



Long Fiber Reinforced Thermoplastics

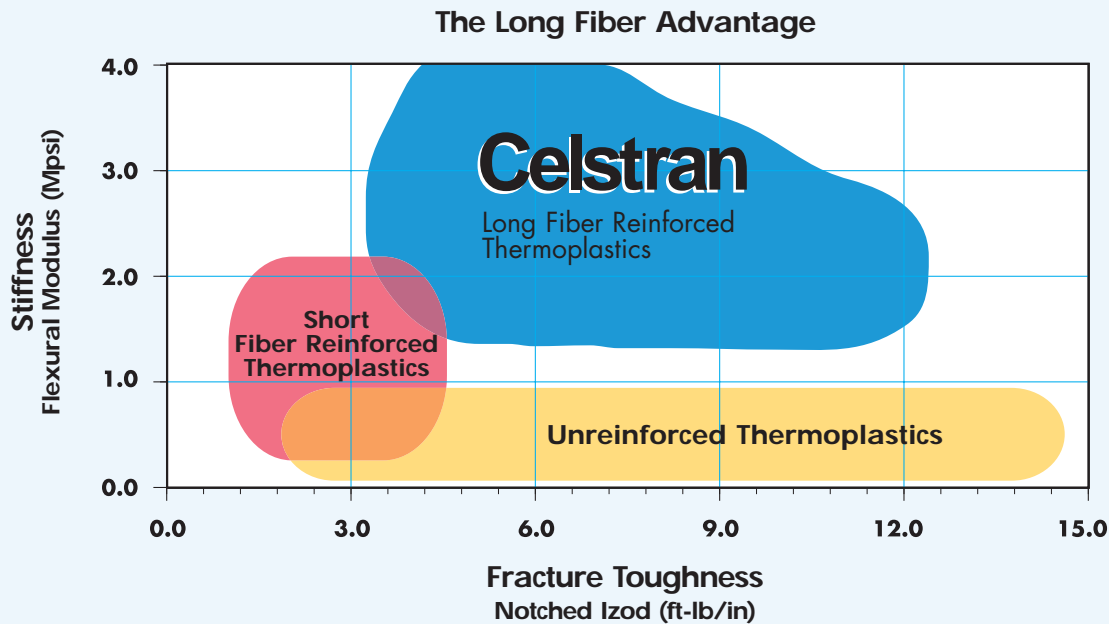
Short Term Properties



Celstran® – The Long Fiber Advantage

- **Stiff & Tough**

Celstran materials provide stiffness and toughness simultaneously – with no trade-offs. Neither short fiber reinforced (SFRT) nor unreinforced thermoplastics can match this performance combination.



- **High Temperature Stiffness**

Celstran LFRT materials retain their modulus (stiffness) at elevated temperatures, extending the operating range of lower cost resins. Celstran LFRT materials outperform many costly, high temperature SFRT and unreinforced materials.

- **Low Temperature Toughness**

Celstran LFRT materials extend the low temperature impact performance (toughness) of molded parts, where SFRT and unreinforced materials fall short.

- **Reduced Creep**

Even under severe loads, Celstran LFRT materials resist deformation and continue to outperform SFRT and unreinforced materials.

- **Improved Dimensional Stability**

Celstran LFRT materials exhibit far less shrinkage than often associated with SFRT and unreinforced materials. The predictable low shrinkage of Celstran LFRT materials allows precise part design to exacting standards.

- **Celstran LFRT Materials as Additives**

Celstran LFRT materials also are used as additives in commodity and recycled resins to increase load capacity, boost part stiffness, and reduce warpage. This has proven to be a particularly successful method in a number of cost-sensitive applications.

