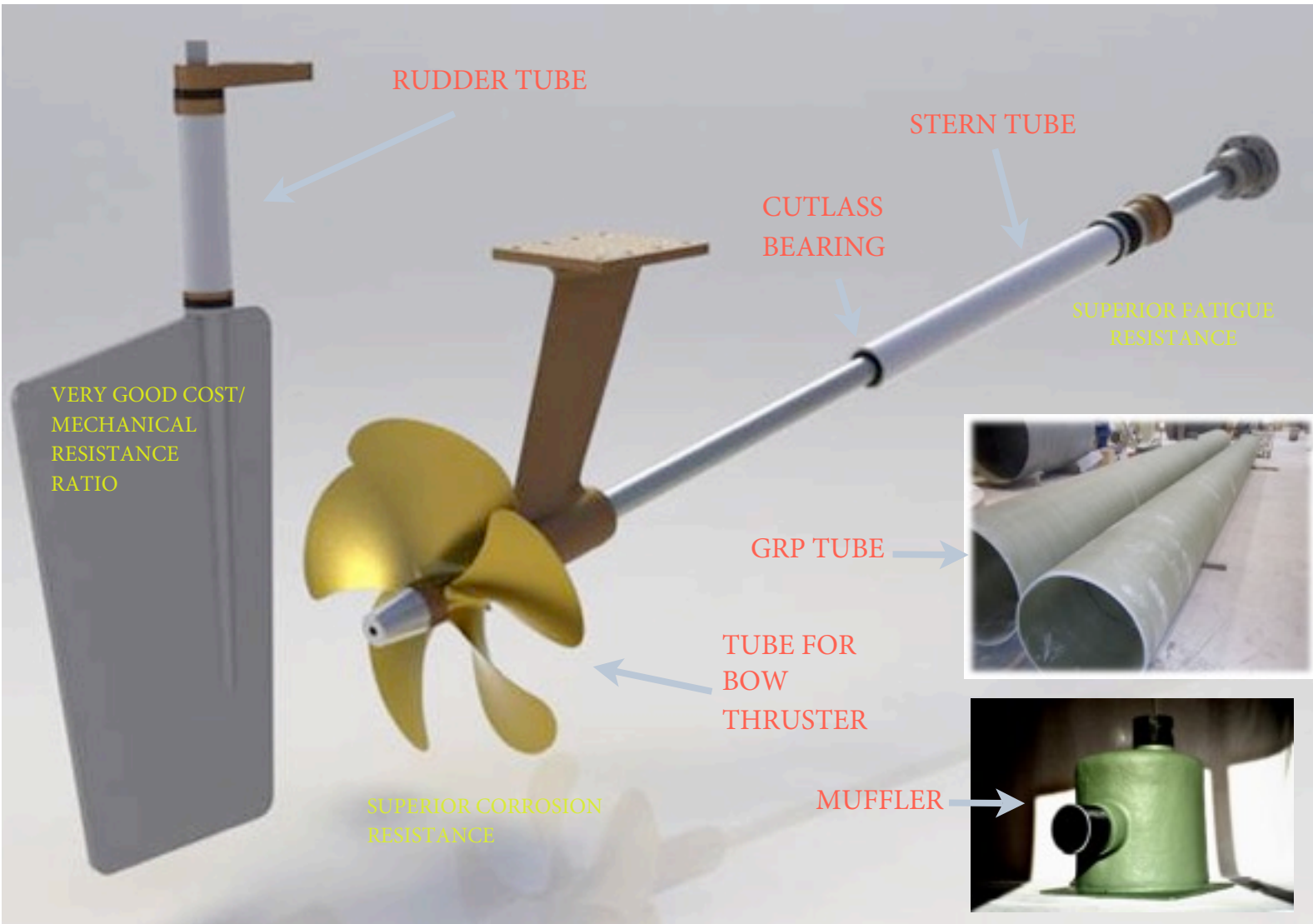


TECHNICAL PARTS FOR YACHTING

COMPOSITE TUBES FOR MARINE APPLICATIONS



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

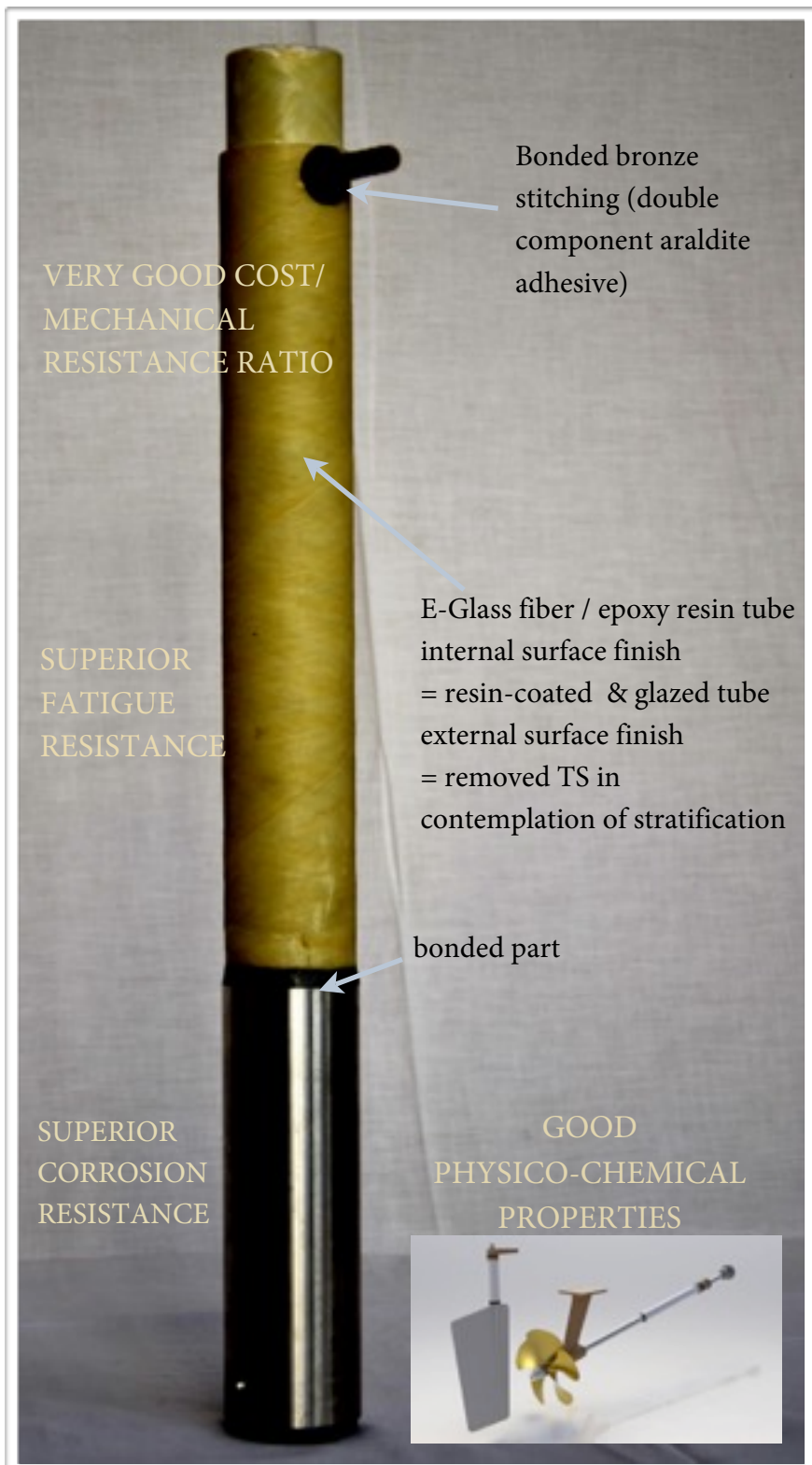
Pleasure boats have been composite-made for more than 40 years. A combination of laws, worldwide competition and technical evolutions has encouraged shipyards to use techniques such as the infusion process, the vacuum forming process, and even the autoclave machine. In the revolution parts sector, such 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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STERN TUBE

E-Glass fiber /
Carbon fiber
epoxy resin
TG = 130°C Tolerances on :
external diameter : +/- 0,8mm
internal diameter : +/- 0,1mm
effective length = 3 m

SHAFT DIAMETER (IN MM)	INT/EXT DIAMETER (IN MM)
22	36/42
25	36/42
25	40/46
30	40/46
30	45/54
35	50,8/58
38,1	50,8/58
40	55/67
45	60/70
50	70/82
60	80/100
superior diameters on demand.	

