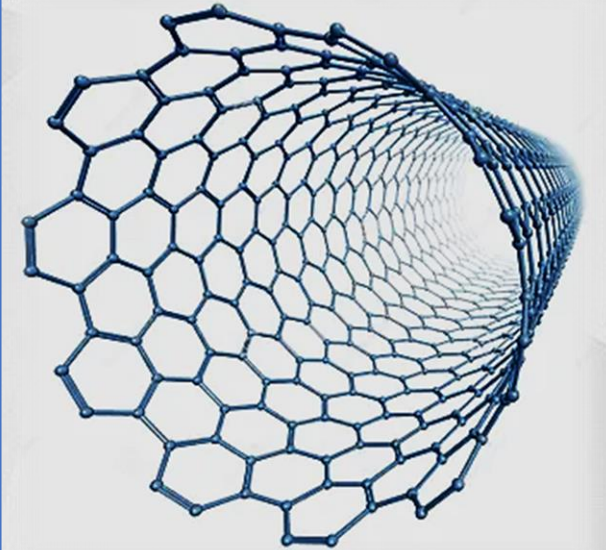


FIBER REINFORCED POLYMER «FRP»

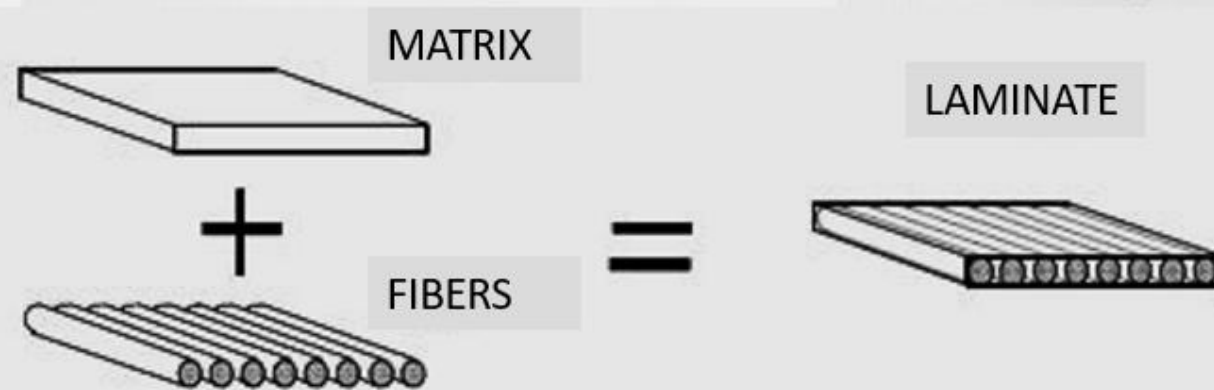
**State of the art,
fields of application and
production technologies.**



What is a material FRP?

The **Fibers Reinforced Polymers** are characterized by the combination of two or more components with distinct physical and chemical properties.

