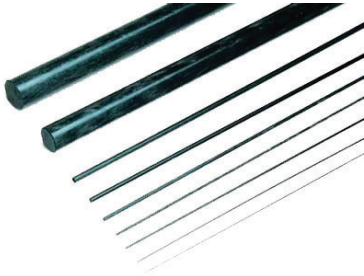


Carbon Fiber Solid Rods - Epoxy(A) 3 Series



Carbon Fiber Solid Rods are manufactured through a process referred to as pultusion. Continuous fibers combined with a resin matrix are pulled through a heated steel forming die. As the carbon fibers are saturated with the resin mixture and then pulled through a round die, the hardening of the resin is initiated by the heat from the die and a rigid, cured structure is formed in the shape and size of the die. The majority of the fibers are running in the 0 degree direction, along the length of the rod to produce an extremely stiff and lightweight with incredible linear strength, due to the orientation of the carbon fibers, and tight outer diameter (OD) tolerances.

Physical Properties

| | | |
|----------------|---|---------------------|
| Diameter | .472" & .625" +/- .005", .750" +/- .008" | Test Method-Caliper |
| Straightness | .080" total indicator runout (TIR) over 24" span | For reference only |
| Color | Natural dark gray to black | No color match |
| Surface Finish | Small scratches, surface defects, or blemishes may be apparent. | Mimimum-Visual |
| Composite Type | 0° unidirectional orientation | For reference only |
| Resin Type | Bisphenol A epoxy 160C | For reference only |
| Fiber Type | 33 to 35 MSI standard modulus carbon fiber | For reference only |
| Fiber Volume | .472" & .625" 60%, .750" 55% | +/- 5% |
| Cuts | Rough abrasive cut both ends, small burrs may be apparent. | Mimimum-Visual |
| Cleaning | Product blown off with dry air, some dust may be apparent. | Mimimum-Visual |

Technical Properties

| | |
|-------------------------|----------------------------|
| Tensile Strength | 250 ksi / 1.72 GPa |
| Tensile Modulus | 20.0 msi / 138 GPa |
| Flexural Strength | 265 ksi / 1.83 GPa |
| Flexural Modulus | 19.0 msi / 131 GPa |
| Ultimate Shear Strength | 6.0 ksi / 41.3 Mpa |
| Ultimate Tensile Strain | 1.50% |
| CTE | -0.1 ppm/cm3 / -0.2 ppm/°C |
| Thermal Properties | 150°F maximum |
| Glass Transition Temp. | 100° C |
| Density | .054 lbs/in3 / 1.5 g/cm3 |

Sample data is measured from a .156" diameter solid rod with standard modulus fibers and Bisphenol Epoxy Vinyl Ester

All the information contained in these properties is believed to be reliable. It is intended for comparison purposes only as each manufactured lot will exhibit variations. The user should evaluate the suitability of each product for their application. We cannot anticipate the variations in all end use and we make no warranties and assume no liability in connection with the use of this information.

Carbon Fiber Solid Rods - Epoxy(F) 3 Series



Carbon Fiber Solid Rods are manufactured through a process referred to as pultursion. Continuous fibers combined with a resin matrix are pulled through a heated steel forming die. As the carbon fibers are saturated with the resin mixture and then pulled through a round die, the hardening of the resin is initiated by the heat from the die and a rigid, cured structure is formed in the shape and size of the die. The majority of the fibers are running in the 0 degree direction, along the length of the rod to produce an extremely stiff and lightweight with incredible linear strength, due to the orientation of the carbon fibers, and tight outer diameter (OD) tolerances.

Physical Properties

| | | |
|----------------|---|---------------------|
| Diameter | .037", .052", .069" +/- .003 | Test Method-Caliper |
| Straightness | Not specified or controlled | For reference only |
| Color | Natural dark gray to black | No color match |
| Surface Finish | Small scratches, surface defects, or blemishes may be apparent. | Mimimum-Visual |
| Composite Type | 0° unidirectional orientation | For reference only |
| Resin Type | Bisphenol F Epoxy 100C | For reference only |
| Fiber Type | 33 to 35 MSI standard modulus carbon fiber | For reference only |
| Fiber Volume | 65% | +/- 5% |
| Cuts | Rough abrasive cut both ends, small burrs may be apparent. | Mimimum-Visual |
| Cleaning | Product blown off with dry air, some dust may be apparent. | Mimimum-Visual |

