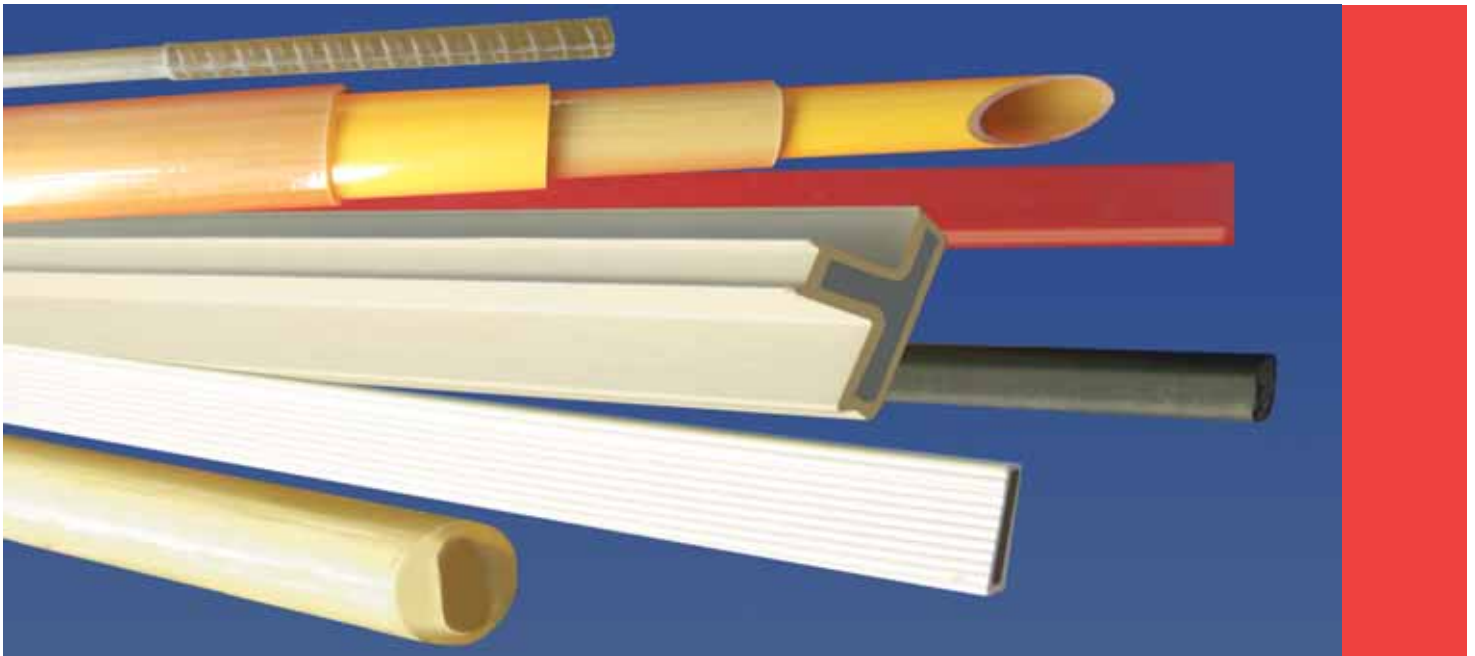


# THERMOPLASTIC PULTRUSION

Fulcrum\* Thermoplastic Composite Products are produced with a proprietary rigid engineering thermoplastic polyurethane matrix. The combination of ductile thermoplastic matrix with high strength continuous fibers results in excellent strength and stiffness combined with superior toughness. The resin offers excellent resistance to a broad range of chemicals, including acids, bases and organic liquids.



- HIGH STRENGTH AND STIFFNESS
- EXCELLENT CORROSION RESISTANCE
- LOW WEIGHT
- THERMOFORMABLE
- HIGH TOUGHNESS
- NON-CONDUCTIVE
- RECYCLABLE
- No VOC EMISSIONS
- LOW THERMAL CONDUCTIVITY
- EASY TO CUT AND FABRICATE

# THREADED PRODUCTS



Fulcrum\* Thermoplastic Composite Threaded Rod Products use a core of continuous fiber composite with a unique patent pending process to form the threads. This combination maximizes the tensile strength, shear strength and torque strength of the component. The rigid engineering thermoplastic polyurethane matrix resin offers excellent resistance to a broad range of chemicals, including acids, bases and organic liquids.

