



# RAFFMETAL

THE ALUMINIUM EVOLUTION



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

Standard: **UNI EN 1676 and 1706**

Alloy group: **Al Cu**

Alloy designation: **EN AB and AC 21000 - Al Cu 4 Mg Ti**

Replaces:

### CHEMICAL COMPOSITION %

ALLOY		ELEMENTS												Individual impurities	Global impurities
		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti			
EN AB 21000	min			4,20		0,20						0,15			
	max	0,15	0,30	5,0	0,10	0,35	-	0,05	0,10	0,05	0,05	0,25	0,03	0,10	
	min														
	max														

### 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) Aged naturally	F		165 - 195		145 - 185		1 - 3		80 - 90
	T4	300	295 - 335	200	215 - 255	5	5 - 9	90	95 - 110
SHELL (as cast) Hardened and Aged	F		195 - 235		165 - 195		1 - 4		85 - 95
	T4	320	325 - 370	200	215 - 255	8	7 - 14	90	100 - 115
PRESSURE DIE (as cast)									

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

DENSITY	2.79 Kg/dm <sup>3</sup>
MELTING RANGE or MELTING POINT	550 °C 645 °C
SPECIFIC HEAT (at 100)°	0.91 J/gK
LINEAR SHRINKAGE IN SAND PROCESS	1.3 - 1.5 %
LINEAR SHRINKAGE IN SHELL PROCES	0.8 - 1.2 %
ELECTRIC CONDUCTIVITY	16 - 23 MS/m
MODULUS OF ELASTICITY	7200 Kg/mm <sup>2</sup>

THERMAL CONDUCTIVITY at 20°C	1.1 - 1.4 W/cmK
LINEAR THERMAL EXPANSION from 20 t 100°C	23.6-10-6/°C
LINEAR THERMAL EXPANSION from 20 t 200°C	24.4-10-6/°C
LINEAR THERMAL EXPANSION from 20 t 300°C	25.0-10-6/°C
SUGGESTED MAXIMUM TEMPERATURE	750 °C
SUGGESTED CASTING TEMPERATURE	
°in sand	700 - 750 °C
°in shell	700 - 730 °C
°in pressure die	

### TECHNOLOGICAL FEATURES, QUALITATIVE INDICATIONS

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

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

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

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Replaces:

### 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

With this type of alloy, many defects in the casting produced derive from "Contamination" with Silicon. Excess Silicone in the alloy increases the susceptibility to heat cracking in the casting solidification phase. The Silicone content must be kept as low as possible and always at values lower than Values for Iron.

Considering the relative level of purity of the alloy's chemical composition (reduced content of Si - 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 suitable for the realisation of highly stressed castings; without particular requirements for corrosion resistance, such as aeronautical constructions and transport, high voltage switches, textile machines, armaments industry. It is susceptible to hardening and tempering.

Alloy **not in compliance with the EN 601** food 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		220 / 1	A U 5 G T		204.2	AlCu 4 MgTi		
Similar					201.2			

### HEAT TREATMENTS

Water quenching from 520-530°C after pre-heating for 8 - 24 hours in normal conditions. Natural Aging for 10 - 15 days at room temperature.  
Annealing at 300-370°C for 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.

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