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# Hardie-Secure Products LTD 150 Full Column

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# Features

The HSP 150mm column has several features

- All aluminium construction
- Modular hinged construction (allowing single person installation of post and lantern)
- Can be transported and installed from a van and at ground level (no need for truck, crane or additional personnel.)
- All components are under the manual handling lifting limit
- Designed and assembled in UK
- EN40 compliant
- Standard 76mm dia lantern mounting point
- Easy to install and maintain
- No specialist tools or equipment required to hinge the lamp post down for maintenance
- Long life
- CE marked



# Sizes and configurations

The HSP 150mm is available in a number of height configurations and planting depths

HSP150 can be installed to provide a lantern height of 4m, 5m or 6m\*\*

Full structural engineers reports for EN40 compliance available on request along with wind zone chart that was used for the evaluation



# Parts

ITEM NO.	PART NUMBER	QTY.
1	Base Extrusion	1
2	Lower Hinge Casting	1
3	M10 Low cap head	2
4	Hinge Pin	1
5	Upper Hinge Casting	1
6	Hinge Seal	1
7	Root Protection	1
8	Door Bracket	1
9	Back Board	1
10	Door	1
11	TRI Head	1
12	M10 cap head	2
13	Security Bolt	2
14	M8 Grub Screw	5
15	76ø Top tube	1







# 5.0m Raise & lower column lighting column





# 6.0m Raise & lower column lighting column

## Note: 6m Colum Area specific - contact office for compatibility

# Hinge Part List HARDIE STREET LIGHTING

(5)			
	ITEM NO.	PART NUMBER	QTY.
	1	Lower Hinge Casting	1
	2	M10 Low cap head	2
8	3	Hinge Pin	1
	4	Upper Hinge Casting	1
	5	Hinge Seal	1
	6	M10 cap head	2
	7	Security Bolt	2
	8	M8 Grub Screw	5
			6





# Hinge









# Backboard











# 6005 Aluminium Anodised AA-25



Ε



# Hardie Lamp Post Structural Analysis

## Matthew Fulcher, John Durban

Doc ref: PPT-2071-0A Date: 1<sup>st</sup> May 2020

Warley Design Solutions Limited. Registered in England & Wales, Company Number 6488160 Registered Address: Unit D1 Great Ropers Business Centre, Great Ropers Lane, Great Warley, Essex CM13 3JW



Hardie Street Lighting is a designer and manufacturer of external street lighting and signage posts. They have an existing street lamp product (the HSP Lamp Column) already installed in public places.

The existing HSP Lamp Column was subject to Structural analysis in accordance with all applicable standards by accredited structural appraisers Webb Yates Engineers Ltd. Web Yates' report [Ref 1] provides full details of the analysis that was undertaken and details of all test parameters / variables used in their analysis of the HSP Lamp Column.

Hardie Street Lighting is now embarking on the design of an improved Lamp Column product. This document presents the results of structural analyses that were performed on the new lamp post design to inform the Hardie design team during the design process and to give confidence that the design will pass the necessary formal structural appraisal that will be carried out prior to placing the new lamp post product on the market.

The application / deployments of the new product will be similar to that of the HSP Lamp Column and so for the purposes of this study and in the interests of expediency the same wind loading criteria as those used by Webb Yates for the HSP Lamp Column have been applied. Any known differences in specification of the new lamp post that are likely to affect or invalidate the parameters used in the structural analysis of the HSP Lamp Column will be flagged in this report.



Material data for the components and the General Wind Pressure  $q_{(z)}$  used in the analysis were taken from Ref 1. The General Wind pressure was multiplied by Shape coefficients for the base components of the lamp post, in the direction of desired loading. The General Wind pressure was multiplied by Shape coefficients and the area for the main pole and the lantern of the lamp post, in the direction of desired loading, to give the force on these items (to be consistent with the Webb Yates report).

Stresses in the lamp post materials and the deflection under wind loading are predicted by the FEA (Finite Element Analysis) software.

Stresses in fixing bolts and in the threads they engage in are calculated by "hand" using forces derived from moments.

# Lamp Post Structural Analysis FEA Benchmarking



To provide a means of checking the results obtained, a benchmark simulation was carried out on a simplified version of the lamp column reviewed in the Webb Yates report using the loads, materials and 20kg lantern stated in their report.



<u>From Web Yates Report</u> Yield Strength of Al 6063T6: 190MPa Partial Safety Factor: 1.2 Acceptance Criteria Ratio (worst case): 0.61 Overall Factor of Safety (Pole): 1/0.61 = 1.64

<u>From FEA</u> Max Stress: 93MPa Overall Factor of Safety (Pole): 190/(93x1.2) = 1.70(Incorporating the partial safety factor from the Webb Yates report)

The factor of safety value from the FEA is comparable with that calculated in the Webb Yates report. Therefore the same method will be used on the new Hardie lamp column FEA.





Three load directions have been analysed, as shown. The loads used are also detailed below and have been calculated using the same methods as the Webb Yates report.



