



HAYES METALS

Part of the Hayes Metal Refineries Group – Established 1927

ABN: 67 129 538 576

SAFETY DATA SHEET FOR ALUMINIUM INGOTS AND PUCKS

Section 1: Product Identification

Product Identifier	Aluminium Casting Alloy Ingots and Aluminium De-Oxidant Pucks (De-Ox) and Ingots		
Standards	Aluminium Casting Alloy Ingots are made to the recognised International Aluminium Standards		
Use	Aluminium Casting Alloy ingot is melted down in a furnace & poured into suitable moulding material to produce castings which are used in a variety of industrial applications. Aluminium De-Ox pucks or Ingots are added to molten Steel.		
Manufacturer & Supplier	AUCKLAND OFFICE Hayes Metal Refineries Limited 305 Neilson Street Onehunga Auckland 1061 New Zealand Ph: +64 9 633 4000 Fax: +64 9 636 4004 Website: www.hayesmetals.co.nz	SYDNEY OFFICE Hayes Metals Pty Ltd 106 Mileham Street South Windsor NSW 2756 Australia Ph: +61 2 9627 7150 Website: www.hayesmetals.com.au	
Emergency Contact Details	Poisons Information Centre	New Zealand Australia	Ph 0800 764 766 Ph 13 11 26

Section 2: Hazard(s) Identification

GHS Classification	Not available		
Acute Health Effects (also see Section 11)	General Toxicity	Aluminium metal in most forms is non-toxic It is not readily absorbed through the skin or gastro-intestinal tract & only poorly through the lungs	
	Ingestion	The solid is regarded as non-toxic	
	Eye	Aluminium alloy product dust may cause eye discomfort with smarting, pain and redness	
	Skin	Aluminium alloy product dust may be abrasive to the skin and may cause discomfort	
	Inhalation	Aluminium alloy product dust may be discomforting to the upper respiratory tract For standard operations (eg. milling, cutting, grinding) aluminium should be treated as a nuisance dust	

Section 3: Composition and Information on Ingredients of Aluminium Casting Alloy Ingots

Typical Constituents	Aluminium	CAS No	7429-90-5	Percentage Range	80.0 – 98.0
	Silicon	CAS No	7440-21-3	Percentage Range	0 – 20.0
	Magnesium	CAS No	7439-95-4	Percentage Range	0 – 10.0
	Copper	CAS No	7440-50-8	Percentage Range	0 – 5.0
	Iron	CAS No	7439-89-6	Percentage Range	0 – 1.5
	Titanium	CAS No	7440-32-6	Percentage Range	0 – 0.5
	Strontium	CAS No	7440-24-6	Percentage Range	<0.1
	Calcium	CAS No	7440-70-2	Percentage Range	<0.1
	Chromium	CAS No	7440-47-3	Percentage Range	0 – 0.5

Typical Constituents continued	Lead	CAS No	7439-92-1	Percentage Range	<0.1
	Manganese	CAS No	7439-96-5	Percentage Range	<0.1
	Nickel	CAS No	7440-02-0	Percentage Range	0 – 1.5
	Sodium	CAS No	7440-23-5	Percentage Range	<0.1
	Tin	CAS No	7440-31-5	Percentage Range	<0.1
	Zinc	CAS No	7440-66-6	Percentage Range	0 – 6.0

Section 4: First Aid Measures

Necessary First Aid Measures	Ingestion	If large quantities of fine aluminium are ingested seek immediate medical attention
	Eye Contact	Check for & remove any contact lenses then immediately flush well under running water for at least 15 minutes Get medical attention if irritation develops
	Skin Contact	Vacuum off excess dust Flush with water and wash with soap & water - if irritation persists consult a physician For burns caused by molten aluminium flush thoroughly with cold water to cool any metal adhering to the skin (but do not attempt to remove metal adhering to skin) & seek medical attention Note that excessive exposure to cold water following a burn can lead to hypothermia
	Inhalation	Remove to fresh air & if irritation or pulmonary symptoms develop consult a physician or local Poison Centre
Exposure Symptoms (refer also to Section 11 for further information on toxicological effects)	Fumes of certain alloying elements in Aluminium Casting Alloy may result in upper respiratory irritation If aluminium is welded then prolonged or repeated inhalation of metal fume may cause dizziness, respiratory irritation and nausea Exposure to fumes from smelting and abrasive manufacture can initiate pulmonary fibrosis	
Medical Attention	Consult specialist medical attention (physician or local Poison Centre) if severe symptoms persist	

