Naphthalene	2B	Possible	-

IARC :
1 - Carcinogenic to human.
2B - Possible carcinogen to human.
3 - Not classifiable as a human carcinogen.

NTP :
Proven - Known to be human carcinogens.
Possible - Reasonably anticipated to be human carcinogens.

OSHA :
+ Potential occupational carcinogen

Other information

Aspiration of this product into the lungs can cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this product. Do not siphon by mouth.

Excess exposure to vapors may produce headaches, dizziness, nausea, drowsiness, irritation of eyes, nose and throat and central nervous system depression. Aspiration of this material into the lungs can cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this product. Inhalation of unleaded gasoline vapors did not produce birth defects in laboratory animals. Ingestion of this material can cause gastrointestinal irritation and diarrhea.

In a long-term inhalation study of whole unleaded gasoline vapors, exposure-related kidney damage and kidney tumors were observed in male rats. Similar kidney effects were not seen in female rats or in mice. At the highest exposure level (2056 ppm), female mice had an increased incidence of liver tumors. Results from subsequent scientific studies have shown that a broad variety of chemicals cause these kidney effects only in the male rat. Further studies have discovered the means by which the physiology of the male rat uniquely predispose it to these effects. Consequently, the Risk Assessment Forum of the Environmental Protection Agency has recognized that these responses are not predictive of a human health hazard. The liver tumors that were increased in the high-dose female mice are likewise of questionable significance because of their high spontaneous occurrence even without chemical exposure and because the rate of their occurrence is accelerated by a broad spectrum of chemicals not commonly considered to be carcinogens (e.g., phenobarbital). Thus, the significance of the mouse liver tumor response in terms of human health is questionable.

Gasoline is a complex mixture of hydrocarbons and contains benzene (typically no more than 2 volume%), toluene, and xylene. Chronic exposure to high levels of benzene has been shown to cause cancer (leukemia) in humans and other adverse blood effects (anemia). Benzene is considered a human carcinogen by IARC, NTP and OSHA. Over exposure to xylene and toluene

can cause irritation to the upper respiratory tract, headache and narcosis. Some liver damage and lung inflammation were seen in chronic studies on xylene in guinea pigs but not in rats.

Solvent "sniffing" (abuse) or intentional overexposure to vapors can produce serious central nervous system effects, including unconsciousness, and possibly death.

Exposure to vapor at high concentrations may have the following effects: heart beat irregularity (arrhythmia)

Gasoline as a mixture is classified as a 2B (possible human) carcinogen by IARC.

Gasoline engine exhaust is classified as possibly carcinogenic to humans by IARC (2B). This classification is based primarily on animal and in vitro studies of gasoline engine exhaust condensates/extracts. Studies of the gaseous exhaust stream in animals did not provide sufficient evidence for classification as a carcinogen.

Gasoline: Additional toxicity information on components.

This product contains n-hexane. Overexposure to n-hexane may cause progressive and potentially irreversible damage to the peripheral nervous system, particularly in the arms and legs. Animal studies have also shown that n-hexane overexposure may cause testicular injury. However, animal studies conducted with commercial hexane, containing 53% n-hexane, showed neither peripheral nervous system damage nor testicular injury at inhalation exposures up to 9000 ppm.

Ethanol:
Irritancy - Skin: A single 4h semi-occlusive application to intact rabbit skin produced minimal signs of irritation (mean scores for erythema or oedema less than 2).

Irritancy - Eye. The eye irritancy has been investigated by OECD Test method 405. Single application to the rabbit eye produced conjunctival irritation and transient corneal damage. The effect was insufficient to warrant classification as an eye irritant.

Sensitization: The material is not sensitizing in standard animal tests. In rare cases non -irritant contact dermatitis has been identified in humans after skin exposure to this material. Such cases have been identified as delayed hypersensitivity or as urticarial reactions. In reactive individuals such reactions may also be elicited by drinking alcoholic drinks or by cross reaction to certain other alcohols.