FEA Materials, Loads and Boundary Conditions





# Lamp Post Structural Analysis FEA model results – Case 1 Stress, Main Pole





FEA model results – Case 1 Stress, Base Extrusion



# Lamp Post Structural Analysis FEA model results – Case 1 Stress, Top Hinge Casting





FEA model results - Case 1 Stress, Bottom Hinge Casting



# Lamp Post Structural Analysis FEA model results – Case 2 Stress, Main Pole





FEA model results – Case 2 Stress, Base Extrusion



FEA model results - Case 2 Stress, Top Hinge Casting



Doc ref: PPT-2071-0A

FEA model results - Case 2 Stress, Bottom Hinge Casting





FEA model results - Case 3 Stress, Main Pole





# FEA model results – Case 3 Stress, Base Extrusion





FEA model results - Case 3 Stress, Top Hinge Casting



FEA model results - Case 3 Stress, Bottom Hinge Casting



FEA model results - deflection



Case 1 Case 3 Case 2 Max Max Max deflection 136mm deflection 210mm deflection 210mm Pole deflection Pole deflection Pole deflection magnified 4.6 times magnified 2.8 times magnified 2.8 times

20

Bolt Strength – Bending Moment calculation





$$M_{XX} = 1.2 \left[ 1.225 \times (0.076 \times (4.015 - 0.126) \times 2.0705) + (1.225 \times 0.1 \times 4.065) + (1.225 \times 0.016826 \times 0.126) \right]$$
  
= 1.2  $\left[ 0.749657 + 0.497963 + 0.00299 \right]$   
= 1.4987 KN.M.

$$M_{yy} = 1.2 \times 0.15 \times 0.5 = 0.09 \text{ KN.M.}$$

 $M_T = 1.2 \times 0.1 \times 1225 \times 0.5 \times 1.2 = 0.0882 \text{ KN.M.}$ 

$$M_{TOT} = M_{XX} + M_{YY} + M_{T}$$
$$= 1.4987 + 0.09 + 0.0882$$
$$= 1.6769 \quad \text{KN.M.}$$

# Lamp Post Structural Analysis Bolt Strength – Stress in M12 Bolts





Center Dist 🗸 104.73mm

Yield stress for A2-70 stainless bolts is 450MPa.

Safety factor = 450/(209.45x1.2) = 1.79(incorporating the partial safety factor as used in the Webb Yates report)

## There is therefore sufficient margin in the bolt.

Doc ref: PPT-2071-0A

# Lamp Post Structural Analysis Bolt Strength – Stress in M10 Bolts







Yield stress for A2-70 Stainless Steel bolts is 450MPa.

Safety factor =  $450/(250 \times 1.2) = 1.5$ 

## There is therefore sufficient margin in the bolt.

Doc ref: PPT-2071-0A

Bolt Strength – FoS of thread in base extrusion



Depth of thread = 40mm Force on bolt = 13,050N Cord length on M10 hole = 24.62mm Area = 24.62 x 40 = 978.4mm<sup>2</sup> Stress = Force / Area = 13,050 / 978.4mm<sup>2</sup> Stress = 13.34 MPa



Shear Strength of AI 6005T6 = 0.55 x 225 = 123.75 MPa

Factor of Safety (FoS) of thread in base extrusion =  $123.75 / (13.33x1.2) = \frac{7.74}{2}$ 

Using a 40mm depth of thread in the base extrusion of gives a FoS of 7.74, which is sufficient margin. The M10 bolts used will therefore not pull out when they experience the maximum moment calculated on page 21.

# Lamp Post Structural Analysis FEA model results – Stress Summary



	Main Pole		Extruded Base		Top Hing	e Casting	Bottom Hinge Casting		
	Stress MPa	Safety Factor	Stress MPa	Safety Factor	Stress MPa	Safety Factor	Stress MPa	Safety Factor	
Case 1	88.6	2.12	100	1.88	110.5	1.13	95.6	1.31	
Case 2	133.2	1.41	81.3	2.31	113.1	1.11	89.9	1.39	
Case 3	132.1	1.42	109.6	1.71	118.4	1.06	107.4	1.16	

	PIN					
	Stress MPa	Safety Factor				
Case 1	34.1	5.13				
Case 2	12.6	13.89				
Case 3	87.9	1.99				

Note: The overall acceptance Criteria Ratio used within the Web Yates report is the inverse of the Safety Factor, therefore as the value required for the acceptance criteria ratio is 1 or less, the value required for the Safety Factor is 1 or higher.



The HSP Lamp Post design that was appraised by Webb Yates was modelled to benchmark the FEA analysis methodology. The results obtained by FEA were found to be very similar to those found by Webb Yates, thus validating the use of FEA for analyzing the design.

Load Case 3 has been found to generate the highest stresses. The direction of wind is opposite to that in Load Case 2, but in terms of stress it has a more significant affect on the top hinge casting and its interface to the bottom hinge casting and extruded base.

The Factor of Safety of all of the items in the new lamp post design is greater than 1, which means all of the items have an acceptance Criteria Ratio of less than 1. Therefore the design of the lamp post is predicted to be satisfactory.



# Appendix



Ref 1: J2097-Doc-01 Revision P1, HSP Lamp Column Appraisal by Webb Yates Engineers Ltd.

Ref 2: Specification for street lighting columns, by Bedford Borough Council



#### Mechanical Properties-Austenitic Grades

Bolts, Screws and Studs

Grada	Property	Tensile Strength Rm MPa	Yield Stress R <sub>p</sub> 0.2 Mpa		
Grade	Class	(N/mm²) minimum	(N/mm²) minimum		
A2	70	700	450		
and A4	80	800	600		

#### Mechanical properties of Umbrako screws

#### MECHANICAL PROPERTIES

ALLOY STEEL									STAINLESS STEEL									
	tensile s	trength	minimum tensile	minimum yield	single shear	recommen ing torqu	ded seat- e* in-lbs	tensile s	strength				recommer ing torqu	nded seat- ie* in-lbs				
nom.	pou	nas	strength nsi	strength nsi	strength of body	UNRC	UNRF	pou	pounds		pounas		pounds minimum tensile		minimum minimum single tensile vield shear		UNRC	UNRF
size	UNRC	UNRF	min.	min. Ibs. mi	lbs. min.	plain	plain	UNRC	UNRF	strength	strength	strength	plain	plain				
#0	-	342	190,000	170,000	320	-	3	-	171	95,000	30,000	130	-	1.3				
#1	499	528	190,000	170,000	475	5	5	250	264	95,000	30,000	190	2.0	2.3				
#2	702	749	190,000	170,000	660	7	8	352	374	95,000	30,000	260	3.8	4				