Section 5: Fire Fighting Measures

Suitable Extinguishing Equipment	Do not use water-based or halogenated extinguishing agents as these can explode on contact with molten metal Use an appropriate class D fire extinguisher (dry chemical powder) or smother with dry sand
Specific Hazards	Aluminium Casting Alloy ingot may lose structural strength when subject to fire and will melt to a hazardous liquid at temperatures in the range of 480 – 660 C, exact melting point being dependent on alloy composition Molten Aluminium Casting Alloy may explode on contact with water or moisture, and may react violently with rust, certain metal oxides and nitrates Aluminium Casting Alloy ingot and scrap for re-melting will at times contain shrinkage cracks and sub-surface cavities which may trap moisture - under certain weather conditions, condensation can form on Aluminium Casting Alloy ingot and/or plastic covers applied to ingots As a safety precaution, remove any surface contaminants and preheat all metal thoroughly as specified in Section 7 Failure to remove all surface or contained moisture completely may result in a violent explosion when the metal is immersed in molten metal - if a plastic cover is applied to the ingot bundle it does not guarantee that the ingot will be in a dry condition To prevent explosions, it should be assumed that ingot may contain moisture & appropriate preheating should be applied to drive off internal & external moisture For further details on safe handling information refer to the Aluminum Association's <i>Guidelines for Handling Molten Aluminum</i> (see details in Section 16)
Special Protective Equipment & Precautions for Fire Fighters	Wear Personal Protective Equipment (PPE) - refer details in Section 8 Use self-contained breathing apparatus Use dry chemical powder, <i>not water-based or halogenated extinguishing agents</i>

Section 6: Accidental Release Measures	
Personal Precautions, Protective Equipment & Emergency Procedures	Accidental releases more likely to occur when product in molten state so when this situation occurs use PPE (described in Section 8) to prevent contamination of skin, eyes & clothing If safety circumstances permit remove heating &/or ignition sources Ensure adequate ventilation available after release contained Contact local fire brigade/emergency services if situation cannot be contained in-house
Environmental Precautions	Molten metal spills will normally solidify quickly on exposure to air Treat solid spill as described in Section 13 Wherever possible keep molten metal spills away from further sources of liquid (eg water supplies, drains, surface water etc)
Method & Materials for Containment & Cleaning up	Molten metal spills can be smothered with dry sand (or suitable commercially available industrial adsorbent material) Do not release solidified product into stormwater drains

Section 7: Handling & Storage	
Precautions for Safe Handling at Room Temperature	Aluminium Casting Alloy Ingot is stable under normal handling conditions Gloves are recommended when handling ingot
Precautions for Safe Handling at Molten Temperature	Melting operations: The following minimum guidelines should be observed prior to and during melting operations of Aluminium Casting Alloy Ingot : Inspect all ingot prior to charging into a furnace & remove surface contamination such as water, ice, snow, deposits of grease & oil & other surface contamination resulting from transport or storage Adequately preheat & dry ingot before charging it into a furnace - as a guide this is done by heating the ingots to 400°C throughout Heating for 2 hours per 25 mm of section thickness is typically required to bring ingot to a uniform temperature. Perform furnace charging sequence in such a way that full submersion of ingots in molten aluminium is avoided to prevent entrapment of moisture beneath molten metal For further information on precautions for use refer to the Aluminum Association's Guidelines for Handling Molten Aluminum (see details in Section 16)
Conditions for Safe Storage	Ingot is supplied shrink-wrapped and should be stored in dry, heated areas to avoid ingress of moisture or contaminants in cracks and cavities

