



SAFETY DATA SHEET

1. Identification

Product identifier	Aluminum Bronze Alloys
Other means of identification	
SDS number	101
Product code	C95200, C95210, C95220, C95400, C95420, C95500, C95510, C95800, C95900, AMS-4640, AMS-4870, AMS-4871, AMS-4880, AMS-4881, A380
Recommended use	Manufacturing
Recommended restrictions	Use in accordance with supplier's recommendations.
Manufacturer / Importer / Supplier / Distributor information	
Company Name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Sweetsboro, OH 44241
Telephone	Corporate: 330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	Category 1
Health hazards	Sensitization, respiratory	Category 1
	Sensitization, skin	Category 2
	Carcinogenicity	Category 1 (Lung, central nervous system)
	Specific target organ toxicity, repeated exposure	
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. Suspected of causing cancer. Causes damage to organs (Lung, central nervous system) through prolonged or repeated exposure.	
Precautionary statement		
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe dust/fume/gas/mist/vapors/spray. In case of inadequate ventilation wear respiratory protection. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection.	
Response	If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a poison center/doctor. If on skin: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	

3. Composition/information on ingredients

Mixture

Aluminum Bronze Alloys

SDS #101 Version: 1.0

Issue date: June 01, 2015

Hazardous components Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	71-90
Aluminum		7429-90-5	7-16
Manganese		7439-96-5	0-14
Iron		7439-89-6	2-6.5
Nickel		7440-02-0	0-6
Cobalt		7440-48-4	0-3
Silicon		7440-21-3	0-1.5
Zinc		7440-66-6	<0.5
Tin		7440-31-5	<0.3

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation	In case of exposure to fumes or particulates: Move to fresh air. Get medical attention if discomfort persists.
Skin contact	Contact with dust: Wash skin with soap and water. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.
Eye contact	Do not rub eyes. Remove any contact lenses. Flush eyes thoroughly with water, taking care to rinse under eyelids. If irritation persists, continue flushing for 15 minutes, rinsing from time to time under eyelids. If discomfort continues, consult a physician.
Ingestion	Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.
Most important symptoms/effects, acute and delayed	Irritation of nose and throat. Irritation of eyes and mucous membranes. Cough. Shortness of breath. Wheezing. Sensitization.
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Symptoms may be delayed.
General information	Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Special powder against metal fires. Dry sand.
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, ferronickel may form highly toxic substances: iron carbonyl and nickel carbonyl, a known carcinogen.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.
Fire-fighting equipment/instructions	Move containers from fire area if you can do it without risk.
Specific methods	Move containers from fire area if you can do so without risk.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.
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Methods and materials for containment and cleaning up

Sweep up or vacuum up spillage and collect in suitable container for disposal. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. If not possible, gently moisten dust before it is collected with shovel, broom or the like. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. Avoid dust formation. This material and its container must be disposed of as hazardous waste.

Environmental precautions

Avoid release to the environment.

7. Handling and storage**Precautions for safe handling**

Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection**Occupational exposure limits****US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)**

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	PEL	5 mg/m3 15 mg/m3	Respirable dust. Total dust.
Cobalt (CAS 7440-48-4)	PEL	0.1 mg/m3	Dust and fume.
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	Respirable fraction. Total dust.
Silicon (CAS 7440-21-3)	PEL	5 mg/m3 15 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	Dust and mist. Fume.
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	Inhalable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	REL	5 mg/m3 5 mg/m3 10 mg/m3	Respirable. Welding fume or pyrophoric powder. Total
Cobalt (CAS 7440-48-4)	REL	0.05 mg/m3	Dust and fume.
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Manganese (CAS 7439-96-5)	REL	1 mg/m3	Fume.
Nickel (CAS 7440-02-0)	STEL	3 mg/m3	Fume.
	REL	0.015 mg/m3	Respirable. Total
	REL	5 mg/m3 10 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Cobalt (CAS 7440-48-4)	1 µg/l	Cobalt	*

* - For sampling details, please see the source document.

Exposure guidelines Follow standard monitoring procedures.

Appropriate engineering controls Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection

Hand protection Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.

Other Wear suitable protective clothing.

Respiratory protection In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance Shapes, Solids, Tubes & Turnings.

Physical state Solid.

Form Shapes, Solids, Tubes & Turnings.

Color Yellow to red.

Odor None.

Odor threshold Not available.

pH Unknown.

Melting point/freezing point 1814 - 1929.2 °F (990 - 1054 °C)

Initial boiling point and boiling range Not available.

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure Not available.

Vapor density Not available.

Relative density 7.5 - 9

Solubility(ies) Insoluble in water.

Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	0.27 - 0.323 lb/in ³ @ 68 F

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.
Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
Inhalation	May cause allergic respiratory reaction. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes.
Symptoms related to the physical, chemical and toxicological characteristics	Irritation of nose and throat. Irritation of eyes and mucous membranes. Coughing. Wheezing. Shortness of breath. Sensitization.

Information on toxicological effects

Acute toxicity	Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea. Ingestion of cobalt may cause nausea, vomiting, diarrhea, and a sensation of hotness. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever.
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Components	Species	Test Results
Silicon (CAS 7440-21-3)		
Acute		
<i>Oral</i>		
LD50	Rat	3150 mg/kg
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.	
Serious eye damage/eye irritation	Dust from machining operation in the eyes will cause irritation.	
Respiratory sensitization	May cause sensitization by inhalation.	
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause sensitization by skin contact. Pre-existing skin conditions including dermatitis might be aggravated by exposure to this product.	
Germ cell mutagenicity	Suspected of causing genetic defects.	
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data. Suspected of causing cancer. Limited evidence of a carcinogenic effect.	

IARC Monographs. Overall Evaluation of Carcinogenicity

Cobalt (CAS 7440-48-4)

2B Possibly carcinogenic to humans.

Nickel (CAS 7440-02-0)

1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)

Known To Be Human Carcinogen.

Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity	In experimental animal studies, cobalt produces adverse developmental effects at doses that produce maternal toxicity. There are no human data on cobalt exposure during pregnancy. Nickel: Has shown teratogenic effects in laboratory animals.
Specific target organ toxicity - single exposure	High concentrations: May cause respiratory irritation.
Specific target organ toxicity - repeated exposure	Not available.
Aspiration hazard	Not applicable.
Chronic effects	Harmful: danger of serious damage to health by prolonged exposure through inhalation. Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic exposure to breathing low levels of manganese dust or fume over a long period of time can result in "manganism," a disease of the central nervous system similar to Parkinson's Disease, gait impairment, muscle spasms and behavioral changes. Chronic inhalation of metallic oxide dust/fume may cause metal fume fever.
Further information	Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Alloys in massive forms present a limited hazard for the environment. The product contains a substance which may cause long-term adverse effects in the environment.
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Components	Species	Test Results
Iron (CAS 7439-89-6)		
Aquatic		
Fish	LC50 Channel catfish (<i>Ictalurus punctatus</i>)	> 500 mg/l, 96 hours
Persistence and degradability	The product is not biodegradable.	
Bioaccumulative potential	The product contains potentially bioaccumulating substances.	
Mobility in soil	Alloys in massive forms are not mobile in the environment.	
Mobility in general	Alloys in massive forms are not mobile in the environment.	
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as a dangerous good.

IMDG

Not regulated as a dangerous good.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.
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15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
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TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not on regulatory list.

CERCLA Hazardous Substance List (40 CFR 302.4)

Cobalt (CAS 7440-48-4)	LISTED
Copper (CAS 7440-50-8)	LISTED
Manganese (CAS 7439-96-5)	LISTED
Nickel (CAS 7440-02-0)	LISTED
Zinc (CAS 7440-66-6)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Cobalt (CAS 7440-48-4)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA) Not regulated.

US state regulations WARNING: This product contains a chemical known to the State of California to cause cancer.

