

SAFETY DATA SHEET (SDS)

Date Issued: 11-16-2015; Updated 07-14-2016

1. IDENTIFICATION

(a) **Product Identifier:** Moldstar 18, Moldstar 21, Moldstar 22, Moldstar 90, Moldstar 97, Moldstar 150

(b) **Material Names:** Chromium Copper Alloy, Copper Alloy, Chrome Copper, Copper Nickel Alloys, High Copper Alloys, Copper Rods, Copper Plate, Copper Forgings, Aluminum Bronzes, Silicon Bronzes, Bronzes Forgings.

(c) **Recommended Use of the Chemical:** Used across a wide range of industries and applications
Restrictions on use: No known restrictions

(d) **Manufacturer/Supplier/Distributor information:**

Performance Alloys and Services, Inc.
N116 W18515 Morse Drive
Germantown, WI 53022 United States

E-mail: quality@moldstar.com

Website: www.moldstar.com

(e) **Contact / Telephone Number (non emergency):**

800-272-3031 or 262-255-6662

2. HAZARD(S) IDENTIFICATION

(a) **Hazard Classification**

This product is exempt from classification according to the OSHA Hazard Communication Standard (CFR1910.1200 App d) since it is an article as sold under normal conditions of use.

(b) **Label Elements**

Signal Word	Not applicable
Symbols	Not applicable
Pictograms	Not applicable

(c) **Hazards Not Otherwise Classified**

Dust or fumes generated by machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the material may produce airborne contaminants (see Section 8) that are hazardous.

(d) Not applicable

3. COMPOSITION / INFORMATION ON INGREDIENTS

Individual Moldstar Copper Alloys compositions are shown on the Certification of Chemical and Mechanical Properties, when supplied, or may be found in Performance Alloys and Services, Inc literature and on the company website: www.moldstar.com . Elements having a listed percentage greater than zero will be present in all alloy grades. Elements having percentages starting with a zero may not be present in certain alloy grades. Elements are listed in alphabetical order, and not in order of percentage (%) by weight found in material.

Element	CAS Number	Percent (%) by weight
Aluminum **	7429-90-5	0 - 20
Chromium *	7440-47-3	0 - 2
Cobalt *	7440-48-4	0 - 3
Copper *	7440-50-8	80 - 100
Iron	7439-89-6	0 - 6

Lead *	7439-92-1	0 - 1
Manganese *	7439-96-5	0 - 14
Nickel	7440-02-0	0 - 32
Silicon	7440-21-3	0 - 4
Tin	7440-31-5	0 - 20
Zinc	7440-66-6	0 - 3
Zirconium	7440-67-7	0 - 0.5

* This constituent, a toxic chemical, makes this product subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40CFR Part 372. Quantity threshold for this chemical, below which reporting of releases is not required, is 25,000 pounds.

** This constituent is reportable only if in the form of dust or fume.

Note: Chromium, lead and nickel have been identified as potential human carcinogens. This material is classified as not hazardous under OSHA regulations.

4. FIRST-AID MEASURES

(a) Eye Contact - No need for first aid is anticipated under normal use conditions.

Inhalation - No need for first aid is anticipated under normal use conditions. If symptoms develop following exposure to fumes or dusts released from the processing of the material (e.g. machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting), immediately remove person from exposure. Seek medical attention if symptoms persist.

Skin - No need for first aid is anticipated under normal use conditions. Vacuum off excess dust. Wash well with soap and water. Avoid blowing particulate into the atmosphere. Contact with these alloy grades in the molten condition will cause severe burns. Get medical attention.

Ingestion - No need for first aid is anticipated under normal use conditions. Seek medical attention if large quantities of material have been ingested.

(b) Most Important Symptoms and Effects, both Acute and Delayed - None expected under normal conditions of use. Dust or fumes generated by machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the material may produce airborne contaminants (see Sections 8 and 11) that are hazardous.

(c) Indication of Immediate Medical Attention and Special Treatment Needs - Not applicable

5. FIRE-FIGHTING MEASURES

(a) Suitable Extinguishing Media - Use suitable extinguishing methods for surrounding fire.