- Low weight
- Non-conductive
- Electromagnetically transparent
- High thread strength
- Low thermal conductivity
- Easy to cut and fabricate

Fulcrum\* threaded rod is available in a range of standard sizes and lengths. The unique process by which Fulcrum\* is manufactured not only enhances the mechanical and chemical properties of the threaded fasteners; it also offers considerably greater design freedom in manufacturing fasteners. The following products are possible by special order:

Bolts

Formed U Bolts

Large diameters&alternative thread forms



Threaded Rod Properties						
UNC Threaded Rod						
	Units	3/8" - 16	1/2" - 13	5/8" - 11	3/4" - 10	1" - 8
Ultimate Tensile Strength <sup>(1)</sup>	lbs (N)	2,000 (8,900)	3,500 (15,600)	6,000 (27,750)	9,000 (40,000)	16,000 (71,000)
Design Strength	lbs (N)	1,500 (6,680)	2,600 (11,700)	4,100 (18,400)	6,700 (30,000)	12,000 (53,000)
Ultimate Torque Strength <sup>(2)</sup>	ft-lbs (Nm)	8 (10.8)	25 (34)	35 (47)	60 (80)	125 (170)
Recommended Torque <sup>(2)</sup>	ft-lbs (Nm)	4 (5.4)	12 (16)	17 (23)	30 (40)	60 (80)
CLTE	in/in/deg F (mm/mm/deg C)	$5.0 \times 10^{-6}$ ( $9.0 \times 10^{-6}$ )	$5.0 \times 10^{-6}$ ( $9.0 \times 10^{-6}$ )	$5.0 \times 10^{-6}$ ( $9.0 \times 10^{-6}$ )	$5.0 \times 10^{-6}$ ( $9.0 \times 10^{-6}$ )	$5.0 \times 10^{-6}$ ( $9.0 \times 10^{-6}$ )
Dielectric Strength	KV/in	400				
Water absorption	Equilibrium @ RT %	0.7	0.7	0.7	0.7	0.7
Max Use Temperature	deg F (deg C)	150 (70)	150 (70)	150 (70)	150 (70)	150 (70)
Weight – Threaded rod	lbs/ft (g/m)	0.07 (105)	0.11 (164)	0.18 (270)	0.27 (403)	0.49 (732)
Weight – Nuts	lbs (g)	0.01 (5)	0.02 (8)	0.05 (23)	0.08 (33)	0.13 (59)
Nut dimensions	Length in (mm) AF in (mm) Flange dia in (mm)	0.75 (19.1) 0.555 (14.1) 0.745 (18.9)	0.855 (21.7) 0.730 (18.5) 1.000 (25.4)	1.220 (31.0) 0.920 (23.4) 1.250 (31.8)	1.590 (40.4) 1.120 (28.4) 1.950 (49.5)	1.750 (44.5) 1.475 (37.5) 2.000 (50.8)
Metric Threaded rod						
	Units	M12 x 1.75	M16 x 2.00	Other sizes can be produced on request. Custom thread forms can be produced on request		
Ultimate Tensile Strength	N (lbs)	8,000 (1,990)	26,750 (6,000)			
Design Strength	N (lbs)	6,670 (1,475)	20,000 (4,500)			
Ultimate Torque Strength <sup>(2)</sup>	Nm (ft-lbs)	18 (13)	47 (35)			
Recommended Torque <sup>(2)</sup>	Nm (ft-lbs)	9 (7)	23 (17)			
CLTE	mm/mm/deg C (in/in/deg F)	$9.0 \times 10^{-6}$ ( $5.0 \times 10^{-6}$ )	$9.0 \times 10^{-6}$ ( $5.0 \times 10^{-6}$ )			
Max Use Temperature	deg C (deg F)	70 (150)	70 (150)			
Weight – Threaded rod	g/m (lbs/ft)	145 (0.10)	270 (0.18)			
Weight – Nuts	g (lbs)	8 (0.02)	23 (0.05)			
Nut dimensions	Length in (mm) AF in (mm) Flange dia in (mm)	21.7 (0.855) 18.5 (0.730) 25.4 (1.000)	31.0 (1.22) 23.4 (0.920) 31.8 (1.250)			

<sup>(1)</sup> Strengths are average values, measured with a single nut with 1/2" of thread protruding beyond the nut.  
<sup>(2)</sup> Torque strengths are measured unlubricated.

Fulcrum\* Thermoplastic Composite Tube and Rod Products are produced with a proprietary rigid engineering thermoplastic polyurethane matrix. The combination of ductile thermoplastic matrix with high strength continuous fibers results in excellent strength and stiffness combined with superior toughness. The resin offers excellent resistance to a broad range of chemicals, including acids, bases and organic liquids.

