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*More than twenty five years
of experience in metallurgy*



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Aluminiums, Brozes and Casting

MANUFACTURING & DISTRIBUTION



*More than twenty five years
of experience in metallurgy*



**Warehousing, cutting and delivery
of aluminium, bronze and casting**

Sabater Fundimol is a company from Alicante, Spain, dedicated to the production and distribution of pieces of aluminium, brass and cast iron.

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SABATER FUNDIMOL has more than 40 years of experience in metalworking industry. We are a wholesale company which is specialized in the storage and cutting of aluminium, duralumin and bronze.

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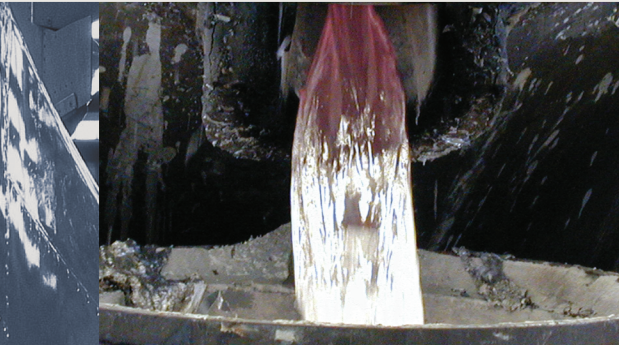
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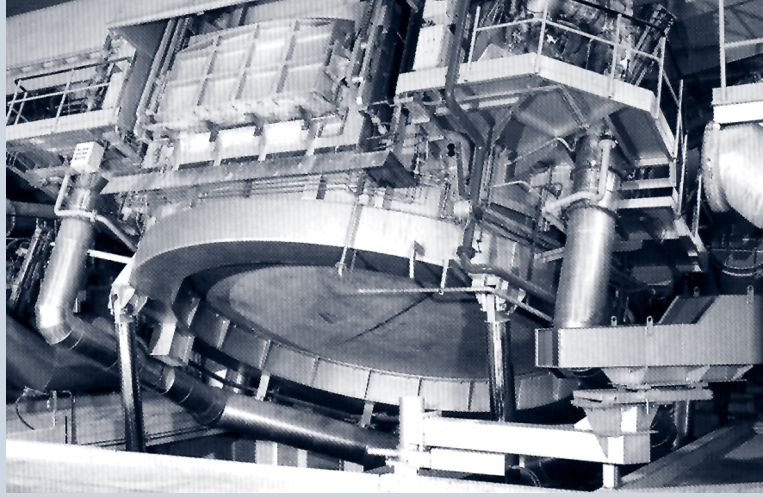
*“ We deliver your order
in Spain within 24 hours ”*



SABATER FUNDIMOL is characterised by its ongoing growth, new technologies applied to management, products and services, and its capacity to adapt to the constantly changing and growing demands of the marketplace.

We cast every tipe of shape and make you a perfect reproduction of whatever you desire with our **first-class materials**, therefore we work with distinct leading sectors, such as toys, shoes and automobiles, etc.

All our products are produced within the most demanding standards of the European Community and accompanied by its corresponding certificate of quality.



ALUMINIUMS

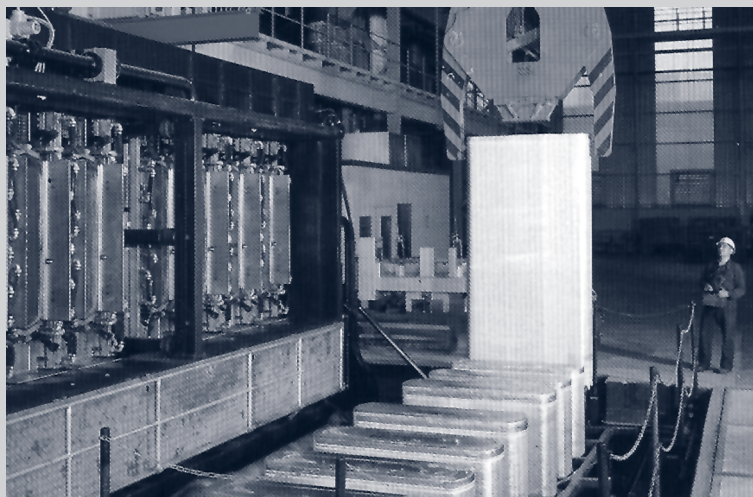
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ALUMINIUMS

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To designate the aluminium and its alloys, both for wrought product and cast products intended to be forged (plates, billets and sketches), a four-figure numerical system is used based on Standard EN 573 and in accordance with the Recommendation dated December 15th 1970 of an International Designation System for Aluminium and Aluminium Alloys for forging issued by the Aluminium Association, Washington DC 20006, USA .

Coding bases

The designation is formed correlatively with the following elements:

- the prefix EN followed by a blank space;
- letter A which refers to aluminium;
- letter W which represents the fact that they are wrought products;
- a dash;
- four digits related with the chemical composition;
- if mandatory, a letter identifying a national variant.

Four-digit designation system

The first of the four digits of the designation indicates the alloy group:

At least 99.00% aluminium	1xxx (series 1000)
Aluminium alloys grouped according to their main alloy element	
Copper	2xxx (series 2000)
Manganese	3xxx (series 3000)
Silicon	4xxx (series 4000)
Magnesium	5xxx (series 5000)
Magnesium and silicon	6xxx (series 6000)
Zinc	7xxx (series 7000)
Other elements	8xxx (series 8000)
Series not used	9xxx (series 9000)

Note: An alloy element is regarded as anything which is intentionally added for any purpose other than grain refinement and for which minimum and maximum limits are specified.



ALUMINIUMS General Tables Chemical Composition

CHEMICAL COMPOSITION OF THE ALUMINIUM ALLOYS MOST USED FOR FORGING

Aluminium. Series 1000

Alloy designation		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ga	V	Notes	Ti	Others		Aluminium min.
Numerical EN AW	Symbolic EN AW													Each	Total	
1080A	Al 99.8(A)	0,15	0,15	0,03	0,02	0,02	...	...	0,06	0,03	...	...	0,02	0,02	...	99,80
1070A	Al 99,7	0,20	0,25	0,03	0,03	0,03	...	...	0,07	...	...	...	0,03	0,03	...	99,70
1050A	Al 99,5	0,25	0,40	0,05	0,05	0,05	...	...	0,07	...	...	...	0,05	0,03	...	99,50
1350	EAl 99,5	0,10	0,40	0,05	0,01	...	0,01	...	0,05	0,03	...	0,05 B; 0,02 V+Ti	...	0,03	0,10	99,50
1200	Al 99,0	1,00 Si+Fe		0,05	0,05	...	...	...	0,10	...	...	...	0,05	0,05	0,15	99,00
1100	Al 99,0Cu	0,95 Si+Fe		0,05-0,20	0,05	...	...	...	0,10	...	...	...	...	0,05	0,15	99,00

Aluminium alloys. Series 2000. Al Cu

Alloy designation		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ga	V	Notes	Ti	Others		Aluminium min.
Numerical EN AW	Symbolic EN AW													Each	Total	
2007	Al Cu4PbMgMn	0,8	0,8	3,3-4,6	0,50-1,0	0,40-1,8	0,10	0,20	0,8	...	...	...	0,20	0,10	0,30	Rest
2011	Al Cu6BiPb	0,40	0,7	5,0-6,0	...	...	...	...	0,30	...	...	...	...	0,05	0,15	Rest
2014	Al Cu4SiMg	0,50-1,2	0,7	3,9-5,0	0,40-1,2	0,20-0,8	0,10	...	0,25	...	...	...	0,15	0,05	0,15	Rest
2017A	Al Cu4MgSi(A)	0,20-0,8	0,7	3,5-4,5	0,40-1,0	0,40-1,0	0,10	...	0,25	...	...	0,25 Zr+Ti	...	0,05	0,15	Rest
2117	Al Cu2,5Mg	0,8	0,7	2,2-3,0	0,20	0,20-0,50	0,10	...	0,25	...	...	...	...	0,05	0,15	Rest
2618A	Al Cu2Mg1,5Ni	0,15-0,25	0,9-1,4	1,8-2,7	0,25	1,2-1,8	...	0,8-1,4	0,15	...	...	0,25 Zr+Ti	0,20	0,05	0,15	Rest
2219	Al Cu6Mn	0,20	0,30	5,8-6,8	0,20-0,40	0,02	...	...	0,10	...	0,05-0,15	0,10-0,25 Zr	0,02-0,10	0,05	0,15	Rest
2024	Al Cu4Mg1	0,50	0,50	3,8-4,9	0,30-0,9	1,2-1,8	0,10	...	0,25	...	...	...	0,15	0,05	0,15	Rest
2030	Al Cu4PbMg	0,8	0,7	3,3-4,5	0,20-1,0	0,50-1,3	0,10	...	0,50	...	...	0,20 Bi; 0,8-1,5 Pb	0,20	0,10	0,30	Rest



ALUMINIUMS General Tables Chemical Composition

CHEMICAL COMPOSITION OF THE ALUMINIUM ALLOYS MOST USED FOR FORGING

Aluminium alloys. Series 3000. Al Mn

Alloy designation		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ga	V	Notes	Ti	Others		Aluminium min.
Numerical EN AW	Symbolic EN AW													Each	Total	
3003	Al Mn1Cu	0,6	0,7	0,05-0,20	1,0-1,5	...	...	...	0,10	...	...	...	...	0,05	0,15	Rest
3103	Al Mn1	0,50	0,7	0,10	0,9-1,5	0,30	0,10	...	0,20	...	...	0,10 Zr+Ti	...	0,05	0,15	Rest
3004	Al Mn1Mg1	0,30	0,7	0,25	1,0-1,5	0,8-1,3	...	...	0,25	...	...	...	...	0,05	0,15	Rest
3005	Al Mn1Mg0,5	0,6	0,7	0,30	1,0-1,5	0,20-0,6	0,10	...	0,25	...	...	...	0,10	0,05	0,15	Rest
3105	Al Mn0,5Mg0,5	0,6	0,7	0,30	0,30-0,8	0,20-0,8	0,20	...	0,40	...	...	...	0,10	0,05	0,15	Rest

Aluminium alloys. Series 5000. Al Mg

Alloy designation		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ga	V	Notes	Ti	Others		Aluminium min.
Numerical EN AW	Symbolic EN AW													Each	Total	
5005	Al Mg1(B)	0,30	0,7	0,20	0,20	0,50-1,1	0,10	...	0,25	...	...	...	...	0,05	0,15	Rest
5050	Al Mg1,5(C)	0,40	0,7	0,20	0,10	1,1-1,8	0,10	...	0,25	...	...	...	...	0,05	0,15	Rest
5251	Al Mg2	0,40	0,50	0,15	0,10-0,50	1,7-2,4	0,15	...	0,15	...	...	...	0,15	0,05	0,15	Rest
5052	Al Mg2,5	0,25	0,40	0,10	0,10	2,2-2,8	0,15-0,35	...	0,10	...	...	...	...	0,05	0,15	Rest
5154A	Al Mg3,5(A)	0,50	0,50	0,10	0,50	3,1-3,9	0,25	...	0,20	...	...	0,10-0,50Mn+Cr	0,20	0,05	0,15	Rest
5454	Al Mg3Mn	0,25	0,40	0,10	0,50-1,0	2,4-3,0	0,05-0,20	...	0,25	...	...	...	0,20	0,05	0,15	Rest
5754	Al Mg3	0,40	0,40	0,10	0,50	2,6-3,6	0,30	...	0,20	...	...	0,10-0,6 Mn+Cr	0,15	0,05	0,15	Rest
5056A	Al Mg5	Véase nueva designación EN AW-5019 [Al Mg5]														
5058	Al Mg5Pb1,5	0,40	0,50	0,10	0,20	4,5-5,6	0,10	...	0,20	...	...	1,2-1,8 Pb	0,20	0,05	0,15	Rest
5083	Al Mg4,5Mn0,7	0,40	0,40	0,10	0,40-1,0	4,0-4,9	0,05-0,25	...	0,25	...	...	...	0,15	0,05	0,15	Rest
5086	Al Mg4	0,40	0,50	0,10	0,20-0,7	3,5-4,5	0,05-0,25	...	0,25	...	...	...	0,15	0,05	0,15	Rest

ALUMINIUMS General Tables Chemical Composition

CHEMICAL COMPOSITION OF THE ALUMINIUM ALLOYS MOST USED FOR FORGING

Aluminium alloys. Series 6000. Al Mg Si

Alloy designation		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ga	V	Notes	Ti	Others		Aluminium min.
Numerical EN AW	Symbolic EN AW													Each	Total	
6101	EAl MgSi	0,30-0,7	0,50	0,10	0,03	0,35-0,8	0,03	...	0,10	...	...	0,06 B	...	0,03	0,10	Rest
6101A	EAl MgSi(A)	0,30-0,7	0,40	0,05	...	0,40-0,9	...	...	...	...	...	...	...	0,03	0,10	Rest
6101B	EAl MgSi(B)	0,30-0,6	0,10-0,30	0,05	0,05	0,35-0,6	...	...	0,10	...	...	...	...	0,03	0,10	Rest
6201	EAl Mg0,7Si	0,50-0,9	0,50	0,10	0,03	0,6-0,9	0,03	...	0,10	...	...	0,06 B	...	0,03	0,10	Rest
6401	Al 99,9MgSi	0,35-0,7	0,04	0,05-0,20	0,03	0,35-0,7	...	...	0,04	...	...	...	0,01	0,01	...	Rest
6003	Al Mg1Si0,8	0,35-1,0	0,6	0,10	0,8	0,8-1,5	0,35	...	0,20	...	...	...	0,10	0,05	0,15	Rest
6005	Al SiMg	0,6-0,9	0,35	0,10	0,10	0,40-0,6	0,10	...	0,10	...	...	...	0,10	0,05	0,15	Rest
6005A	Al SiMg(A)	0,50-0,9	0,35	0,30	0,50	0,40-0,7	0,30	...	0,20	...	...	0,12-0,50 Mn+Cr	0,10	0,05	0,15	Rest
6005B	Al SiMg(B)	0,45-0,8	0,30	0,10	0,10	0,40-0,8	0,10	...	0,10	...	...	...	0,10	0,05	0,15	Rest
6106	Al MgSiMn	0,30-0,6	0,35	0,25	0,05-0,20	0,40-0,8	0,20	...	0,10	...	...	...	...	0,05	0,10	Rest
6011	Al Mg0,9Si0,9Cu	0,6-1,2	1,0	0,40-0,9	0,8	0,6-1,2	0,30	0,20	1,5	...	...	...	0,20	0,05	0,15	Rest
6012	Al MgSiPb	0,6-1,4	0,50	0,10	0,40-1,0	0,6-1,2	0,30	...	0,30	...	...	0,7 Bi; 0,40-2,0Pb	0,20	0,05	0,15	Rest
6013	Al Mg1Si0,8CuMn	0,6-1,0	0,50	0,6-1,1	0,20-0,8	0,8-1,2	0,10	...	0,25	...	...	...	0,10	0,05	0,15	Rest
6015	Al Mg1Si0,3Cu	0,20-0,40	0,10-0,30	0,10-0,25	0,10	0,8-1,1	0,10	...	0,10	...	...	...	0,10	0,05	0,15	Rest
6018	Al Mg1SiPbMn	0,50-1,2	0,7	0,15-0,40	0,30-0,8	0,6-1,2	0,10	...	0,30	...	...	...	0,20	0,05	0,15	Rest
6351	Al Si1Mg0,5Mn	0,7-1,3	0,50	0,10	0,40-0,8	0,40-0,8	...	...	0,20	...	...	...	0,20	0,05	0,15	Rest
6351A	Al Si1Mg0,5Mn(A)	0,7-1,3	0,50	0,10	0,40-0,8	0,40-0,8	...	...	0,20	...	...	...	0,20	0,05	0,15	Rest
6951	Al MgSi0,3Cu	0,20-0,50	0,8	0,15-0,40	0,10	0,40-0,8	...	...	0,20	...	...	...	...	0,05	0,15	Rest
6056	Al Si1MgCuMn	0,7-1,3	0,50	0,50-1,1	0,40-1,0	0,6-1,2	0,25	...	0,10-0,7	...	...	...	...	0,05	0,15	Rest

(continues)



ALUMINIUMS General Tables Chemical Composition

Aluminium alloys. Series 6000. Al Mg Si

Alloy designation		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ga	V	Notes	Ti	Others		Aluminium min.
Numerical EN AW	Symbolic EN AW													Each	Total	
6060	Al MgSi	0,30-0,6	0,10-0,30	0,10	0,10	0,35-0,6	0,05	...	0,15	...	...	...	0,10	0,05	0,15	Rest
6061	Al Mg1SiCu	0,40-0,8	0,7	0,15-0,40	0,15	0,8-1,2	0,04-0,35	...	0,25	...	...	...	0,15	0,05	0,15	Rest
6061A	Al Mg1SiCu(A)	0,40-0,8	0,7	0,15-0,40	0,15	0,8-1,2	0,04-0,35	...	0,25	...	...	...	0,15	0,05	0,15	Rest
6261	Al Mg1SiCuMn	0,40-0,7	0,40	0,15-0,40	0,20-0,35	0,7-1,0	0,10	...	0,20	...	...	...	0,10	0,05	0,15	Rest
6262	Al Mg1SiPb	0,40-0,8	0,7	0,15-0,40	0,15	0,8-1,2	0,04-0,14	...	0,25	...	...	...	0,15	0,05	0,15	Rest
6083	Al Mg0,7Si	0,20-0,6	0,35	0,10	0,10	0,45-0,9	0,10	...	0,10	...	...	...	0,10	0,05	0,15	Rest
6063A	Al Mg0,7Si(A)	0,30-0,6	0,15-0,35	0,10	0,15	0,6-0,9	0,05	...	0,15	...	...	...	0,10	0,05	0,15	Rest
6463	Al Mg0,7Si(B)	0,20-0,6	0,15	0,20	0,05	0,45-0,9	...	...	0,05	...	...	...	...	0,05	0,15	Rest
6081	Al Si0,9MgMn	0,7-1,1	0,50	0,10	0,10-0,45	0,6-1,0	0,10	...	0,20	...	...	...	0,15	0,05	0,15	Rest
6181	Al Si1Mg0,8	0,8-1,2	0,45	0,10	0,15	0,6-1,0	0,10	...	0,20	...	...	...	0,10	0,05	0,15	Rest
6082	Al Si1MgMn	0,7-1,3	0,50	0,10	0,40-1,0	0,6-1,2	0,25	...	0,20	...	...	...	0,10	0,05	0,15	Rest
6082A	Al Si1MgMn(A)	0,7-1,3	0,50	0,10	0,40-1,0	0,6-1,2	0,25	...	0,20	...	...	...	0,10	0,05	0,15	Rest

Aluminium alloys. Series 7000. Al Zn

Alloy designation		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ga	V	Notes	Ti	Others		Aluminium min.
Numerical EN AW	Symbolic EN AW													Each	Total	
7010	Al Zn6MgCu	0,12	0,15	1,5-2,0	0,10	2,1-2,6	0,05	0,05	5,7-6,7	...	...	0,10-0,16 Zr	0,06	0,05	0,15	Rest
7015	Al Zn5Mg1,5CuZr	0,20	0,30	0,06-0,15	0,10	1,3-2,1	0,15	...	4,6-5,2	...	...	0,10-0,20 Zr	0,10	0,05	0,15	Rest
7020	Al Zn4,5Mg1	0,35	0,40	0,20	0,05-0,50	1,0-1,4	0,10-0,35	...	4,0-5,0	...	...	...	...	0,05	0,15	Rest
7022	Al Zn5Mg3Cu	0,50	0,50	0,50-1,0	0,10-0,40	2,6-3,7	0,10-0,30	...	4,3-5,2	...	...	0,20 Ti+Zr	...	0,05	0,15	Rest
7049A	Al Zn8MgCu	0,40	0,50	1,2-1,9	0,50	2,1-3,1	0,05-0,25	...	7,2-8,4	...	...	0,25 Zr+Ti	...	0,05	0,15	Rest
7050	Al Zn6CuMgZr	0,12	0,15	2,0-2,6	0,10	1,9-2,6	0,04	...	5,7-6,7	...	...	0,08-0,15 Zr	0,06	0,05	0,15	Rest
7075	Al Zn5,5MgCu	0,40	0,50	1,2-2,0	0,30	2,1-2,9	0,18-0,28	...	5,1-6,1	...	...	...	0,20	0,05	0,15	Rest



ALUMINIUMS General Tables Equivalences

EQUIVALENCES OF THE ALUMINIUM ALLOYS MOST USED FOR FORGING

European Standard EN 573-1-2		USA	Japan JIS	Spain UNE	France AFNOR	Germany DIN	G.B. B.S.	Sweden SIS	Switzerland V.S.M.	Canada C.S.A.	Italy U.N.I.	
Numerical EN AW	Symbolic										Old	New

Pure aluminium

1050A	Al 99,5	1050A	A1050	L-3051 38.114	A 5	Al99,5 3.0255	1B	4007	Al 99,5	995(2S)	4507	9001/2
1070A	Al 99,7	1070A	A1070	L-3071 38.117	A 7	Al99,7 3.0275	2L 48	4005	Al 99,7	9970	4508	9001/3
1080A	Al 99,8	1080A	A1080	L-3081 38.118	A 8	Al99,8 3.0285	1A	4004	Al 99,8	9980	4509	9001/4
1100	Al99,0Cu	1100	A1100	L-3002 38.119	A 45							
1200	Al 99	1200	A1200	L-3001 38.115	A 4	Al99 3.0205	1C	4010	Al 99	990 (2S)	3567	9001/1
1250	Al 99,5E	1250		L-3052 38.116	A 5/L	EAl 3.0257						
1350												

Aluminium Copper

2007	AlCuMgPb	2007		L-3121 38.139		AlCuMgPb 3.1645		4355				
2011	AlCu6BiPb	2011	A2011	L-3192 38.322	A- U5PbBi	AlCuBiPb 3.1655	FC 1	4338	AlCu6BiPb	CB60(28S)	6362	9002/5
2014	AlCu4SiMg	2014	A2014	L-3130 38.313	A-U4SG	AlCuSiMn 3.1255	H15		AlCu4SiMn	CS4IN	3581	9002/3
2017A	AlCu4MgSi(A)	2017A	A2017	L-3120 38.312	A-U4G	AlCuMg1 3.1325	H14	GA 631		CM41(17S)	5379	9002/2
2024	AlCu4Mg1	2024	A2024	L-3140 38.314	A-U4G1	AlCuMg2 3.1355	L97/L98	5	AlCu4Mg1.5	CG42(24S)	3583	9002/4
2030	AlCu4MgPb	2030		L-3121 38.319	A-U4Pb	AlCuMgPb 3.1645	7L25	4335	decotal-200			
2117	AlCu2.5Mg	2117	A2117	L-3180 38.318	A-U2G	AlCuMg0,5 3.1305 AlCu2,5Mg0,5	L86			CG30	3577	9002/1
2219	AlCu6Mn	2219		L-3191 38.321								
2618A	AlCu2MgNi	2618A		L-3171 38.320	A-U2GN	AlCu2MgNi/WL 3.1924	H16				3578	9002/6

Aluminium Manganese

3003	AlMn1Cu	3003	A3003	L-3810 38.381	A-M1	AlMnCu 3.0517				MC10	7788	9003/1
3004	AlMn1Mg1	3004		L-3820 38.382	A-M1G	AlMn1Mg1 3.0526		GA 6511		(D35)	6351	9003/2
3005	AlMn1Mg0,5	3005			A-MG0,5	AlMn1Mg0,5 3.0525						
3103	AlMn1Mg0,5	3103		L-3811 38.383		AlMn1 3.0515		4067	AlMn		3568	9003/3
3105	AlMn0,5Mg0,5	3105				AlMn0,5Mg0,5 3.0505	N31					



ALUMINIUMS General Tables Equivalences

EQUIVALENCES OF THE ALUMINIUM ALLOYS MOST USED FOR FORGING

(continuation)

European Standard EN 573-1-2		USA	Japan JIS	Spain UNE	France AFNOR	Germany DIN	G.B. B.S.	Sweden SIS	Switzerland V.S.M.	Canada C.S.A.	Italy U.N.I.	
Numerical EN AW	Symbolic										Old	New