(b) Specific Hazards Arising from the Chemical - Not applicable

(c) Special Protective Equipment and Precautions for Fire - Fighters - Not applicable

6. ACCIDENTAL RELEASE MEASURES

(a) Personal Precautions, Protective Equipment, and Emergency Procedures - No special measures required.

(b) Methods and Materials for Containment and Cleaning up - Not applicable

(c) Environmental Precautions - Not applicable

7. HANDLING AND STORAGE

(a) Precautions for Safe Handling - No special requirements.

(b) Conditions for Safe Storage, Including Any Incompatibilities - No special storage requirements.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

(a) Occupational Exposure Limits

Dust or fumes generated by machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the material may produce airborne contaminants with the following Occupational Exposure Limits (OELs):

Component	CAS Number	Percent %	OSHA / P.E.L. TWA	ACGIH TLV® TWA
			Milligrams Per Cubic Meter (mg/m3)	
Aluminum ** Metal & Insoluble Compounds	7429-90-5	0 – 20		
		Dust	15	1 (R)
		Fume	5 (R)	1 (R)
Chromium *	7440-47-3	0 – 2	1	0.5
Cobalt *	7440-48-4	0 – 3	0.1	.02
Copper *	7440-50-8	80 – 100		
		Dust	1	1
		Fume	0.1	0.2
Iron Iron Oxide	7439-89-6	0 – 6		
		Dust/Fume	10	5 (R)
Lead * Metal & Inorganic	7439-92-1	0 – 1		
		Dust/Fume	.05	.15
Manganese *	7439-96-5	0 – 14		
		Dust	5	.020 (R)
		Fume		.1 (I)
Component	CAS Number	Percent %	OSHA / P.E.L. 8-HR TWA	ACGIH TLV® 8-HR TWA
			Milligrams Per Cubic Meter (mg/m3)	
Nickel *	7440-02-0	0 – 32		
		Elemental	1	1.5 (I)
		Insoluble	1	0.2 (I)
Silicon	7440-21-3	0 – 4		
		Total Dust	15	10
		Respirable	5	5
Tin Oxide & Inorganic Compounds	7440-31-5	0 – 20		
			.1	.1
Component	CAS Number	Percent %	OSHA / P.E.L. TWA	ACGIH TLV® TWA
			Milligrams Per Cubic Meter (mg/m3)	
Zinc** Oxide	7440-66-6	0 – 3		
		Total Dust	15	10
		Fume	5	5
				10 (STEL)
Zirconium	7440-67-7	0 – 0.5	5	5

Elements having a listed percentage greater than zero will be present in all alloy grades. Elements having percentages starting with zero may not be present in certain alloy grades.

* This constituent, a toxic chemical, makes this product subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40CFR Part 372. Quantity threshold for this chemical, below which reporting of releases is not required, is 25,000 pounds.

** This constituent is reportable only if in the form of dust or fume.

Exposure Limit Abbreviations

NE	None Established
ACGIH TLV®	American Conference of Governmental Industrial Hygienists Threshold Limit Value ®, 2015 Edition
OSHA / P.E.L.	Occupational Health and Safety Administration / Permissible Exposure Limit
TWA	Time Weighted Average
(STEL)	Short Term Exposure Limit
C	Ceiling Limit
(mg/m3)	milligram of substance per cubic meter of air
(R)	Respirable fraction of particulate sampled
(I)	Inhalable fraction of particulate sampled

(b) Appropriate Engineering Controls

In the solid state, no special requirements are necessary. If processes such as machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting are used on the material, local exhaust ventilation may be required to maintain concentrations of airborne hazardous ingredients below the applicable exposure limits.

(c) Individual Protection Measures; Personal Protective Equipment (PPE)

Eye Protection - Wear safety glasses with side-shields if there is a risk of particles getting in eyes.

Skin protection - No chemical protective clothing is required. If material is processed, use appropriate protective clothing and gloves for the application.