Celstran Products and Applications Guide

	ABS	PA6	PAA	*PA66	PA66/6	*PBT	PC	PCABS	PEHD	*PET	*POM	PP	TPU	*PPS
Usage as Fiber Concentrate		X	X	X	X	X	X	X	X	X	X	X		X
UL Listing	HB, VO(SF)	HB, VO(CF)	HB	HB	VO(GF)	HB	HB, VO(SF)	VO		HB	HB	HB	HB	VO
Agency Approvals		FDA										FDA, NSF	NSF	
Wear Resistance				X							X		X	X
Sound Dampening									X			X		
ESD/EMI Shielding	X	X		X		X	X	X	X		X	X	X	X
Moisture Resistance	X		X						X		X	X	X	X
Hydrocarbon Resistance		X	X	X	X	X	X			X	X		X	X
Acid Resistance	X								X			X	X	X
Base Resistance		X	X	X	X				X		X	X	X	X
High Temp. Apps>250°F		X	X	X	X	X				X				X
Low Temp. Apps<0°F	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Glass Fiber	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Aramid Fiber				X							X		X	X
Carbon Fiber		X	X	X								X	X	X
Stainless Steel Fiber	X	X		X		X	X	X	X		X	X	X	X

*Indicates Ticona Base Resins

Please note that the criteria listed may not apply to all grades within the Celstran product families.
For further information call 1-800-833-4882.

Structural



Superior impact strength and stiffness

Fibers

- Long glass fiber
- 20/30/40/50/60 wt% fiber loading

Resins

- | | |
|-------|--------|
| ABS | PA6 |
| PA6/6 | PBT |
| PC | PC/ABS |
| PEHD | PET |
| POM | PP |
| PPS | TPU |

Applications

- Automotive components
- Recreation vehicle components
- Industrial applications
- Small engine housings

Conductive



Perfect for electronic shielding, static dissipation, conductivity

Fibers

- Long stainless steel fiber
- Long carbon fiber
- Long nickel coated graphite fiber

Resins

- | | |
|-------|--------|
| ABS | PA6 |
| PA6/6 | PBT |
| PC | PC/ABS |
| PEHD | PET |
| POM | PP |
| PPS | TPU |

Applications

- Hand held electronic housings
- Electronic media storage cases
- Computer housings
- Radio face bezels

Custom



Special formulations for demanding applications

Fibers/Resins

Various

Enhancements

- Custom colors
- UV protection
- Wear resistance
- Flame retardance (UL)
- Lubricity
- Automotive approvals
- FDA/NSF/DIN standards

Applications

- Bicycle components
- Industrial gears and bearings
- Industrial drilling
- Sporting goods

Structural Thermoplastic Materials

Reinforced with Glass Long Fibers				Tensile			Flexural		Notched	Comp.	DTUL
Product Name	Resin	Fiber %	Specific Gravity	Strength psi x 10 ³	Modulus psi x 10 ⁶	Elong. %	Strength psi x 10 ³	Modulus psi x 10 ⁶	Izod ft-lb/in	Strength psi x 10 ³	°F @ 264 psi
	ASTM Method:		D-472	D-638	D-638	D-638	D-790	D-790	D-256	D-695	D-648
POM-GF40-01	Acetal	40%	1.72	17.6	1.94	1.2	27.4	1.70	6.2	20.4	320
PA6-GF30-01	Nylon 6	30%	1.36	29.5	1.50	2.6	42.1	1.31	4.9	32.2	405
PA6-GF40-01		40%	1.45	34.4	1.95	2.5	49.1	1.71	6.9	37.4	410
PA6-GF50-01		50%	1.56	39.4	2.55	2.2	57.0	2.13	9.3	39.7	415
PA6-GF60-01		60%	1.69	40.0	3.20	1.9	62.2	2.70	9.8	42.8	415
PA66-GF30-02	Nylon 66, Heat Stabilized (1)	30%	1.36	28.1	1.49	2.4	42.1	1.32	5.0	34.2	485
PA66-GF40-02		40%	1.45	36.7	2.06	2.3	52.0	1.78	6.9	42.7	490
PA66-GF50-02		50%	1.56	43.4	2.65	2.2	60.4	2.14	11.5	44.9	500
PA66-GF60-02		60%	1.69	46.1	3.36	1.8	66.9	2.71	12.4	47.4	505
PCABS-GF25-02	PC/ABS, V0	25%	1.36	17.9	1.21	1.8	27.9	1.12	4.1	25.7	225
PCABS-GF40-02		40%	1.50	22.1	1.81	1.4	34.1	1.64	3.5	31.6	235
PEHD-GF60-01	HDPE	60%	1.50	16.4	1.97	1.5	25.8	1.58	7.5	10.3	250
PP-GF30-02	Polypropylene, Chemically Coupled (2)	30%	1.12	15.6	0.93	2.4	22.7	0.88	4.0	14.4	300
PP-GF40-02		40%	1.21	17.0	1.33	1.9	27.0	1.11	5.1	15.9	305
PP-GF50-02		50%	1.33	17.5	1.60	1.4	28.0	1.39	5.6	17.1	310
PPS-GF30-01	Polyphenylene Sulfide	30%	1.52	23.9	1.91	1.3	33.2	1.68	5.9	33.7	490
PPS-GF40-01		40%	1.62	25.5	2.43	1.2	36.0	2.04	6.4	35.6	535
PPS-GF50-01		50%	1.72	25.6	2.93	1.0	38.4	2.51	6.9	33.6	540
TPU-GF30-01	Thermoplastic Polyurethane	30%	1.43	31.3	1.41	2.9	39.4	1.13	8.2	25.7	185
TPU-GF40-01		40%	1.52	33.8	1.75	2.6	46.0	1.45	11.3	30.4	195
TPU-GF50-01		50%	1.63	35.9	2.18	2.1	52.7	1.84	12.4	33.3	205
TPU-GF60-01		60%	1.76	37.5	2.88	1.7	59.1	2.38	15.8	36.9	215