- ❖ Matrix
- ❖ Fibers



TRADITIONAL TYPES OF FIBERS



GLASS

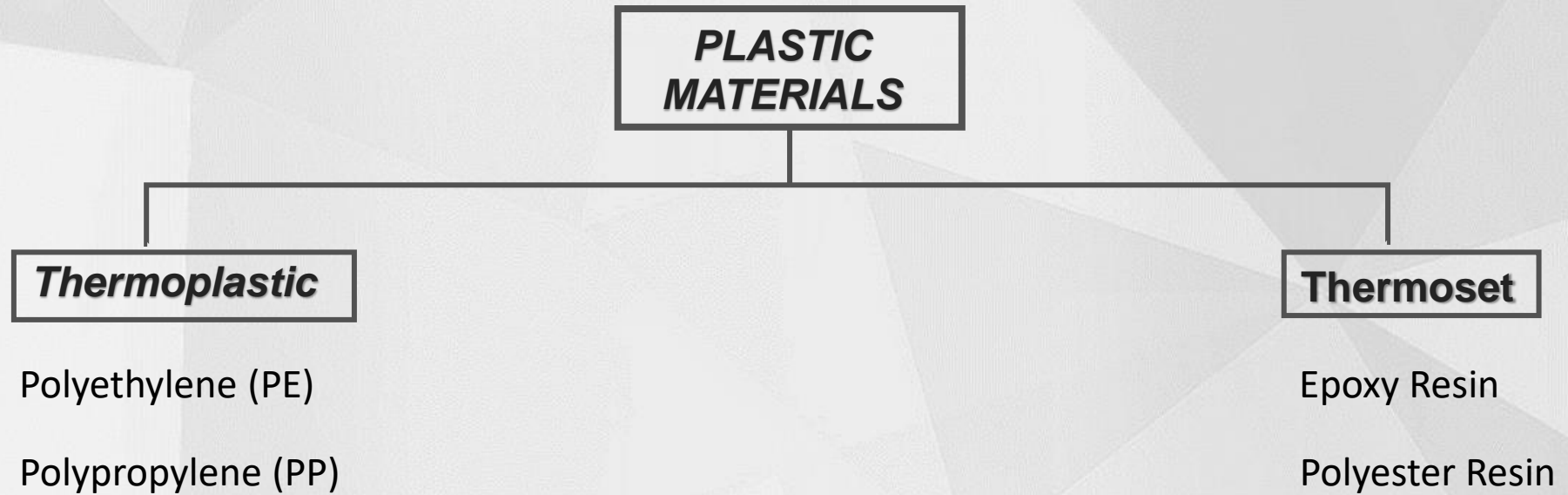


CARBON



KEVLAR

TYPES OF MATRIX



ADVANTAGES

- **High Strength and Stiffness:** Fiber reinforcement significantly increases the strength and stiffness of the material.
- **Lightness:** They are lighter than traditional materials such as steel or aluminium.
- **Corrosion resistance:** They are resistant to corrosion, increasing the life of the products in which they are used.
- **Design Versatility:** It is possible to create complex shapes, offering greater design freedom.

FIELDS OF APPLICATION

Their high performance allows significant uses in multiple industrial sectors:

- **Marine**
- **Aerospace**
- **Aeronautical**
- **Automotive**
- **Eolic**
- **Various**

as well as a whole new series of innovative sectors.



