SAFETY DATA SHEET

Revised: Jan 1, 2015

Supersedes: March 25, 2009

Product Name: **Brazelt #718**

Emergency Phone: 1-708-532-5000 or 1-800-367-6024

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Chemical Formula: Mixture

Other Designations:4047

Supplier: Bellman-Melcor, LLC
7575 183rd Street
Tinley Park, IL 60477
Product Use: Brazing

2. HAZARDS INFORMATION

EMERGENCY OVERVIEW

Solid, silvery, odorless. Non-flammable as supplied. Small chips, fine turnings, and dust from processing may

Explosion/fire hazards may be present when (See Sections 5, 7 and 10 for additional information):

- Dust or fines are dispersed in the air.
- Fines or dust are in contact with other metal oxides (e.g., rust).
- Chips, fines, or dust are in contact with water.
- Molten aluminum is in contact with water/moisture or other metal oxides.

Dust or fume from welding can cause eye, skin, or upper respiratory tract irritation; metal fume fever; lung diseases, neurological effects and other systemic effects.

Potential Health Effects

EYES: Fume can cause irritation. Ultraviolet radiation from welding can cause flash burns.

SKIN: Can cause irritation. Ultraviolet radiation from welding can cause flash burns.

INHALATION: Can cause respiratory tract irritation, metal fume fever, and other health effects listed below:
Cancer hazard

Aluminum is welded in a protective, inert atmosphere such as argon or helium using the MIG or TIG process. Welding processes generate welding fumes and an intense ultraviolet radiation that results in the formation of ozone, and oxides of nitrogen. Ultraviolet radiation from welding can also cause flash burns to the eyes and skin.

- The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 28).
- Exposure to low levels of ozone can cause irritation of the eyes, nose, and throat. Inhalation can cause chest tightness, headache, shortness of breath, cough, wheeze, nausea, and narrowing of airways. Symptoms disappear when removed from exposure.
- Exposure to high levels of ozone may cause acute respiratory distress with shortness of breath, pulmonary changes, hemorrhage, and pulmonary edema (fluid in the lungs). Symptoms of pulmonary edema may be delayed for one or more hours. Exposure of test animals and human tissue to high concentrations has shown chromosomal changes, reproductive effects, blood changes, and death from lung congestion.
- Oxides of nitrogen can cause irritation of the eyes, skin (when moist), and respiratory tract. Exposure to high levels of nitrogen oxides can cause delayed pulmonary edema (fluid in the lungs) which may be fatal. Nitric oxide can cause formation of methemoglobin, which decreases the blood's ability to carry oxygen. Chronic overexposure can cause pulmonary fibrosis (scarring of the lungs).
- Overexposure to Aluminum dust fines and fumes can cause reduced lung function and may be associated with neurological effects.

- Overexposure to magnesium oxide fumes can cause respiratory tract irritation and fever, chills, shortness of breath, and malaise (metal fume fever). Temporary symptoms can include fever, chills, nausea, vomiting, and muscular pain.
- Chronic exposure to inert dusts of silicon can cause increased airway resistance and contributes to chronic bronchitis. Intratracheal administration of silicon in rabbits produced significant pulmonary lesions.
- Exposure to zinc oxide fumes subsequent to burning, welding, and molten metal work can result in fever, chills, shortness of breath, and malaise (metal fume fever), and upper respiratory tract irritation. Temporary symptoms can include fever, chills, nausea, vomiting, and muscular pain. Exposure to dust or fines presents a low health risk by inhalation.
- Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech) lethargy , tremor, muscular weakness, psychological disturbances and spastic gait.
- Hexavalent chromium (Chrome VI) can cause asthmal kidney damage, primary irritant dermatitis, sensitization dermatitis, skin ulceration, and pulmonary edema (fluid in the lungs). Chronic inhalation or overexposure has been associated with lung, nasal, and gastrointestinal cancer. Hexavalent chromium is listed as carcinogenic to humans by IARC (Group 1)*. Chromium and some of its compounds are listed as carcinogenic by the NTP. Hexavalent chromium compounds may be generated during welding operations, with alloys containing chromium. A SIGNIFICANT AMOUNT OF THE CHROMIUM IN THE FUMES CAN BE HEXAVALENT CHROMIUM, WHICH HAS A VERY LOW EXPOSURE LIMIT, 0.005 mg/m^3 (5$\mu g/m^3$).
- The potential for overexposure to copper fume may exist when welding, flame cutting, etc. Overexposure to copper dust/mists can cause irritation of the eyes, skin, and upper respiratory tract. Chronic overexposure may result in blood disorders (anemia), and skin and hair discolorations. Overexposure to copper fume can result in respiratory tract irritation, nausea, and fever chills, shortness of breath and malaise (metal fume fever) .
- Nickel dust and fume can cause skin sensitization, allergic contact dermatitis, and conjunctivitis. Chronic inhalation of high levels of nickel can cause irritation of airways and lungs, lung fibrosis (scarring of the lungs), nasal septum perforation, nasal sinusitis, respiratory sensitization and asthma. Nickel compounds have been associated with cancer of lungs, larynx, and paranasal sinuses in humans. Nickel compounds are listed on the NTP and are listed as carcinogenic to humans by IARC (Group 1)*. Nickel metal is possibly carcinogenic to humans as defined by IARC (Group 28)*.
- Beryllium can cause irritant dermatitis, allergic contact dermatitis, and skin granulomas. Inhalation of excessive levels of beryllium can result in acute pneumonitis (inflammation of the lung tissues).

