



# RAFFMETAL

THE ALUMINIUM EVOLUTION



Leghe di alluminio in colata continua. Continuous casting aluminium alloys

Standard: **UNI EN 1676 and 1706**

Alloy group: **Al Si**

Alloy designation: **EN AB 44000 and AC Al Si 11**

Replaces:

### CHEMICAL COMPOSITION %

ALLOY		ELEMENTS											Individual impurities	Global impurities
		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti		
EN AB 44000	min	10,0												
	max	11,8	0,15	0,03	0,10	0,45	-	-	0,07	-	-	0,15	0,03	0,10
	min	10,0				0,10								
	max	11,8	0,15	0,02	0,05	0,45	-	-	0,07	-	-	0,15	0,03	0,10

### MECHANICAL FEATURES DETECTED FROM SEPARATE CASTING TEST SPECIMENS

Casting process	Temper designations	Rm Tensile strength		Sp 0,2 Yield strength		A Elongation		HB Brinell hardness	
		EN 1706		EN 1706		EN 1706		EN 1706	
		Mpa	N/mm2	Mpa	N/mm2	%	%	HBW	HB
SAND (as cast) Hardened and Aged artif.	F	150	170 - 220	70	80 - 140	6	2 - 4	45	50 - 60
	T6		200 - 320		120 - 300		1 - 3		65 - 120
SHELL (as cast) Hardened and Aged artif.	F	170	180 - 230	80	80 - 130	7	5 - 16	45	55 - 75
	T6		210 - 350		125 - 320		4 - 15		70 - 125
PRESSURE DIE (as cast)									

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

DENSITY	2.67 Kg/dm <sup>3</sup>
MELTING RANGE or MELTING POINT	560 °C 590 °C
SPECIFIC HEAT (at 100)°	0.91 J/Gk
LINEAR SHRINKAGE IN SAND PROCESS	1.0 - 1.2 %
LINEAR SHRINKAGE IN SHELL PROCESS	0.5 - 0.8 %
LINEAR SHRINKAGE IN HIGH PRESSURE DIE	
ELECTRIC CONDUCTIVITY	18 - 24 MS/m
MODULUS OF ELASTICITY	7400 Kg/mm <sup>2</sup>

THERMAL CONDUCTIVITY at 20°C	140 - 170 W/(m K)
LINEAR THERMAL EXPANSION from 20 t 100°C	-
LINEAR THERMAL EXPANSION from 20 t 200°C	21.0-10-6/°C
LINEAR THERMAL EXPANSION from 20 t 300°C	-
SUGGESTED MAXIMUM TEMPERATURE	780 °C
SUGGESTED CASTING TEMPERATURE	
°in sand	670 - 740 °C
°in shell	670 - 740 °C
°in pressure die	-

### TECHNOLOGICAL FEATURES, QUALITATIVE INDICATIONS

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

RESISTANCE TO HOT TEARING	SMALL
PRESSURE TIGHTNESS	EXCELLENT
WELDABILITY	EXCELLENT
DECORATIVE ANODISING	LOW
PROTECTIVE ANODISING	

**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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Alloy designation: **EN AB 44000 and AC Al Si 11**

Replaces:

### GENERALITIES REGARDING USE

The ingot recasting process must be carried out as quickly as possible and overheating must be avoided (maximum melting temperature 780°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.

The important level of the Magnesium in the alloy recommends fast melting of the ingots 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.

### SPECIFICITY REGARDING USE

For the realisation of casting with sensitive thickness, it is recommended to envision "modification" treatment.

If Strontium is used as the modifying element, it is recommended to operate with Strontium that do not exceed 300 ppm in order to prevent excess reactivity of the alloy in the liquid state with consequent oxidation and gassing phenomena

Remember that the contents of Strontium exceeding 100 ppm are normally sufficient to obtain a well-modified structure.

Considering the high level of purity of the alloy's chemical composition (reduced content of Cu - Zn - Fe) it is important to consider 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

AlSi alloy with chemical composition near to the eutectic composition heat treatable with high mechanical resistance. Casting with complex structures with strong stresses, used in the production of wheels for cars, lorries and motorbikes.

Alloy EN 44000 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								
Similar	UNI 3049			LM 9	369.1			

### HEAT TREATMENTS

Hardening 520 - 535°C after pre-heating of 6 - 10 hours in normal conditions. Complete Artificial Aging at 130 - 170°C for 6 - 8 hours.

#### 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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