

Material Properties



| Rods – 3/8" to 12" Diameter 4' 8' 10' Custom Size | | | Engineering Plastics | | | | | | | | | | High Performance Plastics | | | | | | | | | |
|--|-------|------------------------------|----------------------|-------------------------------------|--------------------------------------|------------------|--------------------|----------|----------|---------------|---|----------|--------------------------------|---------------------------|--------------|--|-----------------------|----------|-----------|-------------|----------|--|
| | | | Nylon 6/6 | Nylon 6/6 30% Glass Fiber Filled | Nylon 6/6 MoS ₂ Filled | Acetal-Copolymer | Acetal-Homopolymer | PET | PBT | Polycarbonate | Polycarbonate 20% Glass Fiber Filled | PEEK | PEEK 30% Glass Fiber Filled | PEEK 30% Carbon Filled | PEI - Ultem® | PEI - Ultem® 30% Glass Fiber Filled | Modified PPO - Noryl® | PPS | PFSU | Polysulfone | PVDF | |
| Plates – 3/8" to 5" Thick 2' x 4' 1' x 4' Custom Size | | | | | | | | | | | | | | | | | | | | | | |
| Tubular Bars – Thickness >= 1/2" ID >= 2" OD <= 20" Custom Size | | | | | | | | | | | | | | | | | | | | | | |
| Physical Properties | | | | | | | | | | | | | | | | | | | | | | |
| Specific Gravity | D792 | g/cm3 | 1.14 | 1.34 | 1.16 | 1.41 | 1.42 | 1.34 | 1.31 | 1.2 | 1.35 | 1.32 | 1.5 | 1.4 | 1.27 | 1.51 | 1.08 | 1.35 | 1.29 | 1.24 | 1.78 | |
| Melting Point | D3417 | °F | 500 | 500 | 500 | 335 | 347 | 490 | 430 | 310 | 330 | 630 | 645 | 644 | 460 | 442 | - | 540 | 424 | - | 335 | |
| Continuous Use Temp Limit | - | °F | 220 | 220 | 220 | 180 | 185 | 220 | 220 | 250 | 260 | 480 | 510 | 480 | 340 | 340 | 220 | 425 | 320 | 300 | 280 | |
| Water Absorption/24 Hours | D570 | % | 1.2 | 0.7 | 1.0 | 0.2 | 0.25 | 0.1 | 0.25 | 0.15 | 0.16 | 0.1 | 0.1 | 0.1 | 0.25 | 0.16 | 0.07 | 0.02 | 0.37 | 0.30 | 0.03 | |
| Water Absorption@ saturation | D570 | % | 8.5 | 5.5 | 8.5 | 0.9 | 0.9 | 0.7 | 0.4 | 0.35 | 0.29 | 0.5 | 0.3 | 0.3 | 1.25 | 0.9 | 0.2 | 0.03 | 1.1 | 0.6 | 0.05 | |
| Mechanical Properties | | | | | | | | | | | | | | | | | | | | | | |
| Tensile Strength | D638 | psi (k) | 12 | 23 | 12 | 9.5 | 10 | 11.5 | 8 | 10 | 16 | 14 | 24 | 20 | 15.2 | 24.5 | 9.4 | 13 | 11 | 10.2 | 7 | |
| Tensile Modulus | D638 | psi (k) | 410 | 1,200 | 475 | 400 | 450 | 400 | 250 | 325 | 860 | 500 | 1,300 | 1,100 | 430 | 1,300 | 350 | 480 | 340 | 360 | 250 | |
| Tensile Elongation @ break | D638 | % | 60 | 6 | 50 | 40 | 40 | 50 | 100 | 75 | 5 | 20 | 3 | 5 | 60 | 3 | 30 | 4 to 5 | 60 to 120 | 50 | 100 | |
| Flexural Strength | D790 | psi (k) | 15 | 16 | 17 | 12 | 14 | 15 | 8 | 13 | 19 | 25 | 28 | 25 | 22 | 33 | 13.4 | 21 | 13.2 | 15.4 | 8 | |
| Flexural Modulus | D790 | psi (k) | 401 | 110 | 480 | 400 | 420 | 400 | 290 | 340 | 800 | 550 | 1,350 | 1,350 | 480 | 1,300 | 360 | 580 | 350 | 390 | 290 | |
| Compressive Strength | D695 | psi (k) | 12.5 | 20 | 16 | 15 | 16 | 15 | 10.5 | 12 | 16 | 17 | 26 | 30 | 22 | 30.7 | - | 21 | 14 | 13.9 | 10.5 | |