FIELDS OF APPLICATION

- Marine



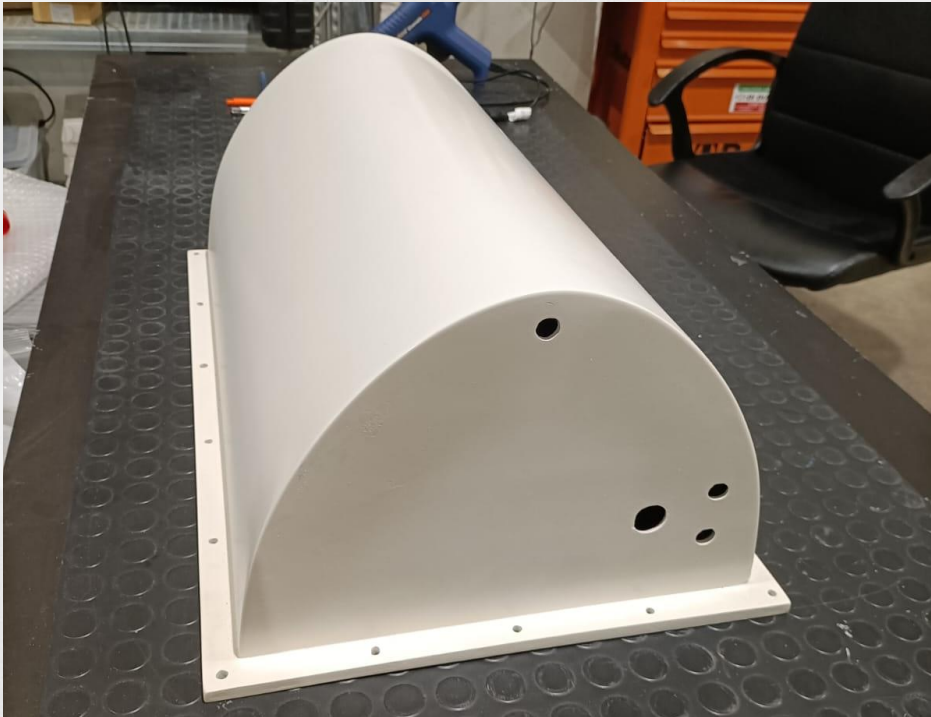
FIELDS OF APPLICATION

- **Marine**



FIELDS OF APPLICATION

- **Aerospace**



RADOME

FIELDS OF APPLICATION

- **Automotive**



PARTS FOR BUS

FIELDS OF APPLICATION

- **Eolic**



WIND TURBINE

FIELDS OF APPLICATION

- **Various**



POOL



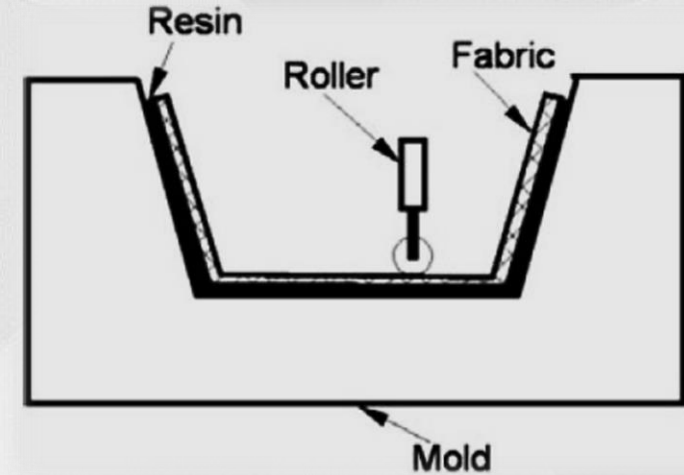
Production technologies

It is possible to use numerous production techniques; the choice of the production process depends on the final product you want to obtain.

- **Manual:** for large and irregularly shaped objects.
- **Infusion:** to obtain composites with high mechanical performance and good repeatability of the physical properties of the finished product.
- **Resin Transfer Molding (RTM):** for the production of composites with an effective quality/price ratio. It also allows you to create complex shapes with high control of the reinforcement arrangement.
- **Autoclave:** for the manufacturing of high-performance components in the aeronautical and aerospace industry.

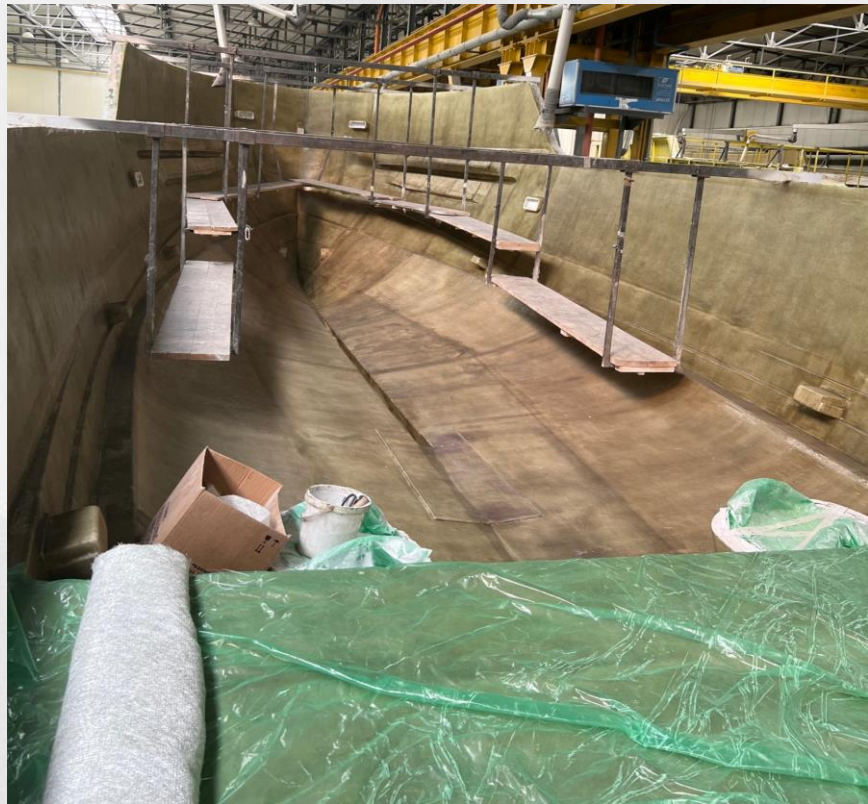
Production technologies

- **Manual**



Production technologies

- **Manual**



Production technologies

- Pre-infusion (Fibers dressing)