  Beryllium can cause lung sensitization in susceptible individuals. Chronic inhalation of dust and fumes by these sensitized individuals can result in a serious, progressive disease called Chronic Beryllium Disease (CBO). This disease, often misdiagnosed as sarcoidosis, is an allergic condition in which the lung tissues become inflamed. This inflammation, sometimes accompanied with fibrosis (lung scarring), restricts the uptake of oxygen into the blood stream. CBD can, over time, be fatal.

  Inhalation of beryllium has produced lung tumors in animals. Beryllium is listed on the NTP and is known to be carcinogenic to humans by IARC (Group 1)*. (See *Section 8)*
- Lead inorganic dust and fume is listed as a possibly carcinogenic to humans by IARC Group 28*. Overexposure to lead dust or fume can cause weakness of extremities (peripheral neuropathy), stomach disturbances, harm to the kidneys, liver, central nervous system, blood and blood forming tissues, and reproductive organs. Overexposure to lead has been associated with human reproductive effects (e.g. reduced fertility and damage to the fetus of exposed pregnant women). Lead is a cumulative toxic metal by Inhalation or ingestion.
- Warning: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & safety Code 25249.5 et seq.)

Medical conditions aggravated by exposure to the product:

Chronic lung disease, skin rashes, and asthma.

***IARC CLASSIFICATIONS:**

Group 1: The agent is carcinogenic to humans.

There is sufficient evidence that a casual relationship existed between exposure to the agent and human cancer.

Group 28: The agent is possibly carcinogenic to humans.

Generally includes agents for which there is limited evidence in humans in the absence of sufficient evidence in experimental animals.

3. COMPOSITION INFORMATION ON INGREDIENTS

Alloy Ingredients: (% by weight shown as a maximum or a range, except for Aluminum, which is a minimum % by weight)

Alloy	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Others Each [1]	Others Total	Al
4047 (718)	11.0-13.0	0.8	0.30	0.15	0.10		—	0.20	----	0.05	0.15	Rm

Notes:

1. Beryllium shall not exceed 0.0003 percent.
2. Rmnd = remainder.
3. 1350 may contain Gallium, 0.03% (max.), Boron 0.05% (max.), and Vanadium plus Titanium, 0.02% (max.).
4. 1188 may contain Gallium, 0.03% (max .), and Vanadium, 0.05% (max.).
5. 2319 contains Vanadium, 0.05-0.15% and Zirconium, 0.10-0.25%.
6. 206.0 may contain Tin, 0.05% (max.).
7. 1199 may contain 0.005% each (max.) of Gallium and Vanadium.

4. FIRST AID MEASURES

EYES: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

SKIN: Wash thoroughly with soap and water. Consult a physician if irritation persists.

INHALATION: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide CPR for persons without pulse or respirations. Consult a physician immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: Non-flammable as shipped. Small chips and dust from processing may ignite readily.

