

# NORYL GTXTM RESIN GTX4610

## **REGION AMERICAS**

#### **DESCRIPTION**

NORYL GTX4610 resin is a 10% glass fiber reinforced alloy of Polyphenylene Ether (PPE) + Polyamide (PA). This high performance injection moldable grade has a UL 5VA flame rating, non-brominated / non-chlorinated FR package, UL746C Outdoor Suitability rating of F1, excellent chemical resistance, high heat resistance, and flow. NORYL GTX4610 resin is an excellent candidate for a wide variety of electrical applications including connectors, sockets, sensors, terminal blocks, and insulator components.

GENERAL INFORMATION	
Features	Flame Retardant, Chemical Resistance, Good Processability, Hydrolytic Stability, Low Warpage, Low Moisture Absorption, Low Specific Gravity, Non halogenated flame retardant, Dimensional stability, High stiffness/Strength, High temperature resistance, No PFAS intentionally added
Fillers	Glass Fiber
Polymer Types	Polyphenylene Ether + PA (PPE+Nylon)
Processing Techniques	Injection Molding
INDUSTRY	SUB INDUSTRY

INDUSTRY	SUB INDUSTRY
Automotive	Automotive Under the Hood
Building and Construction	Building Component
Electrical and Electronics	Electronic Components
Industrial	Electrical

### **TYPICAL PROPERTY VALUES**

Revision 20241015

PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
MECHANICAL (1)			
Tensile Stress, yld, Type I, 5 mm/min	88	MPa	ASTM D638
Tensile Stress, brk, Type I, 5 mm/min	88	MPa	ASTM D638
Tensile Modulus, 5 mm/min	5000	MPa	ASTM D638
Flexural Stress, yld, 1.3 mm/min, 50 mm span	145	MPa	ASTM D790
Flexural Modulus, 1.3 mm/min, 50 mm span	4600	MPa	ASTM D790
Tensile Stress, yield, 5 mm/min	88	MPa	ISO 527
Tensile Stress, break, 5 mm/min	88	MPa	ISO 527
Tensile Strain, yield, 5 mm/min	3	%	ISO 527
Tensile Strain, break, 5 mm/min	3	%	ISO 527
Tensile Modulus, 1 mm/min	5000	MPa	ISO 527
Flexural Stress, yield, 2 mm/min	145	MPa	ISO 178
Flexural Modulus, 2 mm/min	4600	MPa	ISO 178
IMPACT <sup>(1)</sup>			
Izod Impact, notched, 23°C	80	J/m	ASTM D256
Izod Impact, notched, -30°C	65	J/m	ASTM D256
Instrumented Dart Impact Total Energy, 23°C	12	J	ASTM D3763
Izod Impact, notched 80*10*4 +23°C	5	kJ/m²	ISO 180/1A
Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm	5	kJ/m²	ISO 179/1eA

