PLASTICON COMPOSITES FRANCE Technical Parts Department

Plasticon Composites is located in Dompierre sur Yon and accommodates a department which is specifically dedicated to the fabrication of high performance composite parts. Our filament winding technology consists in putting a fiber (made of glass, carbon or others) which is impregnated under constant tension, on a rotating mandrel made of chrome-plated steel. The winding is helical for the fabrication of tubes. It can also be circumferential to get ferrules, or polar for hollow capacities. The resin cross-linking (epoxide matrix) is initiated by heat, or when the part is placed inside a sterilizer. The impregnation process can be in situ (impregnating bath) or beforehand with the help of a prepreg wick or ribbon.

The multiplication of folds creates complete composite layers. Thanks to this method, we can create technical, economical and reliable solutions such as structural parts for the shipbuilding field, fuse housings, telecommunication radomes, reverse osmosis pressure housings, pressure housings for the oceanographic research (deep sea), structural connecting rods, transmission shafts, columns for firefighting systems (offshore platforms), pneumatic cylinders (housings)...

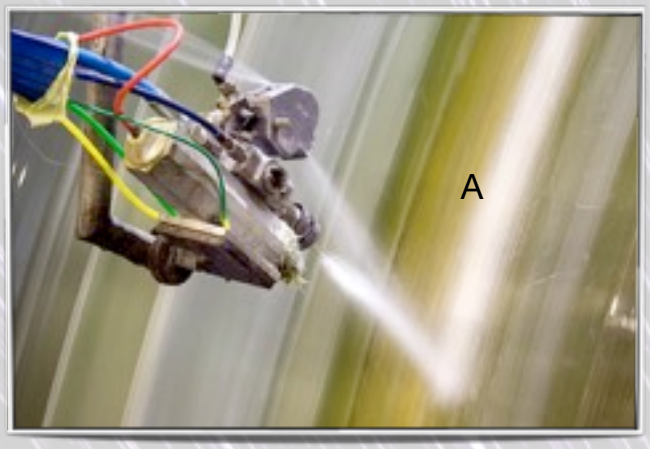
By your side, our team of experts not only assists you from the technical definition of the part to the tests, but also during the fabrication of the prototypes, the size calculation by finite elements, the choice of the materials, the standardization, the quality control...

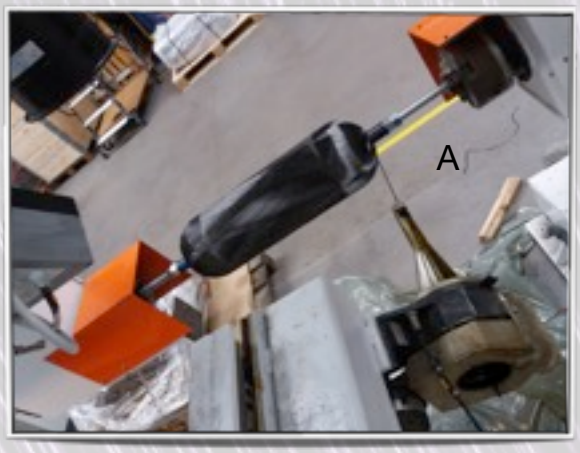
For further information, visit :

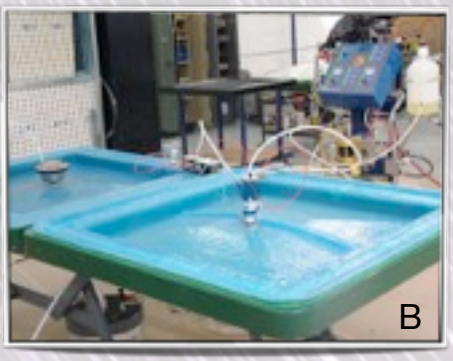
WWW.EPOXYRESOLUTIONS.COM

SPECIAL COMPOSITE PARTS FABRICATION UNIT

Our manufacturing processes







The filament winding process (A) consists in winding up resin-soaked fibers (glass fibers, carbon fibers…) on a mandrel, and then polymerizing the structure (heat-induced polymerization in a sterilizer). The winding machines are digitally controlled and guarantee a perfect reproductibility of the fabrications. As a result, what we get are materials with very good mechanical characteristics (high fiber rate : 60 to 75 % by mass) and with the possibility to place the fibers optimally in the direction of the stress to support.

There are 2 kinds of winding, which can be combined during the tube's fabrication process :
– Hoop Winding : (90-to-85-degree angle in relation to the mandrel's axis) ("parallel winding")
– Helical Winding : (80-to-30-degree angle in relation to the mandrel's axis) ("crossed winding")

Playing with the number of "hoop" and "helix" in the structure of a tube as well as with the given "crossed" angle, it is possible to optimize the structure according to the stress supported by the part. After polymerization, the finished part is separated from the mandrel during the "demandrelling" operation.

The infusion process (B) consists in a pressurized or vacuum injection of a reactive resin in the air gap of a rigid mold where the reinforcement is located (a preformed reinforcement most of the time). Post-curing made in a sterilizer. Product with a nice surface finish.

The fiberglass spray lay-up process (C) consists in applying glass and resin by means of a roving cutter and a sprayer projecting the formulated resin. An air-compressed process. The manufactured parts can have the following characteristics :

– dimensions : limitless, from 0,25 m x 0,25 m,
– thickness and radius of curvature : 5 mm minimum,
– aspect : a smooth face, a natural face,
– production rate : from 50 to 600 kg per man per day.

SPECIAL COMPOSITE PARTS FABRICATION UNIT

Our Resources

MEN

Our team gathers technicians, machine supervisors and operators, engineers, who are all highly experienced in the composite material field, its very specific fabrication and standardization methods. Skills in structures, winding angles, and fiber/resin rates, dimensional tolerance, cure time, surface conditions... are the keywords for those men and women.

MACHINES

A whole range of mandrels (from 21.5 mm to 450 mm in diameter), 5 digital-control winding machines (from 3 m to 8.5 m) including a 5-axe machine dedicated to the polar winding process (for accumulator-type parts). A machine and completion parc. A test bench. An internal laboratory.

MATERIALS

The reinforcement fibers exploited in our workshops are E-type glass fibers, or polyacrylonitrile-based carbon fibers (PAN). The resin (matrix) is an epoxide-type resin made from bisphenol. We work with leaders such as Owens Corning, Dow Plastics, Reichhold, Routtand, Ashland, Hetron, Polynt, Alliancys, Toho Tenax.

OUR TEAM

Our « composite technical parts » department relies on a young, dynamic and highly-qualified team. The proximity we share with our customers, our intimate knowledge of their export or after-sales service problems, our sense of service and reactivity, are shared values we try hard to defend every day.

Main members of our team, from left to right : Clément CHATELLIER (development director in composite solutions - License IMOCP) / Bernard ROBIN (turner-miller) / Jocelain DURET (production Manager GRE) / Samuel METAIS (polyvalent operator) / Tony BAUDRY (machine supervisor) / Bruno LUCAS (machine supervisor) / Franck BOUTET (sales manager GRE) / Audrey Louineau (administrative and commercial assistant - export) / Absent on the photo : Françoise MAZOUIN (completion operator) / Paul-Emmanuel De Becquevort (research engineer) / Jean-Yves Olivré (technical manager Plasticon France).

SPECIAL COMPOSITE PARTS FABRICATION UNIT

Our engineering missions

Economical and durable solutions facilitator.

PLASTICON COMPOSITES FRANCE assists its customers at each key step of the added-value process, and provides an on-demand technical assistance.

Our engineers support your engineering work.