Sub-acute/Subchronic Toxicity: It has been shown in many animal experiments that the repeated oral consumption of large doses of ethanol can lead to damage in practically all organ systems. The main manifestations of the toxic effects are shown by the liver.

Chronic toxicity/carcinogenicity: No convincing evidence of carcinogenic effects in animal studies.

Genotoxicity : The product has been tested in a number of bacterial and mammalian systems. The product did not exhibit mutagenic activity in the following systems (with and without metabolic activation): Drosophila. Salmonella typhimurium. Human lymphocytes in vitro. Most in vitro tests and all in vivo tests for chromosome abberations report negative results. The product did not induce micronuclei in standard bone marrow tests in vivo. There is some evidence that ethanol both induces SCE in vivo and can also act as an aneugen at high doses. Overall, there is no robust evidence that ethanol is a genotoxic hazard according to the criteria normally applied for the purpose of classification and labelling of industrial chemicals.

Reproductive/Developmental Toxicity: Adverse effects on the male reproductive system have been reported in laboratory animals following repeated exposure to high concentrations. Developmental effects have been observed in laboratory animals following large oral exposures.

Human data: In humans excessive consumption of alcoholic beverages during pregnancy is associated with the induction of Fetal Alcohol Syndrome in the offspring. Reduced birth weight and physical and mental defects occur. There is no evidence that such effects might be caused by exposures other than direct ingestion of alcoholic drinks. In humans high lifetime consumption of alcoholic beverages can be associated with certain cancers and effects on the liver. There is no evidence that these can be caused by exposure other than direct ingestion of alcoholic drinks (IARC 1988).

Potential chronic health effects

Carcinogenicity

Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

12. Ecological information

Ecotoxicity

No testing has been performed by the manufacturer.

Persistence/degradability Inherently biodegradable

Mobility Spillages may penetrate the soil causing ground water contamination.

Bioaccumulative potential This product is not expected to bioaccumulate through food chains in the environment.

Other ecological information Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

13. Disposal considerations

Waste information The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

NOTE: The generator of waste has the responsibility for proper waste identification (based on characteristic(s) or listing), transportation and disposal

14. Transport information

International transport regulations

Regulatory information	UN number	Proper shipping name	Class	Packing group	Additional information
DOT Classification	UN1203	Gasoline	3	II	-
TDG Classification	UN1203	GASOLINE	3	II	-
IMDG Classification	UN1203	GASOLINE. Marine pollutant	3	II	**Emergency schedules (EmS)** F-E, S-E
IATA/ICAO Classification	-----	Proper classification to be determined at the time of shipment	-----	-----	-

15. Regulatory information

U.S. Federal Regulations

United States inventory (TSCA 8b) All components are listed or exempted.

SARA 302/304: No products were found.
SARA 311/312 Hazards identification: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard

SARA 313

Product name	CAS number	Concentration

Form R - Reporting requirements	Toluene	108-88-3	4 - 11
	xylene	1330-20-7	4 - 11
	Benzene	71-43-2	0 - 3
	1,2,4-Trimethylbenzene	95-63-6	0 - 3
	n-hexane	110-54-3	1 - 2
	Ethylbenzene	100-41-4	0 - 2
	Cyclohexane	110-82-7	0 - 1
	Naphthalene	91-20-3	0 - 0.5
Supplier notification	Toluene	108-88-3	4 - 11
	xylene	1330-20-7	4 - 11
	Benzene	71-43-2	0 - 3
	1,2,4-Trimethylbenzene	95-63-6	0 - 3
	n-hexane	110-54-3	1 - 2
	Ethylbenzene	100-41-4	0 - 2
	Cyclohexane	110-82-7	0 - 1
	Naphthalene	91-20-3	0 - 0.5

CERCLA Sections 102a/103 Hazardous Substances (40 CFR Part 302.4):

CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.54 kg); n-hexane: 5000 lbs. (2270 kg); Cyclohexane: 1000 lbs. (454 kg); Ethylbenzene: 1000 lbs. (454 kg); Toluene: 1000 lbs. (454 kg); xylene: 100 lbs. (45.4 kg); Naphthalene: 100 lbs. (45.4 kg);

