ALUMINIUM

- TECHNICAL AND PHYSICAL PROPERTIES
- STANDARD TOLERANCES
- DIMENSIONAL TABLES AND WEIGHTS

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ALUMINIUM: TECHNICAL AND PHYSICAL SPECIFICATIONS - (page 01) (*Rev.30-3-'15)*
ALUMINIUM AND ITS ALLOYING ELEMENTS - EFFECTS OF THE ALLOYING ELEMENTS

The presence of alloying elements in the aluminum alloys determines the improvement of the mechanical and technological features, adapting them to the various needs of use. According to the UNI 3565 definition, the light aluminum alloy for plastic working is a complicated alloy, which has the aluminum with specific weight not higher than 3 kg / dm3 as prevalent weight custom. The light alloys for plastic working subject to a significant improvement of the physical-mechanical characteristics after the heat treatment are defined as "quenched and tempered alloys". Instead, the light alloys which are not subject to the effect of the heat treatment but increase the characteristics only as a result of the transformation undergone are called "**hardening alloys**".

HARDENING ALLOYS. The hardening light alloys consist of pure aluminum or alloys obtained by alloying the pure aluminum with particular elements, more or less soluble to sodium, but still inactive to the affects of a treatment. In practice, these alloying elements are: Silicon, Manganese or Magnesium or Magnesium and Manganese or Magnesium and Chromium. The rolled products obtained by hardening have different mechanical features depending on the type of alloy, the degree of hardening and recrystallization, which can be complete for the annealed condition and partial for the half-hard conditions. Another characteristic of the semifinished products by hardening is the possibility to increase their hardness through cold workings to which they are subsequently subjected, such as: bending, shaping, deep drawing and re-rolling.

AL - Series 1000. Rolled Aluminium products which change depending on the different percentages of Fe and Si (from 0.001 to 1.0% considered as impurities). The lack of alloying elements accentuates the specific properties of the aluminum such as the resistance to corrosion, the reflecting power, the predisposition to anodizing, the thermal and electrical conductivity, the plasticity and the deformation.

AL+Mn+Mg - Series 3000. Manganese, alone (intermetallic compound Mn Al_6 up to 1,5%) or together with Magnesium (in contents up to 1,3%), confers to Aluminium higher mechanical features, maintaining good resistance to corrosion, good workability, high plasticity and excellent weldability.

AL + Mg PERALUMAN - Series 5000. Magnesium has a remarkable solubility in Aluminium (17,4% at the eutectic temperature of 449 °C) and it is still relevant at room temperature. For this reason Magnesium is one of the most used alloying elements. In rolled products Magnesium is more efficient than Manganese for hardening the alloy, it is normally provided in the alloy up to 5% together with low levels of Manganese and Chromium. The alloys of the 5000 series (PERALUMAN) have high resistance to corrosion, even in marine atmosphere, high plasticity together with good weldability and good mechanical characteristics.

AL + Fe - Series 8000. Iron, always present as impurity in aluminum, is a generally undesired element; in this case, however, in maximum levels up to 1,5%, it is an alloying element which confers high malleability and isotropic deformation to the rolled products . These particular characteristics of the 8000 series are especially important in the machining of deep drawing.

ALLOYS FOR HARDENING AND TEMPERING - Series 2000. For hardening and tempering are meant those processes of metallurgical transformation obtained by heat treatments which allow the solubilization in solid of the alloying compounds and their subsequent reprecipitation (for natural or artificial aging) in such sizes and distribution to induce a significant increase of the mechanical characteristics. The active alloying elements currently employed to obtain light alloys for hardening and tempering are:

Cu Al_2 and complexes (Al – Cu – Mg) and (Al – Cu – Mg – Si) **#** Mg_2 Si **#** (Zn - Mg - Al - Cu) **#**

Mg+Si ANTICORODAL - Series 6000. Known as ANTICORODAL alloys for their high resistance to corrosion and attitude to the anodic oxidation. The presence of the compound Mg2Si of easy solubility enables hardening and tempering operations in very short time and confers to the rolled products high mechanical characteristics, with good formability to the T4 physical condition.

Zn+Mg or Zn+Cu+Mg - Series 7000. Also known with the name of self-hardening alloys, they have the property of hardening after the natural heating, thanks to the good solubility of the compound Mg Zn2. For such a peculiarity, these alloys recover 80 / 85% of the initial characteristics in the welding area. This makes them interesting for highly stressed buildings, where a wide use of welding is involved as method of assembly, of course taking into consideration the concerns and application techniques necessary to avoid problems of corrosion and stress corrosion.

ALUMINIUM: TECHNICAL AND PHYSICAL SPECIFICATIONS - (page 02)

CHEMICAL COMPONENTS AND THEIR EFFECTS ON THE ALUMINIUM PROPERTIES

Manganese	Mn	improves the toughness
Magnesium	Mg	increases the resistance to corrosion, weldability and mechanical strength.
Magnesium + Silicon	Mg + Si	increases the mechanical strength, formability and resistance to corrosion.
Silicon	Si	lowers the melting point, increases the resistance to wear.
Copper	Cu	increases the mechanical strength and machinability; it reduces the resistance to corrosion and weldability.
Zinc	Zn	increases remarkably the mechanical strength (if in combination with other elements).
Lead	Pb	increases the machinability.

Numerical designation of Aluminium Alloys and Physical Conditions, according to UNI Standards

Aluminum and its alloys are identified with numerical codes of 4 digits: the first digit indicates the group; each group is defined from the main alloying element according to the following correspondence:

1. **Aluminium 99, -%**
2. **Copper**
3. **Manganese**
4. **Silicon**
5. **Magnesium**
6. **Magnesium and Silicon**
7. **Zinc**
8. **Other elements**

The other 3 digits characterize the different degrees of purity of the aluminum or each alloy within the ones which see the mentioned alloying element as the main one.

THE MECHANICAL AND HEAT TREATMENTS ON THE ALUMINIUM ALLOYS

Once established the composition of the alloy, the other important factor which influences the mechanical and technological characteristics of the aluminum alloys is given by the mechanical and heat treatments to which they are subjected; in relation to this, the aluminum alloys are divided into two main groups: alloys by quenching or by structural hardening, (2000, 6000, 7000) and alloys by work hardening through plastic deformation (1000, 3000, 5000 and 8000).

The structural work hardening of the aluminum alloys consists of three distinct phases:
1 - Solubilization, during which the alloying elements enter into solution in the aluminum (at the temperature of about 500 °C); **2 - Quenching** is the quick cooling with water or air jets; **3 - Aging** is the step during which the precipitates of the alloy elements, responsible for the increase of the mechanical characteristics, are formed. **Aging** can be natural, which means that it takes place at room temperature even in the course of the months following the quenching, or **artificial** (also known as tempering), through a heating for some hours at intermediate temperatures (100 - 200 ° C).

The work hardening through plastic deformation is determined by the modification of the crystalline structure resulting from a plastic deformation; it is obtained by rolling or drawing, but also during the machining by bending, deep drawing, flaring or hammering. The work-hardening leads to an increase of the mechanical strength, hardness and a decrease of the elongation. The hardness caused by the work-hardening can be eliminated or reduced with the annealing heat treatment.

Designation of the conditions of supply. With Hxxx are meant the conditions of work hardening of the alloys which acquire the mechanical characteristics by cold deformation (groups 1 - 3 - 5). With Txxx are meant the conditions related to alloys which acquire mechanical characteristics with appropriate heat treatments (heat treatment of solution, followed by tempering and natural and artificial aging) - (groups 2 - 6 - 7 - 8).

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ALUMINIUM: TECHNICAL AND PHYSICAL SPECIFICATIONS - (page 03)

Hardening alloys (series 1000 / 3000 / 5000 / 8000)

Old denominations	New denominations	Definition
HL	F	As cast, without treatments
R	O	Annealed
-	H111	Annealed and flattened
-	H112	Annealed and flattened with different characteristics than the annealed
H15	H12 H22 H32	1/4 hard
H30 H25 H20	H14 H24 H34	1/2 hard
H50	H16 H26 H36	3/4 hard
H70	H18 H28 H38	Hard
-	H19	Superhard

Heat treatment alloys (series 2000 / 6000 / 7000)

Old denominations	New denominations	Definition
Hp	F	As cast, without treatments
R	O	Annealed
TN	T1	Cooled, naturally aged.
THN	T2	Cooled, hardened, naturally aged.
THN	T3	Solubilized, quenched, hardened, naturally aged.
TN	T4	Solubilized, quenched, naturally aged.
TaA	T5	Cooled after hot processing and artificially aged.
TA16	T6	Solubilized, quenched, artificially aged.
TS	T7	Solubilized, quenched, artificially aged.
THA	T8	Solubilized, quenched, hardened, artificially aged.
TAH	T9	Solubilized, quenched, artificially aged, hardened.
TAH	T10	Cooled after hot processing, hardened, artificially aged.

If the number 51 or 52 is added to the physical condition (example T6) means that the following additional treatments were executed:

51 - Stress-relieved by controlled traction.

52 - Stress-relieved by controlled compression.

