Kaye Aluminium Ltd.

Safety Data Sheet

PRODUCT HEALTH & SAFETY INFORMATION SHEET FOR ALUMINIUM and COATINGS

1. GENERAL DATA

Pure aluminium is a soft, malleable, ductile, silvery metal, which is a good conductor of heat and electricity. It can be alloyed with other elements to enhance and add to its natural characteristics. It can be supplied in a variety of forms including sheet and extrusions.

2. ADDITIONAL INFORMATION

Although it is generally agreed that aluminium is an inert substance, hazardous situations can arise when it is subjected to various processes such as: -

Anodising, polishing, thermal breaking, welding and information on these operations is given in the attached appendices.

3. PRODUCT NAME AND DESCRIPTION

Aluminium Extrusions in Mill Finish (uncoated) or coated by Anodising, Electrophoretic Painting or Polyester Powder Coating.
The Extrusions may be thermally broken.

COMPOSITION

Magnesium	.45 - .9%
Silicon	.2 - .6%
Iron	.35 %max
Manganese	.1 %max
Copper	.1 %max
Chromium	.1 %max
Zinc	.1 %max
Aluminium – remainder	97%

PHYSICAL DATA

Melting point	660 C
Boiling point	Not applicable
Vapour pressure	Not applicable
Vapour density	Not applicable
Specific gravity	2.71 approximately
Solubility in water	Insoluble
Appearance and odour	Solid – grey/silver colour, odourless

3. HAZARDS

The hazards associated with aluminium are as follows: -

3.1 Handling

Solid

Possibility of sharp edges, use gloves when handling. Aluminium experiences no colour changed when heated – use gloves to protect against burns. It must be free from moisture before charging into furnaces.

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Liquid

When melting, casting and processing, appropriate protective equipment must be worn – glasses, goggles or visor, metal shedding overalls, foundry footwear, gloves. All tools used with molten metal must be dry.

3.2 Fire

Not a fire hazard except in finely divided form.

3.3 Explosion

Molten aluminium may explode upon contact with water, and many other substances including oxidising agents. All aluminium solids must be free from moisture before adding to molten metal. Finely divided aluminium may explode when mixed with halogen acids, halogenated solvents or ammonium nitrate.

4. Health & Toxicity

Aluminium is poorly absorbed by the body. Little of the element that gets into the body through normal action remains. Aluminium has never been found to be toxic except under quite unusual conditions of exposure. At present, there is no direct clinical or experimental evidence that aluminium is neurotoxic under ordinary conditions of environmental exposure. The HSE recommended long-term exposure limits (eight-hour time weighted average) for aluminium metal and oxide in the air is $10mgm^{-3}$ – the same as for all other "nuisance dust". However, inhalation of any dust or fumes should be avoided. It is understood that aluminium metal and oxide along with many other substances will be reviewed by ACTS/WATCH. Until they are reviewed, exposure should be kept as low as reasonably practicable and the above limit should be used as guidance for the control of exposure.

At high temperatures eg in steel making, alloying elements or impurities such as magnesium, zinc and lead will volatilise and give rise to fumes. Where fuming occurs, local extraction may be necessary to ensure compliance with the required exposure limits.

5. PRECAUTIONS

5.1 Storage

Keep dry, away from incompatible materials, including nitrates, acids and alkalis, which may result in fire and explosion.

5.2 Spillage

Solid aluminium presents no problem. Spillages of molten aluminium freeze up very quickly but substantial amounts may be dammed using **DRY** sand or **DRY** Alumina.

5.3 Disposal

Recycle. Finely divided aluminium may be reactive and its hazard characteristics should be determined prior to disposal.

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5.4 Transport

Solid and liquid aluminium is not classified as dangerous for conveyance by road in the UK.

6. USEFUL PUBLICATIONS

Guidance note EH40 from the Health & Safety Executive – Occupational Exposure Limits.

Foundries Industry Advisory Committee (FIAC) – lst report on clothing to protect against molten metal splash hazards in foundries 1985.

Fire and Explosion Hazards in the Grinding and Polishing of Aluminium and its Alloys – Aluminium Federation.

Properties of Aluminium and its Alloys – Aluminium Federation.

Safety Handling and Storage of Aluminium Powder and Paste – Aluminium Federation.