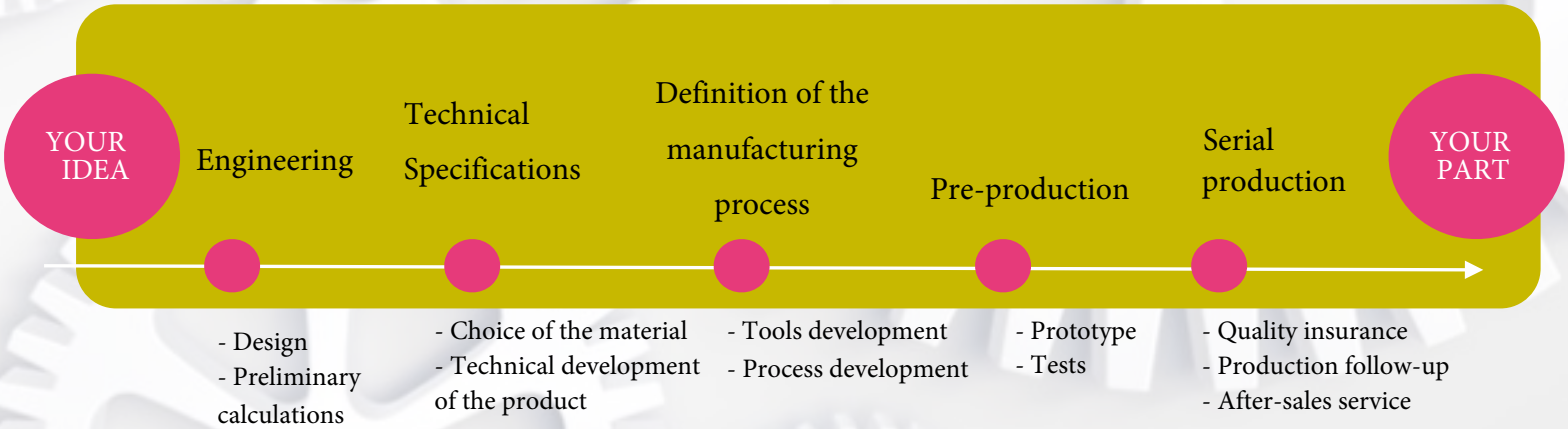
Our main strengths are the design and the optimal conception of complex composite parts which, until today, were mostly made of metal materials. From now on, they will be "designed" and "made" from reinforced plastic materials thanks to glass or carbon fibers.

Our "high-performance technical parts" department will know how to make the most of more than 30 years as a manufacturer for the leaders of the oil and oceanographic exploration, water treatment, the chemical, food-processing industries, etc.

"The development of a composite part provides the possibility to "simultaneously" design the material and the structure. Each initial obligation (mechanical, psycho-chemical, ergonomic, maintenance, economical obligations…) is considered very early in the reflection process.

In the end, our job consists in providing the optimal and durable turnkey solution"

Jean Yves Olivré.
Technical Manager -
Plasticon Composites France.



- Design
- Preliminary calculations

- Choice of the material
- Technical development of the product

- Tools development
- Process development

- Prototype
- Tests

- Quality insurance
- Production follow-up
- After-sales service

To provide you the best support, here are a few examples of our engineering missions :

In a simultanuous conception approach of the "material" and the "structure", our engineering service can propose you a preliminary draft study :

- definition of the materials (resin/fibers) and the manufacturing process, in accordance with your specifications, based on a pre-sizing.
- definition of the assembly method (for example, the bonding procedure which enables to meet the expected performances : blind bonding, resin injection).
- economical feasibility : financial estimate of the project.

Definition of the conception principle thanks to a detailed study which is composed of :

- A finite element sizing of the part, in order to define the transition zones, the localized reinforcements.
- A complete mechanical analysis of the part. A MAJ of the conception (3D model + plans).
- The calculation of the part's cost price – possible investment calculations (specific tools, special means).
- The drafting of the part's lay-up plan.

In conclusion, Plasticon Composites France assists you all along the project, from the conception to the production stage.

SPECIAL COMPOSITE PARTS FABRICATION UNIT

KEY MECHANICAL CHARACTERISTICS

THE PROCESS / OUR MATERIALS

The process consists in winding up resin-soaked fibers (glass fibers, carbon fibers…) on a mandrel, and then polymerizing the structure (heat-induced polymerization in a sterilizer). The winding machines are digitally controlled and guarantee a perfect reproductibility of the fabrications. As a result, what we get are materials with very good mechanical characteristics (high fiber rate : 60 to 75 % by mass) and with the possibility to place the fibers optimally in the direction of the stress to support.

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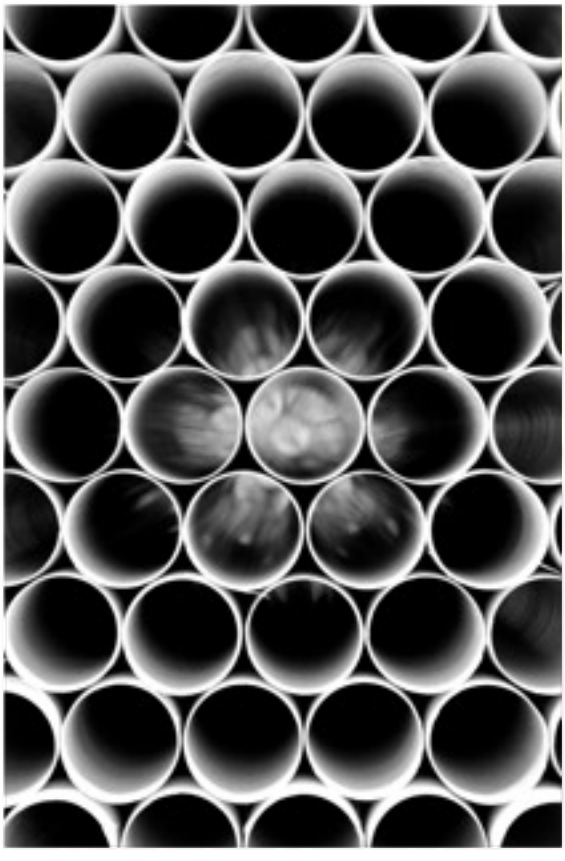
Here are the different qualities according to the nature of the parts :

- Carbon tubes : polyvalent, high crush resistance and torsional strength, high continuous use temperature (130 °C).
- Hybrid tubes : glass-carbon tubes or carbon-aramid tubes make it possible to combine technical nature and design. Advanced material.
- Glass tubes (E-Glass fiber) : Glass-fiber tubes are used for applications requiring insulating tubes, which are able to resist internal pressures and high-temperature working environments (130°C max).

OUR MATERIALS

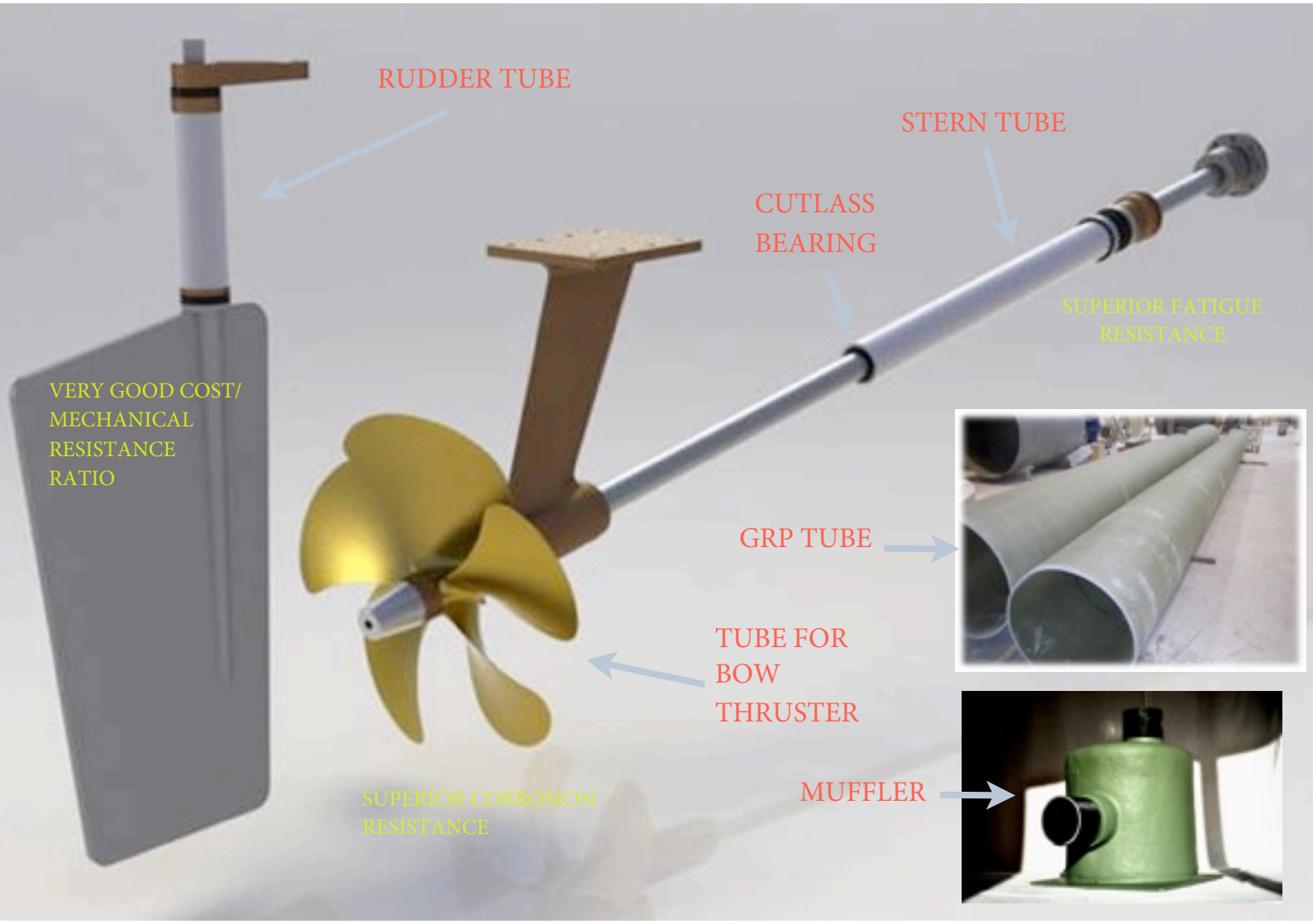
(For standard production such as shipbuilding) :
- Covers : E-Glass roving – 1200 Tex or high-resistance carbon fiber.
- Matrix : Epoxide resin (bisphenol A type) and hardener (amine type) mixing.