1172 N/mm<sup>2</sup>

206 N/mm<sup>2</sup>



#### 35870 : BASE 35879 : CURING AGENT 98870

Description:	HEMPADUR MULTI-STRENGTH GF 35870 is an amine-adduct cured epoxy coating - the product is reinforced with Glassflakes. It is a hard, impact and abrasion resistant coating with good resistance to sea water and splashes from petrol and related products. Suitable for early water exposure and will continue to cure under water.
Recommended use:	As a self-primed, high build coating primarily for areas subject to abrasion and/or to a highly corrosive environment. E.g. splash zones, jetty pilings and working decks.
Service temperature:	Maximum, dry exposure only: 140°C/284°F In water (no temperature gradient): 60°C/140°F Maximum peak temperature in water is 80°C/176°F.
Certificates/Approvals:	Recognized Abrasion Resistant Ice Coating by Lloyds Register. Tested for non-contamination of grain cargo at the Newcastle Occupational Health & Hygiene, Great Britain.
Availability:	Part of Group Assortment. Local availability subject to confirmation.
PHYSICAL CONSTANTS:	
Shade nos/Colours: Finish: Volume solids, %:	19990 / Black. Glossy 87 ± 1
Theoretical spreading rate: Flash point:	2.5 m²/l [100.2 sq.ft./US gallon] - 350 micron/14 mils 35 °C [95 °F]
Specific gravity: Surface-dry:	1.3 kg/litre [11.1 lbs/US gallon] 4 approx. hour(s) 20°C/68°F
Dry to touch: Fully cured:	6 approx. hour(s) 20°C/68°F 7 day(s) 20°C/68°F
VOC content:	200 g/l [1.7 lbs/US gallon]
Shelt life:	2 years for BASE and 3 years (25°C/77°F) for CURING AGENT from time of production.

The physical constants stated are nominal data according to the HEMPEL Group's approved formulas.

#### **APPLICATION DETAILS:**

#### Version, mixed product: Mixing ratio:

Application method: Thinner (max.vol.): Pot life: Nozzle orifice: Nozzle pressure:

Cleaning of tools: Indicated film thickness, dry: Indicated film thickness, wet: Overcoat interval, min: Overcoat interval, max:

Safety:

35870 BASE 35879 : CURING AGENT 98870 3 : 1 by volume Airless spray 08450 (5%) 1 hour(s) 20°C/68°F 0.023 - 0.027 " Reversible 250 bar [3625 psi] (Airless spray data are indicative and subject to adjustment) HEMPEL'S TOOL CLEANER 99610 350 micron [14 mils] 400 micron [16 mils] see REMARKS overleaf see REMARKS overleaf

Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Safety Data Sheets and follow all local or national safety regulations.

## **Product Data HEMPADUR MULTI-STRENGTH GF 35870**



SURFACE PREPARATION:	New steel: Remove oil and gr contaminants by high pressure a surface profile corresponding Comparator Rough Medium (C Maintenance: Remove oil and contaminants by high pressure abrasive blasting or power too blasting hose down the surface Touch up bare spots to full film	ease etc. the e fresh wate g to Rugotes b). After blas d grease etc e fresh wate I cleaning. F e with fresh n thickness v	oroughly with r cleaning. A st No. 3, BN sting, clean t t thoroughly r cleaning. R eather edge water and a when the su	n suitable de brasive blas 10, Keane-T he surface o with suitable emove all ru s to sound a llow drying. face has be	etergent. Ren sting to near ator Compar- carefully from e detergent. ust and loose and intact are come visual	move salts a white metal rator 3.0 G/S n abrasives a Remove sal e material by eas. After we ly dry.	and other Sa 2½ with S, or ISO and dust. ts and other y wet or dry et abrasive	
APPLICATION CONDITIONS:	Apply only on a dry and clean May be applied and will cure a should be above: 15°C/59°F. T provide adequate ventilation d	surface with t temperatur The best res uring applica	a temperation res down to ult is obtaine ation and dry	ure above th 5°C/41°F. Tl ed at: 20-30° ⁄ing.	e dew point he temperat °C/68-86°F.	to avoid cor ure of the pa In confined s	ndensation. aint itself spaces	
PRECEDING COAT:	None. If a blast primer is requi	red, use: HE	EMPADUR 1	5590.				
SUBSEQUENT COAT:	None, or as per specification.							
REMARKS:								
Certificates/Approvals:	The recognition as Abrasion R production site – at present the Hempel factories: Hempel Pai	esistant Ice e certificate nts Poland.	Coating by is valid only Buk and Ku	Lloyds Regis for paint ma nshan . Chir	ster applies f Iterial produc	to the produced at the fo	ct as well as llowing	
Colours/Colour stability:	Light shades will have a tende heat.	ncy to yellow	w when expo	osed to suns	hine and da	rken when e	exposed to	
Weathering/service temperatures:	The natural tendency of epoxy coatings to chalk in outdoor exposure and to become more sensitive to mechanical damage and chemical exposure at elevated temperatures is also reflected in this product							
Application(s):	The product may be immersed after 4 hours of initial curing at 20°C/68°F. Curing will proceed under water. Early immersion may result in some discolouration. This does not affect the protective properties of the product.							
Application equipment:	Standard airless heavy-duty spray equipment: Recommended pump ratio: minimum 45:1 Pump output: 12 litres/minute (theoretical) Spray hoses: max 15 metres/50 feet, 3/8" internal diameter, max 3 metres/10 feet, 1/4" internal diameter If longer spray hoses are necessary it is possible to add up to : 50 meters / 150 feet. The high output capacity of the pump must be obtained. The ratio must be raised to:60:1. Bigger spray nozzles will also call for increased pump size. A reversible nozzle is recommended.							
Film thicknesses/thinning:	May be specified in another fill will alter spreading rate and m 350-500 micron/14-20 mils	m thickness ay influence	than indicat drying time	ed dependin and overcoa	ig on purpos ating interval	e and area o I. Normal rar	of use. This nge dry is:	
Overcoating:	Overcoating intervals related to later conditions of exposure: If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion. Before overcoating after exposure in contaminated environment, clean the surface thoroughly with high pressure fresh water hosing and allow drying.							
	A specification supersedes an	y guideline d	overcoat inte	rvals indicat	ted in the tat	ole.		
	Environment			Atmospher	ic, medium			
	Surface temperature:	10°C	(50°F)	20°C	(68°F)	30°C	(86°F)	
		Min	Max	Min	Max	Min	Max	