Respiratory Protection - In the solid state, no special requirements are necessary. Airborne dust or fumes can be generated by machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the materials. Respiratory protection may be necessary if concentrations of these hazardous ingredients exceed the applicable exposure limits. In these cases a NIOSH approved respirator should be selected based on the form and concentration of the contaminant in air.

9. PHYSICAL AND CHEMICAL PROPERTIES

(a) Appearance	Physical State: Solid Color: Golden/Yellow or Copper/Orange
(b) Odor	Not applicable
(c) Odor threshold	Not applicable
(d) pH	Not applicable
(e) Melting Point	1742-2050 °F (950-1121 °C)
(f) Initial boiling point & boiling range	Not applicable
(g) Flash Point	Not applicable
(h) Evaporation Rate	Not applicable
(i) Flammability	Not applicable
(j) Upper/Lower flammability or explosive limits	Not applicable
(k) Vapor Pressure	Not applicable
(l) Vapor Density	Not applicable
(m) Relative Density	Not applicable
(n) Solubility in Water	Not applicable
(o) Partition Coefficient	Not applicable
(p) Auto-Ignition Temperature	Not applicable
(q) Decomposition Temperature	Not applicable
(r) Viscosity	Not applicable

10. STABILITY AND REACTIVITY

(a) Reactivity	Inert, non-reactive
(b) Chemical Stability	Stable
(c) Possibility of Hazardous Reactions	None known
(d) Conditions to Avoid	None known
(e) Incompatible Materials	None known
(f) Hazardous Decomposition Products	None expected under conditions of normal use.

11. TOXICOLOGICAL INFORMATION

This product as sold is an article but processing may release hazardous substances. Information about these components is supplied.

Acute Toxicity

Copper - Eye and respiratory irritation may occur. High exposure to copper dust may cause gastrointestinal effects due to oral ingestion.

Nickel - One study showed severe lung and kidney damage following exposure to extremely high levels of nickel powder.

Skin Corrosion / Irritation

None expected

Serious Eye Damage or Irritation

None expected

Respiratory or Skin Sensitization

Cobalt - May cause allergy or asthma symptoms or breathing difficulties if inhaled. Contact allergic dermatitis may occur.

Nickel - Contact allergic dermatitis may occur.

Germ Cell Mutagenicity

Nickel - Chromosomal aberrations and in vitro and in vivo testing has shown that nickel is genotoxic (ASTDR).S

Carcinogenicity

Aluminum - Not listed by IARC, NTP or OSHA.

Cobalt - Listed by IARC (possibly carcinogenic to humans-Group 2B). Not listed by NTP or OSHA.

Copper - Not listed by IARC, NTP or OSHA.

Iron - Not listed by IARC, NTP or OSHA.

Manganese - Not listed by IARC, NTP or OSHA.

Nickel - Listed by IARC (possibly carcinogenic to humans-Group 2BA) and NTP (known to be a human carcinogen). The strongest evidence for carcinogenicity is for sulfidic nickel forms and the evidence for oxidic forms of nickel are the weakest. There is no evidence that metallic nickel is associated with nasal or lung cancer (ASTDR).

Reproductive Toxicity

None expected

Specific Target Organ Toxicity - Single Exposure

Copper - A few studies have shown copper to cause metal fume fever, a condition characterized by chills, fever, muscular pain, nausea, and vomiting but these are limited in number and details. Studies have reported upper respiratory tract irritation, metallic taste sensation and nausea.

Nickel - One study showed severe lung and kidney damage following exposure to extremely high levels of nickel powder.

Specific Target Organ Toxicity - Repeated Exposure

Aluminum - There is some evidence that aluminum may accumulate in the body with long-term exposure. Lung changes have been reported in workers exposed to high levels of aluminum dust. Some studies have indicated that there may be subtle neurological effects following long-term exposure to aluminum.