STANDARD CUTLASS BEARINGS

TUBE'S INTERNAL DIAMETER/ THICKNESS IN MM / LENGTH IN MM.
CUTLASS BEARING 22X29X75 + FLANGE
CUTLASS BEARING 22X36X75 + FLANGE
CUTLASS BEARING 25X36X100 + FLANGE
CUTLASS BEARING 25X40X100 + FLANGE
CUTLASS BEARING 30X40X100 + FLANGE
OTHER REFERENCES ON DEMAND.

“The European legislation is now encouraging shipyards to reduce their **styrene** emissions (a monomer used to cross-link polyester resins). The parts, whose crosslinking is initiated by heat in a sterilizer, thanks to expoxide resins, are structurally better, more economical, and they don't emit any steam.”

Jean-Yves Olivré (production manager).

RUDDER TUBE

E-Glass fiber /
Carbon fiber

Polyester resin /
Vinylester

TG max = 130°C

Tolerances on :

external diameter : +/- 1mm

internal diameter +/- 0,2 mm

Finishing :

Natural/TS/unremoved TS

E-Glass fiber / polyester resin or vinylester tube + GGB ring
internal surface finish = resin-coated and glazed tube
external surface finish = removed TS in contemplation of stratification



DIAMETER (MM)	LENGTH (MM)	THICKNESS (MM)
50	from 100 to 1000	4/5/6
55	from 100 to 1000	4/5/6
60	from 100 to 1000	4/5/6
65	from 100 to 1000	4/5/6
70	from 100 to 1000	4/5/6
75	from 100 to 1000	4/5/6
80	from 100 to 1000	5/6/7
85	from 100 to 1000	5/6/7
90	from 100 to 1000	5/6/7
95	from 100 to 1000	5/6/7
100	from 100 to 1000	5/6/7



VERY GOOD COST/
MECHANICAL
RESISTANCE RATIO

SUPERIOR
CORROSION
RESISTANCE

SUPERIOR
FATIGUE
RESISTANCE

WATER EXHAUST PIPE / MUFFLER

E-Glass Fiber / polyester resin
(made thanks to the spray lay-up process).



GOOD
PHYSICO-CHEMICAL
PROPERTIES

AVAILABLE DIAMETERS :

300 MM / 400 MM / 450 MM

(several possible outlets, development available on demand)



E-Glass fiber / polyester resin or vinylester tube
 internal surface finish = resin-coated and glazed tube
 external surface finish = removed TS in contemplation of stratification

GOOD
 PHYSICO-
 CHEMICAL
 PROPERTIES

SUPERIOR
 CORROSION
 RESISTANCE

SUPERIOR
 FATIGUE
 RESISTANCE

VERY GOOD COST/
 MECHANICAL
 RESISTANCE RATIO

GRP TUBE FOR BOW THRUSTER

E-Glass fiber /

Carbon fiber

Polyester resin

Vinylester

TG max = 130 °C

Tolerances on :

external diameter : +/- 1mm

internal diameter +/- 0,2 mm

Finishing :

Natural/TS/unremoved TS

Anti-corrosion layer = 1 mm

INTERNAL DIAMETER (MM)	LENGTH (MM)	THICKNESS (MM)
110	750 / 1000/1500/2000/3000	4,5
125	750 / 1000/1500/2000/3000	4,5
160	750 / 1000/1500/2000/3000	5,5
185	750 / 1000/1500/2000/3000	6
250	750 / 1000/1500/2000/3000	7
300	750 / 1000/1500/2000/3000	10
315	750 / 1000/1500/2000/3000	10
325	750 / 1000/1500/2000/3000/6000	12
400	750 / 1000/1500/2000/3000	14
450	750 / 1000/1500/2000/3000/6000	14