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CHEMISTRY THAT MATTERS



No.				
Wick Softwing Tenny, Rate 8   50         218         "C         ASTM D648           HDT, 0.45 MPS, 3.2 mm, unannealed         220         "C         ASTM D648           CTE, 40°C to 40°C, flow         4.16:05         1/"C         ASTM E831           CTE, 40°C to 40°C, flow         4.16:05         1/"C         B0 11359-2           CTE, 40°C to 40°C, flow         4.16:05         1/"C         B0 11359-2           CTE, 40°C to 40°C, flow         7.46:05         1/"C         B0 11359-2           CTE, 40°C to 40°C, flow         7.46:05         1/"C         B0 11359-2           CTE, 40°C to 40°C, flow         2.28         60         B0 30-8           Most Softening Tenny, Rate 8190         220         "C         B0 30-8           Most Softening Tenny, Rate 8190         224         "C         B0 30-8           MOST SOFT, Both Soft Soft Soft Soft Soft Soft Soft Soft	PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
March   Marc	THERMAL (1)			
CFC, 40°C to 40°C, flow         41605         1/°C         ASTM E831           CFC, 40°C to 40°C, flow         74.0°G         1/°C         ASTM E831           CFC, 40°C to 40°C, flow         41.6°G         1/°C         B0 1389-2           CFC, 40°C to 40°C, flow         74.6°G         1/°C         B0 366           CFC, 40°C to 40°C, flow         220         °C         B0 366           CFC, 40°C to 40°C, flow         220         °C         B0 75.16           CFC, 40°C to 40°C, flow         220         °C         B0 75.16           MCHZ (SAS MPA Flatk 80°10'4 specidium         224         °C         U.7466           Relative Temp Index, Mech w/mpact <sup>(1)</sup> 100         °C         U.7466           Relative Temp Index, Mech w/mpact <sup>(1)</sup> 100         °C         W.7466           Relative Temp Index, Mech w/mpact <sup>(1)</sup> 121         °C         ASTM D792           Mold Shrinkage, 100w, 3.2 mm <sup>(1)</sup> 8.2         9.4         \$MICH Temp Index, Mech w/more Mark More More Mark Mark Mark Mark Mark Mark Mark Mark	Vicat Softening Temp, Rate B/50	218	°C	ASTM D1525
CFC, 40°C to 40°C, 160w         7.40-05         1,°C         ASIM E831           CFC, 40°C to 40°C, 160w         4,1°C5         1,°C         80 11359-2           CFC, 40°C to 40°C, 160w         7.40-05         1,°C         80 1359-2           Vicat Softening Temp, Rate 8,50         218         °C         80 306           Vicat Softening Temp, Rate 8,170         220         °C         80 306           Relative Temp Index, Belegia         140         °C         10.7468           Relative Temp Index, Mech Wijmpact <sup>(1)</sup> 100         °C         0.1748           Relative Temp Index, Mech Wijmpact <sup>(2)</sup> 140         °C         0.1748           Relative Temp Index, Mech Wijmpact <sup>(2)</sup> 180         °C         0.1748           Relative Temp Index, Mech Wijmpact <sup>(2)</sup> 1.21         °C         ASIM D792           Medisture Alley Might Might Michages, 200 × 3.20 mill <sup>(2)</sup> 88.94         %         ASIM D792           Modd Shrinkage, 200 × 3.20 mill <sup>(2)</sup> 88.94         %         ASIM D792           Mech Flow Rate, 300°C (5.0 kg)         18         9(0 mill mill mill mill mill mill mill mil	HDT, 0.45 MPa, 3.2 mm, unannealed	220	°C	ASTM D648
CTE, 40°C to 40°C, flow         41°C 5         17°C         80 11359-2           CTE, 40°C to 40°C, flow         7.4605         17°C         80 11359-2           CTE, 40°C to 40°C, flow         248         17°C         80 1359-2           Vicat Softening Temp, Rate B/120         220         °C         80 306           Vicat Softening Temp, Rate B/120         220         °C         80 306           HOT JR, Los M Mar Jatus 80 1104 spread from         140         °C         UT 468           Relative Temp Index, Mech w/impact <sup>(2)</sup> 100         °C         UT 468           Relative Temp Index, Mech w/impact <sup>(2)</sup> 121         °C         ASI MD 792           Relative Temp Index, Mech w/impact <sup>(2)</sup> 12.1         °C         ASI MD 792           Relative Temp Index, Mech w/impact <sup>(2)</sup> 12.1         °C         ASI MD 792           Mold Shrinkage, vilow, 3.2 mm <sup>(2)</sup> 0.88 - 0.94         %         ASI MD 792           Mold Shrinkage, vilow, 3.2 mm <sup>(2)</sup> 1.81         gl 10 mm         ASI MD 1238           Water Absorption, (23°C) sturted         1.82         gl 10 mm         ASI MD 1238           Water Absorption (23°C) sturted         1.52         6         Cm         SO 62           Melt Volume Rate, MVR at 300°C / 5.	CTE, -40°C to 40°C, flow	4.1E-05	1/°C	ASTM E831