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ALUMINIUM: TECHNICAL AND PHYSICAL SPECIFICATIONS - (page 04)

CORRESPONDENCE BETWEEN THE INTERNATIONAL DESIGNATIONS

Europe UNI EN 573 (in force)	France AFNOR	Germany DIN	Great Britain	Italy UNI		USA ASTM	Japan JIS
				Removed	Removed		
EN AW-1080A ((Al99,8(A))	1080A	Al99,8	1080A	4509	9001/4	1080A	A1080
EN AW-1070A (Al 99,7)	1070A	Al99.7	-	4508	9001/3	1070A	A1070
EN AW-1050A (Al 99,5)	1050A	Al99,5	1050A	4507	9001/2	1050A	A1050
EN AW-1200 (Al99,0)	1200	Al99	1200	3567	9001/1	1200	A1200
EN AW-1100 (Al99,0 Cu)	1100	-	-	-	-	1100	A1100
EN AW-2011 (Al Cu6 Bi Pb)	2011	Al Cu Bi Pb	2011	6362	9002/5	2011	A2011
ENAW-2014 (Al Cu4 Si Mg)	2014	Al Cu Si Mn	2014A	3581	9002/3	2014	A2014
EN AW-2017A ((Al Cu4 Mg Si(A))	2017A	Al Cu Mg1	2017A	3579	9002/2	2017 A	A2017
EN AW-2618A (Al Cu2 Mg1,5 Ni)	2618A	-	2618A	7250		2618A	-
EN AW-2024 (Al Cu4 Mg1)	2024	Al Cu Mg2	2024	3583	9002/4	2024	A2024
EN AW-2030/2007 (Al Cu4 Pb Mg)	2030/ 2007	Al Cu Mg Pb	-	-	9002/8	2030	-
EN AW-3003 (Al Mn1 Cu)	3003	Al Mn Cu	3103	7788	9003/1	3003	A3003
EN AW-3004 (Al Mn1 Mg1)	3004	Al Mn1 Mg1	-	6361	9003/2	3004	A3004
EN AW-3005 (Al Mn1 Mg0,5)	3005	Al Mn1 Mg0,5	-	-	9003/4	3005	A3005
EN AW-3105 (Al Mn0,5 Mg0,5)	3105	Al Mn0,5 Mg0,5	3105	3103	-	-	-
ENAW-5005 ((Al Mg1(B))	5005	Al Mg1	5005	5764	9005/1	5005	A5005
EN AW-5049 (Al Mg2,5 Mn0,8)	5049	Al Mg2,5 Mn0,8	-	-	-	5049	-
EN AW-5251 (Al Mg2)	5251	Al Mg2 Mn0,3	5251	4511	-	5251	-
EN AW-5052 (Al Mg2,5)	5052	Al Mg2,5	-	3574	9005/2	5052	A5052
EN AW-5454 (Al Mg3 Mn)	5454	Al Mg2,7 Mn	5454	7789	9005/3	5454	A5454
EN AW-5754 (Al Mg3)	5754	Al Mg3	-	-	-	5754	-
EN AW-5356 ((Al Mg5 Cr(A))	5356	Al Mg5	3576	-	-	5356	-
EN AW-5182 (Al Mg4,5 Mn0,4)	5182	Al Mg5 Mn	-	-	-	5182	-
EN AW-5083 (Al Mg4,5 Mn0,7)	5083	Al Mg4,5 Mn	5083	7790	9005/5	5083	A5083
EN AW-5086 (Al Mg4)	5086	Al Mg4 Mn	-	5452	9005/4	5086	A5086
EN AW-6005A ((Al Mg Si(A))	6005A	Al Mg Si	-	-	9006/6	6005A	-
EN AW-6026 (Al Mg Si Bi)	6026	Al Mg Si Bi	-	-	-	-	-
EN AW-6060 (Al Mg Si)	6060	Al Mg Si0,5	6063	3569	9006/1	6060	-
EN AW-6061 (Al Mg1 Si Cu)	6061	Al Mg1 Si Cu	6061	6170	9006/2	6061	A6061
EN AW-6012 (Al Mg Si Pb)	6012	Al Mg Si Pb	6012	-	-	-	-
EN AW-6082 (Al Si1 Mg Mn)	6082	Al Mg Si1	6082	3571	9006/4	6082	-
EN AW-7020 (Al Zn4,5 Mg1)	7020	Al Zn4,5 Mg1	7020	7791	9007/1	7020	7020
EN AW-7049A (Al Zn)	7049A	-	-	-	-	7049A	-
EN AW-7075 (Al Zn5,5 Mg Cu)	7075	Al Zn Mg Cu1,5	7075	3735	9007/2	7075	A7075
EN AW-8011A (Al Fe Si)	8011	-	-	-	8011	-	-

CORRESPONDENCE BETWEEN THE EUROPEAN DESIGNATION AND THE COMMON DENOMINATION

EN AW-1050	ALUMINIUM 99,5
EN AW 2011	11S
EN AW 2030-2007	11S
EN AW 2017	AV100 - AVIONAL100
EN AW 5754	PERALUMAN 300 - PE 300
EN AW 5083	PERALUMAN 450 - PE 450
EN AW 6060	AC 63 - ANTICORODAL 6060
EN AW 6082	AC 100 - ANTICORODAL 100
EN AW 7020	CARPENTAL
EN AW 7075	ERGAL 55

ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 05)

CHEMICAL COMPOSITION OF THE ALUMINIUM ALLOYS

Alloy	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ga	V	Additional elements	Impurity		Al
1050A (99,5)	0,25	0,40	0,05	0,05	0,05	-	-	0,07	0.05	-	-	-	0,03	-	99,50
2007	0,80	0,80	3,30÷ 4,60	0,50÷ 1,00	0,40÷ 1,80	0,10	0,20	0,80	0,20	-	-	0,20Bi, 20Sn 0,8÷1,5Pb,	0,10	0,30	Remainder
2011	0,40	0,70	5,00÷ 6,00	-	-	-	-	0,30	-	-	-	0,20÷0,60Bi, 0,20÷0,4Pb	0,05	0,15	Remainder
2014	0,50÷ 1,20	0,70	3,90÷ 5,00	0,40÷ 1,20	0,20÷ 0,80	0,10	-	0,25	0,15	-	-	Zr+T 0,20	0,05	0,15	Remainder
2017	0,20÷ 0,80	0,70	3,50÷ 4,50	0,40÷ 1,00	0,40÷ 1,00	0,10	-	0,25	-	-	-	Zr+Ti 0,25	0,05	0,15	Remainder
2024	0,50	0,50	3,80÷ 4,90	0,30÷ 0,90	1,20÷ 1,80	0,10	-	0,25	0,15	-	-	Zr+Ti 0,20	0,05	0,15	Remainder
2030	0,80	0,70	3,30÷ 4,50	0,20÷ 1,00	0,50÷ 1,3	0,10	-	0,50	0,20	-	-	0,20Bi 0,8÷1,5Pb	0,10	0,30	Remainder
5005	0,30	0,70	0,20	0,20	0,50÷ 1,1	0,10	-	0,25	-	-	-	0,20Bi 0,8÷1,5Pb	0,10	0,30	Remainder
5083	0,40	0,40	0,10	0,40÷ 1,00	4,00÷ 4,90	0,05÷ 0,25	-	0,25	0,15	-	-	-	0,05	0,15	Remainder
5754	0,40	0,40	0,10	0,50	2,60÷ 3,60	0,30	-	0,20	0,15	-	-	0,10÷0,60 Mn+Cr	0,05	0,15	Remainder
6026	0,60÷ 1,40	0,70	0,20÷ 0,50	0,20÷ 1,00	0,60÷ 1,2	0,30	-	0,30	0,20	-	-	0,50÷1,5Bi, 0,4Pb	0,05	0,15	Remainder
6060	0,30÷ 0,60	0,10÷ 0,30	0,10	0,10	0,35÷ 0,60	0,05	-	0,15	0,10	-	-	-	0,05	0,15	Remainder
6061	0,40÷ 0,80	0,70	0,15÷ 0,40	0,15	0,80÷ 1,20	0,04÷ 0,35	-	0,25	0,15	-	-	-	0,05	0,15	Remainder
6063	0,20÷ 0,60	0,35	0,10	0,10	0,45÷ 0,90	0,10	-	0,10	0,10	-	-	-	0,05	0,15	Remainder
6082	0,70÷ 1,3	0,50	0,10	0,40÷ 1,00	0,60÷ 1,20	0,25	-	0,20	0,10	-	-	-	0,05	0,15	Remainder
7020	0,35	0,40	0,20	0,05÷ 0,50	1,0÷ 1,4	0,10÷ 0,35	-	4,00÷ 5,00	-	-	-	-	0,05	0,15	Remainder
7021	0,25	0,40	0,25	0,10	1,20÷ 1,80	0,05	-	5,00÷ 6,00	0,10	-	-	0,08÷0,18Zr	0,05	0,15	Remainder
7075	0,40	0,50	1,20÷ 2,00	0,30	2,10÷ 2,90	0,18÷ 0,28	-	5,10÷ 6,10	0,20	-	-	Zr+Ti 0,25	0,05	0,15	Remainder

For other aluminum alloys not included in this table, please refer to our Sales Department

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ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 06 rev. 07/01/'19)

Average Mechanical Properties in Relation to the Physical Condition

Alloy	PHYSICAL CONDITION		AVERAGE MECHANICAL PROPERTIES			
	Old Standard	New Standard	Rm N/mm^2	Rp $_{0,2}$ N/mm^2	A%	HB
1050	R	O	80	35	38	21
	H30	H14	120	75	8	33
	H70	H18	155	140	6	40
2007/2030	TN	T4	360	240	8	100
2011	THN	T3	320	270	10	90
	TA	T6	310	230	8	110
	THA	T8	370	270	8	115
2014	R	O	190	95	17	47
	TN	T4	405	280	18	110
	TA	T6	475	415	11	135
2017	R	O	195	80	19	50
	TN	T4	360	240	10	110
	THN	T3	420	280	17	110
2024	R	O	195	85	18	52
	TN	T4/T351	420	290	10	120
	TA	T6	470	395	9	125
	THA	T8	475	450	6	128
5005	R	O	125	40	27	30
	H30	H34	160	135	9	45
	H60	H38	200	190	5	51
5083	R	O-H111	265	115	14	73
	H15	H32	305	215	10	89
5754	R	O-H111	190	80	17	52
	H15	H24/32	220	130	14	63
6026	TA	T6	370	300	8	95
	THA	T8	345	315	4	95
6060 6063	R	O	100	55	29	28
	TaN	T1	155	95	19	44
	TN	T4	170	100	22	47
	TaA	T5	205	165	12	65
	TA	T6	200	170	8	72
	THA	T8	265	230	9	79
6061	R	O	125	65	23	33
	TN	T4	235	140	21	62
	TA	T6	305	275	11	97
6082	R	O	125	65	25	35
	TN	T4	240	140	23	60
	TA14	T61	270	185	21	80
	TA16	T6	295	240	8	100
7020	TA	T6	350	290	8	110
7021	-	T79	320	290	2,5	110
7075	R	O	230	115	16	61
	TA	T6	540	470	7	150
	TAA	T73	505	435	13	-

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ALUMINIUM: PHYSICAL AND TECHNICAL CONDITIONS - (page 07)