GRP STRUCTURAL TUBE



E-Glass fiber / Carbon fiber polyester
isophthalic resin / vinylester

TG max = 130°C
Finishing :
Natural/TS/unremoved TS



Connecting beams

Elements for
framework /
Construction industry

GRP Tours

GRP Radome

Feedthroughs

Specific conduits

Piping / Ducts

SUPERIOR
CORROSION
RESISTANCE

SUPERIOR
FATIGUE
RESISTANCE

VERY GOOD COST/
MECHANICAL
RESISTANCE RATIO

Equipment Length = up to 12 operating meters
Thickness calculation according to your technical specifications.

Ø int (mm)	Ø int (mm)	Ø int (mm)	Ø int (mm)
150,00	600,00	1200,00	2400
200,00	700,00	1400	2900
250,00	800,00	1600,00	3500
300,00	900,00	1800,00	4000
350,00	(950)	1900	4500
400,00	1000,00	2000	5000
500,00	1050,00		



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THEY HAVE BEEN TRUSTING US FOR MORE THAN 30 YEARS



BÉNĒTEAU



DUFOUR
YACHTS



Technical characteristics (provided for information only)	
Density	1,9 kg/dm ³
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/mm ²
Tensile strength, circumferential direction	100 daN/mm ²
Elastic modulus, circumferential direction	4000 daN/mm ²
Tensile strength, axial compression	15 daN/mm ²
Tensile strength, 90° / axe compression	40 daN/mm ²
Bending tensile strength	10 daN/mm ²
Bending elastic modulus	1300 daN/mm ²

LIST OF OUR TOOLS

FOR EPOXY RESIN MANUFACTURING (Glass or carbon fiber)

Wide range of mandrels for a low economical launch price.

Minimum thickness

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

Thickness up to

150 mm with an external diameter limit ≤ 270 mm (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					

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 :

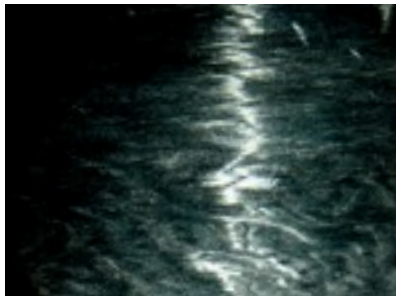
Natural surface with external skin (smooth aspect).

Max. dimensional tolerance on external diameter :

+/0,8 mm.

Colour : tinted black in the mass (= standard).

On demand : White, Green, Yellow, Red, etc.

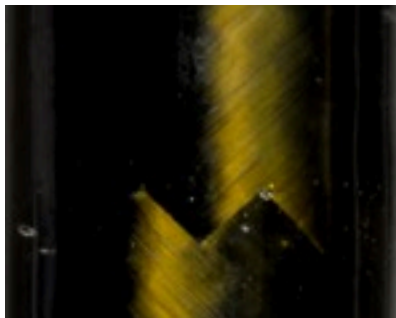


Type-C finishing :

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.

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Dimensional tolerances, finishing and surface finishes

on internal diameter...



