TIMBER HOLDINGS USA
IRON WOODS™

MATERIAL SAFETY DATA SHEET (MSDS) - ALUMINUM ALLOYS

SECTION I: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Aluminum Alloys

Note: Aluminum alloys in their usual solid form and under normal conditions do not present an inhalation, ingestion, or contact health hazard or fire or explosion hazard. Operations such as welding, sawing, brazing, burning, grinding, cutting, abrasive blasting, heat treating, pickling, machining, or similar operations may generate dust, fumes, chips, or machine turnings that may create a health or fire or explosion hazard. This MSDS does not apply to Aluminum alloys in powdered forms.

Suppliers Name: Timber Holdings USA 451 S. River Rd, Bedford NH 03110

Emergency Phone Number: (603 623-4100
Telephone Number for Information: (603) 623-4100

SECTION 2: COMPOSITION AND INFORMATION ON INGREDIENTS

The chemical composition of Aluminum alloys will vary by the alloy grade. Approximate weight percentages (WT. %) are shown below. Refer to product specification for exact composition.

Alloy Name	Copper (Cu)	Silicon (Si)	Iron (Fe)	Manganese (Mn)	Magnesium (Mg)	Zinc (Zn)	Chromium (Cr)	Titanium (Ti)	Zirconium (Zr)	Beryllium (Be)	Vanadium (V)	Nickel (Ni)	Aluminum (Al)
2014	3.9-5.0	0.50-1.2	0.7	0.40-1.2	0.20-0.8	0.25	0.10	0.15	-	-	-	-	Remainder
2219	5.8-6.8	0.20	0.30	0.20-0.40	0.02	0.10	-	0.02-0.10	0.10-0.25	-	0.05-0.15	-	Remainder
2618	1.9-2.7	0.10-0.25	0.9-1.3	-	1.3-1.8	0.10	-	0.04-0.10	-	-	-	0.9-1.2	Remainder
6061	0.15-0.40	0.40-0.8	0.7	0.15	0.8-1.2	0.25	0.04-0.35	0.15	-	-	-	-	Remainder
6151	0.35	0.6-1.2	1.0	0.20	0.45-0.8	0.25	0.15-0.35	0.15	-	-	-	-	Remainder
7049	1.2-1.9	0.25	0.35	0.20	2.0-2.9	7.2-8.2	0.10-0.22	0.10	-	-	-	-	Remainder
7050	2.0-2.6	0.12	0.15	0.10	1.9-2.6	5.7-6.7	0.04	0.06	0.08-0.15	-	-	-	Remainder
7075	1.2-2.0	0.40	0.50	0.30	2.1-2.9	5.1-6.1	0.18-0.28	0.20	-	-	-	-	Remainder
7175	1.2-2.0	0.15	0.20	0.10	2.1-2.9	5.1-6.1	0.18-0.28	0.10	-	-	-	-	Remainder
40E	0.3	0.3	0.5	0.1	0.6	6.5	0.5	0.3	-	-	-	-	91
201	5	-	0.1	0.4	0.4	-	-	0.3	-	-	-	-	94
206	5	-	0.1	0.4	0.4	0.1	-	0.3	-	-	-	-	94
242	4.5	0.6	0.8	0.1	1.7	0.1	0.2	0.2	-	-	-	-	90
354	2.0	9.4	0.2	0.1	0.6	0.1	-	0.2	-	-	-	-	87
C355	1.5	6	0.2	0.1	0.6	0.1	-	0.2	-	-	-	-	92
A356	0.2	8	0.2	0.1	0.5	0.1	-	0.2	-	-	-	-	91
A357	0.2	8	0.2	0.1	0.7	0.1	-	0.2	-	0.07	-	-	91
358	0.1	8	0.1	0.1	0.6	0.1	0.1	0.2	-	0.3	-	-	90
C612	0.6	0.3	1.0	0.1	0.4	7	-	0.2	-	-	-	-	90
PR71A	0.1	0.2	0.1	0.1	0.9	7	0.2	0.2	-	-	-	-	91
RR350	5	0.2	0.3	0.3	-	-	-	0.2	-	-	-	-	92

