



RAFFMETAL

THE ALUMINIUM EVOLUTION



Leghe di alluminio in colata continua. Continuous casting aluminium alloys

Standard: **UNI EN 1676 and 1706**

Alloy group: **Al Si 10 Mg**

Alloy designation: **EN AB and AC 43000 Al Si 10 Mg (a)**

Replaces: **DIN 239 A - Al Si 10 Mg**

CHEMICAL COMPOSITION %

ALLOY		ELEMENTS											Individual impurities	Global impurities
		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti		
EN AB 43000	min	9,0				0,25								
	max	11,0	0,40	0,03	0,45	0,45	-	0,05	0,10	0,05	0,05	0,15	0,05	0,15
DIN 239 A - Al Si 10 Mg	min	9,0				0,20								
	max	11,0	0,50	0,05	0,4	0,50	-	0,05	0,10	0,05	0,05	0,15	0,05	0,15

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	DIN 1725	EN 1706	DIN 1725	EN 1706	DIN 1725	EN 1706	DIN 1725
		Mpa	N/mm2	Mpa	N/mm2	%	%	HBW	HB
SAND (as cast) Hardened and Aged artif.	F	150	160 - 210	80	80 - 110	2	2 - 6	50	50 - 60
	T6	220	220 - 320	180	180 - 260	1	1 - 4	75	80 - 110
SHELL (as cast) Hardened and Aged artif.	F	180	180 - 240	90	90 - 120	2,5	2 - 6	55	60 - 80
	T6	260	240 - 320	220	210 - 280	1	1 - 4	90	85 - 115
Hardened and Sub-aged artif.	T64	240		200		2		80	
PRESSURE DIE (as cast)									

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

DENSITY	2.68 Kg/dm ³
MELTING RANGE or MELTING POINT	550 °C 600 °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 %
ELECTRIC CONDUCTIVITY	18 - 25 MS/m
MODULUS OF ELASTICITY	7400 Kg/mm ²

THERMAL CONDUCTIVITY at 20°C	140 - 170 W/(m K)
LINEAR THERMAL EXPANSION from 20 t 100°C	21 10-6/°K
LINEAR THERMAL EXPANSION from 20 t 200°C	22.0-10-6/K
LINEAR THERMAL EXPANSION from 20 t 300°C	-
SUGGESTED MAXIMUM TEMPERATURE	770 °C
SUGGESTED CASTING TEMPERATURE	
°in sand	680 - 750 °C
°in shell	680 - 750 °C
°in pressure die	-

TECHNOLOGICAL FEATURES, QUALITATIVE INDICATIONS

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

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

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

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Replaces: **DIN 239 A - Al Si 10 Mg**

GENERALITIES REGARDING USE

The ingot recasting process must be carried out as quickly as possible and overheating must be avoided (maximum melting temperature 770°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 EN 43000 alloy is delivered by RAFFMETAL exclusively under the form of ingots produced with Continuous Casting, this has the following advantages:

- Lower presence of oxides with consequent reduced aptitude for the formation of HARD POINTS
- Fine and even structure with reduced quantity and dimension intermetallic compounds
- Reduced hydrogen content in relation to the high solidification speed.
- Possibility of customising according to different options of the dimensions and geometry of the stack
- Less risk of explosion of the ingot in the melting phase owing to the smaller presence of open shrinkage cavities.
- Improved metal yield owing to the excellent surface quality of the ingot

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 of the bath.

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

Considering the relative 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

Alloy with good castability suitable for the realisation of casting in sand and shell of complex designs, which require good mechanical features and pressurised sealing. Used in all industrial sectors, it is used for combustion engine bases and heads, ear boxes, various sumps, etc.

Alloy EN 43000 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		239 A	AS 10 G			Al Si 10 Mg	C 4 AS	
Similar	3051	239 D		LM 9	A 360.2			ETIAL - 171

HEAT TREATMENTS

Hardening 520 - 530°C after pre-heating of 3 - 6 hours in normal conditions
Complete Artificial Aging at 150 - 175°C for 6 - 10 hours.

Limitation of liability

The contents of these technical sheets give 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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