Mechanical characteristics of a glass fiber / epoxy part. *(These values are given honestly and with reservations, they don't engage our company's responsibility).*	Density = 2 to 2,1 kg/dm3 Tensile strength, longitudinal direction = 12 dN/mm² Tensile strength, circumferential direction = 70 dN/mm² Bending tensile strength = 10 dN/mm² Elastic modulus, circumferential direction = 3500 daN/mm² Bending elastic modulus = 1500 dN/mm²
Use temperature (C°)	- 50°C to 120°C



TECHNICAL PARTS FOR YACHTING

COMPOSITE TUBES FOR MARINE APPLICATIONS



The composite material use for marine applications is a long-standing tradition.

Pleasure boats have been composite-made for more than 40 years. A combination of laws, worldwide competition and technical evolutions has encouraged shipyards to use techniques such as the infusion process, the vacuum forming process, and even the autoclave machine. In the revolution parts sector, such as stern tubes, rudder posts, propellers, connecting beams, the filament winding technique has made it possible to produce cheaper and more robust composite parts.

The experience gained in the fields of the composite parts and structural bonding completion has enabled us to deliver parts whose geometry is ever more complex.

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THEY HAVE BEEN TRUSTING US FOR MORE THAN 30 YEARS

Technical characteristics (provided for information only)	
Density	1,9 kg/dm3
Glass percentage by mass	70 to 75%
Coefficient of linear expansion	23.10-6 m/m C°
Thermal conductivity	0,30 Kcal/m/f / C°
Operating temperature	-50° / + 120 °
Tensile strength, longitudinal direction	12 daN/mm2
Tensile strength, circumferential direction	100 daN/mm2
Elastic modulus, circumferential direction	4000 daN/mm2
Tensile strength, axial compression	15 daN/mm2
Tensile strength, 90° / axe compression	40 daN/mm2
Bending tensile strength	10 daN/mm2
Bending elastic modulus	1300 daN/mm2

SPECIAL COMPOSITE PARTS FABRICATION UNIT

Solutions for osmosis water treatment
Composite pressure housings

The reverse osmosis physical process enables to desalinate the water or demineralize brackish water using a semipermeable membrane. This membrane lets water molecules through (H2O) and blocks the salts and all the organic compounds as well. The water which passes through it is therefore purified. For decades, Plasticon Composites France has been developing a unique savoir-faire in the sizing and the fabrication of high-performance pressure housings. There are plenty of various applications such as : drinking water (salt, brackish, drained water), waste water treatment, pure water and ultra-pure water for the chemical, food-processing and electronic industries, boiler feed-water, cosmetic cleansing, bio-engineering, oil and gas.

We have carefully selected a high-quality epoxy resin in order to guarantee the sustainability of our pressure housings (corrosion, high internal pressure, high temperature, microorganism, corrosive agents… etc).

OSMOTEX
RANGE
Compact movable unit
(with optional stainless-steel buffer)

size :
2,5", 4" and 8"

working pressure
up to 1700 PSI
(120 bars)

OSMOCLIPS
RANGE
Compact movable unit
(with optional stainless-steel buffer)

size :
2,5", 4" and 8"

working pressure
up to 450 PSI
(28 bars)

ORDER YOUR PARTS FROM OUR ONLINE SHOP :

WWW.EPOXYRESOLUTIONS.COM

ORDER FROM OUR ONLINE SHOP :

WWW.EPOXYRESOLUTIONS.COM

SECURED PAYMENT

3D SECURE
Verified by MasterCard
VISA SecureCode

DELIVERY THROUGHOUT EUROPE

< 48H

TECHNICAL AND COMMERCIAL ASSISTANCE
from Monday to Friday
from 8.30 am to 6 pm.

FABRICATION FRANÇAISE

YOU CAN REACH US
AT THIS NUMBER :

+33 (0) 2 51 08 86 50

ASK FOR AUDREY

You can also send us an email at :

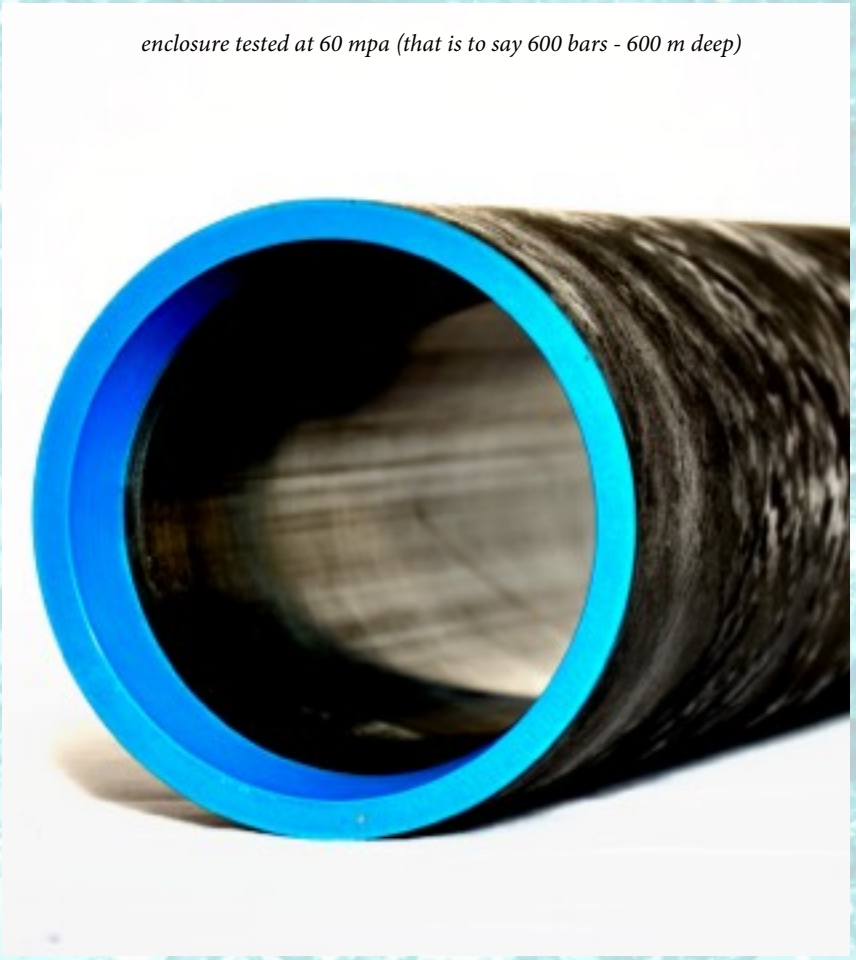
trade@plasticoncomposites.com

Solutions for telecommunication equipments

Composite pressure housings for submersible applications

High depth transponder

enclosure tested at 60 mpa (that is to say 600 bars - 600 m deep)



