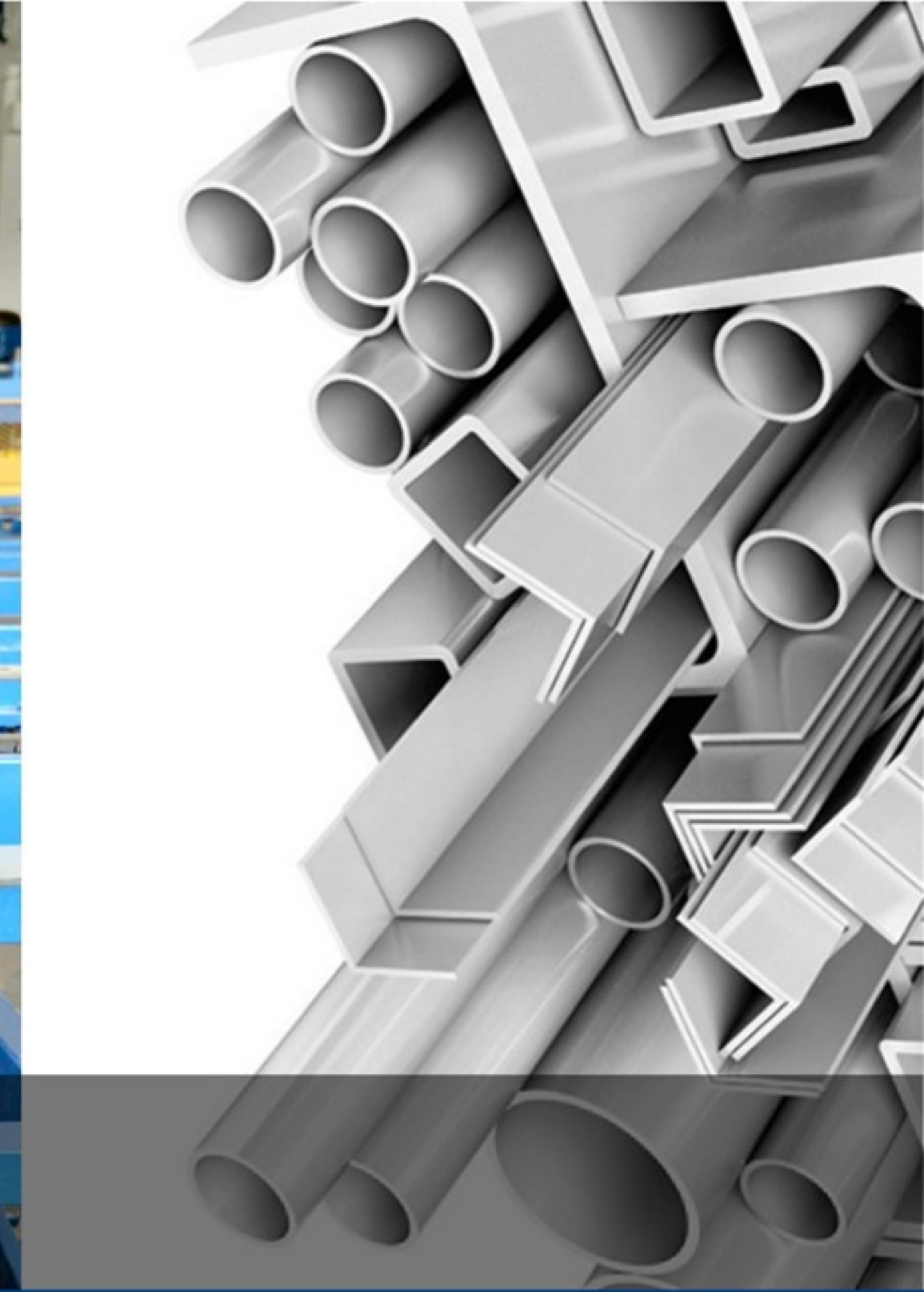