1. Non-heat stabilized grades of nylon-66 (-01 designation) have physical properties similar to the heat stabilized grades of nylon-66 (-02 designation) listed above.

2. Heat stabilized, chemically coupled grades of polypropylene (-03 designation) have physical properties similar to the chemically coupled grades (-02 designation) listed above.

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Conductive Thermoplastic Materials

Reinforced with Stainless Steel Long Fibers				Tensile			Flexural		Notch Izod ft-lb/in	DTUL °F@ 264 psi	Effective Shielding dB @ 1GHz	Volume Resistivity Ohm-cm*	Static Decay sec.
Product Name	Resin	Fiber %	Specific Gravity	Strength psi x 10 ³	Modulus psi x 10 ⁶	Elong. %	Strength psi x 10 ³	Modulus psi x 10 ⁶					
ASTM Method:		D-472	D-638	D-638	D-638	D-790	D-790	D-256	D-648	D-4935	D-257	**	
POM-SF6-02	Polyacetal	6%	1.48	7.0	0.3	5.3	9.3	0.2	1.3	230	84	<0.8	0.1
POM-SF10-02		10%	1.54	9.6	0.5	3.0	13.7	0.4	0.9	230	93	<0.5	0.1
ABS-SF6-01	ABS	6%	1.11	6.9	0.4	2.5	12.1	0.4	1.1	185	53	<0.8	0.1
ABS-SF10-01		10%	1.16	7.1	0.4	2.4	11.8	0.5	1.4	187	75	<0.5	0.1
ABS-SF6-02	ABS, V0	6%	1.28	5.2	0.3	2.6	9.7	0.3	1.4	190	61	<0.8	0.1
ABS-SF10-02		10%	1.32	5.7	0.4	2.5	10.2	0.4	1.5	195	92	<0.5	0.1
PA66-SF6-01	Nylon 66	6%	1.19	11.3	0.5	2.9	18.1	0.5	0.7	170	24	<0.8	0.1
PA66-SF10-01		10%	1.24	11.5	0.6	2.6	18.1	0.5	0.7	175	53	<0.5	0.1
PA66-SF6-02	Nylon 66, Heat Stabilized	6%	1.19	11.3	0.5	2.9	18.1	0.5	0.7	170	24	<0.8	0.1
PA66-SF10-02		10%	1.24	11.5	0.6	2.6	18.1	0.5	0.7	175	53	<0.5	0.1
PC-SF6-01	Polycarbonate	6%	1.26	9.4	0.4	4.7	14.2	0.4	0.8	270	60	<0.8	0.1
PC-SF10-01		10%	1.31	9.8	0.4	4.0	14.0	0.4	1.7	270	90	<0.5	0.1
PC-SF6-02	Polycarbonate, V0	6%	1.26	9.4	0.4	5.1	13.5	0.4	1.3	260	60	<0.8	0.1
PC-SF10-02		10%	1.31	9.9	0.4	4.0	16.2	0.4	1.5	260	90	<0.5	0.1
PCABS-SF6-05	PC/ABS	6%	1.20	8.1	0.4	3.8	13.3	0.4	1.4	230	90	<0.8	0.1
PCABS-SF10-05		10%	1.24	8.7	0.4	3.4	14.5	0.5	1.0	230	93	<0.5	0.1
PCABS-SF10-02	PC/ABS-V0	10%	1.30	8.7	0.4	3.4	14.5	0.5	1.2	195	80	<0.7	0.1
PP-SF6-02	Polypropylene, Chem. Coupled	6%	0.95	4.0	0.2	8.9	6.2	0.2	0.2	125	65	<0.8	0.1
PP-SF10-02		10%	0.99	4.7	0.2	7.9	6.7	0.3	0.4	130	79	<0.5	0.1
TPU-SF6-01	Thermoplastic Polyurethane	6%	1.26	6.9	0.3	4.9	10.4	0.3	2.3	145	82	<0.8	0.1
TPU-SF10-01		10%	1.31	8.3	0.3	4.7	11.1	0.3	1.3	155	95	<0.5	0.1