US. Massachusetts RTK - Substance List

Aluminum (CAS 7429-90-5)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Aluminum (CAS 7429-90-5)	500 LBS
Copper (CAS 7440-50-8)	500 LBS
Manganese (CAS 7439-96-5)	500 LBS
Nickel (CAS 7440-02-0)	500 LBS
Zinc (CAS 7440-66-6)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Aluminum (CAS 7429-90-5)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Aluminum (CAS 7429-90-5)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. California Proposition 65

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

Cobalt (CAS 7440-48-4)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date	June 01, 2015
Version:	1.0
Further information	Not available.
References	HSDB® - Hazardous Substances Data Bank IARC Monographs. Overall Evaluation of Carcinogenicity National Toxicology Program (NTP) Report on Carcinogens ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer	The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.
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SAFETY DATA SHEET

1. Identification

Product identifier	Tin Bronze Alloys
Other means of identification	
SDS number	102
Product code	C90200, C90300, C90500, C90700, C90800, C90810, C91000, C91100, C91300, C91400, C91600, C91700
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Spectrum Machine, Inc.
Telephone	Corporate: 330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 2 (Lung, central nervous system)
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	May cause an allergic skin reaction. May cause damage to organs (Lung, central nervous system) through prolonged or repeated exposure. Suspected of causing cancer. May damage fertility or the unborn child.	
Precautionary statement		
Prevention	Do not breathe fumes and dusts. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace.	
Response	If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 3

3. Composition/information on ingredients

Mixture

Hazardous components			
Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	84-94
Tin		7440-31-5	4.5-17
Nickel		7440-02-0	0-6
Zinc		7440-66-6	1-5
Lead		7439-92-1	0-1
Composition comments	All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.		
4. First-aid measures			
Inhalation	In case of exposure to fumes or particulates: Get medical attention immediately.		
Skin contact	Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.		
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.		
Ingestion	Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.		
Most important symptoms/effects, acute and delayed	May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.		
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Symptoms may be delayed.		
General information	Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.		
5. Fire-fighting measures			
Suitable extinguishing media	Special powder against metal fires. Dry sand.		
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.		
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.		
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.		
Fire-fighting equipment/instructions	Move containers from fire area if you can do it without risk.		
6. Accidental release measures			
Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.		
Methods and materials for containment and cleaning up	Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.		
Environmental precautions	Avoid release to the environment. Do not contaminate water.		

7. Handling and storage

Precautions for safe handling

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m ³

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m ³ 0.1 mg/m ³	Dust and mist. Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m ³	
Tin (CAS 7440-31-5)	PEL	2 mg/m ³	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m ³ 0.2 mg/m ³	Dust and mist. Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m ³	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m ³	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m ³	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper (CAS 7440-50-8)	REL	1 mg/m ³	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m ³	
Nickel (CAS 7440-02-0)	REL	0.015 mg/m ³	
Tin (CAS 7440-31-5)	REL	2 mg/m ³	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection	
Hand protection	Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Shapes, Solids, Tubes & Turnings.
Physical state	Solid.
Form	Shapes, Solids, Tubes & Turnings.
Color	Yellow to red.
Odor	None.
Odor threshold	Not available.
pH	Unknown.
Melting point/freezing point	1832 °F (1000 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	8.78
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	0.317 lb/in ³

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.

Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
Inhalation	May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.

Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.
Germ cell mutagenicity	No data available.
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
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Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.
Aspiration hazard	Not available.
Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.
Further information	Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Harmful to aquatic life with long lasting effects.
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Components	Species	Test Results
Lead (CAS 7439-92-1)	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)
		1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.	
Bioaccumulative potential	The product contains potentially bioaccumulating substances.	
Mobility in soil	Alloys in massive forms are not mobile in the environment.	
Mobility in general	Alloys in massive forms are not mobile in the environment.	
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	
13. Disposal considerations		
Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.	
Local disposal regulations	Dispose in accordance with all applicable regulations.	
Hazardous waste code	Z110: Inorganic compounds n.o.s.	
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.	
Contaminated packaging	Not applicable.	
14. Transport information		
DOT		
Not regulated as a hazardous material by DOT.		
IATA		
Not regulated as a dangerous good.		
IMDG		
Not regulated as a dangerous good.		
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available.	
15. Regulatory information		
US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.	
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)		
Not regulated.		
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)		
Lead (CAS 7439-92-1)	29 CFR 1910.1025	
CERCLA Hazardous Substance List (40 CFR 302.4)		
Copper (CAS 7440-50-8)	LISTED	
Lead (CAS 7439-92-1)	LISTED	
Nickel (CAS 7440-02-0)	LISTED	
Zinc (CAS 7440-66-6)	LISTED	
Superfund Amendments and Reauthorization Act of 1986 (SARA)		
Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No	
SARA 302 Extremely hazardous substance	No	
SARA 311/312 Hazardous chemical	Yes	
Other federal regulations		
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List		
Lead (CAS 7439-92-1)		
Nickel (CAS 7440-02-0)		
Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)		
Not regulated.		
Safe Drinking Water Act (SDWA)	Not regulated.	

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA)

Not regulated.

US state regulations

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

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

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

Copper (CAS 7440-50-8)

500 LBS

Lead (CAS 7439-92-1)

500 LBS

Nickel (CAS 7440-02-0)

500 LBS

Zinc (CAS 7440-66-6)

500 LBS

US. Pennsylvania RTK - Hazardous Substances

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

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

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version**Issue date** June 01, 2015**Version #** 1.0**Further information** Not available.

References

HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.




SAFETY DATA SHEET

1. Identification

Product identifier	Leaded Tin Bronze Alloys
Other means of identification	
SDS number	103
Product code	C92200, C92300, C92310, C92410, C92700, C92900, C93100, C93200, C93300, C93400, C93600, C93700, C93800
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Streetsboro, OH 44241
Telephone	Corporate: 1-330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 4
	Acute toxicity, inhalation	Category 4
	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 1 (Lung, central nervous system)
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	Harmful if swallowed. Harmful if inhaled. May cause an allergic skin reaction. Suspected of causing cancer. May damage fertility or the unborn child. Causes damage to organs (Lung, central nervous system) through prolonged or repeated exposure.	
Precautionary statement		
Prevention	Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe fumes and dusts. Use only outdoors or in a well-ventilated area. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace.	
Response	If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell. If inhaled: Remove person to fresh air and keep comfortable for breathing. If swallowed: Rinse mouth.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1

3. Composition/information on ingredients

Mixture

Hazardous components Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	50-90
Lead		7439-92-1	0.005-34
Nickel		7440-02-0	0.005-32
Zinc		7440-66-6	0.005-26
Tin		7440-31-5	0.005-20
Antimony		7440-36-0	0.005-1.5

Composition comments

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.

4. First-aid measures

Inhalation

In case of exposure to fumes or particulates: Get medical attention immediately.

Skin contact

Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

Eye contact

Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.

Ingestion

Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.

Most important symptoms/effects, acute and delayed

May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.

Indication of immediate medical attention and special treatment needed

Treat symptomatically. Symptoms may be delayed.

General information

Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media

Special powder against metal fires. Dry sand.

Unsuitable extinguishing media

Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.

Specific hazards arising from the chemical

During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire-fighting equipment/instructions

Move containers from fire area if you can do it without risk.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.

Methods and materials for containment and cleaning up

Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.

Environmental precautions

Avoid release to the environment. Do not contaminate water.

7. Handling and storage**Precautions for safe handling**

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection**Occupational exposure limits****US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	PEL	0.5 mg/m3	
Copper (CAS 7440-50-8)	PEL	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	TWA	0.5 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Antimony (CAS 7440-36-0)	REL	0.5 mg/m3	
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values**US. ACGIH. BEIs. Biological Exposure Indices**

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls	Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.
Skin protection	
Hand protection	Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Shapes, Solids, Tubes & Turnings.
Physical state	Solid.
Form	Shapes, Solids, Tubes & Turnings.
Color	Yellow to red.
Odor	None.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	1790.6 °F (977 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	7.5 - 9
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

Other information

Bulk density 0.27 - 0.323 lb/in³

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.
Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting. Harmful if swallowed.
Inhalation	Harmful by inhalation. May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.

Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.
Germ cell mutagenicity	No data available.
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
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Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.
Aspiration hazard	Not available.

Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.
Further information	Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Very toxic to aquatic life with long lasting effects.		
Components	Species	Test Results	
Antimony (CAS 7440-36-0)			
Aquatic			
Fish	LC50	Sheepshead minnow (Cyprinodon variegatus)	6.2 - 8.3 mg/l, 96 hours
Lead (CAS 7439-92-1)			
	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)	1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.		
Bioaccumulative potential	The product contains potentially bioaccumulating substances.		
Mobility in soil	Alloys in massive forms are not mobile in the environment.		
Mobility in general	Alloys in massive forms are not mobile in the environment.		
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.		

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information

DOT

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Lead RQ = 79 LBS)
Transport hazard class(es)	9
Subsidiary class(es)	Not available.
Packing group	III
Special precautions for user	Not available.
Labels required	9
Special provisions	8, 146, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Lead)
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Labels required	9
ERG Code	9L
Special precautions for user	Not available.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead), MARINE POLLUTANT
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III

Environmental hazards**Marine pollutant** Yes**Labels required** 9**EmS** F-A, S-F**Special precautions for user** Not available.**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** No information available.**15. Regulatory information****US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1) 29 CFR 1910.1025

CERCLA Hazardous Substance List (40 CFR 302.4)

Antimony (CAS 7440-36-0) LISTED

Copper (CAS 7440-50-8) LISTED

Lead (CAS 7439-92-1) LISTED

Nickel (CAS 7440-02-0) LISTED

Zinc (CAS 7440-66-6) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)**Hazard categories** Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No**SARA 302 Extremely hazardous substance** No**SARA 311/312 Hazardous chemical** Yes**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Antimony (CAS 7440-36-0)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.**Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number**

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA) Not regulated.**US state regulations** WARNING: This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.**US. Massachusetts RTK - Substance List**

Antimony (CAS 7440-36-0)

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

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

Antimony (CAS 7440-36-0) 500 LBS

Copper (CAS 7440-50-8)	500 LBS
Lead (CAS 7439-92-1)	500 LBS
Nickel (CAS 7440-02-0)	500 LBS
Zinc (CAS 7440-66-6)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Antimony (CAS 7440-36-0)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Antimony (CAS 7440-36-0)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. California Proposition 65

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

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date June 01, 2015

Version # 1.0

Further information Not available.

References HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.

1. Identification

Product identifier	High Lead Tin Bronze Alloys
Other means of identification	
SDS number	104
Product code	C93900, C94000, C94100, C94300, C94310, C94400, C94500
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Streetsboro, OH 44241
Telephone	330-948-1231
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards]Not classified.	
Health hazards	Acute toxicity, oral	Category 4
	Acute toxicity, inhalation	Category 4
	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 2
OSHA hazard(s)	Not classified.	

Label elements

Hazard symbol



Signal word

Danger

Hazard statement

Harmful if swallowed. Harmful if inhaled. May cause an allergic skin reaction. May cause damage to organs (Lung, central nervous system) through prolonged or repeated exposure. Suspected of causing cancer. May damage fertility or the unborn child. Very toxic to aquatic life.

Precautionary statement

Prevention

Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe fumes and dusts. Use only outdoors or in a well-ventilated area. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace.

Response

If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Specific treatment (see this label). Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell. If swallowed: Immediately call a poison center/doctor. If swallowed: Rinse mouth. Do not induce vomiting. If inhaled: Remove person to fresh air and keep comfortable for breathing.

Storage

Store locked up.

Disposal

Dispose of contents/container to a facility that has permission of disposing the industrial waste.

Hazard(s) not otherwise classified (HNOC)

Not classified.

Environmental hazards

Hazardous to the aquatic environment, acute hazard Category 1

3. Composition/information on ingredients

Mixture

Hazardous components Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	68.5-89
Lead		7439-92-1	22-32
Tin		7440-31-5	4.5-6
Nickel		7440-02-0	0-6
Zinc		7440-66-6	0-2.5

Composition comments

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.

4. First-aid measures

Inhalation

In case of exposure to fumes or particulates: Get medical attention immediately.

Skin contact

Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

Eye contact

Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.

Ingestion

Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.

Most important symptoms/effects, acute and delayed

May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.

Indication of immediate medical attention and special treatment needed

Treat symptomatically. Symptoms may be delayed.

General information

Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media

Special powder against metal fires. Dry sand.

Unsuitable extinguishing media

Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.

Specific hazards arising from the chemical

During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire-fighting equipment/instructions

Move containers from fire area if you can do it without risk.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.

Methods and materials for containment and cleaning up

Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.

Environmental precautions

Avoid release to the environment. Do not contaminate water.

7. Handling and storage

Precautions for safe handling

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	Dust and mist. Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection	
Hand protection	Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Shapes, Solids, Tubes & Turnings.
Physical state	Solid.
Form	Shapes, Solids, Tubes & Turnings.
Color	Yellow to red.
Odor	None.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	1724 °F (940 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	7.5 - 9
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	0.27 - 0.323 lb/in ³

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.

Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting. Harmful if swallowed.
Inhalation	Harmful by inhalation. May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.

Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.
Germ cell mutagenicity	No data available.
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
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Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.
Aspiration hazard	Not available.
Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.
Further information	Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Very toxic to aquatic life with long lasting effects.
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Components	Species	Test Results
Lead (CAS 7439-92-1)		
	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)
		1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.	
Bioaccumulative potential	The product contains potentially bioaccumulating substances.	
Mobility in soil	Alloys in massive forms are not mobile in the environment.	
Mobility in general	Alloys in massive forms are not mobile in the environment.	
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information

DOT

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Lead RQ = 42 LBS)
Transport hazard class(es)	9
Subsidiary class(es)	Not available.
Packing group	III
Special precautions for user	Not available.
Labels required	9
Special provisions	8, 146, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Lead)
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Labels required	9
ERG Code	9L
Special precautions for user	Not available.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead), MARINE POLLUTANT
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Environmental hazards	
Marine pollutant	Yes
Labels required	9
EmS	F-A, S-F
Special precautions for user	Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)	Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1) 29 CFR 1910.1025

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8) LISTED
Lead (CAS 7439-92-1) LISTED
Nickel (CAS 7440-02-0) LISTED
Zinc (CAS 7440-66-6) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA) Not regulated.

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

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Copper (CAS 7440-50-8) 500 LBS
Lead (CAS 7439-92-1) 500 LBS
Nickel (CAS 7440-02-0) 500 LBS
Zinc (CAS 7440-66-6) 500 LBS

US. Pennsylvania RTK - Hazardous Substances

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date	June 01, 2015
Version #	1.0
Further information	Not available.
References	HSDB® - Hazardous Substances Data Bank IARC Monographs. Overall Evaluation of Carcinogenicity National Toxicology Program (NTP) Report on Carcinogens ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer	The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.
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SAFETY DATA SHEET

1. Identification

Product identifier	Manganese Bronze Alloys
Other means of identification	
SDS number	105
Product code	C86100, C86200, C86300, C86400, C86500, C86700
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Streetsboro, OH 44241
Telephone	Corporate: 1-330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 2 (Lung, central nervous system)
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	May cause an allergic skin reaction. May cause damage to organs (Lung, central nervous system) through prolonged or repeated exposure. Suspected of causing cancer. May damage fertility or the unborn child.	
Precautionary statement		
Prevention	Do not breathe fumes and dusts. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace.	
Response	If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 3

3. Composition/information on ingredients

Mixture

Hazardous components			
Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	54-66
Zinc		7440-66-6	22-42
Manganese		7439-96-5	0.1-15
Aluminum		7429-90-5	0.5-7.5
Nickel		7440-02-0	0-6
Lead		7439-92-1	0-2.0
Tin		7440-31-5	0-1.5
Composition comments	All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.		
4. First-aid measures			
Inhalation	In case of exposure to fumes or particulates: Get medical attention immediately.		
Skin contact	Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.		
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.		
Ingestion	Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.		
Most important symptoms/effects, acute and delayed	May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.		
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Symptoms may be delayed.		
General information	Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.		
5. Fire-fighting measures			
Suitable extinguishing media	Special powder against metal fires. Dry sand.		
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.		
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.		
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.		
Fire-fighting equipment/instructions	Move containers from fire area if you can do it without risk.		
6. Accidental release measures			
Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.		
Methods and materials for containment and cleaning up	Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.		
Environmental precautions	Avoid release to the environment. Do not contaminate water.		