OCCUPATIONAL EXPOSURE LIMITS

Ingredient	CAS Number	Classified as Carcinogen	PEL (2008) (8-Hour TWA)	TLV (2011) (8-Hour TWA)
Aluminum (as Al)	7429-90-5	None Found	Total Dust 15 mg/m^3 Respirable Dust 5 mg/m^3	1.0 mg/m$^{3\,(R)}$
Silicon (as Si)	7440-21-3	None Found	Total Dust 15 mg/m^3 Respirable Dust 5 mg/m^3	10 mg/m^3
Magnesium (as Mg)	1309-48-4	None Found	Total Particulate 15 mg/m^3	10 mg/m^3 (as oxide fume)
Copper (as Cu)	7440-50-8	None Found	Fume (as Cu) 0.1 mg/m^3 Dust & Mist (as Cu) 1.0 mg/m^3	Fume 0.2 mg/m^3 Dust & Mist (as Cu) 1.0 mg/m^3
Iron (as Fe) (as Fe_2O_3)	7439-89-6 1309-37-1	None Found	PEL Vacated 1989 Oxide Fume 10 mg/m^3	Iron Oxide (Fe2O3) 5.0 mg/m^3
Manganese (as Mn)	7439-96-5	RTECS contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product	5.0 mg/m^3 (Ceiling)	0.2 mg/m^3
Zinc (as Zn) (as ZnO)	7440-66-6 1314-13-2	None Found	Total Dust 15 mg/m^3 Respirable Dust 5 mg/m^3	2 mg/m^3 (as ZnO) Fume 10mg/m^3 as ZnO (STEL)
Titanium (as Ti) (as TiO_2)	7440-32-6 13463-67-7	None Found IARC Group 3	None Listed Total Dust 15 mg/m^3	None Listed 10 mg/m^3
Beryllium (as Be)	7440-41-7	IARC Group 1 Yes – NTP Yes – OSHA	0.002 mg/M^3 0.005 mg/m^3 (Ceiling)	0.00005 mg/m^3 Beryllium and Compounds, as Be (2008)
Chromium (as Cr) (as Cr III) (as Cr VI)	7440-47-3	IARC Class 3 IARC Class 3 IARC Class 1, Yes – NTP	1.0 mg/m^3 0.5 mg/m^3 5.0 ug/m^3 Action Level = 2.5 ug/m^3	Cr Metal and Cr III compounds - 0.5mg/m^3 Water Soluble Cr VI compounds - 0.05mg/m^3 Insoluble Cr VI compounds – 0.01 mg/m3
Nickel (as Ni) Elemental	7440-02-0	IARC Group 2	1.0 mg/m^3	1.5 mg/m^3
Vanadium (as V) (as V2O5)	7440-62-2 1314-62-1	None Found	None Listed Respirable Dust 0.5 mg/m^3 (Ceiling) Fume 0.1 mg/m^3 (Ceiling)	None Listed Fume & Dust 0.05 mg/m^3
Zirconium (Zr)	7440-67-7	None Found	5 mg/m^3	5 mg/m^3 10 mg/m^3 STEL

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SECTION 3: HAZARDS IDENTIFICATION (See Note in Section 1)

Carcinogenicity: IARC, NTP, and OSHA do not list Aluminum alloy as a carcinogen. Beryllium contained in some Aluminum alloys is classified as carcinogenic by IARC, NTP, and OSHA. Chromium metal contained in some aluminum alloys is classified as carcinogenic by IARC. Hexavalent chromium though not present in the alloy may be formed during welding or other thermal processes and is classified as carcinogenic by NTP.

Routes of Entry/Exposure: Aluminum alloys in their usual solid form and under normal conditions do not present an inhalation, ingestion, or contact health hazard. Inhalation may occur if dust or fumes are generated. Skin absorption is not likely to occur, but irritation may occur when in contact with skin. Ingestion is not likely to occur.

Target Organs: Lungs, eyes and skin.

Short-Term (Acute) Effects of Overexposure:

Eyes: Dusts or fumes can cause irritation with burning and tearing.

Skin: Dusts or fumes can cause irritation with itching. Dermatitis may occur.

Inhalation: Dusts or Fumes can cause irritation and dryness of the nose and throat, coughing, bronchitis, pneumonia, chest pain, and pulmonary edema.

Ingestion: Diarrhea, black stools, and cramping may occur.

Long-Term (Chronic) Effects of Overexposure: No significant adverse health effects found in literature search specific to Aluminum alloys. Chronic exposure to certain metals in Aluminum alloys may cause non-progressive pulmonary fibrosis or chronic bronchitis when overexposed to elevated dust or fume concentrations. Other symptoms include shortness of breath, cough, chest tightness, and wheezing without impairment Dermatitis and allergic sensitization have been reported. Overexposure to beryllium may cause chronic beryllium disease. The Department of Energy and others, have questioned the adequacy of existing exposure limits fur beryllium in preventing chronic beryllium disease.

Conditions Aggravated By Exposure: Persons with sensitive skin or allergies to metals may be aggravated by exposure. Persons with respiratory problems and Wilson's disease may also be aggravated by exposure.

