

PRODUCTS:

Molten Aluminum
Aluminum Ingots and Sows
Aluminum Deoxidizing Agents

MATERIAL SAFETY DATA SHEET

REVISION DATE: **April 15, 1999**
MSDS No.: **01**
NFPA: **0-0-0-W (Molten)**
HMIS: **NA**

SECTION 1 - GENERAL INFORMATION

MANUFACTURER:

Wabash Alloys, L.L.C. - 4525 W. Old 24, P.O. Box 466 - Wabash, IN 46992
Wabash Plant - 4525 W. Old 24, Wabash, IN 46992 (219)563-7461
Bellwood Plant - 1711 Reymet Rd. - Richmond, VA 23237 (804)743-6506
Benton Plant - 1118 Vulcan Rd. - Benton, AR 72015 (501)776-0621
Checotah Plant - 100 Apex Rd. - Checotah, OK 74426 (918)473-2321
Cleveland Plant - 4365 Bradley Rd. - Cleveland, OH 44109 (216)661-8600
Dickson Plant - 600 Printwood Dr. - Dickson, TN 37055 (615)446-0600
Marietta Plant - Hazel & Biddle Streets - Marietta, PA 17547 (717)426-1981
Mexico Plant - Ave. de los Hornos esq con Ave. Crisol No. 1200 - Parque Industrial Fundidores - Frontera, Coahuila 25616 (011)011-52-86-34-39-70
Milwaukee Plant - 9100 S. 5th Ave. - Oak Creek, WI 53154 (414)764-2200
Ontario Plants -
7496 Torbram Rd. - Mississauga, Ontario Canada L4T1G9 (905)672-5569
240 Massey Rd. - Guelph, Ontario Canada N1K1C4 (519)836-5600
Russellville Plant - 120 Highway 48, Russellville, AL 35654 (205)332-2216
Syracuse Plant - 6223 Thompson Rd. - East Syracuse, NY 13057 (315)463-9500
Tipton Plant - 841 S. 550 W. - Tipton, IN 46072 (765)675-6750

EMERGENCY: (800)424-9300 CHEMTREC

CHEMICAL FAMILY: **Aluminum**
DOT HAZARD CLASS: IF SOLID: **Not Regulated**
IF MOLTEN: **9 (in Canada: Class 9.1)**

PACKING GROUP: IF MOLTEN: **III**
UN/NA#: IF MOLTEN: **NA9260**
(In Canada UN3258)

SECTION II - INGREDIENTS

| INGREDIENT | CAS NO. | OSHA PEL | ACGIH TLV | %(optional) | INGREDIENT | CAS NO. | OSHA PEL | ACGIH TLV | %(optional) |
|------------------|-----------|----------|-----------|-------------|------------------|-----------|----------|-----------|-------------|
| <u>Aluminum</u> | 7429-90-5 | NA | 10.0mg/m | >70% | <u>Nickel</u> | 7440-02-0 | 1.0mg/m | 1.0mg/m | .01-3.0% |
| Copper | 7440-50-8 | 0.01mg/m | 0.2mg/m | .01-5.0% | <u>Manganese</u> | 7439-96-5 | 5.0mg/m | 5.0mg/m | .01-1.0% |
| Silicon | 7440-21-3 | NA | 10.0mg/m | .01-20.0% | <u>Lead</u> | 7439-92-1 | 0.05mg/m | 0.15mg/m | .01-.50% |
| <u>Magnesium</u> | 7439-95-4 | 15.0mg/m | 10.0mg/m | .01-7.0% | Tin | 7440-31-5 | 2.0mg/m | 2.0mg/m | .01-7.0% |
| <u>Zinc</u> | 7440-66-6 | 5.0mg/m | 10.0mg/m | .01-8.0% | Titanium | 7440-32-6 | 15.0mg/m | 10.0mg/m | .01-.50% |
| Iron | 7439-89-6 | 10.0mg/m | 5.0mg/m | .01-1.0% | <u>Chromium</u> | 7440-47-3 | 1.0mg/m | 0.5mg/m | .01-.60% |

NOTE: See the attached alloy composition sheet and the metal purchasing agent for your company for more information on the composition of the aluminum alloy used.

SARA SECTION 313: If the above ingredients are underlined, they are listed in 40 CFR 372.65 Superfund Amendments and Reauthorization Act (SARA) Section 313, and may be present in quantity greater than the "de minimus" concentration. Therefore those underlined ingredients may be subject to the reporting requirements of SARA Section 313 (aluminum and zinc as fume or dust).