Section 8: Exposure Controls & Personal Protection			
Exposure Standards TWA (Time-weighted average in air for an 8-hour workday, 40-hour week)	ACGIH	Aluminium (metal and oxide) Total dust	10 mg/m ³
		Respirable dust	5 mg/m ³
		Welding fume	5 mg/m ³
		Silicon (as silica) Respirable dust	2 mg/m ³
Engineering Controls	No special equipment required when small quantities are being handled Emissions from furnaces should be ducted appropriately with exhaust ventilation to keep airborne levels below local regulatory bodies' recommended exposure limits		
Personal Protection	Where exposure limit to dust may be exceeded use breathing equipment approved to local regulatory authorities' standard (eg AS/NZS 1715:2009 & AS/NZS 1716:2003) When handling molten Aluminium Casting Alloy it is essential to protect eyes & skin from direct contact whilst exposed skin may also be at risk of burns due to radiant heat		
Recommended Personal Protective Equipment (PPE)	Head	Safety Helmet with Full Face Shield & Neck Protection Breathing Equipment	
	Eyes	Safety Glasses or Full Face Mask	
	Hands	Heat-resistant Gloves or Gauntlets	

PPE cont'd	Body	Heat Resistant Clothing
	Feet	Safety Boots or Shoes (with Spats optional)

Section 9: Physical & Chemical Properties of Aluminium Casting Alloy Ingots

Appearance	Silver coloured	
Magnetic Properties	Non-magnetic	
Thermal Properties	Good thermal conductor	
Electrical Properties	Good electrical conductor	
Odour	None	
Odour Threshold	No data available	
pH	None	
Melting Point Range (degrees C)	480 – 660 (depending on alloy composition)	
Freezing Range	None	
Boiling Point (degrees C)	2460	
Flash Point	No data available	
Evaporation Rate	No data available	
Flammability	Non-flammable at room temperature	
Flammability Limits	No data available	
Vapour Pressure	Negligible at 25C	
Vapour Density	No data available	
Density (g/cm ³)	2.7	
Solubility	Insoluble in	Cold & hot water Concentrated Nitric Acid
	Soluble in	Hydrochloric Acid Sulphuric Acid Alkalies
Partition Coefficient	None in solid ingot form	
Auto-ignition Temperature	Does not ignite at room temperature	
Decomposition Temperature	Above 2000C	
Viscosity	No data available	
Volatile Components	No data available	

Section 10: Stability & Reactivity

Chemical Stability	Aluminium Casting Alloy Ingot is stable at room temperature
Reactivity	Reactive with oxidising agents, acids and alkalis In molten state may react violently when only small traces of water or moisture present
Conditions to Avoid	Damp or wet ingot prior to melting
Corrosivity	In moist air Aluminium & its alloys form an oxide film which protects metal from corrosion Aluminium is strongly electro-positive so it can corrode rapidly in contact with other metals
Polymerisation	Does not occur
Incompatible Materials	Strong oxidising agents, acids, alkalies, halogens
Hazardous Decomposition Products	Metal fumes Note if grinding or any work done on castings release of silica may result from residual sand on casting surface

Section 11: Toxicological Information

Possible Routes of Exposure & Entry	Ingestion
	Inhalation
	Skin
	Eyes
Toxicity to Animals	Not available
Chronic Effects on Humans	Not available