ALLOYS AND PHYSICAL PROPERTIES

Alloy	Specific weight Kg/dm^3	Coefficient of Thermal expansion 10^{-6}/°C	Melting range °C (approximate)	Condition	Electric conductivity m/Ωmm^2	Heat conductivity at 20°C W/mk	Elastic modulus GPa
1050A (99,5)	2,7	23,6	645÷657	0	27÷29	229	69
2007 2030	2,85	23,5	510÷640	T6 T4	57	140	70
2011	2,83	22,9	540÷645	T3	43	151	70
				T8	38	172	
2014	2,8	23	505÷635	T4	51	134	73
				T6	43	155	
2017	2,79	23,6	510÷640	T4	51	134	75
2024	2,78	23,2	500÷635	T4	57	125	73
				T6	45	151	
5005	2,69	23,9	630÷650	H24	31	176	70
5083	2,66	23,9	580÷640	all	6	120	71
5754	2,66	23,5	593÷645	all	5	130	70
6026	2,72	23,4	580-650	T6	39	172	69
6060	2,7	23,2	615÷655	T1	34	193	69
				T5	31	209	
				T6	33	201	
6061	2,7	23,6	580÷650	T4	43	155	69
				T6	40	167	
6063	2,7	23,4	615÷655	T6	33	201	69
6082	2,71	24	585÷645	T6	37	167	69
7020	2,78	23,5	610÷650	T4 T6	46	134	72
7075	2,8	23,5	475÷630	T6	52	130	72

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ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 08)

TECHNOLOGICAL PROPERTIES OF ALUMINIUM

Alloy	Physical condition	Finishing condition	Tool machinability	Shape stability	TIG and MIG welding	Anodic oxidation	Hard anodizing	Resistance to atmospheric corrosion	Resistance to marine corrosion	Cold formability	Deep-drawing
1050A	O/H111	Rolled	1	3	4	4	4	4	4	4	4
	H24	Rolled	1	3	4	4	4	4	4	3	3
	H18	Rolled	1	2	4	4	4	4	4	2	1
2011	T3-T6 T8	Extruded Drawn	5	3	2	1	3	3	1	2	1
2030	T4	Extruded Drawn	5	3	2	3	3	2	1	1	1
2007	T4-T6	Extruded Drawn	5	3	2	3	3	2	1	1	1
2017A	T4	Rolled	3	1	2	3	2	2	1	2	1
2024	T351	Rolled	3	1	2	3	2	2	1	2	1
5005	H24	Rolled	3	2	4	4	4	4	4	3	2
	O/H111	Rolled	0	4	4	4	4	4	4	4	3
5754	O/H111	Rolled	0	3	4	4	4	4	4	3	3
	H32	Rolled	1	4	4	4	4	4	4	3	3
	H24	Rolled	2	3	4	4	4	4	4	2	2
5083	O/H111	Rolled	2	3	4	4	4	4	4	4	3
	H32	Rolled	2	3	4	4	4	4	4	2	1
6026	T6	Extruded Drawn	4	4	4	4	5	4	3	3	3
6060	T5-T6	Extruded	4	4	3	4	4	4	3	4	4
6063	T6	Extruded	3	3	4	5	5	5	4	3	3
6082	T6	Extruded Drawn	4	4	5	5	4	5	4	3	3
	T651	Rolled	3	3	4	4	3	4	3	1	1
7020	T4-T6	Extruded	4	4	3	4	4	3	4	1	1
7021	F	Cast	4	4	4	3	3	3	2	-	-
7075	T6	Extruded Drawn	5	3	1	4	3	3	1	1	1
	T651	Rolled	4	2	1	3	2	2	0	1	1

Meaning of the evaluation numbers

(5) Great - (4) Good - (3) Sufficient - (2) Poor - (1) Insufficient

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ALUMINIUM: PHYSICAL AND TECHNOLOGICAL PROPERTIES - (page 09)

MAIN SURFACE TREATMENTS

Series	Typical treatment	Properties of the anodic coating	Examples of application
1000	Static or transition sulphuric anodizing	Transparency, reflecting power, brilliance. The lower the content of Fe and Si is and the more transparent is the coating.	Decorations and devices for lighting.
2000	Chromic anodizing, dichromate fixing on alloys 2024 and 2618A.	Surface preparation before glueing.	Aeronautics.
	Sulphuric anodizing, dichromate fixing on alloy 2024.	The thickness of the coating is thin and more or less porous depending on the copper dissolution. The protection against corrosion is limited.	Mechanical applications.
3000	Degreasing, chemical conversion, painting for food usage.	Protection, decoration, good resistance to corrosion and scoring. Alloys easy to be anodized.	Packaging, building industry, household utensils
	Degreasing, chemical conversion, continuous lacquering. Sulphuric anodizing.		
	Hard anodizing.	The appearance of the coating is quite gray.	
5000	Static or transition sulphuric anodizing, colorless or electrolytically colored.	Good lifetime of the treatment and good resistance to corrosion. The appearance of the coating, milky or gray, depends on the chemical composition of the alloy.	Outdoor structures Building industry (Alloy 5005)
6000	Colorless or electrolytically colored sulphuric anodizing. Electrostatic lacquering with powder.	To achieve lots with homogeneous appearance it is necessary to control the conditions of processing and heat treatment. Decoration, good lifetime of the appearance, good protection against corrosion. Alloys easy to be anodized.	Small metal parts Nautical building industry
7000	Chromic anodizing on alloy 7075, Sulphuric anodizing on alloy 7020, Hard anodizing on alloy 7075.	Protection, decoration, hardness. Alloys easy to be anodized except for the alloys with higher copper content.	Aeronautics, mechanical applications, sport items

COMMERCIAL BOND S.r.l.

ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 10)

ANODIZING (1st part)

The anodizing is basically a transformation of electrochemical nature of the surface of an object, consisting of aluminum or its alloys. With such an operation, which takes place in an electrolysis bath, the aluminum surface subjected to the treatment gets covered by an oxide coating. After being exposed to the atmospheric air, the aluminium becomes spontaneously covered by a very thin oxide coating. It can be considered as a passivation product able to protect the underlying metal from further corrosions. While the natural oxidation of the aluminum gives, however, poorly adherent coatings, the artificial one, anodic, produces much thicker indelibly adherent coatings by giving hardness and strong consistency to the metal. Nowadays the anodic oxidation of the aluminum, which can be considered as an accelerated passivation process, has reached high importance and is one of the the most brilliant achievements of modern technique in the protection of light metals.

THE ANODIZING is a treatment that forms some types of oxide coatings on the metal surface; their structure and characteristics are different from the ones of natural oxides of aluminum**.** Their thickness varies from few microns to 100 microns (the coating of natural oxide has a thickness of 5-10 microns). As for the requirements of the oxide thickness, it is possible to distinguish five classes of use:

5 micron min.	for indoor spaces without frequent manipulation.
10 micron minimo	for rural atmospheres with periodic maintenance.
15 micron minimo	for industrial and marine atmospheres.
20 micron minimo	for remarkably aggressive industrial or marine atmospheres.
25 micron	for the most aggressive atmospheres.

The anodizing can have several purposes:

- decoration.
- maintenance of the appearance over time.
- protection against atmospheric corrosion.
- surface hardness.
- resistance to abrasion.
- suitability to sliding and against adherence.
- suitability for the application of organic coatings such as glues, paints, varnishes.
- modification of the electrical properties (insulation).
- modification of the optical properties (reflecting power).

There are six main types of anodizing and for each of them it is possible to apply different procedures:

- barrier anodizing, reserved to refined metal for electrical applications.
- sulphuric anodizing, mainly used for protection against corrosion
- chromic anodizing, reserved to applications in the aeronautical field.
- self-colored anodizing, mainly addressed to the building industry and architecture.
- hard anodizing, which increases the surface hardness of the metal.
- phosphorous anodizing, preparatory before gluing.

Generally, the attitude to anodizing depends on the chemical composition and metallurgical physical condition of the metal. It varies from a series of alloys to the other and the anodic coatings do not necessarily have the same characteristics and properties. Just as the natural oxide coatings, also the anodic coatings are not resistant to acid or alkaline solutions. The maintenance of anodized surfaces, for example in the building industry, must be performed with specific products.

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ANODIZING (2nd part)

THE SULPHURIC ANODIZING is the most widespread anodizing and is used for decoration, for the realization of hard coatings and to improve the behavior of the parts during their use. The anodic coatings, the structure of which depends on the nature of the bath and operating conditions, consist of hexagonal cells perforated by microholes. The porous layers are very suitable to the coloration by absorption both for immersion in the coloring bath, both for treatment of electrolytic coloring. The anodic layers, colored or not, shall be subjected to a fixing operation by hydration so that they can have a very good operating performance. To increase the resistance to atmospheric corrosion of certain alloys (2000 and 7000 series) to the fixing bath, the potassium bicarbonate is added. The anodizing layers then assume a yellow-green color.

THE HARD ANODIZING, this designation joins together many anodizing techniques at low temperature, which allow to obtain compact oxide layers with thickness from 50 to 100 micron. They have a resistance to oxidation better than the one of the treated steels and the insulation property is equal to the one of the porcelain. The hard anodizing finds its best applications in the electrical and mechanical industries. Considering the thickness of the anodic layer, it may be necessary, in particular cases, to take into account the dimensional variation of the parts, after anodizing. The alloys subjected to hard anodizing shall have a particular composition; the higher the aluminum content is, the more suitable they are.

The max. percentages of the different elements tolerated for a good anodizing are indicatively as follows:

Iron	**0,5%**
Silicon	**4,0 ÷ 5,0 %**
Copper	**2,0%**
Manganese	**0,5 ÷ 0,8 %**
Magnesium	**7,0%**
Zinc	**6,0 ÷ 8,0 %**
Chromium	**0,3%**
Titanium	**0,3%**

Excessively high percentages of the above listed elements can lead to the following defects on the anodized material:

Iron	gray deposits and black streaks.
Silicon	milky opacification to the oxide; difficulty to anodize the materials obtained by casting.
Copper	it decreases the oxide hardness
Manganese	dark brown coloring of the anodic oxide.
Magnesium	it is the element better tolerated from the anodizing.
Zinc	it can cause browning of the oxide.
Chromium	it generates an oxide of yellowish color.
Titanium	it influences negatively the gloss of the oxide.