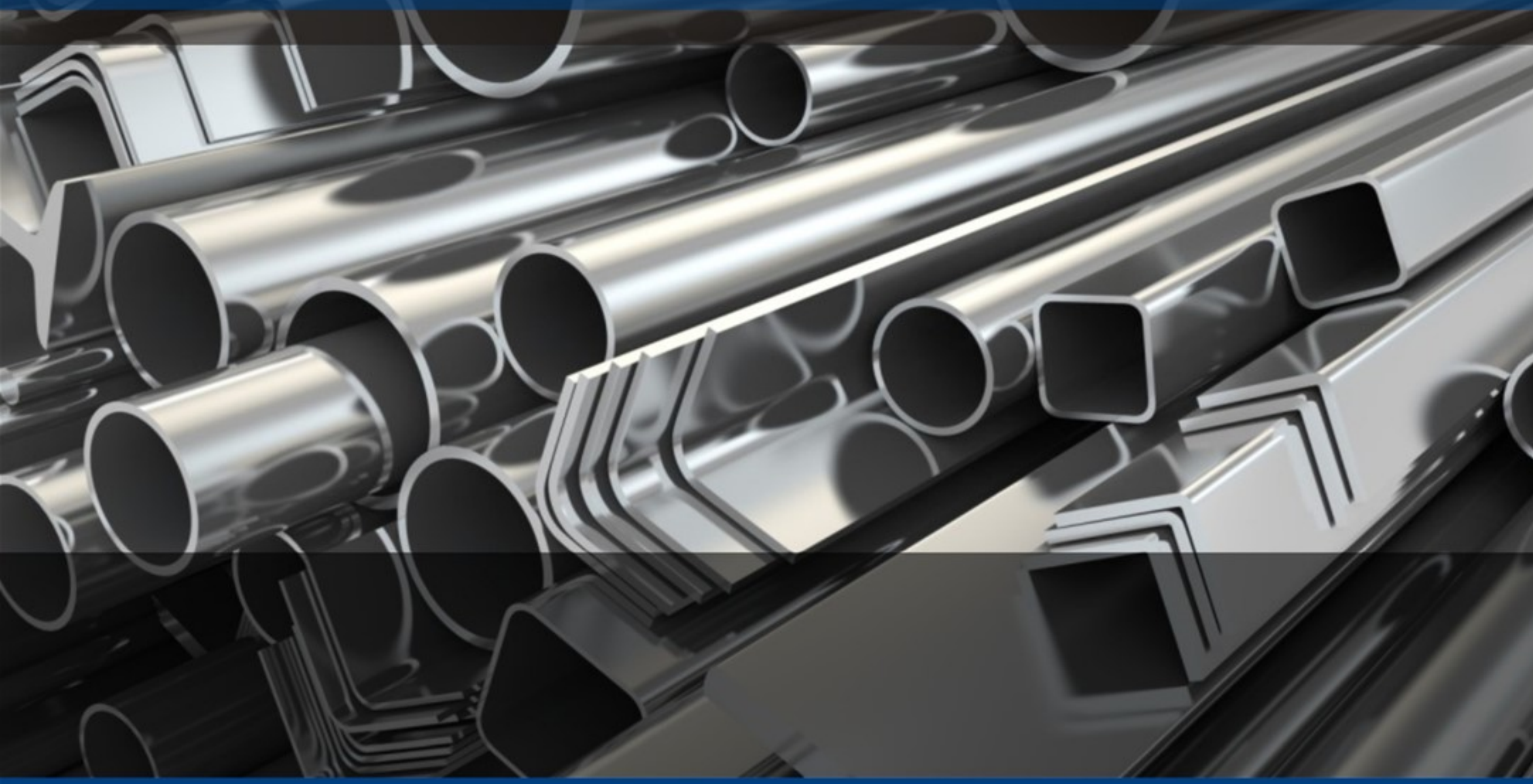