Internal diameter tolerance

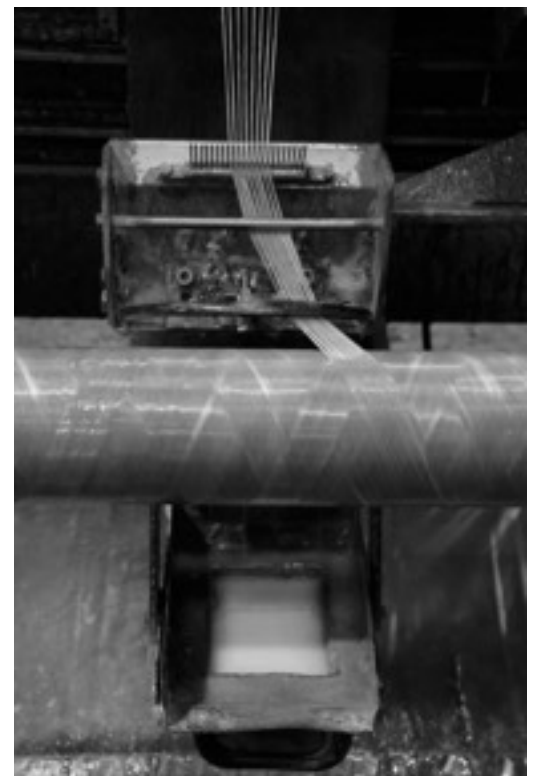
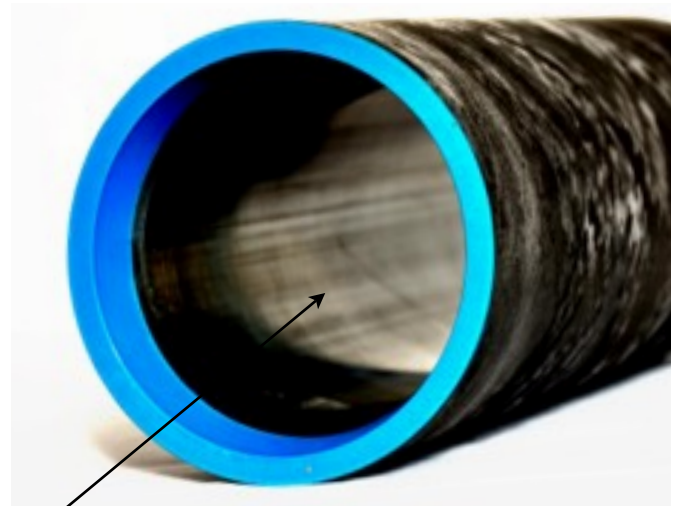
up to **H11**

Rectitude : 0,1mm/m

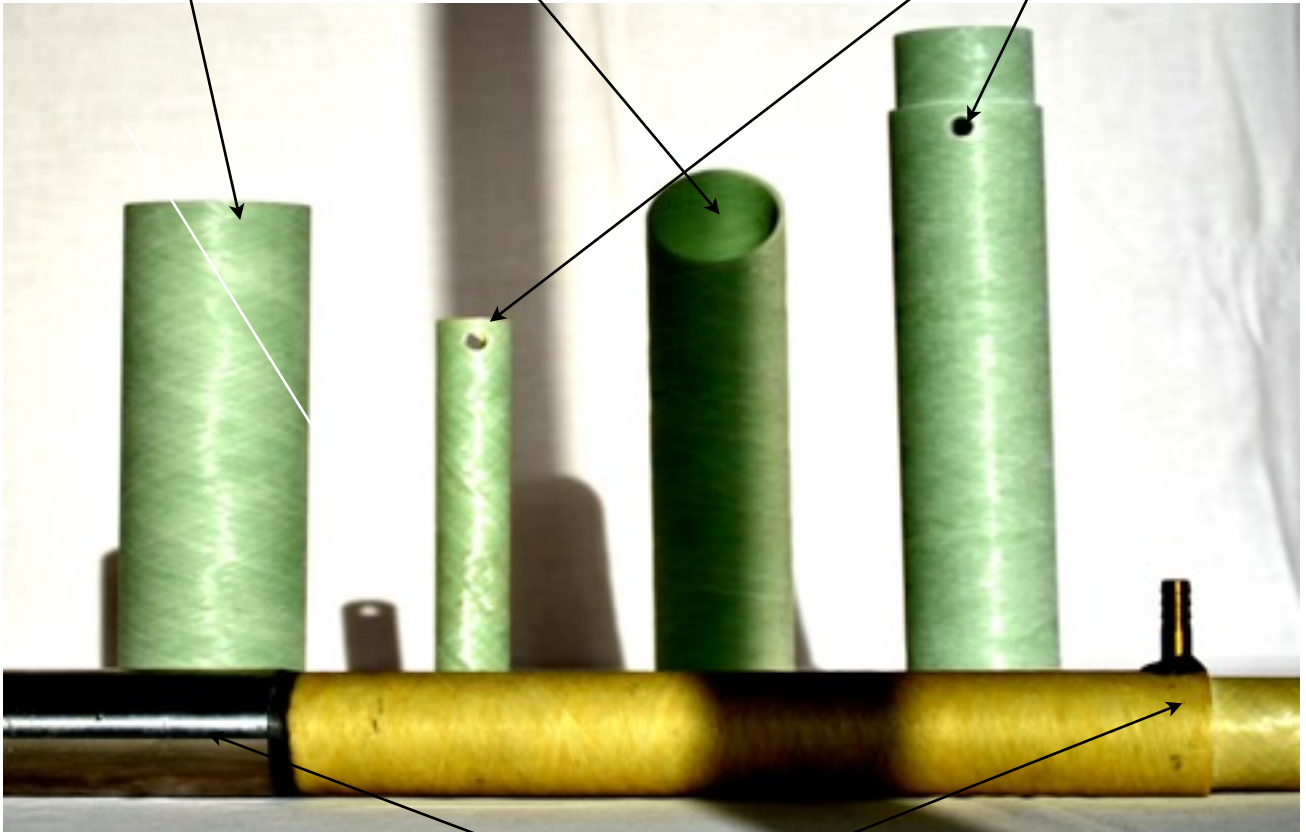
Ovalization : 0,05mm maxi.

