

OMEGA System

Optimized materials for hat section stiffening profiles.

An Omega type stiffener can be compared with a beam. If we apply on this beam an effort in flexion, the top of the Omega works in compression. The supports to be consolidated take the tensile efforts, the shear loads are taken by the side of the omega, following an angle of nearly 45°.

Today's method :

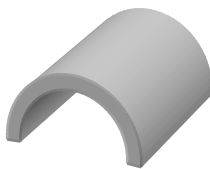
Until today, to make this type of stiffeners, the users had only two solutions :



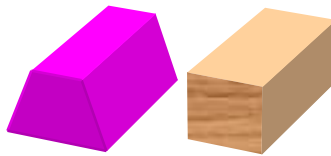
Some products not really adapted for this type of application.



Expensive solutions.



Half tube



PU, PVC Foam
or Wood



V shape profil ; or
Pre-molding

Usually, we pile a succession of chopped strand mats and rovings, to obtain the needed mechanical characteristics.

This solution, using apparently cheap materials, is in fact not cost effective in labor and resin consumption. This method does not take advantage of the anisotropic properties of the composites. As the drapability of the rovings is not sufficient for complicated shapes, the fibers are often cut to make the laminating easier.

The **Omega System** is made with two constituents



A supple profil in foam used as a male mold.



An appropriate fabric to be laminated on the foam.

Definition of the Omega system profil

This type of profil has been chosen for :



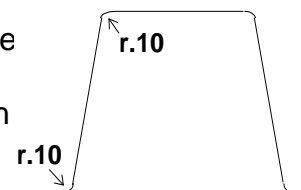
Applying the maximum of reinforcements on the top of the stiffener (compared with the V shape profil or the half tube).



Sides of the Omega profile tapered increasing the stiffening width as well as making the laminating easier.



Radius easy to laminate.



The material

The Omega profil are made from extruded polyethylene.
This foam is light (35 kg/cu.m), waterproof, imputrescible, resistant to the majority of solvants.

It allows the use of polyester, vinylester, polyurethanes or epoxy resins.

Its softness permits to follow easily the concave and convex shapes.

Simple to work with :

Tools : blade, woodwork tools

The waste are weldable with a hot air gun or « mirror »use for PVC plumbing. Like that the welds are made quickly and are solid.

Place the Omega profils on the panel to be stiffened with a hot glue gun.

The Omega profils can be delivered with double sided tape on their base (option).

For use as a mechanical key onto the exterior of a cylindrical parts, it is handy to make the rings before onto the part to be reinforced. By the elasticity of the foam, the rings are clamped onto the cylinder and then the bonding is not needed.

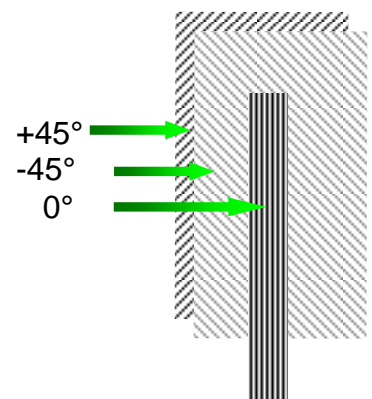
Omega system special fabric

Stripe of **biaxial $\pm 45^\circ$** having in its middle a stripe of **unidirectional 0°** as wide as the top of the Omega used.

Unidirectional fibers (UD 0°) on the top of the Omega for tensile or compressive strength depending on the direction of the effort.

Biaxial fabric $\pm 45^\circ$ for shear strength between the top and the base of the Omega.

Usually, the tensile and compressive efforts are overtaken by the panel to be reinforced, which avoid the laminating of 0° fiber on the base of the Omega.



Advantages of the Omega fabric

Structural :

Adapted to support the efforts on this type of stiffeners.

Diminution of the weight by optimization of the mechanical properties, all the fibers are in place for the efforts applied.

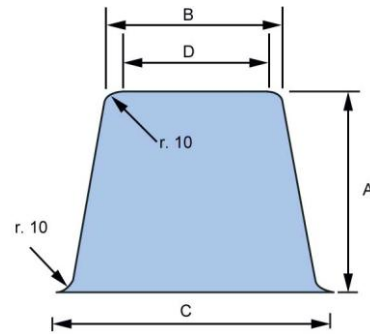
Economical :

Exceptional deformability due to the way of stitching and to the propitious direction ($\pm 45^\circ$) of the fibers.