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ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 12)

UNI-EN 755 TOLERANCE STANDARDS (1st part of 2)

Dimensional tolerance EXTRUDED SQUARE BARS (mm)

Side		Tolerance	
Over	Up to and including	Alloys group 1	Alloys group 2
10	18	± 0,22	± 0,30
18	25	± 0,25	± 0,35
25	40	± 0,30	± 0,40
40	50	± 0,35	± 0,45
50	65	± 0,40	± 0,50
65	80	± 0,45	± 0,70
80	100	± 0,55	± 0,90
100	120	± 0,65	± 1,00
120	150	± 0,80	± 1,20
150	180	± 1,00	± 1,40
180	220	± 1,15	± 1,70

Dimensional tolerance ROUND BARS (mm)

Diameter		Tolerance	
Over	Up to and including	Alloys group 1	Alloys group 2
8	18	± 0,22	± 0,30
18	25	± 0,25	± 0,35
25	40	± 0,30	± 0,40
40	50	± 0,35	± 0,45
50	65	± 0,40	± 0,50
65	80	± 0,45	± 0,70
80	100	± 0,55	± 0,90
100	120	± 0,65	± 1,00
120	150	± 0,80	± 1,20
150	180	± 1,00	± 1,40
180	220	± 1,15	± 1,70
220	270	± 1,30	± 2,00
270	320	± 1,60	± 2,50

Dimensional tolerance HEXAGONAL BARS (mm)

Side		Tolerance	
Over	Up to and including	Alloys group 1	Alloys group 2
10	18	± 0,22	± 0,30
18	25	± 0,25	± 0,35
25	40	± 0,30	± 0,40
40	50	± 0,35	± 0,45
50	65	± 0,40	± 0,50
65	80	± 0,50	± 0,70
80	100	± 0,55	± 0,90
100	120	± 0,65	± 1,00
120	150	± 0,85	± 1,20
150	180	± 1,00	± 1,40
180	220	± 1,15	± 1,70

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ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 13)

UNI-EN 755 TOLERANCE STANDARDS (2nd part of 2)

DIMENSIONAL TOLERANCE FLAT BARS GROUP 1 (mm)

>	≤	Tolerance	2 ÷ 6	6 ÷10	10÷18	18÷30	30÷35	50÷80	80÷120	120÷180	180÷240
10	18	±0,25	±0,20	±0,25	±0,25						
18	30	±0,30	±0,20	±0,25	±0,30	±0,30					
30	50	±0,40	±0,25	±0,25	±0,30	±0,35	±0,40				
50	80	±0,60	±0,25	±0,30	±0,35	±0,40	±0,50	±0,60			
80	120	±0,80	±0,30	±0,35	±0,40	±0,45	±0,60	±0,70	±0,80		
120	180	±1,00	±0,40	±0,45	±0,50	±0,55	±0,60	±0,70	±0,90	±1,00	
180	240	±1,40		±0,55	±0,60	±0,65	±0,70	±0,80	±1,00	±1,20	±1,40
240	350	±1,80		±0,65	±0,70	±0,75	±0,80	±0,90	±1,10	±1,30	±1,50
350	450	±2,20			±0,80	±0,85	±0,90	±1,00	±1,20	±1,40	±1,60
450	600	±3,00					±0,90	±1,00	±1,40		

DIMENSIONAL TOLERANCE FLAT BARS GROUP 2 (mm)

>	≤	Tolerance	2 ÷ 6	6 ÷10	10÷18	18÷30	30÷35	50÷80	80÷120	120÷180	180÷240
10	18	±0,35	±0,25	±0,30	±0,35	-					
18	30	±0,40	±0,25	±0,30	±0,40	±0,40					
30	50	±0,50	±0,30	±0,30	±0,40	±0,50	±0,50				
50	80	±0,70	±0,30	±0,35	±0,45	±0,60	±0,70	±0,70			
80	120	±1,00	±0,35	±0,40	±0,50	±0,60	±0,70	±0,80	±1,00		
120	180	±1,40	±0,45	±0,50	±0,55	±0,70	±0,80	±1,00	±1,10	±1,40	
180	240	±1,80		±0,60	±0,65	±0,70	±0,90	±1,10	±1,30	±1,60	±1,80
240	350	±2,20		±0,70	±0,75	±0,80	±0,90	±1,20	±1,40	±1,70	±1,90
350	450	±2,80			±0,90	±1,00	±1,10	±1,40	±1,80	±2,10	±2,30
450	600	±3,00					±1,20	±1,40	±1,80		

REFERENCE GROUPS

Alloys of Group 1	Alloys of Group 2	
EN AW- 1050A	EN AW-2007	EN AW-5754
EN AW- 1200	EN AW-2011	EN AW-5083
EN AW- 3003	EN AW-2017A	EN AW-5086
EN AW- 5005	EN AW-2024	EN AW-7020
EN AW- 6005A	EN AW-2030	EN AW-7022
EN AW- 6012	EN AW-5154A	EN AW-7075
EN AW- 6060	EN AW-5454	
EN AW- 6061		
EN AW- 6082		

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TOLERANCE ON FLATNESS UNI-EN 755-5

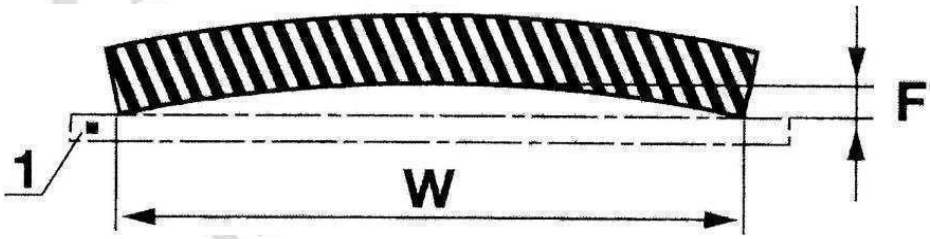
(Convexity and Concavity of the Bars with Rectangular Section)

The flatness tolerance shall be measured in accordance with what is indicated in the figure.
The tolerance is specified in the table.

Width W (mm)		Tolerance of convexity-concavity F (mm)
> 10	≤ 30	0,2
> 30	≤ 50	0,3
> 50	≤ 80	0,4
> 80	≤ 120	0,6
> 120	≤ 180	0,9
> 180	≤ 240	1,2
> 240	≤ 350	1,5
> 350	≤ 450	2,0
> 450	≤ 600	2,5

How to measure the tolerance on flatness.

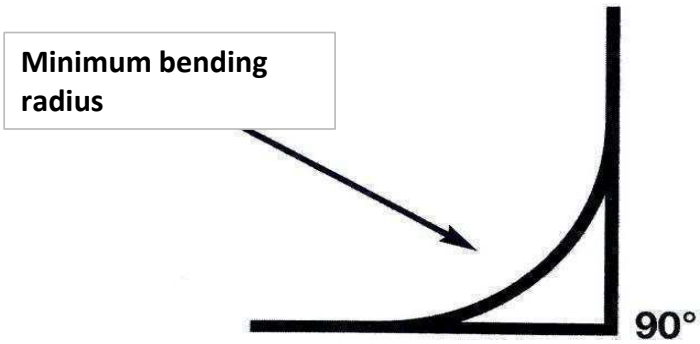
Key **1**: Support plate



TOLERANCE ON MINIMUM BENDING RADII OF ROLLED PRODUCTS

Alloy	Physical condition	Coefficient for thickness			
		Thickness from 0,5 to 1,5 (mm)	Thickness from 1,6 to 3 (mm)	Thickness from 3,1 to 6 (mm)	Thickness from 6,1 to 12,5 (mm)
1050 A	0/H111	0	0	0,5	1
	H24	0,5	1	1,5	2,5
	H18	2	3	-	-
2017 A	T4	3	5	5	8
2024	T3	4	4	5	8
5005	H24	1	1	2	2,5
5754	0/H111	0,5	1	1	2
	H32	1	1,5	1,5	2,5
	H24	1,5	2	2,5	3
5154 A	0/H111	1	1	1,5	2,5
	H32	1,5	2	2,5	3,5
5083	0/H111	1	1	1,5	2,5
	H32	1,5	2	2,5	3,5
6082	T4	1,5	2	3	4
	T6	2,5	3,5	4,5	6

The coefficients are related to internal radii of 90 ° bending in cold condition.
Example: for a thickness of 10mm. (alloy 5083 H111) with a coefficient of 2,5, a minimum radius of 25 (10mmx2,5) is tolerated.



COMMERCIAL ALUMINIUM SPA

ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 15)

TOLERANCE ON THICKNESS - COLD ROLLED PRODUCTS - UNI-EN 485

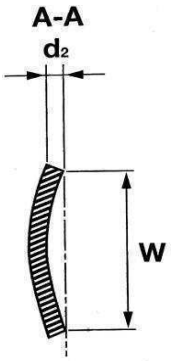
Thickness (mm)		Tolerance on thickness for a specified length (mm)								
>	≤	≤ 1'000		> 1'000 ≤ 1'250		> 1'250 ≤ 1'600		> 1'600 ≤ 2'000		> 2'000 ≤ 2'500
		GROUP		GROUP		GROUP		GROUP		GROUP
		1	2	1	2	1	2	1	2	1 e 2
0,4	0,5	±0,03	±0,03	±0,04	±0,05	±0,05	±0,06	±0,06	±0,07	±0,10
0,5	0,6	±0,03	±0,04	±0,05	±0,06	±0,06	±0,07	±0,07	±0,08	±0,11
0,6	0,8	±0,03	±0,04	±0,06	± 0,07	±0,07	±0,08	±0,08	±0,09	±0,12
0,8	1,0	±0,04	±0,05	±0,06	±0,08	±0,08	±0,09	±0,09	±0,10	±0,13
1,0	1,2	±0,04	±0,05	±0,07	±0,09	±0,09	±0,10	±0,10	±0,12	±0,14
1,2	1,5	±0,05	±0,07	±0,09	±0,11	±0,10	±0,12	±0,11	±0,14	±0,16
1,5	1,8	±0,06	±0,08	±0,10	±0,12	± 0,11	± 0,13	±0,12	±0,15	± 0,17
1,8	2,0	±0,06	±0,09	±0,11	± 0,13	±0,12	± 0,14	±0,14	±0,16	±0,19
2,0	2,5	±0,07	±0,10	± 0,12	±0,14	± 0,13	±0,15	± 0,15	±0,17	±0,20
2,5	3,0	±0,08	±0,11	±0,13	± 0,15	±0,15	±0,17	±0,17	±0,19	±0,23
3,0	3,5	±0,10	±0,12	± 0,15	±0,17	±0,17	±0,19	± 0,18	±0,20	±0,24
3,5	4,0	±0,15	±0,15	±0,20	±0,20	±0,22	±0,22	±0,23	±0,23	±0,25
4,0	5,0	±0,18	±0,18	±0,22	±0,22	±0,24	±0,24	±0,25	±0,25	± 0,29
5,0	6,0	±0,20	±0,20	±0,24	±0,24	±0,25	± 0,25	±0,26	±0,26	±0,32
6,0	8,0	±0,24	±0,24	±0,30	±0,30	±0,31	±0,31	±0,32	±0,32	± 0,38