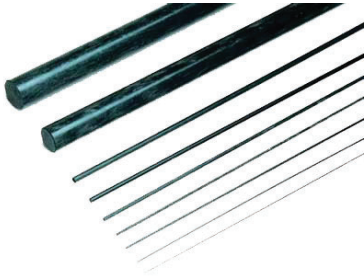
Technical Properties

| | |
|-------------------------|----------------------------|
| Tensile Strength | 250 ksi / 1.72 GPa |
| Tensile Modulus | 20.0 msi / 138 GPa |
| Flexural Strength | 265 ksi / 1.83 GPa |
| Flexural Modulus | 19.0 msi / 131 GPa |
| Ultimate Shear Strength | 6.0 ksi / 41.3 Mpa |
| Ultimate Tensile Strain | 1.50% |
| CTE | -0.1 ppm/cm3 / -0.2 ppm/°C |
| Thermal Properties | 150°F maximum |
| Glass Transition Temp. | 100° C |
| Density | .054 lbs/in3 / 1.5 g/cm3 |

Sample data is measured from a .156" diameter solid rod with standard modulus fibers and Bisphenol Epoxy Vinyl Ester

All the information contained in these properties is believed to be reliable. It is intended for comparison purposes only as each manufactured lot will exhibit variations. The user should evaluate the suitability of each product for their application. We cannot anticipate the variations in all end use and we make no warranties and assume no liability in connection with the use of this information.

Carbon Fiber Solid Rods - Vinyl Ester 5 Series



Carbon Fiber Solid Rods are manufactured through a process referred to as pultusion. Continuous fibers combined with a resin matrix are pulled through a heated steel forming die. As the carbon fibers are saturated with the resin mixture and then pulled through a round die, the hardening of the resin is initiated by the heat from the die and a rigid, cured structure is formed in the shape and size of the die. The majority of the fibers are running in the 0 degree direction, along the length of the rod to produce an extremely stiff and lightweight with incredible linear strength, due to the orientation of the carbon fibers, and tight outer diameter (OD) tolerances.

Physical Properties

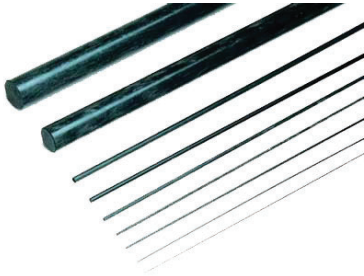
| | | |
|----------------|---|---------------------|
| Diameter | +/- .005" | Test Method-Caliper |
| Straightness | Not specified or controlled | For reference only |
| Color | Natural dark gray to black | No color match |
| Surface Finish | Small scratches, surface defects, or blemishes may be apparent. | Mimimum-Visual |
| Composite Type | 0° unidirectional orientation | For reference only |
| Resin Type | Bisphenol Epoxy Vinyl Ester | For reference only |
| Fiber Type | 33 to 35 MSI standard modulus carbon fiber | For reference only |
| Fiber Volume | 62% | +/- 5% |
| Cuts | Rough abrasive cut both ends, small burrs may be apparent. | Mimimum-Visual |
| Cleaning | Product blown off with dry air, some dust may be apparent. | Mimimum-Visual |

Technical Properties

| | |
|-------------------------|----------------------------|
| Tensile Strength | 250 ksi / 1.72 GPa |
| Tensile Modulus | 20.0 msi / 138 GPa |
| Ultimate Shear Strength | 6.0 ksi / 41.3 Mpa |
| Ultimate Tensile Strain | 1.50% |
| Flexural Strength | 265 ksi / 1.83 GPa |
| Flexural Modulus | 19.0 msi / 131 GPa |
| CTE | -0.1 ppm/cm3 / -0.2 ppm/°C |
| Density | .054 lbs/in3 / 1.5 g/cm3 |
| Glass Transition Temp. | 100° C |
| Thermal Properties | 150°F maximum |

All the information contained in these properties is believed to be reliable. It is intended for comparison purposes only as each manufactured lot will exhibit variations. The user should evaluate the suitability of each product for their application. We cannot anticipate the variations in all end use and we make no warranties and assume no liability in connection with the use of this information.