SUPERIOR FATIGUE RESISTANCE

SUPERIOR CORROSION RESISTANCE

VERY GOOD COST / MECHANICAL RESISTANCE RATIO

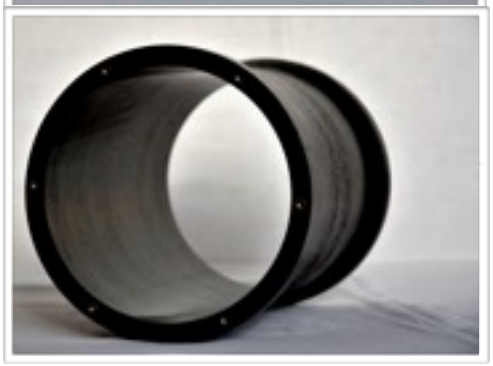
NON-MAGNETISM

EXPLORATION SUBMERSIBLE

COMMUNICATION BEACON

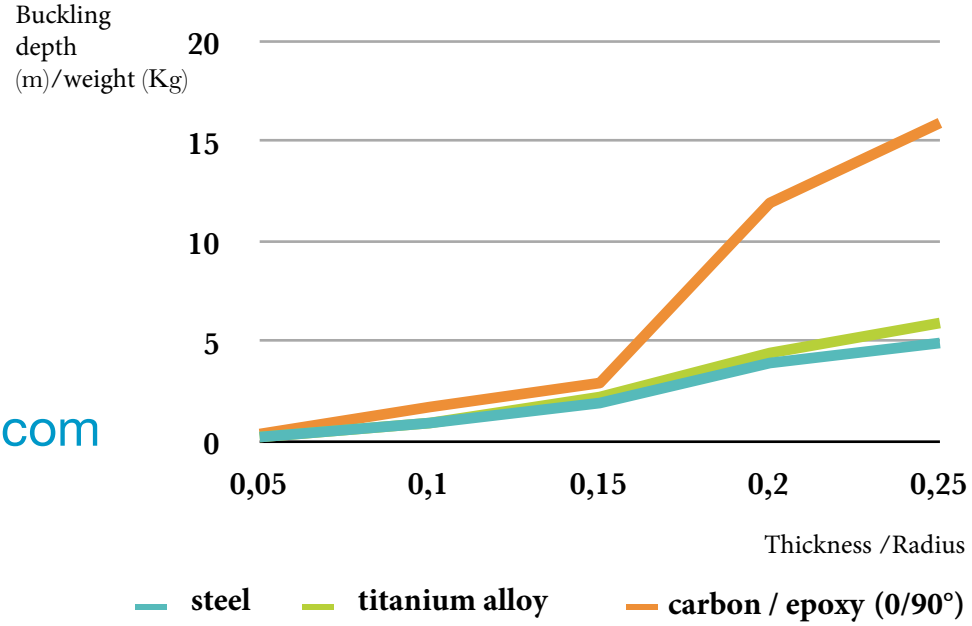
TEST PASSED SUCCESSFULLY!

The deep water exploration (up to 6000 m deep) is a perfect zone for the use of composite materials. The operating conditions (great mechanical stress, long-term immersion) make these materials very attractive. Following several qualification studies, the use of glass/epoxy enclosures for the oceanographic instrumentation protection, up to 6000 m deep underwater, is now widespread. These containers are designed to resist external pressures of more than 60 Mpa. In order to extend the scope of applications of these materials and to meet the demands for specific structures fabrication, several studies have been carried out to assess the possible uses of composite materials for the making of bigger structures such as Autonomous Underwater Vehicles (AUV), used in the seabed study. The opposite figure represents one of the tests carried out by IFREMER on an AUV prototype, ½ scale. The rupture of the cylinder, made thanks to the filament winding process, was buckling-generated under a 600-bar-pressure (6000 m deep).



CHARACTERISTICS	VALUES	UNIT
Internal diameter (H11)	110	mm
External diameter - smooth surface (+/- 0,8mm)	142,4	mm
Possible external length	from 275 to 1675	mm
Plug sealing system	provided	POM
Housing tested for a maximum depth of : (safety factor = 1,5)	6000	m
Colour	black	
Materials (tubes)	E-Glass fiber + epoxy resin	
Materials (locking ring)	POM	
Density	1,9	
Max. number of connectors	10	
Use temperature	-50°C / + 120 °C	

Submersible hull materials behaviour.



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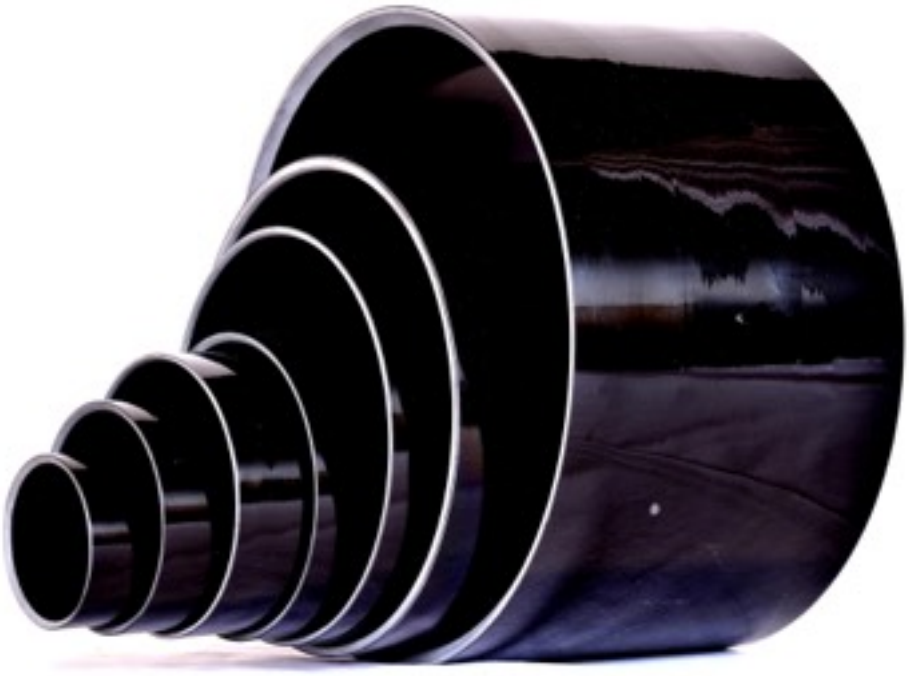
Composite parts for PNEUMATIC CYLINDERS

Plasticon Composites

Standard series conforming to the recommendations of :

CNOMO

cetop



STANDARD CYLINDER HOUSINGS RANGE

Here are the benefits of a composite solution in the pneumatic cylinders sector :

- Self-lubricating
- Sustainability
- Dimensional tolerances and surface aspect

- Dimensional tolerances and surface aspect

- Anti-corrosion
- Good resistance to high temperatures (<=130 °C)
- Lightness
- Non-magnetism

Over the last three decades, Plasticon Composites France has developed a unique savoir-faire in the sizing and the fabrication of high performance composite cylinder housings. We have carefully selected a high-quality epoxy resin in order to guarantee the sustainability of our cylinder housings (corrosion, high internal pressure, high temperature, microorganism, corrosive agents… etc). The excellent surface finish of our adjusted chrome-steel mandrels, around which we wind up our impregnated fibers, enables to get a H11 bore on the internal surface of the tube (rectitude <0,1 mm/m – total roughness between 0,05 and 1,5). Such a surface finish makes it possible to seal directly on this surface. Our products develop in high-standard environments such as the water treatment field, the chemical, food-processing and electronic industries, boiler feed-water, cosmetic cleansing, bio-engineering, oil and gas.