State regulations

Massachusetts Substances

The following components are listed: XYLENE; TOLUENE; ETHYL ALCOHOL; BENZENE; PSEUDOCUMENE; HEXANE; ETHYL BENZENE; CYCLOHEXANE

New Jersey Hazardous Substances

The following components are listed: XYLENES; BENZENE, DIMETHYL-; TOLUENE; BENZENE, METHYL-; ETHYL ALCOHOL; ALCOHOL; BENZENE; PSEUDOCUMENE; 1,2,4-TRIMETHYL BENZENE; n-HEXANE; HEXANE; ETHYL BENZENE; BENZENE, ETHYL-; CYCLOHEXANE; NAPHTHALENE; MOTH FLAKES

Pennsylvania RTK Hazardous Substances

The following components are listed: GASOLINE; BENZENE, DIMETHYL-; BENZENE, METHYL-; DENATURED ALCOHOL; BENZENE; PSEUDOCUMENE; HEXANE; BENZENE, ETHYL-; CYCLOHEXANE; NAPHTHALENE

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.
Ethylbenzene; Naphthalene

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
Toluene

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

Other Prop 65 chemicals will result under certain conditions from the use of this material. For example, burning fuels produces combustion products including carbon monoxide, a Prop 65 reproductive toxin.

Other regulations

Canada inventory

All components are listed or exempted.

REACH Status

For the REACH status of this product please consult your company contact, as identified in Section 1.

Australia inventory (AICS)

At least one component is not listed.

China inventory (IECSC)

At least one component is not listed.

Japan inventory (ENCS)

All components are listed or exempted.

Korea inventory (KECI)

All components are listed or exempted.

Philippines inventory (PICCS)

All components are listed or exempted.

16. Other information

Label requirements

DANGER !

EXTREMELY FLAMMABLE.
VAPOR MAY CAUSE FLASH FIRE.
INHALATION OF VAPOR/AEROSOL CONCENTRATIONS ABOVE THE RECOMMENDED EXPOSURE LIMITS CAUSES HEADACHES, DIZZINESS, DROWSINESS, AND NAUSEA, AND MAY LEAD TO UNCONSCIOUSNESS OR DEATH.
HARMFUL IF SWALLOWED.
HARMFUL OR FATAL IF LIQUID IS ASPIRATED INTO LUNGS.
CAUSES EYE AND SKIN IRRITATION.
PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION.
LONG-TERM EXPOSURE TO VAPORS HAS CAUSED CANCER IN LABORATORY ANIMALS.

HMIS® Rating :

Health	*	**1**
Flammability		**3**
Physical Hazard		**0**
Personal protection		**X**

National Fire Protection Association (U.S.A.)

History

Date of issue 12/31/2012.

Date of previous issue 03/01/2012.

Prepared by Product Stewardship

Indicates information that has changed from previously issued version.

Notice to reader

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from BP Group.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken. You can contact the BP Group to ensure that this document is the most current available. Alteration of this document is strictly prohibited.

Material Safety Data Sheet

24 Hour Assistance:
1-847-367-7700
Rust-Oleum Corp.
www.rustoleum.com

Section 1 - Chemical Product / Company Information

Product Name:	UNVRSL +SSPR 6PK GLOSS BLACK	Revision Date:	10/05/2011
Identification Number:	245196		
Product Use/Class:	Topcoat/Aerosols		
Supplier:	Rust-Oleum Corporation 11 Hawthorn Parkway Vernon Hills, IL 60061 USA	Manufacturer:	Rust-Oleum Corporation 11 Hawthorn Parkway Vernon Hills, IL 60061 USA
Preparer:	Regulatory Department		