Aluminum profiles extrusion



ALUMINUM PROFILE EXTRUSION

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DESIGNED AND MANUFACTURED IN TEHNOMARKET



Zadržavamo pravo tehničkih promena i odstupanja od boja. © Tehnomarket d.o.o. 01/2019





Aluminum profiles that are produced in Tehnomarket's factory are obtained by extrusion process. Extrusion is one of the processes of metal processing by deformation and involves the continuous extrusion of thermally prepared alloys with a mechanical press, through specially prepared dies that define profile's cross-section geometry. Only the primary aluminum alloy AlMgSi0.5 is used as a raw material for the production of aluminum profiles. The extrusion process is carried out on US made BLH extrusion press with 2000 ton capacity and a controlled process of operation.

Beside extrusion of architectural profile systems, Tehnomarket offers custom extrusion according to client's drawings as an additional service.

Special-purpose profiles are used in a wide variety of production areas and are designed specifically by end-users in accordance with their own needs. Ordering of this type of profiles requires harmonization of technical documentation and drawings, followed by ordering of extrusion die. The initial cost of the die is covered by the client, while all maintenance and renewals are covered by Tehnomarket for the duration of the cooperation. In this arrangement, client is the owner of the dies, as well as of intellectual property and profile design.

The extruded profiles are produced according to SRPS EN 755-1 i EN 12020 2 standards (identical with european standards EN 755-1:2008 i EN 12020 2:2008), from primary aluminium alloy AlMgSi0.5 F22 (AA6063 T5 i AA6060 T5).

Profile types

- Based on the application, aluminum profiles are divided into three main categories:
- standard (commercial) - standard L, T i U shaped profiles, square and round tubes and others
 - architectural- profiles used in production of aluminum windows, doors, facades, substructures and similar
 - industrial (custom) - profiled used for specific applications by clients in different areas of industry and manufacturing

Mechanical properties of profiles

After extrusion profiles are additionally heat-treated in the ageing oven, restoring declared mechanical properties. Heat-treatment provides surface hardness of around 80HB, and tensile strength of profiles in the range between 220 to 250MPa. If needed and per special request, extruded profiles can be delivered before ageing for specific machining purposes.

Alloy properties

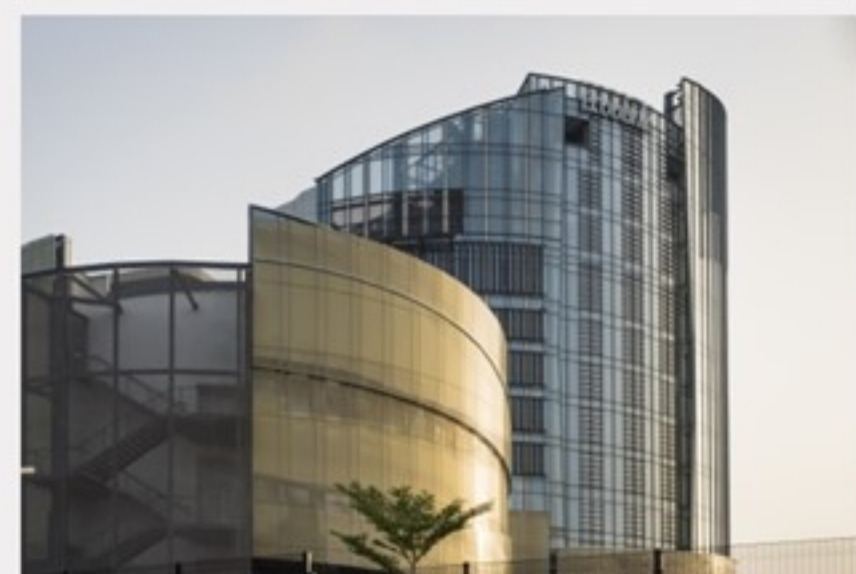
ALLOY	6063	6060
PROPERTIES	Good corrosion resistance. Suitable for machining, surface treatment and welding. Good for plastic deformation. Exceptional for extrusion and thermal treatment.	Remarkable balance between extrudability and mechanical properties. Exceptional surface for machining, while everything else remains as 6063.
MAIN ALLOY COMPONENTS	0.20-0.60 Si max 0.35 Fe 0.45-0.90 Mg	0.30-0.60 Si 0.10-0.30 Fe 0.35-0.60 Mg
TEMPER	T5	T5
HARDNESS	60 Hb	50 Hb