	Min	Max	Min	Max	Min	Max			
HEMPADUR	15 h	150 d	6 h	60 d	3 h	30 d			
HEMPATHANE	10 h	25 d	4 h	10 d	2 h	5 d			
Environment	Immersion								
HEMPADUR	40 h	75 d	16 h	30 d	8 h	15 d			

NR = Not Recommended, Ext. = Extended, m = minute(s), h = hour(s), d = day(s)

Note: **ISSUED BY:** 

#### HEMPADUR MULTI-STRENGTH GF 35870 For professional use only.

3587019990

HEMPEL A/S

This Product Data Sheet supersedes those previously issued. For explanations, definitions and scope, see "Explanatory Notes" available on www.hempel.com. Data, specifications, directions and recommendations given in this data sheet represent only test results or experience obtained under controlled or specially defined circumstances. Their accuracy, completeness or appropriateness under the actual conditions of any intended use of the Products herein must be determined exclusively by the Buyer and/or User. The Products are supplied and all technical assistance is given subject to HEMPEL'S GENERAL CONDITIONS OF SALES, DELIVERY AND SERVICE, unless otherwise expressly agreed

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# INTERNATIONAL STANDARD

ISO 7599

Third edition 2018-01

## Anodizing of aluminium and its alloys — Method for specifying decorative and protective anodic oxidation coatings on aluminium

Anodisation de l'aluminium et de ses alliages — Méthode de spécification des caractéristiques des revêtements décoratifs et protecteurs obtenus par oxydation anodique sur aluminium



Reference number ISO 7599:2018(E)



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#### Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see <a href="http://www.iso.org/directives">www.iso.org/directives</a>).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see <a href="https://www.iso.org/patents">www.iso.org/patents</a>).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: <a href="http://www.iso.org/iso/foreword.html">www.iso.org/iso/foreword.html</a>.

This document was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 2, *Organic and anodic oxidation coatings on aluminium*.

This third edition cancels and replaces the second edition (ISO 7599:2010), which has been technically revised.

The main changes compared to the previous edition are as follows:

- certain terms and definitions have been deleted;
- <u>Annex D</u> has been revised.

Provläsningsexemplar / Preview

# Anodizing of aluminium and its alloys — Method for specifying decorative and protective anodic oxidation coatings on aluminium

#### 1 Scope

This document specifies a method for specifying decorative and protective anodic oxidation coatings on aluminium (including aluminium-based alloys). It defines the characteristic properties of anodic oxidation coatings, lists methods of test for checking the characteristic properties, provides minimum performance requirements, and gives information on the grades of aluminium suitable for anodizing and the importance of pretreatment to ensure the required appearance or texture of the finished work.

It is not applicable to

- a) non-porous anodic oxidation coatings of the barrier layer type,
- b) anodic oxidation coatings produced by chromic acid or phosphoric acid anodizing,
- c) anodic oxidation coatings intended merely to prepare the substrate for subsequent application of organic coatings or for the electrodeposition of metals, and
- d) hard anodic oxidation coatings used mainly for engineering purposes, for which abrasion and wear resistance are the primary characteristics (see ISO 10074).

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1463, Metallic and oxide coatings — Measurement of coating thickness — Microscopical method

ISO 2085, Anodizing of aluminium and its alloys — Check for continuity of thin anodic oxidation coatings — Copper sulfate test

ISO 2106, Anodizing of aluminium and its alloys — Determination of mass per unit area (surface density) of anodic oxidation coatings — Gravimetric method

ISO 2128, Anodizing of aluminium and its alloys — Determination of thickness of anodic oxidation coatings — Non-destructive measurement by split-beam microscope

ISO 2143, Anodizing of aluminium and its alloys — Estimation of loss of absorptive power of anodic oxidation coatings after sealing — Dye-spot test with prior acid treatment

ISO 2360, Non-conductive coatings on non-magnetic electrically conductive base metals — Measurement of coating thickness — Amplitude-sensitive eddy-current method

ISO 2376, Anodizing of aluminium and its alloys — Determination of electric breakdown potential

ISO 2931, Anodizing of aluminium and its alloys — Assessment of quality of sealed anodic oxidation coatings by measurement of admittance

ISO 3210, Anodizing of aluminium and its alloys — Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in acid solution(s)

ISO 3211, Anodizing of aluminium and its alloys — Assessment of resistance of anodic oxidation coatings to cracking by deformation