Also See TOXICOLOGICAL INFORMATION (Section I I)

SECTION 4: FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids apart to ensure flushing of entire eye surface. Seek medical attention after flushing eyes with water.

Skin: Wash contaminated areas with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and wash before reuse. Seek medical attention if any irritation or redness occurs.

Inhalation: Get person out of contaminated area to fresh air. If breathing has stopped, give artificial respiration and seek medical attention immediately.

Ingestion: Seek medical attention immediately. Never give anything by mouth to an unconscious person.

Get appropriate in-plant, paramedic, or community medical support after first aid is given.

Note to Physicians: Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES (See Note in Section 1)

Auto ignition Temperature: Auto ignition will not occur for solid metal alloy. Dust cloud may be explosive (NFPA 65).

Flammable Limits: Not Tested.

Extinguishing Media: Do Not Use Water or Halogenated Extinguisher Agents! Dry sodium chloride is most effective for containing particulate fires. Flux (KCI, $MgCl_2$, CaF2) is effective in reducing the oxygen supply of the fire. See NFPA Code No. 65 for more information.

Special Fire Fighting Procedures: Wear self-contained breathing apparatus with full face piece operated in positive pressure mode and full turn-out gear. Unusual Fire and Explosion Hazards: No fire or explosion hazard with solid metal alloys. A severe fire hazard may exist when fine turnings or chips are produced and during disposal of scrap containing chips or fines. Dry Aluminum alloy powder (NFPA 65) can be ignited by a match or small spark. Toxic metal fumes of aluminum, silicon, magnesium, copper, iron, nickel, zinc, titanium, and beryllium may be emitted. Molten alloy and water can cause an explosion.

SECTION 6: ACCIDENTAL RELEASE MEASURES (See Note in Section 1)

Should spills of dust occur, use vacuum cleaner rated to clean up explosive dust and equipped with High Efficiency Particulate (HEPA) filters to clean minor spills. Do not sweep or use compressed air to clean up spills. Dispose of spilled material in accordance with local, state, and federal regulations.

SECTION 7: HANDLING AND STORAGE

Handling Precautions: Avoid generation of dust. Use good housekeeping practices if dusts are formed to prevent accumulation. Use appropriate personal protection. Contact qualified safety and health specialists to review usage and possible exposures. Follow procedures contained in 29 CFR 1910.307, Aluminum Association Bulletin F-l and NFPA 65. Provide grounding and bonding to prevent accumulation of static charges during dust or fume generation (NFPA 65,70,77).

Storage Requirements: Store in cool, dry, and well ventilated area away from incompatibles. Protect from physical damage and contact with water.

Regulatory Requirements: Follow OSHA, EPA, and DOT requirements.

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SECTION 8: EXPOSURE CONTROLS, PERSONAL PROTECTION (See Note in Section 1)

Air Monitoring: Air monitoring should be performed by a professional industrial hygienist to determine the level of exposure. Results from monitoring will help to determine the appropriate personal protective clothing and equipment required.

Respiratory Protection: Air monitoring will help determine if and what level of respiratory protection is required. A respiratory protection program must be implemented if respirators are required (29 CFR 1910.134). Half face air purifying respirators with high efficiency particulate (HEPA) filters can be used when airborne concentrations do not exceed ten (10) times the Equivalent Exposure for PELs or TLVs.

Protective Clothing: Normal work clothes may be worn when airborne exposures are within allowable limits and contact with dust is not likely to occur. Use a qualified safety and health specialist to perform a hazard assessment (29 CFR 1910.133).

Engineering Controls: Local exhaust ventilation should be used whenever feasible to capture dust or fumes before reaching workers' breathing zone. Local exhaust should meet criteria in NFPA 65. Use vacuum cleaners rated to clean up explosive dust and equipped with High Efficiency Particulate (HEPA) filters to clean work surfaces and protective clothing before removal. Use non-sparking metal equipment. All electrical equipment must be suitable for use in hazardous atmospheres if aluminum dust, fumes, or powder are formed (29 CFR 1910.307).

Work-Practices: Food and beverages should not be consumed, tobacco products should not be present or used, and cosmetics should not be applied in areas where dust or fumes are present. Workers should wash their hands and face prior to eating, drinking, smoking, or applying cosmetics and at the end of the work shift. Adequate washing facilities should be available and used by workers. Keep work areas free of waste.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Aluminum alloys are solid at room temperatures with a silver color. No distinctive odor.