FIRE/EXP LOSION: May be a potential hazard under the following conditions:

- Dusts or fines dispersed in the air can be explosive.
- Chips, fines and dust in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces.
- Fines and dust in contact with certain metal oxides (e.g., rust). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.
- Molten aluminum in contact with water/moisture or other metal oxides (e.g., rust). Moisture entrapped by molten aluminum can be explosive. Contact of molten aluminum with other metal ox ides can initiate a thermite reaction.

EXTINGUISHING MEDIA: Use firefighting methods and materials that are appropriate for surrounding fire. Use coarse water spray on chips or turnings. For fines, dust or molten aluminum, use Class D extinguishing agents.

DO NOT USE: Halogenated extinguishing agents on small chips/fines. Do not use water in fighting fires around molten aluminum.

FIRE FIGHTING INSTRUCTIONS: Fire fighters should wear NIOSH approved positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

6. ACCIDENTAL RELEASE MEASURES

SMALL/LARGE SPILL: If molten: Contain the flow using dry sand or salt flux as a dam. Do not use shovels or hand tools to halt the flow of molten aluminum. Allow the spill to cool before remelting as scrap.

7. HANDLING AND STORAGE

Product should be kept dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different.

REQUIREMENTS FOR PROCESSES WHICH GENERATE DUSTS OR FINES

- If processing of these products includes operations where dust or extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F1 and National Fire Protection Association (NFPA) brochures listed in Section 16. Use non-sparking handling equipment. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during aluminum dust handling and transfer operations. (See Section 15).
- Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.
- Do not allow chips, fines or dust to contact water, particularly in enclosed areas.
- Avoid all ignition sources. Good housekeeping practices must be maintained.

REQUIREMENTS FOR REMELTING OF ALUMINUM SCRAP MATERIAL AND/OR INGOT

- Molten aluminum and water can be an explosive combination. The risk is greatest when there is sufficient molten aluminum to entrap or seal *off* the water. Water and other forms of contamination on or contained in aluminum scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined even a few drops of water can lead to violent explosions.

- All tooling and containers which come in contact with molten aluminum must be preheated or specially coated and rust free. Molds and ladles must be preheated or oiled before casting. Any surfaces that may contact molten aluminum (i.e., concrete) should be specially coated.
- Drops of molten aluminum in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Circulation of the water and removal of the aluminum particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:

- Inspect all aluminum materials before furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
- Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- Preheat and dry large or heavy items such as ingot adequately before charging into a furnace containing molten aluminum. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the internal metal temperature of the coldest item of the batch to 400°F and then hold at that temperature for 6 hours.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use with adequate explosion-proof ventilation to meet the limits listed in Section 2.

RESPIRATORY PROTECTION: Use NIOSH-approved respiratory protection for dust, fume, high efficiency dust/fume mask for lead, or other (organic vapor) as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 2.

EYE PROTECTION: Welders should use appropriate equipment (e.g. welder's helmet, face shield, filter lens) to prevent eye irritation or flash burns.

SKIN PROTECTION: Wear impervious gloves to avoid any skin injury.

- The presence of airborne beryllium has been detected during the welding of aluminum alloys with beryllium content at only 0.002% by weight. In accordance with OSHA 29 CFR 1910.252: Welding or cutting operations involving beryllium-containing base or filler metals shall be done using local exhaust ventilation and airline respirators unless atmospheric tests under the most adverse conditions have established that the workers exposures is within the acceptable concentrations defined by 29 CFR 1910.1000. In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.
- Good industrial hygiene practices, including reducing occupational exposures to as low as reasonably achievable, are recommended. Where employees are exposed to beryllium above the PEL or where excessive contamination of clothing with beryllium is possible, adequate protective clothing should be provided to prevent contamination of personal clothing. Personnel assigned to launder such clothing should be advised of beryllium's presence and potential health effects.
- Sampling to establish lead level exposure is advised where exposure to airborne particulate or fumes is possible. Consult OSHA Lead Standard 29 CFR 1910.1025 for specific health/industrial hygiene precautions and requirements to follow when handling lead compounds.