Our engineering service is at your disposal to support you along the development project.

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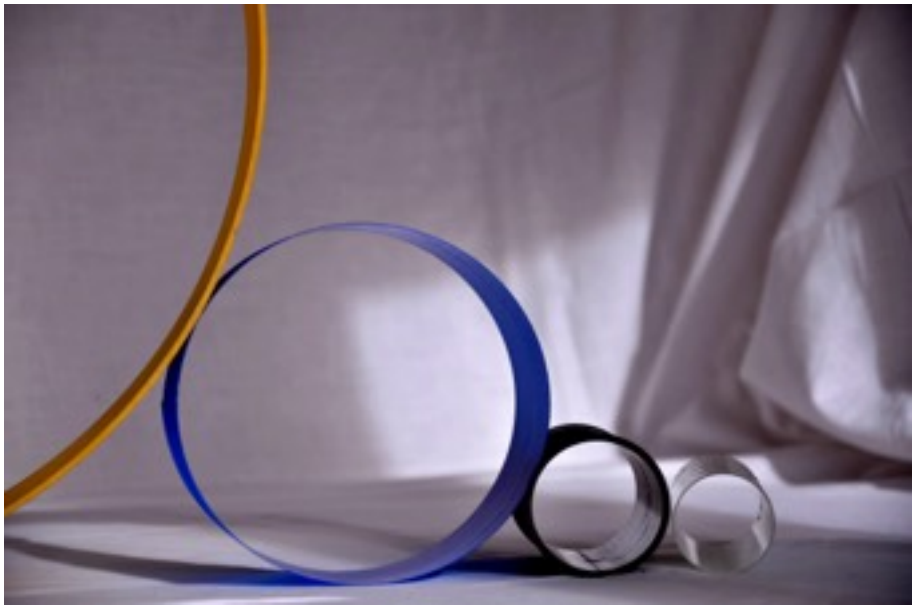
COMPOSITE PARTS IN THE **ELECTRICAL PROTECTION** FIELD

COMPOSITE FUSE HOUSINGS

Here are the benefits of a composite solution in the electrical protection sector :

- Insulating ability
- Dimensional tolerances and surface aspect
- Anti-corrosion
- Good resistance to high temperatures (<=130 °C)
- Lightness
- Non-magnetism



Over the last three decades, Plasticon Composites France has developed a unique savoir-faire in the sizing and the fabrication of high performance composite parts. We have carefully selected a high-quality epoxy resin in order to guarantee the sustainability of our technical parts (corrosion, high temperature, microorganism, corrosive agents… etc).

Our products develop in environments with demanding standards such as the water treatment field, the chemical, food-processing and electrical industries, boiler-feed water, cosmetic cleansing, bio-engineering, oil and gas.

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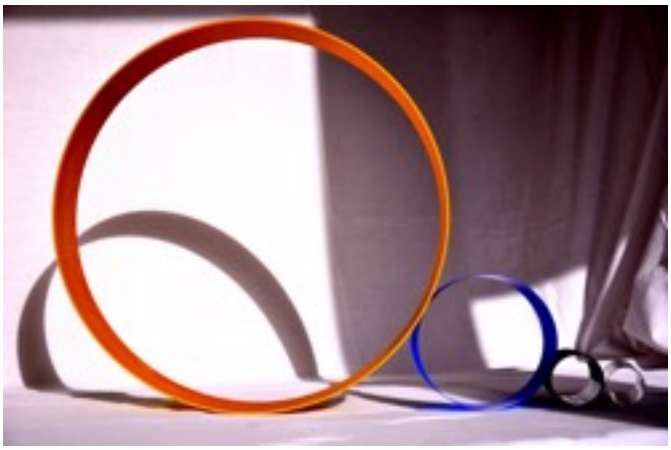
SPECIAL COMPOSITE PARTS FABRICATION UNIT



SPECIAL PARTS & CARBON TUBES

Anti-corrosion / lightness / sustainability/ economical

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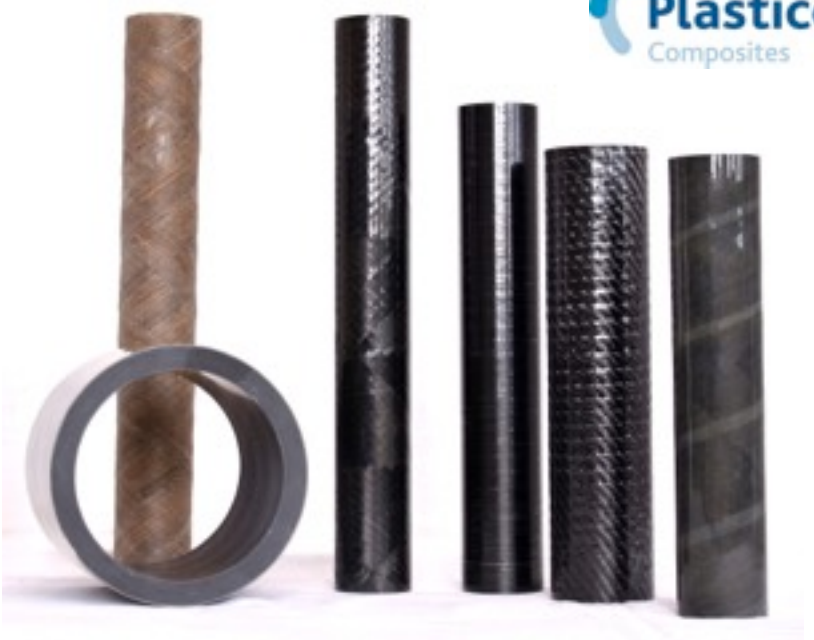

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SPECIAL COMPOSITE PARTS FABRICATION UNIT

COMPOSITE TECHNICAL PARTS
GLASS / CARBON FIBER TUBES FOR TELESCOPIC MASTS

SOLUTION FOR GREAT-HEIGHT PRUNING

Compared advantages :
mechanical characteristics / lightness / electrical insulation (high-voltage power lines proximity) / economical

ELIATIS CHAPTRACK

Alti-Coup'

Located in the Isère region, the Eliatis company and Plasticon Composites France have developed a triple telescopic mast made of fiberglass / epoxide matrix. Thanks to its hydraulic engine, the mast spreads out over 23 m, which enables the activation of a 700-mm-in-diameter saw blade at its end.

Road-approved, this machine makes it possible to prune with complete safety, in forest areas, notably along high-voltage power lines (insulating characteristic of the composite mast). The « Alti-coup » system is a registered trademark sold around the world by the Eliatis company.