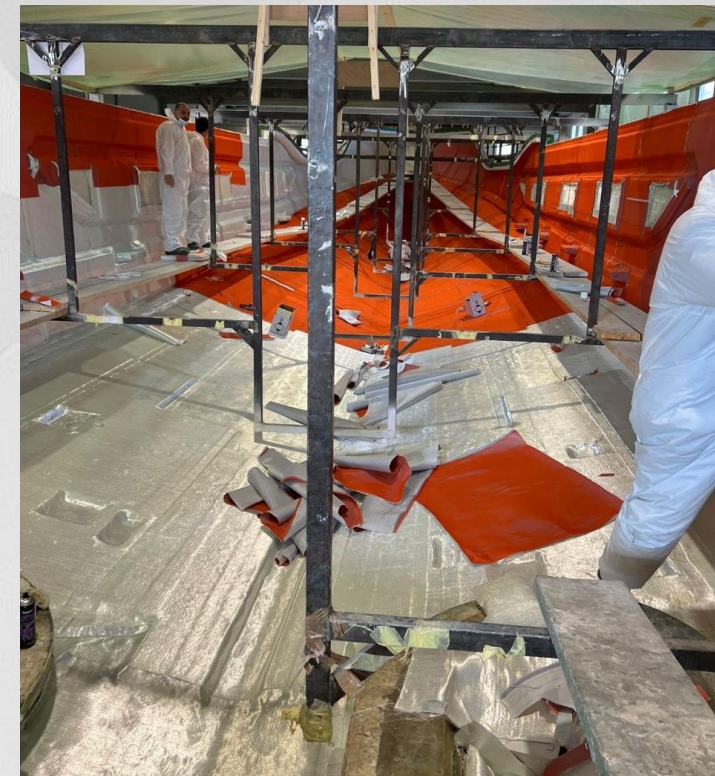
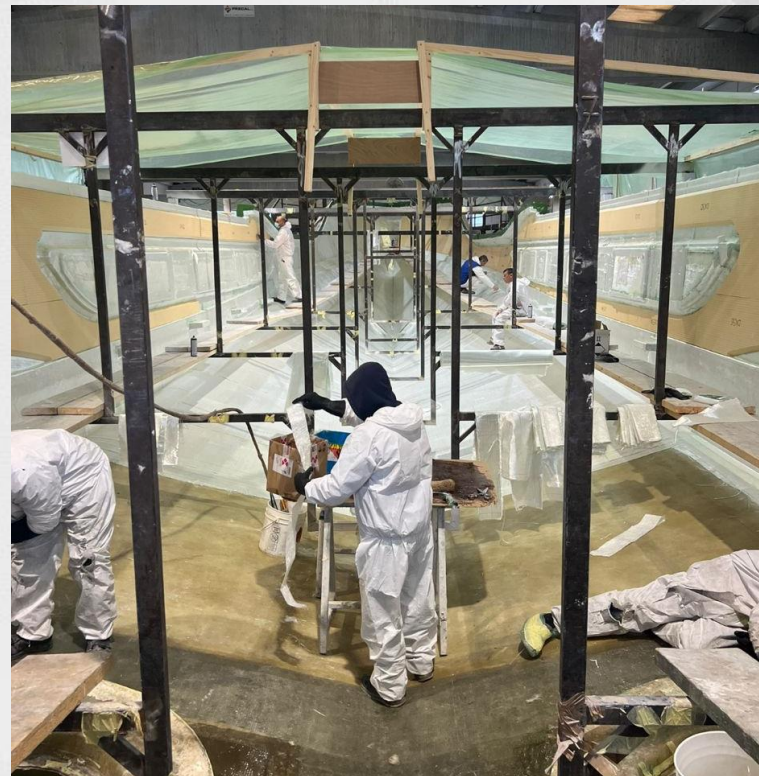
Production technologies

