

TECHNOLOGY	ADVANTAGES	DISADVANTAGES
Wrapping	1) Thanks to very slight single layers the material becomes much more homogeneous and compact, confronting to other proceedings where the crossed carbon wires leave several interfaced cavities that are extremely difficult to eliminate.	1) The cost of construction is higher that used with the Filament winding technology. The cycle is actually less automatisized and requires a specialized work force.
	2) For the same reason the finishing obtained superficially during rectification, and without any special carryovers, is indeed much better than Filament winding or Pull winding.	2) For high performance manufacturings, such as the Prepeg quality, the specialization of the work force and the control procedures are more critical as compared to those requested for the Filament winding. Expertise and a good quality control system are necessary. Therefore there are less companies that are able to operate with security in Wrapping, than those that can be find using Filament winding.
	3) One can use and mix diverse carbon layers (high module, high resistance, rigid or tenacious, ect.) with flexibility and efficiency, in projecting the features of the piece. These are results impossible to obtain with other technologies.	3) For diverse reasons it is not possible to exceed certain diametrics and distances. Therefore there is a limit to the maximum dimensions of the manufacturings that, if made using Filament winding, could exceed 10 m. length and one diametric meter.
	4) One might have fiber layers exactly at 0° with elastic longitude module performances that are much higher as compared to ones obtained with Filament winding (it is also made possible by using a 3 heads for Pull winding).	
	5) The relationship fiber-resin, apart from being much more precise in Wrapping, also permits an inferior quantity of resin, so as to obtain another improvement in the material's structural features.	
Filament winding	1) The process is very automated and needs less manufacturing as compared to Wrapping.	1) The preparation is quite long, so it is convenient only if the numbers of pieces made are not limited to a single unit.
	2) The speed in production is superior.	2) The precision fiber/resin is not controllable and so, considering how easily pores are created, the content of the resin remains at a high level.
	3)The process is carried out in a single cycle.	3) It is complicated to put fibers at 0°.
	4) One can design tubes of large dimensions (with an adequate machine).	4) It is difficult to use diverse types of fibers.
		5) The composite easily shows pores.
		6) Due to its pores the processing ends up with no good surfaces and often needs an external coating in resin.
Pull winding	1) Great automatization.	1) Little flexibility in production: usable only for large scale productions.
	2) Process in a single cycle.	2) Few project flexibilities: the fibers should be placed only in defined directions and corners.
	3) Reduced costs.	3) Low quality composite.
		4) Very little precision in curves and right lines.
		5) The diametric and the thickness should not exceed certain reduced relative values.