* Sample contact points were abraded prior to testing.

** Federal Standard 101C, Method 4046, 15% RH, +5 kV.

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Custom Thermoplastic Materials

Long Fiber Reinforced Thermoplastics				Tensile			Flexural		Notched	Comp.	DTUL	
Product Name	Resin	Fiber		Specific Gravity	Strength psi x 10 ³	Modulus psi x 10 ⁶	Elong. %	Strength psi x 10 ³	Modulus psi x 10 ⁶	Izod ft-lb/in	Strength psi x 10 ³	°F @ 264 psi
		Type	%									
POM-AF20-01	Acetal	Aramid	20%	1.42	13.7	0.91	2.4	18.8	0.91	5.6	N/A	320
PA66-AF35-02	Nylon 66		35%	1.22	17.3	1.31	1.6	26.6	1.19	2.7	19.5	475
PPS-AF35-01	PPS		35%	1.35	14.4	1.40	1.3	21.5	1.28	2.4	21.5	500
PA66-CF40-01	Nylon 66	Carbon	40%	1.33	44.5	4.92	1.0	68.8	3.81	4.9	40.6	500
PPS-CF40-01	PPS		40%	1.46	22.9	5.05	0.5	43.1	4.33	3.1	35.2	530
TPU-CF40-01	Polyurethane		40%	1.38	45.2	4.30	1.1	59.3	3.37	6.1	33.6	235

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Any values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. Colorants or other additives may cause significant variations in data values.

Any determination of the suitability of this material for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use.

It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication.

Please consult the nearest Ticona Sales Office, or call the numbers listed above for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process these products.

Celstran® long fiber reinforced thermoplastic is not intended for use in medical or dental implants.

Products Offered by Ticona

Celcon® and **Hostaform®** acetal copolymer (POM)
GUR® ultra-high molecular weight polyethylene
(UHMW-PE)

Celanex® thermoplastic polyester

Impet® thermoplastic polyester

Vandar® thermoplastic polyester alloy

Riteflex® thermoplastic polyester elastomer

Vectra® liquid crystal polymer (LCP)

Celstran®, **Compel®** and **Fiberod®** long fiber
reinforced thermoplastics

Fortron® polyphenylene sulfide (PPS)

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Duracon™ acetal copolymer (POM) and **Duranex™**
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