

# FRP PULTRUSION PROCESS

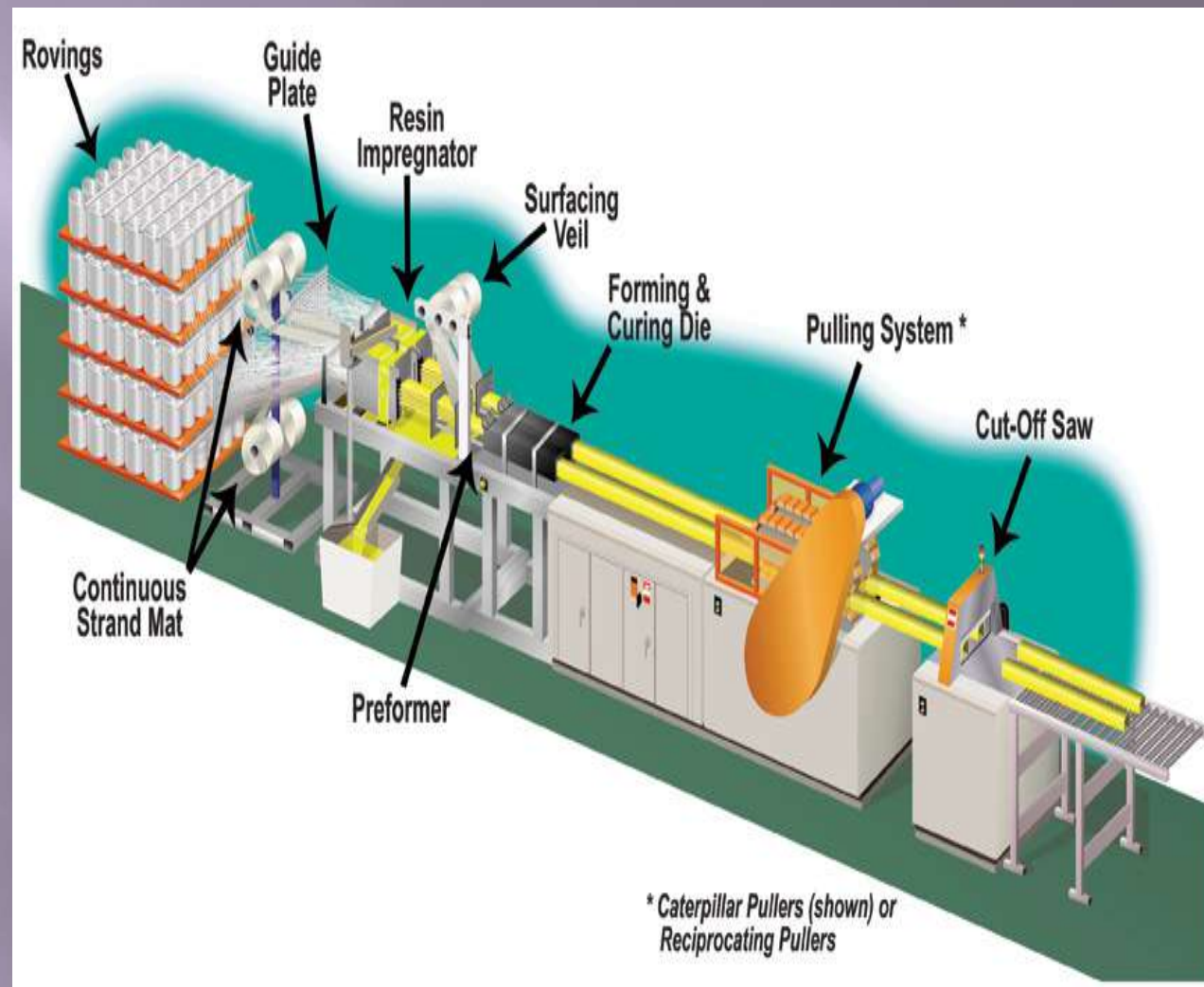
**Presented by**

**FIBRO PLASTICHEM INDIA PVT LTD  
DANKUNI, HOOGHLY  
WEST BENGAL**

**Website-[www.fibroplasticchem.com](http://www.fibroplasticchem.com)**

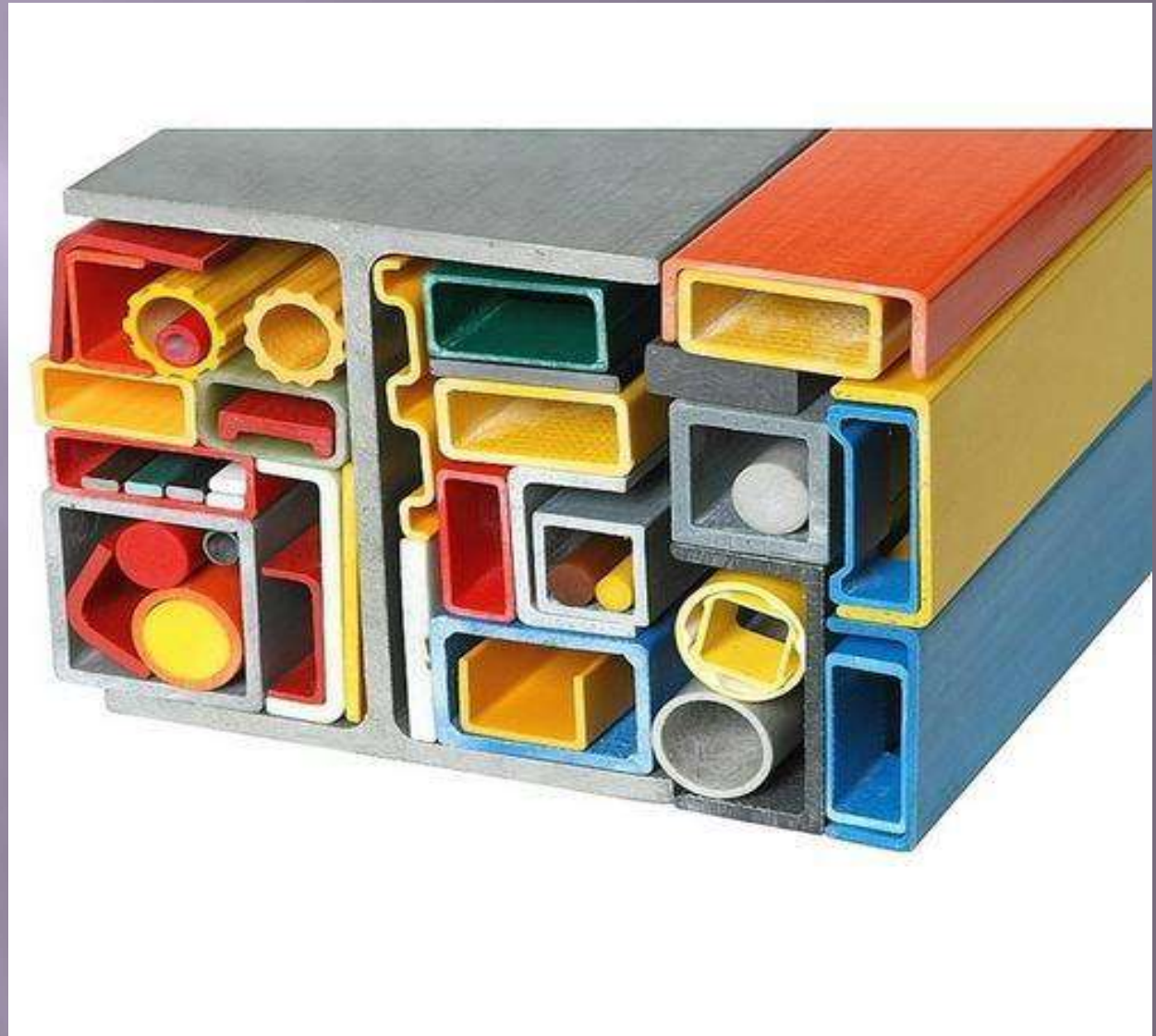
# WHAT IS PULTRUSION

**Pultrusion** is a continuous manufacturing process utilized to make pultruded profiles with constant cross-sections whereby reinforcements, in the form of roving and mats, are saturated with resin and guided into a heated die. Once in the die, the resin undergoes a curing process known as polymerization. The once resin-saturated reinforcements exit the die in a solid-state and in the form of the cross-section of the die. The pultrusion process requires little labor and is ideal for mass production of constant cross-section profiles.