ISO 7583, Anodizing of aluminium and its alloys — Terms and definitions

ISO 8251, Anodizing of aluminium and its alloys — Measurement of abrasion resistance of anodic oxidation coatings

ISO 8993, Anodizing of aluminium and its alloys — Rating system for the evaluation of pitting corrosion — Chart method

ISO 8994, Anodizing of aluminium and its alloys — Rating system for the evaluation of pitting corrosion — Grid method

ISO 9220, Metallic coatings — Measurement of coating thickness — Scanning electron microscope method

ISO 9227, Corrosion tests in artificial atmospheres — Salt spray tests

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7583 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <a href="https://www.iso.org/obp">https://www.iso.org/obp</a>
- IEC Electropedia: available at http://www.electropedia.org/

#### 4 Information supplied by the customer to the anodizer

#### 4.1 General

The information required from the customer by the anodizer in order to anodize the product correctly is given in 4.2 and 4.3: 4.2 specifies information that is essential whenever a product is to be anodized; 4.3 identifies additional information required for particular product applications. A summary of the subclause references relating to this information is given in <u>Annex F</u>.

NOTE Certain properties (for example, high specular reflectance) are only obtainable by the use of special alloys, and some properties can be incompatible with others.

The customer and the anodizer can share the information about cleaning in case of external architectural application (see  $\underline{\text{Annex E}}$ ).

#### 4.2 Essential information

The following information shall be supplied by the customer to the anodizer, if necessary in consultation with the aluminium supplier and/or anodizer:

- a) a reference to this document, i.e. ISO 7599;
- b) the intended service use of the article to be anodized;
- c) the specification of the aluminium to be anodized;
- d) an indication of the significant surface(s) of the article to be anodized;
- e) the surface preparation to be used on the aluminium before anodizing;
- f) the anodic oxidation coating thickness class required (see <u>6.2</u>);
- g) whether a clear or coloured anodized finish is required;

h) whether the product is to be sealed or left unsealed, and if it is to be sealed, what sealing method is to be used.

Significant surfaces as per d) above are indicated preferably by drawings or by suitably marked test specimens; in some cases, there can be different requirements for the finish on different parts of the significant surface(s).

The surface preparation as per e) above is indicated preferably by agreed samples; guidance on surface preparation is given in <u>Annex B</u>.

NOTE Guidance on the choice of aluminium is given in <u>Annex A</u>.

#### 4.3 Additional information

Additional information can be required for certain applications and, if so, shall be specified by the customer, if necessary in consultation with the anodizer. It includes the following:

- a) the type of anodizing and the colouring process to be used;
- b) details of any formal sampling plans required;
- c) the preferred position and maximum size of contact marks;
- d) any limits of variation of final surface finish on the significant surface(s);
- e) the colour of the anodized article(s) and maximum limits of colour variation (see <u>8.2</u>);
- f) any requirements for quality of sealing;
- g) any requirements for corrosion resistance and the method of test to be used;
- h) any requirements for abrasion resistance, the property to be tested and the measurements required (i.e. wear resistance, wear resistance coefficient, wear index, mass wear index, mean specific abrasion resistance) and the method of test to be used;
- i) any requirements for resistance to cracking by deformation;
- j) any requirements for fastness to light or ultraviolet radiation of coloured anodic oxidation coatings;
- k) any requirements for light reflection properties, i.e. total reflectance, specular reflectance, specular gloss, diffuse reflectance and image clarity;
- l) any requirements for electric breakdown potential;
- m) any requirements for the continuity of the anodic oxidation coating;
- n) any requirements for the mass per unit area (surface density) of the coating.

Acceptable limits of variation of final surface finish as per d) above are identified preferably by agreed limit samples.

Acceptable maximum limits of colour variation as per e) above are identified preferably by agreed limit samples.

#### 5 Tests

#### 5.1 Sampling procedures

Sampling procedures shall be specified by the customer. Guidance on the choice of suitable sampling procedures is given in ISO 2859-1.

#### 5.2 Test specimens

Wherever practicable, test specimens shall be production components. However, if by agreement special test specimens are prepared for convenience in referee or acceptance tests, they shall be of the same alloy as the production components and processed through the anodizing line at the same time as the production components.

#### 5.3 Acceptance tests

Acceptance tests shall be as specified by the customer.

#### 5.4 Referee tests

In cases of dispute, the appropriate referee tests specified in this document shall be used.

#### 5.5 Production control tests

Tests for production control purposes shall be at the discretion of the anodizer.

#### 6 Coating thickness

#### 6.1 General

Anodic oxidation coatings are designated by their thickness class. The required thickness of a coating is of the utmost importance and shall always be specified.

#### 6.2 Classification

Anodic oxidation coatings are graded according to the minimum allowed value of the average thickness (minimum average thickness) in micrometres. The thickness classes are designated by the letters "AA", followed by the thickness grade; typical thickness classes are given in <u>Table 1</u>.

For anodic oxidation coatings designed to impart particular surface properties, an average thickness higher than typical may be selected, and additional intermediate values of average thickness may be specified if necessary, but in no case shall the minimum local thickness be less than 80 % of the minimum average thickness. The choice of thickness class will depend on relevant national standards.

Class	Minimum average thickness <sup>a</sup>	Minimum local thickness <sup>a</sup>
	μm	μm
AA 5	5,0	4
AA 10	10,0	8
AA 15	15,0	12
AA 20	20,0	16
AA 25	25,0	20
<sup>a</sup> The interpretation of average and local thickness requirements on a test specimen shall be in accordance with Annex C.		

Table 1 — Typical coating thickness classes

For certain applications, such as those where resistance to corrosion is paramount, the anodizer and the customer may agree to specify a minimum local thickness, with no restriction as to the average thickness.