Melting Point: l200°F (for aluminum)

Specific Gravity: 2.7

Vapor Pressure: NA

Evaporation Rate: NA

Vapor Density: NA

Solubility in Water: Insoluble

Percent Volatile: Nil

pH: NA

SECTION 10: STABILITY AND REACTIVITY (See Note in Section 1)

Stability: Aluminum alloys are stable at room temperature under normal storage and handling conditions.

Conditions Contributing to Instability: Avoid creating dusty airborne conditions. Violent explosion can occur when water comes in contact with molten metal (reference NFPA65).

Incompatibility: Contact of casting dust with halogens, or finely divided bromates, chlorates, or iodates can form an explosive mixture. Castings react with acids or alkalis to form hydrogen gas. Molten aluminum can react violently with water, rust, certain metal oxides (copper, iron, and lead), and nitrates (ammonium and fertilizers). Violent reaction can occur when dust or fumes come in contact with strong oxidizers.

Hazardous Decomposition Products: Toxic metal oxide fumes.

Conditions Contributing To Hazardous Polymerization: None known

SECTION 11: TOXICOLOGICAL INFORMATION (See Note in Section 1)

Eye Effects: Rabbit, Draize Test, 3 mg: Mild (Si)
Skin Effects: Human, Draize Test, 300 ug/3 Days: Mild (Zn and TiO_2)
Chronic Effects: Rat, inhalation, TC_{Lo}: 0.5 mg/m^3/24 hr./61 Days (Fe_20_3)
Carcinogenicity: Known to be carcinogenic by NTP (as Cr), Not classifiable as to its carcinogenicity to humans, IARC Group 3 (TiO_2).
Tumorigenic: Rat, Intrapleural, TD_{Lo}: 90 mg/kg (Al_2O_3,) Rat, Intratracheal, TD_{Lo}: 13 mg/kg (Be)

Acute Effects: Rat, Intratracheal, LD_{Lo}: 278 mg/kg (CuO); Rat, Intravenous, LD_{50} : 496 ug/kg (as Be)
Human, Inhalation, TC_{Lo}: 124 mg/m^3/50 minutes (Zn)
Teratogenicity: No reference found.
Mutagenicity: Mouse, Interperitoneal, Micronucleus Test: 3 gm/kg/3 Days (TiO_2)

See NIOSH, RTECS BD1200000 (aluminum oxide), DS1750000 (beryllium), N07400000 (iron oxide), GL7900000 (copper oxide), VW0400000 (silicon), XR2275000 (titanium oxide), and ZG8600000 (zinc) for additional toxicity data.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity: There is little tendency for bioaccumulation along food chain.

Environmental Degradation: In water, Aluminum alloys will eventually precipitate in sediments. Aluminum alloys will oxidize in salt water.

SECTION 13: DISPOSAL CONSIDERATIONS

Dispose of spilled material in accordance with local, state, and federal regulations.

SECTION 14: TRANSPORTATION INFORMATION

DOT Transportation Data: Aluminum alloys are not listed in 49 CFR 172.101

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SECTION 15: REGULATORY INFORMATION

The OSHA PELs are included in Section 2. The Aluminum alloys contain toxic chemicals subject to the reporting requirements of SARA Title III Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40 CFR 372). This law requires certain manufacturers to report annual emissions of specific toxic chemical and chemical categories. Aluminum as a fume or dust, vanadium, molybdenum trioxide, and chromium are listed as Section 313 toxic chemicals. The Aluminum alloys may also require notification under SARA Title III Section 311/312 if inventories exceed the Threshold Planning Quantity. Your State Emergency Planning Committee should be contacted to determine if the Threshold Planning Quantity reporting requirements for your state are lower than EPA reporting requirements. The table below represents current EPA requirements.

	Aluminum (Al)	Copper (Cu)	Manganese (Mn)	Beryllium (Be)	Nickel (Ni)	Zinc (Zn)	Magnesium (Mg)	Vanadium (V)	Titanium (Ti)	Silicon (Si)	Iron (Fe)	Zirconium (Zr)	Chromium (Cr)
CAS Numbers	7429-90-5 (as Al) 1344-28-1 (as Al_2O_3)	744-50-8 (as Cu)	7439-96-5 (as Mn)	7440-41-7	7440-02-0 (as Ni)	7440-66-6 (as Zn)	1309-48-4 As MgO	7440-62-2 (as V)	7440-32-6 (as Ti)	7440-21-3 (as Si)	1309-37-1 (as Fe)	7440-67-7 (as Zr)	7440-47-3 (as Cr) 1308-38-9 (as Cr_2O_3)
SARA 313	Y (only as fume or dust)	Y	Y	Y	Y	Y (fume or dust only)	NA	Y (as fume or dust)	NA	NA	NA	NA	Y
SARA 302 EHS TPQ (lbs.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RCRA Hazardous Waste No.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	D007
RCRA Hazardous Waste Code	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	E
CERCLA RQ (lbs.)	NA	5000*	NA	NA	100*	NA	NA	NA	NA	NA	NA	NA	5000* (as Cr)

*** = CERCLA reporting required only if diameter of particles released is less than 100 micrometers.**

SARA Hazard Categories: Immediate (acute) health hazard and Delayed (chronic) health hazard if dust or fumes are generated during processing. Reactive hazard if molten metal state.