Magnesium-aluminium

5005	AlMg1(B)	5005	A5005	L-3350 38.335	A-G0,6	AlMg1 3.3315	N41	4106	AlMg1	B57S	5764	9005/1
5050	AlMg1,5	5050		L-3380 38.338	A-G1,5	AlMg1,5 3.3316	3L 44		AlMg1,5	A57S	3573	9005/7
5052	AlMg2,5	5052	A5252	L-3360 38.336	A-G2,5C	AlMg2,5 3.3523	L80/L81	4120	AlMg2,5	GR20(57 S)	3574	9005/2
5056 A	AlMg5	5056A	A5056	L-3320 38.332	A-G5	AlMg5 3.3555	N6/2L58	4146	AlMg5	GM50R(56S)	3576	
5083	AlMg4,5Mn0,7	5083	A5083	L-3321 38.340	A- G4,5MC	AlMg4,5Mn 3.3547	N8	4140	AlMg4,5Mn	GM4I(D5 4S)	7790	9005/5
5086	AlMg4	5086		L-3322 38.341	A-G4MC	AlMg4,Mn 3.3545			AlMg4Mn	GM40	5452	9005/4
5154A	AlMg3,5	5154 A	A5154	L-3392 38.421	A-G3C		N5					
5251	AlMg2	5251		L-3361 38.347	A-G2M	AlMg2Mn0,3 3.3525	N4					
5454	AlMg3Mn	5454		L-3391 38.345	A- G2,5MC	AlMg2,7Mn 3.3537		4130	AlMg3		7789	9005/3
5754	AlMg3	5754		L-3390 38.339	A-G3M	AlMg3 3.3535		4130	AlMg3			9005/3

Magnesium-Silicon aluminium

6005A	AlSiMg(A)	6005A		L-3454 38.349	A-SG0,5	AlMgSi0,7 3.3210			AlMgSi0,7			
6012	AlMgSiPb	6012		L-3452 38.334		AlMgSiPb 3.0615						
6060	AlMgSi0,5	6060		L-3442 38.350	AGS	AlMgSi0,5 3.3206	H9	4104	AlMgSi0,5		3589	9006/1
6063	AlMg0,7Si	6063	A6063	L-3441 38.337	AGS	AlMgSi0,5 3.3206	H9	4104	AlMgSi0,5			
6061	AlMg1SiCu	6061	A6061	L-3420 38.342	A-GSUC	AlMg1SiCu 3.3211	H20			GS11N	6170	9006/2
6063A												
6082	AlMgSi1MgMn	6082		L-3453 38.348	A- SGM0,7	AlMgSi1 3.2315	H30	4212	AlMgSi1Mn		3571	9006/4
6181	AlSi1Mg0,8	6181		L-3455 38.423	A-SG	AlMgSi0,8 3.2315						
6101	E-Al1MgSi	6101	A6101	L-3431 38.343		E- Al1MgSi0,5 3.2307	91E					
6262	AlMg1SiPb	6262										9006/7
6351	AlSi1Mg	6351		L-3451 38.334						SG11R		

Aluminium Zinc

7020	AlZn4,5MgI	7020		L-3741 38.374	A-Z5G	AlZn4,5Mg1 3.4335	H17	4425	AlZn4,5Mg1		7791	9007/1
7022	AlZnMgCu0,5	7022				AlZnMgCu0,5 3.4345						9007/5
7049A	AlZn8MgCu	7049 A			A-Z8GU							
7075	AlZn5,5MgCu	7075	A7075	L-3710 38.371	A-Z5GU	AlZnMgCu1,5 3.4365	2L95		AlZn6MgCu1 ,5	ZG62	3735	9007/2



ALUMINIUMS General Tables Mechanical characteristics

Mechanical characteristics of those alloys used most for forging

Alloy Standards EN AW	State	Breaking Load P.M N/Mm	Elastic Limit Rp0.2 N/Mm	Elongation A 5.65%	Fatigue limit N/Mm	Brinell Hardness HB	Vickers Hardness HV
1050	0	80	35	45	55	20	20
1050	H12	100	85	13		30	30
1050	H14	115	100	10	70	35	36
1050	H16	130	120	8		40	
1050	H18	150	140	6	100	43	44
1200	0	90	40	40	70	23	22
1200	H12	110	90	11		31	32
1200	H14	130	110	10	100 38		38
1200	H16	140	130	8		40	42
1200	H18	160	150	6	130	45	46
2011	T3	365	290	15	250	95	100
2011	T6	395	300	12	250	100	115
2011	T8	420	315	13	250	115	120
2014	0	190	85	20	180	55	60
2014	T4	425	280	18	280	110	120
2014	T6	485	430	12	290	140	150
2017	0	180	70	20	180	45	50
2017	T4	425	275	21	260	110	115
2024	T0	185	75	20	175	60	65
2024	T3	480	345	19	285	115	120
2024	T4	465	335	20	285	120	125
2030	T3	465	360	11	275	110	125
2030	T4	445	295	14	265	100	
3003	H14	165	150	10	130 45		46
3103	H14	155	140	9	130	45	50
5005	H14	165	145	12		50	50
5052	0/H111	195	90	25	210	50	50
5083	0/H111	295	150	22	250 70		75
5251	H22	210	165	15		65	65
5754	0/H111	220	105	25	225 60		55
5086	0/H111	275	130	24	240	65	65
6005A	T1	205	105	25			
6005A	T5	265	235	14			
6060	T5	225	190	14	160 80		80
6061	T4	230	135	22	180	65	70
6061	T6/T651	310	270	15	190 95		100
6063	T6	245	215	15	150	75	80
6063	T8	260	240			85	85
6082	T6/T651	340	310	12	210	95	95
7020	T6/T651	380	340	14	270	120	125
7075	T6/T651	570	510	11	300	150	160
7075	T7351	500	435	14	300	140	150



ALUMINIUMS General Tables Physical properties

Physical properties of those alloys used most for forging

Standard EN 573-1 Numerical Designation	Specific weight Kg/dm ³	Linear expansion °C ⁻¹ x 10 ⁻⁶ (20/100°C)	Specific heat J/(Kg x °C) (0/100°C)	Melting range °C	Modulus of elasticity N/mm ²	Thermal conductivity W/(m x °C) at 20 °C	Electrical conductivity % IACS	Electrical resistivity 10 ⁻³ μΩ x m at 20 °C
1050A	2,7	23,5	899	645/658	70.000	229	59,5	29,2
1350	2,7	23,6	900	646/657	70.000	234		27,9
1200	2,72	23,4	898	645/657	70.000	225	58,5	33,9
1100	2,71	23,6	904	643/657	70.000	222		29,2
2011	2,82	23,1	864	541/638	70.000	152	39	44
2011	2,82	23,1	864	541/638	70.000	152	39	44
2014	2,8	22,5	920	507/638	70.000	134	34	51
2017A	2,79	23,6	920	510/640	70.000	134	34	51
2618A	2,76	22,3	875	549/638	70.000	146		47
2024	2,77	21,1	875	502/638	70.000	121	30	56
2030	2,82	23,0	864	510/640	70.000	134	34	51
2030	2,82	23,0	864	510/640	70.000	134	34	51
3003	2,73	23,2	893	643/654	70.000	159	42	42
3103	2,73	23,1	892	640/655	70.000	160	42	41
3004	2,72	23,2	893	629/634	70.000	166		39
3005	2,73	23,2	897	632/653	70.000	166		39
3105	2,71	23,6	897	638/657	70.000	172		38
5005	2,7	23,7	900	632/652	70.000	201	52	33
5251	2,68	23,8	900	597/650		139	37,5	44
5052	2,68	23,8	900	605/650	70.000	138	35	50
5754	2,67	23,8	900	590/645	70.000	132	32,5	53
5083	2,66	24,2	900	574/638	70.000	117	28,5	59
5086	2,66	23,8	900	585/640	70.000	126	31	56
6005A	2,7	23,6	940	607/654	70.000	180		37
6005A	2,7	23,6	940	607/654	70.000	188		36
6060	2,7	23,4	945	615/655	70.000	200	54	33
6061	2,7	23,6	896	582/652	70.000	153	40	43
6061	2,7	23,6	896	582/652	70.000	167	43	40
6262	2,71	23,4		582/652	70.000	172		38
6063	2,69	23,4	900	615/655	70.000	201	52	32
6063	2,69	23,4	900	615/655	70.000	201	52	32
6082	2,71	23,5	960	570/645	70.000	174	44	42
7020	2,78	23,1	875	604/645	70.000	137	35	49
7049A	2,82	23,4	960	477/627	70.000	154		43
7075	2,8	23,4	960	477/635	70.000	130	33	52
7075	2,8	23,4	960	477/635	70.000	155		43



ALUMINIUMS General Tables Technical suitabilities

ALLOY EN AW	1050 A	1080 A	1200 A	2011	2014	2017 A	2024	2030	5005	5251	5754	5083	5086	6005 A	6061	6063	6082	6262	7020	7075
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EMBOSSING

Embossing in annealed condition	MB	MB	MB						B	R	R	R	R					B		
Forging in state F	MB	MB	MB	B	B	B	R	R	R	B	B	R	R	B	MB	R	MB	B	R	R

STAMPING

In annealed condition	MB	MB	MB						MB	MB	B	B	B					B		
In semi-hard condition	B	B	B						R	R	R	R	R					R		
In hard condition	M	-	M						M	M										

CHIP FRAGMENTATION

In H12-H32 states												R	R							
In H14-H34 states											R									
In H18-H38 states	R	M	R						R	R										
In T3 and/or T8 states				MB			B	MB												
In T4 state				MB		B		MB												
In T5 and/or T6 states					B									R	R	R	R	MB	B	B

NATURAL BEHAVIOUR

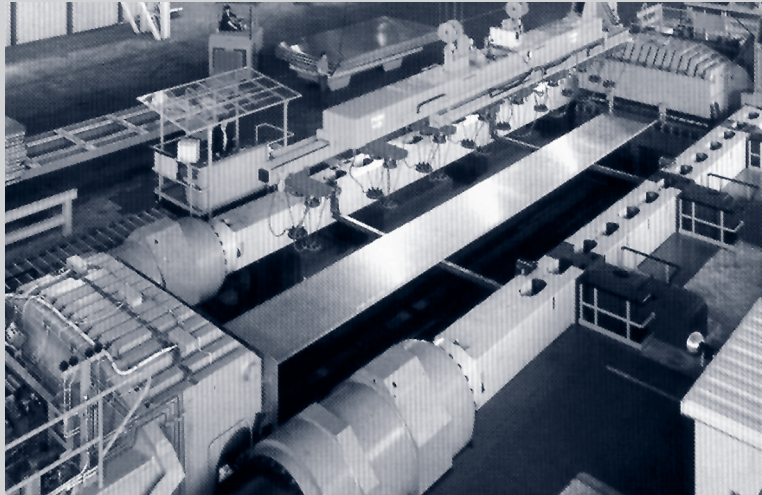
To atmospheric agents	MB	MB	MB	R	R	R	R	R	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	B	R
In marine environment	B	MB	B	M	M M M			M	B	MB	MB	MB	MB	MB	B	B	B	B	B	R	M

ANODIZED

For protection	MB	MB	MB	R	R	R	R	R	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	B	B
Decorative	B	MB	R	R	R	R	B	R	B	B	B	R	R R R			B	R R R			R	
Hard	MB	MB	MB	B/R	B	B	R	B/R	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB

WELDING

Under flame	MB	MB	MB		B	B	B		MB	MB	MB	MB	MB	MB	MB	MB	B	MB	B	B	B
To arc TIG - MIG	MB	MB	MB	M	M M M			M	MB	B	MB	MB	MB	B	B	B	B	B	B	B	M
Owing to resistance	MB	B	MB		MB	MB	MB		MB	B	MB	MB	MB	B	B	MB	MB	B	B	B	
Brazed	MB	MB	MB	M	B	B	B	M	MB	B	R	M	M	B	B	MB	B	B B		R	



ALUMINIUMS

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ALUMINIUMS Alloys Pure Aluminium 1050

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al	Others
Minimum										
Maximum	0,25	0,40	0,05	0,05	0,05		0,07	0,05	99,5	0,03

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 1050A	1,050A	38.114 L-3051	A 5 57350	A 99.5 3.0255	1 B	4507 9000-P-2	4007	Al 99.5	A 1050 A1x1

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-1050A [Al 99,5]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius ^{a)}		Hardness HBS ¹⁾
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
F	≥2,5	150,0	65								
O/H111	0,2	0,5	65	95	20		20		0 t	0 t	20
	0,5	1,5	65	95	20		22		0 t	0 t	20
	1,5	3,0	65	95	20		26		0 t	0 t	20
	3,0	6,0	65	95	20		29		0,5 t	0,5 t	20
	6,0	12,5	65	95	20		35		1,0 t	1,0 t	20
	12,5	50,0		95	20			32			20
H14	0,2	0,5	105	145	85		2		1,0 t	0 t	34
	0,5	1,5	105	145	85		3		1,0 t	0,5 t	34
	1,5	3,0	105	145	85		4		1,0 t	1,0 t	34
	3,0	6,0	105	145	85		5			1,5 t	34
	6,0	12,5	105	145	85		6			2,5 t	34
	12,5	25,0	105	145	85			6			34
H16	0,2	0,5	120	160	100		1			0,5 t	39
	0,5	1,5	120	160	100		2			1,0 t	39
	1,5	4,0	120	160	100		3			1,5 t	39
H18	0,2	0,5	140		120		1			1,0 t	42
	0,5	1,5	140		120		2			2,0 t	42
	1,5	3,0	140		120		2			3,0 t	42
H24	0,2	0,5	105	145	75		3		1,0 t	0 t	33
	0,5	1,5	105	145	75		4		1,0 t	0,5 t	33
	1,5	3,0	105	145	75		5		1,0 t	1,0 t	33
	3,0	6,0	105	145	75		8		1,5 t	1,5 t	33
	6,0	12,5	105	145	75		8			2,5 t	33
H26	0,2	0,5	120	160	90		2			0,5 t	38
	0,5	1,5	120	160	90		3			1,0 t	38
	1,5	4,0	120	160	90		4			1,5 t	38

a) Multiply the coefficient by the sheet thickness



ALUMINIUMS Alloys Pure Aluminium 1050

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-1050A [Al 99,5]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.
F ⁴⁾ , H112	all	all	60	–	20	–	25	23
O, H111	all	all	60	95	20	–	25	23

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	máx. mín.		máx.	min	min.
F ⁴⁾ , H112	all	60	–	20	–	25	23
O, H111	all	60	95 20		–	25	23

Extruded profile

Estado de tratamiento	Medidas mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	máx. mín.		máx.	min	min.
F ⁴⁾ , H112	all	60	–	20	–	25	23

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

4) Treatment state "F": the values of the characteristics are indicated merely for the sake of information.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
69.000	2,70	646-657	23,5	229	2,9	59,5	-0,84

Technological suitabilities

Welding	Natural behaviour	Anodized	Mechanization	State F	State H14
Under flame MB	In a rural environment MB	For protection MB	Chip fragmentation	M	M
At the arc under argon gas MB	In an industrial environment B	Decorative B	Surface gloss	R	R
Owing to electrical resistance MB	In a marine environment B	Hard anodized MB			
Brazed MB	In sea water B				

Stamping	State 0	State H-14	State H-18	Coating
Owing to expansion	MB	B	M	Lacquered MB
Deep stamping	MB	B	M	Galvanized B
				Electroless nickel B

Thermal treatments

Forging temperature interval: 350° - 500°C
 Total annealing: 340°C
 Partial annealing: 240°C

Products

Wire rods, extruded profiles, tubes, sheets, plates.

Observations and applications

Excellent corrosion-proofing and conformability. Good electrical and thermal conductivity. Typical applications: tanks and boilers, roofs and rooftops, chemical industry, food equipment and containers, deformable tubes for pharmaceutical containers, condenser blades, nuclear applications, rivets etc.



ALUMINIUMS Alloys Aluminium - Copper 2007

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Bi	Pb	Others	Al
Minimum			3,30	0,50	0,40	0,80				0,8		
Maximum	0,80	0,80	4,6	1,00	1,80	1,50	0,80	0,20	0,20	1,20		rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 2007	2007	38.139 L-31121		3.1645 AlCuMgPb		9007-P8	4335		

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-1050A [Al 99.5]

Extruded bar

Treatment state	Measurements mm		R _m Mpa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	mín.	máx.	mín.	máx.	mín	mín.	
T4, T4510, T4511 ⁵⁾	≤ 80	≤ 80	370	–	250	–	8	6	110
	80 < D ≤ 200	80 < D ≤ 200	340	–	220	–	8	–	110
	200 < D ≤ 250	200 < D ≤ 250	330	–	210	–	7	–	110

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

5) The characteristics can be obtained by means of cooling in a press.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
72.500	2,85	510-640	23	130	5,1	3,4	-0,87

Technological suitabilities

Welding	Natural behaviour	Anodized	Mechanization	State T-4
Under flame	M In a rural environment	R For protection	B Chip fragmentation	MB
At the arc under argon gas	M In an industrial environment	R Decorative	M Surface gloss	R
Owing to electrical resistance	B In a marine environment	M Hard anodized	R	
Brazed	M In sea water	M		

Thermal treatments

Forging temperature interval: 380° - 460°C.
Total annealing: 420°C with long-term cooling up to 250°C.
Partial annealing: 340°C.

Products

Bars, tubes, extruded profiles.

Observations and applications

As with alloy 2011 and 2030, it is characterised by high mechanical resistance and ease of machining, making them appropriate for turning works, threaded rods, bushings, washers etc. Owing to machinability, it must be used whenever you need to work at high speeds with high performance and an excellent chip detachment.



Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Bi	Pb	Others	Al
Minimum			5,00						0,20	0,20		
Maximum	0,40	0,70,	6,00				0,30		0,60	0,60		rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 2011	2011	38.322 L-3192	A-U5PbBi	AlCuBiPb 3.1655	FC1	6362 9002/5	4335	AlCu6PbBi	A 2011

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-1050A [Al 99.5]

Extruded bar

Treatment state	Measurements mm		R _m Mpa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	mín.	máx.	mín.	máx.	mín	mín.	
T4	≤ 200	≤ 60	275	–	20	–	14	12	90
T6 ⁵⁾	≤ 75	≤ 60	310	–	230	–	8	6	110
	75 < D ≤ 200	–	295	–	195	–	6	–	110

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

5) The characteristics can be obtained by means of cooling in a press.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
72.500	2,84	540-650	23	T3-152	T3-4,4	T3-39	

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State:	T3	T3 T4 T6 T8
Under flame	M	In a rural environment	R	For protection	B	Chip fragmentation		MB	MB
At the arc under argon gas	R	In an industrial environment	R	Decorative	M	Surface gloss		B	B
Owing to electrical resistance	R	In a marine environment	M	Hard anodized	R				
Brazed	M	In sea water	M						

Thermal treatments

Forging temperature interval: 400°-480°C.
 Total annealing: 420°C with long-term cooling up to 250°C.
 Annealing against acidity: 340°C

Products

Bars, profiles, tubes, flat bars.

Observations and applications

Well-machined alloy because of their corrosion, protection anodizing is recommended.
 This alloy is easy to machine and you can work at high speeds with all kinds of parts under turning such as rapid-connection fittings, sleeves, flanges, washers, screws, pulleys, pistons, cylinders, tyres, plugs, bushings, threaded rods etc.



Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Bi	Ti+Zr	Others	Al
Minimum	0,50		3,90	0,40	0,20							
Maximum	1,20	0,70	5,00	1,20	0,80	0,10	0,25	0,15		0,20	0,15	rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 2014	2014	38.313 L-3130	A-U4SG	ALCuSi Mn 31255	H15	3581 9002/3		AlCu4SiMn	A 2014

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-2014 [Al Cu4SiMg]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
O	≥0,4	1,5		220		140	12		0,5 t	0 t	55
	1,5	3,0		220		140	13		1,0 t	1,0 t	55
	3,0	6,0		220		140	16			1,5 t	55
	6,0	9,0		220		140	16			2,5 t	55
	9,0	12,5		220		140	16			4,0 t	55
	12,5	25,0		220				10			55
T3	≥0,4	1,5	395		245		14				111
	1,5	6,0	400		245		14				112
T4 T451	≥0,4	1,5	395		240		14		3,0 t	3,0 t	110
	1,5	6,0	395		240		14		5,0 t	5,0 t	110
	6,0	12,5	400		250		14			8,0 t	112
T451	12,5	40,0	400		250			10			112
	40,0	100,0	395		250			7			111
T42	≥0,4	6,0	395		230		14				110
	6,0	12,5	400		235		14				111
	12,5	25,0	400		235			12			111
T6 T651	≥0,4	1,5	440		390		6			5,0 t	133
	1,5	6,0	440		390		7			7,0 t	133
	6,0	12,5	450		395		7			10 t	135
T651	12,5	40,0	460		400			6			138
	40,0	60,0	450		390			5			135
	60,0	80,0	435		380			4			131
	80,0	100,0	420		360			4			126
	100,0	120,0	410		350			4			123
T62	≥0,4	12,5	440		390		7				133
	12,5	25,0	450		395			6			135



Mechanical properties

Standard: EN 755-2

Alloy: EN AW-2014 [Al Cu4SiMg]

Extruded bar

Treatment state	Measurements mm		R _m Mpa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	min.	máx.	min.	máx.	min	min.	
O, H111	≤ 200	≤ 200	–	250	–	135	12	10	55
	≤ 25	≤ 25	370	–	230	–	13	11	–
T4, T4510, T4511	25 < D ≤ 75	25 < S ≤ 75	410	–	270	–	12	–	110
	75 < D ≤ 150	75 < S ≤ 150	390	–	250	–	10	–	110
	150 < D ≤ 200	150 < S ≤ 200	350	–	230	–	8	–	110
T6, T6510, T6511	≤ 25	≤ 25	415	–	370	–	6	5	140
	25 < D ≤ 75	25 < S ≤ 75	460	–	415	–	7	–	140
	75 < D ≤ 150	75 < S ≤ 150	465	–	420	–	7	–	140
	150 < D ≤ 200	150 < S ≤ 200	430	–	350	–	6	–	140
	200 < D ≤ 250	200 < S ≤ 250	420	–	320	–	5	–	140

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity % IACS	Dissolution potential V
73.000	2,80	500-640	22,7	T4-134 T6-155	T4-5,1 T6-4,3	T4-34 T6-40	-0,78

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization : State T4 State T6		
Under flame	M	In a rural environment	R	For protection	R	Chip fragmentation	B	B
At the arc under argon gas	M	In an industrial environment	R	Decorative	M	Surface gloss	R	R
Owing to electrical resistance	MB	In a marine environment	R	Hard anodized	R			
Brazed	B	In sea water	M					

Thermal treatments

Products

Observations and applications

Forging temperature interval: 380°-460°C. Total annealing: 420°C with long-term cooling up to 250°C. Annealing against acidity: 340°C	Bars, extruded profiles, tubes, sheets, plates.	The high mechanical characteristics of this alloy, particularly in a T6 state makes it very suitable for the aeronautical industry, structural elements and construction in general, iron fittings, screws, bolts etc.
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ALUMINIUMS Alloys Aluminium - Copper 2017 A

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Bi	Ti+Zr	Others	Al
Minimum	0,20		3,50	0,40	0,40							
Maximum	0,80	0,70	4,50	1,00	1,00	0,10	0,25			0,25	0,15	rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 2017	2017 A	38.312 L-3120	A-U4G	AlCuMg1 31325	H14	3579 9002/2			A2017

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-2017A [Al Cu4MgSi(A)]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
O	≥0,4	1,5		225		145	12		0,5 t	0 t	55
	1,5	3,0		225		145	14		1,0 t	1,0 t	55
	3,0	6,0		225		145	13			1,5 t	55
	6,0	9,0		225		145	13			2,5 t	55
	9,0	12,5		225		145	13			4,0 t	55
	12,5	25,0		225		145		12			55
T4	≥0,4	1,5	390		245		14		3,0 t	3,0 t	110
T451	1,5	6,0	390		245		15		5,0 t	5,0 t	110
	6,0	12,5	390		260		13			8,0 t	111
T451	12,5	40,0	390		250			12			110
	40,0	100,0	385		240			10			108
	100,0	120,0	370		240			8			105
	120,0	150,0	350		240			4			101
T42	≥0,4	3,0	390		235		14				109
	3,0	12,5	390		235		15				109
	12,5	25,0	390		235			12			109

For new applications of this alloy, which entails certain properties like corrosion-proofing, toughness, fatigue resistance, you are strongly recommended to consult us with a view to making a more thorough selection of the material.

1) Solely for information.

2) Far lower bending radii can be obtained immediately after the tempering.