7. Handling and storage

Precautions for safe handling

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	PEL	5 mg/m3 15 mg/m3	Respirable dust. Total dust.
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	Dust and mist. Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	REL	5 mg/m3 5 mg/m3 10 mg/m3	Welding fume or pyrophoric powder. Respirable. Total
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Manganese (CAS 7439-96-5)	REL	1 mg/m3	Fume.
	STEL	3 mg/m3	Fume.
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls	Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.
Skin protection	
Hand protection	Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Shapes, Solids, Tubes & Turnings.
Physical state	Solid.
Form	Shapes, Solids, Tubes & Turnings.
Color	Yellow to red.
Odor	None.
Odor threshold	Not available.
pH	Unknown.
Melting point/freezing point	1616 - 1725.8 °F (880 - 941 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	7.5 - 9
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

Other information

Bulk density 0.27 - 0.323 lb/in³ (20°C/68°F)

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.
Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
Inhalation	May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.

Symptoms related to the physical, chemical and toxicological characteristics May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.

Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.
Germ cell mutagenicity	No data available.
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
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Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.
Aspiration hazard	Not available.

Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.
Further information	Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Harmful to aquatic life with long lasting effects.		
	Components	Species	Test Results
	Lead (CAS 7439-92-1)	LC50 Rainbow trout, donaldson trout (Oncorhynchus mykiss)	1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.		
Bioaccumulative potential	The product contains potentially bioaccumulating substances.		
Mobility in soil	Alloys in massive forms are not mobile in the environment.		
Mobility in general	Alloys in massive forms are not mobile in the environment.		
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.		

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as a dangerous good.

IMDG

Not regulated as a dangerous good.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1) 29 CFR 1910.1025

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8)	LISTED
Lead (CAS 7439-92-1)	LISTED
Manganese (CAS 7439-96-5)	LISTED
Nickel (CAS 7440-02-0)	LISTED
Zinc (CAS 7440-66-6)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

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

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations

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

Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA) Not regulated.

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

US. Massachusetts RTK - Substance List

Aluminum (CAS 7429-90-5)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Aluminum (CAS 7429-90-5)	500 LBS
Copper (CAS 7440-50-8)	500 LBS
Lead (CAS 7439-92-1)	500 LBS
Manganese (CAS 7439-96-5)	500 LBS
Nickel (CAS 7440-02-0)	500 LBS
Zinc (CAS 7440-66-6)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Aluminum (CAS 7429-90-5)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Aluminum (CAS 7429-90-5)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. California Proposition 65

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

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date June 01, 2015

Version # 1.0

Further information Not available.

References HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.



SAFETY DATA SHEET

1. Identification

Product identifier	Yellow Brass Alloys
Other means of identification	
SDS number	106
Product code	C85200, C85300, C85400, C85500, C85700, C85800, C36000
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Streetsboro, OH 44241
Telephone	Corporate: 1-330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 2 (Lung, central nervous system)
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	May cause an allergic skin reaction. May cause damage to organs (Lung, central nervous system) through prolonged or repeated exposure. Suspected of causing cancer. May damage fertility or the unborn child.	
Precautionary statement		
Prevention	Do not breathe fumes and dusts. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace.	
Response	If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 3

3. Composition/information on ingredients

Mixture

Hazardous components			
Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	58-64
Zinc		7440-66-6	32-41
Lead		7439-92-1	0.8-1.5
Tin		7440-31-5	0.5-1.5
Nickel		7440-02-0	0-1
Composition comments	All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.		
4. First-aid measures			
Inhalation	In case of exposure to fumes or particulates: Get medical attention immediately.		
Skin contact	Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.		
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.		
Ingestion	Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.		
Most important symptoms/effects, acute and delayed	May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.		
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Symptoms may be delayed.		
General information	Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.		
5. Fire-fighting measures			
Suitable extinguishing media	Special powder against metal fires. Dry sand.		
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.		
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.		
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.		
Fire-fighting equipment/instructions	Move containers from fire area if you can do it without risk.		
6. Accidental release measures			
Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.		
Methods and materials for containment and cleaning up	Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.		
Environmental precautions	Avoid release to the environment. Do not contaminate water.		

7. Handling and storage

Precautions for safe handling

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	Dust and mist. Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection	
Hand protection	Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Tubes, Solids & Turnings.
Physical state	Solid.
Form	Tubes, Solids & Turnings.
Color	Yellow.
Odor	None.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	1725.8 °F (941 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure	Not available.
Vapor density	Not available.
Relative density	8.5
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	0.304 lb/in ³

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.

Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
Inhalation	May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.

Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.
Germ cell mutagenicity	No data available.
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
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Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.
Aspiration hazard	Not available.
Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.
Further information	Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Harmful to aquatic life with long lasting effects.
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Components	Species	Test Results
Lead (CAS 7439-92-1)	LC50 Rainbow trout, donaldson trout (Oncorhynhus mykiss)	1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.	
Bioaccumulative potential	The product contains potentially bioaccumulating substances.	
Mobility in soil	Alloys in massive forms are not mobile in the environment.	
Mobility in general	Alloys in massive forms are not mobile in the environment.	
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	
13. Disposal considerations		
Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.	
Local disposal regulations	Dispose in accordance with all applicable regulations.	
Hazardous waste code	Z110: Inorganic compounds n.o.s.	
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.	
Contaminated packaging	Not applicable.	
14. Transport information		
DOT Not regulated as a hazardous material by DOT.		
IATA Not regulated as a dangerous good.		
IMDG Not regulated as a dangerous good.		
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available.	
15. Regulatory information		
US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.	
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D) Not regulated.		
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) Lead (CAS 7439-92-1)29 CFR 1910.1025		
CERCLA Hazardous Substance List (40 CFR 302.4) Copper (CAS 7440-50-8)LISTED Lead (CAS 7439-92-1)LISTED Nickel (CAS 7440-02-0)LISTED Zinc (CAS 7440-66-6)LISTED		
Superfund Amendments and Reauthorization Act of 1986 (SARA)		
Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No	
SARA 302 Extremely hazardous substance	No	
SARA 311/312 Hazardous chemical	Yes	
Other federal regulations		
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List Lead (CAS 7439-92-1) Nickel (CAS 7440-02-0)		
Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130) Not regulated.		
Safe Drinking Water Act (SDWA)	Not regulated.	

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA)

Not regulated.

US state regulations

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

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

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

Copper (CAS 7440-50-8)

500 LBS

Lead (CAS 7439-92-1)

500 LBS

Nickel (CAS 7440-02-0)

500 LBS

Zinc (CAS 7440-66-6)

500 LBS

US. Pennsylvania RTK - Hazardous Substances

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

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

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version**Issue date** June 01, 2015**Version #** 1.0**Further information** Not available.

References

HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.




SAFETY DATA SHEET

1. Identification

Product identifier	Red Brass Alloys
Other means of identification	
SDS number	107
Product code	C83600, C83800, C84400, C84500, C84800, Red Brass
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Streetsboro, OH 44241
Telephone	Corporate: 1-330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 2 (Lung, central nervous system)
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	May cause an allergic skin reaction. May cause damage to organs (Lung, central nervous system) through prolonged or repeated exposure. Suspected of causing cancer. May damage fertility or the unborn child.	
Precautionary statement		
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace. Do not breathe dust/fume.	
Response	If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 2

3. Composition/information on ingredients

Mixture

Hazardous components			
Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	78-86
Zinc		7440-66-6	4-16
Lead		7439-92-1	4-8
Tin		7440-31-5	2.3-6
Nickel		7440-02-0	0-1
Composition comments	All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.		
4. First-aid measures			
Inhalation	In case of exposure to fumes or particulates: Get medical attention immediately.		
Skin contact	Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.		
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.		
Ingestion	Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.		
Most important symptoms/effects, acute and delayed	May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.		
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Symptoms may be delayed.		
General information	Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.		
5. Fire-fighting measures			
Suitable extinguishing media	Special powder against metal fires. Dry sand.		
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.		
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.		
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.		
Fire-fighting equipment/instructions	Move containers from fire area if you can do it without risk.		
6. Accidental release measures			
Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.		
Methods and materials for containment and cleaning up	Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.		
Environmental precautions	Avoid release to the environment. Do not contaminate water.		

