



RAFFMETAL

THE ALUMINIUM EVOLUTION



Leghe di alluminio in colata continua. Continuous casting aluminium alloys

Standard: **UNI EN 1676 and 1706**

Alloy group: **Al Si 5 Cu**

Alloy designation: **EN AB and AC 45300 - Al Si 5 Cu 1 Mg**

Replaces: **UNI 3600 - G Al Si 5 Cu Mg**

CHEMICAL COMPOSITION %

ALLOY		ELEMENTS												
		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti	Individual impurities	Global impurities
EN AB 45300	min	4,5		1,0		0,40								
	max	5,5	0,55	1,5	0,55	0,65	-	0,25	0,15	0,15	0,05	0,20	0,05	0,15
UNI 3600 - G Al Si 5 Cu Mg	min	4,5		1,10		0,45								
	max	5,5	0,5	1,50	0,1	0,65	-	0,10	0,05			0,15		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	UNI 3600	EN 1706	UNI 3600	EN 1706	UNI 3600	EN 1706	UNI 3600
		Mpa	N/mm2	Mpa	N/mm2	%	%	HBW	HB
SAND (as cast)	F		145-175		125-145		1-2		65-85
	T4	170	215-245	120	155-185	2	2-3	80	85-100
	T6 2	230	245-265	200	185-215	1	1-2	100	95-110
SHELL (as cast)	F		205-245		125-155		4-5		70-95
	T4	230	305-345	140	195-235	3	5-9	85	100-130
	T6 3	280	345-390	210	275-315	1	2-5	110	110-140

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

DENSITY	2.71 Kg/dm ³
MELTING RANGE or MELTING POINT	554 °C 627 °C
SPECIFIC HEAT (at 100)°	0.23 cal/g °C
LATENT HEAT OF MELTING	93 cal/g
LINEAR SHRINKAGE	~ 0,30 %
ELECTRIC CONDUCTIVITY	19 - 23 MS/m
MODULUS OF ELASTICITY	7200 Kg/mm ²

THERMAL CONDUCTIVITY at 20°C	140 - 150 W/(m K)
LINEAR THERMAL EXPANSION from 20 t 100°C	22.2x10 ⁻⁶ /°C
LINEAR THERMAL EXPANSION from 20 t 200°C	23.3x10 ⁻⁶ /°C
LINEAR THERMAL EXPANSION from 20 t 300°C	24.1x10 ⁻⁶ /°C
SUGGESTED MAXIMUM TEMPERATURE	780 °C
SUGGESTED CASTING TEMPERATURE	
°in sand	690-750 °C
°in shell	680-740 °C
°in pressure die	

TECHNOLOGICAL FEATURES, QUALITATIVE INDICATIONS

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

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

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

Raffmetal S.p.a.
via malpaga, 82 25070 Casto (BS)
tel:0365.890.100 fax 0365.899.327
qualita@raffmetal.it
vendite@raffmetal.it

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



RAFFMETAL

THE ALUMINIUM EVOLUTION



Leghe di alluminio in colata continua. Continuous casting aluminium alloys

Standard: **UNI EN 1676 and 1706**

Alloy group: **Al Si 5 Cu**

Alloy designation: **EN AB and AC 45300 - Al Si 5 Cu 1 Mg**

Replaces: **UNI 3600 - G Al Si 5 Cu Mg**

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 EN 45300 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

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 during melting of the metal must be considered (about 0.05% 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 Zn) 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 suitable for realisation of castings in sand or in shell where high mechanical features and pressurised sealing are requested and on which important mechanical processes are envisioned. Used in the transport industries, hydraulics and compressed air (motor cylinders and bases, pump bodies, compressor pistons).

Alloy EN 45300 is **not 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			AS 4 GU	LM 16	355.2	AlSi 5 Cu Mg	C 4 DS	
Similar	SA313.1			L 78	SAE C 355		AC 4 D	

HEAT TREATMENTS

Hot water quenching from 510-530°C after pre-heating in normal conditions for 12 hours minimum in sand castings and 8 hours minimum for castings in shell:

T4 = Artificial aging at 150-160 °C for 4 hours in normal conditions,

T6 2 = Artificial aging at 150-160 °C or 8 hours in normal conditions,

T6 3 = Artificial aging at 165-175 °C or 1 hours in normal conditions,

Annealing at 350-390 °C or 4-8 hours in normal conditions.

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.

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

Raffmetal S.p.a.
via malpaga, 82 25070 Casto (BS)
tel:0365.890.100 fax 0365.899.327
qualita@raffmetal.it
vendite@raffmetal.it

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