FABRICATION FRANÇAISE

SPECIAL COMPOSITE PARTS FABRICATION UNIT

Glass / carbon fiber military tactical masts

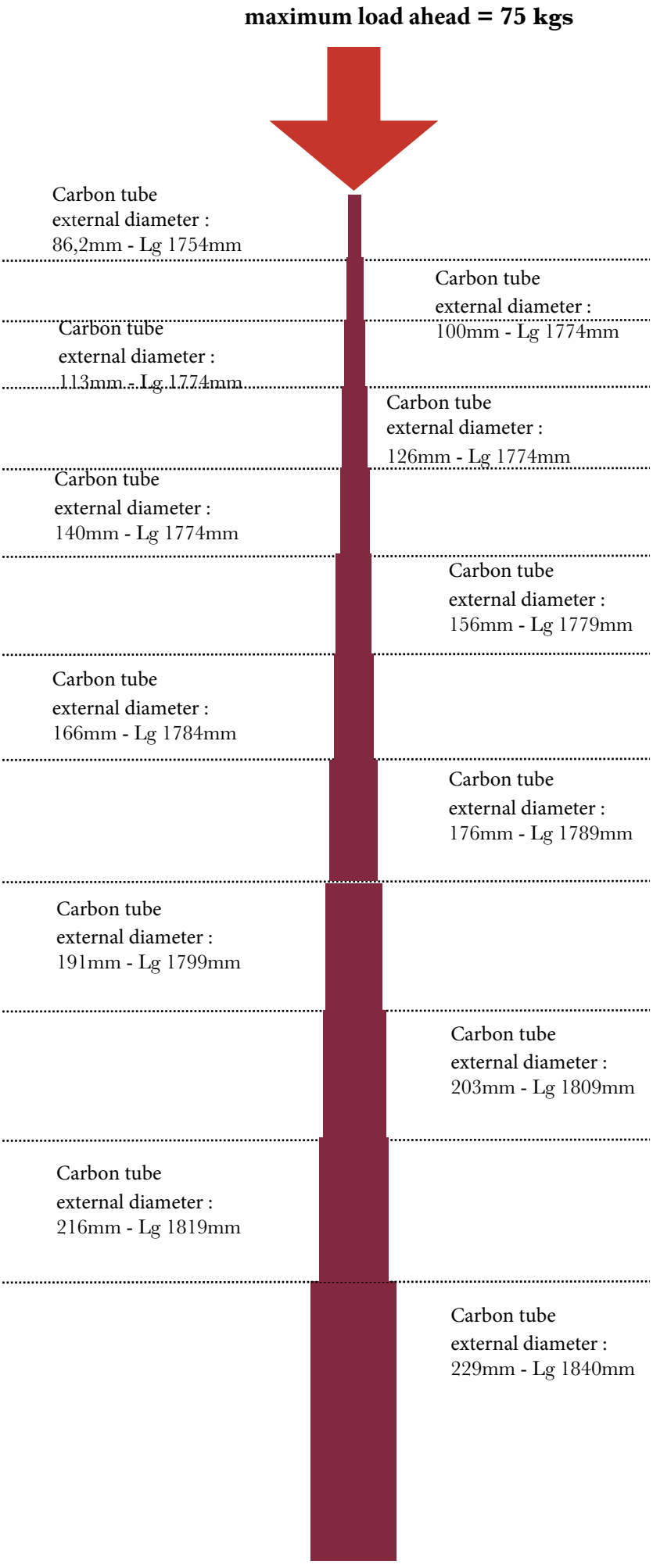
non-magnetic

economical

cost weight / mechanical characteristics ratio

Mast composed of 12 telescopic tubes of variable length and a 3-mm thickness, carbon-fiber-epoxy-resin made. The mast is locked in place by means of aluminium clamping clips.

Height when spread out = 18 000 mm
Height when retracted = 2500 mm
Locked in place by means of aluminium clamping clips
The mast is shrouded on 3 levels by a total of 9 cables.



SPECIAL COMPOSITE PARTS FABRICATION UNIT

LIST OF OUR TOOLS

FOR EPOXY RESIN MANUFACTURING (Glass or carbon fiber)

Wide range of mandrels for a low economical launch price.

Minimun thickness

0,8 mm (standard) 0,3 mm (machined - on demand).

Thickness up to 150 mm with an external diameter limit <=270mm (size of our sterilizers)

Tools length = 3 operating meters					
Ø int (mm)	Ø int (mm)	Ø int (mm)	Ø int (mm)	Ø int (mm)	Ø int (mm)
21,50	43,30	58,00	82,55	114,50	178,30
22,00	44,00	60,00	85,00	117,50	185,00
23,00	45,00	62,00	88,90	120,00	190,00
24,00	46,00	63,00	90,50	125,00	200,00
25,00	47,00	65,00	92,40	130,00	202,00
26,00	48,00	70,00	95,00	134,00	250,00
28,00	49,00	72,00	97,20	135,00	254,40
32,00	50,00	74,00	100,00	140,00	
34,00	50,90	75,00	101,60	142,00	
35,00	51,00	76,00	104,00	150,00	
36,00	54,00	76,20	105,00	150,70	
37,00	55,00	80,00	107,00	155,00	
40,00	57,00	81,00	110,00	160,00	

Tools length = 9 operating meters					
Ø int (mm)					
202 - 8"	Specific tools (non-standard diameter) on demand.				
325					
450					

SPECIAL COMPOSITE PARTS FABRICATION UNIT

Dimensional tolerances, finishing and surface finishes

on external diameter...

Type-A finishing :
Natural surface with removed tear strip (rough surface)
Max. dimensional tolerance on external diameter :
+/0,8 mm.

★

Type-B finishing :
Natural surface with external skin (smooth aspect).
Max. dimensional tolerance on external diameter :
+/0,8 mm.
Colour : tinted black in the mass (= standard).
On demand : White, Green, Yellow, Red, etc.

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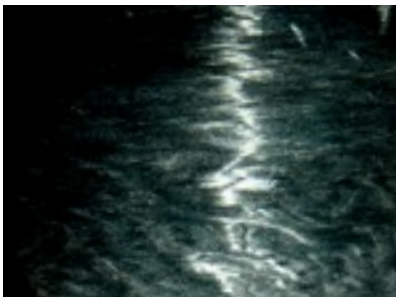
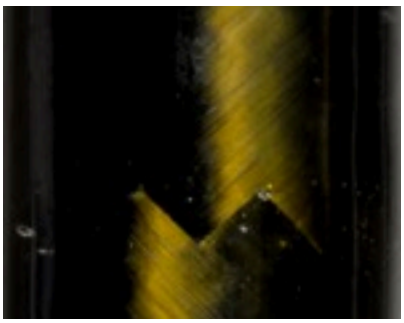


Type-C finishing :
Surface after partial machining or sanding.
Max. dimensional tolerance on external diameter :
+/- 0,2 mm to +/- 0,5mm (*)

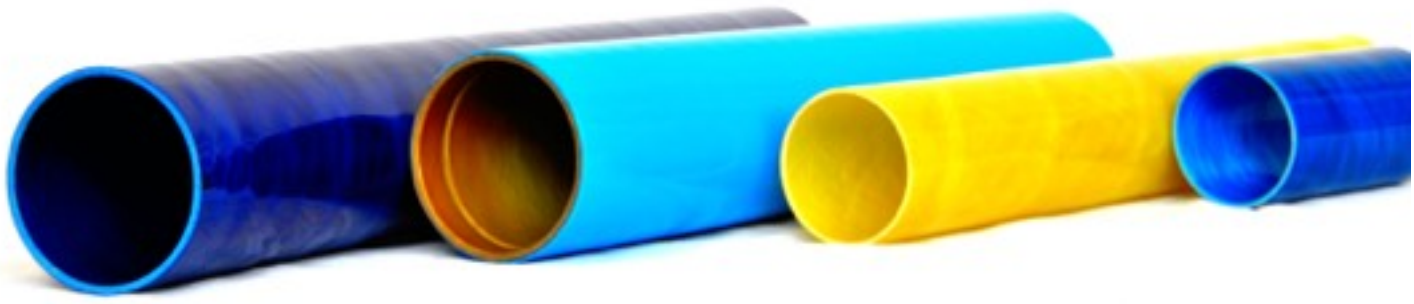
★★



Type-D finishing :
Varnished surface (matt or shiny) after partial sanding.
Max. dimensional tolerance on external diameter :
+/- 0,2 mm to +/- 0,5mm (*)

★★★

(*) according to the selected diameters and the thickness of the part.



★ impact on the part's final price.