With this system, the diminution of the number of layers and the deformability of these decrease obviously the labor cost, regarding fabric cutting and laminating.

There is as well a diminution of the resin consumption (ratio glass/resin : 50% by weight for a fabric without chopped strand mat).

OMEGA System



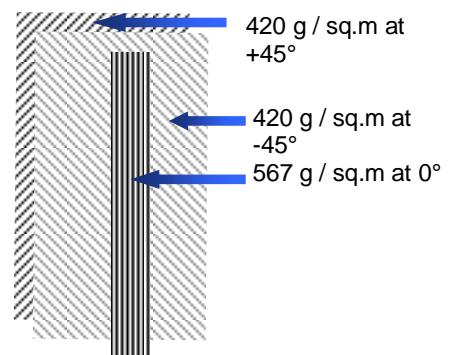
Standard profiles for the OMEGA System
Length : 2.75 m

References	preconized fabrics	A	B	C	D	ml by box
25 / 20 / 30	ETo1369 220mm	25	20	30	12	1584
30 / 25 / 40	ETo1369 220mm	30	25	40	15	990
40 / 30 / 50	ETo1369 220mm	40	30	50	20	577.5
45 / 20 / 45	ETo1369 220mm	45	20	45	12	643.5
50 / 40 / 60	ETo1369 270mm	50	40	60	30	363
60 / 25 / 60	ETo1369 270mm	60	25	60	15	385
60 / 50 / 65	ETo1369 320mm	60	50	65	35	275
80 / 50 / 75	ETo1369 320mm	80	50	75	35	154
80 / 80 / 105	ETo1369 440mm	80	80	105	65	115.5
100 / 50 / 110	ETo1369 440mm	100	50	110	35	115.5
100 / 80 / 110	ETo1369 440mm	100	80	110	65	99
100 / 100 / 130	↑	100	100	130	85	82.5
120 / 80 / 110		120	80	110	65	82.5
120 / 95 / 130		120	95	130	80	68.75
120 / 120 / 150	Consult us	120	120	150	100	55
150 / 120 / 160	↓	120	120	160	100	44
160 / 100 / 150		160	100	150	85	33
200 / 120 / 180		200	120	180	100	33

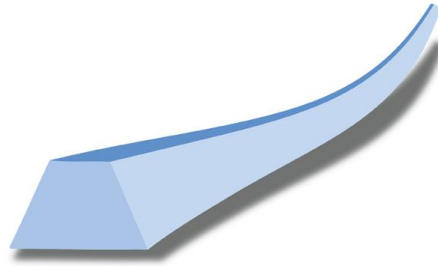
The list above include the profiles that are the most used in the composite field. Do not hesitate to contact our technical department, for dimensions adapted to your project. These profiles are made from a material (extruded polyethylene 35 kg/cu.m) compatible with polyester, vinylester ,polyurethane and epoxy resins.

Special triaxial fabric OMEGA system :E To 1369

Total width (mm)	Width of the U.D (mm)	weight/lm (g)
220	20	196
270	30	244
320	35	289
440	65	406



OMEGA Foam



Properties	Norms	OMEGA Foam
Material		Extruded Polyethylene
density	DIN 53420	35 Kg / cu.m
Compressive strenght	ASTM D 3575	40 Kpa @ 10% 55 Kpa @ 25% 110 Kpa @ 50%
Tensile strength	DIN 53571	350 kPa
Elongation at break	DIN 53571	85 %
Remanent deformation	ISO 1856	8% after 24h of covering
Tear strenght	DIN 53575	1.2 N / mm
Thermal conductivity	DIN 52612	0.052 W / m.K
Permeability to steam at 23°C on a thickness of 25 mm	DIN 53429	0.8 g / sq.m / 24h
Water absorption after 24h of immersion		2% of the volume
Fire retardant		none
Recycling		recyclable

Panels of supple extruded polyethylene foam 35 Kg / cu.m

Panels (dimensions in cm: L x l x h)	Cylinders (length 2,75 m)
275 x 60 x 3	Diamètre 50 mm
275 x 60 x 5	Diamètre 80 mm
275 x 60 x 8	Diamètre 100 mm
275 x 60 x 10	Diamètre 150 mm