- Pre-infusion (Fibers dressing)

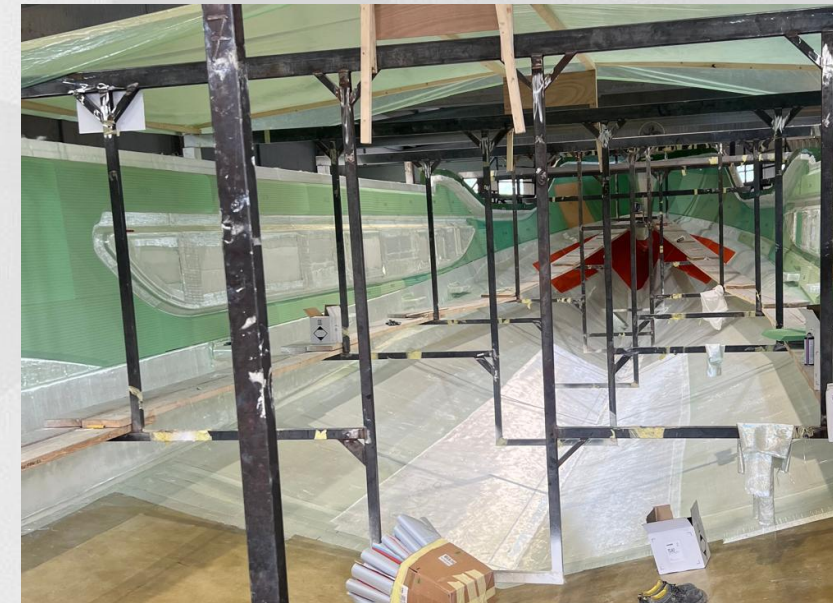
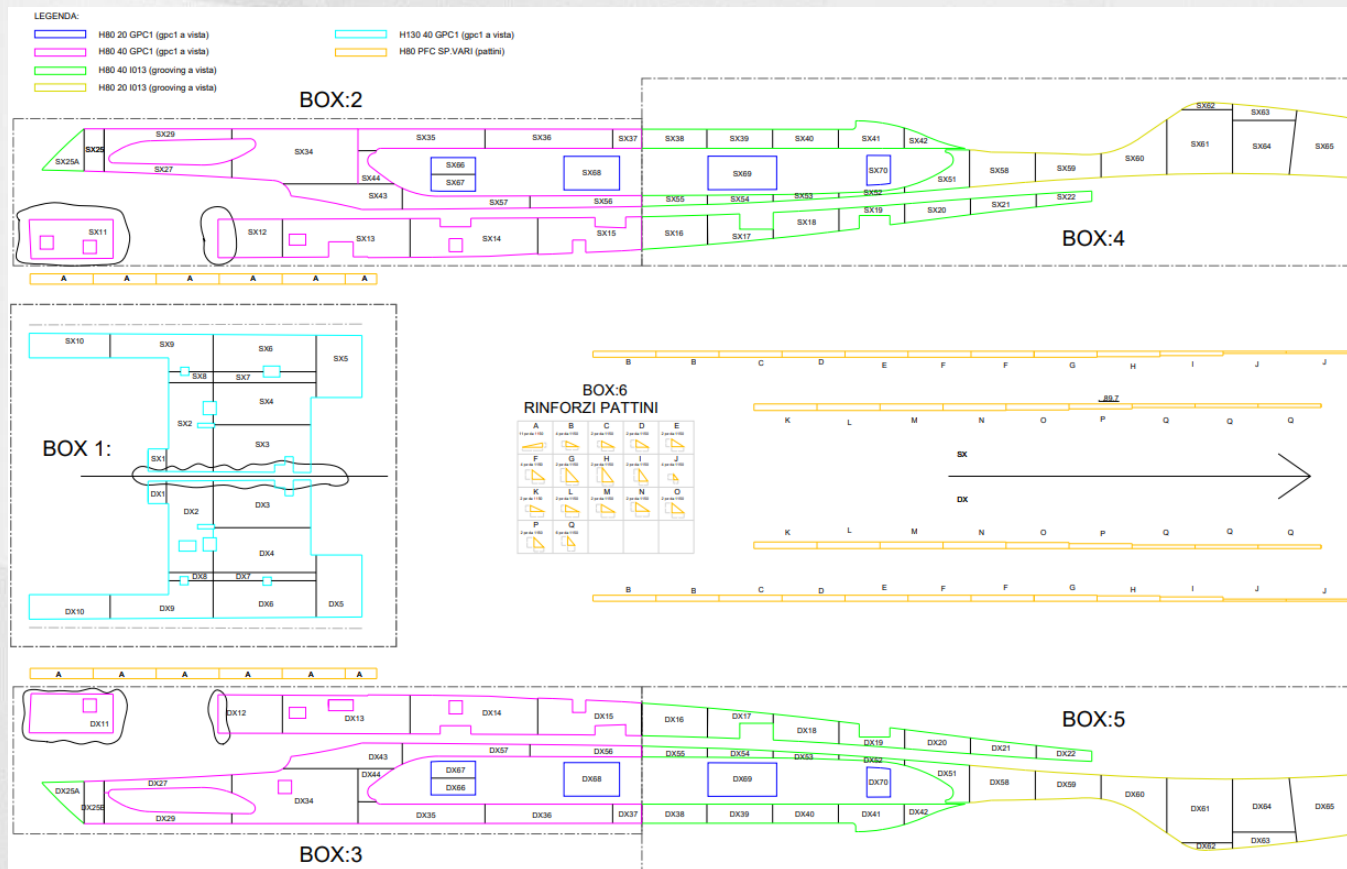