SECTION III - PHYSICAL DATA

BOILING POINT (760 MM HG): NA

MELTING POINT: 940-1220°F, Alloys 850.1, 851.0 & 852.1: 400-1200°F

SPECIFIC GRAVITY (H₂O=1): 360 Alloy-2.63 to B850 Alloy-2.88

EVAPORATION RATE (BuAc=1): NA

VAPOR DENSITY (air =1): NA

VAPOR PRESSURE AT 20°: NA

PERCENT VOLATILE BY VOLUME (%): NA

SOLUBILITY IN WATER: **Insoluble**APPEARANCE & ODOR: **Silvery colored solid or liquid if molten, no odor.**

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): NA

IGNITION SENSITIVITY: NA

FLAMMABLE LIMITS: LEL: NA UEL: NA

EXPLOSION SEVERITY: NA

MINIMUM EXPLOSION CONCENTRATION: NA

IGNITION TEMPERATURE: NA

EXTINGUISHING MEDIA: NA

SPECIAL FIRE FIGHTING PROCEDURES: Castings, ingot and/or scrap do not present fire or explosion hazards under normal conditions. Use fire fighting methods appropriate for surrounding fire. Small chips, fine turnings or dust may ignite under certain circumstances. Use coarse water spray on finely divided metal such as turnings; class D extinguishers or dry sand on fines or dust. Do not use halogenated extinguishing agents on dust or fines.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Dust clouds may be explosive. Prevent formation of dust clouds. Molten aluminum may explode on contact with water or react violently with water, rust, and certain metal oxides (oxides of Aluminum, Copper, Iron or Lead) (This is actually a steam explosion.) Avoid the use of water in fighting fires around molten aluminum.

THE FOLLOWING GUIDELINES SHOULD BE OBSERVED:

1. Inspect all remelt ingot prior to furnace charging and remove surface contamination such as ice, snow, deposits of grease and oil or other surface contamination resulting from shipment or storage.
2. Store ingot in dry, heated areas with any crack or cavities pointed downward.
3. Preheat and dry ingot adequately before charging it into a furnace. This is typically done by the use of ovens, homogenizing furnaces, gas flame, or placement of the ingot on furnace sills, if they are suitable for that purpose.
4. Perform the furnace charging sequence in such a way that submergence of remelt ingot in molten aluminum is avoided.

SECTION V - HEALTH HAZARD DATA

ROUTES OF ENTRY: **Inhalation, Ingestion most likely**CARCINOGENIC: **Alloying Ingredients: Arsenic, Beryllium, Cadmium, Chromium, Lead, and Nickel.**NTP **YES**IARC MONOGRAPH **YES**OSHA **NO**

SIGNS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE: Irritation to eyes; fatigue; weakness; lassitude; insomnia; constipation; abdominal pain; colic.
CHRONIC: Pulmonary fibrosis; facial pallor; anemia; gingival lead line; tremors; wrist drop; encephalopathy; nephropathy; hypotension; lead, cadmium, nickel, beryllium, and chromium have been implicated as carcinogens.

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation of aluminum alloy fume and dust may aggravate pulmonary disorders and cause irritation and shortness of breath. If affected, remove to fresh air and consult a physician.

INGREDIENT - HEALTH HAZARDS, SIGNS AND SYMPTOMS OF EXPOSURE:

Aluminum dust/fines and fumes are low health risk by inhalation. For standard operations (e.g. milling, cutting, grinding, etc.), aluminum should be treated as a nuisance dust and is so defined by the American Conference of Governmental Industrial Hygienist (ACGIH).

Overexposure to nickel dust and fume is possible. Exposure to nickel oxide in excess of recommended limits has been associated with pneumoconiosis in animal studies. Nickel metal and its oxides are animal carcinogens when given intramuscularly, while certain nickel compounds are carcinogenic by inhalation producing lung tumors. Carcinogenicity by inhalation has not been clearly established for nickel metal and its oxide. Nickel and its compounds are listed in the latest Annual Report on Carcinogens as published by the National Toxicology Program (NTP) and by the International Agency for Research on Cancer (IARC).

Certain chromium compounds have been shown to cause nasal and lung cancer by inhalation. Chromium and its compounds are listed in the latest annual report of Carcinogens by the National Toxicology Program (NTP) and by the International Agency for Research on Cancer (IARC).

Exposure to zinc oxide fume subsequent to burning, welding, and molten metal work can result in "zinc chills" (metal fume fever). Temporary symptoms can include fever, chills, nausea, vomiting, and muscular pain. Exposure to dust/fines presents a low health risk by inhalation.

The potential for overexposure to copper fume may exist when welding, flame cutting, etc. on alloys containing amounts of copper greater than 2.5%. Overexposure to copper fume can result in upper respiratory tract irritation, nausea, and metal fume fever.