SECTION 16: OTHER INFORMATION

References:

The information contained on this Material Safety Data Sheet (MSDS) is believed to be correct as it was obtained from sources which we believe are reliable, including: Threshold Limit Values & Biological Exposure Indices for 1999 and 2011, (American Conference of Government and Industrial Hygienists), Air Contaminants-Permissible Exposure Limits (Title 29, Code of Federal Regulations, Part 19 IO.IOOO-OSHA), National Institute of Occupational Safety and Health (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS), Sax's Dangerous Properties of Industrial Materials, 9th Edition, Patty's Industrial Hygiene and Toxicology, 3n1 Revised Edition, Hawley's Condensed Chemical Dictionary, 12th Edition, NIOSH Pocket Guide, 1999, Handbook of Environmental Data on Organic Chemicals, 3''' Edition, Hazardous Materials Handbook, NIOSH Criteria Documents, 1996, NIOSH Health Hazard Evaluations, 1996, ACGIH Documentation of TLVs and BEls, 1991.

Abbreviations:

OSHA = Occupational Safety and Health Administration
PEL = Permissible Exposure Limit
STEL = Short Term Exposure Limit
Ft^3 = cubic foot
m^3= cubic meter
NT = Not Tested
C=Ceiling
CAS = Chemical Abstract Service
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act (40 CFR302)
TPQ = Threshold Planning Quantity
H Acute Hazardous Waste
E = Toxicity Characteristic Waste
LD_{511} = Lethal Dose for 50% of species tested

IARC = International Agency for Research on Cancer
Group I – Human Sufficient Evidence
Group 3 - Human Inadequate Evidence
NIOSH = National Institute of Occupational Safety and Health
ACGIH = American Conference of Governmental Industrial Hygienists
TLV = Threshold Limit Value
oz=ounce
mg = milligram (1/1,000 of a gram) (454 grams in one pound)
NA = Not Applicable
Nil = Negligible
TWA = Time Weighted Average
RCRA = Resource Conservation and Recovery Act (40 CFR 261)
SARA = Superfund Amendments and Reauthorization Act (40 CFR 372)

RQ = Reportable Quantities
Y = Yes
I = Ignitable Waste
R = High Risk Potential (HRP)
TD_{50} = Toxic Dose for 50% of species tested
NTP = National Toxicology Program
NFPA -= National Fire Protection Association
RTECS = Registry of Toxic Effects of Chemical Substances
BEl = Biological Exposure Index

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References:

The information contained on this Material Safety Data Sheet (MSDS) is believed to be correct as it was obtained from sources which we believe are reliable, including:

OSHA Regulations, Title 29 Part 1910
ACGIH Documentation of TLV's and BEl's, 1991
NIOSH RTECS
NIOSH Criteria Documents Plus CD-ROM, 12/96
NIOSHTIC
Patty's Industrial Hygiene and Toxicology, CD-ROM
Handbook of Environmental Data on Organic Chemicals
Hazardous Materials Handbook
IARC 7th Annual Report on Carcinogens
American Industrial Hygiene Association Journal
Toxicology, The Basic Science of Poisons, McGraw-Hill
American Conference of Government Industrial Hygienists TLV and BEI's, 1991 & 2011

NIOSH *Occupational Diseases-A Guide to Their Recognition*
NIOSH Pocket Guide 4/99
NIOSH Health Hazard Evaluations, CD-ROM *7/97*
SAX's *Dangerous Properties of Industrial Materials,* CD-ROM
Hawley's *Condensed Chemical Dictionary,* CD-ROM
EPA Regulations, Title 40, Parts 261, 304, 368, 372
Toxicology Profiles, Agency for Toxic Substances and Disease Registry, PHS
NTP Annual Report on Carcinogens, National Technical Information Service
Chemical Protective Clothing Performance Index Book, J. Wiley and Sons
Industrial Toxicology, Safety, &: Health Applications in the Workplace, Van Nostrand
Occupational Health Guidelines for Chemical Hazards, NIOSH/OSHA

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Date Revised: **12/06/18**