| Compressive Modulus | D695 | psi (k) | 420 | - | 420 | 400 | 450 | 420 | - | - | - | 500 | - | - | 480 | - | - | - | - | - | - | |
| Rockwell Hardness | D785 | M | M85 | M100 | M85 | M88 | M94 | M95 | M72 | M72 | M91 | M110 | M105 | M102 | M109 | M114 | - | M95 | M80 | M69 | M75 | |
| Rockwell Hardness | D785 | R | R120 | R122 | R115 | R120 | R121 | R120 | - | R118 | R122 | R126 | R126 | R124 | R123 | R127 | R120 | R125 | R120 | R120 | R84 | |
| Izod Impact Notched | D256 | ft.lb/inch | 0.6 | 2.0 | 0.7 | 1.2 | 1.2 | 0.5 | 0.6 | 17 | 2.0 | 1.6 | 1.4 | 1.3 | 1.0 | 1.8 | 0.6 | 0.5 | 13.0 | 1.3 | 3.0 | |
| Hardness, Durometer, Shore D | 2240 | - | D80 | - | D85 | D85 | D86 | D87 | - | D80 | D87 | D85 | D86 | D93 | D86 | 1 | D86 | D80 | D80 | D80 | D77 | |
| Shear Strength | D732 | psi (k) | 10 | - | 10.5 | 8 | 9 | 8 | - | 9 | - | 7.7 | 14 | - | 15 | - | - | 9 | 9 | 9 | - | |
| Coeff of Friction | - | ft.lb/inch | 0.25 | 0.31 | 0.25 | 0.15 | 0.2 | 0.2 | - | 0.38 | 0.22 | 0.4 | - | 0.2 | - | 0.24 | 0.35 | - | - | 0.36 | 0.58 | |
| Coeff of Linear Thermal Expansion | D696 | in/F(1.0E-5) | 4.0 to 4.4 | 1.50 | 4 to 4.4 | 5.40 | 5.50 | 3.30 | 4.0 | 3.80 | 1.50 | 2.60 | 1.20 | 1.10 | 3.1 | 1.1 | 3.3 | 2.90 | 3.10 | 3.10 | 6.60 | |
| Heat Deflection Temp @ 66 psi | D648 | °F | 425 | 500 | 470 | 320 | 330 | 240 | 320 | 295 | 300 | 360 | 500 | - | 410 | 414 | 290 | 400 | 417 | 358 | 270 | |
| Heat Deflection Temp @ 264 psi | D648 | °F | 197 | 485 | 200 | 230 | 270 | 175 | 175 | 270 | 295 | 320 | - | 530 | 392 | 410 | 260 | 225 | 405 | 345 | 230 | |
| Thermal Conductivity | C177 | BTU.in/ft ² .hr.F | 1.7 | 2 | 1.7 | 1.6 | 2.5 | 1.8 | 1.4 | 1.3 | 1.47 | 1.74 | 2.98 | 6.3 | 1.0 | 1.8 | 1.6 | 2.0 | 2.42 | 1.75 | 0.75 | |
| Flammability rating | UL94 | - | V-2 | HB | HB | HB | HB | HB | HB | HB | V-0 | V-1 | V-0 | V-0 | V-0 | V-0 | V-1 | V-0 | V-0 | V-0 | V-0 | |
| Electrical Properties | | | | | | | | | | | | | | | | | | | | | | |
| Dielectric Strength | D149 | volts/mil | - | 350 | 350 | 500 | 500 | 390 | 400 | 380 | 490 | 480 | 500 | 32 | 830 | 770 | 500 | 400 | 370 | 425 | 1600 | |
| Dielectric Constant @ 1 MHz | D150 | - | 3.60 | 3.60 | 3.80 | 3.80 | 3.50 | 3.10 | 3.00 | 3.10 | 3.13 | 3.30 | - | 3.30 | 3.15 | 3.70 | 2.7 | 3.00 | 3.40 | 3.06 | 8.35 | |
| Dissipation Factor @ 1MHz | D150 | - | 0.03 | 0.0016 | 0.02 | 0.005 | 0.0048 | 0.02 | - | 0.006 | 0.009 | 0.003 | - | - | 0.001 | 0.0015 | 0.001 | 0.001 | 0.0002 | 0.005 | 0.06 | |
| Volume Resistivity | D257 | ohm.cm | 1.00E+15 | 1.00E+15 | >1.0E+13 | 1.00E+15 | 1.00E+15 | 1.00E+16 | > 1.0E13 | >1.0E+13 | 1.00E+17 | 1.00E+15 | 1.00E+16 | <1.0E+5 | 1.00E+17 | 3.00E+16 | 1.00E+17 | 4.50E+16 | 1.00E+16 | 5.00E+16 | 2.00E+14 | |
| Compliance | | | | | | | | | | | | | | | | | | | | | | |
| FDA Compliance | - | - | yes | no | no | yes | yes | yes | yes | no | no | yes | no | no | yes | no | no | no | yes | yes | yes | |

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