

Product Safety Data Sheet

Zinc and Zinc Alloys

According to Regulation (ECV) No. 1907/2006 (REACH)



Section 1 - Identification of the substance / preparation and of the company / undertaking:

Identification of the product

Product Name: Zinc and Zinc Alloys

Reach Regulation No.

Use of the Substance / Preparation

Industrial Melted to produce castings

Consumer It is thought that there will be no consumer use of alloy ingot

Function of the Substance / Preparation

Used in pressure and gravity die-casting process in order to produce castings.

Operational Area

Industrial processing.

Company / undertaking identification The Brock Metal Company Limited

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Web Site – www.brockmetal.com

Form: Ingots, Feeder Bars, Sticks, Cast Shapes.

Section 2 - Hazardous Information:

Not classified as hazardous

Section 3 - Chemical Composition / Information on Ingredients

All Brock alloys are based on high purity Zinc with additions of Aluminium, Copper and Magnesium. The maximum levels of these additions for each alloy are as follows

Short Designation	Specification	Alloy Symbol	Alloy Number	Aluminium	Copper	Magnesium
ZL2	BS EN 1774: 1997	ZnAl4Cu3	ZL0430	4.2	3.3	0.06
ZL3	BS EN 1774: 1997	ZnAl4	ZL0400	4.2	0.03	0.06
ZL5	BS EN 1774: 1997	ZnAl4Cu1	ZL0410	4.2	1.1	0.06
ZL6	BS EN 1774: 1997	ZnAl6Cu1	ZL0610	6.0	1.6	.005
ZL7				4.05	0.03	0.02
ZL8	BS EN 1774: 1997	ZnAl8Cu1	ZL0810	8.8	1.3	0.03
ZL12	BS EN 1774: 1997	ZnAl11Cu1	ZL1110	11.5	1.2	0.03
ZL27	BS EN 1774: 1997	ZnAl27Cu2	ZL2720	28.0	2.5	0.02

Impurities: The maximum impurity levels (percentage by weight) specified within the alloys are as follows:

Short Designation	Alloy Symbol	Alloy Number	Iron	Lead	Cadmium	Tin	Nickel	Silicon
ZL2	ZnAl4Cu3	ZL0430	0.020	0.003	0.003	0.001	0.001	0.02
ZL3	ZnAl4	ZL0400	0.020	0.003	0.003	0.001	0.001	0.02
ZL5	ZnAl4Cu1	ZL0410	0.020	0.003	0.003	0.001	0.001	0.02
ZL6	ZnAl6Cu1	ZL0610	0.020	0.003	0.003	0.001	0.001	0.02
ZL7			0.020	0.003	0.003	0.001	0.020	0.02
ZL8	ZnAl8Cu1	ZL0810	0.035	0.005	0.005	0.002	0.001	0.035
ZL12	ZnAl11Cu1	ZL1110	0.05	0.005	0.005	0.002	-	0.05
ZL27	ZnAl27Cu2	ZL2720	0.07	0.005	0.005	0.002	-	0.07

These elements are not known to constitute a risk to health or safety at the levels stated. Other impurities may be present in the alloys but at levels less than stated above.

Chemical Name	CAS Number	EINECS No.
Zinc	7440-66-6	231-175-3
Aluminium	7429-90-5	231-072-3
Magnesium	7439-95-4	231-104-6
Copper	7440-50-8	231-159-6

Section 4 - Exposure Scenarios and First Aid Measures.

First Aid Measures

Inhalation

Remove victim from exposure to processing fumes or dusts to fresh air. Seek medical attention immediately.

Ingestion:

Not regarded as a normal occupational hazard. Do not induce vomiting – Seek medical attention immediately if large quantities of dust or fume are ingested.

Skin Contact:

If dust, remove contaminated clothing and wash effected area with soap and water. Seek medical attention if irritation persists.

Molten Metal – flood contact area to solidify and cool but do not attempt to remove encrusted metal on skin or clothing. Continue to flush for at least 10 minutes. Cover burns, if bigger than a 50 pence piece. Seek further medical attention immediately.

Eyes:

If dust enters eyes flush for 10 – 20 minutes with cold water. Seek medical attention if required.

Section 5 - Fire Fighting Measures

Zinc ingots are not flammable. If present in a fire then use suitable extinguishing media for surrounding combustibles.

If present in molten form use dry sand, DO NOT use water as this may present an explosion hazards.

Finely divided metallic dust form flammable or explosive dust clouds when mixed with air. Bulk dust in a damp state may heat spontaneously and ignite on exposure to air.

Section 6 - Accidental Release Measures:

Material is recyclable by supplier. In solid state pick up and reuse if not contaminated. If contaminated, material should be carried out in accordance with current regulations.

Section 7 - Handling and Storage:

Store metal in a dry area away from incompatible materials. Ingots suspected of containing moisture should be thoroughly dried before adding to a molten bath.