EXPOSURE LIMITS:

			EXPOSURE LIMITS (TWA in mg/m^3 unless noted)	
Component	**CAS No.**	**Form**	**ACGIH TLV**	**OSHA PEL**
Aluminum	7429-90-5	Total dust, fume Respirable	1	15 5
Beryllium and Beryllium Compounds	7440-41-7	All compounds as Be	0.00005	0.002, 0.005 Ceiling, 0.025 for 30 minutes
Chromium	7440-47-3	Metals Cr II compounds Cr III compounds, inorganic Cr VI compounds, water soluble Cr VI compounds, water insoluble	0.5 —— 0.5 as Cr 0.05 as Cr 0.01 as Cr	1 0.5 as Cr 0.5 as Cr 0.005 as Cr VI 0.005 as Cr VI
Copper	7440-50-8	Fume Dust/mist	0.2 1	0.1 1
Gallium	7440-55-3		None	None
Iron	7439-89-6	Oxide dust & fume (as Fe)	5 (respirable)	10
Lead (nonvolatile)	7439-92-1	Elemental and inorganic compounds	0.05 as Pb	0.05 as Pb
Magnesium	7439-95-4	Oxide fume	10 (inhalable)	15 Total particulate
Manganese	7439-96-5	Dust fume	0.2	5 (ceiling)
Nickel	7440-02-0	Metal & insoluble compounds Soluble inorganic compounds Insoluble inorganic compounds	1.5 as Ni 0.1 as Ni inhalable 0.2 as Ni inhalable	1 as Ni 1 as Ni 1 as Ni
Silicon	7440-21-3	Total dust Respirable	TLV withdrawn ——	15 5
Titanium	7440-32-6	Oxide dust	10	15 (total particulate)
Vanadium	7440-62-2	Respirable dust Respirable fume	0.05 as V2Os	0.5 (ceiling) as V2Os 0.1 (ceiling) as V2Os
zinc	7440-66-6	Oxide fume Total Oxide dust Respirable oxide dust	—— —— 2, 10 (STEL)	5 15 5
Zirconium	7440-67-7		5, 10 (STEL)	5 (compounds only)

Possible hazards during processing, welding, or brazing

	ACGIH TLV	OSHA PEL
Ozone (light, heavy work)	0.1, 0.05 ppm	0.1 ppm
Nitric oxide	25 ppm	25 ppm
Nitrogen dioxide	3, 5ppm (STEL)	5ppm (ceiling)

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEA RANCE:	Solid
BOILING POINT:	Not applicable
FREEZE-MELT POINT:	970 -1215 °F (521 -657 °C)
VAPOR PRESSURE (mm):	Not applicable
VAPOR DENSITY (air = 1):	Not applicable
SOLUBILITY IN WATER:	None
SPECIFIC GRAV ITY:	Not determined
DENSITY:	Approximately 0.1 lb/in^3
pH:	Not applicable
ODOR:	None
ODOR THRESHOLD (ppm):	Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION:	Not applicable

10. STABILITY AND REACTIVITY

Stable under normal conditions of use, storage, and transportation as shipped. Chips, fines, dust and molten aluminum are considerable more reactive with the following:

- Water: Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
  Molten aluminum can react violently/explosively with water or moisture, particularly when the water is entrapped.
- Heat: Oxidizes at a rate dependent upon temperature and particle size.
- Strong oxidizers: Violent reaction with considerable heat generation.
  Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten.
- Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
- Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided aluminum.
- Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation.
  Morten aluminum can react violently without external ignition source.
- Iron powder: An explosive reaction forming hydrogen gas occurs when heated above 1470 °F (600 °C).

11. TOXICOLOGJ.CA L INFORMATION

LDsa or LCLo found for oral, dermal or inhalation routes of administration:

Nickel:	oral rat LD_{50}: 9000 mg/kg body weight
Silicon:	oral rat LD5o: 3160 mg/kg body weight
Manganese:	oral rat LD5o: 9000 mg/kg body weight
Iron:	intraperitoneal rabbit LDLa: 20 mg/kg - no toxic effect noted

12. ECOLOGICAL INFORMA TION

ECOTOXICOLOGICAL/CHEMICAL FATE INFORMATION: Not available.