EN-AW chemical composition

Alloy label			Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Bi	Pb	Sn	others		
standard	numerical	chemical symbols													each	total	
EN 573-3	EN AW-6060	EN AW-AlMgSi	min	0,3	0,1		0,35										
			max	0,6	0,3	0,1	0,1	0,6	0,05		0,05	0,1				0,05	0,15
EN 573-3	EN AW-6063	EN AW-AlMg0,7Si	min	0,2			0,45										
			max	0,6	0,35	0,1	0,1	0,9	0,1		0,1	0,1				0,05	0,15

APPLICATION

construction, transportation, car, machine, food, electro and sports industries





The extruded profiles without additional surface treatment are categorized as raw. Tehnomarket provides raw profiles with surface quality according to current standards SRPS EN ISO 7599 (for anodisation process of aluminum and aluminum alloys) and SRPS EN 12206 (for powdercoating process).

The profile geometry

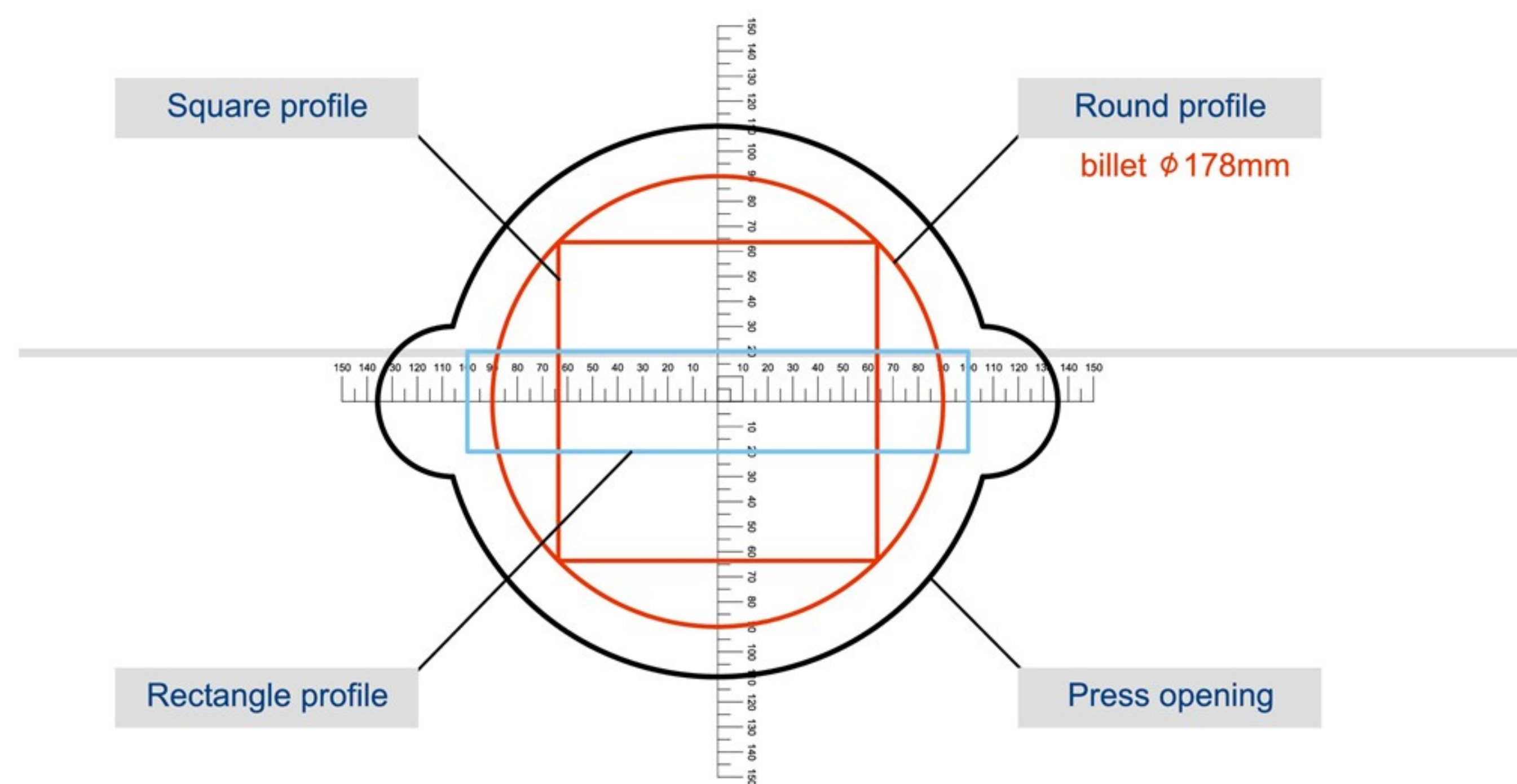
The profile geometry is defined via technical drawings used to manufacture extrusion dies. Production tolerances for both profiles and dies is defined by series of standards SRPS EN 755, also used as the benchmark for in-house quality control of extruded profiles. This is necessary due to standard extrusion process wear of the dies. Allowed tolerances are + 10% compared to theoretical weights.