It is necessary to ensure that all ingots are dry prior to use as the addition of wet or damp ingots to molten metal may cause an explosion.

Do not allow water to come into contact with molten metal as this super heats the water and evolves hydrogen gas. This reaction will cause the molten metal to explode.

Contact with acids and alkali hydroxides results in the evolution of hydrogen gas which is potentially explosive. Mixtures with potassium chlorate or ammonium nitrate may explode on impact.

When handling molten alloys it is necessary to observe the relevant HSE regulations for personal protection

Bulk storage often requires stacking of pallets or ingot bundles. In this instance, care should be taken to ensure that stacks are well aligned and stable. One tonne pallets or bundles should not be stacked more than four units high. Any stack should consist of only one pallet type.

Pallets and bundles should be lifted by overhead crane or forklift truck and under no circumstances should either be lifted by the Steel straps.

It is recommended that gloves are worn when handling ingots manually to avoid minor cuts and abrasions, and that normal precautions for industrial lifting should be observed

Under no circumstances should Zinc be stored with strong acids or alkalis as Zinc can react vigorously with either to produce hydrogen gas which, in poorly ventilated conditions could produce a combustible or explosive mixture with air.

Zinc dust is normally the result of finishing or fettling operations and is classified as a mild irritant and of moderate toxicity. As such respiratory equipment of the SCBA type is recommended. Under certain conditions explosive mixtures may be formed in the air presenting a fire risk.

Fluxing: Fluxing of Zinc alloys using proprietary products may produce Zinc Chloride fumes, which are extremely irritating. In consequence, this should be carried out in a well-ventilated area with appropriate local exhaust ventilation to maintain levels below the recommended standard.

Section 8 – Exposure Controls / Personal Protection

	Carcinogen	Comments	Occupational Exposure limit	
			Long Term EXP Limit (8Hour TWA)	Short Term EXP Limit (15 minute TWA)
Zinc Oxide and fume (ZnO)	No		Not listed	Not Listed
Zinc	No		Not listed	Not listed
Aluminium metal - Inhalable dust Respirable dust	No		10 ppm 4ppm	Not listed
Magnesium	No		Not Listed	Not Listed
Copper – fume Dusts and mists	No		0.2 mgm-3 1 mgm-3	Not listed

DNEL

Industrial / Professional	Consumer	Exposure Route	Exposure Duration	Remarks
Relevant	Not relevant	Oral	Short term / Long term	
Relevant	Not relevant	Dermal	Short term / Long term	
Relevant	Not relevant	Inhalation	Short term / Long term	

PNEC

Industrial / Professional	Consumer	Exposure Route	Exposure Duration	Remarks
Relevant	Not relevant	Water	Single / Continuous	Readily Biodegradable
Relevant	Not relevant	Air	Single / Continuous	Abiotic Degradable
Relevant	Not relevant	Soil	Single / Continuous	Biodegradable

Protective Clothing:

Protective clothing should be selected specifically for the work place, depending on the concentration and quantity of the hazardous substances handles. The resistance of protective clothing to molten metal should be ascertained with the respective supplier.

Gloves and coveralls, shop coat or other work clothing are recommended to prevent prolonged or repeated direct skin contact when this product is processed.

Eye protection should be worn where fume or dust is generated.

Respiratory protection may be required where oxide fume is generated.

Where hot or molten metal is handled, heat-resistant gloves, full face visor, and molten metal resistant clothing to protect from hot metal splash should be worn. Foundry or safety type boots are recommended.

Other Protective Equipment

Ventilation: Use adequate local or general ventilation to maintain the concentration of zinc and aluminum oxide fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Where metallic dust particles of zinc and aluminum metals are being collected and transported by a ventilation system, use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Locate dust collectors and fans outdoors if possible and provide dust collectors with explosion vents or blow out panels.

Respirators: Where zinc or aluminium oxide fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate respiratory protection equipment.

Industrial Hygiene:

No special precautions required. Change contaminated clothing, wash hands and face after working with substance. Wash hands before eating, drinking or smoking.

Environmental exposure controls and protective equipment:

Water	Do not release to water
Air	Local Exhaust ventilation may be required
Soil	Do not release to soil

Exposure controls for consumer use and in articles.

It is thought that there are no exposure scenarios for Zinc Alloy Ingot to consumers.

Section 9 - Physical and Chemical Properties

Form	Ingot, Feeder Bar, Sticks, Cast Shapes
Appearance	Zinc is a silver grey metal
Odour	None in solid form
Physical State	All ingots carry the manufacturers name, alloy type and batch or melt numbers which allow chemical analysis to be traced.
pH Value	Not applicable
Melting Point	ZL2 379 – 390 °C ZL3 381 – 387 °C ZL5 380 – 386 °C ZL6 375 – 395 °C ZL7 381 – 387 °C ZL8 375 – 404 °C ZL12 375 – 432 °C ZL27 375 – 484 °C
Boiling Point	907 °C
Vapour Pressure	Negligible @ 20°C
Relative Vapour Density	Not applicable.
Density	6.7 g/cm ³ approx – dependent on the alloy.
Solubility in water	Insoluble
Solubility other	Soluble in acids and Alkalis

Section 10 – Stability and Reactivity Data

Zinc is stable under normal conditions but can react vigorously with acids and alkali's. Zinc is stable at room temperature. Hazardous fumes do not occur when Zinc is heated within normal melting ranges.