SPECIAL COMPOSITE PARTS FABRICATION UNIT

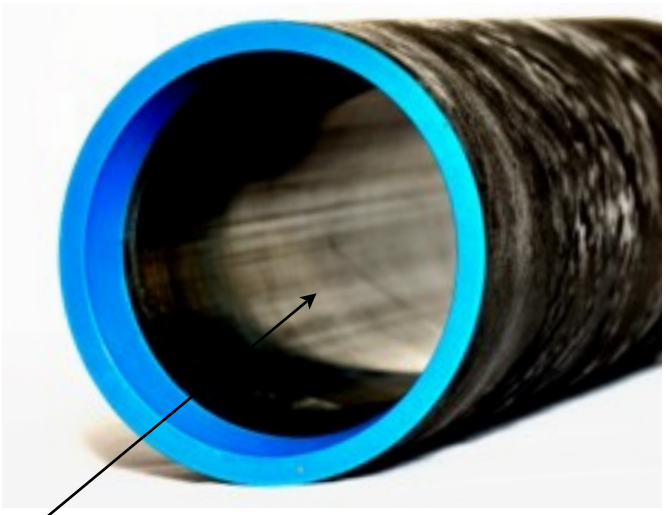
Dimensional tolerances, finishing and surface finishes

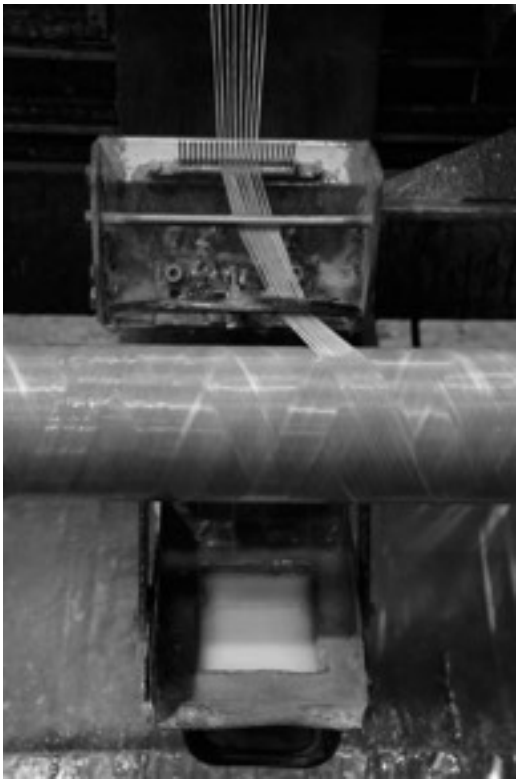
on internal diameter...

Internal diameter tolerance
up to **H11**

Rectitude : 0,1mm/m
Ovalization : 0,05mm maxi.
Internal roughness : AR between 0,5 and 1,5 µm

Explanation : the fiber is wound-up around a mandrel whose surface finish is extremely smooth (some of our mandrels are chromed-adjusted), depending on the selected mandrel, the internal roughness of the tube makes it possible to seal directly on this surface.





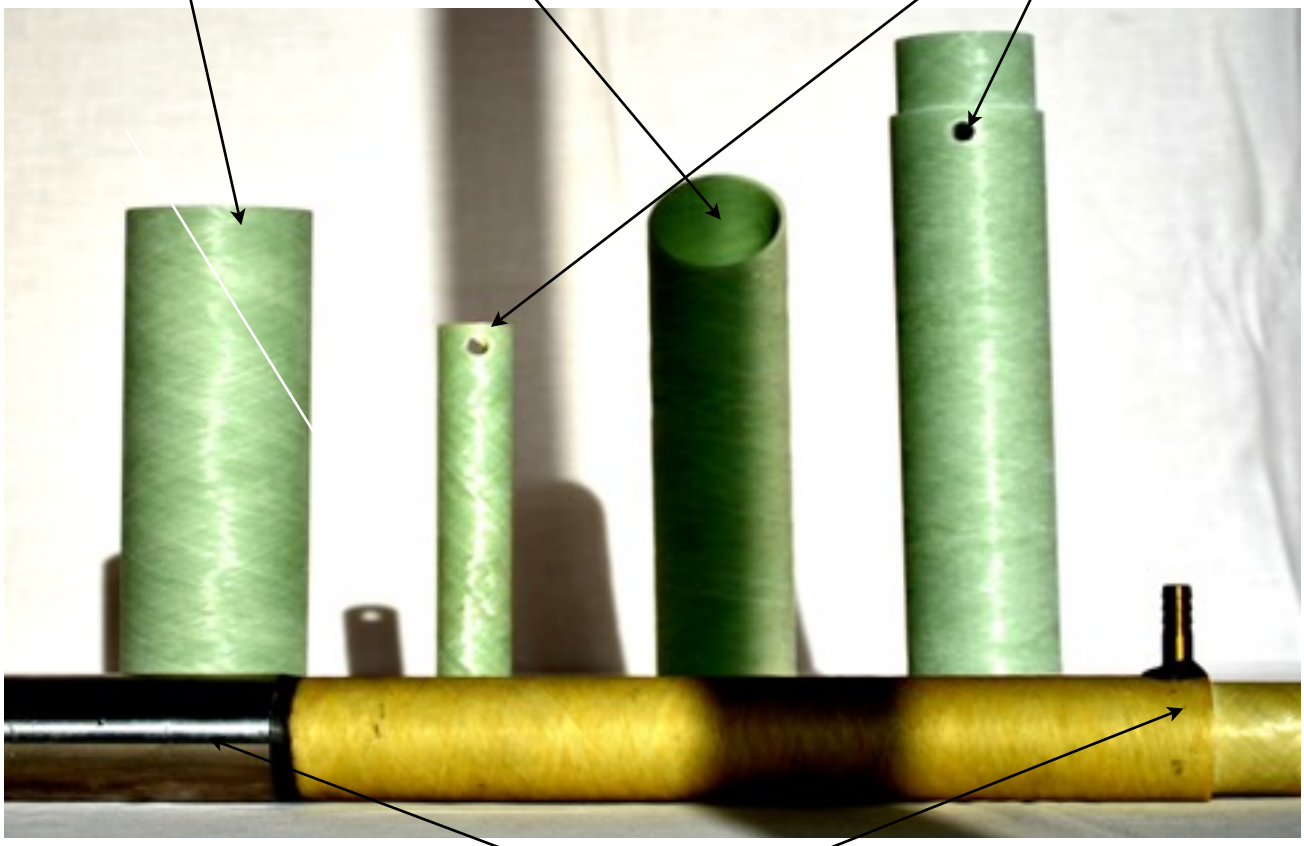
SPECIAL COMPOSITE PARTS FABRICATION UNIT

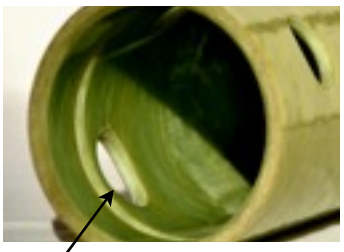
POSSIBLE COMPLETION OPERATIONS ON A COMPOSITE PART

Machining rework of the sides

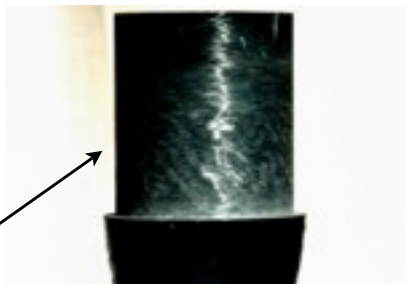
Special cutting

Drilling



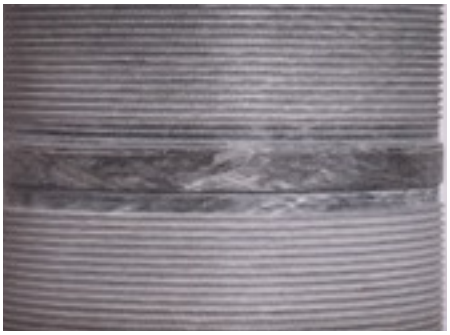


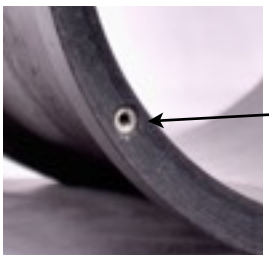
Bonding of an insert or other additional parts