Upon delivery, the profiles are cut into rods, divided into two categories of cutting:

- rough cutting - cutting directly on extrusion line, before the heat treatment of profiles and with precision of +/-15mm. The minimal profile length with rough cutting is 2m, with standard rod length of 6m.
- precise cutting - in case when customer requires profiles shorter than 2m, as well as in situations when precision cutting with +/- 1 mm precision is needed, achieved with additional cutting after heat treatment of profiles.

The maximal profile length is limited to 7,5m by heat treatment oven, which is also the maximal length for both raw and anodized profiles. In case of powder coating, the maximal length is determined by spraying chamber length that is usually 6,5m.

Diagram of maximal profile dimensions



Tehnomarket offers extruded profiles with maximal dimensions defined by 200mm circle, while the best results are achieved with profiles that fit into 178mm circle.

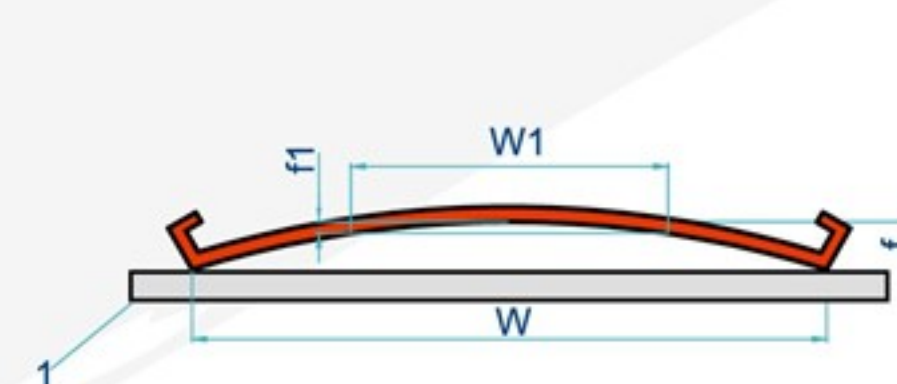
The minimal recommended wall thickness is 1mm and goes to standard 3/5mm, except in case of special geometries and solid crosssections.

The optimal profile weight is from minimum 0,25kg/m to 2,5kg/m, with ideal results in the 1-1,4kg/m range.