Incompatibilities: Contact with acids and alkalis will generate highly flammable hydrogen gas. Acidic arsenic or antimony compounds in contact with Zinc metal may evolve highly toxic arsine or stibine gas. Incompatible with strong oxidising agents such as chlorine, fluorine, bromine, sodium potassium or barium peroxide, sodium or potassium chlorate, chromium trioxide and fused ammonium nitrate. Also incompatible with elemental sulphur dust, halogenated hydrocarbons or chlorinated solvents and chlorinated rubber.

Hazardous Decomposition Products: Thermal oxidation of this metal or dust will generate Zinc oxide fume which on inhalation in sufficient quantity can produce metal fume fever, a transient influenza like illness.

Section 11 – Toxicological Information:

General: In the metallic form in which this product is sold it is relatively non-toxic. The primary route of exposure would be through the generation and inhalation of metal oxide fume, principally composed of zinc oxide.

Acute:

Inhalation Heating Zinc to temperatures near or above its boiling point will produce Zinc Oxide fumes. It is therefore advisable to avoid conditions and practices, which generate fumes. Inhalation of Zinc fumes may produce metal fume fever, a benign, reversible, flu like condition. The symptoms of metal fume fever will occur within 3 to 10 hours of exposure. These will include immediate dryness and irritation of the throat, tightness of the chest, and coughing. These may later be followed by flu like symptoms which include fever, malaise, perspiration, frontal headache, muscle cramps, low back pain and occasionally blurred vision, nausea and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. There are no recognized complications, after effects, or chronic effects that result from this condition. Rest assists recovery and a symptomatic treatment such as aspirin is recommended.

Ingestion: Not normally regarded as a normal occupational hazard. When ingested in excessive quantities Zinc can irritate the stomach resulting in nausea and vomiting.

Skin Contact: Accidental burn by molten alloy or molten metal may cause severe burn damage to skin tissue. Contact with dust or fume may cause local skin irritation but would not cause tissue damage.

Eyes: Molten metal may cause severe burn damage and may result in loss of vision. This metal alloy is not chemically irritating to the eyes

Chronic:

There is no chronic form of metal fume fever but in rare instances an acute incident may be followed by complaints such as bronchitis or pneumonia. Some workers may develop a short-term immunity (resistance) so that repeated exposure to zinc oxide fumes does not cause metal fume fever. This immunity (resistance) however is quickly lost after short absences from work (weekends or holidays). Workers exposed to finely-divided metallic zinc for up to 35 years revealed no acute or chronic illnesses attributable to zinc. Aluminium dust has little or no adverse effect on the lungs and does not produce any identifiable toxic effects in the body. Neither zinc nor aluminium is listed as a human carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH) or the European Union (EU).

Section 12 - Ecological Information:

Zinc in the metallic form has limited bioavailability and poses no immediate ecological risk. However, processes in the environment may alter its bioavailability.

In aquatic systems Zinc bioaccumulates in both plants and animals. In terrestrial systems the mobility of Zinc in soil is dependent on soil conditions. Zinc also bioaccumulates in terrestrial plants vertebrates and mammals with plant uptake from soil dependent on the plant species, soil pH and soil composition.

Section 13 - Disposal Considerations:**Product**

If material cannot be returned to process or salvage, dispose of in accordance with applicable local regulations. Your supplier may be able to recycle this material for you.

Packaging

Packaging must be disposed of in compliance with country specific regulations or must be passed to a packaging return system.

Steel banding can be recycled.

Section 14 - Transportation Information:

Zinc ingot is not classified as hazardous for transport.

Section 15 – Regulatory Information

Ingredients Listed on the European Inventory of Existing

Commercial Chemical Substances (EINECS) - Yes

EU Classification - Not applicable. Neither zinc nor aluminium is listed as a dangerous substance.

Labelling according to EC Directives:

None Specific

Section 16 – Other Information

None

This information has been compiled is based on the present state of our knowledge and as completely and accurately as possible based on the normal usage of the material. However, all information is given without warranty of representation and is intended solely for your own investigation and verification. It is not possible to identify all hazards associated with the use of this product and we disclaim any liability for damages arising out of or related to the information provided.

The exposure limits are those listed in the current Guidance note EH 40 published by the UK Health and safety executive.

Should you have further queries related to the use of Zinc Alloys or regarding the information provided we would be pleased to discuss these in more detail.