Mechanical properties

Standard: EN 755-2

Alloy: EN AW-2017A [Al Cu4MgSi(A)]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HBS
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
O, H111	≤ 200	≤ 200	–	250	–	135	12	10	55
T4, T4510, T4511 ⁵⁾	≤ 25	≤ 25	380	–	260	–	12	10	110
	25 < D ≤ 75	25 < S ≤ 75	400	–	270	–	10	–	110
	75 < D ≤ 150	75 < S ≤ 150	390	–	260	–	9	–	110
	150 < D ≤ 200	150 < S ≤ 200	370	–	240	–	8	–	105
	200 < D ≤ 250	200 < S ≤ 250	360	–	220	–	7	–	105

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
O, H111	≤ 20	–	250	–	135	12	10
T4, T4510, T4511 ⁵⁾	≤ 10	380	– 260	–	–	12	10
	10 < e ≤ 75	400	–	270	–	10	8

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
T4, T4510, T4511 ⁵⁾	≤ 30	380	–	260	–	10	8

- 1) D = Diameter of circular section bars.
 2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.
 3) e = Wall thickness.
 5) The characteristics can be obtained by means of cooling in a press.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
72.500	2,79	505-650	22,9	134	0-3,5 T4-5,1	T4-34	-0,69

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization		State:T4
Under flame	B	In a rural environment	R	For protection	R	Chip fragmentation		B
At the arc under argon gas	M	In an industrial environment	M	Decorative	R	Surface gloss		B
Owing to electrical resistance	MB	In a marine environment	M	Hard anodized	B			
Brazed	M	In sea water	M					

Thermal treatments

Forging temperature interval: 380° - 460°C. Total annealing: 420°C with long-term cooling up to 250°C. Partial annealing: 340°C.

Products

Bars, wire, extruded profiles, tubes, sheets and plates.

Observations and applications

Average mechanical resistance and easy machining, suitable for mechanical applications, structural elements, boiler-making, rail braking, aviation, iron fittings, screws, bolts, ultralight elements, blow moulds and footwear, tempered state rivets before maturation, machinery.



ALUMINIUMS Alloys Aluminium - Copper 2024

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Bi	Ti+Zr	Others	Al
Minimum			3,80	0,30	1,20							
Maximum	0,50	0,50	4,90	0,90	1,80	0,10	0,25	0,15		0,20	0,15	rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 2024	2024	38.314 L-3140	A-U4G1	ALCuMg2 31355		3583 9002/4		AlCu4Mg1.5	A 2024

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-2024 [Al Cu4Mg1]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
O	≥0,4	1,5		220		140	12		0,5 t	0 t	55
	1,5	3,0		220		140	13		2,0 t	1,0 t	55
	3,0	6,0		220		140	13		3,0 t	1,5 t	55
	6,0	9,0		220		140	13			2,5 t	55
	9,0	12,5		220		140	13			4,0 t	55
	12,5	25,0		220				11			55
T4	≥0,4	1,5	425		275		12		4,0 t		120
	1,5	6,0	425		275		14		5,0 t		120
T3 T351	≥0,4	1,5	435		290		12		4,0 t	4,0 t	123
	1,5	3,0	435		290		14		4,0 t	4,0 t	123
	3,0	6,0	440		290		14		5,0 t	5,0 t	124
	6,0	12,5	440		290		13			8,0 t	124
T351	12,5	40,0	430		290			11			122
	40,0	80,0	420		290			8			120
	80,0	100,0	400		285			7			115
	100,0	120,0	380		270			5			110
	120	150,0	360		250			5			104
	≥0,4	6,0	425		260		15				119
	6,0	12,5	425		260		12				119
	12,5	25,0	420		260			8			118
T8 T851	≥0,4	1,5	460		400		5				138
	1,5	6,0	460		400		6				138
	6,0	12,5	460		400		5				138
T851	12,5	25,0	455		400			4			137
	25,0	40,0	455		395			4			136



ALUMINIUMS Alloys Aluminium - Copper 2024

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-2024 [Al Cu4Mg1]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HBS
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
O, H111	≤ 200	≤ 200	–	250	–	150	12	10	55
T3, T3510, T3511	≤ 50	≤ 50	450	–	310	–	8	6	120
	50 < D ≤ 100	50 < S ≤ 100	440	–	300	–	8	–	120
	100 < D ≤ 200	100 < S ≤ 200	420	–	280	–	8	–	120
	200 < D ≤ 250	200 < S ≤ 250	400	–	270	–	8	–	120
T8, T8510, T8511	≤ 150	≤ 150	455	–	380	–	5	4	138

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
O, H111	≤ 30	–	250	–	150	12	10
T3, T3510, T3511	≤ 30	420	–	290	–	8	6
T8, T8510, T8511	≤ 30	455	–	380	–	5	4

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
O, H111	all	–	250	–	150	12	10
T3, T3510, T3511	≤ 15	395	–	290	–	8	6
	15 < e ≤ 50	420	–	290	–	8	–
T8, T8510, T8511	≤ 50	455	–	380	–	5	4

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
73.000	2,79	500-650	23,1	121-193	T0-3,4 T3/T4-5,7	T0-50 T3/T4-30	-0,69

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State T3	State T4
			R		R		B	B
Under flame	B	In a rural environment	R	For protection	R	Chip fragmentation	B	B
At the arc under argon gas	B	In an industrial environment	M	Decorative	M	Surface gloss	B	B
Owing to electrical resistance	MB	In a marine environment	M	Hard anodized	R			
Brazed	B	In sea water	M					

Thermal treatments

Forging temperature interval: 380°-460°C.
Total annealing: 420°C. Annealing against acidity: 340°C

Products

Bars, extruded profiles, tubes, wire, sheets, plates.

Observations and applications

High-resistance alloy. Mainly used in aeronautics, the military and arms' industry, structural elements requiring high level mechanical characteristics, iron fittings, screws, bolts, dies, moulds, tools etc.



ALUMINIUMS Alloys Aluminium - Copper 2030

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Bi	Pb	Others	Al
Minimum			3,30	0,20	0,50					0,8		
Maximum	0,80	0,70	4,50	1,00	1,30	0,10	0,50	0,20	0,20	1,50		rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 2030	2030	38.319 L-3121	A-U4Pb	3.1645 AlCuMgPb	7L25		4335	AlCu4MgPb	

Mechanical properties

Standard: UNE 38323 Alloy: EN AW-2030 [Al Cu4PbMg]

Spoke/Cold worked bar

Treatment state ⁵⁾	Measurements mm		R _m Mpa		R _{p0,2} Mpa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min.		
T3 ⁴⁾	≤30	≤30	370	–	240	–	7	5	
	30 < D ≤ 80	30 < S ≤ 80	340	– 220	–	–	6	–	115
T351 ⁴⁾	≤80	≤80	370	–	240	–	5	3	

Cold worked tube

Treatment state ⁵⁾	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min.	min.
T3 ⁴⁾	≤20	370	–	240	–	7	5
T3510, T3511 ⁴⁾	≤20	370	–	240	–	5	3

Extruded bar

Treatment state ⁵⁾	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min.	min.	
T4, T4510, T4511 ⁴⁾	≤ 80	≤ 80	370	–	250	–	8	6	115
	80 < D ≤ 200	80 < S ≤ 200	340	–	220	–	8	–	115
	200 < D ≤ 250	200 < S ≤ 250	330	–	210	–	7	–	115

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

4) The characteristics can be obtained by means of cooling in a press

5) Treatment state based on Standard UNE-EN 515



Mechanical properties

Standard: UNE 38323 Alloy: EN AW-2030 [Al Cu4PbMg]

Extruded tube

Treatment state ⁵⁾	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T4, T4510, T4511 ⁴⁾	≤ 25	370	–	250	–	8	6

Extruded profile

Treatment state ⁵⁾	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T4, T4510, T4511 ⁴⁾	≤ 30	370	–	280	–	8	6

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
72.500	2,82	510-650	23	134	5,1	3,4	-0,87

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State T4
Under flame	M	In a rural environment	R	For protection	R	Chip fragmentation	MB
At the arc under argon gas	M	In an industrial environment	R	Decorative	M	Surface gloss	R
Owing to electrical resistance	B	In a marine environment	M	Hard anodized	R		
Brazed	M	In sea water	M				

Thermal treatments

Forging temperature interval: 380° - 460°C.
 Total annealing: 420°C with long-term cooling up to 250°C.
 Partial annealing: 340°C.

Products

Bars, tubes, extruded profiles.

Observations and applications

As with alloy 2011, it is characterised by high mechanical resistance and ease of machining, making them appropriate for turning works. Owing to the high machinability, you are recommended to use it when working at high speeds with high performance and excellent chip detachment.



ALUMINIUMS Alloys Aluminium - Magnesium 5083

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others	
Minimum				0,40	4,00	0,05			Ti+Zr	
Maximum	0,40	0,40	0,10	1,00	4,90	0,25	0,25	0,15	0,20	0,15

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 5083	5083	38.340 L-3321	A-G4.5MC	ALMg4.5Mn 3.3547	N8	7790 9005/5	4140	ALMg4.5 Mn	A 5083

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-5083 [Al Mg4,5Mn0,7]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS ¹⁾
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
F ¹⁾	≥2,5	150,0	275								
O/H111	0,2	0,5	275	350	125		11		1,0 t	0,5 t	75
	0,5	1,5	275	350	125		12		1,0 t	1,0 t	75
	1,5	3,0	275	350	125		13		1,5 t	1,0 t	75
	3,0	6,0	275	350	125		15			1,5 t	75
	6,0	12,5	275	350	125		16			2,5 t	75
	12,5	50,0	275	350	125			15			75
	50,0	80,0	270	345	115			14			73
	80,0	120,0	265		110			12			70
H112	≥6,0	12,5	275		125		12				75
	12,5	40,0	275		125			10			75
	40,0	80,0	270		115			10			73
H116 ²⁾	≥1,5	3,0	305		215		8		3,0 t	2,0 t	89
	3,0	6,0	305		215		10			2,5 t	89
	6,0	12,5	305		215		12			4,0 t	89
	12,5	40,0	305		215			10			89
	40,0	80,0	285		200			10			83
H22/H32	0,2	0,5	305	380	215		5		2,0 t	0,5 t	89
	0,5	1,5	305	380	215		6		2,0 t	1,5 t	89
	1,5	3,0	305	380	215		7		3,0 t	2,0 t	89
	3,0	6,0	305	380	215		8			2,5 t	89
	6,0	12,5	305	380	215		10			3,5 t	89
	12,5	25,0	305	380	215			9			89

1) Solely for information.

2) The material provided in this state must be able to show no sign of exfoliation corrosion after being subjected to accelerated testing of susceptibility to exfoliation corrosion according to ASTM G66-86.



ALUMINIUMS Alloys Aluminium - Magnesium 5083

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-5083 [Al Mg4,5Mn0,7]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.
F ⁴⁾	< 200	200	270	–	110	–	12	10
	200 < D < 250	200 < S < 250	260	–	100	–	12	–
O, H111	≤ 200	≤ 200	270	–	110	–	12	10
H112	≤ 200	≤ 200	270	–	125	–	12	10

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
F ⁴⁾	All	270	–	110	–	12	10
O, H111	All	270	–	110	–	12	10
H112	All	270	–	125	–	12	10

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
F ⁴⁾	All	270	–	110	–	12	10
H112	All	270	–	125	–	12	10

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

4) Treatment state "F": the values of the characteristics are indicated merely for the sake of information.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
71.000	2,66	580-640	23,9	117	6,0	28,5	0,86

Technological suitabilities

Welding	Natural behaviour	Anodized	Mechanization	State: H-111 H-32	
Under flame	MB In a rural environment	MB For protection	Chip fragmentation	R	R
At the arc under argon gas	MB In an industrial environment	MB Decorative	Surface gloss	MB	MB
Owing to electrical resistance	MB In a marine environment	MB Hard anodized			
Brazed	M In sea water				

Thermal treatments

Forging temperature: 350°- 480°C.
Total annealing: from 30 minutes to 2 hours between 345°C – 380°C.
Partial annealing: 240°C.

Products

Bars, sheets, plates, tubes, profiles.

Observations and applications

Alloy with high resistance to corrosion and good weldability which is why it is used in shipbuilding, the automobile industry and all kinds of boiler-making. It is also used owing to its ease of machining for tools in the aeronautical sector, the construction of machinery for the textile industry, containers, packaging etc. Used to manufacture moulds for footwear, thermoforming, blowing and industry as a whole.



ALUMINIUMS Alloys Aluminium - Magnesium 5086

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
Minimum				0,20	3,5	0,05			
Maximum	0,40	0,50	0,10	0,7	4,5	0,25	0,25	0,15	0,15

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
En AW 5086	5086	38.341 L-3322	A-G4MC	3.3545 AlMg4Mn		5452 9005/4		AlMg4Mn	A5086

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-5086 [Al Mg4]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS ¹⁾
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
F ¹⁾	≥2,5	150,0	240								
O/H111	0,2	0,5	240	310	100		11		1,0 t	0,5 t	65
	0,5	1,5	240	310	100		12		1,0 t	1,0 t	65
	1,5	3,0	240	310	100		13		1,0 t	1,0 t	65
	3,0	6,0	240	310	100		15		1,5 t	1,5 t	65
	6,0	12,5	240	310	100		17			2,5 t	65
H112	≥6,0	12,5	250		125		8				69
	12,5	40,0	240		105			9			65
	40,0	80,0	240		100			12			65
H116 ²⁾	≥1,5	3,0	275		195		8		2,0 t	2,0 t	81
	3,0	6,0	275		195		9			2,5 t	81
	6,0	12,5	275		195		10			3,5 t	81
	12,5	50,0	275		195			9			81
H14	0,2	0,5	300	360	240		2				90
	0,5	1,5	300	360	240		3				90
	1,5	3,0	300	360	240		3				90
	3,0	6,0	300	360	240		3				90
	6,0	12,5	300	360	240		4				90
	12,5	25,0	300	360	240			3			90
H22/H32	0,2	0,5	275	335	185		5		2,0 t	0,5 t	80
	0,5	1,5	275	335	185		6		2,0 t	1,5 t	80
	1,5	3,0	275	335	185		7		2,0 t	2,0 t	80
	3,0	6,0	275	335	185		8			2,5 t	80
	6,0	12,5	275	335	185		10			3,5 t	80
	12,5	40,0	275	335	185			9			80

1) Solely for information.

2) The material provided in this state must be able to show no sign of exfoliation corrosion after being subjected to accelerated testing of susceptibility to exfoliation corrosion according to ASTM G66-86.



ALUMINIUMS Alloys Aluminium - Magnesium 5086

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-5086 [Al Mg4]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.
F ⁴⁾ H112	≤ 250	≤ 250	240	–	95	–	12	10
O, H111	≤ 200	≤ 200	240	320	95	–	18	15

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
F ⁴⁾ H112	All	240	–	95	–	12	10
O, H111	All	240	320	95	–	18	15

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
F ⁴⁾ H112	All	240	–	95	–	12	10

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

4) Treatment state "F": the values of the characteristics are indicated merely for the sake of information.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity % IACS	Dissolution potential V
71.000	2,67	580-640	23,8	126	5,6	31	-0,86

Technological suitabilities

Welding	Natural behaviour	Anodized	Mechanization	State F
Under flame MB	In a rural environment MB	For protection MB	Chip fragmentation	R
At the arc under argon gas MB	In an industrial environment MB	Decorative R	Surface gloss	B
Owing to electrical resistance MB	In a marine environment MB	Hard anodized MB		
Brazed M	In sea water MB			

Thermal treatments

Forging temperature interval: 350°-480°C.
Total annealing: 340°C.
Partial annealing: 240°C.

Products

Bars, tubes, sheets and plates.

Observations and applications

Endowed with similar characteristics to alloy 5083, it has similar uses.
Construction of naval boiler making, construction of industrial vehicles, truck chassis, dumpers, tubes for bicycles, hulls of boats, sailboats, silos etc.



ALUMINIUMS Alloys Aluminium - Magnesium 5754

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
Minimum					2,6				
Maximum	0,40	0,40	0,10 0,50		3,6	0,30	0,20 0,15 0,15		

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 5754	5754	38.339 L-3390	A-G3M	AL Mg 3 33535	(N51)	3059/9005-P3	4130	AL Mg 3	

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-5754 [Al Mg3]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
F	≥2,5	100,0	190								
O/H111	0,2	0,5	190	240	80		12		0,5 t	0 t	52
	0,5	1,5	190	240	80		14		0,5 t	0,5 t	52
	1,5	3,0	190	240	80		16		1,0 t	1,0 t	52
	3,0	6,0	190	240	80		18		1,0 t	1,0 t	52
	6,0	12,5	190	240	80		18			2,0 t	52
	12,5	100,0	190	240	80			17			52
H12	0,2	0,5	220	270	170		4				66
	0,5	1,5	220	270	170		5				66
	1,5	3,0	220	270	170		6				66
	3,0	6,0	220	270	170		7				66
	6,0	12,5	220	270	170		9				66
H14	0,2	0,5	240	280	190		3				72
	0,5	1,5	240	280	190		3				72
	1,5	3,0	240	280	190		4				72
	3,0	6,0	240	280	190		4				72
	6,0	12,5	240	280	190		5				72
H22/H32	0,2	0,5	220	270	130		7		1,5 t	0,5 t	63
	0,5	1,5	220	270	130		8		1,5 t	1,0 t	63
	1,5	3,0	220	270	130		10		2,0 t	1,5 t	63
	3,0	6,0	220	270	130		11			1,5 t	63
	6,0	12,5	220	270	130		10			2,5 t	63
H24/H34	0,2	0,5	240	280	160		6		2,5 t	1,0 t	70
	0,5	1,5	240	280	160		6		2,5 t	1,5 t	70
	1,5	3,0	240	280	160		7		2,5 t	2,0 t	70
	3,0	6,0	240	280	160		8			2,5 t	70
	6,0	12,5	240	280	160		10			3,0 t	70



ALUMINIUMS Alloys Aluminium - Magnesium 5754

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-5754 [Al Mg3]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.
F ⁴⁾ , H112	≤ 150	≤ 150	180	–	80	–	14	12
	150 < D ≤ 250	150 < S ≤ 250	180	–	70	–	13	–
O, H111	≤ 150	≤ 150	180	250	80	–	17	15

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
F ⁴⁾ , H112	≤ 25	180	–	80	–	14	12
O, H111	≤ 25	180	250	80	–	17	15

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min. max.		min	min.
F ⁴⁾ , H112	≤ 25	180	–	80	–	14	12

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

4) Treatment state "F": the values of the characteristics are indicated merely for the sake of information.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity % IACS	Dissolution potential V
70.500	2,68	590-640	23,8	133	5,2	32,5	-0,85

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State: 0	H24
Under flame	MB	In a rural environment	MB	For protection	MB	Chip fragmentation	R	R
At the arc under argon gas	MB	In an industrial environment	MB	Decorative	B	Surface gloss	MB	MB
Owing to electrical resistance	MB	In a marine environment	MB	Hard anodized	MB			
Brazed	R	In sea water	B					

Thermal treatments

Forging temperature interval: 350° - 500°C.
Total annealing: 340°C.
Partial annealing: 240°C.

Products

Bars, wires, extruded profiles, tubes, sheets, strips and plates.

Observations and applications

Alloy endowed with high mechanical resistance, very easy to weld using conventional methods with an excellent capacity to receive protection anodizing treatments and hard. Its corrosion-proofing is good, comparable to that of pure aluminium as a whole and even better in a marine environment which is why it is highly suited to; shipbuilding as well as fridges, fish trays, proton floats etc. It is also used in boiler-making, recipients for petrol, chemical industry, tanks for transport, the automobile industry, railway and underground wagons, buses etc.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6005 A

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Mn+Cr	Others
Minimum	0,50				0,40				0,12	
Maximum	0,90	0,35	0,30	0,50	0,70	0,30	0,20	0,10	0,50	0,15

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 6005 A	6005 ^a	38.349 L-3454	A-SG0.5	AlMgSi0.7 3.3210		9006/6-P6		AlMgSi0.7	

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6005 [Al SiMg]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
T6 ⁵⁾	≤ 25	≤ 25	270	–	225	–	10	8	90
	25 < D ≤ 50	25 < S ≤ 50	270	–	225	–	8	–	90
	50 < D ≤ 100	50 < S ≤ 100	260	–	215	–	8	–	90

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.	max.		min	min.
T6 ⁵⁾	≤ 5	270	–	225	–	8	6
	5 < e ≤ 10	260	– 215	–	–	8	6

Extruded profile ¹⁰⁾

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
Perfil abierto T4 ⁵⁾	≤ 25	180	–	90	–	15	13
T6 ⁵⁾	≤ 5	270	–	225	–	8	6
	5 < e ≤ 10	260	–	215	–	8	6
	10 < e ≤ 25	250	–	200	–	8	6
Perfil hueco T4 ⁵⁾	≤ 10	180	–	90	–	15	13
T6 ⁵⁾	≤ 5	255	–	215	–	8	6
	5 < e ≤ 15	250	–	200	–	8	6

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

5) The characteristics can be obtained by means of cooling in a press

10) In the case that the cross section is composed of elements of different thickness, with different mechanical characteristics values, the lowest values should be considered valid for the entire section.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6005 A

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
69.500	2,71	600-650	23,5	192	3,4	49,5	-0,83

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization		State: T5	T6
Under flame	MB	In a rural environment	MB	For protection	MB	Chip fragmentation	R	R	
At the arc under argon gas	B	In an industrial environment	B	Decorative	B	Surface gloss	MB	MB	
Owing to electrical resistance	MB	In a marine environment	B	Hard anodized	MB				
Brazed	MB	In sea water	R						

Thermal treatments

Forging temperature interval: 350°-500°C.
 Total annealing: 420°C with long-term cooling up to 250°C.
 Annealing against acidity: 340°C

Products

Bars, wire, extruded profiles, tubes.

Observations and applications

This alloy is very easy to extrude. With the T5 state, a better surface finish and enhanced straightness. It is used for bus and railway wagon structures, electricity poles, platforms, piping, shipbuilding, the automobile industry etc.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6012

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Bi	Al
Minimum	0,60			0,40	0,60				0,40		
Maximum	1,40	0,50	0,10	1,00	1,20	0,30	0,30	0,20	2,00	0,70	rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 6012	6012	38.344 L-3452	A-SGPbBi	AlMgSiPb 3.0615					

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6012 [Al MgSiPb]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
T6, T6510, T6511 ⁵⁾	≤ 150	≤ 150	310	–	260	–	8	6	80
	150 < D ≤ 200	150 < S ≤ 200	260	–	200	–	8	–	80

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
T6, T6510, T6511 ⁵⁾	≤ 30	310	–	260	–	8	6

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T6, T6510, T6511 ⁵⁾	≤ 30	310	–	260	–	8	6

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

5) The characteristics can be obtained by means of cooling in a press



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6012

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
69.000	2,75	580-650	23,5	167 (T6)	4,2 (T6)		

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State: T6	T8
Under flame	B	In a rural environment	B	For protection	MB	Chip fragmentation	MB	MB
At the arc under argon gas	B	In an industrial environment	B	Decorative	B	Surface gloss	B	B
Owing to electrical resistance	MB	In a marine environment	B	Hard anodized	MB			
Brazed	B	In sea water	R					

Thermal treatments

Forging temperature interval: 340°-480°C.
 Total annealing: 420°C with long-term cooling up to 250°C.
 Annealing against acidity: 340°C

Products

Bars, extruded profiles, tubes.

Observations and applications

This alloy is typically used for manufacturing parts which require easy machining and are highly suitable for anodization.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6060

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
Minimum	0,30	0,10			0,35				
Maximum	0,60	0,30	0,10	0,10	0,60	0,05	0,15	0,20	0,15

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 6060	6060		A-GS	AlMgSi0.5 3.3206		9006-P1	4103	AlMgSi0.5	

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6060 [Al MgSi]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
T4	≤ 150	≤ 150	120	–	60	–	16	14	50
T5	≤ 150	≤ 150	160	–	120	–	8	6	75
T6	≤ 150	≤ 150	190	–	150	–	8	6	85
T64	≤ 50	≤ 50	180	–	120	–	12	10	
T66	≤ 150	≤ 150	215	–	160	–	8	6	

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T4	≤ 15	120	–	60	–	16	14
T5	≤ 15	160	– 120		–	8	6
T6	≤ 15	190	–	150	–	8	6
T64	≤ 15	180	– 120		–	12	10
T66	≤ 15	215	–	160	–	8	6

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T4	≤ 25	120	–	60	–	16	14
T5	≤ 5	160	–	120	–	8	6
	5 < e ≤ 25	140	–	100	–	8	6
T6	≤ 3	190	–	150	–	8	6
	3 < e ≤ 25	170	–	140	–	8	6
T64	≤ 15	180	–	120	–	12	10
T66	≤ 3	215	–	160	–	8	6
	3 < e ≤ 25	195	–	150	–	8	6

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6060

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
69.500	2,70	615-655	23,4	T5-209	T5-3,2	T5-54	-0,80

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State: T5	T6
Under flame	B	In a rural environment	MB	For protection	MB	Chip fragmentation	R	R
At the arc under argon gas	B	In an industrial environment	MB	Decorative	MB	Surface gloss	MB	MB
Owing to electrical resistance	MB	In a marine environment	B	Hard anodized	MB			
Brazed	MB	In sea water	B					

Thermal treatments

Forging temperature interval: 400°-480°C.
 Total annealing: 420°C with long-term cooling up to 250°C.
 Annealing against acidity: 340°C

Products

Bars, wires, extruded profiles, tubes.

