

MATERIAL PROPERTIES

SuperStud!TM System with Molded ISOPLAST* Flanged Hex Nuts Metric Version

Note: Available in Imperial Only

Property (coupon values)	ASTM Test	Units	Diameter /Threads per Millimeter				
			9.5 16 UNC	12.7 13 UNC	15.9 11 UNC	19.1 10 UNC	25.4 8 UNC
Ultimate Thread Shear Capacity Using CP Hex Nut ^{1 2 6}		kg	567	1,134	1,769	2,563	3,357
Max. Ultimate Design Tensile Load Using CP Hex Nut ^{1 2 5 6}		kg	454	907	1,415	2,050	2,812
Flexural Strength ^{2 3}	D790	MPa	413	413	413	413	413
Flexural Modulus ^{2 3}	D790	GPa	13.8	13.8	13.8	17.3	19
Compressive Strength (LW) ^{2 3}	D695	MPa	379	379	379	379	414
Ultimate Transverse Shear ^{2 3}	B565	load kg	1,905	3,357	5,262	7,802	12,428
Transverse Shear Yield ^{2 3}		load kg	953	1,497	2,041	3,401	5,670
Dielectric Strength ^{2 3}	D149	kV/mm	1.58	1.58	1.58	1.58	1.58
Water Absorption ²	D570	%	1	1	1	1	1
Coefficient of Thermal Expansion (LW)	D696	10 ⁻⁶ K ⁻¹	9.5	9.5	9.5	9.5	9.5
Torque Strength Using CP Hex Nut Lubricated With SAE 10W30 Motor Oil ^{2 4 5 6}							
	Ultimate	m-Kg	1.1	2.0	4.5	6.9	15.8
	Recommended	m-Kg	0.55	1.1	2.21	3.32	6.91
Stud Weight ³		Kg/m	0.1	0.18	0.31	0.47	0.88
Thickness Hex Nut		mm	19.1	21.7	31.0	40.4	44.5
Diameter of Flange		mm	18.9	25.4	31.8	49.5	50.8

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L W = lengthwise

Notes: 1. The results are average values based on random sampling and testing of production lots. Composite materials are not homogeneous; and therefore, the location of the coupon extraction can cause variances in the coupon results. Creative Pultrusions publishes an average value of random samples from production lots.

¹Applies to single nut only; multiple nuts do not yield corresponding results.

²Ultimate strength values are average obtained in design testing.

³Values are based on unthreaded rod.

⁴Torque results are dependent on several variable factors including the lubricant used, the length of stud between nuts, alignment, washer surfaces, etc. Therefore, if such results of torque tightening are important, it is vital that torque limits be determined experimentally for the exact installation conditions.

⁵Appropriate safety factors must be applied.

⁶Properties apply to Superstud!¹ used with CP Hex Nut.

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Chemical Resistance Molded ISOPLAST* Flanged Hex Nuts

Test Procedures

All tests were conducted by immersing an injection-molded, 0.125-inch thick sample of the chemical. Unless otherwise indicated, the samples were exposed for 28 days at 73°F, then were removed and tested.

Chemical	Change In Weight (%)	Strength at Yield (%)	Elongation at Yield (%)	Modulus
Acetic Acid, 5%	+0.7	90	96	88
Acetic Acid, 20%	+0.7	96	98	-
Acetic Acid, glacial	+5.3	82	106	80
Ammonia, concentrated	+1.0	86	86	97
ANDEROL, 401 Lubricant	-	119	87	-
ASTM Fuel A	+0.2	103	97	-
ASTM Fuel B	+0.2	101	97	-
ASTM Fuel C	+0.2	101	100	-
ASTM #1 Oil	+0.2	111	103	-
ASTM #3 Oil	+0.3	101	102	-
Benzene	+1.4	89	100	93
Calcium Chloride, saturate	+0.4	103	97	-
Carbon Tetrachloride	+0.2	98	98	103
Clorox Bleach	+0.5	93	94	102
Cottonseed Oil	+0.2	106	94	102
Diocetyl Phthalate	+0.2	106	97	-
Ethanol, 50%	+1.0	91	98	92
Ethanol, 95%	+2.5	83	98	84
Ethylene Glycol, 100%	-0.3	103	110	98
Ethylene Glycol, 50%	+0.3	94	100	94
Freon Fluorocarbon	0	105	91	-
Gasoline, high test	+0.1	101	102	-
Heptane	0	102	100	103
Hydrochloric, Acid, 20%	+0.2	96	96	96
Hydrogen Peroxide, 3%	+0.6	92	90	84
Hydrogen Peroxide, 30%	+0.8	90	96	96
Isopropanol	+0.2	100	106	99
Kerosene	-0.1	101	96	104
Magnesium Chloride, saturated	-	128	141	-
Mineral Oil	+0.2	101	98	-
Motor Oil, 10W40	+0.3	101	100	-
Mr. Clean Cleaner	+0.7	93	98	-
Nitric Acid, 40%	+1.1	95	102	94
Perchloroethane	+0.6	102	102	109
Phosphoric Acid, 60%	+0.6	99	100	-
Sodium Chloride, 10%	+0.2	92	92	90
Sodium Hydroxide, 10%	+0.3	94	94	108
Sodium Hydroxide, 20%	+0.6	98	100	-
Sulfuric Acid, 20%	+0.5	97	98	-
Sulfuric Acid, 30%	+0.3	97	93	97
Sulfuric Acid, 70%	-0.1	101	102	100
Toluene	+1.5	97	98	111
Transmission Fluid, Type A	+0.2	101	103	-
Tricresyl Phosphate	0	106	102	-
Triethylamine	-0.2	104	104	104
Water, distilled	+0.6	89	92	106
Water, distilled*	+1.5	106	110	-
Water, sea	+0.8	92	97	-
Zinc Chloride, 50%**	-	106	102	104

*28 days at 158°F.

**21 days at 73°F.

Note: Testing results provided by Craftech® Industries, Hudson, NY