MATERIAL SAFETY DATA SHEET
BRONZE ALLOYS XP55, C61550, C69300, C66540

1.0 PRODUCT AND COMPANY IDENTIFICATION

PMX Industries, Inc.
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PRODUCT NAMES:

PMX ALLOY #	COMMON NAME	UNS #/CDA #
XP55	PMX High Precision Aluminum Bronze	C61550
693		C69300
66540		C66540

CHEMICAL FAMILY: Copper Alloy

ISSUE DATE: December 15, 2004

SUPERSEDES DATE: May 13, 1999

2.0 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Copper alloy products in the natural state do not present a hazard for emergency response personnel.

POTENTIAL HEALTH EFFECTS:

Copper alloy products in the natural state do not present an inhalation, ingestion, or contact hazard. However, operations such as burning, welding, sawing, brazing, or grinding may release fumes and/or dusts which may present health hazards if occupational exposure limits are exceeded.

LIKELY ROUTES OF EXPOSURE: Inhalation, Eye Contact, Skin Contact

INHALATION: Short-term exposure to fumes/dust may produce irritation of the respiratory system. Exposure to high concentrations of copper oxide fumes may cause metal fume fever.

EYE: Short-term exposure to fumes/dust may produce irritation.

SKIN: Repeated or prolonged exposure to copper dusts or mists may cause irritant or allergic contact dermatitis.

INGESTION: Ingestion of large doses of nickel compounds (1-3 mg/kg) has been shown to cause intestinal disorders, convulsions, and asphyxia.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Exposure to fumes or dust may aggravate existing respiratory disease or dermatitis.

TARGET ORGANS: Upper respiratory tract, eyes, skin

SIGNS AND SYMPTOMS:

Metal fume fever – metallic taste in mouth, dryness, and irritation of the throat, and influenza-like symptoms. The effects may be delayed.

Nickel overexposure – effects on nasal sinuses, including inflammation and ulceration.

CARCINOGENICITY:

COMPONENT	ACGIH	IARC	NTP
Aluminum	No	No	No
Copper (fume, dusts & mists)	No	No	No
Nickel	No	Yes	Yes

See Toxicological Information (Section #11)

POTENTIAL ENVIRONMENTAL EFFECTS:

None known. Product has not been tested for environmental properties.

3.0 CHEMICAL COMPONENTS

NOTE: This MSDS applies to a range of alloys. For actual compositions refer to material test report or specific alloy specification. All percentages are by weight.

COMPONENT	CAS #	%
Aluminum	7429-90-5	4.5 – 6.5
Copper	7440-50-8	88.4 – 93
Nickel	7440-02-0	2 – 2.25

4.0 FIRST AID MEASURES

INHALATION: If exposed to excessive levels of metal fumes, remove to fresh air. Seek medical attention.

EYE: Flush with water for at least 15 minutes.

SKIN: Wash with soap and water.

5.0 FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA: Use extinguishing media appropriate to the surrounding material.

SPECIAL FIREFIGHTING INSTRUCTIONS: Copper alloy products in the solid state present no fire or explosion hazard, but may react with strong acids, bases, or oxidizing agents.

6.0 ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN THE EVENT OF SPILLS, LEAKS, OR RELEASES: Not applicable

7.0 HANDLING AND STORAGE

HANDLING: In welding, precautions should be taken for airborne contaminants that may originate from components of the welding rod.

8.0 EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE GUIDELINES

COMPONENT	OSHA PEL TWA	ACGIH® TLV® TWA
Aluminum metal dust	5.0 mg/m^3 respirable dust 15.0 mg/m^3 total dust	10.0 mg/m^3
Copper dust, mist	1.0 mg/m^3	1.0 mg/m^3
Copper fume	0.1 mg/m^3	0.2 mg/m^3
Nickel, elemental	1.0 mg/m^3	1.5 mg/m^3 I

ENGINEERING CONTROLS: Local exhaust ventilation should be utilized when welding, burning, sawing, brazing, grinding, or machining when exposure exceeds occupational exposure limits.

EYE PROTECTION: Safety glasses or goggles should be utilized as required by exposure. Other protective equipment should be utilized as required by welding standards.

SKIN PROTECTION: Wear appropriate personal protective clothing to prevent skin contact with copper dusts and mists.

RESPIRATORY PROTECTION: NIOSH-approved dust or fume respirator should be used to avoid excessive inhalation of particulates when exposure exceeds occupational exposure limits.

OTHER PREVENTIVE MEASURES: Do not eat, drink, or smoke during work. Wash hands before eating or smoking.