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.

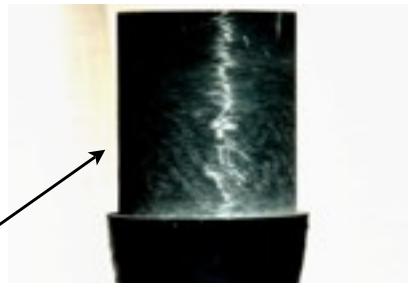


POSSIBLE COMPLETION OPERATIONS ON A COMPOSITE PART

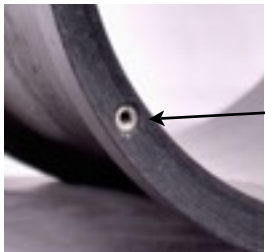


Machining of an internal groove and laying of a stainless-steel ring

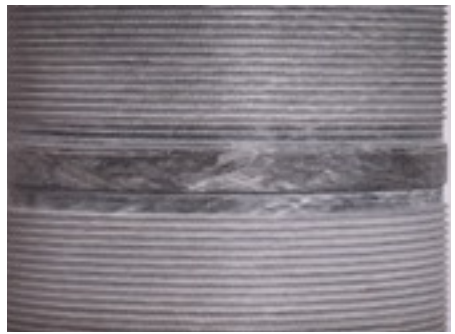
Bonding of an insert or other additional parts