Fulcrum\* tubes and rods are available to order in a range of standard sizes. Fulcrum\* tubes and rods can be supplied overcoated with a range of thermoplastics offering a wide variety of surface properties, independent of the properties of the composite:

- Colour
- Anti-static
- Soft touch
- Special effects
- Abrasion resistance
- Surface texture
- U/V stability
- Enhanced chemical resistance

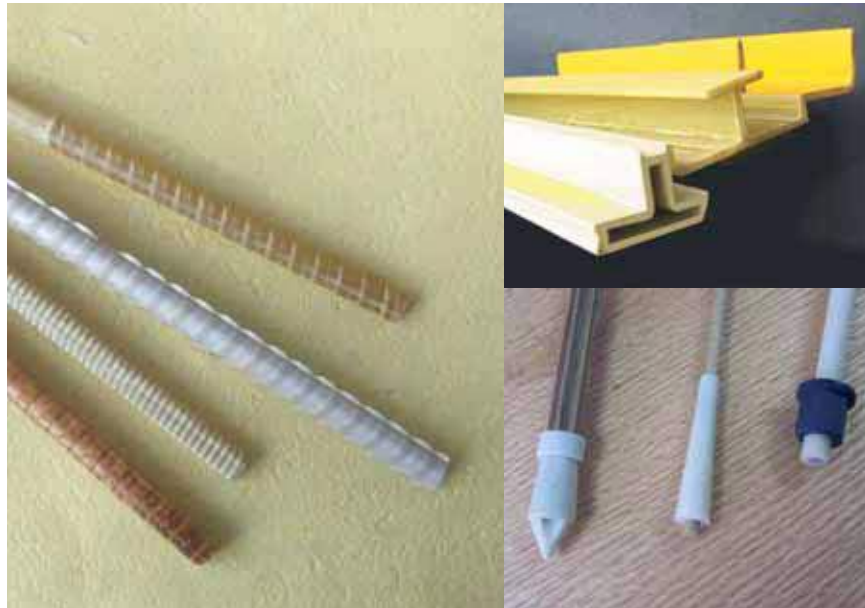


### Typical Properties

Tube and rod properties can be varied based on glass loading and overcoat materials. Typical values are Flexural Modulus 5-6 million psi (34-41 GPa) and 100,000-150,000 psi (700-1000 MPa) Flexural Strength. For more detail see properties Technical Data Sheet.

Threaded rod and tubes are also available as standard products.

Tube and Rod Sizes						
Tube sizes						
Product code	Outside Diameter		Outside Diameter with Over-extrusion		Inside Diameter	
	inches	mm	inches	mm	inches	mm
T46	0.181	4.6	0.197	5.0	0.118	3.0
T50	0.197	5.0	0.215	5.45	0.118	3.0
T76	0.299	7.6	0.315	8.0	0.217	5.5
T96	0.378	9.6	0.394	10.0	0.285	7.5
T104	0.409	10.4	0.433	11.0	0.276	7.0
T124-10	0.488	12.4	0.512	13.0	0.394	10.0
T124-9	0.488	12.4	0.512	13.0	0.354	9.0
T150	0.591	15.0	0.618	15.7	0.472	12.0
T250	0.984	25.0	1.024	26.0	0.866	22.0
T310	1.220	31.0	1.260	32.0	1.102	28.0
T370	1.457	37.0	1.496	38.0	1.339	34.0
T430	1.693	43.0	1.732	44.0	1.575	40.0
Rod sizes						
Product code	Diameter		Diameter with Over-extrusion		Other diameters, wall thicknesses and over-extrusion thicknesses can be produced on request.	
	inches	mm	inches	mm		
R46	0.181	4.6	0.197	5.0		
R50	0.197	5.0	0.215	5.45		
R63	0.250	6.3	NA	NA		
R76	0.299	7.6	0.315	8.0		
R96	0.378	9.6	0.394	10		
R127	0.500	12.7	NA	NA		



Pultruded Fulcrum\* profiles can be manufactured in a wide variety of custom shapes. As with other pultrusion and extrusion processes creation of a new profile requires manufacturing a die. In many instances we are able to use our existing die bases and produce custom inserts for the new profile, thus reducing cost and time to sampling.

The combination of Fulcrum\* with co-extrusion or over-moulding adds an extra dimension of design freedom not available with other types of composite profiles. It allows the surface properties to be decided independent of the composite structure. Co-extrusion allows the insertion of different elements within the structure for example to absorb or dissipate energy. Fulcrum\* profiles can be overmoulded with compatible polymers to create true three dimensional features on a profile without disruption of the fiber architecture.

#### Notes for use.

Fulcrum\* Composites Inc believes the data supplied to be accurate at the time of publication. As with all composite products the performance in the final application is influenced by a number of factors including load, duration, temperature, environment. Further data is available on the effects of these factors however it remains the responsibility of the end user to determine the suitability of these products under end use conditions.

To discuss your requirements for any custom profile please call us.



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