Observations and applications

The most notable characteristic of this alloy is its ease of extrusion. This means it is used a lot in profiling: doors, windows, curtain walls, furniture, structures, stairs, rungs, guard rails, fences, lattices, barriers, railings, heat dissipators, engine bodyworks, irrigation, heating and refrigeration tubes, special elements for machines etc.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6061

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others	
Minimum	0,40		0,15		0,80	0,04			Others	Total
Maximum	0,80	0,70	0,40	0,15	1,20	0,35	0,25	0,15	0,05	0,15

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 6061	6061	38.342 L-3420	A-SGUC	ALMgSi1Cu 33206	H20	6170 9006-P2			

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-6061 [Al Mg1SiCu]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
O	≥0,4	1,5		150		85	14		1,0 t	0,5 t	40
	1,5	3,0		150		85	16		1,0 t	1,0 t	40
	3,0	6,0		150		85	19			1,0 t	40
	6,0	12,5		150		85	16			2,0 t	40
	12,5	25,0		150				16			40
T4, T451	≥0,4	1,5	205		110		12		1,5 t	1,0 t	58
	1,5	3,0	205		110		14		2,0 t	1,5 t	58
	3,0	6,0	205		110		16			3,0 t	58
	6,0	12,5	205		110		18			4,0 t	58
T451	12,5	40,0	205		110			15			58
	40,0	80,0	205		110			14			58
T42	≥0,4	1,5	205		95		12			1,0 t	57
	1,5	3,0	205		95		14			1,5 t	57
	3,0	6,0	205		95		16			3,0 t	57
	6,0	12,5	205		95		18			4,0 t	57
	12,5	40,0	205		95			15			57
	40,0	80,0	205		95			14			57
T6, T651, T62	≥0,4	1,5	290		240		6			2,5 t	88
	1,5	3,0	290		240		7			3,5 t	88
	3,0	6,0	290		240		10			4,0 t	88
	6,0	12,5	290		240		9			5,0 t	88
T651, T62	12,5	40,0	290		240			8			88
	40,0	80,0	290		240			6			88
	80,0	100,0	290		240			5			88
	100,0	150,0	275		240			5			84
	150,0	175,0	265		230			4			81



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6061

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6061 [Al Mg1SiCu]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HBS
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
O, H111	≤ 200	≤ 200	–	150	–	110	16	14	40
T4	≤ 200	≤ 200	180	–	110	–	15	13	60
T6	≤ 200	≤ 200	260	–	240	–	8	6	90

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
O, H111	≤ 25	–	150	–	110	16	14
T4	≤ 25	180	– 110	–	–	15	13
T6	≤ 5	260	–	240	–	8	6
	5 < e ≤ 25	260	– 240	–	–	10	8

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
T4	≤ 25	180	–	110	–	15	13
T6	≤ 5	260	– 240	–	–	9	7
	5 < e ≤ 25	260	–	240	–	10	8

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
70.000	2,70	580-650	23,3	T4-155 T6-166	T4-4,3 T6-4,0	T4-40 T6-43	-0,83

Technological suitabilities

Welding	Natural behaviour	Anodized	Mechanization	State: 0	T6
Under flame MB	In a rural environment MB	For protection MB	Chip fragmentation	M	R
At the arc under argon gas B	In an industrial environment MB	Decorative R	Surface gloss	R	MB
Owing to electrical resistance B	In a marine environment B	Hard anodized MB			
Brazed B	In sea water R				

Thermal treatments

Forging temperature interval: 350°-500°C.
Total annealing: 420°C with long-term cooling up to 250°C. Annealing against acidity: 340°C

Products

Bars, wires, extruded profiles, tubes, sheets, plates.

Observations and applications

Alloy endowed with similar characteristics and uses to 6082.

Good mechanical characteristics in T6 state. Good corrosion-proofing and suitability for anodization both hard and protection as well as good arc welding. Typical applications are: structural elements as a whole, shipbuilding and aerospace industry, railway constructions, moulds and machined parts etc.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6063 C

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
Minimum	0,30	0,10			0,40				
Maximum	0,60	0,30	0,10	0,30	0,60	0,05	0,15	0,20	0,15

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 6063	6063	38.337 L-3441	A-GS	ALMgSi0.5 3.3206	H9	3569 9006-P1	4104	AlMgSi 0.5	A2X5

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6063 [Al Mg0,7Si]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HBS
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
O, H111	≤ 200	≤ 200	–	130	–	–	18	16	25
T4	≤ 150	≤ 150	130	–	65	–	14	12	50
	150 < D ≤ 200	150 < S ≤ 200	120	–	65	–	12	–	50
T5	≤ 200	≤ 200	175	–	130	–	8	6	60
T6 ⁵⁾	≤ 150	≤ 150	215	–	170	–	10	8	75
	150 < D ≤ 200	150 < S ≤ 200	195	–	160	–	10	–	75
T66 ⁵⁾	≤ 200	≤ 200	245	–	200	–	10	8	

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
O, H111	≤ 25	–	130	–	–	18	16
T4 ⁵⁾	≤ 10	130	–	65	–	14	12
	10 < e ≤ 25	120	–	65	–	12	10
T5	≤ 25	175	– 130		–	8	6
T6 ⁵⁾	≤ 25	215	–	170	–	10	8
T66 ⁵⁾	≤ 25	245	– 200		–	10	8



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6063 C

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6063 [Al Mg0,7Si]

Extruded profile¹⁰⁾

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T4 ⁵⁾	≤ 25	130	–	65	–	14	12
T5	≤ 3	175	–	130	–	8	6
	3 < e ≤ 25	160	–	110	–	7	5
T6 ⁵⁾	≤ 10	215	–	170	–	8	6
	10 < e ≤ 25	195	–	160	–	8	6
T64 ⁵⁾⁸⁾	≤ 15	180	–	120	–	12	10
T66 ⁵⁾	≤ 10	245	–	200	–	8	6
	10 < e ≤ 25	225	–	180	–	8	6

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

5) The characteristics can be obtained by means of cooling in a press

8) Bending quality

10) In the case that the cross section is composed of elements of different thickness, with different mechanical characteristics values, the lowest values should be considered valid for the entire section.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
69.500	2,70	615-655	23,5	T5-209	T5-3,1	T5-55,5	-0,80

Technological suitabilities

Welding	Natural behaviour	Anodized	Mechanization	State: T5		T6		
				R	MB	R	MB	
Under flame	B	In a rural environment	MB	For protection	MB	Chip fragmentation	R	R
At the arc under argon gas	B	In an industrial environment	MB	Decorative	MB	Surface gloss	MB	MB
Owing to electrical resistance	MB	In a marine environment	B	Hard anodized	MB			
Brazed	MB	In sea water	B					

Thermal treatments

Forging temperature interval: 400°-480°C.
Total annealing: 420°C with long-term cooling up to 250°C.
Annealing against acidity: 340°C

Products

Bars, wires, extruded profiles, tubes.

Observations and applications

The most notable characteristic of this alloy is its ease of extrusion. This means it is used a lot in profiling: doors, windows, curtain walls, furniture, structures, stairs, rungs, guard rails, fences, lattices, barriers, railings, heat dissipators, engine bodyworks, irrigation, heating and refrigeration tubes, special elements for machines etc.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6082

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others	Others
Minimum	0,70			0,40	0,60				Each	Total
Maximum	1,30	0,50	0,10	1,00	1,20	0,25	0,20	0,10	0,05	0,10

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 6082	6082	38.348 L-3453	A-SGM0,7	ALMgSi1 3.3215	H30	3571 9006-P4	4212	ALMgSi1Mn	

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-6082 [Al Si1MgMn]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS ¹⁾
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
O	≥0,4	1,5		150		85	14		1,0 t	0,5 t	40
	1,5	3,0		150		85	16		1,0 t	1,0 t	40
	3,0	6,0		150		85	18			1,5 t	40
	6,0	12,5		150		85	17			2,5 t	40
	12,5	25,0		155				16			40
T4, T451	≥0,4	1,5	205		110		12		3,0 t	1,5 t	58
	1,5	3,0	205		110		14		3,0 t	2,0 t	58
	3,0	6,0	205		110		15			3,0 t	58
	6,0	12,5	205		110		14			4,0 t	58
T451	12,5	40,0	205		110			13			58
	40,0	80,0	205		110			12			58
T42 ²⁾	≥0,4	1,5	205		95		12			1,5 t	57
	1,5	3,0	205		95		14			2,0 t	57
	3,0	6,0	205		95		15			3,0 t	57
	6,0	12,5	205		95		14			4,0 t	57
	12,5	40,0	205		95			13			57
	40,0	80,0	205		95			12			57
T6, T651, T62 ²⁾	≥0,4	1,5	310		260		6			2,5 t	94
	1,5	3,0	310		260		7			3,5 t	94
	3,0	6,0	310		260		10			4,5 t	94
	6,0	12,5	300		255		9			6,0 t	91
T651, T62	12,5	60,0	295		240			8			89
	60,0	100,0	295		240			7			89
	100,0	150,0	275		240			6			84
	150,0	175,0	275		230			4			83

1) Solely for information.

2) Far lower bending radii can be obtained immediately after the tempering.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6082

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6082 [Al Si1MgMn]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HBS
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
O, H111	≤ 200	≤ 200	–	160	–	110	14	12	40
T4	≤ 200	≤ 200	205	–	110	–	14	12	60
T6	≤ 20	≤ 20	295	–	250	–	8	6	95
	20 < D ≤ 150	20 < S ≤ 150	310		260		8		95
	150 < D ≤ 200	150 < S ≤ 200	280		240		6		95
	200 < D ≤ 250	200 < S ≤ 250	270		200		6		95

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.		max.	min	min.
T6	≤ 5	290	–	250	–	8	6
	5 < e ≤ 25	310	– 260		–	10	8

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min. max.			min	min.
Perfil hueco T5	≤ 5	270	–	230	–	8	6
T6	≤ 5	290	– 250 –			8	6
	5 < e ≤ 15	310	–	260	–	10	8

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity % IACS	Dissolution potential V
70.000	2,71	575-650	23,1	T4-167 T6-172	T4-4,1 T5-3,9	T4-42 T6-44	-0,83

Technological suitabilities

Welding	Natural behaviour	Anodized	Mechanization	State 0	State T6
Under flame MB	In a rural environment MB	For protection MB	Chip fragmentation	M	R
At the arc under argon gas B	In an industrial environment MB	Decorative R	Surface gloss	R	MB
Owing to electrical resistance MB	In a marine environment B	Hard anodized MB			
Brazed B	In sea water R				

Thermal treatments

Forging temperature interval: 350°-500°C.
Total annealing: 420°C with long-term cooling up to 250°C. Annealing against acidity: 340°C

Products

Bars, wires, extruded profiles, tubes, sheets, plates.

Observations and applications

Alloy similar to 6061. Good mechanical characteristics in T6 state. Good corrosion-proofing and suitability for anodization both hard and protection as well as good arc welding. Applications: structural elements as a whole, shipbuilding and aerospace industry, railway constructions, moulds and machined parts etc.



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6262

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Bi	Al
Minimum	0,40		0,15		0,80	0,04			0,40	0,40	
Maximum	0,80	0,70	0,40	0,15	1,20	0,14	0,25	0,15	0,70	0,70	rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
EN AW 6262	6262								

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-6262 [Al Mg1SiPb]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.
T6 ⁵⁾	≤ 200	≤ 200	260	–	240	–	10	8

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T6 ⁵⁾	≤ 25	260	–	240	–	10	8

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T6 ⁵⁾	≤ 25	260	–	240	–	10	8

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

5) The characteristics can be obtained by means of cooling in a press



ALUMINIUMS Alloys Aluminium - Magnesium - Silicon 6262

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
70.000	2,75	580-650	23,5	167 (T6)	4,3 (T6)	T6-29,8	-0,79

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State T5	State T9
Under flame	B	In a rural environment	B	For protection	MB	Chip fragmentation	MB	MB
At the arc under argon gas	R	In an industrial environment	B	Decorative	B	Surface gloss	B	B
Owing to electrical resistance	B	In a marine environment	R	Hard anodized	MB			
Brazed	R	In sea water	R					

Thermal treatments

Forging temperature interval: 340°-480°C.
 Total annealing: 420°C with long-term cooling up to 250°C.
 Annealing against acidity: 340°C

Products

Bars, extruded profiles, tubes.

Observations and applications

This alloy is typically used for manufacturing parts which require easy machining and are highly suitable for anodization.



ALUMINIUMS Alloys Aluminium - Zinc 7020

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Others	Others	Al
Minimum				0,05	1,0	0,10	4,0	Each	Total	
Maximum	0,35	0,40	0,20	0,50	1,4	0,35	5,0	0,05	0,15	Rest

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	J.I.S.
En AW 7020	7020	L3741 38.374	A-Z4G	AlZn4,5Mg1 3.4335	H17	7791 9007/P1	4425	AlZn4,5Mg1	A7020

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-7020 [Al Zn4,5Mg1]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS ¹⁾
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
O	≥0,4	1,5		220		140	12				45
	1,5	3,0		220		140	13				45
	3,0	6,0		220		140	15				45
	6,0	12,5		220		140	12				45
T4, T451 ²⁾³⁾	≥0,4	1,5	320		210		11			2,0 t	92
	1,5	3,0	320		210		12			2,5 t	92
	3,0	6,0	320		210		13			3,5 t	92
	6,0	12,5	320		210		14			5,0 t	92
T6, T651, T62 ²⁾	≥0,4	1,5	350		280		7			3,5 t	104
	1,5	3,0	350		280		8			4,0 t	104
	3,0	6,0	350		280		10			5,5 t	104
	6,0	12,5	350		280		10			8,0 t	104
T651	12,5	40,0	350		280			9			104
	40,0	100,0	340		270			8			101
	100,0	150,0	330		260			7			98
	150,0	175,0	330		260			6			98

For new applications of this alloy, which entails certain properties like corrosion-proofing, toughness, fatigue resistance, you are strongly recommended to consult us with a view to making a more thorough selection of the material.

1) Solely for information.

2) Far lower bending radii can be obtained immediately after the tempering.

3) Avoid use of this alloy in finished products in states T4 or T451. The mechanical properties specified are obtained only after three months natural aging at room temperature. This maturation can be roughly obtained keeping the samples tempered for 60h at a temperature between 60 °C and 65 °C.



ALUMINIUMS Alloys Aluminium - Zinc 7020

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-7020 [Al Zn4,5Mg1]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.
T6 ⁵⁾	≤ 50	≤ 50	350	–	290	–	10	8
	50 < D ≤ 200	50 < S ≤ 200	340	–	275	–	10	–

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.	max.	min	min.	
T6 ⁵⁾	≤ 15	350	–	290	–	10	8

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min. max.	max.	min	min.	
T6 ⁵⁾	≤ 40	350	– 290 –			10	8

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

5) The characteristics can be obtained by means of cooling in a press.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
70.000	2,78	605-645	23,3	T5-139 T6-140	T5-5 T6-5	T5-35 T6-35	

Technological suitabilities

Welding	Natural behaviour		Anodized		Mechanization	State T5	State T6	
Under flame	B	In a rural environment	B	For protection	B	Chip fragmentation	B	B
At the arc under argon gas	B	In an industrial environment	B	Decorative	R	Surface gloss	B	B
Owing to electrical resistance	B	In a marine environment	R	Hard anodized	MB			
Brazed	B	In sea water	R					

Thermal treatments

Products

Observations and applications

Bars, extruded profiles, tubes, sheets, plates.

Alloy endowed with average mechanical characteristics, but highly suitable for welding, good corrosion resistance and good surface finish after protection anodization and hard. Typical uses of this alloy are: structures entailing welding, with tempering treatment not being vital after welding as maturation is sufficient to obtain good mechanical characteristics. It is also used in mechanical applications, armament, transport, aeronautical constructions etc.



ALUMINIUMS Alloys Aluminium - Zinc 7022

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Ti+Zr	Others
Minimum			0,50	0,10	2,60	0,10	4,30			
Maximum	0,50	0,50	1,00	0,40	3,70	0,30	5,20		0,20	0,05

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N. 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I	S.I.S.	V.S.M.	J.I.S.
En AW 7022				AlMgCu0,5 3.4345		9007/5			

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-7022 [Al Zn5Mg3Cu]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS ¹⁾
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
T6	6,0	12,5	450		370		8				133
T6, T651	12,5	25,0	450		370			8			133
	25,0	50,0	450		370			7			133
	50,0	100,0	430		370			5			127
	100,0	200,0	410		370			3			121

For new applications of this alloy, which entails certain properties like corrosion-proofing, toughness, fatigue resistance, you are strongly recommended to consult us with a view to making a more thorough selection of the material.

1) Solely for information.

Mechanical properties Standard: EN 755-2 Alloy: EN AW-7022 [Al Zn5Mg3Cu]

Extruded bar								
Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.
T6, T6510, T6511 ⁵⁾	≤ 80	≤ 80	490	–	420	–	7	5
	80 < D ≤ 200	80 < S ≤ 200	470	–	400	–	7	–

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min.	max.	min	min.	
T6, T6510, T6511 ⁵⁾	≤ 30	490	–	420	–	7	5

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max. min. max.	max.	min	min.	
T6, T6510, T6511 ⁵⁾	≤ 30	490	–	420	–	7	5

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

5) The characteristics can be obtained by means of cooling in a press.



Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
71.000	2,78	485-640	23,6	13-16		17-23	

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization	State T651
Under flame	M	In a rural environment	B	For protection	B	Chip fragmentation	B
At the arc under argon gas	R	In an industrial environment	R	Decorative	M	Surface gloss	B
Owing to electrical resistance	B	In a marine environment	M	Hard anodized	B		
Brazed	M	In sea water	M				

Thermal treatments

Products

Observations and applications

Plates for moulds.

Alloy endowed with excellent machinability as well as good dimensional stability and high mechanical characteristics.
It is used to construct injection moulds for plastics, bottles, recipients, footwear etc.



ALUMINIUMS Alloys Aluminium - Zinc 7075

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others elements
Minimum			1,2		2,1	0,18	5,1		Zr+Ti Total
Maximum	0,40	0,50	2,0	0,30	2,9	0,28	6,1	0,20	0,25 0,15

International Equivalences

Europe	USA	Spain	France	Germany	G.B.	Italy	Sweden	Switzerland	Japan
E.N 573	A.A.	U.N.E.	AFNOR	D.I.N.	B.S.	U.N.I.	S.I.S.	V.S.M.	JIS
En AW 7075	7075	38.371 L-3710	A-ZSGU	AlZnMgCu1.5 3.4365		3735 9007 / 2		AlnZn6MgCu1.5	A7075

Mechanical properties of sheets Standard: EN 485-2 Aluminium EN AW-7075 [Al Zn5,5MgCu]

Treatment state	Nominal thickness mm		R _m MPa		R _{p0,2} MPa		Min. elongation %		Bending radius		Hardness HBS
	Greater than	up to	min.	max.	min.	max.	A _{50mm}	A	180°	90°	
O	≥0,4	0,8		275		145	10		1,0 t	0,5 t	55
	0,8	1,5		275		145	10		2,0 t	1,0 t	55
	1,5	3,0		275		145	10		3,0 t	1,0 t	55
	3,0	6,0		275		145	10			2,5 t	55
	6,0	12,5		275		145	10			4,0 t	55
T6, T651, T62	≥0,4	0,8	525		460		6			4,5 t	157
	0,8	1,5	540		460		6			5,5 t	160
	1,5	3,0	540		470		7			6,5 t	161
	3,0	6,0	545		475		8			8,0 t	163
	6,0	12,5	540		460		8			12 t	160
T651, T62	12,5	25,0	540		470			6			161
	25,0	50,0	530		460			5			158
	50,0	60,0	525		440			4			155
	60,0	80,0	495		420			4			147
	80,0	90,0	490		390			4			144
	90,0	100,0	460		360			3			135
	100,0	120,0	410		300			2			119
	120,0	150,0	360		260			2			104
T76, T7651	≥1,5	3,0	500		425		7				149
	3,0	6,0	500		425		8				149
	6,0	12,5	490		415		7				146
T7351	12,5	25,0	475		390			6			140
	25,0	50,0	475		390			5			140
	50,0	60,0	455		360			5			133
	60,0	80,0	440		340			5			129
	80,0	100,0	430		340			5			126



ALUMINIUMS Alloys Aluminium - Zinc 7075

Mechanical properties

Standard: EN 755-2

Alloy: EN AW-7075 [Al Zn5,5MgCu]

Extruded bar

Treatment state	Measurements mm		R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %	Hardness HB
	D ¹⁾	S ²⁾	min.	max.	min.	max.	min	min.	
O	≤ 200	≤ 200	–	275	–	165	10	8	60
T6. T6510, T6511	≤ 25	≤ 25	540	–	480	–	7	5	140
	25 < D ≤ 100	25 < S ≤ 100	560	–	500	–	7	–	140
	100 < D ≤ 150	100 < S ≤ 150	530	–	470	–	6	–	140
	150 < D ≤ 200	150 < S ≤ 200	470	–	400	–	5	–	140

Extruded tube

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
O, H111	≤ 10	–	275	–	165	10	–
T6. T6510, T6511	≤ 5	540	–	485	–	8	6
	5 < e ≤ 10	560	–	505	–	7	5
	10 < e ≤ 50	560	–	495	–	6	4

Extruded profile

Treatment state	Measurements mm e ³⁾	R _m MPa		R _{p0,2} MPa		A %	A _{50 mm} %
		min.	max.	min.	max.	min	min.
T6. T6510, T6511	≤ 25	530	–	460	–	6	4
	25 < e ≤ 60	540	–	470	–	6	–

1) D = Diameter of circular section bars.

2) S = Distance between faces for square-section and hexagonal bars, thickness for rectangular section bars.

3) e = Wall thickness.

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
72.000	2,81	470-640	23,5	0 – 180 T6 - 135	0 – 3,9 T6- 5,3	0 –45,5 T6- 34,00	-0,81

Technological suitabilities

Welding		Natural behaviour		Anodized		Mechanization		State-0	State T6
Under flame	B	In a rural environment	B	For protection	R	Chip fragmentation	M	MB	
At the arc under argon gas	M	In an industrial environment	R	Decorative	R	Surface gloss		MB	
Owing to electrical resistance	B	In a marine environment	MB	Hard anodized	M				
Brazed	R	In sea water			M				

Thermal treatments

Placement in solution 450°C + 5°C. Maturation: T5/T6 state, 4 minimum days at 20°C. Artificial maturation: T5/T6 states, 4 hours at 100°C + 5°C, followed by 24 hours at 140°C + 5°C.

Products

Bars, profiles, tubes, sheets, plates.

Observations and applications

One of the alloys endowed with the highest level mechanical characteristics is used for armaments, constructions, aeronautics, aerospace and nuts and bolts. Also in the construction of injection moulds for plastics and blowing.



ALUMINIUMS Alloys Homogenized Plate AA 5083

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
Minimum				0,40	4,00	0,05			Ti+Zr
Maximum	0,40	0,40	0,10	1,00	4,90	0,25	0,25	0,15	0,20 0,15

Mechanical properties

Breaking load R _m N/mm ²	Elastic limit R _{p0.2} N/mm ²	Elongation at 5.65%	Fatigue limit N/mm ²	Shear strength τ N/mm ²	Brinell (Hardness HB)
240-280	100-130	6		175	70

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
70.000	2,66	580-640	23,3	110-130	6	16,2	

Technological suitabilities

Welding		Anodized		Natural behaviour		Coating	
Under flame	MB	For protection	MB	Atmospheric agents	MB	Galvanized	B
To low arc (TIG-MIG)	MB	Decoration	R	Marine environment	MB	Electroless nickel	B
Resistance	MB	Hard	MB				
Brazed	M			Mechanization	B		

PRODUCT

Homogenized aluminium plate.
Formats up to 1030 mm thick can be supplied.