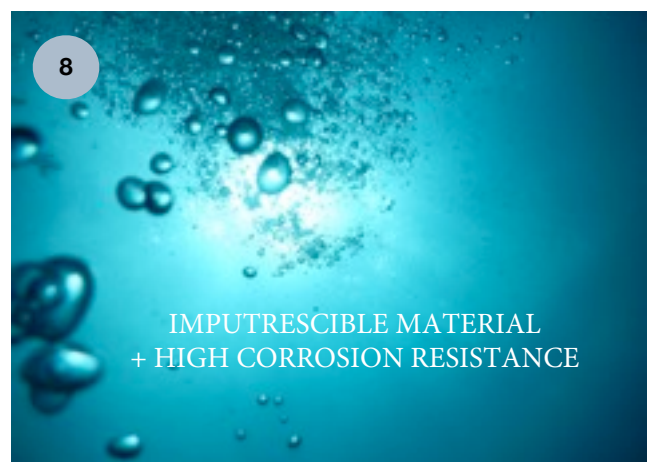
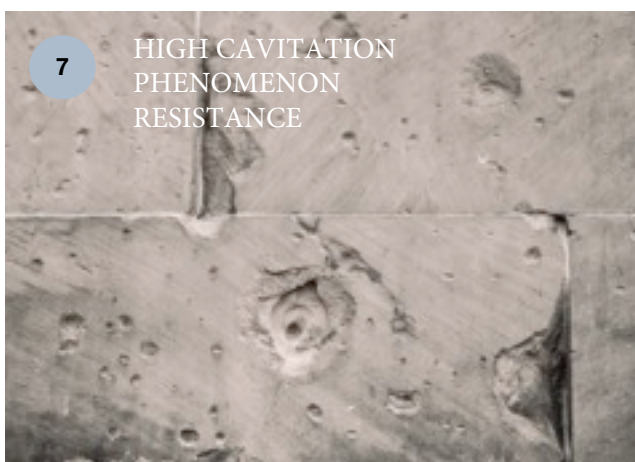
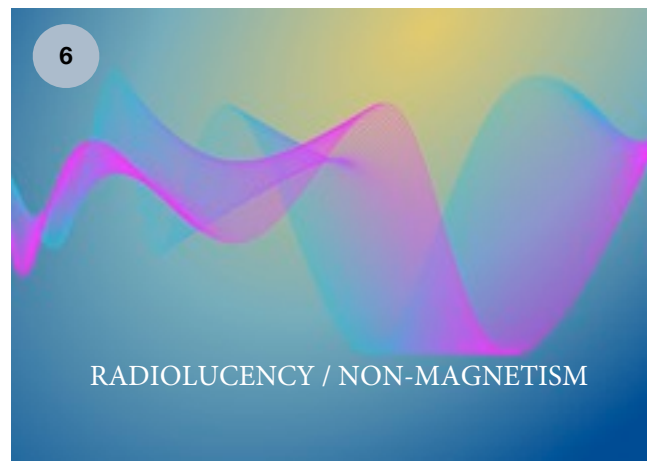
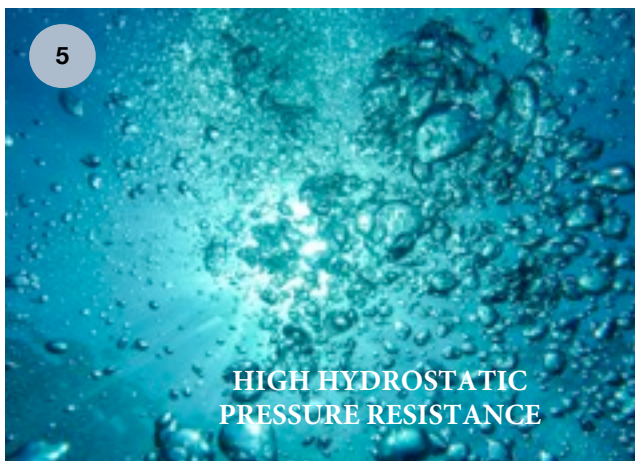
Specific machining