The use of some dyestuffs necessitates the specification of class AA 20 or higher to obtain adequate dye absorption and light fastness.

For anodized aluminium, the degree of protection against pitting corrosion of the aluminium increases with an increase in coating thickness. Thus, product life time is very dependent on the coating thickness. Specifiers should consider the full life cycle impact of the product, including the energy expenditure associated with manufacture, in-service maintenance procedures and recycling.

#### 6.3 Measurement of thickness

Thickness measurements shall be carried out by one or more of the following methods:

- a) examination of cross-section using microscopy in accordance with ISO 1463 or ISO 9220;
- b) eddy-current method in accordance with ISO 2360;
- c) split-beam microscope method specified in ISO 2128.

When using method b), the measurement apparatus shall be calibrated in accordance with the manufacturer's instructions using calibration standards before any measuring is performed. Calibration standards are described in <u>Annex D</u>.

In cases of dispute, method a) shall be the referee method.

Thickness measurements shall be made on the significant surfaces in accordance with <u>Annex C</u>, but no measurements shall be made within 5 mm of the areas of anodic contact or in the immediate vicinity of a sharp edge.

#### 7 Quality of sealing

#### 7.1 General

Sealing is a treatment applied to an anodic oxidation coating to reduce its porosity and absorption capacity (as defined in ISO 7583). In many applications, anodic oxidation coatings are expected to resist degradation by aqueous solutions. Sealing can provide that resistance. Where the retention of the initial appearance is important, for example, in outdoor architectural applications, sealing at the surface of the anodic oxidation coating is important. Where the anodized aluminium is expected to resist strongly acidic or alkaline conditions over a short time period, for example, car-wash fluids, sealing throughout the thickness of the coating can be important.

Hydrothermal sealing is very well established and quality control methods have been developed for anodic oxidation coatings sealed using such treatments. These test methods can be appropriate where other sealing treatments are used.

#### 7.2 Assessment of quality of hydrothermal sealing

#### 7.2.1 Referee test

In cases of dispute, the quality of hydrothermal sealing of anodic oxidation coatings shall be determined by one of the test methods specified in ISO 3210. The necessity of prior acid treatment and maximum accepted loss of mass shall be agreed between the anodizer and the customer.

The test should be carried out without prior acid treatment for internal architectural and decorative coatings and with prior acid treatment for external architectural coatings.

These methods are surface-specific. They test the resistance of the surface of a sealed anodic oxidation coating to attack by certain acid solutions. They are not intended to test the quality of the whole thickness of the coating.

NOTE The maximum accepted loss of mass of anodic oxidation coatings is variously set at  $30 \text{ mg/dm}^2$  or  $40 \text{ mg/dm}^2$ .



# **Registration** Certificate

This document certifies that the Quality Management Systems of

#### HARDIE-SECURE PRODUCTS LIMITED

Have been assessed and approved by CQS (Certified Quality Systems) Limited to the following Management System Standard

# BS EN ISO 9001 : 2015

The scope of this certification applies to the Quality Management Systems relating to the following activities

THE DESIGN AND SUPPLY OF STREET LIGHTING AND SECURITY PRODUCTS





EAC 17

Certificate Issued: 30th May 2017

Certificate No:

**Expiry** Date:

GB2005007

29th May 2020

Should verification of the validity of this certificate be required please contact:

CQS (Certified Quality Systems) Ltd United Kingdom Head Office: +44(0)1684 571350 email: verification@cqsltd.com

On behalf of CQS (Certified Quality Systems) Limited

SIC 25990

This certificate remains valid while the holder maintains their Management Systems in accordance with the guidelines above, which will be audited by CQS (Certified Quality Systems) Ltd or its nominee This certificate remains the property of CQS (Certified Quality Systems) Ltd and must be returned in the event of cancellation.



# BS EN ISO 9001 : 2015 Certificat

# **Registration** Certificate

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Approval No. AL20RO Certificate No. TA17902E

## APPROVAL OF MANUFACTURING PROCESS

This is to certify that

#### Press Metal International Ltd. Foshan, Guangdong China

has been approved for the manufacturing process of undermentioned materials by the NIPPON KAIJI KYOKAI in accordance with the requirements of 1.2, Part K of the Society's "Rules for the Survey and Construction of Steel Ships" and Chapter 5, Part 1 of the Society's "Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use".

> MATERIALS : Aluminium Alloys

The details of the relevant approval conditions are given in the PARTICULARS OF APPROVAL listed in the reverse of this certificate.

The products for the ships classed with the Society are to be manufactured, tested and inspected in compliance with the Rules.

ClassNK &

This Certificate is valid from 31 August 2017 until 30 August 2022. Issued at Tokyo on 31 August 2017.

Initial Approval Date: 31 August 2017

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H. Kobayashi General Manager Material and Equipment Department



No. : TA17903E Date : 31 August 2017

## PARTICULARS OF APPROVAL

#### Approval Conditions for Manufacturing Process of Aluminium Alloys

- 1. Manufacturer : Press Metal International Ltd.
- 2. Kind of Product : Extruded Shapes
- 3. Grade : 6082S
- 4. System of Constituent : Al-Mg-Si
- 5. Temper Condition : T6
- 6. Max. Thickness ÷ 22.7mm

H. Kobayashi

H. Kobayashi General Manager Material and Equipment Department



No. : TA17904E Date : 31 August 2017

## PARTICULARS OF APPROVAL

#### Approval Conditions for Manufacturing Process of Aluminium Alloys

- Manufacturer
   Press Metal International Ltd.
   Kind of Product
   Extruded Tubes
   Grade
   6082S
- 4. System of Constituent : Al-Mg-Si
- 5. Temper Condition : T6
- 6. Dimension
  - (1) Max. Outside Dia. : 76.2mm
  - (2) Max. Thickness : 12.7mm

