

SUPERFLOW



COMALCO

TECHNICAL DATASHEET EXTRUSION ALLOY SF6060

Issue date: Sep 2002

FEATURES:

Comalco alloy SF6060 is a high speed extrusion alloy with moderate strength and good anodizing characteristics. The maximum extrusion speed of SF6060 is typically 10 to 20% higher than for common 6063 alloys, and with appropriate press quenching and ageing, SF6060 will meet the minimum T6 properties specified for 6063 alloys.

APPLICATIONS:

Alloy SF6060 can be used in applications requiring moderate strength and good formability. Uses include architectural systems such as handrails, window and door frames, as well as general applications ranging from builder's hardware to heat sink profiles. Furthermore, the good anodising properties of SF6060 make this alloy suitable for bright finish profiles.

COMPOSITION:

The composition of Comalco SF6060 alloy meets the international specification for alloy AA6060 which is provided below in weight %:

Alloy	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
AA6060	0.30	0.10	0.10	0.10	0.35	0.05	0.15	0.10	0.05 each
	-0.6	-0.30			-0.6				0.15 total

BILLET CASTING TECHNOLOGY AND PRODUCT QUALITY:

Comalco's Superflow billet is produced using air pressurized casting technology, which minimises contact between molten metal and mould resulting in a smooth finish on the billet. Air pressurised casting also imparts a high solidification rate to the billet which results in a shallow segregation zone, uniform dendrite arm spacing and fine grain structures.

This advanced casting technology, combined with sophisticated metal preparation and continuous homogenisation treatment ensures that Comalco's Superflow billet offers low breakout pressure, high extrusion speed, consistent extrusion performance and good extrudate surface finish.

Product quality is ensured through stringent chemical analysis (NATA accredited), manual and ultrasonic inspection for defects, and metallurgical assessment.

SUPERFLOW



COMALCO

TECHNICAL DATASHEET EXTRUSION ALLOY SF6060

TYPICAL PROCESSING CONDITIONS:

Preheating

Billet should be preheated to a temperature in the region of 450°C to ensure good extrudability and mechanical properties. Difficult sections, such as thin walled extrusions or hollows may require higher billet preheat temperatures (~470°C), while simple sections may be extruded with lower preheat temperatures (~430°C).

Extrusion Conditions

The temperature of the container should be set at least 30°C below the billet temperature to ensure the billet skin is retained in the butt. The billet preheat temperature and extrusion speed should be controlled so that the exit temperature is maintained in the range of 500°C to 550°C. Higher exit temperatures, up to 580°C, may be possible depending on processing conditions. Typical extrusion speeds for this alloy are in the range of 40 to 100 m/min for solid profiles and 30 to 60 m/min for hollow profiles.

Press Quenching

The cooling rate of the extrudate from exit temperature down to 250°C should be in excess of 60°C/min to achieve minimum mechanical properties. For thin sections (less than 6mm), a still air or light fan quench should be adequate to achieve this cooling rate. For thicker sections (6 to 10mm), vigorous fan or mist quenching is usually required to achieve the minimum cooling rate.

Straightening

Stretching to an elongation of about 0.5% is recommended for straightening while stretching beyond 1% elongation may result in orange peel finish on the extrudate.

Ageing Treatment

Various ageing times and temperatures can be used to obtain good mechanical properties. However the initial aging conditions recommended for SF6060 alloy for production operations are 6 hours at 190 +/- 5°C.

IMPORTANT DISCLAIMER: This brochure has not been prepared with any particular reader in mind and, therefore, although we believe that the advice and information herein is accurate and reliable, no warranty of accuracy, reliability or completeness and (except insofar as liability under any statute cannot be excluded) no responsibility arising in any other way for errors or omissions or negligence is accepted by the company or any director, employee or agent of the company.