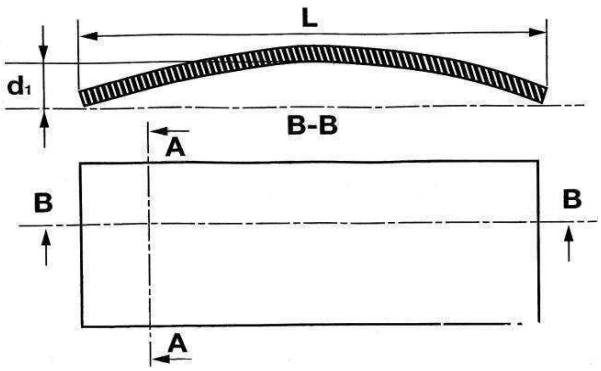
TOLERANCE ON FLATNESS - COLD ROLLED PRODUCTS

Specified thickness mm		Total deviation %	
>	≤	On the length d1 max/L	On the width d2 max/W
-	0,5	to be agreed	to be agreed
0,5	3	0,4	0,5
3	6	0,3	0,4
6	8	0,2	0,3

GROUP 1			GROUP 2			
EN AW 1050A	EN AW 3003		EN AW 2017A	EN AW 5454	EN AW 5086	EN AW 7020
EN AW 1200	EN AW 5005		EN AW 2024	EN AW 5754	EN AW 6061	EN AW 7022
-	-		EN AW 5154A	EN AW 5083	EN AW 6082	EN AW 7075

The data refer to standard size products. The tolerance on flatness after cutting shall be eventually agreed





ALUMINIUM: PHYSICAL AND TECHNICAL PROPERTIES - (page 16)

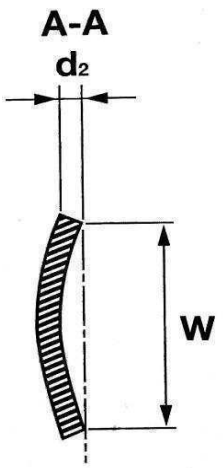
TOLERANCE ON THICKNESS - HOT ROLLED PRODUCTS - UNI-EN 485 (mm)

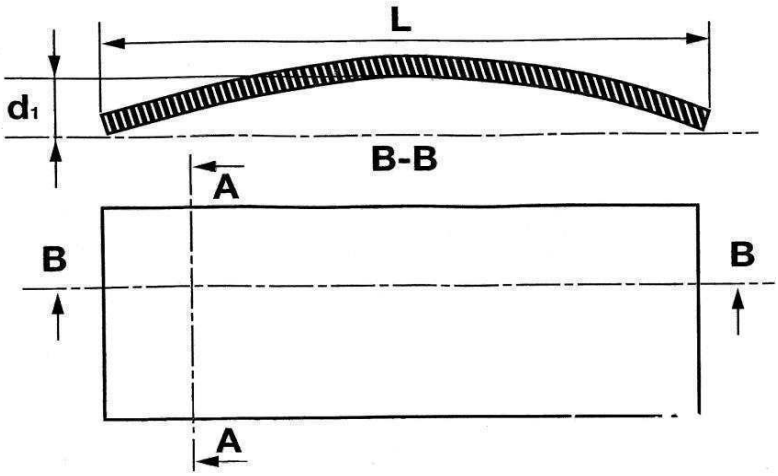
≥	≤	≥ 1'250	> 1'250 ≤ 1'600	> 1'600 ≤ 2'000	> 2'000 ≤ 2'500
2,5	4	± 0,28	± 0,28	± 0,32	± 0,35
4	5	± 0,30	± 0,30	± 0,50	± 0,40
5	6	± 0,32	± 0,32	± 0,40	± 0,45
6	8	± 0,35	± 0,40	± 0,40	± 0,50
8	10	± 0,45	± 0,50	± 0,50	± 0,55
10	15	± 0,50	± 0,60	± 0,65	± 0,65
15	20	± 0,60	± 0,70	± 0,75	± 0,80
20	30	± 0,65	± 0,75	± 0,85	± 0,90
30	40	± 0,75	± 0,85	± 1,00	± 1,10
40	50	± 0,90	± 1,00	± 1,10	± 1,20
50	60	± 1,10	± 1,20	± 1,40	± 1,50
60	80	± 1,40	± 1,50	± 1,70	± 1,90
80	100	± 1,70	± 1,80	± 1,90	± 2,10
100	150	± 2,20	± 2,20	± 2,70	± 2,80
150	200	± 2,80	± 2,80	± 3,30	± 3,30

TOLERANCE ON FLATNESS - HOT ROLLED PRODUCTS

Specified thickness mm		Total deviation %	
		On the length	On the width
>	≤	d_1 max/L	d_2 max/W
> 2,5	3,0	0,4	0,5
> 3,0	6,0	0,3	0,4
> 6,0	50	0,2	0,4
> 50	200	0,2	0,2

The data refer to standard size products. The tolerance on flatness after cutting shall be eventually agreed





COMMERCIAL PROPERTIES

ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 17)

EXTRUDED BARS 2000 - 6000 - 7000 SERIES

ROUND				SQUARE	
Dim. Ø (mm)	Weight kg/mt	Dim. Ø (mm)	Weight kg/mt	Dim. (mm)	Weight kg/mt
5	0,06	310*	211,23	4 x 4	0,04
8	0,15	320*	225,08	5 x 5	0,07
10	0,21	350*	269,26	6 x 6	0,10
15	0,48	380*	317,39	8 x 8	0,18
20	0,86	390*	334,32	10 x 10	0,28
25	1,35	400*	351,68	12 x 12	0,40
30	1,94	410*	369,48	15 x 15	0,62
35	2,64	420*	387,73	20 x 20	1,10
40	3,45	450*	445,10	25 x 25	1,72
45	4,37	460*	465,10	30 x 30	2,48
50	5,39	500*	549,50	35 x 35	3,37
55	6,53	600*	791,28	40 x 40	4,40
60	7,77			45 x 45	5,57
65	9,12	**CAST AND TURNED 2000 AND 6000 SERIES**		50 x 50	6,88
70	10,57			55 x 55	8,32
75	12,14	210	96,93	60 x 60	9,90
80	13,81	220	106,38	65 x 65	11,62
85	15,59	230	116,27	70 x 70	13,48
90	17,48	240	126,60	75 x 75	15,47
95	19,48	250	137,38	80 x 80	17,60
100	21,58	260	148,58	85 x 85	19,87
105	23,80	270	160,23	90 x 90	22,28
110	26,12	280	172,32	95 x 95	24,82
115	28,55	290	181,50	100 x 100	27,50
120	31,08	300	197,82	105 x 105	30,32
125	33,73	310	207,94	110 x 110	33,28
130	36,48	320	221,00	115 x 115	37,71
140	42,31	330	235,00	120 x 120	39,60
150	48,57	350	264,00	130 x 130	46,48
160	55,26	360	285,00	140 x 140	53,90
170	62,38	380	311,70	150 x 150	61,88
180	69,94	390	334,00	160 x 160	70,40
190	77,93	400	345,40	180 x 180	89,10
200	87,92	410	362,80	200 x 200	110,00
210	96,93	420	380,80	220 x 220	133,10
220	106,38	430	400,00	250 x 250	171,88
230	116,27	450	437,10		
240	126,60	460	456,70		
250	137,38	480	488,00		
260	148,58	500	539,60		
270	160,23	550	653,00		
280	172,32	600	791,28		
300*	197,82	640	884,00		

* Extruded bars on demand, available in cast and turned condition in standard length of 1 / 1,5 meters with possibility of cutting to specific length.
The weights indicated in the table are theoretical and may vary depending on the alloy.
The standard length of round and square extruded bars is 3 meters.
Other dimensions, heat treatments (physical condition) and special alloys can be produced on specific customer request.
We invite you to contact us to examine the feasibility.

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ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 18)

DRAWN BARS

ROUND mm	Weight kg/mt	FLAT mm	Weight kg/mt	HEXAGON mm	Weight kg/mt
3	0,026	21 x 16	0,924	6	0,084
4	0,034	20 x 15	0,810	7	0,115
5	0,053	25 x 15	1,030	8	0,150
6	0,076	25 x 20	1,370	10	0,234
7	0,104	30 x 15	1,240	11	0,238
8	0,136	30 x 20	1,650	12	0,337
9	0,172	30 x 25	2,063	13	0,395
10	0,212	40 x 25	2,750	14	0,458
11	0,257	40 x 30	3,300	15	0,526
12	0,305	50 x 20	2,750	16	0,599
13	0,358	50 x 30	4,050	17	0,676
14	0,416	60 x 30	4,950	18	0,758
15	0,477	60 x 40	6,600	19	0,844
16	0,543	**SQUARE mm**	**Weight kg/mt**	20	0,935
17	0,613			21	1,031
18	0,687	10 x 10	0,270	22	1,131
19	0,766	15 x 15	0,620	23	1,237
20	0,848	20 x 20	1,100	24	1,347
21	0,935	25 x 25	1,710	25	1,461
22	1,026	30 x 30	2,470	26	1,581
23	1,121	32 x 32	2,760	27	1,704
24	1,223	35 x 35	3,360	28	1,834
25	1,325	40 x 40	4,560	29	1,961
26	1,443	50 x 50	6,750	30	2,104
27	1,546	52 x 52	7,440	32	2,394
28	1,663	55 x 55	8,620	33	2,539
29	1,780			34	2,703
30	1,909			35	2,863
32	2,171			36	3,030
34	2,490			37	3,191
35	2,598			38	3,377
36	2,750			39	3,553
38	3,062			40	3,741
40	3,393			42	4,114
42	3,740			45	4,720
43	3,990			46	4,948
44	4,110			50	5,845
45	4,294			55	7,060
46	4,490				
48	4,970				
49	5,080				
50	5,301				
52	5,830				
55	6,415				
58	7,130				
60	7,633				
65	9,12				

Standard length of the drawn round bar 3 meters

Other dimensions, heat treatments (physical condition) and special alloys can be realized on specific customer request. We invite you to contact us to examine the feasibility.