Exposure to magnesium oxide fume subsequent to burning or welding can result in metal fume fever. Exposure to magnesium metal or oxide dust should be a low health risk by inhalation and should be treated as a nuisance dust. When plasma arc cutting with auxiliary gasses containing nitrogen, the exposure limits for oxides of nitrogen can be exceeded.

Overexposure to manganese oxide fumes may cause metal fume fever. Chronic overexposure to manganese fumes may cause nervous system disorders (e.g. Parkinsonian-type symptoms, pneumonitis, and fibrosis of lung tissue).

Welding aluminum, plasma arc cutting, and arc spray metalizing can generate ozone. Ozone overexposure can result in mucous membrane irritation as well as pulmonary changes including irritations/congestion/edema.

When plasma arc cutting with auxiliary gasses containing nitrogen, the exposure limits for oxides of nitrogen can be exceeded. Nitrogen dioxide can cause irritation of eyes, nose, throat and delayed pulmonary edema. Short exposure to very high concentrations (>250 ppm) may cause pulmonary edema and death.

Nitric oxide is a severe eye, skin, and mucous membrane irritant; it may cause formation of methemoglobin and subsequent action on the central nervous system. Nitrogen monoxide can be fatal if inhaled at very high concentrations (>100 ppm).

Overexposure to lead dust or fumes over an extended time can result in such toxic effects as central nervous system disturbances, peripheral neuropathy, renal changes, gastrointestinal disturbances, anemia, and chromosomal changes. Overexposure to lead has been associated with human reproductive effects such as reduced fertility in both men and women and damage to the fetus of exposed pregnant women. Symptoms of chronic lead overexposure include tiredness, irritability, appetite loss, metallic taste, and loss of sleep. Since lead is a cumulative toxic metal by inhalation or ingestion, appropriate industrial hygiene precautions (i.e. good personal hygiene) need to be taken.

SECTION VI - SPILL OR LEAK PROCEDURES

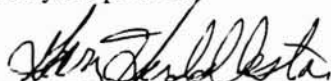
RESPONSE AND WASTE DISPOSAL STEPS FOR RELEASE OR SPILLS:

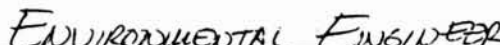
SOLIDS SPILL: **Reconsolidate and reband ingots or sows for recycling.**LIQUID SPILL: **Contain spill with sand, earth or other non-flammable materials. Allow spill to solidify and cool, and collect for recycling by remelting.**RCRA HAZARDOUS WASTE NUMBER: **Not federally regulated.****SECTION VII - REACTIVITY DATA**STABILITY: **Stable under normal conditions.**CONDITIONS TO AVOID: **Avoid contact of molten aluminum alloy with water.**INCOMPATIBILITY (Materials to Avoid): **Finely divided aluminum in contact with water will generate hydrogen gas (explosive) and heat. Reacts violently with halogenated hydrocarbons.**HAZARDOUS DECOMPOSITION PRODUCTS: **Contact with acids and alkalines will generate hydrogen gas.**HAZARDOUS POLYMERIZATION: **Will not occur.****SECTION VIII - SPECIAL PROTECTION INFORMATION**RESPIRATORY PROTECTION **Required when welding or machining; wear a particle dust mask or a 1/2 face cartridge-**
(SPECIFY TYPE): **type mask.**VENTILATION: **Engineering control by forced ventilation when aluminum alloys are processed by heat cutting, welding, and brazing.**SKIN PROTECTION: **Long-sleeved shirt and long-length pants. Gloves should be worn to help prevent cuts due to sharp edges on the metal.**EYE PROTECTION: **Wear safety glasses with side shields, goggles, or full face shield.****SECTION IX - SPECIAL PRECAUTIONS**SARA TITLE III INFO: Fire Sudden Release of Pressure Reactivity Immediate (acute) Delayed (chronic)

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Most alloys have a low health risk potential. The potential for overexposure to copper fume may exist during the melting of dross containing high amounts of copper (e.r. 2.5%). These alloys include 206.1, 240.1, 295.1, 296.1, 308.1, 319.1, 333.1, A380.1, B3801.1, 384.1, A384.1, B390.1, and possibly 332.1 and 383.1. Overexposure to copper fumes can result in upper respiratory tract irritation, nausea and metal fume fever. Nickel and Chromium are mainly trace elements < 0.10% max. There are several alloys that contain over 0.10% Nickel - 240.1, 336.1, 850.1, 851.1, 852.1 and over 0.10% Chromium - 712.2 and 771.2. Nickel and Chromium and their compounds are listed in the 3rd Annual Report on Carcinogens and prepared by the National Toxicology Program (NTP). Their presence in dross, however, does not present carcinogenic or other health hazards because of the chemical form in which they are present.