7. Handling and storage

Precautions for safe handling

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	Dust and mist. Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection	
Hand protection	Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Shapes, Solids, Tubes & Turnings.
Physical state	Solid.
Form	Shapes, Solids, Tubes & Turnings.
Color	Yellow to red.
Odor	None.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	1841 °F (1005 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	8.7
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	314 lb/in ³ (20°C/ 68°F)

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.

Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
Inhalation	May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.

Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.
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Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.
Germ cell mutagenicity	No data available.
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
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Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.
Aspiration hazard	Not available.
Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.
Further information	Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Toxic to aquatic life with long lasting effects.
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Components	Species	Test Results
Lead (CAS 7439-92-1)		
	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)
		1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.	
Bioaccumulative potential	The product contains potentially bioaccumulating substances.	
Mobility in soil	Alloys in massive forms are not mobile in the environment.	
Mobility in general	Alloys in massive forms are not mobile in the environment.	
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information

DOT

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Lead RQ = 140 LBS)
Transport hazard class(es)	9
Subsidiary class(es)	Not available.
Packing group	III
Special precautions for user	Not available.
Labels required	9
Special provisions	8, 146, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Lead)
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Labels required	9
ERG Code	9L
Special precautions for user	Not available.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead), MARINE POLLUTANT
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Environmental hazards	
Marine pollutant	Yes
Labels required	9
EmS	F-A, S-F
Special precautions for user	Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)	Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1) 29 CFR 1910.1025

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8) LISTED
Lead (CAS 7439-92-1) LISTED
Nickel (CAS 7440-02-0) LISTED
Zinc (CAS 7440-66-6) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA) Not regulated.

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

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Copper (CAS 7440-50-8) 500 LBS
Lead (CAS 7439-92-1) 500 LBS
Nickel (CAS 7440-02-0) 500 LBS
Zinc (CAS 7440-66-6) 500 LBS

US. Pennsylvania RTK - Hazardous Substances

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date June 01, 2015

Version # 1.0

Further information Not available.

References HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.



SAFETY DATA SHEET

1. Identification

Product identifier	Nickel Silver Alloys
Other means of identification	
SDS number	108
Product code	C97300, Nickel-Silver
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Streetsboro, OH 44241
Telephone	Corporate: 1-330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 4
	Acute toxicity, inhalation	Category 4
	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 1 (Lung, central nervous system)
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	Harmful if swallowed. Harmful if inhaled. May cause an allergic skin reaction. Causes damage to organs (Lung, central nervous system) through prolonged or repeated exposure. Suspected of causing cancer. May damage fertility or the unborn child.	
Precautionary statement		
Prevention	Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe fumes and dusts. Use only outdoors or in a well-ventilated area. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace.	
Response	If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell. If swallowed: Rinse mouth. If inhaled: Remove person to fresh air and keep comfortable for breathing.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 2

3. Composition/information on ingredients

Mixture

Hazardous components Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	53-87
Nickel		7440-02-0	9-33
Zinc		7440-66-6	0-25
Lead		7439-92-1	0-11
Tin		7440-31-5	0-5.5
Manganese		7439-96-5	0-1.5

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.

4. First-aid measures

Inhalation In case of exposure to fumes or particulates: Get medical attention immediately.

Skin contact Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

Eye contact Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.

Ingestion Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.

Most important symptoms/effects, acute and delayed May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.

Indication of immediate medical attention and special treatment needed Treat symptomatically. Symptoms may be delayed.

General information Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Special powder against metal fires. Dry sand.

Unsuitable extinguishing media Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire-fighting equipment/instructions Move containers from fire area if you can do it without risk.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.

Methods and materials for containment and cleaning up Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.

Environmental precautions Avoid release to the environment. Do not contaminate water.

7. Handling and storage

Precautions for safe handling

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	Dust and mist. Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Manganese (CAS 7439-96-5)	REL	1 mg/m3	Fume.
	STEL	3 mg/m3	Fume.
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.
Skin protection	
Hand protection	Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Arcs, Solids, Rectangles, Tubes & Turnings.
Physical state	Solid.
Form	Arcs, Solids, Rectangles, Tubes & Turnings.
Color	Silver to Yellow.
Odor	None.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	1850 - 1904 °F (1010 - 1040 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	8.95
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	0.321 lb/in ³ (20°C/68°F)

10. Stability and reactivity

Reactivity	Stable at normal conditions.
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Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.
Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting. Harmful if swallowed.
Inhalation	Harmful by inhalation. May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.

Information on toxicological effects

Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.
Germ cell mutagenicity	No data available.
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
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Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.
Aspiration hazard	Not available.
Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.

Further information

Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Components	Species	Test Results
Lead (CAS 7439-92-1)	LC50 Rainbow trout, donaldson trout (Oncorhynchus mykiss)	1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.	
Bioaccumulative potential	The product contains potentially bioaccumulating substances.	
Mobility in soil	Alloys in massive forms are not mobile in the environment.	
Mobility in general	Alloys in massive forms are not mobile in the environment.	
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information**DOT**

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Lead RQ = 134 LBS)
Transport hazard class(es)	9
Subsidiary class(es)	Not available.
Packing group	III
Special precautions for user	Not available.
Labels required	9
Special provisions	8, 146, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Lead)
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Labels required	9
ERG Code	9L
Special precautions for user	Not available.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead), MARINE POLLUTANT
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Environmental hazards	
Marine pollutant	Yes
Labels required	9
EmS	F-A, S-F
Special precautions for user	Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1) 29 CFR 1910.1025

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8)	LISTED
Lead (CAS 7439-92-1)	LISTED
Manganese (CAS 7439-96-5)	LISTED
Nickel (CAS 7440-02-0)	LISTED
Zinc (CAS 7440-66-6)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance	No
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SARA 311/312 Hazardous chemical	Yes
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Other federal regulations

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

Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.
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Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA)	Not regulated.
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US state regulations

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

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Copper (CAS 7440-50-8)	500 LBS
Lead (CAS 7439-92-1)	500 LBS
Manganese (CAS 7439-96-5)	500 LBS
Nickel (CAS 7440-02-0)	500 LBS
Zinc (CAS 7440-66-6)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date June 01, 2015

Version # 1.0

Further information Not available.

References HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.



SAFETY DATA SHEET

1. Identification

Product identifier	Copper Aluminum Alloys
Other means of identification	
SDS number	109
Product code	C61400, C61900, C62300, C62400, C62500, C63000, C63200, C63600, C63700, C64200
Recommended use	Manufacturing
Recommended restrictions	Not assigned.
Manufacturer / Importer / Supplier / Distributor information	
Company name	Spectrum Machine, Inc.
Address	Corporate: 1668 Frost Rd., Streetsboro, OH 44241
Telephone	Corporate: 1-330-626-3666
Contact person	Tim Lamb
E-mail	timlamb@spectrummachine.com
Emergency phone number	1-888-276-6937

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Sensitization, respiratory	Category 1
	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility, the unborn child)	Category 1A
	Specific target organ toxicity, repeated exposure	Category 2 (Lung, central nervous system)
OSHA hazard(s)	Not classified.	
Label elements		
Hazard symbol		
Signal word	Danger	
Hazard statement	May cause an allergic skin reaction. May cause damage to organs (Lung, central nervous system) through prolonged or repeated exposure. Suspected of causing cancer. May damage fertility or the unborn child. May cause allergy or asthma symptoms or breathing difficulties if inhaled.	
Precautionary statement		
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace. Do not breathe dust/fume. Wear respiratory protection.	
Response	If on skin: Wash with plenty of soap and water. If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 2

3. Composition/information on ingredients

Mixture

Hazardous components Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	58-94.5
Aluminum		7429-90-5	0.25-16
Nickel		7440-02-0	0-5.5
Manganese		7439-96-5	0.3-3.5
Lead		7439-92-1	0-3.0
Cobalt		7440-48-4	0-2.5
Silicon		7440-21-3	0-1.5

Composition comments

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.