CFE. 40°C to 40°C x lifow         7.46.05         1,°C         50.1359.2           Wick at Softening Temp, Rate B J50         218         °C         50.306           Wick at Softening Temp, Rate B J120         220         °C         50.306           HDT J81, 0.45 MPa Flath 88°10°4 spréAmm         224         °C         U.7468           Relative Temp Index, Blec I°         100         °C         U.7468           Relative Temp Index, Mech w/joinpact (°I)         100         °C         U.7468           Relative Temp Index, Mech w/joinpact (°I)         121         °C         ASIM 10792           Relative Temp Index, Mech w/joinpact (°I)         1.21         °C         ASIM 10792           Relative Temp Index, Mech w/joinpact (°I)         1.21         °C         ASIM 10792           Mold Shrinkage, flow, 3.2 mm (°I)         0.88 - 0.94         %         5MC created           Mold Shrinkage, flow, 3.2 mm (°I)         0.95 - 1.01         %         5MC created           Mold Shrinkage, flow, 3.2 mm (°I)         1.21         %         5MC created           Mold Shrinkage, flow, 3.2 mm (°I)         1.21         %         5MC created           Mold Shrinkage, flow, 3.2 mm (°I)         1.21         %         5MC created           Mold Shrinkage, flow, 3.2 mm (°I)	CTE, -40°C to 40°C, xflow	7.4E-05	1/°C	ASTM E831
Vical Softening Temp, Rate 8 50         218         "C         ISO 306           Vical Softening Temp, Rate 8 170         220         "C         ISO 306           Mort Diff, IG, ASB Mar Take Wo 1704 speakmm         229         "C         ISO 75/19f           Relative Temp Index, Elec (**)         140         "C         U. 7468           Relative Temp Index, Mech w/Impact (**)         100         "C         U. 7468           Relative Temp Index, Mech w/Impact (**)         100         "C         U. 7468           Relative Temp Index, Mech w/Impact (**)         121         "C         ATM 0792           Relative Temp Index, Mech w/Impact (**)         121         "S         ASTM 0792           Will Assert Assert (**)         32         ASTM 0792           Will Assert (**)         45         SS 06 2           Will Assert (**)         45         SS 06 2           Will Assert (**)         45         SS 06 2           Welder (**)         45         SS 06 2 </td <td>CTE, -40°C to 40°C, flow</td> <td>4.1E-05</td> <td>1/°C</td> <td>ISO 11359-2</td>	CTE, -40°C to 40°C, flow	4.1E-05	1/°C	ISO 11359-2
Vical Softening Temp, Rate 8   120         220         °C         ISO 306           HOT 176, OAS MRR Flattw 80°10°10°4 spe-64mm         224         °C         ISO 75   8°           Relative Temp Index, Letc. Plan         140         °C         UL 7468           Relative Temp Index, Mech w/impact. Plan         140         °C         UL 7468           Relative Temp Index, Mech w/o impact. Plan         140         °C         UL 7468           Relative Temp Index, Mech w/o impact. Plan         140         °C         UL 7468           Relative Temp Index, Mech w/o impact. Plan         140         °C         UL 7468           Relative Temp Index, Mech w/o impact. Plan         140         °C         UL 7468           Relative Temp Index, Mech w/o impact. Plan         150         S         ASTM D792           Relative Temp Index, Mech w/o impact. Plan         151         S         ASTM D792           Model Shrinkage, flow, 3.2 mm Plan         152         S         ASIM D792           Model Shrinkage, flow, 3.2 mm Plan         152         S         ASIM D182           Despective Streat, Mate, 300°C/5.0 kg         152         S         M/O         D182           Despective Absorption (23°C/5.0 kg	CTE, -40°C to 40°C, xflow	7.4E-05	1/°C	ISO 11359-2
Red   Red   PC   Red   Red   PC   Red	Vicat Softening Temp, Rate B/50	218	°C	ISO 306
Relative Temp Index, Elect. Plant (Mirror)	Vicat Softening Temp, Rate B/120	220	°C	ISO 306