SUPERFLOW



COMALCO

TECHNICAL DATASHEET EXTRUSION ALLOY SF6060

TYPICAL PHYSICAL PROPERTIES (T5 Temper)*:

Density	2700 kg/m ³
Modulus of Elasticity	69 GPa
Coefficient of thermal expansion	23.4 x 10 ⁻⁶ /°C
Thermal Conductivity	209 W/(m.K)
Electrical Conductivity	32 MS/m
Approximate Melting Range	615°C to 650°C

**Not to be used for design purposes.*

TYPICAL APPLICATION DATA :

Corrosion Resistance	A, A
Machining	C, C
Anodizing	A, A
Brazing	A
Cold Forming	A, C
Inert Gas Welding	A

Relative ratings in decreasing order of merit = A, B, C, D

First letter refers to annealed condition; second letter refers to T5 temper

MECHANICAL PROPERTIES:

With appropriate extrusion and heat treatment practices, the following minimum and typical properties will be achieved as specified in the Australian Aluminium Council Standards for 6063 alloys.

Property	T5 Minimum Properties	T6 Minimum Properties	T5 Typical Properties*
Ultimate tensile strength (MPa)	150	205	215
Yield Strength (MPa)	110	170	195
Elongation (%)	8	8	12
Webster Hardness			13
Section Thickness	0 - 12 mm	0 - 25 mm	

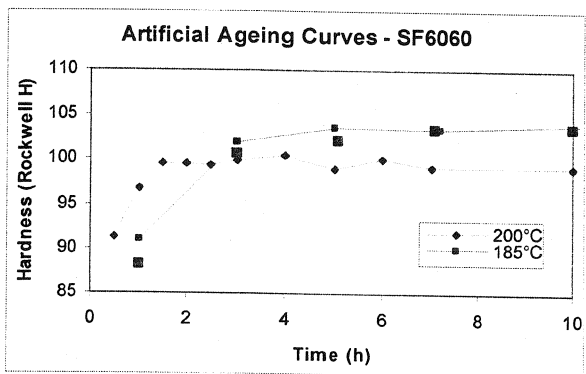
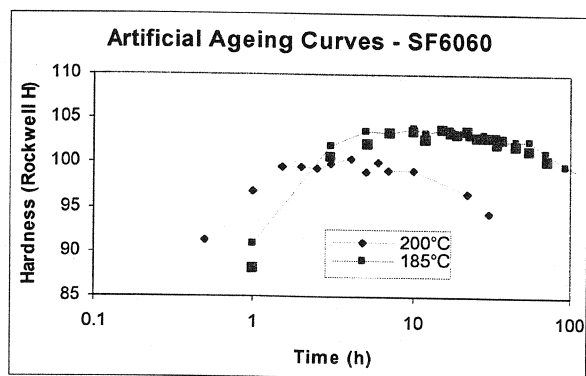
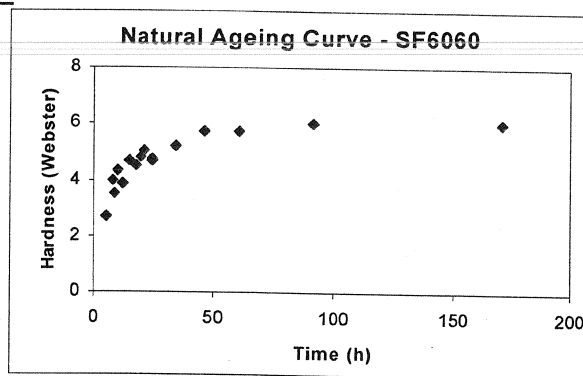
* fan press quenched and aged for 6h at 190°C

SUPERFLOW



TECHNICAL DATASHEET EXTRUSION ALLOY SF6060

AGEING CURVES:



Note that the artificial ageing curves were generated by separate solution treatment (520 °C with water quench), natural ageing for 24 hours plus ageing at 185 and 200 °C and may not be representative of properties achieved by press quenching and ageing.