Machining of an internal groove and laying of a stainless-steel ring

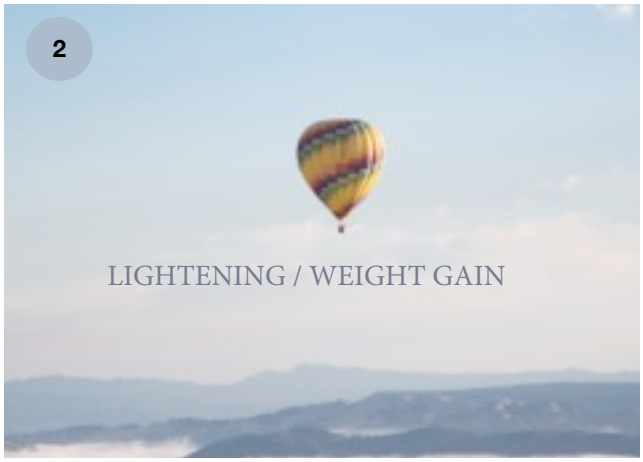
Specific machining

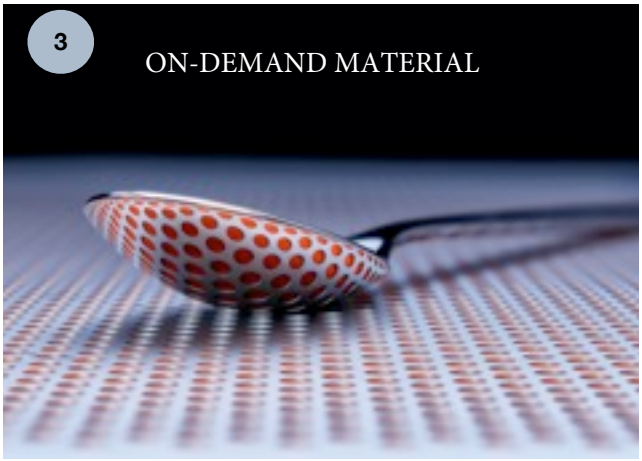


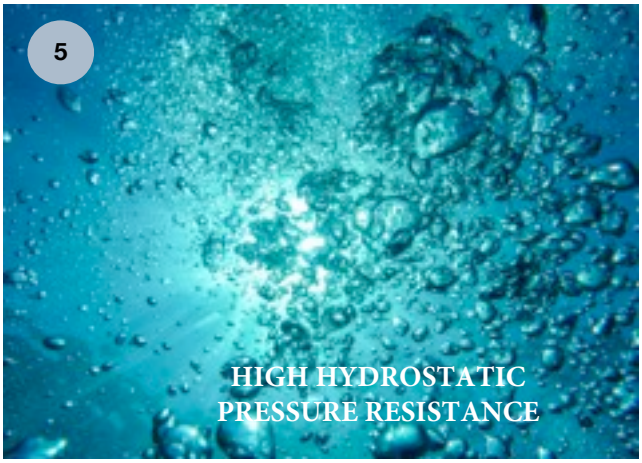


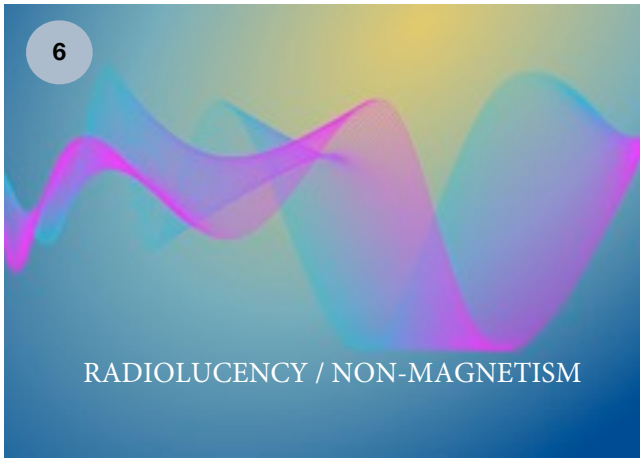
Laying of a helicoid

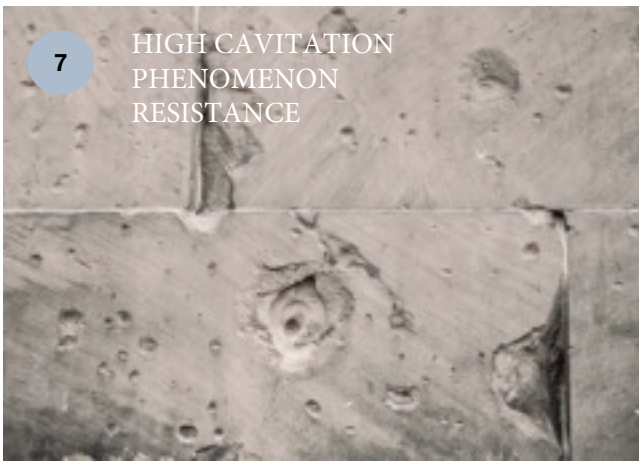
COMPARED BENEFITS OF OUR PARTS

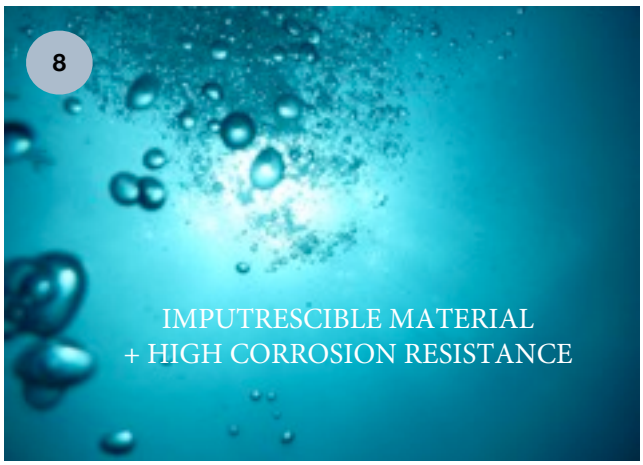




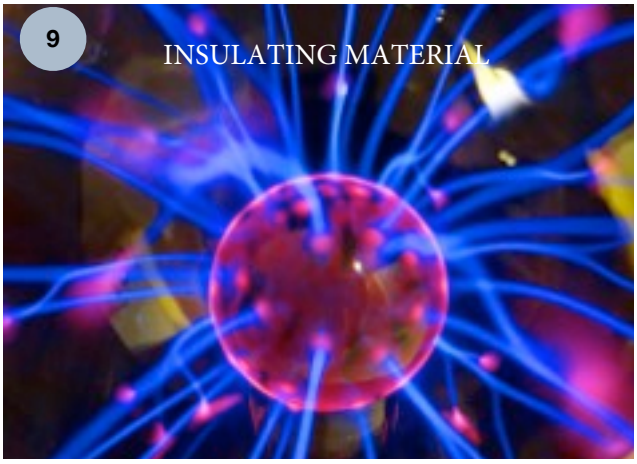


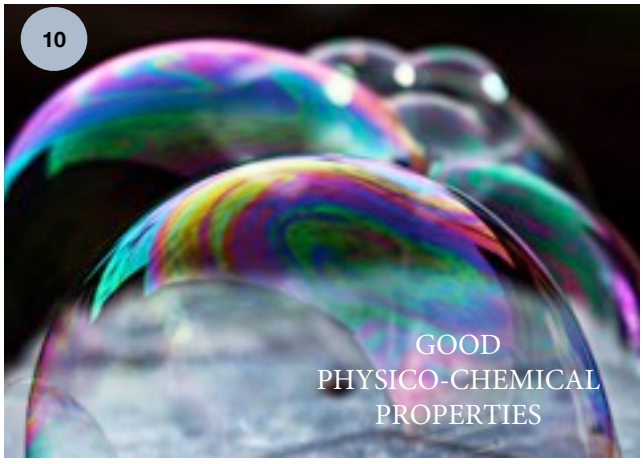


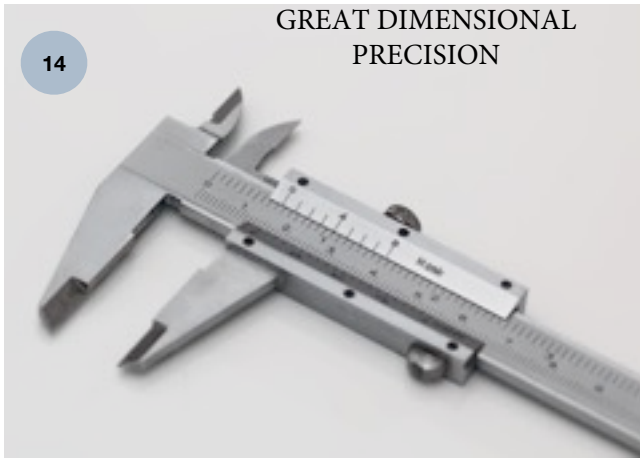




COMPARED BENEFITS OF OUR PARTS







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