6. FINISHES AND SECONDARY PROCESSES

6.1 ANODISING

Natural or silver anodising consists of a layer of hydrated aluminium oxide containing a little aluminium sulphate, which is firmly bonded to the aluminium. This layer is between .005 and .025 and so represents a very small proportion of the section. It cannot become etched from the aluminium in normal operations but severe deformation can result in extremely small flakes being detached and possibly projected. It is therefore prudent to wear safety glasses when bending or punching. The coating is the body will deal with non toxic and very minute particles ingested. When sawing there is a potential for dust, which like any other should be carried away from the operator by the extractor.

Coloured coatings may contain organic or inorganic pigments and oxides of tin, cobalt or magnesium. If the film is attacked by strong acids and alkalis these substances may be released. Any sawing may release these in the dust, which should be carried away by an extractor as above.

6.2 ELECTROPHORETIC PAINT

The white paint consists largely of titanium dioxide and a modified acrylic resin carried in solvents, which are driven off during curing thus the cured coating itself, presents no hazard in normal use.

If the material is sawn then some paint particles may be released in the dust which though considered harmless in themselves may change by being inhaled through a lighted cigarette etc or if burned. The dust like any dust is considered hazardous and should be controlled by extraction.

6.3 POLYESTER POWDER COATINGS

Adequately cured and adherent coatings of polyester may be expected to present negligible hazard under normal conditions of use where risk of transfer into the body is minimal.

Some coloured coatings contain pigments of lead compounds which, although they are of low solubility, should not be used where they are likely to be sucked or chewed by children.

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Dust from sawing etc presents the normal hazard of any dust and should be controlled by extraction. Dust from coloured powder should be collected by vacuum and disposed of by approved means.

Burning of the coating can produce harmful materials which will vary and depend upon the factors present during combustion but could include Acrolein and other aldehydes, phthalic anhydride, phenol, nitrogen oxides, amines, hydrogen cyanide and low molecular weight free isocyanate.

6.4 WELDING

MIG welding or plasma arc cutting of aluminium alloys can generate ozone, nitric oxides and Ultraviolet radiation. Ozone over exposure may result in mucous membrane irritation, as well as other pulmonary discomforts.

Fumes may also arise from volatilisation of the electrodes or its coatings. The inhalation of freshly formed metallic oxides such as cadmium, chrome, nickel that may be present as alloying constituents may cause welding fume fever.

Good ventilation is recommended and observance of normal protective measures generally applicable to welding operators.

It should be noted ozone could be generated quite a distance from the arc.

6.5 THERMAL BREAK

6.5.1 FILLING

This product involves the exothermic interaction of two chemicals to form a polyurethane polymer; the manufacture recommendations for handling the components must be followed. In addition, the presence of water, which modifies the reaction, must be avoided. Extraction of air from the process area is essential.

There are two mandatory rules during filling: -

There must be no smoking in the department – it is suggested that the ‘miners code’ be adopted. This is not primarily a fire hazard: the chemical fumes will decompose if drawn through red-hot burning tobacco giving highly toxic products.

Fire, most likely of electrical plant origin, is extremely dangerous: all precautions to prevent it must be taken. If there is a fire, however there must be no attempt to extinguish it – immediate evacuation must be the rule. The local fire service must be informed of this potential hazard and may recommend the local provision of rescue, breathing equipment and the appropriate training in its use.

The storage of materials and the disposal of waste materials and ‘empty’ drums are controlled by the Control of Pollution Act. The use and particularly the welding or cutting of ‘empty’ drums must be prevented.

Plant cleaning is often effected by an organic solvent (typically Methylene Chloride), the user of which must observe the suppliers recommendation.

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6.5.2 AFTER CURING & MILLING

There is an almost identical material used to line and/or coat potable water and food containers. The two components used to create the thermal break, when dispensed in the correct ratio, are completely inert when they have reacted together and are fully cured.

The material supplier regularly monitors the plant to ensure the ratios and dispensing is correct.

6.5.3 SAWING

Provided the material has been dispensed correctly as above, no hazardous fumes are given off when sawing through the material. The dust is a different proposition simply because it is a dust and any dust particle can be considered hazardous. We recommend that the sawing operation is fitted with an exhaust facility to draw off and collect the dust particles. Any not collected should be regularly cleaned from the floor using a vacuum cleaner and dust from both should be carefully disposed of. The burning of the dust or inhalation through a lighted cigarette etc. can produce harmful products.

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