4. First-aid measures

Inhalation

In case of exposure to fumes or particulates: Get medical attention immediately.

Skin contact

Contact with dust: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

Eye contact

Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids wide apart.

Ingestion

Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.

Most important symptoms/effects, acute and delayed

May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. Sensitization. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.

Indication of immediate medical attention and special treatment needed

Treat symptomatically. Symptoms may be delayed.

General information

Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media

Special powder against metal fires. Dry sand.

Unsuitable extinguishing media

Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.

Specific hazards arising from the chemical

During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire-fighting equipment/instructions

Move containers from fire area if you can do it without risk.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.

Methods and materials for containment and cleaning up

Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.

Environmental precautions

Avoid release to the environment. Do not contaminate water.

7. Handling and storage**Precautions for safe handling**

Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid generation and spreading of dust and fumes. Avoid inhalation of dust and contact with skin and eyes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection**Occupational exposure limits****US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	PEL	5 mg/m3	Respirable dust.
		15 mg/m3	Total dust.
Cobalt (CAS 7440-48-4)	PEL	0.1 mg/m3	Dust and fume.
Copper (CAS 7440-50-8)	PEL	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Silicon (CAS 7440-21-3)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	REL	5 mg/m3	Welding fume or pyrophoric powder.
		5 mg/m3	Respirable.
		10 mg/m3	Total
Cobalt (CAS 7440-48-4)	REL	0.05 mg/m3	Dust and fume.
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Manganese (CAS 7439-96-5)	REL	1 mg/m3	Fume.
		3 mg/m3	Fume.
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Silicon (CAS 7440-21-3)	REL	5 mg/m3	Respirable.
		10 mg/m3	Total

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Cobalt (CAS 7440-48-4)	1 µg/l	Cobalt	*
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines Follow standard monitoring procedures.

Appropriate engineering controls Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection

Hand protection Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.

Other Wear suitable protective clothing.

Respiratory protection In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Private clothes and working clothes should be kept separately. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance Shapes, Solids, Tubes & Turnings.

Physical state Solid.

Form Shapes, Solids, Tubes & Turnings.

Color Yellow.

Odor None.

Odor threshold Not available.

pH Not available.

Melting point/freezing point Not available.

Initial boiling point and boiling range Not available.

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure Not available.

Vapor density Not available.

Relative density Not available.

Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.
Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
Inhalation	May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia. Sensitization.

Information on toxicological effects

Acute toxicity	Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea. Ingestion of cobalt may cause nausea, vomiting, diarrhea, and a sensation of hotness. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
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Components	Species	Test Results
Silicon (CAS 7440-21-3)		
Acute		
Oral		
LD50	Rat	3150 mg/kg
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.	
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.	
Respiratory sensitization	May cause sensitization by inhalation.	
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause allergic skin reaction.	
Germ cell mutagenicity	No data available.	
Carcinogenicity	Possible cancer hazard - may cause cancer based on animal data.	
IARC Monographs. Overall Evaluation of Carcinogenicity		
Cobalt (CAS 7440-48-4)	2B Possibly carcinogenic to humans.	

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)

2B Possibly carcinogenic to humans.

1 Carcinogenic to humans.

Known To Be Human Carcinogen.

Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity

Nickel: Has shown teratogenic effects in laboratory animals. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the changes of miscarriage or birth defects. Continuous exposure may result in decreased fertility. Exposure of the mother during pregnancy may cause birth defects. In experimental animal studies, cobalt produces adverse developmental effects at doses that produce maternal toxicity. There are no human data on cobalt exposure during pregnancy.

Specific target organ toxicity - single exposure

Not available.

Specific target organ toxicity - repeated exposure

Causes damage to the following organs through prolonged or repeated exposure: Lung. Central nervous system.

Aspiration hazard

Not available.

Chronic effects

Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.

Further information

Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information**Ecotoxicity**

Toxic to aquatic life with long lasting effects.

Components**Species****Test Results**

Lead (CAS 7439-92-1)

LC50

Rainbow trout, donaldson trout
(Oncorhynchus mykiss)

1.17 mg/l, 96 Hours

Persistence and degradability

The product is not biodegradable.

Bioaccumulative potential

The product contains potentially bioaccumulating substances.

Mobility in soil

Alloys in massive forms are not mobile in the environment.

Mobility in general

Alloys in massive forms are not mobile in the environment.

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. Disposal considerations**Disposal instructions**

This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.

Local disposal regulations

Dispose in accordance with all applicable regulations.

Hazardous waste code

Z110: Inorganic compounds n.o.s.

Waste from residues / unused products

Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.

Contaminated packaging

Not applicable.

14. Transport information**DOT****UN number**

UN3077

UN proper shipping name

Environmentally hazardous substances, solid, n.o.s. (Lead RQ = 393 LBS)

Transport hazard class(es)

9

Subsidiary class(es)

-

Packing group

III

Special precautions for user

Not available.

Labels required

9

Special provisions

8, 146, B54, IB8, IP3, N20, T1, TP33

Packaging exceptions

155

Packaging non bulk

213

Packaging bulk

240

IATA**UN number**

UN3077

UN proper shipping name

Environmentally hazardous substance, solid, n.o.s. (Lead)

Transport hazard class(es)

9

Subsidiary class(es)	-
Packaging group	III
Labels required	9
ERG Code	9L
Special precautions for user	Not available.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead)
Transport hazard class(es)	9
Subsidiary class(es)	-
Packaging group	III
Environmental hazards	
Marine pollutant	Yes
Labels required	9
EmS	F-A, S-F
Special precautions for user	Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1)	29 CFR 1910.1025
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CERCLA Hazardous Substance List (40 CFR 302.4)

Cobalt (CAS 7440-48-4)	LISTED
Copper (CAS 7440-50-8)	LISTED
Lead (CAS 7439-92-1)	LISTED
Manganese (CAS 7439-96-5)	LISTED
Nickel (CAS 7440-02-0)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance	No
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SARA 311/312 Hazardous chemical	Yes
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Other federal regulations

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

Cobalt (CAS 7440-48-4)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.
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Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA)	Not regulated.
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US state regulations

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

US. Massachusetts RTK - Substance List

Aluminum (CAS 7429-90-5)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)

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

Aluminum (CAS 7429-90-5)	500 LBS
Copper (CAS 7440-50-8)	500 LBS
Lead (CAS 7439-92-1)	500 LBS
Manganese (CAS 7439-96-5)	500 LBS
Nickel (CAS 7440-02-0)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Aluminum (CAS 7429-90-5)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)

US. Rhode Island RTK

Aluminum (CAS 7429-90-5)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)

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

Cobalt (CAS 7440-48-4)
Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date June 01, 2015

Version # 1.0

Further information Not available.

References

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IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.

1. Identification

Product identifier Phos Copper Tin Alloys

Other means of identification

SDS number 110

Product code C51000

Recommended use Manufacturing

Recommended restrictions Use in accordance with supplier's recommendations.

Manufacturer / Importer / Supplier / Distributor information

Company name Spectrum Machine, Inc.

Address Corporate: 1668 Frost Rd., Streetsboro, OH 44241

Telephone Corporate: 1-330-626-3666

Contact person Tim Lamb

E-mail timlamb@spectrummachine.com

Emergency phone number 1-888-276-6937

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Reproductive toxicity Category 1A

OSHA hazard(s) Not classified.

Label elements

Hazard symbol



Signal word Danger

Hazard statement May damage fertility or the unborn child.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.

Response If exposed or concerned: Get medical advice/attention.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) Not classified.