H. Kobavashi

H. Kobayashi General Manager Material and Equipment Department

## Certificate Standard ISO 9001:2015 Certificate Registr. No. 01 100 1632354 Certificate Holder: Press Metal International Ltd. Unified Social Credit Code: 91440600775071672P Registration Address: No. 21, Qili Road (South), Leping Town, Sanshui District, Foshan City, Guangdong Province 528137,, P. R. China Operation Address: same as above Scope: Design and Manufacturing of Architectural and Industrial Aluminium Alloy Profile (Mill Finished Profiles, Anodized Profiles, Powder Spraying Profiles, Fluorocarbon Spraying Profiles, Anti-thermal Profiles); Manufacturing of Mobile Aluminium Alloy Profile for Sunroof Guide Rail Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met. Validity: The certificate is valid from 2018-08-22 until 2021-08-21. It remains valid subject to satisfactory surveillance audits. First certification 2016 This certificate information can be searched on CNCA official website http://www.cnca.gov.cn 2018-08-23 TÜV Rheimand Cert GmbH Am Grauen Stein · 51105 Köln







# Certificate

Standard

# ISO 14001:2015

Certificate Registr. No.

01 104 060460

Certificate Holder:

#### Press Metal International Ltd.

No. 21, Qili Road (South), Leping Town, Sanshui District Foshan City, Guangdong Province 528137, P. R. China

Scope:

Design and Manufacturing of Architectural and Industrial Aluminum Alloy Profile (Anodized Oxided Profiles, Electrophoretic Painting Profiles, Powder Spraying Profiles, Fluorocarbon Spraying Profiles, Anti-thermal Profiles)

Proof has been furnished by means of an audit that the requirements of ISO 14001:2015 are met.

Validity:

The certificate is valid from 2020-01-03 until 2023-01-02. It remains valid subject to satisfactory surveillance audits. First certification 2011



**TÜV Rheinland Cert GmbH** Am Grauen Stein · 51105 Köln

www.tuv.com



DAkkS Deutsche Akkreditierungsstelle D-ZM-16031-01-00



# Certificate

Standard

# ISO 45001:2018

Certificate Registr. No.

01 113 060460

Certificate Holder:

#### Press Metal International Ltd.

No. 21, Qili Road (South), Leping Town, Sanshui District, Foshan City, Guangdong Province 528137, P. R. China

Scope:

Design and Manufacturing of Architectural and Industrial Aluminum Alloy Profile (Anodized Oxided Profiles, Electrophoretic Painting Profiles, Powder Spraying Profiles, Fluorocarbon Spraying Profiles, Anti-thermal Profiles)

Proof has been furnished by means of an audit that the requirements of ISO 45001:2018 are met.

Validity:

The certificate is valid from 2020-01-03 until 2023-01-02. It remains valid subject to satisfactory surveillance audits. First certification 2011

2020-01-03

**TUV Rheinland Cert GmbH** Am Grauen Stein · 51105 Köln

#### www.tuv.com







## Material Safety Data Sheet

#### **1. Product and Company Identification**

Material Name: WROUGHT ALUMINUM PRODUCTS,6\*\*\* SERIES ALLOYS

MSDS Number: PMI101

Product use: Various fabricated aluminum parts and products

#### 2. Hazards Identification

Emergency overview

Solid. Silver colored. Odorless. Non-combustible as supplied. Small chips, fine turnings and dust from processing may be readily ignitable.

Explosion/fire hazards may be present when (See Sections 5, 7 and 10 for additional information): Dust or fines are dispersed in air.

- . Chips, dust or fines are in contact with water.
- Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide).
- Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Dust and fume from processing: Can cause irritation of the eyes, skin and respiratory tract.

#### Potential health effects

The health effects listed below are not likely to occur unless processing of this product generates dusts or fumes. The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified individual. Additional health information can be found in Section 11.

Eyes	Dust and fumes from processing: Can cause irritation.	
Skin	Contact with residual oil/oil coating: Can cause irritation. Prolonged or repeated skin contact may cause dermatitis. Dust and fumes from processing: Can cause irritation. Prolonged or repeated skin contact may cause sensitization and allergic contact dermatitis.	
Inhalation	<ul> <li>Health effects from mechanical processing (e.g., cutting, grinding):</li> <li>Dust: Can cause irritation of the upper respiratory tract. Chronic overexposures: Can cause reduction in the number of red blood cells (anemia), skin abnormalities (pigmentation changes), central nervous system damage, secondary Parkinson's disease and reproductive harm.</li> <li>Additional health effects from elevated temperature processing (e.g., welding, melting):</li> <li>Dust and fumes: Can cause irritation of the respiratory tract. Acute overexposures: Can cause metal fume fever (nausea, chills, fever, shortness of breath and malaise), reduced ability of the blood to carry oxygen (methemaglobin) and the accumulation of fluid in the lungs (pulmonary edema). Chronic overexposures: Can cause respiratory sensitization and lung cancer.</li> </ul>	
Carcinogenicity and Reproductive Hazard	Product as shipped: Does not present any cancer or reproductive hazards. Dust from mechanical processing: Can present a cancer hazard (Nickel, Lead). Can present a reproductive hazard (Lead, Manganese). Dust and fumes from processing: Can present a cancer hazard (Hexavalent chromium compounds, Nickel compounds, Lead compounds, Welding fumes). Can present a reproductive hazard (Lead compounds, Manganese compounds).	
Medical conditions aggravated by exposure to product	Dust and fumes from processing: Asthma, chronic lung disease, Secondary Parkinson's disease and skin rashes.	