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL CEILING
Acetone	67-64-1	30.0	500 ppm	750 ppm	1000 ppm	N.E.
Liquefied Petroleum Gas	68476-86-8	30.0	N.E.	N.E.	N.E.	N.E.
n-Butyl Acetate	123-86-4	15.0	150 ppm	200 ppm	150 ppm	N.E.
Medium Oil Alkyd	PROPRIETARY	10.0	N.E.	N.E.	N.E.	N.E.
Solvent Naptha, Light Aromatic	64742-95-6	5.0	N.E.	N.E.	N.E.	N.E.
1,2,4-Trimethylbenzene	95-63-6	5.0	25 ppm	N.E.	N.E.	N.E.
Propylene Glycol Monobutyl Ether	5131-66-8	5.0	N.E.	N.E.	N.E.	N.E.
Carbon Black	1333-86-4	5.0	3.5 mg/m3	N.E.	3.5 mg/m3	N.E.
Xylene	1330-20-7	1.0	100 ppm	150 ppm	100 ppm	N.E.
Ethylbenzene	100-41-4	1.0	100 ppm	125 ppm	100 ppm	N.E.

Section 3 - Hazards Identification

*** Emergency Overview ***: Harmful if inhaled. May affect the brain or nervous system causing dizziness, headache or nausea. Contents Under Pressure. Vapors may cause flash fire or explosion. Harmful if swallowed. Extremely flammable liquid and vapor.

Effects Of Overexposure - Eye Contact: Causes eye irritation.

Effects Of Overexposure - Skin Contact: Prolonged or repeated contact may cause skin irritation. Substance may cause slight skin irritation.

Effects Of Overexposure - Inhalation: High vapor concentrations are irritating to the eyes, nose, throat and lungs. Harmful if inhaled. High gas, vapor, mist or dust concentrations may be harmful if inhaled. Avoid breathing vapors or mists.

Effects Of Overexposure - Ingestion: Aspiration hazard if swallowed; can enter lungs and cause damage. Substance may be harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: May cause central nervous system disorder (e.g., narcosis

involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Overexposure to xylene in laboratory animals has been associated with liver abnormalities, kidney, lung, spleen, eye and blood damage as well as reproductive disorders. Effects in humans, due to chronic overexposure, have included liver, cardiac abnormalities and nervous system damage.

Contains carbon black. Chronic inflammation, lung fibrosis, and lung tumors have been observed in some rats experimentally exposed for long periods of time to excessive concentrations of carbon black and several insoluble fine dust particles. Tumors have not been observed in other animal species (i.e., mouse and hamster) under similar circumstances and study conditions. Epidemiological studies of North American workers show no evidence of clinically significant adverse health effects due to occupational exposure to carbon black.

Carbon black is listed as a Group 2B-"Possibly carcinogenic to humans" by IARC and is proposed to be listed as A4- "not classified as a human carcinogen" by the American Conference of Governmental Industrial Hygienists. Significant exposure is not anticipated during brush application or drying. Risk of overexposure depends on duration and level of exposure to dust from repeated sanding of surfaces or spray mist and the actual concentration of carbon black in the formula.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Section 4 - First Aid Measures

First Aid - Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids open. Get medical attention. Do NOT allow rubbing of eyes or keeping eyes closed.

First Aid - Skin Contact: Wash with soap and water. Get medical attention if irritation develops or persists.

First Aid - Inhalation: If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical assistance immediately.

First Aid - Ingestion: Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. Get immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point: -156 F (Setaflash)

Extinguishing Media: Film Forming Foam, Carbon Dioxide, Dry Chemical, Dry Sand, Water Fog

Unusual Fire And Explosion Hazards: Perforation of the pressurized container may cause bursting of the can. Isolate from heat, electrical equipment, sparks and open flame. Keep containers tightly closed. Vapors can travel to a source of ignition and flash back. Vapors may form explosive mixtures with air. Closed containers may explode when exposed to extreme heat. FLASH POINT IS LESS THAN 20 °. F. - EXTREMELY FLAMMABLE LIQUID AND VAPOR! Water spray may be ineffective.

Special Firefighting Procedures: Evacuate area and fight fire from a safe distance.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Contain spilled liquid with sand or earth. DO NOT use combustible materials such as sawdust. Remove all sources of ignition, ventilate area and remove with inert absorbent and non-sparking tools. Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers.