9.0 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Salmon-colored, lustrous metal		
ODOR:	None	**PHYSICAL STATE:**	Solid
pH:	Not applicable	**VAPOR PRESSURE:**	Not applicable
VAPOR DENSITY (AIR = 1)	Not applicable	**PERCENT VOLATILE:**	Not applicable
EVAPORATION RATE:	Not applicable	**SPECIFIC GRAVITY:**	Not available
SOLUBILITY IN WATER:	Not applicable	**DENSITY, LB/IN^3:**	Not available
MELTING POINT:	Not available		
FLASH POINT:	Not applicable	**LOWER EXPLOSIVE LIMIT (%):**	None
AUTOIGNITION TEMPERATURE:	Not applicable	**UPPER EXPLOSIVE LIMIT (%)**	None

10.0 STABILITY AND REACTIVITY

CHEMICAL STABILITY:	Stable
CONDITIONS TO AVOID:	None
INCOMPATIBLE MATERIALS:	Mercury, ammonia, acetylene acids. Contact with strong acids, bases, or oxidizing agents
HAZARDOUS DECOMPOSITION PRODUCTS:	Metallic dust or fumes may be produced during welding, burning, grinding, and machining.
POSSIBILITY OF HAZARDOUS REACTIONS:	Will not occur

11.0 TOXICOLOGY INFORMATION

ACUTE TOXICITY DATA FOR COMPONENTS

Aluminum	TCLo:	4 mg/m^3 /1 year (human, inhalation—respiratory and metabolic effects)
Copper	TDLo:	120 μg/kg (human, oral—gastrointestinal effects)
	LD_{50}:	0.07 mg/kg (mouse, intraperitoneal)
Nickel	LD_{50}:	250 mg/kg (rodent, intraperitoneal)

CHRONIC EFFECTS:

Chronic overexposure to aluminum-containing dusts may cause fibrosis of the lungs.

Repeated or prolonged overexposure to copper fume may cause the skin and hair to change color.

Hypersensitivity to nickel is common and may cause allergic contact dermatitis, pulmonary asthma, and conjunctivitis.

12.0 ECOLOGICAL INFORMATION

Not applicable

13.0 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS:

According to local, state, and federal regulations.

14.0 TRANSPORT INFORMATION

Not applicable

15.0 REGULATORY INFORMATION

GLOBAL INVENTORIES

	ALUMINUM	COPPER	NICKEL
TSCA: United States	Included	Included	Included
DSL: Canada	Included	Included	Included
EINECS: European Union:	Included	Included	Included

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):

These alloys are not regulated under Section 302 of SARA and 40 CFR 355.

SARA TITLE III SECTION 311/312 HAZARDOUS CATEGORIZATION (40 CFR 370):

OSHA defines these alloys as hazardous under 29 CFR 1910.1200(d).

SARA TITLE III SECTION 313 TOXIC CHEMICALS (40 CFR 372):

These alloys may contain the following toxic chemical(s) subject to reporting requirements under this section of SARA and of 40 CFR 372:

COMPONENT	CAS #	% BY WEIGHT
Aluminum (fume or dust only)	7429-90-5	4.5 – 6.5
Copper	7440-50-8	88.4 – 93
Nickel	7440-02-0	2 – 2.25

OTHER LISTS

Chemical Name	CA Prop 65 Chemical	MA Toxic Substance List	MI Critical Materials Register	NJ Hazardous Substances List	PA Right-to-Know List
Aluminum	No	Yes	No	Yes	Yes
Copper	No	Yes	Yes	Yes	Yes
Nickel	Yes	Yes	Yes	Yes	Yes

16.0 OTHER INFORMATION

REFERENCES

ACGIH® Threshold Limit Values (TLV®) (2004)

Agency for Toxic Substances and Disease Registry (ATSDR):

- Toxicological Profile for Aluminum, July 1999
- Toxicological Profile for Copper, September 2002
- Draft Toxicological Profile for Nickel, September 2003

International Agency for Research on Cancer (IARC) Monographs

National Library of Medicine (NLM) Databases:

- ChemID
- Integrated Risk Information (IRIS)
- International Toxicity Estimates for Risk (ITER)
- Chemical Carcinogenesis Risk Information System (CCRIS)
- Hazardous Substances Data Bank (HSDB)

National Toxicology Program (NTP) Reports

NIOSH Pocket Guide to Chemical Hazards (2003)

NIOSH/OSHA Occupational Health Guideline for Copper Fume

NIOSH/OSHA Occupational Health Guideline for Copper Dusts and Mists

NIOSH/OSHA Occupational Health Guideline for Nickel Metal and Soluble Nickel Compounds

OSHA General Industry Standards (29 CFR 1910)

Registry of Toxic Effects of Chemical Substances (RTECS®)

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