#### 3. Composition / Information on Ingredients

Componente	non-hazardous.	CA6 #	Dorcont
composition comments	non-hazardous.		lieu as
Composition comments	Complete composition is provided below and may include some components classified as		

Components for 6063 Aluminum Alloy

Components	Percent
Si	0.43-0.47
Fe	≤0.17
Cu	≤0.10
Mn	≤0.05
Mg	0.50-0.54
Cr	≤0.05
Zn	≤0.03
Ti	≤0.08

#### 4. First Aid Measures

First aid procedures	
Eye contact	Dust and fumes from processing: Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician.
Skin contact	Dust and fumes from processing: Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Inhalation	Dust and fumes from processing: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

#### 5. Fire Fighting Measures

Flammable/Combustible Properties	This product does not present fire or explosion hazards as shipped. Small chips, fine turnings, and dust from processing may be readily ignitable.
Fire / Explosion Hazards	<ul> <li>May be a potential hazard under the following conditions:</li> <li>Dust clouds may be explosive. Even a minor dust cloud can explode violently. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.</li> <li>Chips, fines and dust in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces.</li> <li>Dust and fines in contact with certain metal oxides (e.g., rust, copper oxide). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.</li> <li>Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with certain metal oxides can initiate a thermite reaction. Finely divided metals (e.g., powders or wire) may have enough surface oxide to produce thermite reactions/explosions.</li> </ul>
Extinguishing media	
Suitable extinguishing media	Use Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and turnings.
Unsuitable extinguishing media	DO NOT USE halogenated extinguishing agents on small chips/fines. DO NOT USE water in fighting fires around molten metal. These fire extinguishing agents will react with the burning material.
Protection of firefighters	
Protective equipment for firefighters	Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

#### 6. Accidental Release Measures

Spill or leak procedure	Collect scrap for recycling. If molten: Contain the flow using dry sand or salt flux as a dam. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap.
7. Handling and Storage	
Handling	Keep material dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Hot aluminum does not necessarily glow red.
Requirements for Processes Which Generate Dusts or Fines	If processing of this product generates dust or if extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) brochures listed in Section 16.
	Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15).
	Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.
	Do not allow chips, fines or dust to contact water, particularly in enclosed areas.
	Avoid all ignition sources. Good housekeeping practices must be maintained. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. Do not use compressed air to remove settled material from floors, beams or equipment.
Requirements for Remelting of Scrap Material or Ingot	Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions.
	All tooling, containers, molds and ladles which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Any surfaces that may contact molten metal (e.g., concrete) should be specially coated.
	Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards.
	<ul> <li>During melting operations, the following minimum guidelines should be observed:</li> <li>Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.</li> <li>Store materials in dry, heated areas with any cracks or cavities pointed downwards.</li> <li>Preheat and dry large items adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the metal temperature of the coldest item of the batch to 400°F (200°C) and then hold at that temperature for 6 hours.</li> </ul>
	Thermite explosions have been reported when aluminum alloys were melted in furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion.

#### 8. Exposure Controls / Personal Protection

Engineering controls

Dust and fumes from processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.

## WROUGHT ALUMINUM PRODUCTS, 6xxx SERIES ALLOYS

#### WARNING

Non-combustible as supplied. Small chips, fine turnings and dust from processing may be readily ignitable.

Explosion/fire hazards may be present when:

Dust or fines are dispersed in air; Chips, fines or dust are in contact with water; Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide). Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Dust and fume from processing: Can cause irritation of the eyes, skin and respiratory tract. Prolonged or repeated skin contact may cause sensitization and allergic contact dermatitis.

Health effects from mechanical processing (e.g., cutting, grinding): Chronic overexposures: Can cause reduction in number of red blood cells, skin abnormalities, central nervous system damage, secondary Parkinson's disease and reproductive harm.

Additional health effects from elevated temperature processing (e.g., welding, melting): Acute overexposures: Can cause metal fume fever, reduced ability of the blood to carry oxygen and the accumulation of fluid in the lungs. Chronic overexposures: Can cause respiratory sensitization and lung cancer.

#### FIRST AID

Dust and fumes from processing: Rinse eyes with plenty of water or saline for at Eye contact least 15 minutes. Consult a physician. Dust and fumes from processing: Wash with soap and water for at least 15 Skin contact minutes. Get medical attention if irritation develops or persists. Dust and fumes from processing: Remove to fresh air. Check for clear airway, Inhalation

breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

#### FIRE FIGHTING

Suitable extinguishing media	Use Class D extinguishing agents on fines, dust or molten metal. Use coarse water spray on chips and turnings.
Extinguishing media which must not be used for safety reasons	DO NOT USE halogenated extinguishing agents on small chips/fines. DO NOT USE water in fighting fires around molten metal. These fire extinguishing agents will react with the burning material.
SPILL PROCEDURES	
Spill or leak procedure	Collect scrap for recycling. If molten: Contain the flow using dry sand or salt flux as a dam. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap.

#### HANDLING AND STORAGE

Handling

Keep material dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Hot aluminum does not necessarily glow red.

Contains:	
Aluminum	7429-90-5
Magnesium	7439-95-4
Silicon	7440-21-3
Manganese	7439-96-5
Copper	7440-50-8
Iron	7439-89-6
Zinc	7440-66-6
Chromium	7440-47-3
Lead†	7439-92-1
Nickel‡	7440-02-0

See Alcoa Material Safety Data Sheet No. 668 for more information about use and disposal. Emergency Phone: (412) 553-4001.