Environmental hazards Hazardous to the aquatic environment, long-term hazard Category 2

3. Composition/information on ingredients

Mixture

Hazardous components		CAS number	%
Chemical name	Common name and synonyms		
Copper		7440-50-8	87-95
Tin		7440-31-5	1.5-11
Zinc		7440-66-6	0-4.5
Lead		7439-92-1	0-4
Nickel		7440-02-0	0-0.2

Composition comments	All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.
4. First-aid measures	
Inhalation	In case of exposure to fumes or particulates: Move to fresh air. Get medical attention if discomfort persists.
Skin contact	Contact with dust: Wash skin with soap and water. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.
Eye contact	Do not rub eyes. Remove any contact lenses. Flush eyes thoroughly with water, taking care to rinse under eyelids. If irritation persists, continue flushing for 15 minutes, rinsing from time to time under eyelids. If discomfort continues, consult a physician.
Ingestion	Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.
Most important symptoms/effects, acute and delayed	May cause irritation to mucous membranes. May cause skin and eye irritation. Cough. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Symptoms may be delayed.
General information	Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.
5. Fire-fighting measures	
Suitable extinguishing media	Special powder against metal fires. Dry sand.
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.
Specific hazards arising from the chemical	Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.
Fire-fighting equipment/instructions	Move containers from fire area if you can do it without risk.
Specific methods	Move containers from fire area if you can do so without risk.
6. Accidental release measures	
Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.
Methods and materials for containment and cleaning up	Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. If not possible, gently moisten dust before it is collected with shovel, broom or the like. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. Avoid dust formation. This material and its container must be disposed of as hazardous waste.
Environmental precautions	Avoid release to the environment. Do not contaminate water.
7. Handling and storage	
Precautions for safe handling	Follow special national provisions related to work with lead and its compounds. Pregnant women should not work with the product, if there is the least risk of lead exposure. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid inhalation of dust and contact with skin and eyes. Avoid generation and spreading of dust and fumes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	Dust and mist. Fume.
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Lead (CAS 7439-92-1)	REL	0.05 mg/m3	
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

US. ACGIH. BEIs. Biological Exposure Indices

Components	Value	Determinant	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	*

* - For sampling details, please see the source document.

Exposure guidelines Follow standard monitoring procedures.

Appropriate engineering controls Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards. Follow the schedule for work place measurements when working with lead and its compounds.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection

Hand protection Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.

Other Wear suitable protective clothing.

Respiratory protection When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. Seek advice from local supervisor.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Solids, Shapes, Tubes, Turnings & Bushings.
Physical state	Solid.
Form	Solids, Shapes, Tubes, Turnings & Bushings.
Color	Yellow to red.
Odor	None.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Contact with acids will release flammable hydrogen gas. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.
Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Lead oxide fumes may be formed at elevated temperatures.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
Inhalation	May cause respiratory tract irritation. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract.
Skin contact	May cause skin irritation. Hot or molten material may produce thermal burns.
Eye contact	May cause eye irritation. Molten material will produce thermal burns.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Shortness of breath. Wheezing. The principal symptoms of lead poisoning are gastro-intestinal or central nervous system disturbances and anemia.

Information on toxicological effects

Acute toxicity	May cause eye, skin and respiratory tract irritation. Dusts may irritate the respiratory tract, skin and eyes. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	No data available.
Skin sensitization	The product contains a small amount of sensitizing substance which may provoke an allergic reaction among sensitive individuals in contact with skin.
Germ cell mutagenicity	No data available.
Carcinogenicity	
IARC Monographs. Overall Evaluation of Carcinogenicity	
Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.
NTP Report on Carcinogens	
Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
Reproductive toxicity	May damage fertility or the unborn child. Contains a substance/a group of substances which may cause harm to the unborn child.
Specific target organ toxicity - single exposure	No data available.
Specific target organ toxicity - repeated exposure	Not available.
Aspiration hazard	Not applicable.
Chronic effects	Danger of cumulative effects. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever. Lead may produce maternal toxicity, toxicity to the fetus, and adverse effects to blood, bone marrow, central/peripheral nervous systems, kidney, liver, and reproductive system.
Further information	Lead is accumulated in the body and may cause damage to the brain and nervous system after prolonged exposure. Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Toxic to aquatic life with long lasting effects.		
Components	Species		Test Results
Lead (CAS 7439-92-1)	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)	1.17 mg/l, 96 Hours
Persistence and degradability	The product is not biodegradable.		
Bioaccumulative potential	The product contains potentially bioaccumulating substances.		
Mobility in soil	Alloys in massive forms are not mobile in the environment.		
Mobility in general	Alloys in massive forms are not mobile in the environment.		
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.		

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information

DOT	
UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Lead RQ = 393 LBS)
Transport hazard class(es)	9

Subsidiary class(es)	-
Packing group	III
Special precautions for user	Not available.
Labels required	9
Special provisions	8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Lead)
Transport hazard class(es)	9
Subsidiary class(es)	-
Packing group	III
Labels required	9
ERG Code	9L
Special precautions for user	Not available.

IMDG

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead), MARINE POLLUTANT
Transport hazard class(es)	9
Subsidiary class(es)	-
Packing group	III
Labels required	9
EmS	F-A, S-F
Special precautions for user	Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1) 29 CFR 1910.1025

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8)	LISTED
Lead (CAS 7439-92-1)	LISTED
Nickel (CAS 7440-02-0)	LISTED
Zinc (CAS 7440-66-6)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations

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

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA)

Not regulated.

US state regulations

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

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

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

Copper (CAS 7440-50-8)

500 LBS

Lead (CAS 7439-92-1)

500 LBS

Nickel (CAS 7440-02-0)

500 LBS

Zinc (CAS 7440-66-6)

500 LBS

US. Pennsylvania RTK - Hazardous Substances

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

US. Rhode Island RTK

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Tin (CAS 7440-31-5)

Zinc (CAS 7440-66-6)

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

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version**Issue date**

June 01, 2015

Version #

1.0

Further information

Not available.

References

HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

The information in this MSDS was obtained from industry sources that we believe to be 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 the handling, storage, use, or disposal of the product.



SAFETY DATA SHEET

1. Identification

Product identifier Bismuth Alloys

Other means of identification

SDS number 111

Product code C89320, C89325, C89510, C89360, C89510, C89520, C89530, C89831, C89833, C89835, C89836, C89837

Recommended use Manufacturing

Recommended restrictions Not assigned.

Manufacturer / Importer / Supplier / Distributor information

Company name Spectrum Machine, Inc.

Address Corporate: 1668 Frost Rd., Streetsboro, OH 44241

Telephone Corporate: 1-330-626-3666

Contact person Tim Lamb

E-mail timlamb@spectrummachine.com

Emergency phone number 1-888-276-6737

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Sensitization, skin Category 1


Carcinogenicity Category 2

Specific target organ toxicity, repeated exposure Category 2 (Lung)

OSHA hazard(s) Not classified.

Label elements

Hazard symbol



Signal word Warning

Hazard statement May cause an allergic skin reaction. Suspected of causing cancer. May cause damage to organs (Lung) through prolonged or repeated exposure by inhalation.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/protective clothing. Do not breathe fumes and dusts.

Response If on skin: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Specific treatment (see this label). Wash contaminated clothing before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.

Storage Store locked up.

Disposal Dispose of contents/container to a facility that has permission of disposing the industrial waste.

Hazard(s) not otherwise classified (HNOC) Not classified.

3. Composition/information on ingredients

Mixture

Hazardous components			
Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	85-91
Tin		7440-31-5	4-7.5

Hazardous components			
Chemical name	Common name and synonyms	CAS number	%
Bismuth		7440-69-9	0.5-6
Selenium		7782-49-2	0-1.1
Nickel		7440-02-0	0-1
Composition comments		All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The alloy contains additional alloying elements at concentrations below disclosure requirements. At temperatures above the melting point the alloys may liberate fumes containing oxides of alloying elements.	
4. First-aid measures			
Inhalation	In case of exposure to fumes or particulates: Move to fresh air. Get medical attention if discomfort persists.		
Skin contact	Contact with dust: Wash skin with soap and water. In case of allergic reaction or other skin disorders: Seek medical attention and bring along these instructions. In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.		
Eye contact	Do not rub eyes. Remove any contact lenses. Flush eyes thoroughly with water, taking care to rinse under eyelids. If irritation persists, continue flushing for 15 minutes, rinsing from time to time under eyelids. If discomfort continues, consult a physician.		
Ingestion	Rinse mouth thoroughly if dust is ingested. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.		
Most important symptoms/effects, acute and delayed	May cause skin and eye irritation. May cause irritation to mucous membranes. Cough. Shortness of breath. Wheezing. Sensitization.		
Indication of immediate medical attention and special treatment needed	Treat symptomatically. Symptoms may be delayed.		
General information	Get medical attention if any discomfort develops. Seek medical attention for all burns, regardless how minor they may seem. Show this safety data sheet to the doctor in attendance.		
5. Fire-fighting measures			
Suitable extinguishing media	Special powder against metal fires. Dry sand.		
Unsuitable extinguishing media	Do not use water or halogenated extinguishing media. Do not use water on molten metal: Explosion hazard could result.		
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. In a fire, nickel may form nickel carbonyl, a highly toxic substance and known carcinogen.		
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.		
Fire-fighting equipment/instructions	Move containers from fire area if you can do it without risk.		
6. Accidental release measures			
Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.		
Methods and materials for containment and cleaning up	Avoid dust formation. Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. The vacuum cleaner should be explosion-proofed. If not possible, gently moisten dust before it is collected with shovel, broom or the like. This material and its container must be disposed of as hazardous waste.		
Environmental precautions	Avoid release to the environment. Do not contaminate water.		