Carbon Fiber Solid Rods - Epoxy 5 Series



Carbon Fiber Solid Rods are manufactured through a process referred to as pultursion. Continuous fibers combined with a resin matrix are pulled through a heated steel forming die. As the carbon fibers are saturated with the resin mixture and then pulled through a round die, the hardening of the resin is initiated by the heat from the die and a rigid, cured structure is formed in the shape and size of the die. The majority of the fibers are running in the 0 degree direction, along the length of the rod to produce an extremely stiff and lightweight with incredible linear strength, due to the orientation of the carbon fibers, and tight outer diameter (OD) tolerances.

Physical Properties

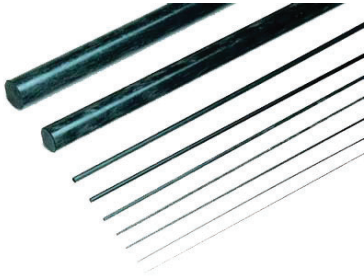
| | | |
|----------------|---|---------------------|
| Diameter | +/- .005" | Test Method-Caliper |
| Straightness | Not specified or controlled | For reference only |
| Color | Natural dark gray to black | No color match |
| Surface Finish | Small scratches, surface defects, or blemishes may be apparent. | Mimimum-Visual |
| Composite Type | 0° unidirectional orientation | For reference only |
| Resin Type | Bisphenol F epoxy | For reference only |
| Fiber Type | 33 to 35 MSI standard modulus carbon fiber | For reference only |
| Fiber Volume | 67% | +/- 5% |
| Cuts | Rough abrasive cut both ends, small burrs may be apparent. | Mimimum-Visual |
| Cleaning | Product blown off with dry air, some dust may be apparent. | Mimimum-Visual |

Technical Properties

| | |
|-------------------------|--------------------|
| Tensile Strength | 320 ksi / 2.34 GPa |
| Tensile Modulus | 19.5 msi / 134 GPa |
| Compressive Strength | 270 ksi / 1.90 GPa |
| Compressive Modulus | 19.0 msi / 131 GPa |
| Ultimate Tensile Strain | 1.30% |
| Glass Transition Temp. | 100° C |
| Thermal Properties | 150°F maximum |

All the information contained in these properties is believed to be reliable. It is intended for comparison purposes only as each manufactured lot will exhibit variations. The user should evaluate the suitability of each product for their application. We cannot anticipate the variations in all end use and we make no warranties and assume no liability in connection with the use of this information.

Carbon Fiber Solid Rods - Epoxy 7 Series



Carbon Fiber Solid Rods are manufactured through a process referred to as pultursion. Continuous fibers combined with a resin matrix are pulled through a heated steel forming die. As the carbon fibers are saturated with the resin mixture and then pulled through a round die, the hardening of the resin is initiated by the heat from the die and a rigid, cured structure is formed in the shape and size of the die. The majority of the fibers are running in the 0 degree direction, along the length of the rod to produce an extremely stiff and lightweight with incredible linear strength, due to the orientation of the carbon fibers, and tight outer diameter (OD) tolerances.

Physical Properties

| | | |
|----------------|---|---------------------|
| Diameter | +/- .010" | Test Method-Caliper |
| Straightness | 0.020" per foot | For reference only |
| Color | Natural dark gray to black | No color match |
| Surface Finish | Small scratches, surface defects, or blemishes may be apparent. | Mimimum-Visual |
| Composite Type | 0° unidirectional orientation | For reference only |
| Resin Type | Epoxy | For reference only |
| Fiber Type | 33 to 35 MSI standard modulus carbon fiber | For reference only |
| Fiber Volume | 55% | +/- 5% |
| Cuts | Rough abrasive cut both ends, small burrs may be apparent. | Mimimum-Visual |
| Cleaning | Product blown off with dry air, some dust may be apparent. | Mimimum-Visual |

Technical Properties

| | |
|-------------------|------------|
| Tensile Strength | >200 kpsi |
| Tensile Modulus | >14.5 Mpsi |
| Flexural Strength | >200 ksi |
| Flexural Modulus | >14.5 Mpsi |
| Specific gravity | 1.5 gm/cc |
| Barcol Hardness | 50-60 |
| Tg (F°) | 250° F |

Sample data is measured from a .250" diameter solid rod.

All the information contained in these properties is believed to be reliable. It is intended for comparison purposes only as each manufactured lot will exhibit variations. The user should evaluate the suitability of each product for their application. We cannot anticipate the variations in all end use and we make no warranties and assume no liability in connection with the use of this information.