Cobalt - Animal studies have shown respiratory effects following inhalation exposure (lung edema, decreased pulmonary function). Transient myocardial changes have also been reported. Studies have shown asthma and pulmonary function changes in workers in the cemented tungsten carbide industry and cobalt is thought to play a significant role in these effects although it is not the only substance these workers were exposed to.

Iron - Prolonged exposure may lead result in iron deposits in the lung, a condition known as siderosis.

Manganese - Inflammatory changes in the lung were found in monkeys exposed to manganese dioxide via inhalation for 10 months. At high exposure levels (greater than 5 mg/m³), manganism (chronic manganese poisoning) has been reported in workers. Symptoms of manganism include sleepiness, weakness in the legs, a mask-like facial appearance, emotional disturbances and a spastic gait. High levels of pneumonia have also been reported in workers inhaling large amounts of manganese dust and fume. In some studies, manganese has been associated with longer reaction times, hand steadiness and eye-hand coordination. Effects appear to be more pronounced with exposures to respirable sized particles.

Nickel (elemental and nickel oxide) - Animal studies have shown lung changes and inflammation.

Aspiration Hazard

Based on the physical form, the product is not expected to be an aspiration hazard.

12. ECOLOGICAL INFORMATION

(a) Ecotoxicity	Ecotoxicity is expected to be minimal since the material is a solid with low water solubility.
(b) Persistence and Degradability	Not applicable
(c) Bioaccumulative Potential	Not applicable
(d) Mobility in Soil	Not applicable
(e) Other Adverse Effects	Not applicable

13. DISPOSAL CONSIDERATIONS

This product is not considered to be hazardous waste according to US RCRA and Canadian regulations. Recover or recycle if possible. Dispose of according to federal, state and local regulations. Dust collected from material processing operations (e.g. machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting) may be classified as a hazardous waste. Consult federal, state and local regulations.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (DOT)	Product is not regulated
International Maritime Dangerous Goods (IMDG)	Product is not regulated
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Product is not regulated
International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)	Product is not regulated

15. REGULATORY INFORMATION

If this product is reformulated or further processed, the regulatory status of the components listed in the composition section of this sheet may be altered. The following regulatory information may not be complete and should not be relied upon as the sole source of information regarding regulatory responsibilities.

Occupational Health and Safety Administration

This product is an article as sold. Dust or fumes generated by machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the material may produce airborne contaminants that are regulated by OSHA.

TSCA Chemical Inventories

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Other Regulatory Information

Element	CAS Number	EINECS	CERCLA RQ (lbs)	Section 313	NPRI Threshold Category	California Prop 65
Aluminum (fume or dust)	7429-90-5	231-072-3		313	1A	
Cobalt	7440-48-4	231-158-0		313	1A	Carcinogen
Copper	7440-50-8	231-159-6	5,000	313	1A	
Iron	7439-89-6	231-096-4				
Manganese	7439-96-5	231-105-1		313	1A	
Nickel	7440-02-0	231-111-4	100	313	1A	Carcinogen

CAS- Chemical Abstract Service - Registry Number

EINECS - European Inventory of Existing Commercial Chemical Substances

CERCLA RQ (reportable quantity) - if a value is listed then releases of particles, = 100 µm in size, to the environment may require reporting under CERCLA Sections 102-103 (40 CFR Part 302).

Section 313 - if '313' is listed then may be subject to the reporting requirements found under EPCRA Section 313 (40 CFR Part 372).

NPRI (National Pollutant Release Inventory) Threshold Category - if 1A or 1B is listed, may be subject to reporting under the Canadian Environmental Protection Act, 1999.

California Prop 65 - if listed WARNING: This product contains chemicals known to the State of California to cause cancer.

These products are not believed to contain any substances that meet the notification requirements found under EPCRA Sections 302 or 304 (40 CFR Part 355) nor subject to the accidental release prevention requirements under CAA 112(r) (40 CFR Part 68).

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

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WARNING: This product contains chemical(s) known to the State of California to cause cancer.

Dust or fumes generated by machining, grinding, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the material can produce airborne contaminants that are hazardous. Consult the Safety Data Sheet (SDS) for this product for further information.