Observations and applications

One of its main characteristics is that it is stress-free and thus remains stable during the machining process.
Its main applications are: moulds for thermoforming, moulds for blowing, moulds for vacuums, prototype moulds etc.



ALUMINIUMS Alloys Rectified Precision Plate (5083)

Chemical composition

%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others
Minimum				0,40	4,00	0,05			Ti+Zr
Maximum	0,40	0,40	0,10	1,00	4,90	0,25	0,25	0,15	0,20 0,15

Mechanical properties

Breaking load R _m N/mm ²	Elastic limit R _{p0.2} N/mm ²	Elongation at 5.65%	Fatigue limit N/mm ²	Shear strength τ N/mm ²	Brinell (Hardness HB)
240-280	125-190	10			70

Physical properties

Modulus of elasticity N/mm ²	Specific weight g/cm ³	Melting temperature °C	Linear expansion coefficient 1/10 ⁶ K	Thermal conductivity W/mK	Electrical resistivity at 20°C - μΩ cm	Electrical conductivity% IACS	Dissolution potential V
70.000	2,66	580-640	23,3	117	6	16,2	

Technological suitabilities

Welding		Anodized		Natural behaviour		Coating	
Under flame	MB	For protection	MB	Atmospheric agents	MB	Galvanized	B
To low arc (TIG-MIG)	MB	Decoration	R	Marine environment	MB	Electroless nickel	B
Resistance	MB	Hard	MB				
Brazed	M			Mechanization	B		

TOLERANCES

Thickness in mm	Flatness mm/m	Tolerance in thickness	Roughness
5	≤ 0,80	± 0,1	0,4 μm R _a
6 - 12,7	≤ 0,40	± 0,1	0,4 μm R _a
>12,7	≤ 0,13	± 0,1	0,4 μm R _a

PRODUCT

Aluminium plate milled and plastified on both sides.

Observations and applications

One of its main characteristics is that it is stress-free and thus remains stable during the machining process.

Its main applications are: high precision parts, electronic components, automobile industry, computers, pneumatics, manufacture of machinery for packaging etc.

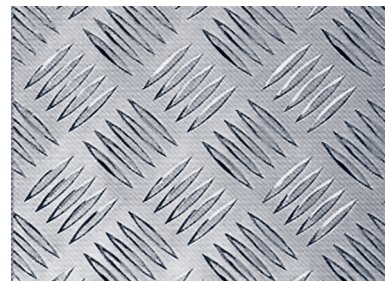


Dueto and Damero printed aluminium plates

Thickness mm	Dimension mm	Thickness with tread mm	Weight m2 kg	Weight Sheet Kg
2,0	2000 x 1000	2,8 / 3,5	6,2	12,48
2,0	2500 x 1250	2,8 / 3,5	6,20	19,50
2,0	3000 x 1500	2,8 / 3,5	6,20	27,90
2,5	2000 x 1000	3,3 / 4,0	8,00	16,00
3,0	2000 x 1000	3,8 / 4,5	9,30	18,60
3,0	2500 x 1250	3,8 / 4,5	9,30	29,06
3,0	3000 x 1500	3,8 / 4,5	9,30	41,85
4,0	2000 x 1000	4,8 / 5,5	12,40	24,80
4,0	2500 x 1250	4,8 / 5,5	12,40	38,75
4,0	3000 x 1500	4,8 / 5,5	12,40	55,80
5,0	2000 x 1000	5,8 / 6,5	14,50	29,00
5,0	2500 x 1250	5,8 / 6,5	14,50	45,50
5,0	3000 x 1500	5,8 / 6,5	14,50	66,00
6,0	2000 x 1000	6,8 / 7,5	17,50	35,00
6,0	2500 x 1250	6,8 / 7,5	17,50	55,00
6,0	3000 x 1500	6,8 / 7,5	17,50	79,00
8,0	3000 X 1500	8,8 / 9,5	24,80	111,60



Dueto two splints
Alloy: 5754



Damero five splints
Alloy 5754



FORTAL

ALUMOLD 1 500L

ALUMOLD 1 500F

ALUMOLD 2 400L

ALUMOLD 2 400F

Product

High resistance aluminium plate for mould and tool construction.

Observations and applications

Developed for the aeronautical industry, this alloy's properties have been optimised for the mould construction industry and this is its main use so as to be able to replace medium and high-quality steels.

Its most important properties are its high-level mechanical characteristics, excellent machinability and great uniformity of all its properties by means of the total thickness of the plate. These properties involve excellent machining for the mould constructor which is constant for the whole plate even at higher thicknesses.

The plates denote very good dimensional stability and can be supplied stress-free.

In the mould and tool construction industry the advantages of aluminium are being increasingly preferred to the steels used traditionally

Excellent properties for machining.

The cutting speeds in traditional processes are 5 times quicker than with steels which brings about a notable fall in working time.

The machining time saved with regard to steel may be reduced by 80%. Hence, the time elapsing between the design of a part (prototype) and the completed mould is reduced greatly, allowing very rapid access to the market. A lower cost per tool is also obtained and a greater tool duration owing to the lower wear and tear.

Low weight.

Aluminium density is 2 to 3 times lower than that of steels, allowing more convenient, easier handling of moulds. As they have less inertia, they can be opened and closed more rapidly.

High thermal conductivity.

Owing to the fact that thermal conductivity is around 4 times higher than that of steel, this allows a considerable reduction in the work cycle duration.

The use of less complex refrigeration systems is also possible. The good, even evacuation of heat reduces the appearance of internal stresses and the attendant distortion of the finished moulds.

High electrical conductivity.

Thanks to the fact that the electrical conductivity is around 10 times higher, there is the possibility of working on the aluminium an average of 4 to 5 times more speedily by (EDM) than with steel, the result is a particularly economical working method.



ALUMINIUMS Alloys FORTAL

ALUMINIUM PLATE TYPE 7XXX THICKNESS 25 TO 305

Removal of stresses by traction for thicknesses falling between 25 and 200.

Mechanical characteristics

Thickness mm	Typical values			Hardness HBS
	R _m MPa	R _{p0.2} Mpa	A %	
From 6 to 12	590	525	11	180
From 12 to 25	590	525	10	180
From 25 to 40	580	520	9	175
From 40 to 50	570	500	9	170
From 50 to 60	560	485	9	160
From 60 to 80	525	445	8	155
From 80 to 100	535	480	8	155
From 100 to 120	530	475	8	155
From 120 to 140	520	465	7	150
From 140 to 160	515	455	6	150
From 160 to 180	510	450	5	150

Physical properties

Specific weight Kg/dm ³	Linear expansion coefficient (0-100°C) 10/°C	Thermal conductivity (0-100°C) W/m.°C	Specific heat J/kg.°C	Modulus of elasticity Mpa	Compression modulus Mpa	Poisson Ratio	Melting range °C
2,82	23,7	153	857	72.000	72.000	0,33	475-630

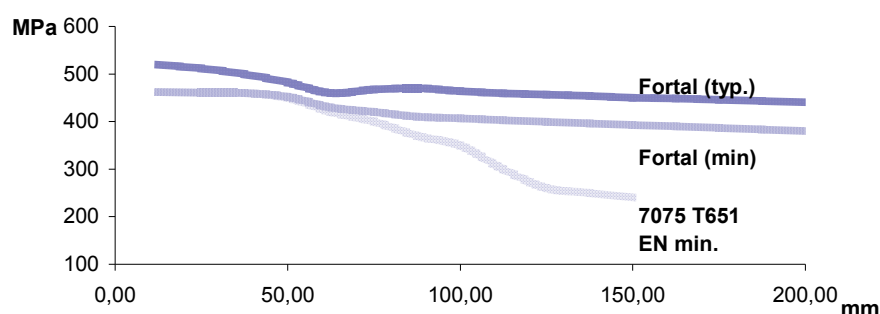
Technological suitabilities

Welding		Anodized		Mechanization	
Filling (TIG)	Good DC/Helium rod 5180, 5356, 4047, 4145	For protection	B	Chip fragmentation	B
		Decorative	avoid	Surface gloss	MB
		Hard	MB		

Applications

Prototype moulds and medium-sized and large moulds for plastics' injection.
Moulds for blowing and thermoforming.
Machine elements etc.

Mechanical properties





ALUMINIUM PLATE TYPE 7XXX THICKNESS 25 TO 305

Removal of stresses by traction for thicknesses falling between 25 and 200.
Removal of stresses by compression for thicknesses falling between 205 and 305.

Mechanical characteristics

Thickness mm	Guaranteed minimum			Typical values			Hardness HBS
	R _m MPa	R _{p0.2} Mpa	A %	R _m MPa	R _{p0.2} Mpa	A %	
From 25 to 75	560	510	5	590	540	10	185
From 76 to 127	550	500	4	580	530	6	185
From 128 to 152	540	490	2,5	570	520	4	180
From 153 to 203	525	480	1	555	510	2	180
From 204 to 254	505	460	1	535	490	1,5	175
From 255 to 305	470	435	0,5	510	470	1,5	175

Physical properties

Specific weight Kg/dm ³	Linear expansion coefficient (0-100°C) 10/°C	Thermal conductivity (0-100°C) W/m.°C	Specific heat J/kg.°C	Modulus of elasticity Mpa	Compression modulus Mpa	Poisson Ratio	Melting range °C
2,82	23,7	153	857	72.000	72.000	0,33	475-630

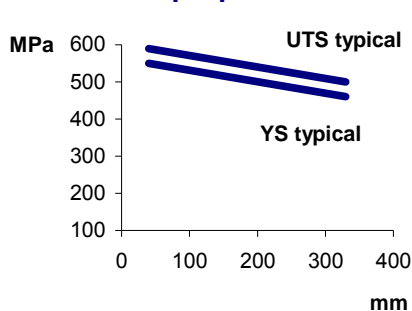
Technological suitabilities

Welding		Anodized	Mechanization	
Filling (TIG)	Good DC/Helium rod 5180, 5356, 4047, 4145	For protection	B	Chip fragmentation
		Decorative	avoid	Surface gloss
		Hard	MB	B

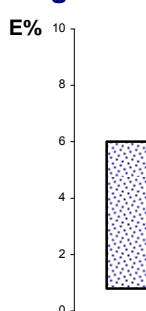
Applications

Prototype moulds and medium-sized and large moulds for plastics' injection.
Moulds for blowing and thermoforming.
Machine elements etc.

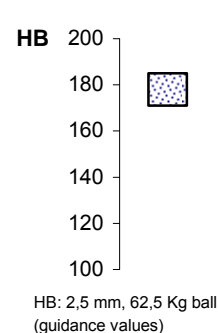
Mechanical properties



Elongation



Hardness





ALUMINIUMS Alloys ALUMOLD 1 500F

ALUMINIUM PLATE TYPE 7XXX FORGING THICKNESS 175 TO 500

As regards forging, we obtain better mechanical characteristics and greater elongation.

Mechanical characteristics

Thickness mm	Guaranteed minimum			Typical values			Hardness HBS
	R _m MPa	R _{p0.2} Mpa	A %	R _m MPa	R _{p0.2} Mpa	A %	
From 175 to 200	475	420	4	530	470	10	180
From 200 to 300	465	400	3,5	520	460	9	175
From 300 to 400	450	370	3	520	460	9	175
From 400 to 450	440	350	3	520	460	9	160

Physical properties

Specific weight Kg/dm ³	Linear expansion coefficient (0-100°C) 10/°C	Thermal conductivity (0-100°C) W/m.°C	Specific heat J/kg.°C	Modulus of elasticity Mpa	Compression modulus Mpa	Poisson Ratio	Melting range °C
2,82	23,7	153	857	72.000	73.000	0,33	475-630

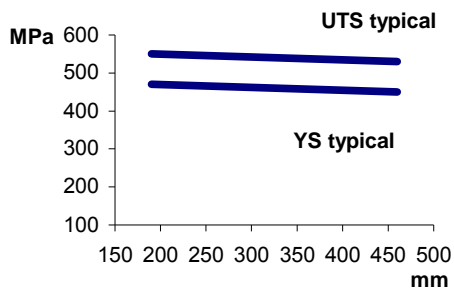
Technological suitabilities

Welding		Anodized	Mechanization	
Filling (TIG)	Good DC/Helium rod 5180, 5356, 4047, 4145	For protection	B	Chip fragmentation
		Decorative	avoid	Surface gloss
		Hard	MB	

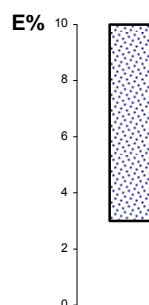
Applications

Prototype moulds and medium-sized and large moulds for plastics' injection.
Moulds for blowing and thermoforming.
Machine elements, etc.

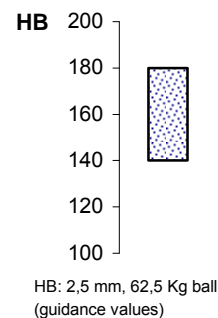
Mechanical properties



Elongation



Hardness





ALUMINIUM PLATE TYPE 7XXX THICKNESS 25 TO 305

Removal of stresses by traction for thicknesses falling between 25 and 200.
Removal of stresses by compression for thicknesses falling between 205 and 305.

Mechanical characteristics

Thickness mm	Guaranteed minimum			Typical values			Hardness HBS
	R _m MPa	R _{p0.2} Mpa	A %	R _m MPa	R _{p0.2} Mpa	A %	
From 25 to 75	445	400	7	470	430	12	160
From 76 to 127	420	380	7	450	410	10	140
From 128 to 152	400	350	7	430	380	10	140
From 153 to 203	395	350	6	420	360	9	140
From 204 to 254	390	330	5	420	360	9	140
From 255 to 305				400	340	5	130

Physical properties

Specific weight Kg/dm ³	Linear expansion coefficient (0-100°C) 10/°C	Thermal conductivity (0-100°C) W/m.°C	Specific heat J/kg.°C	Modulus of elasticity Mpa	Compression modulus Mpa	Poisson Ratio	Melting range °C
2,79	23,5	122	960	72.000	73.000	0,33	610-650

Technological suitabilities

Welding		Anodized	Mechanization	
Assembly (MIG-TIG)	B	For protection	B	Chip fragmentation
Filling (TIG)	MB	Decorative	avoid	Surface gloss
		Hard	MB	

Applications

Prototype moulds and medium-sized series for plastics' injection.
Moulds for blowing and thermoforming.
Machine elements etc.



ALUMINIUMS Alloys ALUMOLD 2 400F

ALUMINIUM PLATE TYPE 7XXX FORGING THICKNESS 310 TO 800

Mechanical characteristics

Thickness mm	Guaranteed minimum			Typical values			Hardness HBS
	R _m MPa	R _{p0.2} Mpa	A %	R _m MPa	R _{p0.2} Mpa	A %	
From 325 to 400	320	260	12	370	320	14	
From 400 to 500	310	250	11	360	310	13	
From 500 to 600	300	240	10	350	300	12	
From 600 to 700							
From 700 to 800							

Physical properties

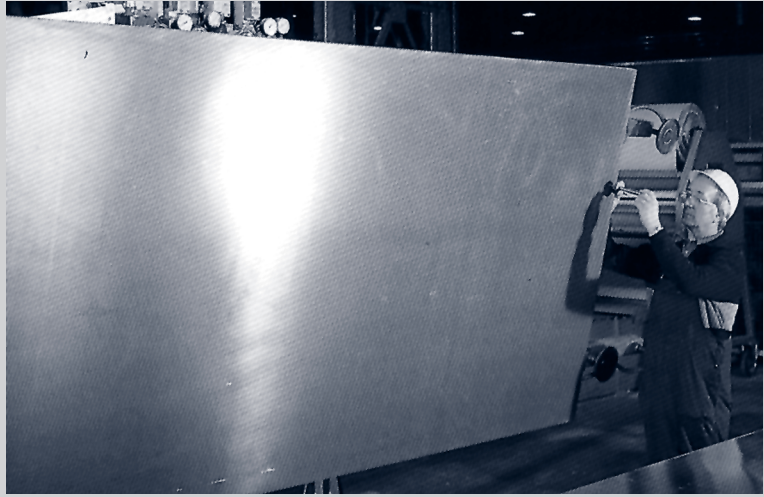
Specific weight Kg/dm ³	Linear expansion coefficient (0-100°C) 10/°C	Thermal conductivity (0-100°C) W/m.°C	Specific heat J/kg.°C	Modulus of elasticity Mpa	Compression modulus Mpa	Poisson Ratio	Melting range °C
2,79	23,5	122	960	72.000	73.000	0,33	610-650

Technological suitabilities

Welding	Anodized	Mechanization
Assembly (MIG-TIG) B	For protection B	Chip fragmentation B
Filling (TIG) MB	Decorative avoid	Surface gloss MB
	Hard MB	

Applications

Prototype moulds and medium-sized series for plastics' injection.
Moulds for blowing and thermoforming.
Machine elements etc.



ALUMINIUMS

MATERIALS IN STOCK

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Angles with equal sides 77

Angles with unequal sides 77

"T"-shaped profiles 79

Double "T"-shaped profiles 79

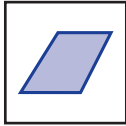
"U"-shaped profiles 80

● = MATERIAL USUALLY IN STOCK

⊙ = MATERIAL ON REQUEST OR NOT USUALLY IN STOCK



ALUMINIUMS Materials in Stock Sheets and Plates



● = MATERIAL USUALLY IN STOCK
 ◎ = MATERIAL ON REQUEST OR NOT USUALLY IN STOCK

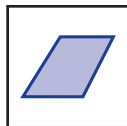
Sheets and Plates

Thickness mm	Dimension mm	theoretical weight kg/sheet	AT AW 1050 H-14/18/24	AT AW 2017 T-4/T451	AT AW 2024 T-3/T-351	AT AW 5083 F/H-111/H24	AT AW 5086 H-111	AT AW 5754 H-111/H22	AT AW 6061 T-651	AT AW 6082 T-651	AT AW 7022 T-651/T652	AT AW 7075 T-651/T652	ALUMOLD
0,5	2000x1000	2,75	●	◎	◎	◎	◎	●	◎	◎	◎	◎	◎
0,8	2000x1000	4,4	●	◎	◎	◎	◎	●	◎	◎	◎	◎	◎
1	2000x1000	5,5	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
1	2500x1250	8,6	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
1	3000x1500	12,4	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
1,5	2000x1000	8,25	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
1,5	2500x1250	12,9	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
1,5	3000x1500	18,6	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
2	2000x1000	11	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
2	2500x1250	17,2	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
2	3000x1500	24,8	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
2	4000X2000	44	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
3	2000x1000	16,5	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
3	2500x1250	25,8	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
3	3000x1500	37,2	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
3	4000X2000	66	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
4	2000x1000	22	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
4	2500x1250	34,4	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
4	3000x1500	49,5	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
4	4000X2000	88	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
5	2000x1000	27,5	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
5	2500x1250	43	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
5	3000x1500	61,9	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
5	4000X2000	110	●	◎	◎	●	◎	●	◎	●	◎	◎	◎
6	2000x1000	33	◎	◎	◎	●	◎	●	◎	●	◎	◎	◎
6	2500x1250	51,6	◎	◎	◎	●	◎	●	◎	●	◎	◎	◎
6	3000x1500	74,25	◎	◎	◎	●	◎	●	◎	●	◎	◎	◎
6	4000X2000	132	◎	◎	◎	●	◎	●	◎	●	◎	◎	◎
8	2000x1000	44	◎	◎	◎	●	◎	●	◎	●	◎	●	◎
8	2500x1250	68,75	◎	◎	◎	●	◎	●	◎	●	◎	◎	◎
8	3000x1500	99	◎	●	◎	●	◎	●	◎	●	◎	●	◎
8	4000X2000	176	◎	●	◎	●	◎	●	◎	●	◎	◎	◎
10	3000X1500	124	◎	●	◎	●	◎	●	●	●	◎	●	◎
10	4000X2000	220	◎	●	◎	●	◎	●	●	●	◎	●	◎
12	3020X1520	151,5	◎	●	◎	●	◎	●	●	●	◎	●	◎
12	4020X2020	268	◎	●	◎	●	◎	●	●	●	◎	●	◎
15	3020X2020	190	◎	●	◎	●	◎	●	●	●	◎	●	◎

(continuous)



ALUMINIUMS Materials in Stock Sheets and Plates



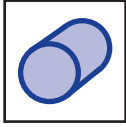
● = MATERIAL USUALLY IN STOCK
 ◎ = MATERIAL ON REQUEST OR NOT USUALLY IN STOCK

Sheets and Plates

Thickness mm	Dimension mm	theoretical weight kg/sheet	AT AW 1050 H-14/18/24	AT AW 2017 T-4/T451	AT AW 2024 T-3/T-351	AT AW 5083 F/H-111/H24	AT AW 5086 H-111	AT AW 5754 H-111/H22	AT AW 6061 T-651	AT AW 6082 T-651	AT AW 7022 T-651/T652	AT AW 7075 T-651/T652	ALUMOLD
15	4020X2020	335	◎	●	◎	●	◎	●	●	●	◎	●	◎
20	3020X1520	252,5	◎	●	◎	●	◎	●	●	●	◎	●	◎
20	4020X2020	446,7	◎	●	◎	●	◎	●	●	●	◎	●	◎
25	3020X1520	315,6	◎	●	◎	●	◎	●	●	●	◎	●	◎
25	4020X2020	558,5	◎	●	◎	●	◎	●	●	●	◎	●	◎
30	3020X1520	378,7	◎	●	◎	●	◎	●	●	●	◎	●	●
30	4020X2020	670	◎	●	◎	●	◎	◎	●	●	◎	●	●
35	3020X1520	442	◎	◎	◎	●	◎	◎	●	●	◎	●	●
35	4020X2020	576,5	◎	◎	◎	●	◎	◎	●	●	◎	●	●
40	3020X1520	505	◎	●	◎	●	◎	◎	●	●	◎	●	●
40	4020X2020	893,5	◎	●	◎	●	◎	◎	●	●	◎	●	●
45	3020X1520	557,7	◎	◎	◎	●	◎	◎	●	●	◎	●	●
45	4020X2020	986,6	◎	◎	◎	●	◎	◎	●	●	◎	●	●
50	3020X1520	631,2	◎	●	◎	●	◎	◎	●	●	◎	●	●
50	4020X2020	1116,5	◎	●	◎	●	◎	◎	●	●	◎	●	●
60	3020X1520	757,5	◎	●	◎	●	◎	◎	●	●	●	●	●
60	4020X2020	1340	◎	●	◎	●	◎	◎	●	●	●	●	●
70	3020X1520	884,7	◎	●	◎	●	◎	◎	●	●	●	●	●
70	4020X2020	1563,2	◎	●	◎	●	◎	◎	●	●	●	●	●
80	3020X1520	1010	◎	●	◎	●	◎	◎	●	●	●	●	●
80	4020X2020	1786	◎	●	◎	●	◎	◎	●	●	●	●	●
90	3020X1520	1136,5	◎	◎	◎	●	◎	◎	●	●	●	●	●
100	3020X1520	1337,6	◎	◎	◎	●	◎	◎	●	●	●	●	●
110	3020X1520	1388,6	◎	◎	◎	●	◎	◎	◎	●	●	●	●
120	3020X1520	1515	◎	◎	◎	●	◎	◎	◎	●	●	●	●
130	3020X1520	1641,5	◎	◎	◎	●	◎	◎	◎	●	●	●	●
140	3020X1520	1767,5	◎	◎	◎	●	◎	◎	◎	●	●	●	●
150	3020X1520	1858	◎	◎	◎	●	◎	◎	◎	●	●	●	●
160	3020X1520	2020	◎	◎	◎	●	◎	◎	◎	●	●	●	●
180	3020X1520	2272	◎	◎	◎	●	◎	◎	◎	●	●	●	●
200	2500X1500	2025	◎	◎	◎	●	◎	◎	◎	●	●	●	●
225	2500X1500	2278	◎	◎	◎	●	◎	◎	◎	◎	●	●	●
250	2500X1500	2531	◎	◎	◎	●	◎	◎	◎	◎	●	●	●
275	2500X1500	2784	◎	◎	◎	●	◎	◎	◎	◎	●	●	●
300	2500X1500	3038	◎	◎	◎	●	◎	◎	◎	◎	●	●	●
350	2500X1500	3543	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	●
400	2500X1500	4050	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	●



ALUMINIUMS Materials in Stock Machinable Bars



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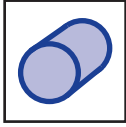
Rounds