Section 7 - Handling And Storage

Handling: Wash hands before eating. Use only in a well-ventilated area. Avoid breathing vapor or mist. Wash thoroughly after handling. Follow all MSDS/label precautions even after container is emptied because it may retain product residues.

Storage: Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Do not store above 120 ° F. Store large quantities in buildings designed and protected for storage of NFPA Class I flammable liquids. Contents under pressure. Do not expose to heat or store above 120 ° F.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation.

Respiratory Protection: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. A NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.

Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or in any other circumstances where air purifying respirators may not provide adequate protection.

Skin Protection: Nitrile or Neoprene gloves may afford adequate skin protection. Use impervious gloves to prevent skin contact and absorption of this material through the skin.

Eye Protection: Use safety eyewear designed to protect against splash of liquids.

Other protective equipment: Refer to safety supervisor or industrial hygienist for further information regarding personal protective equipment and its application.

Hygienic Practices: Wash thoroughly with soap and water before eating, drinking or smoking.

Section 9 - Physical And Chemical Properties

Vapor Density:	Heavier than Air	Odor:	Solvent Like
Appearance:	Aerosolized Mist	Evaporation Rate:	Faster than Ether
Solubility in H2O:	Slight	Freeze Point:	N.D.
Specific Gravity:	0.775	pH:	N.A.
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Avoid temperatures above 120 ° F. Avoid all possible sources of ignition.

Incompatibility: Incompatible with strong oxidizing agents, strong acids and strong alkalies.

Hazardous Decomposition: When heated to decomposition, it emits acrid smoke and irritating fumes. By open flame, carbon monoxide and carbon dioxide.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Chemical Name	LD50	LC50
Acetone	5800 mg/kg (Rat)	50100 mg/m3 (Rat, 8Hr)
Liquefied Petroleum Gas	N.E.	N.E.
n-Butyl Acetate	13100 mg/kg (Rat, Oral)	2000 ppm (Rat, Inhalation, 4 Hr)
Medium Oil Alkyd	N.E.	N.E.
Solvent Naptha, Light Aromatic	4700 mg/kg (Rat, Oral)	3670 mg/kg (Rat, Inhalation)
1,2,4-Trimethylbenzene	N.E.	18000 mg/m3 (Rat, 4Hr)
Propylene Glycol Monobutyl Ether	2200 mg/kg (Rat, Oral)	N.E.
Carbon Black	>8000 mg/kg (Rat, Oral)	N.E.
Xylene	4300 mg/kg (Rat, Oral)	5000 ppm (Rat, Inhalation, 4Hr)
Ethylbenzene	3500 mg/kg (Rat, Oral)	N.E.

Section 12 - Ecological Information

Ecological Information: Product is a mixture of listed components.

Section 13 - Disposal Information

Disposal Information: Dispose of material in accordance to local, state and federal regulations and ordinances. Do not allow to enter storm drains or sewer systems.

Section 14 - Transportation Information

	Domestic (USDOT)	International (IMDG)	Air (IATA)
Proper Shipping Name:	Consumer Commodity	Aerosols	Aerosols
Hazard Class:	ORM-D	2.1	2.1
UN Number:	N.A.	UN1950	UN1950
Packing Group:	N.A.	N.A.	N.A.
Limited Quantity:	No	Yes	Yes

Section 15 - Regulatory Information

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD, PRESSURIZED GAS HAZARD

SARA Section 313:

Listed below are the substances (if any) contained in this product that are 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:

Chemical Name	CAS Number
1,2,4-Trimethylbenzene	95-63-6
Xylene	1330-20-7

Toxic Substances Control Act:

Listed below are the substances (if any) contained in this product that are subject to the reporting requirements of TSCA 12(B) if exported from the United States:

U.S. State Regulations: As follows -

New Jersey Right-to-Know:

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name	CAS Number
Alkyd Resin	PROPRIETARY

Pennsylvania Right-to-Know:

