



# RAFFMETAL

THE ALUMINIUM EVOLUTION



**Leghe di alluminio in colata continua. Continuous casting aluminium alloys**

Standard: **UNI EN 1676 and 1706**

Alloy group: **Al Mg**

Alloy designation: **EN AB and AC 51100 - Al Mg 3 (a)**

Replaces: **UNI 3059 - G Al Mg 3**

### CHEMICAL COMPOSITION %

ALLOY		ELEMENTS											Individual impurities	Global impurities
		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti		
EN AB 51100	min					2,7								
	max	0,45	0,40	0,03	0,45	3,5	-	-	0,10	-	-	0,15	0,05	0,15
UNI 3059	min				0,25	2,80								
	max	0,3	0,4	0,05	0,4	3,20	-	0,01	0,10			0,20		0,20

### MECHANICAL FEATURES DETECTED FROM SEPARATE CASTING TEST SPECIMENS

Casting process	Temper designations	Rm Tensile strenght		Sp 0,2 Yield strenght		A Elongation		HB Brinell hardness	
		EN 1706	UNI 3059	EN 1706	UNI 3059	EN 1706	UNI 3059	EN 1706	UNI 3059
		Mpa	N/mm2	Mpa	N/mm2	%	%	HBW	HB
SAND (as cast) Annealed	F	140	125-155	70	60-80	3	5-9	50	40-50
SHELL (as cast) Annealed	F	150	145-195	70	60-80	5	6-10	50	45-55
PRESSURE DIE (as cast)									

### PHYSICAL PROPERTIES (indicative values subject to the UNI EN and ex UNI Standards)

DENSITY	2.68 Kg/dm <sup>3</sup>
MELTING RANGE or MELTING POINT	600 °C 640 °C
SPECIFIC HEAT (at 100)°	0.23 cal/g °C
LATENT HEAT OF MELTING	93 cal/g
LINEAR SHRINKAGE	~1.40 %
ELECTRIC CONDUCTIVITY	17 - 22 MS/m
MODULUS OF ELASTICITY	6900 Kg/mm <sup>2</sup>

THERMAL CONDUCTIVITY at 20°C	130 - 140 W/(m K)
LINEAR THERMAL EXPANSION from 20 t 100°C	24.0x10-6/°C
LINEAR THERMAL EXPANSION from 20 t 200°C	24.5x10-6/°C
LINEAR THERMAL EXPANSION from 20 t 300°C	25.0x10-6/°C
SUGGESTED MAXIMUM TEMPERATURE	750 °C
SUGGESTED CASTING TEMPERATURE	
°in sand	720-750 °C
°in shell	720-750 °C
°in pressure die	

### TECHNOLOGICAL FEATURES, QUALITATIVE INDICATIONS

STRENGTH AT ELEVATED TEMPERATURE(to 200°C)	LOW
GENERAL RESISTANCE TO CORROSION	EXCELLENT
MACHINABILITY	SUFFICIENT
CASTABILITY	MEDIUM
POLISHING	SUFFICIENT

RESISTANCE TO HOT TEARING	MEDIUM
PRESSURE TIGHTNESS	MEDIUM
WELDABILITY	MEDIUM
DECORATIVE ANODISING	EXCELLENT
PROTECTIVE ANODISING	EXCELLENT

**AZIENDA CON SISTEMA DI GESTIONE PER LA QUALITÀ CERTIFICATO DA DNV = UNI EN ISO 9001:2008 =**

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**AZIENDA CON SISTEMA DI GESTIONE AMBIENTALE CERTIFICATO DA DNV = UNI EN ISO 14001:2004 =**



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## GENERALITIES REGARDING USE

The ingot recasting process must be carried out as quickly as possible and overheating must be avoided (maximum melting temperature 750°C).

The iron tools that can come into contact with the liquid metal must be appropriately painted to prevent contamination of the alloy.

The best results for refining the alloy are reached by treatments with inert gases such as nitrogen and/or argon with the intent of removing the hydrogen dissolved and the oxides present in the bath of molten metal. Better distribution of the gas in the molten metal is obtained by the use of relevant rotors. Pay particular attention that all transfer operations of the molten metal are performed with less turbulence possible. It is recommended to leave the molten metal at rest for a few minutes before starting casting. Careful skimming operations of the bath are recommended.

The re-cycling of risers and casting appendixes is allowed but within the limits of 40% of the total weight of the load.

## SPECIFICITY REGARDING USE

As it is a Magnesium-based alloy, fast melting of the ingots is recommended in order to reduce the loss of the same, the oxidation of the melted metal and the absorption of hydrogen.

If casting must be produced for heat treatment, the loss of magnesium during melting of the metal must be considered (about 0.1% for each melting process), the integration of this element is therefore recommended to guarantee the effective heat treatment.

Considering the relative level of purity of the alloy's chemical composition (reduced content of Cu - Zn - Fe) it is important to check the level of cleanliness of the melting furnaces and the attention of the re-cycling of the risers in order to prevent induced pollution that could jeopardise the technical properties of the alloy.

## TYPICAL USE

Alloy suitable for the realisation of casting in sand and in shell resistant to corrosion, also without performing surface treatments.

Used particularly in the chemical, naval, furniture and foodstuff industries.

Used for the construction of bases for scales and slicing machines.

Alloy EN 51100 is in compliance with the EN 601 Foodstuff Standard.

## COMPARISON WITH EQUIVALENT OR SIMILAR FOREIGN STANDARDS

	ITALY	GERMANY	FRANCE	G.B.R.	USA	ISO	JAPAN	TURKEY
	UNI	(Din1725/5-86)	(NFA57-105)	(BS1490-88)	(ASTM B179-82)	(3522-84)	(JIS H2211-92)	(ETIAL)
Equivalent		242			514.0-514.1	Al Mg 3	D6 V	
Similar	SA503.1	244	AG 3T	LM 5	SAE 330		D65-ADC6	

## HEAT TREATMENTS

Annealing at 330-380°C for 4-8 hours in normal conditions, followed by slow cooling to 200 °C

### Limitation of liability

The contents of these technical sheets gave an informative purpose and do not constitute a warranty regarding the properties stated. The decisions based on this information are taken under the responsibility and risk of the user and do not exclude it from the verification. If the former are not carried out, we do not assume any liability.

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