13. DISPOSAL CONSIDERATION

Collect scrap for remelting and recycling. To maintain metal purity, it may be desirable to segregate this scrap from other alloys.

RCRA Status: Characterize in accordance with 40 CFR 261 or state equivalent.

14. TRANSPORT INFORMATION

USA DOT: Not Regulated - Enter the proper freight classification, "SOS Number," and "Product Name" on the shipping paperwork.

Canadian TOG Hazard Class & PIN: Not regulated.

15. REGULATORY INFORMATION

All electrical equipment must be suitable for use in hazardous atmospheres involving aluminum powder in accordance with 29 CFR 1910.307. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installation, which will meet this requirement.

U.S. Federal Regulations

TSCA STATUS: All components of this product are listed on the TSCA inventory.

CERCLA HAZARDOUS SUBSTANCES: Beryllium, Chromium, Chromium compounds, Copper, Lead, Manganese, Nickel, Zinc.

SARA TITLE III:

Section 311/312 Physical and Health Hazard Categories: Immediate (acute), delayed (chronic) if particulates/fumes are generated during processing.

Section 313 Toxic Chemicals: Aluminum (fume/dust), Beryllium, Chromium, Copper, Lead, Manganese, Nickel, Vanadium (fume/dust), and Zinc (fume/dust).

State Regulations

PENNSYLVANIA "Special Hazardous Substance": Beryllium; Nickel; Chromium compounds, hexavalent.

International Regulations

CANADIAN DOMESTIC SUBSTANCES LIST: All components of this product are listed on the Canadian DSL.

EUROPEAN COMMUNITY: All components of this product are listed on ECOIN, the European Core Inventory.

16. OTHER INFORMATION

STATUS: Changes in Section 3.

PREPARED BY: Hazardous Materials Control Committee

- OSHA Standard 29 CFR 1910.1025 (Lead)
- OSHA Standard 29 CFR 1910.252
- ANSI 249.1, Safety in Welding and Cutting
- Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated during Various Aluminum Fabricating Operations." The Aluminum Association, 900 19th Street, NW, Washington, DC 20006.
- NFPA 65, Standard for Processing and Finishing of Aluminum (NFPA phone: 800-344-3555)
- NFPA 70, Standard for National Electrical Code
- NFPA 77, Standard for Static Electricity
- Guide to Occupational Exposure Values-1997, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- Dept. of Health and Human Services, NIOSH: Registry of Toxic Effects of Chemical Substances, 1985-86 Edition
- Sax, N. Irving: Dangerous Properties of Industrial Materials, Van Nostrand Reinhold Co., Inc. 1984

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LEGEND:

ACG IH	American Conference of Governmental Industrial Hygienists	atm	atmosphere
AICS	Australian Inventory of Chemical Substances	cm	centimeter
CAS	Chemical Abstract Services	g	gram
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act	In	inch
CFR	Code of Federal Regulations	kg	kilogram
DOT	Department of Transportation	lb.	pound
DSL	Domestic Substances List(Canada)	m	meter
ECOIN	European Core Inventory	mg	milligram
EPA	Environmental Protection Agency	mm	millimeter
IARC	International Agency for Research on Cancer	n.o.s.	not otherwise specified
LC_{50}	Lethal Concentration (50 percent kill)	ppb	parts per billion
LC_{Lo}	Lowest published lethal concentration	ppm	parts per million
LD_{50}	Lethal dose (50 percent kill)	psia	pounds/square inch absolute
LO_{Lo}	Lowest published lethal dose	ug	microgram
MIG	Metal Inert Gas		
NFPA	National Fire Protection Association		
NIOSH	National Institute for Occupational Safety and Health		
NTP	National Toxology Program		
OSHA	Occupational Safety and Health Administration		
PEL	Permissible Exposure Limit		
PIN	Product Identification Number		
RCA	Resource Conservation and Recovery Act		
SARA	Superfund Amendments and Reauthorization Act		
$TEL	Short Term Exposure Limit		
TCLP	Toxic Chemicals Leachate Program		
TOG	Transportation of Dangerous Goods		
TIG	Tungsten Inert Gas		
TLV	Threshold Limit Value		
TSCA	Toxic Substances Control Act		
TWA	Time weighted Average		