



**NORYL™ Resin N190X**  
**Americas: COMMERCIAL**

PPE+PS blend. Unfilled. Non-brominated, non-chlorinated FR system. UL94 V0/5VA rated. RTI Elec/Imp/Str 95/80/95. Dielectric strength. Suitable for E/E market applications.

TYPICAL PROPERTIES <sup>1</sup>	TYPICAL VALUE	Unit	Standard
<b>MECHANICAL</b>			
Tensile Stress, yld, Type I, 2.0 in/min	8700	psi	ASTM D 638
Tensile Stress, brk, Type I, 2.0 in/min	6800	psi	ASTM D 638
Tensile Strain, yld, Type I, 2.0 in/min	3.6	%	ASTM D 638
Tensile Strain, brk, Type I, 2.0 in/min	9	%	ASTM D 638
Tensile Modulus, 2.0 in/min	374000	psi	ASTM D 638
Flexural Stress, yld, 0.05 in/min, 2 in span	14200	psi	ASTM D 790
Flexural Stress, yld, 0.10 in/min, 4 in span	13200	psi	ASTM D 790
Flexural Modulus, 0.05 in/min, 2 in span	362000	psi	ASTM D 790
Flexural Modulus, 0.10 in/min, 4 in span	333000	psi	ASTM D 790
Hardness, Rockwell R	120	-	ASTM D 785
Taber Abrasion, CS-17, 1 kg	76	mg/1000cy	ASTM D 1044
Tensile Stress, yield, 50 mm/min	58	MPa	ISO 527
Tensile Stress, break, 50 mm/min	50	MPa	ISO 527
Tensile Strain, yield, 50 mm/min	3.2	%	ISO 527
Tensile Strain, break, 50 mm/min	9.2	%	ISO 527
Tensile Modulus, 1 mm/min	2600	MPa	ISO 527
Flexural Stress, yield, 2 mm/min	87	MPa	ISO 178
Flexural Modulus, 2 mm/min	2350	MPa	ISO 178
<b>IMPACT</b>			
Izod Impact, unnotched, 73°F	13.5	ft-lb/in	ASTM D 4812
Izod Impact, notched, 73°F	5.5	ft-lb/in	ASTM D 256
Izod Impact, notched, -22°F	1.8	ft-lb/in	ASTM D 256

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(2) Only typical data for selection purposes. Not to be used for part or tool design.

(3) This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

(4) Internal measurements according to UL standards.

(5) Measurements made from laboratory test coupon. Actual shrinkage may vary outside of range due to differences in processing conditions, equipment, part geometry and tool design. It is recommended that mold shrinkage studies be performed with surrogate or legacy tooling prior to cutting tools for new molded article.

Source GMD, last updated:

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<b>IMPACT</b>			
Instrumented Impact Total Energy, 73°F	442	in-lb	ASTM D 3763
Izod Impact, notched 80*10*4 +23°C	20	kJ/m <sup>2</sup>	ISO 180/1A
Charpy Impact, notched, 23°C	20	kJ/m <sup>2</sup>	ISO 179/2C
<b>THERMAL</b>			
Vicat Softening Temp, Rate B/50	219	°F	ASTM D 1525
HDT, 66 psi, 0.125 in, unannealed	203	°F	ASTM D 648
HDT, 264 psi, 0.125 in, unannealed	172	°F	ASTM D 648
HDT, 264 psi, 0.250 in, unannealed	186	°F	ASTM D 648
CTE, flow, -40°F to 100°F	4.27E-05	1/°F	ASTM E 831
CTE, xflow, -40°F to 100°F	4.5E-05	1/°F	ASTM E 831
Thermal Conductivity	0.24	W/m-°C	ASTM C 177
Vicat Softening Temp, Rate B/120	107	°C	ISO 306
HDT/Bf, 0.45 MPa Flatw 80*10*4 sp=64mm	95	°C	ISO 75/Bf
HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm	82	°C	ISO 75/Af
Relative Temp Index, Elec	95	°C	UL 746B
Relative Temp Index, Mech w/impact	80	°C	UL 746B
Relative Temp Index, Mech w/o impact	95	°C	UL 746B
<b>PHYSICAL</b>			
Specific Gravity	1.13	-	ASTM D 792
Water Absorption, 24 hours @ 73°F	0.08	%	ASTM D 570
Mold Shrinkage, flow, 0.125" (5)	0.5 - 0.7	%	SABIC Method
Melt Flow Rate, 280°C/5.0 kgf	20	g/10 min	ASTM D 1238
Melt Volume Rate, MVR at 280°C/5.0 kg	23	cm <sup>3</sup> /10 min	ISO 1133
<b>ELECTRICAL</b>			
Volume Resistivity	1.8E+16	Ohm-cm	ASTM D 257
Dielectric Strength, in oil, 125 mils	490	V/mil	ASTM D 149

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TYPICAL PROPERTIES <sup>1</sup>	TYPICAL VALUE	Unit	Standard
<b>ELECTRICAL</b>			
Relative Permittivity, 100 Hz	2.74	-	ASTM D 150
Relative Permittivity, 100 kHz	2.6	-	ASTM D 150
Dissipation Factor, 100 Hz	0.013	-	ASTM D 150
Dissipation Factor, 100 kHz	0.0055	-	ASTM D 150
Arc Resistance, Tungsten {PLC}	7	PLC Code	ASTM D 495
Hot Wire Ignition {PLC}	2	PLC Code	UL 746A
High Voltage Arc Track Rate {PLC}	4	PLC Code	UL 746A
High Ampere Arc Ign, surface {PLC}	2	PLC Code	UL 746A
Comparative Tracking Index (UL) {PLC}	1	PLC Code	UL 746A
<b>FLAME CHARACTERISTICS</b>			
UL Recognized, 94HB Flame Class Rating (3)	0.04	in	UL 94
UL Recognized, 94V-0 Flame Class Rating (3)	0.058	in	UL 94
UL Recognized, 94-5VA Rating (3)	0.118	in	UL 94
Oxygen Index (LOI)	39	%	ASTM D 2863
UV-light, water exposure/immersion	F1	-	UL 746C

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PROCESSING PARAMETERS	TYPICAL VALUE	Unit
<b>Injection Molding</b>		
Drying Temperature	170 - 180	°F
Drying Time	3 - 4	hrs
Drying Time (Cumulative)	8	hrs
Maximum Moisture Content	0.02	%
Melt Temperature	480 - 530	°F
Nozzle Temperature	480 - 530	°F
Front - Zone 3 Temperature	460 - 530	°F
Middle - Zone 2 Temperature	440 - 520	°F
Rear - Zone 1 Temperature	420 - 510	°F
Mold Temperature	130 - 170	°F
Back Pressure	50 - 100	psi
Screw Speed	20 - 100	rpm
Shot to Cylinder Size	30 - 70	%
Vent Depth	0.0015 - 0.002	in

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