Production technologies

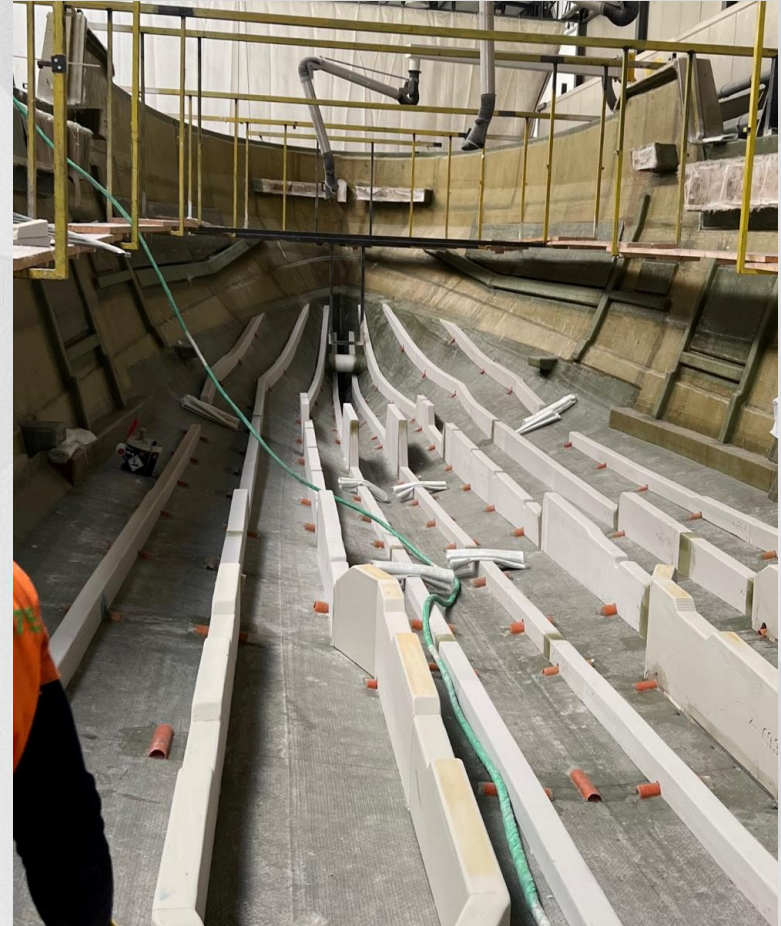
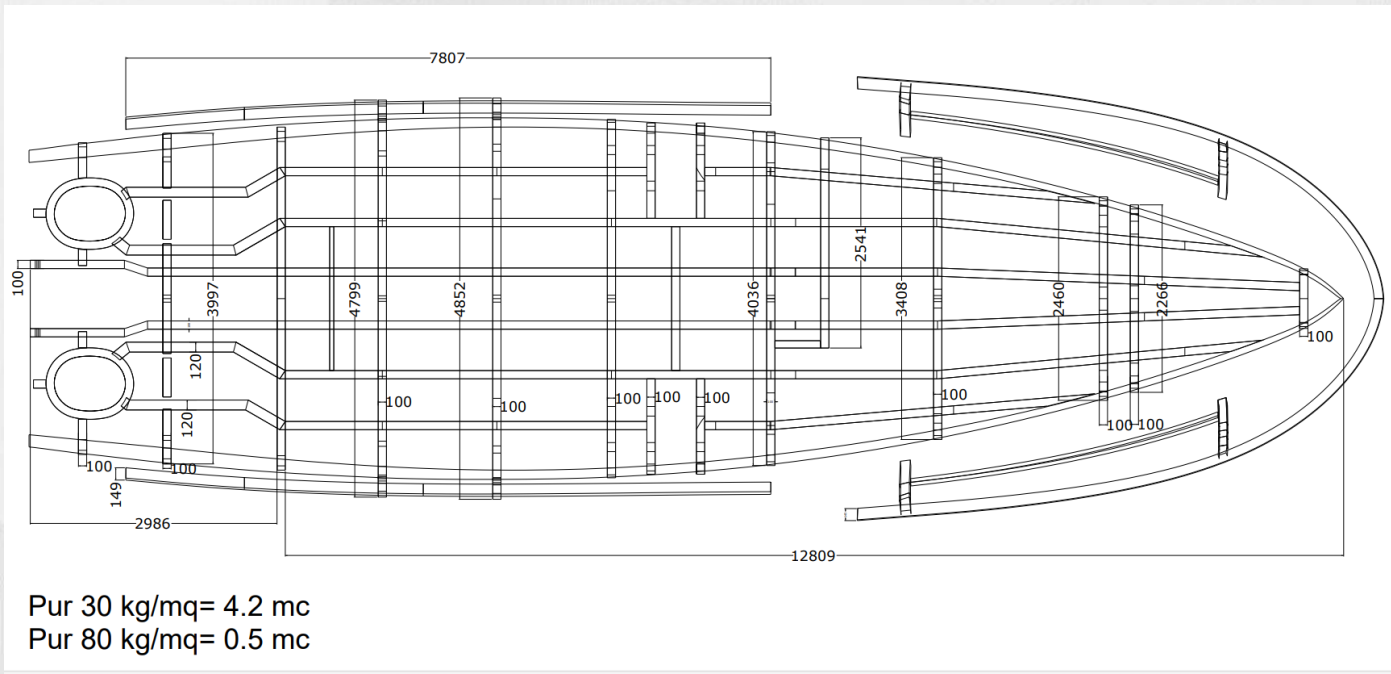
- Pre-infusion (Fibers dressing and PVC kitting)



PVC KITTING MATERIAL COMPOSITES



PUR KITTING MATERIAL COMPOSITES



FULL KITTING



CASE STUDY - PVC KITTING YACHT 60 FT

ECONOMIC ANALYSIS - YACHT 60FT					
	H	RATE €/H	€	MQ	MQ/H
KIT	56	25	1.400 €	101	1,8
NO KIT	120	25	3.000 €	101	0,8
SAVING		1.600 €			



CASE STUDY - KIT ADVANCED YACHT 110 FT

KIT TRADITIONAL				KIT ADVANCED	
KIT	MQ	RESIN ABSORPTION INDEX KG/MQ	KG	KIT	KG
HP 80 30 GPC1	98,2	1,83	179,706	GPC1	693
HM 100 GPC1	132	1,83	241,56	PF2	496
HP 80 I013	71,6	5,44	389,504		
HM 100 I013	79	5,44	429,76		

Resin absorbed by the kit	1240,53	1189
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GOING FROM THE TRADITIONAL KIT TO THE KIT ADVANCED THE NET WEIGHT SAVINGS IN RESIN ON A TOTAL OF 359 MQ OF APPLICATION IS EQUAL TO 744 KG (PF2) / 547 kg (GPC1).