APPROVAL


NAME


TITLE


DATE

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COMMON ALLOYS PRODUCED - APPROXIMATE CHEMICAL COMPOSITION

| 4/15/99 | | | | | | | | | | | | | | |
|---------|-----------|---------|---------|---------|-----------|-----------|-----------|---------|---------|------|-----------|------|-------|--------------|
| AA | | | | | | | | | | | | | OTHER | |
| NUMBER | SI | FE | CU | MN | MG | CR | NI | ZN | SN | PB | TI | EACH | TOTAL | ALUMINUM |
| 240.1 | 0.50 | 0.40 | 7.0-9.0 | 0.3-0.7 | 5.6-6.5 | | 0.3-0.7 | 0.10 | | 0.05 | 0.20 | 0.05 | 0.15 | REMAINDER |
| 295.1 | 0.7-1.5 | 0.80 | 4.0-5.0 | 0.35 | 0.03 | | | 0.35 | | 0.05 | 0.25 | 0.05 | 0.15 | REMAINDER |
| 296.1 | 2.0-3.0 | 0.90 | 4.0-5.0 | 0.35 | 0.05 | | 0.35 | 0.50 | | | 0.25 | | 0.35 | REMAINDER |
| 308.1 | 5.0-6.0 | 0.80 | 4.0-5.0 | 0.50 | 0.10 | | | 1.00 | | | 0.25 | | 0.50 | REMAINDER |
| 319.1 | 5.5-6.5 | 0.80 | 3.0-4.0 | 0.50 | 0.10 | | 0.35 | 1.00 | | | 0.25 | | 0.50 | REMAINDER |
| 332.1 | 8.5-10.5 | 0.90 | 2.0-4.0 | 0.50 | 0.6-1.5 | | 0.50 | 1.00 | | | 0.25 | | 0.50 | REMAINDER |
| 333.1 | 8.0-10.0 | 0.80 | 3.0-4.0 | 0.50 | 0.1-0.5 | | 0.50 | 1.00 | | | 0.25 | | 0.50 | REMAINDER |
| 336.1 | 11.0-13.0 | 0.90 | 0.5-1.5 | 0.35 | 0.8-1.3 | | 2.0-3.0 | 0.35 | | 0.05 | 0.25 | 0.05 | 0.15 | REMAINDER |
| 339.1 | 11.0-13.0 | 0.90 | 1.5-3.0 | 0.50 | 0.6-1.5 | | 0.5-1.5 | 1.00 | | | 0.25 | | 0.50 | REMAINDER |
| 355.1 | 4.5-5.5 | 0.50 | 1.0-1.5 | 0.05 | 0.45-0.6 | 0.25 | | 0.35 | | 0.05 | 0.25 | 0.05 | 0.15 | REMAINDER |
| 356.1 | 6.5-7.5 | 0.50 | 0.25 | 0.04 | 0.25-0.45 | | | 0.35 | | 0.05 | 0.25 | 0.05 | 0.15 | REMAINDER |
| A360.1 | 9.0-10.0 | 1.00 | 0.60 | 0.35 | 0.45-0.6 | | 0.50 | 0.40 | 0.15 | | | | 0.25 | REMAINDER |
| 361.1 | 9.5-10.5 | 0.80 | 0.50 | 0.25 | 0.45-0.6 | 0.20-0.30 | 0.20-0.30 | 0.40 | 0.10 | | 0.20 | 0.05 | 0.15 | REMAINDER |
| 364.2 | 7.5-9.5 | 0.7-1.1 | 0.20 | 0.10 | 0.25-0.4 | 0.25-0.5 | 0.15 | 0.15 | 0.15 | | 0.15 | 0.05 | 0.15 | REMAINDER |
| A380.1 | 7.5-9.5 | 1.00 | 3.0-4.0 | 0.50 | 0.10 | | 0.50 | 2.90 | 0.35 | | | | 0.50 | REMAINDER |
| B380.1 | 7.5-9.5 | 1.00 | 3.0-4.0 | 0.50 | 0.10 | | 0.50 | 0.90 | 0.35 | | | | 0.50 | REMAINDER |
| 383.1 | 9.5-11.5 | 1.00 | 2.0-3.0 | 0.50 | 0.10 | | 0.30 | 2.90 | 0.15 | | | | 0.50 | REMAINDER |
