



Major Benefits of Pultruded FRP Composites

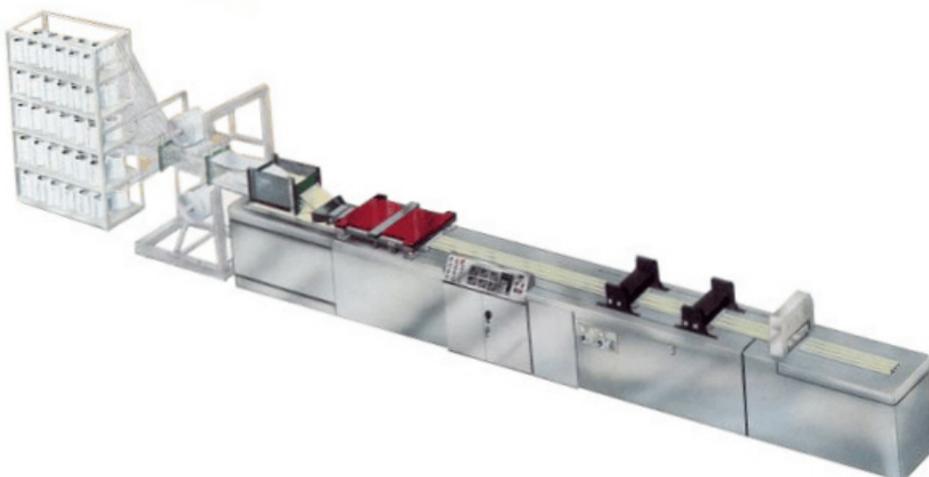
- **Affordable** - most economic method of producing fiber reinforced composites
- **Lightweight** - favorable strength properties as compared to steel - twice the stiffness of aluminum with carbon fibers at 60% the weight
- **Customization** - cross-section made to consolidate parts - resin systems can be tailored to fit your application
- **Consistency** - excellent cosmetics - dimensional stability predictable engineered properties.

Description of the Pultrusion Process:

Continuous fibers cannot be pushed or "extruded" through a die, they need to be drawn or "pulled". Pultrusion is this drawing of fibers through a resin bath, where they are wet-out, and then through a heated piece of tooling (die) that has a tightly toleranced shape cut into it.

The fiber bundles are dispensed from racks or creels that packages rest on. Often, fibers are added to the process ahead of the creels in the form of a rolled material. This combination of reinforcements is oriented through forming guides to get the fiber materials where they need to be in the finished part. This precise location of fiber provides specific properties in the finished part.

When passing through the die the materials are heated between 275-400 degrees F. This void in the die gives the wet, fibrous mass its shape/finished dimensions while it conducts heat into the process and cures the catalyzed resin system as it moves through the die. The material is "pulled" by reciprocating clamps (or a belt puller) that grab the material top and bottom and pull it continuously. These pullers are usually 15-30 feet past the die area.



When the material leaves the die it is still very hot but it is the dimension of the finished part. The part cools and after passing through the pullers the material is cut to length in-line with an automated saw. The parts can be cut to any length from 2" to continuous 25,000 ft reels.



Why Choose Pultrusion?

Pultrusion offers all of the same benefits that are inherent to the other FRP processes but typically at much higher production rates, leading to more favorable costs.

Because of this continuous processing approach through one die, the part uniformity with pultrusion is excellent! The dies are often made to a tolerance of plus/minus .0005" of an inch when manufactured and they have a highly polished surface. This process allows the manufacturer the ability to make parts to your needed tight tolerances and provide an inherent glossy/smooth finish straight from the die. Colors are also something that can be added to the resin system to bring a uniform and attractive look to your finished part.

From an engineering perspective, pultrusion is a great option because of its consistency and the ability to tailor the "fiber architecture" to meet particular mechanical needs. It is an excellent material for linear stiffness in bending applications. The tensile strength is formidable because of the ease of loading axial fibers into the process.

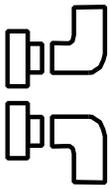
However, there are numerous options in rolled goods that combine fiber angles (mats/woven fabrics). These mats allow the engineer to design in the proper transverse strength properties and the torsion rigidity needed as well.

Because of the broad base of resin systems that are available the engineer can feel comfortable about material properties at elevated temperatures, in highly corrosive atmospheres, in handling impact loads, and in cyclic fatigue applications. Various resin options are considered with each custom pultruded profile. The process-ability, physical properties, and associated costs of a resin system are all evaluated before we choose the direction we should take in the production of a particular profile.

This continuous process allows for lower manufacturing costs at every level and makes pultrusion a very sound option for your material needs!

Pultrusion Overview:

- Most economic method of producing fiber reinforced composites
- Predictable Engineered Properties are consistently attainable
- Constant cross-sections and Linear parts (no tapers or bends)
- Consistency in dimensions and appearance are inherent in process
- Customization of resin systems to fit your needs
- Exotic fibers can get you the properties you want



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- Excellent strength to weight ratio vs. traditional materials
- 2 X the stiffness of Aluminum with carbon fibers
- All the benefits of FRP (corrosion resistance & insulating properties)
- Potential for parts consolidation
- Light Weight Materials (20% weight of steel - 65% weight of aluminum)
- Dimensional stability with wide temperature variations

Contact FiberSystems Today!

Call or Email

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