Relative Temp Index, Mech w/impact (2)         100         °C         U. 7468           Relative Temp Index, Mech w/o impact (2)         140         °C         U. 7468           FWHYSICAL (**)         U. 7468           FWHYSICAL (**)         SATM D792           Mold Shrinkage, flow, 3.2 mm (2)         0.88 – 0.94         %         ASMIC method           Mold Shrinkage, flow, 3.2 mm (2)         0.95 – 1.01         %         ASMIC method           Mold Shrinkage, flow, 3.2 mm (2)         18         g/10 min         ASIM D1238           Melt Flow Rate, 300°C/5.0 kg         18         g/10 min         ASIM D1238           Water Absorption (23°C/saturated)         3.8         %         105 62-1           Melt Volume Rate, WR at 300°C/5.0 kg         1.5         m²/10 min         ASIM D123           Melt Volume Rate, MR at 300°C/5.0 kg         1.5+16         0.cm         ASIM D149           EICETRICAL (**)         V         ASIM D149           University (**)         1.5+16         0.cm         ASIM D149           Comparative Tracking Index (40)         2.2         0.cm         ASIM D149           Comparative Tracking Index (40)         2.2         0.cm         0.cm         0.cm           High Worldage Art Track Rat	HDT/Bf, 0.45 MPa Flatw 80*10*4 sp=64mm	224	°C	ISO 75/Bf
Relative Temp Index, Mech w/jo impact ( <sup>2)</sup> 140         °C         U. 7468           PHYSICAL ( <sup>3)</sup> FRYSICAL ( <sup>3)</sup> Specific Graving         2.1         A STM D792           Mold Shrinkage, flow, 3.2 mm ( <sup>3)</sup> 0.88 – 0.94         \$ SABIC method           Mold Shrinkage, xilow, 3.2 mm ( <sup>3)</sup> 0.95 – 1.01         \$ SABIC method           Molt Shrinkage, xilow, 3.2 mm ( <sup>3)</sup> 18         9 (10 m)         ASTM D1238           Water Absorption, (23°C/ 50 kgf)         12.1         2.0         (20 m)         180 (20 m)           Water Absorption (23°C/ 50 kg H)         0.5         3         0.0         2.0         180 (20 m)           Melt Volume Rate, MVR at 300°C/5.0 kg         1.5 (16 m)         0.0         Mol 70 m)         2.0         1.0         2.0         1.0         2.0         1.0         2.0         1.0         2.0         1.0         2.0         1.0         2.0         1.0         2.0         2.0         1.0         2.0	Relative Temp Index, Elec (2)	140	°C	UL 746B
PRYSICAL (1)         Specific Gravity         1.21         - ASTM D792           Specific Gravity         0.88 - 0.94         %         ASTM COME           Mold Shrinkage, flow, 3.2 mm (1)         0.88 - 0.94         %         SABIC method           Mold Shrinkage, flow, 3.2 mm (1)         0.95 - 1.01         %         SABIC method           Mold Shrinkage, flow, 3.2 mm (1)         1.21         %         SABIC method           Mold Shrinkage, flow, 3.2 mm (1)         1.21         g/m²         ISTM D1238           Density         1.21         g/m²         ISTM D1238           Water Absorption, (23°C/ 50 kgl)         3.8         %         ISTM D1238           Melk Volume Rate, MVR at 300°C/5.0 kg         15         cm²/10 min         ISTM D149           ELECTRICAL (1)         W         ASTM D149         Comparative Tracking Index (1)         ASTM D149           ELECTRICAL (1)         LL+16         Q.cm         ASTM D149           Comparative Tracking Index (UL) {PLC}         2         PLC Code         U. 746A           Comparative Tracking Index (UL) {PLC}         2         PLC Code         U. 746A           Williagh Amp Art Ignition (HMI), PLC 0         3         mm         U. U. 746A           High Amp Art Ignition (HMI), PLC 0         2	Relative Temp Index, Mech w/impact (2)	100	°C	UL 746B
Specific Gravity         1.21	Relative Temp Index, Mech w/o impact (2)	140	°C	UL 746B
Mold Shrinkage, flow, 3.2 mm <sup>(3)</sup> Mold Shrinkage, flow, 3.2 mm <sup>(3)</sup> Mold Shrinkage, xflow, 3.2 mm <sup>(3)</sup> Mold Shrinkage, xflow, 3.2 mm <sup>(3)</sup> Mold Shrinkage, xflow, 3.2 mm <sup>(3)</sup> 18  121  121  121  121  121  121  121	PHYSICAL (1)			
Model Shrinkage, xflow, 3.2 mm <sup>(1)</sup> 0.95 – 1.01         % GABIC method           Melt Flow Race, 300°C/5.0 kgf         18         g/l min         ASTM D1238           Density         1.21         g/cm²         80 183           Watter Absorption (23°C/50 kgf)         1.22         3.8         60 62           Melt Volume Rate, MVR at 300°C/5.0 kg         1.5         60 62           Melt Volume Rate, MVR at 300°C/5.0 kg         1.6±16         0.0m         0.0m         ASTM D257           (1)         Volume Rate, MVR at 300°C/5.0 kg         1.6±16         0.0m         ASTM D19           (1)         Volume Rate, MVR at 300°C/5.0 kg         1.6±16         0.0m         ASTM D19           (1)         Volume Rate, MVR at 300°C/5.0 kg         1.6±16         0.0m         ASTM D19           (1)         Volume Rate, MVR at 300°C/5.0 kg         ASTM D19         ASTM D19           (1)         Volume Rate, MVR at 300°C/5.0 kg         ASTM D19           (1)         MV/mm         ASTM D19           (1)         ASTM D19           (1)         2.4         ASTM D19           (1)         PLC Code         U. 746A           (1) <t< td=""><td>Specific Gravity</td><td>1,21</td><td>-</td><td>ASTM D792</td></t<>	Specific Gravity	1,21	-	ASTM D792