COMPAGNIE FONDE SPA

ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 19)

EXTRUDED FLAT BARS

Section (mm)	Weight kg/mt	Section (mm)	Weight kg/mt	Section (mm)	Weight kg/mt	Section (mm)	Weight kg/mt
10 x 2	0,05	35 x 12	1,13	70 x 12	2,27	100 x 80	21,60
10 x 3	0,08	35 x 15	1,41	70 x 15	2,84	110 x 35	10,39
10 x 4	0,10	35 x 20	1,89	70 x 20	3,78	120 x 5	1,62
10 x 5	0,13	35 x 25	2,36	70 x 25	4,73	120 x 6	1,94
10 x 6	0,16	40 x 2	0,36	70 x 30	5,67	120 x 8	2,59
10 x 8	0,20	40 x 3	0,32	70 x 35	6,62	120 x 10	3,24
12 x 4	0,12	40 x 4	0,43	70 x 40	7,56	120 x 12	3,89
12 x 8	0,25	40 x 5	0,54	70 x 50	9,45	120 x 15	4,86
15 x 2	0,08	40 x 6	0,64	70 x 60	11,34	120 x 20	6,48
15 x 3	0,12	40 x 8	0,86	80 x 2	0,43	120 x 25	8,10
15 x 4	0,16	40 x 10	1,08	80 x 3	0,65	120 x 30	9,72
15 x 5	0,20	40 x 12	1,30	80 x 4	0,86	120 x 40	12,96
15 x 6	0,25	40 x 15	1,62	80 x 5	1,08	120 x 50	16,20
15 x 8	0,32	40 x 20	2,16	80 x 6	1,29	120 x 60	19,44
15 x 10	0,40	40 x 25	2,70	80 x 8	1,73	120 x 70	22,68
15 x 12	0,48	40 x 30	3,24	80 x 10	2,16	120 x 80	25,92
20 x 2	0,11	45 x 5	0,60	80 x 12	2,60	120 x 90	29,16
20 x 3	0,16	45 x 6	0,72	80 x 15	3,24	130 x 25	8,77
20 x 4	0,21	45 x 10	1,21	80 x 20	4,32	130 x 30	10,53
20 x 5	0,27	45 x 30	3,64	80 x 25	5,40	130 x 40	14,04
20 x 6	0,32	50 x 2	0,27	80 x 30	6,48	130 x 60	21,06
20 x 8	0,43	50 x 3	0,40	80 x 35	7,56	150 x 6	2,43
20 x 10	0,54	50 x 4	0,54	80 x 40	8,64	150 x 8	3,24
20 x 12	0,65	50 x 5	0,67	80 x 50	10,80	150 x 10	4,05
20 x 15	0,81	50 x 6	0,81	80 x 60	12,96	150 x 12	4,86
25 x 2	0,13	50 x 8	1,08	80 x 70	15,12	150 x 15	6,07
25 x 3	0,20	50 x 10	1,35	90 x 8	1,94	150 x 20	8,10
25 x 4	0,27	50 x 12	1,62	90 x 10	2,90	150 x 25	10,12
25 x 5	0,33	50 x 15	2,02	90 x 12	2,91	150 x 30	12,15
25 x 6	0,40	50 x 20	2,70	90 x 15	3,72	150 x 40	18,15
25 x 8	0,54	50 x 25	3,37	90 x 20	4,86	150 x 50	20,70
25 x 10	0,67	50 x 30	4,05	90 x 25	6,07	150 x 60	24,30
25 x 12	0,81	50 x 35	4,72	90 x 30	7,45	160 x 10	4,40
25 x 15	1,01	50 x 40	5,40	90 x 40	9,94	160 x 20	8,80
25 x 20	1,35	60 x 2	0,33	90 x 50	12,15	180 x 10	4,86
30 x 2	0,16	60 x 3	0,48	90 x 60	14,90	180 x 12	5,83
30 x 3	0,24	60 x 4	0,66	90 x 70	17,01	200 x 10	5,40
30 x 4	0,32	60 x 5	0,81	100 x 3	0,81	200 x 15	8,10
30 x 5	0,40	60 x 6	0,97	100 x 4	1,08	200 x 20	10,80
30 x 6	0,48	60 x 8	1,30	100 x 5	1,35	200 x 25	13,50
30 x 8	0,64	60 x 10	1,62	100 x 6	1,62	200 x 30	16,20
30 x 10	0,81	60 x 12	1,94	100 x 8	2,16	200 x 40	21,60
30 x 12	0,97	60 x 15	2,43	100 x 10	2,70	200 x 50	27,00
30 x 15	1,21	60 x 20	3,24	100 x 12	3,24	250 x 10	7,54
30 x 20	1,62	60 x 25	4,05	100 x 15	4,06	250 x 15	10,80
30 x 25	2,02	60 x 30	4,86	100 x 20	5,40	250 x 20	13,50
35 x 2	0,18	60 x 35	5,67	100 x 25	6,75	250 x 25	16,87
35 x 3	0,28	60 x 40	6,48	100 x 30	8,10	250 x 30	20,25
35 x 4	0,34	60 x 50	8,10	100 x 35	2,45	250 x 40	27,00
35 x 5	0,47	70 x 5	0,95	100 x 40	10,80	300 x 10	8,10
35 x 6	0,57	70 x 6	1,14	100 x 50	13,50	300 x 15	12,15
35 x 8	0,75	70 x 8	1,51	100 x 60	16,20	300 x 20	16,20
35 x 10	0,94	70 x 10	1,89	100 x 70	18,90	300 x 30	24,30

Standard length of the extruded flat bar 6 meters.
Other dimensions, heat treatments (physical condition) and alloys can be realized on request.
We invite you to contact us to examine the feasibility.

ALUMINIUM: PLATES - FRESAL AND FUSALL - (page 20)

THICKNESS OF ALUMINIUM PLATES SOLD AND CUT TO SIZE IN THE ALLOYS: 6082; 5083; 2017; 7075

4	5	6	8	10	12	15	20
25	30	35	40	45	50	55	60
65	70	80	90	100	110	120	130
140	150	160	180	200	220	250	300

The plates with the above specified thickness can be cut to size on customer request, please consult the page about the Standard for thickness, flatness, type and cutting tolerance. The sheets with thickness from 1 mm. to 3 mm. can be cut only on request but the scrap is charged to the customer and the cutting cost is calculated on a flat rate.
Other dimensions, heat treatments (physical condition) and special alloys can be realized on specific customer request. We invite you to contact us to examine the feasibility.

FRESAL

Plates in alloy 5083 obtained from cast sawed blocks, milled and PVC coated on both sides.
These plates have a very high flatness degree and precise tolerance on the thickness.
Suitable for the realization of mechanical parts of high precision.
The dimensional stability is guaranteed during and after machining.

• TOLERANCE:		• MECHANICAL PROPERTIES:		
Roughness	**Tolerance on flatness**	**Rm (Mpa)**	**A (%)**	**HB**
Ra ≤ 0,4 μ	Thickness 5 mm ≤ 0,80 mm/ml	275	15	75
	Thickness 6 mm to 12,7 mm	**• THICKNESS (mm):**		
	≤ 0,40 mm/ml	5 - 6 - 8 - 10 - 12 - 12,7 - 15 - 15,88 - 20 - 25 - 25,40 - 30 - 35 - 40 - 45 - 50		
	Thickness > 12,7 ≤ 0,13 mm/ml			

FUSALL 5083 - O

The plates are cut to size by sectioning big cast stabilized blocks in alloy 5083.
Excellent shape stability.
Used for the construction of molds.

Properties	
Shape stability	Very good
Machinability	Very good
Welding (Gas/TIG/MIG/Resistance)	Poor/Good Good/Good
Resistance to corrosion (Sea water / Weather conditions)	Very good/ Very good
Anodizing (not decorative)	Good/Good
Contact with food	YES
Mechanical Properties	
Tensile Strength	230÷290 MPa
Yield strength $Rp_{0,2}$	110÷130 MPa
Elongation A 5%	10÷14
Brinnel Hardness	69÷73
Physical properties	
Density	2,66 g/cm^3
Heat conductivity	110÷130 W/m*K
Modulus of elasticity	70 Gpa
Coefficient of thermal expansion	24,2 10^{-6}/K
Electric conductivity	16÷19 (m/Ωmm2)
Specific heat capacity	900 (J/kg*K)

FUSALL 7021 - T79

The plates are cut to size by sectioning big cast stabilized blocks in alloy 7021.
It has high mechanical properties.
Excellent machinability.
Used for the construction of molds.