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name	CAS Number
Alkyd Resin	PROPRIETARY

International Regulations: As follows -

CANADIAN WHMIS:

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: AB5 D2A D2B

Section 16 - Other Information

HMIS Ratings:

Health: 2* Flammability: 4 Physical Hazard: 0 Personal Protection: X

NFPA Ratings:

Health: 2 Flammability: 4 Instability: 0

VOLATILE ORGANIC COMPOUNDS, g/L: 528

REASON FOR REVISION: Regulatory Update

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Rust-Oleum Corporation believes, to the best of its knowledge, information and belief, the information contained herein to be accurate and reliable as of the date of this material safety data sheet. However, because the conditions of handling, use, and storage of these materials are beyond our control, we assume no responsibility or liability for personal injury or property damage incurred by the use of these materials. Rust-Oleum Corporation makes no warranty, expressed or implied, regarding the accuracy or reliability of the data or results obtained from their use. All materials may present unknown hazards and should be used with caution. The information and recommendations in this material safety data sheet are offered for the users' consideration and examination. It is the responsibility of the user to determine the final suitability of this information and to comply with all applicable international, federal, state, and local laws and regulations.

MICHIGAN COATING PRODUCTS, INC.
GRAND RAPIDS, MI 49503 **JANUARY 1, 2000**

MATERIAL SAFETY DATA SHEET

MANUFACTURER'S NAME: Michigan Coating Products, Inc.
ADDRESS: 601 Ionia S.W.
Grand Rapids, MI 49503
PHONE: (616) 456-8800
FOR CHEMICAL EMERGENCY SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT-CALL: (800) 373-7542

PRODUCT NAME: TOUCH UP LACQUER-AEROSOL **PRODUCT CODE:** [redacted]
HAZARDOUS CLASS:
HMIS RATING HEALTH: 2 REACTIVITY: 0
FLAMMABILITY: 3 PERSONAL PROTECTION: -
CHEMICAL FAMILY: NITROCELLULOSE LACQUER
CHEMICAL NAME & SYNONYMS: MODIFIED NITROCELLULOSE RESIN

PHYSICAL DATA – FIRE AND EXPLOSION HAZARD DATA

(PROPELLANT)
VAPOR PRESSURE: 1600 TO 5600 mm HG
VAPOR DENSITY (AIR-1): HEAVIER
%VOLATILE BY VOLUME: 80-90 W/PROPELL
EVAP. RATE (BUT.ACE-1): FASTER

FLASH POINT: GEG; -10F METHOD: TCC
FLAMMABLE LIMITS (%VOL) LOWER: 1.70
UPPER:
CONSUMER COMMODITY ORM-D

FIRE EXTINGUISHER MEDIA:
FOAM, C02, OR DRY CHEMICAL
WATER FOG MAY LESSEN INTENSITY

OTHER SPECIAL PRECAUTIONS:
PROPELLANT IS A COMPRESSED FLAMMABLE GAS
STORE AWAY FROM HEAT
DO NOT PUNCTURE CONTAINER
CONTAINER MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT

HAZARDOUS INGREDIENTS

PIGMENTS:	%WT	TLV	SOLVENTS:	%WT	TLV
VARIOUS INNERT PIGMENTS	3-5	N/A	ACETONE (67-64-1)	16-30	750 PPM
			ETHYL ACETATE (141-78-6)	20-25	400 PPM
			BUTYL ACETATE (123-86-4)	3-18	150 PPM
			ISO PROPYL ALCOHOL (67-63-0)	1-3	400 PPM
VEHICLE	%WT	TLV	PROPELLANTS:	%WT	TLV
MODIFIED NITROCELLULOSE RESIN	7-15	N/A	PROPANE (74-98-6)	8-18	1000
			ISO BUTANE (75-28-5)		N/A
HAZARDOUS MIXTURES OR OTHER LIQUIDS, SOLIDS OR GASES				%WT	TLV

