

## CBT<sup>®</sup> 500 Resin in Casting and Composites

The low viscosity of CBT 500 resin is especially suitable in many casting and composite processing techniques. By incorporating high filler and fiber loadings (greater than 70% by weight), significantly greater flexibility in desired part properties can be achieved.

Use of CBT in casting offers the following benefits over conventional polymers:

- Thermally neutral polymerization (<10°C) allows larger castings and up to 50% reduction in cycle time
- VOC's are negligible
- Improved product quality: Good surface appearance and stability, no chipping, fewer rejects, less post polymerization processing

### Highly Filled Casting

CBT 500 is effective in casting with minerals or metals such as calcium carbonate, silicon dioxide, barium sulfate, and aluminum. It produces highly filled or reinforced PBT materials that achieve the following characteristics:

- High heat distortion temperatures
- Low thermal expansion
- High surface hardness and scratch resistance
- Superior machinability compared to epoxy-based syntactic foam
- Excellent surface finish with good edge definition
- High heat distortion temperature

Centrifugal casting and vacuum-assisted casting can be used to create rods, tubes, rollers, discs, and sheets of virtually any size that the equipment can support.

These materials offer great potential for high-volume production of:

- **Cost-effective solid surface products** such as sinks, wash basins, bath and shower accessories, kitchen counter tops, working tables, and floor tiles.
- **Rapid prototyping or short-run production parts.** The engineering plastic properties of PBT permit functional testing of commercial products. CBT resin can be easily cast into silicone-based prototype molds without the need of special casting or prototyping equipment.
- **Producing unfilled PBT resin products** ranging from stock shapes to net shape parts.



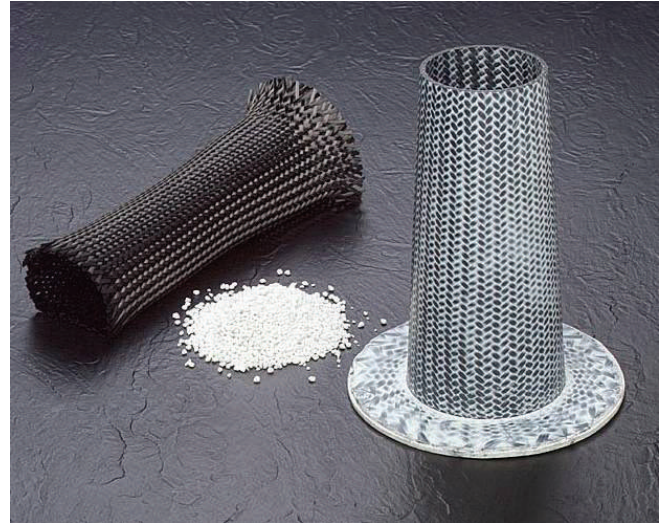
Physical properties of CBT resin cast and polymerized with 67 wt% aluminum powder

Property PBT + 67 wt% aluminum powder	Value Metric (English)	Unit Metric (English)	ASTM Standard
Hardness	87	Shore D	ISO 868
Density	2.01 (125)	g/cm <sup>3</sup> (lb/ft <sup>3</sup> )	ASTM C128
Tensile Strength	39 (5.66 x 10 <sup>4</sup> )	MPa (psi)	D638
Tensile Modulus	9.2 (1.33 x 10 <sup>6</sup> )	GPa (psi)	D638
Elongation at Break	1.0	%	D1708
Compression Strength	110 (1.60 x 10 <sup>4</sup> )	MPa (psi)	D695
Flexural Modulus	3.0 (4.35 x 10 <sup>5</sup> )	GPa (psi)	D790
CTE (23°C—80°C)	67 (37)	10 <sup>-6</sup> /K 10 <sup>-6</sup> /°F	E831
HDT B (1.82 MPa)	214 (417)	°C (°F)	D648

## Resin Transfer Molding

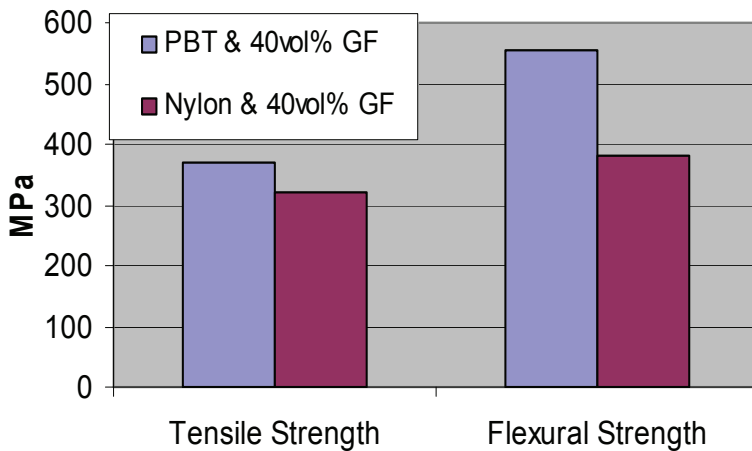
CBT 500 is effective in low pressure or vacuum assisted resin transfer molding (RTM). CBT 500 is compatible with all fiber types that are epoxy sized. CBT 500 offers superior wet out and higher fiber loading with lower void content. These advantages provide better mechanical properties, and enhanced fatigue life.

CBT 500 offers excellent thermoplastic solutions for the impending restrictions on the thermoset market. CBT 500 composites can be used in the automotive, aerospace, wind power, marine and military applications.



Physical properties of CBT resin compared to Valox 315 cast and polymerized

Mechanical properties of glass fiber composites — PBT vs Nylon



Property	CBT Value Metric (Imperial)	Valox 315 Value Metric (Imperial)	Unit Metric (Imperial)	ASTM Standard
Specific Gravity	1.31 (0.047)	1.31 (0.047)	g/cm <sup>3</sup> (lb/in <sup>3</sup> )	D792
Tensile Strength at Yield	55 (7.98 x 10 <sup>3</sup> )	51 (7.40 x 10 <sup>3</sup> )	MPa (psi)	D638
Flexural Strength	101 (1.46 x 10 <sup>4</sup> )	82 (1.19 x 10 <sup>4</sup> )	MPa (psi)	D790
Flexural Modulus	3.0 (4.35 x 10 <sup>5</sup> )	2.34 (3.39 x 10 <sup>5</sup> )	GPa (psi)	D790
CTE (23°C—80°C)	97 (54)	N/A*	10 <sup>-6</sup> /K 10 <sup>-6</sup> /°F	E831
HDT (0.45 MPa)	150 (302)	154 (309)	°C (°F)	D648
HDT (1.82 MPa)	52 (126)	54 (129)	°C (°F)	D648
Linear Shrinkage	3.0	1.0-2.4	%	—

\*Comparable data not available

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