Diameter in mm	theoretical weight Kgs/m/l	2007 T-4	2011 T-6	2017 T-4	2030 T-4	5083 F	6060/63 T-5	6012 T-6	6061 T-6	6082 T-6	6262 T-6/T-9	7075 T-6
4	0,035	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
5	0,55	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
6	0,079	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
7	0,108	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
8	0,141	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
9	0,179	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
10	0,22	◎	●	◎	◎	◎	●	◎	◎	●	◎	◎
11	0,266	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
12	0,318	◎	●	◎	◎	◎	●	◎	◎	◎	◎	◎
13	0,373	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
14	0,432	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
15	0,496	◎	●	◎	◎	◎	●	◎	◎	●	●	◎
16	0,564	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
17	0,635	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
18	0,714	◎	●	◎	◎	◎	◎	◎	◎	●	●	◎
19	0,794	◎	●	◎	◎	◎	◎	◎	◎	◎	◎	◎
20	0,88	●	●	◎	●	◎	◎	●	◎	●	●	●
21	0,97	◎	●	◎	●	◎	◎	◎	◎	◎	◎	◎
22	1,066	●	●	◎	●	◎	◎	●	◎	●	●	◎
23	1,165	◎	●	◎	●	◎	◎	◎	◎	◎	◎	◎
24	1,267	◎	●	◎	●	◎	◎	◎	◎	◎	◎	◎
25	1,375	●	●	◎	●	◎	◎	●	◎	●	●	●
26	1,488	◎	●	◎	●	◎	◎	◎	◎	◎	◎	◎
27	1,605	◎	●	◎	●	◎	◎	◎	◎	◎	◎	◎
28	1,726	●	●	◎	●	◎	◎	●	◎	●	●	◎
30	1,98	●	●	●	●	◎	◎	●	◎	●	●	●
32	2,253	●	●	◎	●	◎	◎	●	◎	●	●	◎
35	2,695	●	●	◎	●	◎	◎	●	◎	●	●	●
38	3,177	◎	●	◎	●	◎	◎	◎	◎	◎	◎	◎
40	3,52	●	●	●	●	◎	◎	●	◎	●	●	●
42	3,881	●	●	◎	●	◎	◎	●	◎	●	●	◎
45	4,52	●	●	◎	●	◎	◎	●	◎	●	●	●
50	5,5	●	●	●	●	◎	◎	●	◎	●	●	●
55	6,655	●	●	◎	●	◎	◎	●	◎	●	●	●
60	7,92	●	●	●	●	◎	◎	●	◎	●	●	●

(continuous)



ALUMINIUMS Materials in Stock Machinable Bars



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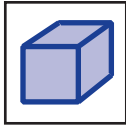
Rounds

(continuation)

Diameter in mm	theoretical weight Kgs/m/l	2007 T-4	2011 T-6	2017 T-4	2030 T-4	5083 F	6060/63 T-5	6012 T-6	6061 T-6	6082 T-6	6262 T-6/T-9	7075 T-6
65	9,295	●	●	◎	●	◎	◎	●	◎	●	●	●
70	10,8	●	●	●	●	◎	◎	●	◎	●	●	●
75	12,4	●	●	◎	●	◎	◎	●	◎	●	●	●
80	14,1	●	●	●	●	◎	◎	●	◎	●	●	●
85	15,9	●	●	◎	●	◎	◎	●	◎	●	◎	●
90	17,9	●	●	●	●	◎	◎	●	◎	●	●	●
95	19,9	●	●	◎	●	◎	◎	◎	◎	◎	◎	◎
100	22	●	●	●	●	◎	◎	●	◎	●	●	●
105	24,3	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
110	26,7	●	●	●	●	◎	◎	◎	◎	●	◎	●
115	29,1	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
120	31,7	●	●	●	●	◎	◎	◎	◎	●	◎	●
125	34,4	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
130	35,5	●	●	●	●	◎	◎	◎	◎	●	◎	●
140	43,2	●	●	●	●	◎	◎	◎	◎	●	◎	●
150	49,5	●	●	●	●	◎	◎	◎	◎	●	◎	●
160	56,4	●	●	●	●	◎	◎	◎	◎	●	◎	●
170	63,6	●	●	◎	●	◎	◎	◎	◎	●	◎	◎
180	71,3	●	●	●	●	◎	◎	◎	◎	●	◎	●
190	80	●	●	◎	●	◎	◎	◎	◎	◎	◎	◎
200	87,9	●	●	●	●	◎	◎	◎	◎	●	◎	●
210	96	●	◎	◎	●	◎	◎	◎	◎	●	◎	◎
220	106,5	●	◎	◎	●	◎	◎	◎	◎	◎	◎	◎
225	111,4	◎	◎	●	◎	◎	◎	◎	◎	●	◎	◎
230	116	●	◎	◎	●	◎	◎	◎	◎	●	◎	◎
240	126	●	◎	◎	●	◎	◎	◎	◎	◎	◎	◎
250	137,5	●	◎	●	●	◎	◎	◎	◎	●	◎	◎
260	148,8	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
275	169,5	●	◎	●	●	◎	◎	◎	◎	●	◎	◎
280	173	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
300	198	●	◎	●	●	◎	◎	◎	◎	●	◎	◎
325	234	●	◎	◎	◎	◎	◎	◎	◎	●	◎	◎
350	265	●	◎	●	◎	◎	◎	◎	◎	●	◎	◎
400	346	●	◎	●	◎	◎	◎	◎	◎	●	◎	◎
450	455	●	◎	◎	◎	◎	◎	◎	◎	●	◎	◎



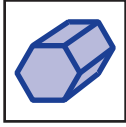
ALUMINIUMS Materials in Stock Machinable Bars



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Square

Diameter in mm	theoretical weight Kgs/m/l	2007 T-4	2011 T-6	2017 T-4	2030 T-4	6060/63 T-5	6061 T-6	6082 T-6	7075 T-6
8	0,18	◎	◎	◎	◎	◎	◎	◎	◎
10	0,28	◎	◎	◎	◎	●	◎	●	◎
12	0,403	◎	◎	◎	◎	●	◎	◎	◎
15	0,63	●	●	◎	●	●	◎	●	◎
20	1,12	●	●	◎	●	◎	◎	●	◎
25	1,75	●	●	◎	●	◎	◎	●	◎
30	2,52	●	●	◎	●	◎	◎	●	◎
35	3,43	●	●	◎	●	◎	◎	●	◎
40	4,48	●	●	◎	●	◎	◎	●	◎
45	5,67	◎	◎	◎	◎	◎	◎	◎	◎
50	7	●	●	◎	●	◎	◎	●	◎
55	8,47	◎	◎	◎	◎	◎	◎	◎	◎
60	10,1	●	●	◎	●	◎	◎	●	◎
65	11,83	◎	◎	◎	◎	◎	◎	◎	◎
70	13,72	●	●	◎	●	◎	◎	●	◎
75	15,75	◎	◎	◎	◎	◎	◎	◎	◎
80	17,92	●	●	◎	●	◎	◎	●	◎
85	20,23	◎	◎	◎	◎	◎	◎	◎	◎
90	22,68	●	●	◎	●	◎	◎	●	◎
95	25,27	◎	◎	◎	◎	◎	◎	◎	◎
100	28	●	●	◎	●	◎	◎	●	◎
110	33,88	●	●	◎	●	◎	◎	●	◎
120	40,32	●	●	◎	●	◎	◎	●	◎
130	47,32	◎	◎	◎	◎	◎	◎	◎	◎
140	53,9	◎	◎	◎	◎	◎	◎	◎	◎
150	67,8	◎	◎	◎	◎	◎	◎	◎	◎

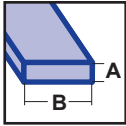


Hexagonal

Diameter in mm	theoretical weight Kgs/m/l	2007 T-4	2011 T-6	2017 T-4	2030 T-4	6060/63 T-5	6061 T-6	6082 T-6	7075 T-6
8	0,155	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
10	0,242	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
11	0,293	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
12	0,349	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
14	0,475	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
15	0,545	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
16	0,62	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
17	0,7	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
18	0,785	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
19	0,875	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
20	0,969	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
21	1,069	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
22	1,173	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
23	1,282	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
24	1,396	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
25	1,515	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
26	1,679	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
27	1,767	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
28	1,901	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
30	2,182	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
32	2,483	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
35	2,97	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
40	3,879	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
45	4,91	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
50	6,062	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
55	7,335	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
60	8,729	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙



ALUMINIUMS Materials in Stock Standardised Profiles



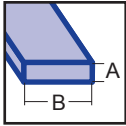
● = MATERIAL USUALLY IN STOCK
 ◎ = MATERIAL ON REQUEST OR NOT USUALLY IN STOCK
 Note: supply length 6,000 mm if not otherwise specified.

Standardised Flat Bars

Dimensions (mm)		Weight (Kg/ml)	Availability
B	A		
15	3	0,136	◎
15	7	0,299	◎
16	3	1,138	◎
16	6	0,274	◎
18	4	0,206	◎
20	2	0,115	◎
20	3	0,173	◎
20	4	0,217	◎
20	5	0,271	●
20	6	0,325	◎
20	8	0,434	●
20	10	0,542	●
25	2	0,136	◎
25	3	0,204	●
25	4	0,271	◎
25	5	0,340	●
25	10	0,678	●
25	12	0,814	◎
30	3	0,245	●
30	4	0,325	◎
30	5	0,408	●
30	6	0,488	●
30	8	0,651	●
30	10	0,814	●
30	12	0,972	●
30	15	1,220	●
30	20	1,632	●
30	25	2,040	◎
35	5	0,476	◎
40	2	0,217	◎
40	4	0,434	◎
40	5	0,544	●
40	6	0,653	◎
40	8	0,868	●
40	10	1,085	●
40	12	1,298	●
40	15	1,672	●
40	20	2,176	●
40	25	2,7000	●
45	6	0,763	◎
50	3	0,407	◎
50	5	0,680	●
50	6	0,816	◎
50	8	1,088	●
50	10	1,360	●
50	12	1,627	●



ALUMINIUMS Materials in Stock Standardised Profiles



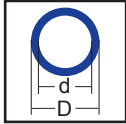
● = MATERIAL USUALLY IN STOCK
 ◎ = MATERIAL ON REQUEST OR NOT USUALLY IN STOCK
 Note: supply length 6,000 mm if not otherwise specified.

Standardised Flat Bars

Dimensions (mm)		Weight (Kg/ml)	Availability
B	A		
50	15	2,034	◎
50	20	2,712	●
50	25	3,390	●
50	30	4,080	●
60	5	0,814	●
60	6	0,976	●
60	8	1,302	●
60	10	1,626	●
60	12	1,953	●
60	15	2,441	●
60	20	3,254	●
60	30	4,860	●
60	40	6,504	◎
65	15	2,766	◎
70	5	0,948	●
70	10	1,898	●
70	20	3,787	●
75	15	3,040	◎
80	5	1,085	◎
80	8	1,736	◎
80	10	2,170	●
80	15	3,360	●
80	20	4,339	●
80	30	6,720	●
90	10	2,430	●
90	20	5,040	◎
100	5	1,356	●
100	8	2,176	●
100	10	2,720	●
100	12	3,240	●
100	15	4,200	●
100	20	5,424	●
100	27	7,658	◎
120	10	3,264	●
120	12	4,050	●
120	20	6,509	●
130	15	5,530	◎
140	10	3,970	◎
140	20	7,940	◎
150	6	2,440	◎
150	10	4,068	●
150	20	8,130	●
150	30	12,190	●
160	16	7,260	◎
170	4	1,930	◎
200	10	5,673	●
200	12	6,806	●
200	15	8,508	●



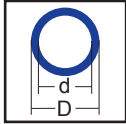
ALUMINIUMS Standardised Profiles



Note: supply length 6,000 mm if any other length is ordered.

Round Tubes

D	Dimensions (mm)		Weight (Kg/ml)	MLX (cm)	WX (cm)
	d	e			
12	10	1,25	12	10	0,114
13	10,5	1,25	13	10,5	0,125
13	10	1,5	13	10	0,141
16	13	1,5	16	13	0,228
18	15	1,5	18	15	0,297
20	18	1	20	18	0,271
20	17	1,5	20	17	0,376
20	16	2	20	16	0,465
21	15	3	21	15	0,674
22	19	1,5	22	19	0,465
22	18	2	22	18	0,578
25	22	1,5	25	22	0,613
25	21	2	25	21	0,771
25,6	16,5	4,55	25,6	16,5	1,364
26,5	20,5	3	26,5	20,5	1,174
30	27	1,5	30	27	0,912
30	26	2	30	26	1,156
30	25	2,5	30	25	1,373
30	24	3	30	24	1,566
30	22	4	30	22	1,885
30	20	5	30	20	2,128
32	29	1,5	32	29	1,048
33	28	2,5	33	28	1,700
33	26	3,5	33	26	2,170
33	25	4	33	25	2,367
35	31	2	35	31	1,618
35	30	2,5	35	30	1,938
36,2	25,5	5,35	36,2	25,5	3,512
38	35	1,5	38	35	1,511
38	32	3	38	32	2,679
40	36	2	40	36	2,162
40	35	2,5	40	35	2,600
40	30	5	40	30	4,296
42	36	3	42	36	3,348
45	40	2,5	45	40	3,360
45	37	4	45	37	4,858
47	43	2	47	43	3,053
48	42	3	48	42	4,492
50	47	1,5	50	47	2,692
50	45	2,5	50	45	4,221
50	40	5	50	40	7,246
52	40	6	52	40	8,972
55	50	2,5	55	50	5,179
60	57	1,5	60	57	3,935
60	56	2	60	56	5,115
60	55	2,5	60	55	6,234
60	52	4	60	52	9,243



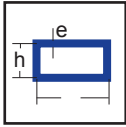
Note: supply length 6,000 mm if any other length is ordered.

Round Tubes

Dimensions (mm)			Weight (Kg/ml)	MLX (cm)	WX (cm)
D	d	e			
60	50	5	2,334	32,960	10,980
65	61	2	1,070	19,670	60,500
65	60	2,5	1,326	24,030	7,388
70	65	2,5	1,432	30,240	8,640
70	60	5	2,758	54,260	15,500
75	70	2,5	1,538	37,470	9,990
76	71	2,5	1,560	39,040	10,272
80	70	5	3,182	83,220	20,802
80	75	2,5	1,644	45,760	11,438
85	79	3	2,088	65,050	15,305
85	75	5	3,394	100,940	23,748
90	80	5	3,606	121,000	26,890
90	85	2,5	1,857	65,830	14,628
100	94	3	2,470	107,630	21,526
100	90	5	4,030	168,820	33,764
100	80	10	7,636	289,820	57,965
108	100	4	3,530	176,990	32,770
110	100	5	4,455	227,840	41,423
120	114	3	2,980	188,840	31,470
120	110	5	4,890	299,200	49,866
120	106	7	6,712	398,200	66,363
120	104	8	7,603	443,630	73,940
120	100	10	9,336	527,040	87,836
125	115	5	5,090	339,900	54,383
130	125	2,5	2,708	203,570	31,319
140	130	5	5,730	483,780	69,110
140	120	10	11,030	867,880	123,983
146	130	8	9,365	828,430	113,483
150	134	5	9,640	902,400	120,320
150	140	5	6,153	599,330	79,910
150	138	6	7,330	704,800	93,973
150	136	7	8,495	805,770	107,437
150	125	12,5	14,600	1286,660	171,554
155	145	5	6,364	663,440	85,604
160	150	5	6,580	731,950	91,495
160	140	10	12,725	1331,280	166,410
168	160	4	5,568	693,300	82,536
180	160	10	14,430	1936,010	215,116
190	180	5	7,845	1244,010	130,963
200	190	5	8,275	1456,900	145,690
200	180	10	16,120	2,700,099	270,099
210	200	5	8,700	1692,600	161,200
219	211	4	7,298	1561,700	142,619
230	218	6	11,406	2560,140	230,448
254	246	4	8,490	2455,030	193,310
273	265	4	9,130	3,058,03	224,050
302	290	6	15,066	6113,200	404,847



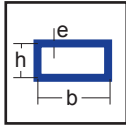
ALUMINIUMS Standardised Profiles



Rectangular Tubes

Dimensions (mm)			Weight (Kg/ml)	MLX (cm)	MLY (cm)	WX (cm)	WY (cm)
b	h	e					
20	10	1,5	0,232	0,130	0,190	0,238	0,379
20	10	2	0,282	0,130	0,460	0,277	0,463
25	15	1,5	0,318	0,400	0,900	0,512	0,709
30	10	1,5	0,314	0,160	1,090	0,344	0,733
30	15	1,5	0,356	0,460	1,400	0,603	0,935
30	20	2	0,499	1,110	2,150	1,113	1,438
35	20	1,5	0,443	1,030	2,510	1,024	1,432
40	10	2	0,499	0,260	3,000	0,537	1,500
40	12	1,5	0,418	0,360	2,610	0,586	1,300
40	20	1,30	0,424	1,030	3,090	1,026	1,542
40	20	1,5	0,487	1,170	3,510	1,153	1,744
40	20	2	0,637	1,450	4,440	1,437	2,223
40	25	2	0,693	2,440	5,160	1,943	2,586
40	30	2	0,749	3,750	5,900	2,484	2,945
40	30	4	1,398	6,150	9,990	4,108	4,999
45	15	1,5	0,461	0,670	3,990	0,882	1,772
50	20	2	0,750	1,770	7,880	1,764	3,144
50	25	1,5	0,613	2,330	7,030	1,873	2,803
50	25	2	0,806	2,980	9,030	2,366	3,604
50	40	2	0,976	8,770	12,480	4,392	4,988
50	40	4	1,861	15,220	21,920	7,600	8,763
55	15	1,5	0,544	0,810	6,730	1,063	2,450
60	10	1,5	0,571	0,350	7,210	0,675	2,400
60	20	1,5	0,656	1,680	9,770	1,666	3,257
60	20	2	0,861	2,080	12,570	2,088	4,194
60	30	2	0,976	5,310	15,940	3,531	5,536
60	40	1,5	0,824	0,930	14,890	3,971	4,967
60	40	2	1,088	10,240	19,330	5,113	6,437
60	40	3	1,530	14,310	27,380	7,157	9,128
60	40	4	1,996	17,800	34,500	8,900	11,501
70	20	2	0,976	2,430	18,850	2,412	5,393
70	30	2,5	1,349	7,290	28,550	4,856	8,155
75	25	2	1,09	4,270	25,260	3,428	6,733

Note: supply length 6,000 mm if not otherwise specified.



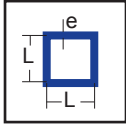
Rectangular Tubes

Dimensions (mm)			Weight (Kg/ml)	MLX (cm)	MLY (cm)	WX (cm)	WY (cm)
b	h	e					
80	20	1,7	0,937	2,430	23,180	2,416	5,790
80	30	2	1,206	6,880	32,900	4,580	8,222
80	40	1,5	0,999	10,180	29,930	5,083	7,477
80	40	2	1,317	13,130	38,990	6,560	9,744
80	40	4	2,541	23,020	71,140	11,504	17,784
80	60	2	1,544	32,770	51,130	10,925	12,788
100	20	2	1,317	3,400	48,710	3,391	9,742
100	25	1,7	1,173	4,920	46,100	3,929	9,218
100	40	2	1,543	16,020	67,930	8,005	13,584
100	40	4	2,996	28,230	125,690	14,105	25,135
100	50	2	1,655	26,320	77,530	10,520	15,506
100	50	2,5	2,06	32,040	95,170	12,812	19,031
100	50	3	2,45	37,440	112,120	14,980	22,426
120	40	2	1,77	18,920	107,740	9,451	17,957
120	40	4	3,45	33,430	201,360	16,709	33,560
120	50	2	1,883	30,920	121,670	12,364	20,277
120	50	4	3,675	55,870	228,300	22,342	38,050
120	60	4	3,9	84,770	255,210	28,256	42,534
120	80	3	3,3	127,050	238,400	31,760	39,732
140	60	2,5	2,765	64,850	244,350	21,610	34,906
146	110	2,3	3,28	239,680	361,620	43,577	50,633
150	30	2	1,995	12,350	169,440	8,240	22,596
150	50	2,5	2,76	46,160	263,000	18,455	35,065
150	70	2,7	3,287	46,370	282,550	29,683	45,480
160	80	10	12,472	430,660	1358,650	107,665	169,836
170	50	2,7	3,287	55,360	389,600	22,155	45,835
192	78	4	5,94	233,330	966,720	59,830	100,700
200	70	3	4,49	147,850	772,590	42,245	77,255
200	100	3,5	5,81	372,100	1095,170	74,595	109,517
300	120	4,5	10,489	1003,460	4205,100	167,250	280,400

Note: supply length 6,000 mm if not otherwise specified.



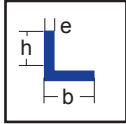
ALUMINIUMS Standardised Profiles



Square Tubes

L	Dimensions (mm)		e	Weight (Kg/ml)	ML (cm)	WX (cm)
	L	L				
15	15	15	1,5	0,258	0,260	0,330
16	16	16	1,5	0,267	0,320	0,382
20	20	20	1,5	0,344	0,630	0,634
20	20	20	2	0,410	0,770	0,785
25	25	25	1,5	0,396	1,310	0,041
25	25	25	2	0,508	1,640	1,306
25	25	25	3	0,760	2,160	1,734
30	30	30	1,5	0,476	2,330	1,550
30	30	30	2	0,660	2,950	1,960
35	35	35	1,5	0,570	3,770	2,154
35	35	35	2	0,760	4,820	2,747
40	40	40	1,5	0,680	5,710	2,856
40	40	40	2	0,880	7,360	3,666
40	40	40	3	1,220	10,210	5,100
40	40	40	4	1,597	12,610	6,299
45	45	45	2	0,980	1063,000	4,723
50	50	50	2	1,060	14,780	5,907
50	50	50	3	1,564	20,840	8,340
50	50	50	4	2,042	26,160	10,462
60	60	60	1,5	0,998	20,040	6,667
60	60	60	2	1,278	26,030	8,681
60	60	60	4	2,463	47,050	15,692
70	70	70	1,8	1,389	38,060	10,882
80	80	80	2	1,698	63,330	15,830
80	80	80	4	3,310	117,350	29,344
100	100	100	2	2,226	125,540	25,109
100	100	100	2,5	2,771	154,570	30,916
100	100	100	4	4,266	236,380	47,271
120	120	120	2,50	3,229	270,530	45,088
150	150	150	4	6,128	830,560	110,740
255	255	255	3,50	9,870	3712,600	291,187

Note: supply length 6,000 mm if not otherwise specified.



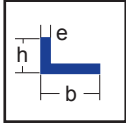
Angles with equal sides

b	Dimensions (mm)		e	Weight (Kg/ml)	MLX (cm)	WX (cm)
	h					
15	15		1,5	0,121	0,091	0,085
15	15		2	0,152		
20	20		1,5	0,164	0,224	0,155
20	20		2	0,215	0,288	0,202
20	20		3	0,315	0,403	0,290
25	25		1,5	0,206	0,447	0,246
25	25		2	0,272	0,579	0,321
25	25		3	0,400	0,820	0,465
25	25		4	0,522	1,035	0,599
30	30		1,5	0,249	0,783	0,357
30	30		2	0,329	1,020	0,469
30	30		3	0,485	1,458	0,681
30	30		4	0,635	1,855	0,882
35	35		2	0,386	1,642	0,644
35	35		3	0,570	2,363	0,940
40	40		2	0,442	2,476	0,845
40	40		3	0,656	3,581	1,241
40	40		4	0,865	4,605	1,612
40	40		5	1,068	5,568	1,972
50	50		2	0,559	4,903	1,330
50	50		5	1,340	11,253	3,157
50	50		6	1,600	13,128	3,720
60	60		2	0,700	8,560	1,930
60	60		3	0,952	12,583	2,865
60	60		5	1,632	19,900	4,610
60	60		6	1,940	23,333	5,450
60	60		8	2,542	29,685	7,055
70	70		5	1,910	32,155	6,352
70	70		6	2,275	37,803	7,515
70	70		7	2,525	43,220	8,660
75	75		6	2,450	46,880	8,670
80	80		8	3,450	73,730	12,920
90	90		10	4,825	129,183	20,245
100	100		10	5,389	180,001	25,245

Note: supply length 6,000 mm if not otherwise specified.