7. Handling and storage

Precautions for safe handling

Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Provide adequate ventilation. Avoid contact with sharp edges and hot surfaces. Avoid inhalation of dust and contact with skin and eyes. Avoid generation and spreading of dust and fumes. Avoid contact with hot or molten material. Dust clouds may be explosive under certain conditions. Take precautionary measures against static discharges when there is a risk of dust explosion. Use explosion-proof electrical equipment if airborne dust levels are high. To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Wear appropriate personal protective equipment. Do not use water on molten metal. Do not eat, drink or smoke when using the product. Keep the workplace clean. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep dry. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3 0.1 mg/m3	Dust and mist. Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Selenium (CAS 7782-49-2)	PEL	0.2 mg/m3	
Tin (CAS 7440-31-5)	PEL	2 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3 0.2 mg/m3	Dust and mist. Fume.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Selenium (CAS 7782-49-2)	TWA	0.2 mg/m3	
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper (CAS 7440-50-8)	REL	1 mg/m3	Dust and mist.
Nickel (CAS 7440-02-0)	REL	0.015 mg/m3	
Selenium (CAS 7782-49-2)	REL	0.2 mg/m3	
Tin (CAS 7440-31-5)	REL	2 mg/m3	

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high. Special ventilation should be used to convey finely divided metallic dust generated by grinding, sawing etc., in order to eliminate explosion hazards.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear dust-resistant safety goggles where there is danger of eye contact. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

Skin protection

Hand protection

Wear suitable protective gloves to prevent cuts and abrasions. When material is heated, wear gloves to protect against thermal burns. Suitable gloves can be recommended by the glove supplier.

Other

Wear suitable protective clothing.

Respiratory protection

In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated uniforms should be laundered separately from other clothing to prevent potential cross-contamination. If possible, an industrial laundry service should be used to eliminate the possibility of contaminating the home environment. Handle in accordance with good industrial hygiene and safety practices. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance	Shapes, Solids, Tubes & Turnings.
Physical state	Solid.
Form	Shapes, Solids, Tubes & Turnings.
Color	Yellow to red.
Odor	None.
Odor threshold	Not available.
pH	Unknown.
Melting point/freezing point	1725.8 °F (941 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	Insoluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	0.313 - 0.323 lb/in ³

10. Stability and reactivity

Reactivity	Not available.
Chemical stability	Stable at normal conditions. Massive metal is stable and non reactive under normal conditions of use, storage and transport.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hot molten material will react violently with water resulting in spattering and fuming.
Conditions to avoid	Contact with incompatible materials. Contact with acids will release flammable hydrogen gas. Avoid dust formation. Dust clouds may be explosive under certain conditions.
Incompatible materials	Acids. Ammonium nitrate. Fluoride. Halogens. Nitrates. Phosphorus. Strong oxidizing agents. Sulfur.
Hazardous decomposition products	Welding, burning, sawing, brazing, grinding or machining operations may generate dusts and fumes of metal oxides. Phosphorus oxides. Selenium/selenium oxides.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.
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Inhalation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin contact	May cause an allergic skin reaction. Hot or molten material may produce thermal burns. Workers allergic to nickel may develop eczema or rashes. Acute exposure to cobalt metal, dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Eye contact	Molten material will produce thermal burns. Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation to mucous membranes. May cause skin and eye irritation. Coughing. Wheezing. Shortness of breath. Sensitization.
Information on toxicological effects	
Acute toxicity	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Acute exposure to dust, and fume may cause irritation of skin and eyes. In sensitized individuals, exposure causes an asthma-like attack, with wheezing, bronchospasm, and dyspnea.
Skin corrosion/irritation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Hot or molten material may produce thermal burns.
Serious eye damage/eye irritation	Dust from machining operation in the eyes may cause irritation.
Respiratory sensitization	Not classified.
Skin sensitization	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May cause sensitization by skin contact. Pre-existing skin conditions including dermatitis might be aggravated by exposure to this product.
Germ cell mutagenicity	No data available.
Carcinogenicity	Suspected of causing cancer.
IARC Monographs. Overall Evaluation of Carcinogenicity	
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.
Selenium (CAS 7782-49-2)	3 Not classifiable as to carcinogenicity to humans.
NTP Report on Carcinogens	
Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
Reproductive toxicity	Nickel: Has shown teratogenic effects in laboratory animals.
Specific target organ toxicity - single exposure	May cause respiratory irritation.
Specific target organ toxicity - repeated exposure	Causes damage to the following organs through prolonged or repeated exposure: Lung.
Aspiration hazard	Not available.
Chronic effects	Harmful: danger of serious damage to health by prolonged exposure through inhalation. Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Chronic inhalation of metallic oxide dust/fume may cause metal fume fever.
Further information	Welding or plasma arc cutting of metal and alloys can generate ozone, nitric oxides and ultraviolet radiation. Ozone overexposure may result in mucous membrane irritation or pulmonary discomfort. UV radiation can cause skin erythema and welders flash.

12. Ecological information

Ecotoxicity	Alloys in massive forms present a limited hazard for the environment. The product contains a substance which may cause long-term adverse effects in the environment.		
Components	Species		Test Results
Selenium (CAS 7782-49-2)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	0.94 - 1.2 mg/l, 96 hours
Persistence and degradability	The product is not biodegradable.		
Bioaccumulative potential	The product contains potentially bioaccumulating substances.		
Mobility in soil	Alloys in massive forms are not mobile in the environment.		
Mobility in general	Alloys in massive forms are not mobile in the environment.		
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.		

13. Disposal considerations

Disposal instructions	This material and its container must be disposed of as hazardous waste. Dispose in accordance with all applicable regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Z110: Inorganic compounds n.o.s.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging	Not applicable.

14. Transport information

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as a dangerous good.

IMDG

Not regulated as a dangerous good.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not on regulatory list.

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8)	LISTED
Nickel (CAS 7440-02-0)	LISTED
Selenium (CAS 7782-49-2)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations

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

Nickel (CAS 7440-02-0)
Selenium (CAS 7782-49-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA) Not regulated.

US state regulations WARNING: This product contains a chemical known to the State of California to cause cancer.

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8)
 Nickel (CAS 7440-02-0)
 Selenium (CAS 7782-49-2)
 Tin (CAS 7440-31-5)

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

Copper (CAS 7440-50-8)	500 LBS
Nickel (CAS 7440-02-0)	500 LBS
Selenium (CAS 7782-49-2)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Copper (CAS 7440-50-8)
 Nickel (CAS 7440-02-0)
 Selenium (CAS 7782-49-2)
 Tin (CAS 7440-31-5)

US. Rhode Island RTK

Copper (CAS 7440-50-8)
 Nickel (CAS 7440-02-0)
 Selenium (CAS 7782-49-2)
 Tin (CAS 7440-31-5)

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

Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date June 01, 2015

Version # 1.0

Further information Not available.

References HSDB® - Hazardous Substances Data Bank
 IARC Monographs. Overall Evaluation of Carcinogenicity
 National Toxicology Program (NTP) Report on Carcinogens
 ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

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