Deviation from convexity and concavity

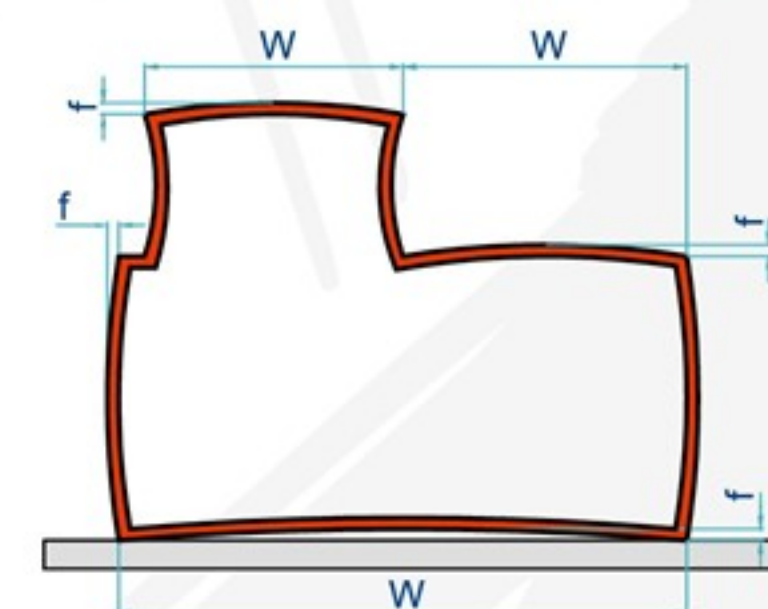
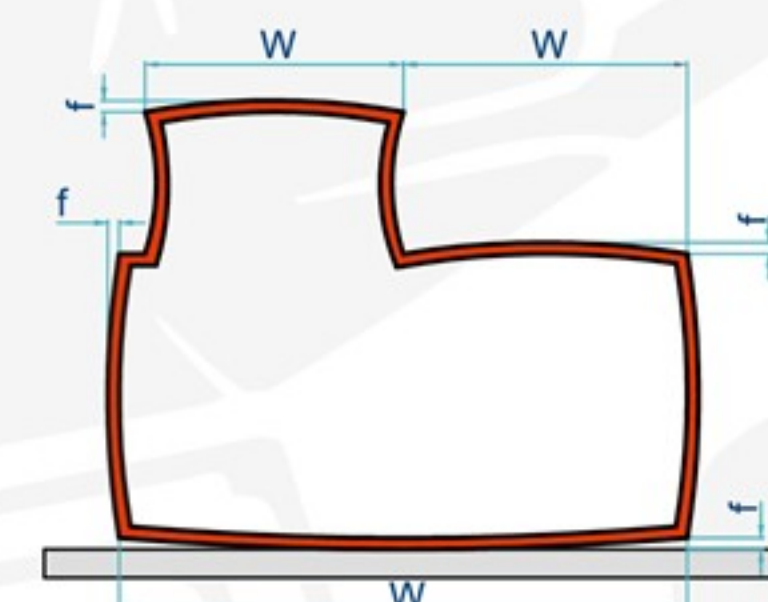
Dimension H		Maximal allowed deviation f
from	to (and including)	
/	30	0,20
30	60	0,30
60	100	0,40
100	150	0,50
150	200	0,70



1 - base plate
W - width
f - deviation
W1 - 100mm
f1 - local deviation for every 100mm

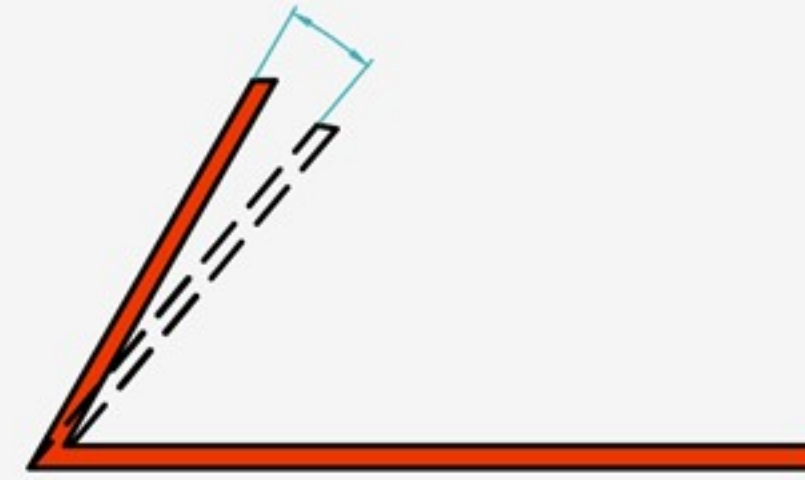
Right angle tolerancy (90°)