SPECIAL PROTECTION INFORMATION: RESPIRATORY PROTECTION: NONE NORMALLY NEEDED.
VENTILATION: MOVING FLOW OF FRESH AIR. PROTECTIVE GLOVES: NONE. EYE PROTECTION:
SAFETY GLASSES. OTHER PROTECTIVE EQUIPMENT: NONE

CONTACT PERSON: T. J. LILLEY

MICHIGAN COATING PRODUCTS, INC.
GRAND RAPIDS, MI 49503

HEALTH HAZARD DATA

****

EFFECTS OF OVER EXPOSURE: EYES: SEVERE IRRITATION AND DISCOMFORT. REVERSIBLE AND/OR IRREVERSIBLE DAMAGE MAY OCCUR. SKIN: SEVERE IRRITATION AND DISCOMFORT. DEFATTING OF SKIN, CHEMICAL DERMATITIS, AND OTHER TOXIC SYSTEMIC EFFECTS FROM SKIN ABSORPTIONS ARE POSSIBLE. INHALATION: DIZZINESS. IMPAIRED COORDINATION, HEADACHES AND LOSS OF CONSCIOUSNESS, SEVERE RESPIRATORY TRACT IRRITATION. TOXIC SYSTEMIC EFFECTS ARE POSSIBLE.

FIRST AID PROCEDURES: EYES: FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. GET IMMEDIATE MEDICAL ATTENTION. SKIN: WASH EXPOSED AREA WITH MILD SOAP AND PLENTY OF WATER. IF EXPOSED AREA IS LARGE GET IMMEDIATE MEDICAL ATTENTION. INHALATION: REMOVE VICTIM FROM AREA OF EXPOSURE. IF UNCONSCIOUS, GIVE OXYGEN. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING, GET IMMEDIATE MEDICAL ATTENTION. INGESTION: MAY BE HARMFUL OR FATAL IF SWALLOWED. DO NOT INDUCE VOMITING. GET IMMEDIATE ATTENTION.

REACTIVITY DATA: STABILITY: STABLE. CONDITIONS TO AVOID: EXPOSURE TO EXCESSIVE HEAT, OPEN FLAMES AND SPARKS. AVOID CONDITIONS THAT FAVOR THE FORMATION OF EXCESSIVE MISTS AND/OR FUMES. INCOMPATIBILITY: STRONG OXIDIZING AGENTS.

SPILL OR LEAK PROCEDURES: STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: WIPE UP SMALL SPILLS. REMOVE TO OUT OF DOORS.
WASTE DISPOSAL METHOD: SMALL AMOUNTS TO LANDFILL IF LOCAL, STATE, AND FEDERAL REGULATIONS PERMIT.

SPECIAL PRECAUTIONS: DANGER!! EXTREMELY FLAMMABLE> CONTENTS UNDER PRESSURE. VAPOR HARMFUL. KEEP AWAY FROM HEAT, SPARKS, PILOT LIGHT, OPEN FLAME, OR OTHER HEAT SOURCES. DO NOT PUNCTURE OR INCINERATE CONTAINER OR STORE ABOVE 120 DEG. F. EXPOSURE TO HEAT OR PROLONGED EXPOSURE TO SUN MAY CAUSE BURSTING. USE ONLY WITH ADEQUATE VENTILATION. USE ONLY IN AN AREA VENTILATED BY MOVING FRESH AIR UNTIL ALL VAPORS (ODORS) ARE GONE. KEEP OUT OF REACH OF CHILDREN. AVOID CONTACT WITH EYES, OR PROLONGED AND REPEATED EXPOSURE TO EYES. INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS CAN BE HARMFUL OR FATAL.

THE INFORMATION IN THIS MSDS WAS OBTAINED FROM SOURCES WHICH WE BELIEVE TO BE RELIABLE. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, REGARDING IT'S COMPLETENESS. THE CONDITIONS OF HANDLING, STORAGE, USE AND DISPOSAL OF THE PRODUCT ARE BEYOND OUR CONTROL AND MAY BE BEYOND OUR KNOWLEDGE. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE, OR EXPENSE ARISING OUT OF, OR IN ANY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.