# Features of Pultrusion Process

- ❑ Consistent quality
  - ❑ Low weight
  - ❑ High strength
  - ❑ Good surface finish
  - ❑ Continuous length
  - ❑ Excellent corrosion properties
  - ❑ Electrical and thermal insulation
  - ❑ Maintenance free
  - ❑ Non magnetic
  - ❑ Fire retardant properties
  - ❑ Excellent creep and fatigue performance
  - ❑ Transparent to radio frequencies
- Pigmentability



# Typical Properties of Pultruded Profile

<b>Mechanical</b>			
Tensile Strength (LW)	D638	psi	33,000
Tensile Strength (CW)	D638	psi	7,500
Tensile Modulus (LW)	D638	10 <sup>6</sup> psi	2.5
Tensile Modulus (CW)	D638	10 <sup>6</sup> psi	0.8
Compressive Strength (LW)	D695	psi	33,000
Compressive Strength (CW)	D695	psi	16,500
Compressive Modulus (LW)	D695	10 <sup>6</sup> psi	3.0
Compressive Modulus (CW)	D695	10 <sup>6</sup> psi	1.0
Flexural Strength (LW)	D790	psi	33,000
Flexural Strength (CW)	D790	psi	11,000
Flexural Modulus (LW)	D790	10 <sup>6</sup> psi	1.6
Flexural Modulus (CW)	D790	10 <sup>6</sup> psi	0.8
Modulus of Elasticity (Channels) (Square and Rectangular Tubes)	Full Section <sup>2</sup>	10 <sup>6</sup> psi	2.8-3.2
	Full Section <sup>2</sup>	10 <sup>6</sup> psi	2.8
	Full Section <sup>2</sup>	10 <sup>6</sup> psi	3.2
Shear Modulus	Full Section <sup>2</sup>	10 <sup>6</sup> psi	0.42
Interlaminar Shear (LW) <sup>3</sup>	D2344	psi	4,500
Shear Strength By Punch (PF)	D732	psi	5,500
Notched Izod Impact (LW)	D256	ft-lbs/in	28
Notched Izod Impact (CW)	D256	ft-lbs/in	4
Maximum Bearing Strength (LW)	D953	psi	30,000
Maximum Bearing Strength (CW)	D953	psi	18,000
Poisson's Ratio (LW)	D3039	in/in	0.35
Poisson's Ratio (CW)	D3039	in/in	0.15
In-plane Shear (LW)	Modified D2344 <sup>4</sup>	psi	7,000

LW = lengthwise

CW = crosswise

PF = perpendicular to laminate face

# Typical Properties of Pultruded Profile

## Physical

Barcol Hardness <sup>1</sup>	D2583		45
Water Absorption	D570	% Max	0.6
Density	D792	lbs/in <sup>3</sup>	0.060-0.070
Specific Gravity	D792		1.66-1.93
Coefficient of Thermal Expansion (LW)	D696	10 <sup>-6</sup> in/in/°F	4.4
Thermal Conductivity (PF)	C177	BTU-in/ft <sup>2</sup> /hr/°F	4

## Electrical

Arc Resistance (LW)	D495	seconds	120
Dielectric Strength (LW)	D149	KV/in	40
Dielectric Strength (PF)	D149	volts/mil	200
Dielectric Constant (PF)	D150	@60Hz	5.2

# Comparison with Conventional Material

PARAMETERS	FIBRO FRP PULTRUDED PROFILE	HOT DIP GI	SS
CORROSION RESISTIVITY	Very high	Moderate	High
ELECTRICAL CONDUCTIVITY	Low	High	High
LIFE SPAN	High	Moderate	High
STRENGTH TO WEIGHT RATIO	High	Low	Low
LIFE CYCLE COST	Low	High	High
CHEMICAL RESISTIVITY	High	High	Moderate
EMI / RFI TRANSPARENCY	High	Nil	Nil
INSTALLATION COST	Low	Moderate	Moderate
HANDLING	Very Easy	Difficult	Difficult
ANTI SKID	Available	NA	NA
COLOUR RANGE	Available	NA	NA

# FPC VALUE ADDED PRODUCTS

## ▣ FRP CONVEYOR GUARD



# FPC VALUE ADDED PRODUCTS

## ▣ FRP TRANSFORMER FENCING





# FPC VALUE ADDED PRODUCTS

## ▣ FRP HANDRAIL



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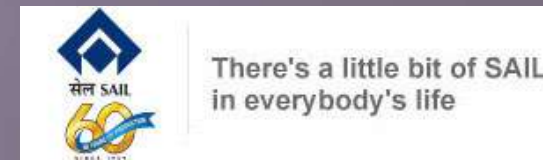
## ▣ FRP GAZIBOO



# FRP LADDER CABLE TRAY



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