Dimension H		Maximal allowed deviation z from thr right angle
from	to (and including)	
/	30	0,20
30	50	0,30
50	80	0,40
80	100	0,50
100	120	0,60
120	140	0,70
140	160	0,80
160	180	0,90



Angle measurement except for the right angle

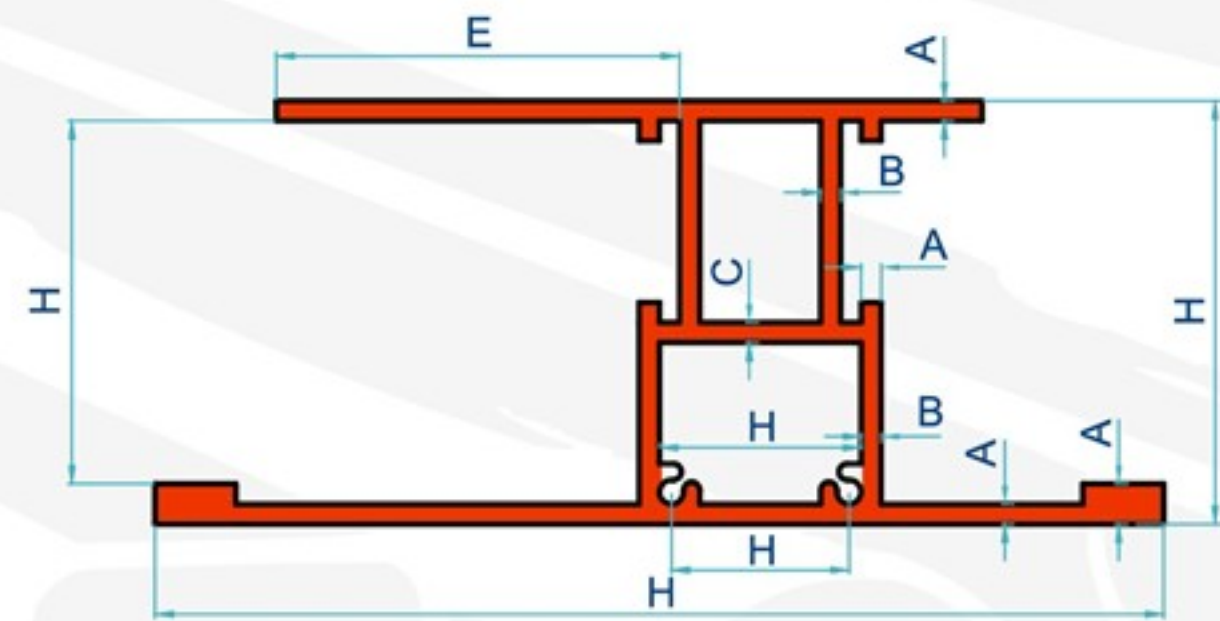
maximal allowed deviation for angles other than the right angle must be $\pm 1^\circ$



Dimensional tolerance

Cross section dimensions

- A** - wall thickness except those that encompass spaces in hollow
- B** - wall thickness that cover hollow spaces in hollow profiles, except those between the two hollow chambers
- C** - wall thickness between the two hollow spaces in hollow profiles
- E** - the length of the shorter profile end in open-ended profiles
- H** - all dimensions (except the wall thickness) between the points on the cross profile or the centers of the open screw holes for fasteners, including the open ends