Properties	
Shape stability	Very good
Machinability	Very good
Welding (Gas/TIG/MIG/Resistance)	No/Very good Very good/No
Resistance to corrosion (Sea water / Weather conditions)	Poor/ Good
Anodizzazione (non decorativa)	Good
Contatto con il cibo	NO
Mechanical Properties	
Tensile Strength	320÷380 Mpa
Yield strength $Rp_{0,2}$	290÷340 MPa
Elongation A 5%	2,5÷4,5
Brinnel Hardness	110÷120
Physical properties	
Density	2,80 g/cm^3
Heat conductivity	125÷155 W/m*K
Modulus of elasticity	70 Gpa
Coefficient of thermal expansion	23,0 10^{-6}/K
Electric conductivity	21÷24 (m/Ωmm2)
Specific heat capacity	875 (J/kg*K)

COMMERCIALE SOMMERCIALE

ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 21)

TREAD PLATES

Sizes	Thickness under the raised pattern (mm)	Total Thickness (mm)	Weight of the plate (Kg)	Alloy 1050 99,5	Alloy 5754 H111
1000x2000	2,0	3,5	13,00	99,5	-
1000x2000	3,0	4,5	18,00	99,5	-
1000x2000	5,0	6,5	30,00	99,5	5754
1250x2500	2,0	3,5	20,30	99,5	-
1250x2500	3,0	4,5	27,84	99,5	-
1250x2500	5,0	7,0	46,00	-	5754
1500x3000	2,0	3,5	29,25	99,5	-
1500x3000	3,0	4,5	40,00	99,5	-
1500x3000	5,0	7,0	68,00	-	5754

SMOOTH PLATES

Sizes (mm)	Thickness (mm)	Weight (Kg) of the Plate	Alloy 1050 99,5	Alloy Anticorodal	Alloy Peraluman	Alloy Avional	Alloy Ergal
1000x2000	0,5	2,70	99,5 H 24	-	_	_	_
1000x2000	0,6	3,24	99,5 H 24	-	-	-	-
1000x2000	0,7	3,78	99,5 H 24	-	-	-	-
1000x2000	0,8	4,32	99,5 H 24	-	-	-	-
1000x2000	1,0	5,40	99,5 H 24	6082 T651	5754 H 111	2017 T451	7075 T 651
1000x2000	1,2	6,48	99,5 H 24	-	5754 H 111	-	-
1000x2000	1,5	8,10	99,5 H 24	-	5754 H 111	2017 T451	7075T651
1000x2000	2,0	10,80	99,5 H 24	6082 T651	5754 H 111	2017T 451	7075 T 651
1000x2000	2,5	13,50	99,5 H 24	-	5754 H 111	2017 T451	7075 T 651
1000x2000	3,0	16,20	99,5 H 24	6082 T651	5754 H 111	2017T451	7075 T 651
1000x2000	4,0	21,60	99,5 H 24	6082 T651	5754 H 111	2017 T 451	7075 T 651
1000x2000	5,0	27,00	99,5 H 24	6082 T651	5754 H 111	2017 T 451	7075 T 651
1000x2000	6,0	32,40	99,5 H 24	6082 T651	5754 H 111	2017 T451	7075 T 651
1000x2000	8,0	43,20	99,5 H 24	6082 T651	5083 H 111	2017 T451	7075 T 651
1000x2000	10,0	54,00	99,5 H 24	6082 T651	5083 H 111	-	7075 T 651
1000x2000	12,0	64,80	-	6082 T651	5083 H 111	-	7075 T 651
1000x2000	15,0	81,00	-	6082 T651	5083 H 111	-	7075 T 651
1000x2000	20,0	108,00	-	6082 T651	5083 H 111	-	7075 T 651
1250x2500	1,0	8,70	99,5 H 24	-	5754 H 111	-	-
1250x2500	1,5	12,66	99,5 H 24	-	5754 H 111	-	-
1250x2500	2,0	21,09	99,5 H 24	-	5754 H 111	-	-
1250x2500	3,0	25,30	99,5 H 24	-	5754 H 111	-	-
1250x2500	4,0	33,75	99,5 H 24	-	5754 H 111	-	-
1250x2500	5,0	42,19	99,5 H 24	-	5754 H 111	-	-
1500x3000	1,0	12,20	99,5 H 24	-	5754 H 111	-	-
1500x3000	1,5	18,23	99,5 H 24	-	5754 H 111	-	-
1500x3000	2,0	24,30	99,5 H 24	-	5754 H 111	-	-
1500x3000	3,0	36,45	99,5 H 24	-	5754 H 111	-	-
1500x3000	8,0	97,20	-	6082 T651	5083 H 111	-	7075 T 651
1500x3000	10,0	121,50	-	6082 T651	5083 H 111	-	7075 T 651

COMMERCIALE ALUMINIUM SPA

ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 22)

EXTRUDED ROUND TUBES - ALLOY 6060 - UNI 9006/1 - (Table 1 of 3)

Outside Ø (mm)	Inside Ø (mm)	Thickness (mm)	Weight kg/meter	Outside Ø (mm)	Inside Ø (mm)	Thickness (mm)	Weight kg/meter
5	3	1	0,033	25	23	1	0,204
6	4	1	0,042	26	22	2	0,408
7	5	1	0,051	26	24	1	0,210
8	6	1	0,060	27	21	3	0,611
9	7	1	0,068	27	25	1	0,221
10	5	2,5	0,159	28	15	6,5	1,186
10	6	2	0,135	28	22	3	0,636
10	7	1,5	0,108	28	24	2	0,441
10	8	1	0,076	28	25	1,5	0,337
11	9	1	0,085	28	26	1	0,229
12	5	3,5	0,254	30	15	7,5	1,432
12	8	2	0,170	30	17,5	6,25	1,222
12	9	1,5	0,134	30	20	5	1,060
12	10	1	0,093	30	24	3	0,686
13	10	1,5	0,146	30	25	2,5	0,583
13	11	1	0,102	30	26	2	0,475
14	7	3,5	0,310	30	27	1,5	0,362
14	10	2	0,203	30	28	1	0,246
14	11	1,5	0,159	32	22	5	1,145
14	12	1	0,110	32	24	4	0,948
15	10	2,5	0,265	32	26	3	0,737
15	11	2	0,220	32	28	2	0,509
15	12	1,5	0,172	32	29	1,5	0,388
15	13	1	0,119	32	30	1	0,268
16	12	2	0,237	33	30	1,5	0,400
16	13	1,5	0,184	35	22	6,5	1,572
16	14	1	0,127	35	25	5	1,272
17	11	3	0,356	35	26	4,5	1,165
17	12	2,5	0,308	35	27	4	1,052
18	12	3	0,382	35	29	3	0,814
18	13	2,5	0,329	35	30	2,5	0,688
18	14	2	0,272	35	31	2	0,560
18	15	1,5	0,210	35	32	1,5	0,426
18	16	1	0,144	35	33	1	0,289
20	10	5	0,636	38	24	7	1,839
20	12	4	0,543	38	28	5	1,399
20	14	3	0,435	38	32	3	0,891
20	15	2,5	0,373	38	35	1,5	0,464
20	16	2	0,306	40	15	12,5	2,916
20	17	1,5	0,235	40	20	10	2,544
20	18	1	0,163	40	25	7,5	2,100
22	18	2	0,337	40	30	5	1,485
22	20	1	0,178	40	32	4	1,222
23	21	1	0,186	40	34	3	0,942
24	20	2	0,373	40	35	2,5	0,795
24	21	1,5	0,286	40	36	2	0,645
24	22		0,194	40	37	1,5	0,490
25	15	5	0,848	40	38	1	0,330
25	16	4,5	0,782	42	36	3	0,992
25	19	3	0,559	42	38	2	0,679
25	20	2,5	0,478	42	40	1	0,347
25	21	2	0,390	45	15	15	3,817
25	22	1,5	0,298	45	25	10	2,969

COMPROMETONSA

ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 23)

EXTRUDED ROUND TUBES - ALLOY 6060 - UNI 9006/1 - (Table 2 of 3)

Outside Ø (mm)	Inside Ø (mm)	Thickness (mm)	Weight kg/meter	Outside Ø (mm)	Inside Ø (mm)	Thickness (mm)	Weight kg/meter
45	27	9	2,75	70	40	15	7,00
45	30	7,5	2,39	70	45	12,5	6,10
45	35	5	1,70	70	50	10	5,09
45	40	2,5	0,90	70	55	7,5	3,98
45	41	2	0,73	70	60	5	2,76
45	42	1,5	0,55	70	54	3	1,71
45	43	1	0,38	70	65	2,5	1,43
48	28	10	3,22	70	66	2	1,15
48	38	5	1,82	70	67	1,5	0,87
48	41	3,5	1,33	75	35	20	9,33
50	20	15	4,45	75	40	17,5	8,54
50	25	12,5	3,98	75	45	15	7,63
50	30	10	3,39	75	50	12,5	6,63
50	35	7,5	2,70	75	55	10	5,51
50	40	5	1,91	75	60	7,5	4,29
50	44	3	1,20	75	65	5	2,97
50	45	2,5	1,08	75	70	2,5	1,54
50	46	2	0,81	80	25	27,5	12,25
50	47	1,5	0,62	80	30	25	11,66
50	48	1	0,42	80	40	20	10,18
55	20	17,5	5,57	80	45	17,5	9,27
55	25	15	5,09	80	50	15	8,27
55	30	12,5	4,51	80	55	12,5	7,16
55	35	10	3,82	80	60	10	5,94
55	40	7,5	3,02	80	64	8	4,89
55	45	5	2,12	80	70	5	3,18
55	50	2,5	1,11	80	74	3	1,96
55	51	2	0,90	80	75	2,5	1,64
60	20	20	6,79	80	76	2	1,32
60	25	17,5	6,31	80	71	1,5	1,00
60	30	15	5,73	85	75	5	3,39
60	35	12,5	5,04	85	80	2,5	1,75
60	40	10	4,24	85	81	2	1,41
60	44	8	3,53	90	40	25	13,78
60	45	7,5	3,34	90	50	20	11,88
60	50	5	2,34	90	60	15	9,54
60	52	4	1,90	90	65	12,5	8,22
60	54	3	1,45	90	70	10	6,79
60	55	2,5	1,22	90	80	5	3,61
60	56	2	0,98	90	84	3	2,21
60	57	1,5	0,74	90	85	2,5	1,86
60	58	1	0,50	90	86	2	1,49
65	30	17,5	7,05	95	85	5	3,82
65	35	15	6,36	95	90	2,5	1,96
65	40	12,5	5,57	100	40	30	17,81
65	45	10	4,66	100	45	27,5	16,91
65	50	7,5	3,66	100	50	25	15,91
65	55	5	2,54	100	60	20	13,57
65	60	2,5	1,33	100	70	15	10,82
65	61	2	1,07	100	75	12,5	9,28
67	63	2	1,10	100	80	10	7,64
70	25	22,5	9,07	100	84	8	6,37
70	30	20	8,48	100	90	5	4,03
70	35	17,5	7,79	100	92	4	44,08