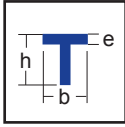
ALUMINIUMS Standardised Profiles



Angles with unequal sides

Dimensions (mm)			Weight (Kg/ml)	MLX (cm)	MLY (cm)	WX (cm)	WY (cm)
b	h	e					
20	10	1,5					
25	10	2	1,188	0,043	0,422	0,053	0,274
30	15	1,5	0,188	0,114	0,625	0,095	0,322
30	15	2	0,233	0,135	0,489	0,119	0,299
30	20	2	0,260	0,325	0,894	0,214	0,444
30	25	6	0,835	1,490	2,390	0,870	1,220
35	15	1,5	0,210	0,116	0,952	0,091	0,426
40	20	2	0,331	0,351	1,967	0,221	0,760
40	25	2	0,341	0,664	2,126	0,343	0,791
40	30	2	0,369	1,112	2,256	0,487	0,815
50	15	2	0,355	0,153	3,270	0,122	1,091
50	25	2	0,416	0,700	3,901	0,345	1,195
60	15	2	0,416	0,163	5,396	0,125	1,532
60	32	2	0,508	1,475	6,963	0,573	1,753
60	40	2	0,553	2,775	7,513	0,888	1,819
60	40	4	1,088	5,183	14,272	1,704	3,521
65	30	6	1,510	3,171	22,924	1,381	5,663
70	35	2	0,588	1,974	10,901	0,695	2,374
70	35	3	0,865	2,851	15,972	1,014	3,508
70	50	5	1,703	12,660	34,850	3,320	6,884
80	20	2	0,555	0,395	13,000	0,230	2,753
80	40	2	0,664	2,984	16,370	0,914	3,110
85	25	1,7	0,524	0,665	14,091	0,309	2,735
100	50	6	2,450	15,895	90,575	4,035	14,076
100	75	9,5	4,459	75,830	156,622	13,683	23,068
103	36	2	0,774	0,231	31,249	0,755	4,879
110	70	8	3,905	55,214	171,501	10,347	23,376
150	90	9,5	6,204	143,144	513,367	20,584	51,575
180	70	10	6,808	74,627	811,627	13,265	72,957
200	100	9,52	7,844	208,470	1173,265	26,170	90,487

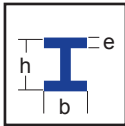
Note: supply length 6,000 mm if not otherwise specified.



"T"-shaped profiles

b (mm)	h (mm)	e (mm)	Weight (Kg/ml)	Mlx (cm4)	Mly (cm4)	Wx (cm3)	Wy (cm3)
15	15	1,50	0,121	0,091	0,043	0,085	0,057
20	20	1,50	0,164	0,224	0,101 0,155		0,101
20	20	2,00	0,215	0,288	0,135	0,202	0,135
25	25	1,50	0,206	0,447	0,196 0,246		0,157
30	30	2,00	0,329	1,020	0,452	0,469	0,301
40	40	2,00	0,442	2,476	1,069 0,846		0,535
40	40	4,00	0,862	4,608	2,153	1,615	1,076
50	50	5,00	1,347	11,250	5,255	3,155	2,102
60	60	3,00	0,995	12,536	5,413	2,856	1,804
80	80	6,40	2,787	60,691	27,467	10,531	6,867
100	70	4,00	1,882	29,118	33,369	5,384	6,674
104	80	6-8	3,513	71,030	65,826	11,838	12,659

Standard length 6,000 mm.



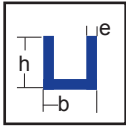
Double "T"-shaped profiles

b (mm)	h (mm)	e (mm)	Weight (Kg/ml)	Mlx (cm4)	Mly (cm4)	Wx (cm3)	Wy (cm3)
83,0	48,0	5,00	2,889	40,826	47,689	17,001	11,491
101,6	76,2	6,35	4,797	171,370	111,131	44,979	21,876
152,4	76,2	9,53	9,770	339,796	562,620	89,185	73,835

Standard length 6,000 mm.



ALUMINIOS Perfiles Normalizados



"U"-shaped profiles

b (mm)	h (mm)	e (mm)	Weight (Kg/ml)	Mlx (cm4)	Mly (cm4)	Wx (cm3)	Wy (cm3)
10	10	1,50	0,115	0,039	0,059	0,064	0,118
15	15	2,00	0,232	0,181	0,278 0,196		0,370
16	16	1,50	0,191	0,176	0,281	0,174	0,351
20	20	1,50	0,242	0,354	0,576 0,277		0,576
20	20	2,00	0,318	0,453	0,719	0,360	0,719
25	15	2,00	0,289	0,218	0,950 0,214		0,760
30	15	1,50	0,242	0,182	1,161	0,170	0,774
30	20	3,00	0,544	0,731	2,542 0,554		1,694
30	30	2,00	0,488	1,613	2,649	0,839	1,766
40	20	2,00	0,431	0,576	3,668 0,404		1,834
40	25	3,00	0,714	1,524	6,128	0,899	3,064
40	40	2,00	0,658	3,928	6,559 1,517		3,279
40	40	4,00	1,270	7,246	11,503	2,882	5,751
50	20	2,00	0,448	0,616	6,233 0,416		2,493
50	25	3,00	0,799	1,641	10,425	0,930	4,170
60	15	1,50	0,370	0,220	6,166 0,185		2,055
60	20	2,00	0,544	0,648	9,658	0,425	3,219
60	30	4,00	1,270	3,711	23,535 1,764		7,845
60	30	5,00	1,559	4,433	27,958	2,143	9,319
60	40	5,00	1,843	10,097	35,542	3,777	11,847
70	20	2,00	0,601	0,675	14,042	0,432	4,012
76	35	5,00	1,928	7,463	56,161 3,012		14,779
80	20	2,00	0,658	0,696	19,487	0,438	4,872
80	40	2,00	0,885	4,952	31,658 1,693		7,914
80	40	3,00	1,310	7,164	45,723	2,480	11,431
80	40	4,00	1,7242	9,216	58,692 3,231		14,673
80	40	6,00	0,517	12,896	81,578	4,637	20,394
80	45	7,00	3,096	20,442	100,960	6,694	25,240
100	20	2,00	0,771	0,730	33,956	0,447	6,791
100	40	4,00	1,950	9,861	99,727 3,328		19,945
100	45	2,00	1,055	7,338	57,970	2,184	11,594
100	50	5,00	2,693	22,501	143,292	6,310	28,658
100	50	6,00	3,198	26,252	166,794	7,437	33,359
101	50	6,00/8,00	3,711	29,886	193,329	8,538	38,283
101,6	50,8	6,35/7,90	3,817	31,790	201,408	8,956	39,647
120	30	2,00	0,998	2,458	67,791 1,015		11,298
125	63	6,00	4,065	54,241	340,015	12,060	54,402
135	25	2,00	1,026	1,487	81,694 0,714		12,103
150	50	5,00	3,402	25,328	377,250	6,643	50,300
150	75	10,00/13,00	9,0314	162,195	1.025,493	31,157	136,725
152,4	57,2	6,35	0,574	45,922	531,901	10,785	69,803
152,4	76,2	6,35/9,53	6,504	125,724	800,299	23,185	105,026
152,4	76,2	9,53/12,70	8,904	166,092	1.051,371	31,284	137,975
160	80	4,00	3,538	79,238	506,522 13,542		63,315
160	80	10,00	8,505	177,967	1.130,000	31,592	141,250
165	18	2,00	1,117	0,582	117,381 0,374		14,228
175	57,2	6,35	4,981	47,697	743,023	10,962	84,917
177,8	63,5	6,35	5,258	64,670	831,054 13,501		93,482
200	75	14,00	12,780	206,720	2.413,372	38,430	241,337
200	85	12,00	11,771	263,605	2.350,170	43,167	235,017
203,2	58,2	6,35	5,525	52,106	1.082,117	11,530	106,508
203,2	76,2	7,92/12,70	9,791	170,647	1.985,828	30,442	195,456
254	76,2	9,53/12,70	12,106	192,842	3.653,181	33,402	287,652



BRONZES

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BRONZES General Tables Equivalences - Composition

Red Brass and Tin Bronze Alloys

Commercial Ref.	Chemical composition Alloys re. specifications in force (values in percentages, minimum/maximum)										Most similar International standards
	Cu	Sn	Pb	Zn	Ni	P	Fe	Sb	S	Others	
B – 0 2)	Rest	1,5 3,0	4,0 9,0	7,0 11,0	2,0	0,10	1,2	0,3	0,10		BS 1400 - LG1 C84400
B – 5 2)	Rest	4 7	4 6,5	4 6,5	2					1	ISO 1338 - CuSn5Pb5Zn5 BS 1400 - LG2 NFA 53-707 - UE5 C83600
B – 7 2) 3)	Rest	6,0 8,0	5,0 7,0	3,5 5,5	2,0					1,0	ISO 1338 - CuSn7Pb6Zn4 BS 1400 - LG3 NFA 53-707 - UE7 C93200
B-Rg10 2)	86,0 89,0	9,0 11,0	1,5	1,0 3,0	0,05 2	0,25 0,05	2,0 0,25	0,3	0,10		ISO 1338 - CuSn10Zn2 BS 1400 - LG3 NFA 53-707 - UE10 C90500
B – 10 2)	Rest	9,0 12,0	1,0	1,0	2,0	0,4	0,2	0,2	0,05		ISO 1338 - CuSn10 BS 1400 - CT1 C90700
B – 12 1),2)	Rest	10,5 13,0	1,0	1,0	2,0	0,4	0,2	0,2	0,05		ISO 1338 - CuSn12 BS 1400 - PB2 NFA 53-707 - UE12 C91700



Red Brass and Tin Bronze Alloys

Commercial Ref.	Denomination of materials and processes in accordance with standard			Approximate mechanical characteristics at 20°C (minimum values)					Properties	Applications
	Denomination	Material no.	Process	Elastic limit $R_{p0.2}$ N/mm ²	Breaking load $R_{p0.2}$ N/mm ²	Elongation A5 (%)	Hardness HB 10/1000	Elastic Modulus KN/mm ²		
B - 0 2)	CuSn2ZnPb DIN 1705	2.1098.01	G GC GZ	90	210	18	60	90 to 95	Good machinability. Weldable with brass. Works well at moderate speed and load. Resistant to sea water and waste water. Working temperature up to 225°C.	Bushings and bearings at moderate speeds and loads. Low pressure valves and fittings.
B - 5 2)	CuSn5ZnPb DIN 1705	2.1096.01	G GC GZ	90	220	16	60	65 to 105	Good machinability. Weldable with brass, with soft solder; only conditionally strong. Works well at moderate load. Resistant to sea water.	Bushings and bearings at moderate speeds and loads. Low pressure valves and fittings.
B - 7 2) 3)	CuSn7ZnPb DIN 1705	2.1090.01 2.1090.04 2.1090.03	G GC GZ	120 120 130	240 270 270	15 16 13	65 70 75	98 to 115	Semi-hard material. Resistant to wear and tear and sea water.	Bearings, sliding plates up to peaks of 4,000 N/mm ² . Appropriate for emergency sliding.
B-Rg10 2)	CuSn10Zn DIN 1705	2.1086.01	G GC GZ	130		15	75	75 to 110	Hard material. Good resistance to traction, wear and tear and sea water.	Sliding bearings and coupling parts subjected to moderate stresses.
B - 10 2)	CuSn10 DIN 1705	2.1050.01	G GC GZ	130	270	18	70	90 to 110	Hard material endowed with a high expansion percentage, resistant to corrosion and sea water.	Suitable for guide wheels and turbine blades.
B - 12 1), 2)	CuSn12 DIN 1705	2.1052.01 2.1052.04 2.1052.03	G GC GZ	140 140 150	260 280 280	12 8 5	80 90 95	90 to 110	Hard material with resistance to wear and tear, corrosion and sea water.	Spindle nuts, worm gears and cylinder liners.



BRONZES General Tables Equivalences - Composition

Lead Bronzes

Commercial Ref.	Chemical composition Alloys re. specifications in force (values in percentages, minimum/maximum)										Most similar International standards
	Cu	Sn	Pb	Zn	Ni	P	Fe	Sb	S	Others	
B - Pb10 2)	78,0 82,0	9,0 11,0	8,0 11,0	2,0	1,50	0,05	0,25	0,50			SO 1338 - CuPb10Sn NFA 53-707 - CuPb10Sn10 BS 1400 - LB2 C93700
B - Pb15 2)	75,0 79,0	7,0 9,0	13,0 17,0	3,0	2,0	0,05	0,25	0,50			ISO 1338 - CuPb15n8 BS 1400 - LB1 C93800
B - Pb20 2)	69,0 76,0	4,0 6,0	18,0 23,0	3,0	2,50	0,05	0,25	0,50			ISO 1338 - CuPb20Sn NFA 53-707 - CuPb20Sn5 BS 1400 - LB5 C94300

Aluminium Bronzes

Commercial Ref.	Chemical composition Alloys re. specifications in force (values in percentages, minimum/maximum)										Most similar International standards
	Cu	Sn	Pb	Zn	Ni	P	Fe	Sb	S	Others	
B-AlFe 2) 5)	83,0	0,3	0,2	0,5	3,0	0,2	2,0 4,0	8,0 11,0	1,0		ISO 1338 - CuAl10Fe3 BS 1400 - AB1 NFA 53-709-CuAl10Fe3 C95400 - AMPCO 18
B-AlNi 2) 5)	79,0 Resto	0,2	0,05	0,5	4,0 6,5	0,1	3,5 5,5	8,5 11,0	3,0		ISO 1338 - CuAl10Fe5Ni5 BS 1400 - AB2 NFA 53-709-CuAl10Fe5Ni5 C95500



BRONZES General Tables Characteristics - Applications

Lead Bronzes

Commercial Ref.	Denomination of materials and processes in accordance with standard			Approximate mechanical characteristics at 20°C (minimum values)					Properties	Applications
	Denomination	Material no.	Process	Elastic limit $R_{p0.2}$ N/mm ²	Breaking load $R_{p0.2}$ N/mm ²	Elongation A5 (%)	Hardness HB 10/1000	Elastic Modulus KN/mm ²		
B - Pb10 2)	CuPb10Sn DIN 1716	2.1176.01	G	80	180	8	65	75 to 83	Material endowed with good corrosion-proofing, resistance to slipping and wear and tear. Excellent antifriction quality.	Friction bearings for high speeds, pressures, impacts and vibrations in contact with acidic or abrasive agents for hot rolling mills etc.
		2.1176.04	GC	110	230	12	70			
		2.1176.03	GZ	110	220	8	70			
B - Pb15 2)	CuPb15Sn DIN 1716	2.1182.01	G	90	180	8	60	75 to 80	Corrosion-proofing and good emergency operating properties without lubricant, even with water.	Bearings for medium loads and high speeds, hot rolling mills, pumps and corrosion-proof valves.
		2.1182.04	GC	110	220	8	65			
		2.1182.03	GZ	110	220	7	65			
B - Pb20 2)	CuPb20Sn DIN 1716	2.1188.01	G GC GZ	90	160	6	50	74 to 78	Suitable for emergency use without lubricant, also with intermittent water. Resistant to sulphuric acid.	Bearings for medium loads and high speeds, hot rolling mills, pumps and corrosion-proof valves.

Aluminium Bronzes

Commercial Ref.	Denomination of materials and processes in accordance with standard			Approximate mechanical characteristics at 20°C (minimum values)					Properties	Applications
	Denomination	Material no.	Process	Elastic limit $R_{p0.2}$ N/mm ²	Breaking load $R_{p0.2}$ N/mm ²	Elongation A5 (%)	Hardness HB 10/1000	Elastic Modulus KN/mm ²		
B-AlFe 2) 5)	CuAl10Fe3 DIN 1714	2.0940.01	G	180	500	15	115	110 to 116	Extremely hard, tough material. Not suitable for use in sea water.	For mechanical components submitted to stresses between -200 and +200°C.
		2.0940.03	GC GZ	200	550	15	115			
B-AlNi 2) 5)	CuAl10Ni DIN 1714	2.0975.01	G	270	600	12	140	110 to 128	Extremely hard, tough material. Resistant to non-oxidant acids including hot sea water. Highly weldable material.	For very high loads and stresses.
		2.0975.04	GC	300	700	13	160			
		2.0975.03	GZ	300	700	13	160			



BRONZES General Tables Equivalences - Composition

High Resistance Brasses

Commercial Ref.	Chemical composition Alloys re. specifications in force (values in percentages, minimum/maximum)											Most similar International standards
	Cu	Sn	Pb	Zn	Ni	P	Fe	Si	Co	Mn	Al	
B-255 2) 5)	60,0 67,0	0,1	0,2	Rest	3,0	0,05	1,5 4,0	0,1		2,5 5,0	3,0 7,0	ISO 1338 - CuZn25Al6Fe3Mn3 BS 1400 - HT B3 NFA 53-703-CuZn19Al6 C86300
B-342 2) 5)	55,0 66,0	0,3	0,3	Rest	3,0	0,05	0,5 2,5	0,1		0,3 4,0	1,0 3,0	ISO 1338 - CuZn34Al2Fe3Mn3 BS 1400 - HT B1 NFA 53-703-CuZn33Al4 C86700

Special Alloys

Commercial Ref.	Chemical composition Alloys re. specifications in force (values in percentages, minimum/maximum)											Most similar International standards
	Cu	Sn	Pb	Zn	Ni	P	Fe	Si	Co	Mn	Al	
B-102 5) 6)	84,5 87		0,05		9 11	0,05	1,0 1,8	0,1		1,5		C96200 GAMM MM12CuNi10Fe1Mn
B-134 5)	Rest	0,1	0,05	0,1			4,0 5,0			1,5 2,5	12,5 13,5	AMPCO 21W B-134 forjado, equivale a C62500- AMPCO 21
B-159	Rest	0,1	0,05		13,5 16,5		0,4 1,0		1,0 2,0	0,5	10,75 11,5	C99300 INCRAMET 800
B-033	89,0	1,0	0,5	5,0			2,5	1,0 5,0		1,5	1,5	C87200



BRONZES General Tables Characteristics - Applications

High Resistance Brasses

Commercial Ref.	Denomination of materials and processes in accordance with standard			Approximate mechanical characteristics at 20°C (minimum values)					Properties	Applications
	Denomination	Material no.			Breaking load R _{p0.2} N/mm ²	Elongation A5 (%)	Hardness HB 10/1000	Elastic Modulus KN/mm ²		
B-255 2) 5)	CuZn25Al5 DIN 1709	2.0598.01	G	450	750	8	180	105 to 115	Material endowed with very high static load for works subjected to slow speeds.	Die-making
		2.0598.03	GC	480	750	5	190			
		2.0598.02	GK	480	750	8	180			
B-342 2) 5)	CuZn34Al2 DIN 1709	2.0596.01	G	250	600	15	140	90 to 98	Material endowed with static load and high hardness. Not suitable for marine use.	Parts of valves, seats, cones, etc.
		2.0596.03	GC	260	620	14	150			
		2.0596.02	GK	260	600	10	140			

Special Alloys

Commercial Ref.	Denomination of materials and processes in accordance with standard			Approximate mechanical characteristics at 20°C (minimum values)					Properties	Applications
	Denomination	Material no.	Process	Elastic limit R _{p0.2} N/mm ²	Breaking load R _{p0.2} N/mm ²	Elongation A5 (%)	Hardness HB 10/1000	Elastic Modulus KN/mm ²		
B-102 5) 6)	ASTM	C96200	B505	310	500	20	65	135	High corrosion-proofing in sea water. Very weldable.	Construction of high-pressure piping.
			B369	310	550	20	65			
B-134 5)	ASTM	unedited C62500		380	600	1	270	110	Very high mechanical characteristics. Particularly shock-resistant.	Stainless steel deep stamping moulds.
	ASTM		414	758	1	285				
B-159	ASTM	C99300	unedited	627 to 675		4	200	126	Material resistant to work at very high temperatures.	Manufacture of glass injection moulds.
B-033	ASTM	C87200	B148 B505 B271	176		30	85	105	Corrosion-proofing and appropriate for marine piping accessories.	Bearings, propellers, valve components and terminal boards.

Notes

- 1) For continuous and centrifugal casting, 10.5% of Sn is admissible.
- 2) The Ni content contains Cu.
- 3) For continuous and centrifugal casting, 5.6% of Sn is admissible.
- 4) In the June 1973 edition, the former reference G-BZ14 was done away by the DIN standard in favour of alloy reference DIN 1705 CuSn12.
- 5) Wrought material subject to other improvement processes subsequent to smelting to improve its mechanical characteristics; its final values depend on the process.
- 6) Excellent deformation when cold.

G - Sand casting.
GC - Continuous casting.
GK - Die casting.
GZ - Centrifugal casting.

B128 - Sand casting (depending on alloys)
B271 - Centrifugal casting.
B505 - Continuous casting.
B584 - Sand casting (depending on alloys)

FORMS OF SUPPLY
1 - Rough casting.
2 - Roughing.
3 - Thermally treated.
4 - Terminated on plan.
5 - Forging.



BRONZES General Tables Approximate measurements and weights

Hollow bars

Ø (mm)		Weight (Kg) Length 650 mm	Ø (mm)		Weight (Kg) Length 650 mm
Outer	Inner		Outer	Inner	
25	15	2,00	85	40	27,00
30	15	3,50	85	45	25,00
30	20	2,50	85	50	23,00
35	15	5,00	85	55	21,00
35	20	4,00	85	60	18,50
40	15	6,50	90	35	31,50
40	20	6,00	90	40	30,50
40	25	5,00	90	45	29,00
45	20	8,00	90	50	26,50
45	25	7,00	90	55	25,00
45	30	5,50	90	60	22,50
50	20	10,00 90		65	19,50
50	25	9,00	95	40	34,00
50	30	8,00	95	50	31,50
50	35	6,50	95	60	27,00
55	20	12,00 95		70	21,00
55	25	11,50	100	50	34,00
55	30	10,00	100	60	30,50
55	35	9,00	100	70	25,50
60	25	14,50	100	80	17,50
60	30	13,50	110	55	43,00
60	35	11,50	110	65	37,00
60	40	9,50	110	75	31,50
60	45	8,00	110	85	25,00
65	25	27,00	120	50	55,00
65	30	15,50	120	60	50,00
65	35	15,00	120	70	44,50
65	40	13,00	120	80	38,50
65	45	11,50	120	90	31,00
70	25	19,50	130	60	61,00
70	30	19,00	130	70	54,00
70	35	17,50	130	80	49,00
70	40	16,00	130	90	41,50
70	45	14,00	130	100	33,00
70	50	12,50	140	70	70,00
75	35	20,50	140	80	62,50
75	40	19,50	140	90	56,00
75	45	17,00	140	100	46,00
75	50	15,50	140	110	37,50
80	30	25,00	150	70	81,00
80	35	24,00	150	80	76,00
80	40	22,50	150	90	69,00
80	45	20,50	150	100	61,00
80	50	18,50	150	110	53,00
80	55	16,50	160	90	81,00
85	30	29,00	160	100	72,50
85	35	27,50	160	110	63,00

CONTINUOUS CASTING OF BARS, BOTH HOLLOW AND SOLID FOR LENGTHS OF 650 mm.
 Though, to order, they may be delivered in lengths of up to 3 m provided that they are continuous casting.
 CASTING OF ALL KINDS OF PARTS TO ORDER.

**Hollow bars**

Ø (mm)		Weight (Kg) Length 650 mm	Ø (mm)		Weight (Kg) Length 650 mm
Outer	Inner		Outer	Inner	
160	120	53,00	240	200	83,00
160	130	41,50	250	160	158,50
170	95	91,00	250	170	144,00
170	105	81,00	250	180	139,00
170	115	72,00	250	190	122,50
170	125	60,00	250	200	105,00
170	135	48,00	250	210	86,50
170	145	36,00	250	220	67,50
180	100	101,00	260	160	182,00
180	110	94,00	260	170	166,00
180	120	83,50	260	180	141,50
180	130	72,40	260	190	136,00
180	140	60,50	260	200	120,50
180	150	47,50	270	170	196,00
190	115	104,00	270	180	180,00
190	125	92,00	270	190	166,00
190	135	80,00	270	200	150,00
190	145	68,00	270	210	132,00
190	155	55,00	270	220	177,00
200	120	116,00	280	180	205,00
200	130	106,50	280	190	190,00
200	140	94,50	280	200	173,00
200	150	82,00	280	210	156,00
200	160	68,00	280	220	138,00
210	135	118,00	280	230	119,00
210	145	106,00	290	190	216,00
210	155	93,00	290	200	198,00
210	165	80,00	290	210	180,00
210	175	64,00	290	220	163,00
210	185	48,00	290	230	143,00
220	140	133,00	290	250	124,00
220	150	119,50	300	190	242,00
220	160	106,00	300	200	224,00
220	170	91,00	300	210	205,00
220	180	75,50	300	220	186,00
220	190	59,00	300	230	169,00
230	150	132,50	300	240	150,00
230	160	126,00	300	250	129,00
230	170	111,50	310	200	239,00
230	180	95,50	320	210	223,00
230	190	79,00	330	220	202,00
230	200	62,00	330	230	185,00
240	150	150,50	330	240	165,00
240	160	137,50	330	250	145,00
240	170	132,50	330	260	122,00
240	180	117,00	330	270	100,00
240	190	100,50			

CONTINUOUS CASTING OF BARS, BOTH HOLLOW AND SOLID FOR LENGTHS OF 650 mm.
 Though, to order, they may be delivered in lengths of up to 3 m provided that they are continuous casting.
 CASTING OF ALL KINDS OF PARTS TO ORDER.