Dimensional tolerance table

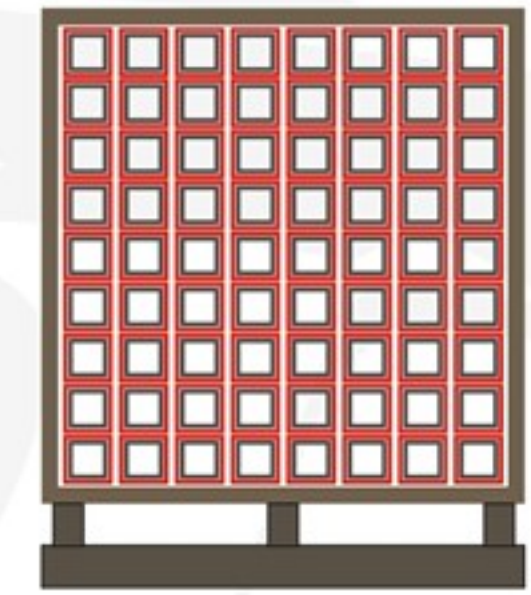
Dimension H		Tolerance H (except for the open ends)	Tolerance H (open ends)	
from	to (and including)		E 60	60 E 120
/	10	$\pm 0,15$	$\pm 0,15$	b
10	15	$\pm 0,20$	$\pm 0,20$	b
15	30	$\pm 0,25$	$\pm 0,25$	b
30	45	$\pm 0,30$	$\pm 0,30$	$\pm 0,45$
45	60	$\pm 0,40$	$\pm 0,40$	$\pm 0,55$
60	90	$\pm 0,45$	$\pm 0,45$	$\pm 0,65$
90	120	$\pm 0,60$	$\pm 0,60$	$\pm 0,80$
120	150	$\pm 0,80$	$\pm 0,80$	$\pm 1,00$
150	180	$\pm 1,00$	$\pm 1,00$	$\pm 1,30$

a - the tolerance for E values above 120mm must be negotiated between the supplier and the buyer

b - will be negotiated between the supplier and the buyer

Profile packaging

- no packaging
- paper between rows
- pair wrapping (stretch film)
- paper between profiles
- individually wrapped profiles (natron or crepe paper)
- cardboard between rows
- individually wrapped profiles (stretch film)



bulk profile packaging dimensions 500x500x6000mm, 300-700kg

Bulk packaging allows the transportation of the profiles under the optimal conditions, without the risk of the damage. Depending on the profile application, the required protection level and transport and manipulation preferences, there are several options for the bulk packaging of the aluminum profiles:

- wood pallet with the outer frame
- cardboard cover on the wood pallet
- cardboard cover on the wood pallet and the wooden frames
- packaging according to the client specification

Surface protection of the profiles



In order to offer a highest level of service "Tehnomarket" has started a new powder coating facility in a dedicated space of approximately 2000m² that consists of several main sections: mechanical cleaning of profiles, chemical pretreatment, drying, electrostatic powder coating, baking in polymerization oven (at 180°C) and packaging. The line is suitable for aluminum profiles from 2m to 7m in length, and in order to meet the highest aesthetical and technical standards only renowned "Tiger" and "Akzo Nobel" powders are used in a variety of textures, finishes and RAL colors.

Powdercoating is based on a quality preparation and degreasing of aluminium with usage of **Qualicoat** certified "Henkel" technology. The profile preparation is done in seven bathtubs, combined with demi water and "chrome free" technology. This process is unique in Serbia and introduces an ecologically clean technology that is quickly becoming a standard in developed countries. The application of positively charged color powder is performed in cabins with automatic spray guns. Final colored layer thickness is 60 to 80 microns, and both epoxy and polyester colors can be used, depending on the final application of aluminium profiles.

Beside powder coating, the profiles can also be anodized in several colors and shades of black, silver and brown.



Tehnomarket was awarded with ISO 9001:2015. ISO 14001:2015 i OHSAS 18001:2008 certificates that guarantee high and continuous quality of the extruded profiles and final products, ecological and environmental standards, safe working environment and a socially responsible business practices.