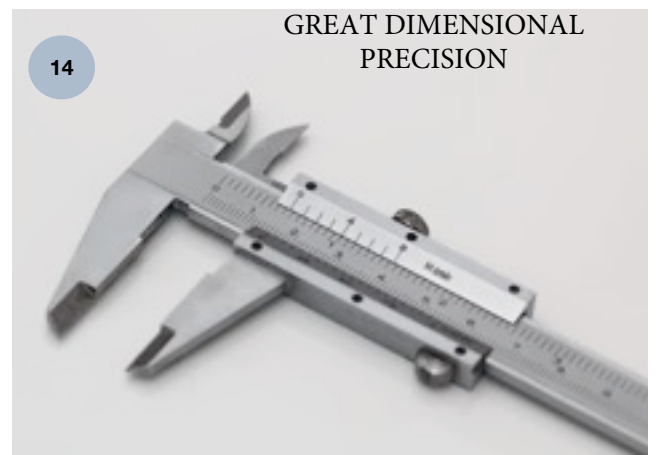
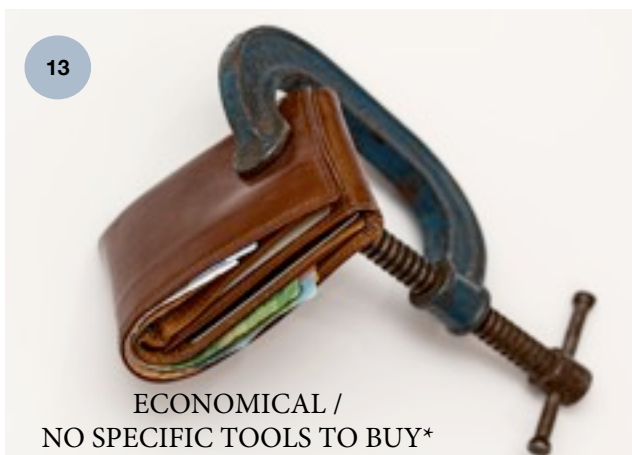
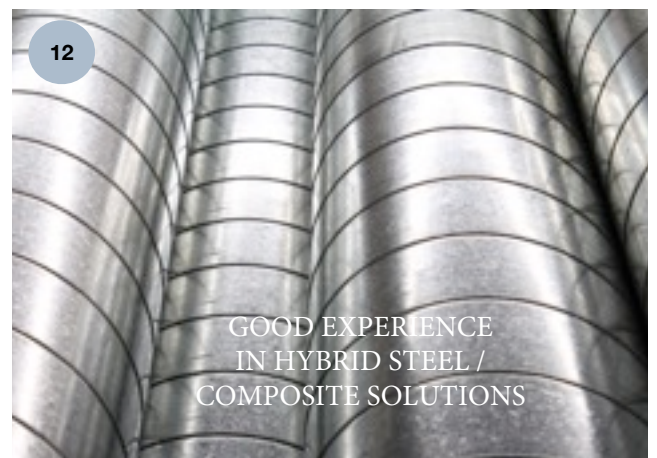
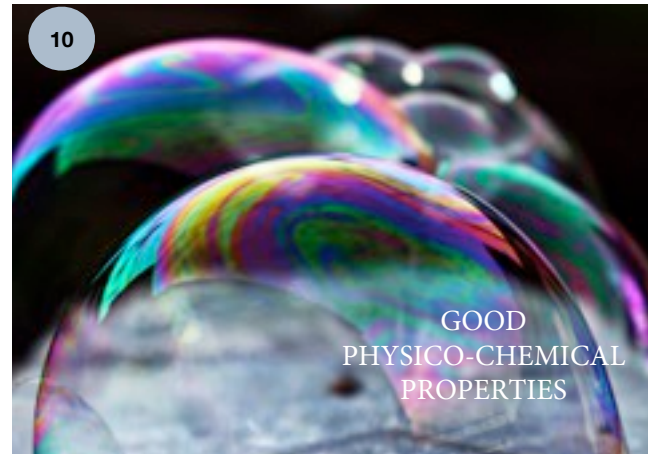
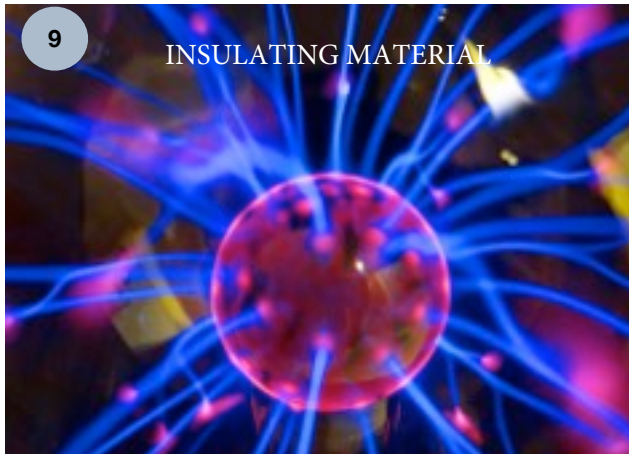
Laying of a helicoid



COMPARED BENEFITS OF OUR PARTS



COMPARED BENEFITS OF OUR PARTS





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from 8.30 am to 6 pm.



< 48H

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