ALUMINUM ALLOY, EXTRUSION, HIGH STRENGTH, WELDABLE **WSS-M2A164-A1**
JAGUAR LAND ROVER ONLY

ALUMINUM ALLOY, EXTRUSION, OVERAGED, WELDABLE **WSS-M2A164-A2**
JAGUAR LAND ROVER ONLY

1. SCOPE

The materials defined by these specifications are for a 6XXX series aluminum alloy suitable for thin walled, hollow extrusions and available in two heat-treated conditions. These materials are weldable and capable of undergoing reasonable levels of deformation under mechanical forming processes such as stretch bending and hydroforming.

2. APPLICATION

These specifications were originally released for extruded aluminum alloy profiles in a space frame, body in white structure by Jaguar.

These two specifications cover the same base alloy but heat-treated to two different temper conditions. The A1 variant covers the T6 (solution treated and artificially aged), which gives the highest level of strength and is suitable for quasi-statically loaded components eg. jacking and towing reinforcements. The A2 variant covers the T7 (over aged) temper condition. This gives a stabilised material that can be exposed to high temperature service conditions (> 80 °C). Its fracture behavior also makes this condition best suited to impact loaded components eg. crush cans.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 DIMENSIONAL TOLERANCES

Dimensional tolerances for extruded profiles shall be in accordance with EN 755-9, Alloy Group 1.

3.3 CHEMICAL COMPOSITION
(ASTM E 34/ASTM E 101/ASTM E 227/ASTM E 607/ASTM E 1251)

The determination of the chemical composition can be made with chemical, spectroscopic of x-ray fluorescence, in accordance with the above standards. In the case of dispute, the umpire method shall be ASTM E 34.

Silicon	0.30 - 0.6
Iron	0.35 max.
Copper	0.25 max.
Manganese	0.05 - 0.20
Magnesium	0.40 - 0.80
Chromium	0.20 max.
Zinc	0.10 max.
Vanadium	0.20 max.
Titanium	0.10 max.
Others	0.15 max.
Aluminum	Remainder

Date	Action	Revisions	
2009 02 04	Revised	Revised 3.3 & 5.1	A R Tautscher
2003 09 23	Revised	Para 3.0 inserted; para 3.1, 3.10 and 4 deleted	
2002 01 31	Activated		N E Heath

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3.4 MECHANICAL PROPERTIES
(EN 10002-1/ASTM E 646/ISO 6892)

Longitudinal Properties

Specification Number	Temper Condition	Wall Thickness mm	0.2% Proof Strength MPa	Tensile Strength MPa	Elongation A5 %	Elongation A50mm %	Hardness HB
A1	T6	< 5	200 min.	250 min.	8 min.	6 min.	75 min.
		5 to 15	180 min.	225 min.	8 min.	6 min.	75 min.
A2	T7	< 5	200 min.	215 min.	10 min.	8 min.	70 min.
		5 to 15	180 min.	190 min.	10 min.	8 min.	70 min.

3.5 FUSION WELDABILITY

Fusion weldability shall be in accordance with ES 2W93-8A297-AA. Parts to be fusion welded shall have a clean surface and a controlled oxide film achieved either by pickling and/or chemical conversion (pretreatment). See para. 5.2.

3.6 RIVETABILITY

Rivetability shall be in accordance with ES 2W93-F00004-AA

3.7 ADHESIVE AND SEALANT PERFORMANCE REQUIREMENTS
(For applications where adhesives and sealants are required)

Material supplied to these specifications shall demonstrate acceptable adhesive and sealant performance per the material specifications and the adhesive and sealant compatibility procedures identified by the responsible Materials Engineering activity.

3.8 PAINTABILITY

Material supplied to these specifications must have prior approval for paintability by the responsible Materials Engineering activity. This approval shall be based on samples prepared to local processes and performance requirements.

3.9 SURFACE QUALITY

The surface quality requirements (Class 1, 2 or 3) shall be as defined as follows:

Class 1 (Exposed) – Extruded parts in this class shall have a surface finish free from visible die marks, indentations and scratches.

Class 2 – This surface class applies to surfaces not covered by trim materials, but only exposed to view when the closures are in an open position. It is desirable that extruded parts in this class are free from severe die marks and moderate and heavy indentations. There shall be no adverse effect on the functionality of the final product.

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