Acute Potential Health Effects	Skin	Exposure may cause skin irritation
	Eyes	Not expected to be a hazard unless dust particles are present Dust particles deposited in the eye are generally innocuous but can cause eye irritation by mechanical action & should be removed immediately
	Inhalation	Not expected to be a hazard unless it is heated or dust particles are present in which case respiratory tract irritation may occur Heating Aluminium Casting Alloy ingot can release Aluminium Oxide fumes which can cause fume metal fever if inhaled (an influenza-like illness with symptoms of metallic taste, fever, chills, aches, chest tightness & cough)
	Ingestion	Acute Aluminium toxicity is unlikely
Chronic Potential Health Effects	Skin	Contact dermatitis occurs rarely after Aluminium Casting Alloy exposure
	Inhalation	Chronic exposure to product dust may cause dyspnea (abnormal breathing), cough, asthma, chronic obstructive lung disease, pulmonary fibrosis (scarring of lung tissue), pneumothorax (collapsed lung), pneumoconiosis (lung disease), encephalopathy (disease of the brain), weakness, uncoordination, epileptiform (seizures resembling epilepsy) & other neurological symptoms similar to those described for chronic ingestion Hepatic necrosis (liver failure) is a possible effect of continued exposure to airborne particulates carrying Aluminium
	Ingestion	Chronic ingestion of Aluminium may cause aluminium-related bone disease or aluminium-induced osteomalacia (bone softening) with fracturing osteodystrophy (defective bone development), microcytic anaemia (caused by small red blood cells), weakness, fatigue, visual & auditory hallucinations, memory loss, speech & language impairment, epileptic seizures, motor disturbances & dementia

Section 12: Ecological Information

Ecotoxicity	Not available
BOD5 & COD	Not available
Products of Biodegradation	Possibly hazardous short-term degradation products are not likely However long-term degradation products may arise
Toxicity of Products of Biodegradation	The products of degradation are less toxic than the product itself
Special Remarks on the Products of Biodegradation	Not available

Section 13: Disposal Considerations

Disposal Methods	Solid	Product (eg scrap, swarf etc) can be recycled or remelted
	Fine Waste	Product (eg fine powder & dross) may be reactive & its hazardous characteristic should be determined prior to disposal Any disposal of waste should be carried out in accordance with national environmental control regulations (council, federal & state)

Section 14: Transport Information

UN Number	Not assigned for non-hazardous substances
ADG Code	Not available
HSNO Code	Not available
Dangerous Goods Class	Not available
Transport Hazard Class	Not available
Packing Group Number	Not available

Environmental Hazards for Transport Purposes	Not available
Special Precautions for Users	Not available
Hazchem or Emergency Action Code	Not assigned – standard null plate can be fitted to indicate transport of non-hazardous substances

Section 15: Regulatory Information

International Agreements	American Conference of Governmental Industrial Hygienists ACGIH (1991)
Safety, Health & Environmental Regulations	Australian Workplace Exposure Standards for Atmospheric Contamination - Guidance Notes NOHSC 3008 (1995) 3 rd Edition
	Safe Work Australia: Guidance on the Interpretation of Workplace Exposure Standards for Airborne Contaminants (Apr 2012)
	HSNO : NZ Hazardous Substances & New Organisms Act (1996)
	National Model Regulations for the Control of Workplace Hazardous Substances - NOHSC 1005 (1994)
	Approved Criteria for Classifying Hazardous Substances - NOHSC 1008 (2004) 3 rd Edition

Section 16: Other Information

References	Safe Work Australia: Code of Practice for Preparation of Safety Data Sheets for Hazardous Chemicals (Dec 2011)		
	Aluminum Association: Guidelines for Handling Molten Aluminum (available from Australian Aluminium Council, 16 Bougainville Street, Manuka, ACT 2603, Australia Phone: + 61 2 6295 7300 Fax: + 61 2 6295 7514)		
	Australian Aluminium Council: Aluminium Standards and Data - Ingots and Castings June 1997		
	AS/NZS 1715:2009 : Selection, Use & Maintenance of Respiratory Protective Devices		
	AS/NZS 1716:2003 : Respiratory Protective Devices		
	CAS Registry Handbook of Common Names - published by Chemical Abstract Service (division of American Chemical Society)		
	ADG : Australian Dangerous Goods Code, 7th Edition (October 2011)		
	UN (United Nations) Number : Number assigned to dangerous goods by the UN Sub-Committee of Experts on the Transport of Dangerous Goods		
	GHS: Globally Harmonised System of Classification & Labelling of Chemicals , 3 rd Revised Edition (2009), published by United Nations – superseding EU (European Union) Dangerous Substances Directive		
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