BRONZES General Tables Approximate measurements and weights

Solid bars

Ø (mm)	Weight (Kg) Length 650 mm
15	1,10
20	2,00
25	3,00
30	4,50
35	6,00
40	7,50
45	9,50
50	11,50
55	14,00
60	16,50
65	20,00
70	22,50
75	26,50
80	29,50
85	34,50
90	37,50
95	42,50
100	46,50
110	56,00
120	66,50
130	77,50
140	87,00
150	101,50
160	112,00
170	126
180	143
190	159,00
200	176,00
210	194,00
220	213,00
230	232,00
240	253,00
250	274,00
260	297,00
270	320,00
280	344,00
290	369,00
300	395,00

Square and rectangular

Width (mm)	Thickness mm	Weight/Part (Kgs) Length 2,000 mm
20	20	8,4
30	30	17,8
40	40	30,7
50	50	47,0
60	60	66,9
80	80	117,0
100	100	181,0
120	120	259,0
150	150	402,0
260	60	282,6
310	10	65,1
310	15	92,3
310	20	119,4
310	25	146,6
310	30	173,7
310	35	200,9
310	40	228,0
310	50	282,3



CASTING

ALUMINIUM

General Tables **92**

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ALUMINIUM General Tables Chemical composition

Chemical composition of Aluminium alloys for casting

Group of alloys	Alloy designation		Chemical composition as % of mass											Others ¹⁾	
	Numerical EN AC	Symbolic EN AC	Si	Fe	Cu	MN	Mg	Cr	Ni	Zn	Pb	Sn	Ti	Each	Total
AlCu	21000	Al Cu4MgTi	0,20 (0,15)	0,35 (0,30)	4,2 to 5,0	0,10	0,15 to 0,35 (0,20 to 0,35)	-	0,05	0,10	0,05	0,05	0,15 to 0,30 (0,15 to 0,25)	0,03	0,10
	21100	Al Cu4Ti	0,18 (0,15)	0,19 (0,15)	4,2 to 5,2	0,55	-	-	-	0,07	-	-	0,15 to 0,30 (0,15 to 0,25)	0,03	0,10
AlSiMgTi	41000	Al Si2MgTi	1,6 to 2,4	0,60 (0,50)	0,10 (0,08)	0,30 - 0,50	0,45 to 0,65 (0,50 to 0,65)	-	0,05	0,10	0,05	0,05	0,05 to 0,20 (0,07 to 0,15)	0,05	0,15
AlSi7Mg	42000	Al Si7Mg	6,5 to 7,5	0,55 (0,45)	0,20 (0,15)	0,35	0,20 to 0,65 (0,25 to 0,65)	-	0,15	0,15	0,15	0,05	0,05 to 0,25 (0,05 to 0,20)	0,05	0,15
	42100	Al Si.7Mg0.3	6,5 to 7,5	0,19 (0,15)	0,05 (0,03)	0,10	0,25 to 0,45 (0,30 to 0,45)	-	-	0,07	-	-	0,08 to 0,25 (0,10 to 0,18)	0,03	0,10
	42200	Al Si7Mg0.6	6,5 to 7,5	0,19 (0,15)	0,05 (0,03)	0,10	0,45 to 0,70 (0,50 to 0,70)	-	-	0,07	-	-	0,08 to 0,25 (0,10 to 0,18)	0,03	0,10
AlSi10Mg	43000	Al Si10Mg(a)	9,0 to 11,0	0,55 (0,40)	0,05 (0,03)	0,45	0,20 to 0,45 (0,25 to 0,45)	-	0,05	0,10	0,05	0,05	0,15	0,05	0,15
	43100	Al Si10Mg(b)	9,0 to 11,0	0,55 (0,45)	0,10 (0,08)	0,45	0,20 to 0,45 (0,25 to 0,45)	-	0,05	0,10	0,05	0,05	0,15	0,05	0,15
	43200	Al Si10Mg(Cu)	9,0 to 11,0	0,65 (0,55)	0,35 (0,30)	0,55	0,20 to 0,45 (0,25 to 0,45)	-	0,15	0,35	0,10	-	0,20 (0,15)	0,05	0,15
	43300	Al Si9Mg	9,0 to 10,0	0,19 (0,15)	0,05 (0,03)	0,10	0,25 to 0,45 (0,30 to 0,45)	-	-	0,07	-	-	0,15	0,03	0,10
	43400	Al Si10Mg(Fe)	9,0 to 11,0	1,0 (0,45 to 0,9)	0,10 (0,08)	0,55	0,20 to 0,50 (0,25 to 0,50)	-	0,15	0,15	0,15	0,05	0,20 (0,15)	0,05	0,15
AlSi	44000	Al Si11	10,0 to 11,8	0,19 (0,15)	0,05 (0,03)	0,10	0,45	-	-	0,07	-	-	0,15	0,03	0,10
	44100	Al Si12(b)	10,5 to 13,5	0,65 (0,55)	0,15 (0,10)	0,55	0,10	-	0,10	0,15	0,10	-	0,20 (0,15)	0,05	0,15
	44200	Al Si12(a)	10,5 to 13,5	0,55 (0,40)	0,05 (0,03)	0,35	-	-	-	0,10	-	-	0,15	0,05	0,15
	44300	Al Si12(Fe)	10,5 to 13,5	1,0 (0,45 to 0,9)	0,10 (0,08)	0,55	-	-	-	0,15	-	-	0,15	0,05	0,25
	44400	Al Si9	8,0 to 11,0	0,65 (0,55)	0,10 (0,08)	0,50	0,10	-	0,05	0,15	0,05	0,05	0,15	0,05	0,15
AlSi5Cu	45000	Al Si6Cu4	5,0 to 7,0	1,0 (0,9)	3,0 to 5,0	0,20 to 0,65	0,55	0,15	0,45	2,0	0,30	0,15	0,25 (0,20)	0,05	0,35
	45100	Al Si5Cu3Mg	4,5 to 6,0	0,60 (0,50)	2,6 to 3,6	0,55	0,15 to 0,45 (0,20 to 0,45)	-	0,10	0,20	0,10	0,05	0,25 (0,20)	0,05	0,15
	45200	Al Si5Cu3Mn	4,5 to 6,0	0,8 (0,7)	2,5 to 4,0	0,20 to 0,55	0,40	-	0,30	0,55	0,20	0,10	0,20 (0,15)	0,05	0,25
	45300	Al Si5Cu1Mg	4,5 to 5,5	0,65 (0,55)	1,0 to 1,5	0,55	0,35 to 0,65 (0,40 to 0,65)	-	0,25	0,15	0,15	0,05	0,05 to 0,25 (0,05 to 0,20)	0,05	0,15
	45400	Al Si5Cu3	4,5 a 6,0	0,60 (0,50)	2,6 a 3,6	0,55	0,05	-	0,10	0,20	0,10	0,05	0,25 (0,20)	0,05	0,15



ALUMINIUM General Tables Chemical composition

Chemical composition of Aluminium alloys for casting

Group of alloys	Alloy designation		Chemical composition as % of mass												
	Numerical EN AC	Symbolic EN AC	Si	Fe	Cu	MN	Mg	Cr	Ni	Zn	Pb	Sn	Ti	Others ¹⁾	
														Each	Total
AlSi9Cu	46000	Al Si9Cu3(Fe)	8,0 to 11,0	1,3 (0,6 to 1,1)	2,0 to 4,0	0,55	0,05 to 0,55 (0,15 to 0,55)	0,15	0,55	1,2	0,35	0,25	0,25 (0,20)	0,05	0,25
	46100	Al Si11Cu2(Fe)	10,0 to 12,0	1,1 (0,45 to 1,0)	1,5 to 2,5	0,55	0,30	0,15	0,45	1,7	0,25	0,25	0,25 (0,20)	0,05	0,25
	46200	Al Si8Cu3	7,5 to 9,5	0,8 (0,7)	2,0 to 3,5	0,15 to 0,65	0,05 to 0,55 (0,15 to 0,55)	-	0,35	1,2	0,25	0,15	0,25 (0,20)	0,05	0,25
	46300	Al Si7Cu3Mg	6,5 to 8,0	0,8 (0,7)	3,0 to 4,0	0,20 to 0,65	0,30 to 0,50 (0,35 to 0,60)	-	0,30	0,65	0,15	0,10	0,25 (0,20)	0,05	0,25
	46400	Al Si9Cu1Mg	8,3 to 9,7	0,8 (0,7)	0,8 to 1,3	0,15 to 0,55	0,25 to 0,65 (0,30 to 0,65)	-	0,20	0,8	0,10	0,10	0,10 to 0,20 (0,10 to 0,18)	0,05	0,25
	46500	Al Si9Cu3(Fe)(Zn)	8,0 to 11,0	1,3 (0,6 to 1,2)	2,0 to 4,0	0,55	0,05 to 0,55 (0,15 to 0,55)	0,15	0,55	3,0	0,35	0,25	0,25 (0,20)	0,05	0,25
	46600	Al Si7Cu2	6,0 to 8,0	0,8 (0,7)	1,5 to 2,5	0,15 to 0,65	0,35	-	0,35	1,0	0,25	0,15	0,25 (0,20)	0,05	0,15
	AlSi(Cu)	47000	Al Si12(Cu)	10,5 to 13,5	0,8 (0,7)	1,0 (0,9)	0,05 to 0,55	0,35	0,10	0,30	0,55	0,20	0,10	0,20 (0,15)	0,05	0,25
47100		Al Si12Cu1(Fe)	10,5 to 13,5	1,3 (0,6 to 1,1)	0,7 to 1,2	0,55	0,35	0,10	0,30	0,55	0,20	0,10	0,20 (0,15)	0,05	0,25
AlSiCuNiMg	48000	Al Si12CuNiMg	10,5 to 13,5	0,7 (0,6)	0,8 to 1,5	0,35	0,8 to 1,5 (0,9 to 1,5)	-	0,7 to 1,3	0,35	-	-	0,25 (0,20)	0,05	0,15
AlMg	51000	Al Mg3(b)	0,55 (0,45)	0,55 (0,45)	0,10 (0,08)	0,45	2,5 to 3,5 (2,7 to 3,5)	-	-	0,10	-	-	0,20 (0,15)	0,05	0,15
	51100	Al Mg3(a)	0,55 (0,45)	0,55 (0,40)	0,05 (0,03)	0,45	2,5 to 3,5 (2,7 to 3,5)	-	-	0,10	-	-	0,20 (0,15)	0,05	0,15
	51200	Al Mg9	2,5	1,0 (0,45 to 0,9)	0,10 (0,08)	0,55	8,0 to 10,5 (8,5 to 10,5)	-	0,10	0,25	0,10	0,10	0,20 (0,15)	0,05	0,15
	51300	Al Mg5	0,55 (0,35)	0,55 (0,45)	0,10 (0,05)	0,45	4,5 to 6,5 (4,8 to 6,5)	-	-	0,10	-	-	0,20 (0,15)	0,05	0,15
	51400	Al Mg5(Si)	1,5 (1,3)	0,55 (0,45)	0,05 (0,03)	0,45	4,5 to 6,5 (4,8 to 6,5)	-	-	0,10	-	-	0,20 (0,15)	0,05	0,15
AlZnMg	71000	AlZn5Mg	0,30 (0,25)	0,80 (0,70)	0,15 to 0,35	0,40	0,40 to 0,70 (0,45 to 0,70)	0,15 to 0,60	0,05	4,50 to 6,00	0,05	0,05	0,10 to 0,25 (0,12 to 0,20)	0,05	0,15

Note 1 - The figures in brackets are for ingot compositions which may be different than for cast parts.

Note 2 - In each alloy unit the alloys are arranged in decreasing order of tonnes of moulded parts produced in Europe.

Note 3 - The limits provided are regarded as maximum values unless they are expressed as tolerance limits.

1) "Others" does not include modification or refining elements such as Na, Sr, Sb and P.



Mechanical characteristics of Aluminium alloys for casting

Groups of alloys	Alloy designation		Treatment state designation	Shear strength Rm MPa min.	Conventional elastic limit Rp0.2 MPa min.	Elongation A50mm % min.	Brinell Hardness HBS
	Numerical EN AC	Symbolic EN AC					
AlCu	21000	Al Cu4MgTi	T4	300	200	5	90
	21100	Al Cu4Ti	T6	300	200	3	95
			T64	280	180	5	85
AlSiMgTi	41000	Al Si2MgTi	F	140	70	3	50
			T6	240	180	3	85
AlSi7Mg	42000	Al Si7Mg	F	140	80	2	50
			T6	220	180	1	75
	42100	Al Si.7Mg0.3	T6	230	190	2	75
			42200	Al Si7Mg0.6	T6	250	210	1	85
AlSi10Mg	43000	Al Si10Mg(a)	F	150	80	2	50
			T6	220	180	1	75
	43100	Al Si10Mg(b)	F	150	80	2	50
			T6	220	180	1	75
	43200	Al Si10Mg(Cu)	F	160	80	1	50
			T6	220	180	1	75
43300	Al Si9Mg	T6	230	190	2	75	
AlSi	44000	Al Si11	F	150	70	6	45
	44100	Al Si12(b)	F	150	70	4	50
	44200	Al Si12(a)	F	150	70	5	50
AlSi5Cu	45000	Al Si6Cu4	F	150	90	1	60
			T6	230	200	< 1	90
	45200	Al Si5Cu3Mn	F	140	70	1	60
			T6	230	200	< 1	100
AlSi9Cu	46200	Al Si8Cu3	F	150	90	1	60
	46400	Al S9Cu1Mg	F	135	90	1	60
	46600	Al Si7Cu2	F	150	90	1	60
AlSi(Cu)	47000	Al Si12(Cu)	F	150	80	1	50
AlMg	51000	Al Mg3(b)	F	140	70	3	50
	51100	Al Mg3(a)	F	140	70	3	50
	51300	Al Mg5	F	160	90	3	55
	51400	Al Mg5(Si)	F	160	100	3	60
AlZnMg	71000	AlZn5Mg	T1	190	120	4	60

1 N/mm² = 1 MPa



Preceding designations

Preceding designations of the aluminium alloys for moulding corresponding to Spain (UNE)

Europe EN 1706-1998		Spain		
Numerical	Symbolic	Numerical	Symbolic	UNE Standard Cancelled
EN AC-21000	EN AC-Al-Cu4MgTi	L-2140	Al-4CuMgTi	38-214
EN AC-42000	EN AC-AlSi7Mg	L-2651	Al-7SiMg	38-267
EN AC-42100	EN AC-AlSi7Mg0,3	L-2652	Al-7Si0,3Mg	38-241
EN AC-42200	EN AC-AlSi7Mg0,6	L-2653	Al-7Si0,6Mg	38-242
EN AC-43000	EN AC-AlSi10Mg (a)	L-2560	Al-10SiMg	38-256
EN AC-43400	EN AC-AlSi10Mg (Fe)	L-2561	Al-10SiMgFe	38-268
EN AC-44000	EN AC-AlSi11	L-2522	Al-11Si	38-243
EN AC-44100	EN AC-AlSi12 (a)	L-2520	Al-12Si	38-252
EN AC-45000	EN AC-AlSi6Cu4	L-2620	Al-6Si4Cu	38-262
EN AC-45200	EN AC-AlSi5Cu3Mn	L-2610	Al-5Si3Cu	38-261
EN AC-45300	EN AC-AlSi5Cu1Mg	L-2571	Al-5SiCuMg	38-266
EN AC-46000	EN AC-AlSi9Cu3 (Fe)	L-2631	Al-9Si3CuZnFe	38-245
EN AC-46500	EN AC-AlSi9Cu3 (Fe)(Zn)	L-2630	Al-9Si3Cu3ZnFe	38-263
EN AC-47000	EN AC-AlSi12 (Cu)	L-2530	Al-12SiCu	38-253
EN AC-47100	EN AC-AlSi12Cu1 (Fe)	L-2521	Al-12Si1CuFe	38-269
EN AC-48000	EN AC-AlSi12CuNiMg	L-2551	Al-12SiCuNiMg	38-265
EN AC-51000	EN AC-AlMg3 (a)	L-2340	Al-3Mg	38-236
EN AC-71000	EN AC-AlZn5Mg	L-2710	Al-5ZnMg	38-271



ALUMINIUM CASTING General Tables Technical suitabilities

Technological suitabilities of Aluminium alloys for casting

Group of alloys	Alloy designation		Moulding method				Mouldability			Other properties								Mechanical characteristics				
	Numerical EN AC	Symbolic EN AC	Sand	Die	A pressure	Precision (lost wax)	Fluidity	Resist. to hot cracking	Vatertightness	Machinability Raw moulding	After thermal treatment	Corrosion-proofing	Decorative anodized	Solubility ²⁾	Polishability	Expansion coefficient 10-6/K 293-373K	Electrical conductivity MS/m	Thermal conductivity M/mK	Resist. to atmosph. temp.	Resist. to temp. up to 200°C	Ductability (shock resist.)	Fatigue strength MPa
AlCu	21000	AlCu4MgTi	•	•		•	C	D	D	-	A	D	C	D	B	23	16 to 23	120 to 150	A	B	A	80 to 110
	21100	AlCu4Ti	•	•			C	D	D	-	A	D	C	D	B	23	16 to 23	120 to 110	A	B	A	80 to 110
AlSiMgTi	41000	AlSi2MgTi	•	•			C	C	C	C	B	B	B	B	B	23	19 to 25	140 to 160	B		B	-
AlSi7Mg	42000	AlSi7Mg	•	•		•	B	A	B	B/C	B	B/C	D	B	C	22	19 to 25	150 to 170	B	C	C	80 to 110
	42100	AlSi7Mg0.3	•	•		•	B	A	B	-	B	B	D	B	C	22	21 to 27	160 to 180	A	C	A	80 to 110
	42200	AlSi7Mg0.6	•	•		•	B	A	B	-	B	B	D	B	C	22	20 to 26	150 to 180	A	C	A	80 to 110
AlSi10Mg	43000	AlSiMg(a)	•	•			A	A	B	B/C	B	B	E	A	D	21	19 to 25	150 to 170	B	C	C	80 to 110
	43100	AlSi10Mg(b)	•	•			A	A	B	B/C	B	B/C	E	A	D	21	18 to 25	140 to 170	B	C	C	80 to 110
	43200	AlSi10Mg(Cu)	•	•			A	A	B	B/C	B	C	E	A	C	21	16 to 24	130 to 170	B	C	C	80 to 110
	43300	AlSi9Mg	•	•			A	A	B	B/C	B	B	E	A	D	21	20 to 26	150 to 180	A	C	A	80 to 110
	43400	AlSi10Mg(Fe)				•	A	A	C	B	-	C	E	D	D	21	16 to 21	130 to 150	B	C	C	60 to 90
AlSi	44000	AlSi11	•	•			A	A	A	C	-	B	E	A	D	21	18 to 24	140 to 170	D	C	A	60 to 90
	44100	AlSi12(b)	•	•		•	A	A	A	C	-	B/C	E	A	D	20	16 to 23	130 to 160	D	C	B	60 to 90
	44200	AlSi12(a)	•	•			A	A	A	C	-	B	E	A	D	20	17 to 24	140 to 170	D	C	A	60 to 90
	44300	AlSi12(Fe)				•	A	A	C	C	-	C	E	D	D	20	16 to 22	130 to 160	B	C	C	60 to 90
	44400	AlSi9				•	A	A	C	C	-	C	E D		D	21	16 to 22	130 to 150	C	C	C	60 to 90
AlSi5Cu	45000	AlSi6Cu4	•	•			B	B	B	B	-	D	D	C	B	22	14 to 17	110 to 120	D	A	C	60 to 90
	45100	AlSi5Cu3Mg		•			B	B	B	B	A	D	D	C	B	22	16 to 19	130	A	A	C	80 to 110
	45200	AlSi5Cu3Mn	•	•		•	B	B	B	B	B	D	D	C	B	22	15 to 19	120 to 130	A	A	C	70 to 100
	45300	AlSi5Cu1Mg	•	•			C	B	C	B	B	D	D	C	B	22	19 to 23	140 to 150	B	B	B	70 to 100
	45400	AlSi5Cu3		•			B	B	B	B	B	D	D	C	B	22	16 to 19	120 to 130	B	A	A	70 to 100

(continues)



ALUMINIUM CASTING General Tables Technical suitabilities

Technological suitabilities of Aluminium alloys for casting

Group of alloys	Alloy designation		Moulding method				Mouldability			Other properties								Mechanical characteristics				
	Numerical EN AC	Symbolic EN AC	Sand	Die	A pressure	Precision (lost wax)	Fluidity	Resist. to hot cracking	Watertightness	Machinability		Corrosion-proofing	Decorative anodized	Solubility ²⁾	Polishability	Expansion coefficient 10-6/K 293-373K	Electrical conductivity MS/m	Thermal conductivity M/mK	Resist. to atmosph. temp.	Resist. to temp. up to 200°C	Ductability (shock resist.)	Fatigue strength MPa
AlSi9Cu	46000	AlSi9Cu3(Fe)			●		B	B	C	B	-	D	E	F	C	21	13 to 17	110 to 120	B	B	D	60 to 90
	46100	AlSi11Cu2(Fe)			●		A	B	C	C	-	D	E	F	C	20	14 to 18	120 to 130	B	B	D	60 to 90
	46200	AlSi8Cu3	●	●	●		B	B	B	B	-	D	E	B	C	21	14 to 18	110 to 130	B	A	C	60 to 90
	45300	AlSi7Cu3Mg		●			B	B	B	C	-	C	E	B	C	21	14 to 17	110 to 120	D	A	C	60 to 90
	46400	AlSi9Cu1Mg	●	●			B	B	B	B	B	D	E	B	D	21	16 to 22	130 to 150	A	B	C	60 to 90
AlSi9Cu	46500	AlSi9Cu3(Fe)(Zn)			●		B	B	B	B	-	D	E	F	C	21	13 to 17	110 to 120	B	A	D	60 to 90
	46600	AlSi7Cu2	●	●			B	B	B	B	-	D	E	C	C	21	15 to 19	120 to 130	D	B	C	50 to 70
AlSi(Cu)	47000	AlSi12(Cu)	●	●			A	A	A	C	-	C	E	A	C	20	16 to 22	130 to 150	D	B	C	60 to 90
	47100	AlSi12Cu1(Fe)			●		A	A	C	C	-	C	E	F	C	20	15 to 20	120 to 150	B	B	C	60 to 90
AlSiCuNiMg	48000	AlSi12CuNiMg		●			A	A	A	-	B	C	E	A	C	20	15 to 23	130 to 160	A	A	D	80 to 110
AlMg	51000	AlMg3(b)	●	●			C	D	D	A	-	A	A	C	A	24	17 to 22	130 to 140	D	B	B	60 to 90
	51100	AlMg3(a)	●	●	●		C	D	D	A	-	A	A	C	A	24	17 to 22	130 to 140	D	B	B	60 to 90
	51200	AlMg9	●	●		●	C	D	D	A	-	A	B	C	A	24	11 to 14	60 to 90	C	B	C	60 to 90
	51300	AlMg5	●	●			C	D	D	A	-	A	A	C	A	24	15 to 21	110 to 130	D	B	B	60 to 90
	51400	AlMg5(Si)	●	●			C	D	D	A	-	A	B	C	A	24	15 to 21	110 to 140	D	B	B	60 to 90
AlZnMg	71000	AlZn5Mg	●	●			C	D	D	A	A	B	B	C	B	24	19 to 21	130 to 140	C	D	B	60 to 90

Indicates the moulding process used most for each alloy: A: Excellent; D: Bad; B: Good; E: Not recommended; C: Regular; F Inappropriate

NOTE - In a family of alloys, the designation for two letters separated by a stroke, for example B/C, allows small differences to be indicated.

1) The comparisons only apply to the corresponding column.

2) The weldability of pressurised moulded parts depends on the quantity of gas occluded and, in the majority of cases, it is very poor. Using special injection moulding processes, the values of B to C can be obtained.

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