| 384.1 | 10.5-12.0 | 1.00 | 3.0-4.5 | 0.50 | 0.10 | | 0.50 | 2.90 | 0.35 | | | | 0.50 | REMAINDER |
| A384.1 | 10.5-12.0 | 1.00 | 3.0-4.5 | 0.50 | 0.10 | | 0.50 | 0.90 | 0.35 | | | | 0.50 | REMAINDER |
| B390.1 | 16.0-18.0 | 1.00 | 4.0-5.0 | 0.50 | 0.5-0.65 | | 0.10 | 1.40 | | 0.10 | 0.20 | 0.10 | 0.20 | REMAINDER |
| 392.1 | 18.0-20.0 | 1.10 | 0.4-0.8 | 0.2-0.6 | 0.9-1.2 | | 0.50 | 0.40 | 0.30 | 0.15 | 0.20 | 0.15 | 0.50 | REMAINDER |
| A413.1 | 11.0-13.0 | 1.00 | 1.00 | 0.35 | 0.10 | | 0.50 | 0.40 | 0.15 | | | | 0.25 | REMAINDER |
| 443.1 | 4.5-6.0 | 0.60 | 0.60 | 0.50 | 0.05 | 0.25 | | 0.50 | | | 0.25 | | 0.35 | REMAINDER |
| A443.1 | 4.5-6.0 | 0.60 | 0.30 | 0.50 | 0.05 | 0.25 | | 0.50 | | | 0.25 | | 0.35 | REMAINDER |
| 712.2 | 0.15 | 0.40 | 0.25 | 0.10 | 0.5-0.65 | 0.4-0.6 | | 5.0-6.5 | | 0.05 | 0.15-0.25 | 0.05 | 0.20 | REMAINDER |
| 713.1 | 0.25 | 0.80 | 0.4-1.0 | 0.60 | 0.25-0.5 | 0.35 | 0.15 | 7.0-8.0 | | 0.10 | 0.25 | 0.10 | 0.25 | REMAINDER |
| 714.1 | 0.5-1.0 | 0.6-1.0 | 0.10 | 0.4-0.6 | 2.7-4.0 | | | 0.05 | | | | 0.05 | 0.15 | REMAINDER |
| 771.2 | 0.10 | 0.10 | 0.10 | 0.10 | 0.85-1.0 | 0.06-0.2 | | 6.5-7.5 | | 0.05 | 0.1-0.2 | 0.05 | 0.15 | REMAINDER |
| 850.1 | 0.70 | 0.50 | 0.7-1.3 | 0.10 | 0.10 | | 0.7-1.3 | | 5.5-7.0 | | 0.20 | | 0.30 | REMAINDER |
| 851.1 | 2.0-3.0 | 0.50 | 0.7-1.3 | 0.10 | 0.10 | | 0.3-0.7 | | 5.5-7.0 | | 0.20 | | 0.30 | REMAINDER |
| 852.1 | 0.40 | 0.50 | 1.7-2.3 | 0.10 | 0.7-0.9 | | 0.9-1.5 | | 5.5-7.0 | | 0.20 | | 0.30 | REMAINDER |
| ADC 6 | 1.00 | 0.90 | 0.10 | 0.4-0.5 | 2.6-4.0 | | 0.50 | 0.50 | 0.30 | | | 0.10 | 0.30 | REMAINDER |
| ADC 10 | 7.5-9.5 | 0.90 | 2.0-3.0 | 0.50 | 0.30 | | 0.50 | 1.00 | 0.30 | | | | | REMAINDER |
| ADC 12 | 10.5-12.0 | 0.90 | 1.5-3.5 | 0.50 | 0.30 | | 0.50 | 1.00 | 0.30 | | | | | REMAINDER |
| SP 12 | 9.5-11.5 | 1.00 | 2.0-3.0 | 0.50 | 0.10 | | 0.30 | 2.90 | 0.15 | | | | | REMAINDER |
| GRADE 1 | 1.00 | 2.00 | 1.50 | 1.00 | 1.00 | | | 1.00 | | | | | *N/A | 95.0 MINIMUM |
| GRADE 4 | 2.50 | 5.00 | 5.00 | 2.50 | 2.50 | | | 5.50 | | | | | *N/A | 85.0 MINIMUM |

* FOR GRADE 1 AND GRADE 4 THE TOTAL PERCENTAGE OF IMPURITIES (NON-ALUMINUM) IS 5.00 AND 15.00 PERCENT RESPECTIVELY.

NOTE: COMPOSITION IS IN WEIGHT PERCENT AND IS A MAXIMUM PERCENTAGE UNLESS OTHERWISE INDICATED AS A RANGE OR A MINIMUM.