COMPRAFERRO SRL

ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 24)

EXTRUDED ROUND TUBES - ALLOY 6060 - UNI 9006/1 - (Table 3 of 3)

Outside Ø (mm)	Inside Ø (mm)	Thickness (mm)	Weight kg/meter	Outside Ø (mm)	Inside Ø (mm)	Thickness (mm)	Weight kg/meter
100	94	3	2,47	150	146	2	2,50
100	95	2,5	2,07	155	115	20	22,90
100	96	2	1,66	155	135	10	12,30
105	100	2,5	2,17	160	120	20	24,00
110	45	32,5	21,37	160	130	15	18,45
110	50	30	20,36	160	140	10	12,72
110	60	25	18,03	160	150	5	6,57
110	70	20	15,20	160	152	4	5,30
110	75	17,5	13,73	165	115	25	29,69
110	80	15	12,09	170	90	40	44,08
110	90	10	8,48	170	100	35	40,10
110	100	5	4,45	170	130	20	25,45
110	105	2,5	2,28	170	140	15	19,70
115	110	2,5	2,39	170	150	10	13,57
120	50	35	25,24	170	160	5	7,00
120	60	30	22,90	171	108	31,5	37,27
120	70	25	20,15	180	80	50	55,14
120	80	20	16,96	180	82	49	54,45
120	90	15	13,36	180	100	40	47,50
120	100	10	9,33	180	130	25	32,87
120	104	8	7,60	180	140	20	27,14
120	110	5	4,88	180	150	15	20,99
120	112	4	3,94	180	155	12,5	17,76
120	114	3	2,98	180	160	10	14,42
120	115	2,5	2,49	180	164	8	11,67
124	121	1,5	1,57	180	170	5	7,42
125	85	20	17,81	190	164	13	19,52
125	115	5	5,13	190	170	10	15,30
125	120	2,5	2,60	190	180	5	7,84
130	46	42	31,35	200	160	20	30,54
130	50	40	30,50	200	170	15	23,54
130	70	30	25,45	200	180	10	16,12
130	80	25	22,27	200	190	5	8,27
130	90	20	18,66	203	152	25,5	39,00
130	100	15	14,63	210	200	5	8,72
130	110	10	10,17	220	185	17,5	29,00
130	120	5	5,30	220	190	15	26,00
130	125	2,5	2,70	220	207	6,5	11,76
140	70	35	31,17	230	200	15	27,42
140	100	20	20,36	230	210	10	18,70
140	120	10	11,03	235	115	60	89,10
140	125	7,5	8,46	250	210	20	39,00
140	130	5	5,73	250	220	15	30,00
150	100	25	26,51	250	226	12	24,21
150	110	20	22,05	250	234	8	16,42
150	120	15	17,18	270	240	15	32,43
150	130	10	11,88	300	280	10	24,58
150	134	8	9,63	303	250	26,5	62,14
150	140	5	6,15	303	267	18	43,50

Standard length of the Round Tubes 6 meters
On customer request it is possible to develop the die and produce:
Tubes in other alloys like 6082 - 7020 - 7075; Drawn tubes in the alloys 6060 - 6082 - 7020 - 7075.
Tubes with different diameters than the ones listed and different lengths than the standard
We can develop round tubes with max. out.Ø 1800 mm. and ins.Ø requested from the customer, even in small quantities.

COMPROMEC ENGINEERING

ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 25)

RECTANGULAR AND SQUARE TUBES ALLOY 6060 - UNI 9006-1

RECTANGULAR TUBES				SQUARE TUBES		
Width (mm)	Height (mm)	Thickness (mm)	Kg/Mt	Width (mm)	Thickness (mm)	Kg/Mt
20	10	1,5	0,23	10	1	0,10
20	15	2	0,34	12	1	0,12
25	15	1,5	0,30	15	1	0,22
30	10	1,5	0,30	15	1,5	0,20
30	15	1,5	0,34	15	2	0,28
30	20	2	0,50	20	1,5	0,30
40	15	1,5	0,42	20	2	0,39
40	20	1,5	0,46	25	1,5	0,38
40	20	2	0,60	25	2	0,50
40	25	2	0,66	30	1,5	0,46
40	30	2	0,71	30	2	0,61
45	20	2	0,66	30	3	0,87
50	20	2	0,72	35	1,5	0,54
50	25	2	0,77	35	2	0,71
50	30	2	0,82	40	2	0,82
50	40	2	0,93	40	3	1,12
60	20	2	0,82	45	2	0,93
60	30	2	0,94	50	2	1,09
60	40	2	1,04	50	4	1,99
80	15	1,5	0,75	60	2	1,25
80	20	2	1,04	60	3	1,85
80	30	2	1,08	80	2	1,68
80	40	2	1,25	100	2	2,70
80	40	4	2,40	100	4	4,15
80	50	2	1,36	120	5	6,23
80	50	4	2,50			
100	20	2	1,25			
100	30	2	1,36			
100	40	2	1,47			
100	50	2	1,58			
100	50	4	3,07			
100	60	3	2,46			
120	15	2	1,42			
120	20	2	1,47			
120	40	2	1,68			
150	50	3	3,14			
200	50	3	3,95			
200	50	4	5,23			

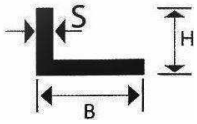
Standard length of the rectangular and square tubes 6 meters.
Other dimensions, heat treatments (physical condition) and special alloys can be realized on customer request.

We invite you to contact us to examine the feasibility.

COMMERCIAL FOND SPA

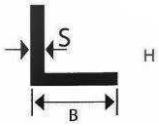
ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 26)
"T" AND ANGLE PROFILES - ALLOY 6060 - UNI 9006-1

UNEQUAL SIDES



B (mm)	H (mm)	S (mm)	Weight Kg/Mt
15	10	1,5	0,095
15	10	2	0,124
20	10	1,5	0,142
20	15	2	0,181
20	15	3	0,271
25	15	2	0,206
25	20	3	0,348
30	15	2	0,233
30	20	2	0,260
30	10	3	0,309
40	10	2	0,259
40	20	2	0,313
40	20	3	0,313
50	20	2	0,368
50	25	2	0,395
50	25	3	0,583
50	30	5	1,014
60	15	2	0,394
60	20	2	0,422
60	30	2	0,475
60	30	3	0,705
60	40	4	1,037
70	20	2	0,475
80	20	2	0,530
80	40	4	1,250
80	40	6	1,847
100	20	2	0,640
100	50	2	0,800
100	50	5	1,957
100	50	10	3,780
115	65	6	2,839

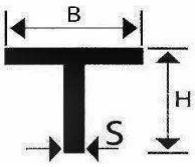
EQUAL SIDES



B (mm)	S (mm)	Weight Kg/Mt
10	1,5	0,750
15	1,5	0,115
15	2	0,151
15	3	0,219
20	1,5	0,156
20	2	0,205
20	3	0,300
25	2	0,260
25	4	0,497
30	2	0,313
30	3	0,462
30	4	0,610
35	2	0,367
40	2	0,421
40	3	0,624
40	4	0,821
40	5	1,027
50	2	0,530
50	3	0,786
50	4	1,037
50	5	1,282
60	2	0,637
60	3	0,948
80	6	2,495
100	10	5,200

The above specified weight per meter is theoretical. The standard length of the angle profiles is 6 meters. Other dimensions, heat treatments (physical condition) and special alloys can be realized on specific customer request.

"T" PROFILES



B (mm)	H (mm)	S (mm)	Weight Kg/Mt
15	15	1,5	0,115
15	15	2	0,151
20	20	2	0,205
25	25	2	0,260
30	30	2	0,314
30	30	3	0,462
40	40	2	0,421
40	20	2	0,313
40	40	4	0,842
50	50	5	1,282

COMMERCIALE TONI SPA

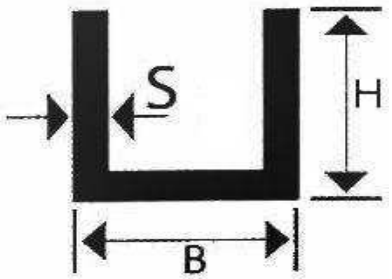
ALUMINIUM: DIMENSIONAL TABLES AND WEIGHTS - (page 27)
"U" PROFILES - ALLOY 6060 - UNI 9006-1

EQUAL SIDES

B (mm)	H (mm)	S (mm)	Weight Kg/Mt
8	8	1	0,059
10	10	1	0,076
10	10	1,5	0,110
10	10	2	0,14
12	12	1	0,098
15	15	1,5	0,170
15	15	2	0,221
20	20	2	0,302
25	25	2	0,385
30	30	2	0,465
30	30	3	0,680
35	35	2	0,545
40	40	2	0,625
40	40	3	0,923
40	40	4	1,209
40	40	5	1,890
50	50	2	0,79
50	50	3	1,166
50	50	4	1,533
50	50	5	1,890

NARROW BASE

B (mm)	H (mm)	S (mm)	Weight Kg/Mt
10	15	1,5	0,150
10	20	1,5	0,190
12	15	1,5	0,109
15	20	2	0,275
15	30	2	0,385



WIDE BASE

B (mm)	H (mm)	S (mm)	Weight Kg/Mt
20	10	1,5	0,153
20	10	2	0,190
25	15	2	0,275
30	15	2	0,305
30	20	2	0,357
35	20	2	0,384
40	20	2	0,410
45	20	2	0,437
50	25	2	0,518
50	20	2	0,460
50	30	2	0,572
50	30	3	0,843
60	20	2	0,520
60	30	2	0,627
60	40	4	1,425
80	20	2	0,626
80	40	4	1,961
100	50	5	2,565
120	60	9	5,400

The standard length of the "U" profiles is 6 meters.
Other dimensions, heat treatments (physical condition) and special alloys can be realized on specific customer request.
We invite you to contact us to examine the feasibility.

COMMERCIALE FOLIO SPA