WHY USE THE KIT?

**The use of the kits reduces manpower hours,
resin consumption and
waste.**

REDUCES COSTS AND WEIGHTS.

Production technologies

- Infusion



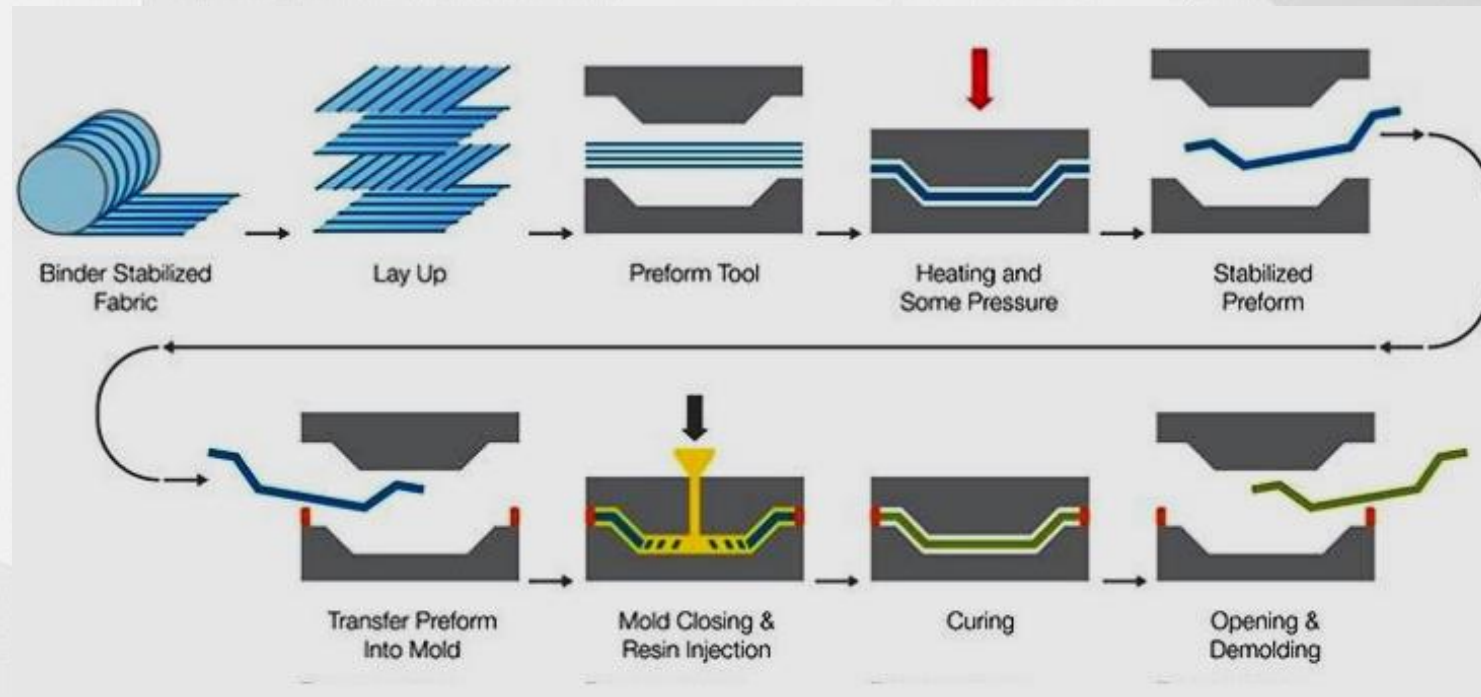
Production technologies

- Infusion



Production technologies

- RTM



Production technologies

- AUTOCLAVE



CONCLUSION

The future goal is to improve material properties, reduce costs and make production processes more efficient and sustainable.

- Create recyclable polymer matrix composites.
- To introduce nanomaterials into the polymer matrix to further improve the mechanical and thermal properties of the composites.

THANKS!..Questions?

www.gccgroup.it
stc@studiococcia.org