Mel Flow Rate, 300°C/5.0 kgf         18         g/ 10 min         ASTM D1238           Density         1.21         3.8         \$ 150 62-1           Water Absorption, (23°C/saturated)         3.8         \$ 150 62-1           Molisture Absorption (23°C/50 kRH)         15         ∞ m³/10 min         \$ 150 62-1           Melt Volume Rate, MVR at 300°C/5.0 kg         15         ∞ m³/10 min         \$ 15133           ELECTRICAL ***         V         STM D149         STM D257           ELECTRICAL ***         V/mm         ASTM D149           ELECTRICAL ***         M/mm         ASTM D149           Dielectric Strength, in air, 1.6 mm         24.4         M/mm         ASTM D149           Comparative Tracking Index (UJ (PLC)         2         4.2         V         EC 60112           Comparative Tracking Index (UJ (PLC)         2         Mm         U. 746A         M           High Amp Arc Ignition (HAU), PLC 0         2.8         mm         U. 746A         M           Hot-Wire Ignition (HWI), PLC 0         2         2         Code         ASTM D495           LAME CHARACTERISTICS **         L         L         Code         ASTM D495           LU Vellow Card Link 2         E.121562-100033074         2         .         .<	Mold Shrinkage, flow, 3.2 mm <sup>(3)</sup>	0.88 - 0.94	%	SABIC method
Density         1.21         g/cm²         ISO 1183           Water Absorption, (23°C/ soturated)         3.8         %         ISO 62-1           Moisture Absorption (23°C / 50% RH)         0.5         %         ISO 62-1           Melt Volume Rate, MVR at 300°C/5.0 kg         15         cm²/10 min         ISO 1133           ELECTRICAL!           Volume Resistivity         1.8+16         0.cm         ASTM D257           Dielectric Strength, in air, 1.6 mm         23.2         kV/mm         ASTM D149           Dielectric Strength, in oil, 1.6 mm         24.4         kV/mm         ASTM D149           Comparative Tracking Index (UI) (PLC)         2         PLC Code         UL 746A           Comparative Tracking Index (WI) (PLC)         23         mm         UL 746A           High Amp Arc Ignition (HM), PLC 0         23         PLC Code         UL 746A           Hot-Wire Ignition (HM), PLC 0         23         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         2         PLC Code         ASTM D495           FLAME CHARACTERISTICS (2)         UL Yellow Card Link         12         EL Code         ASTM D495           UL Yellow Card Link         12         EL 21562-100033074         7         1	Mold Shrinkage, xflow, 3.2 mm <sup>(3)</sup>	0.95 – 1.01	%	SABIC method
Water Absorption, (23°C / saturated)         3.8         %         ISO 62-1           Moisture Absorption (23°C / 50% RH)         0.5         %         ISO 62           Melt Volume Rate, MVR at 300°C / 5.0 kg         15         cm² / 10 min         ISO 133           ELECTRICAL (*)***           Volume Resistivity         1.E+16         Ω.cm         ASTM D257           Dielectric Strength, in air, 1.6 mm         23.2         W//mm         ASTM D149           Dielectric Strength, in oil, 1.6 mm         24.4         W//mm         ASTM D149           Comparative Tracking Index (UL) (PLC)         2         PLC Code         UL 746A           Comparative Tracking Index (HJ), PLC 0         0.8         mm         UL 746A           Loth Graph Carlot (HMI), PLC 0         23         mm         UL 746A           High Voltage Arc Track Rate (PLC)         2         PLC Code         UL 746A           High Voltage Arc Track Rate (PLC)         2         PLC Code         UL 746A           Lot Viellow Card Link 2         E121562-100033074         *         *           UL Vellow Card Link 2         E121562-100033074         *         *           UL Recognized, 94-Vo Flame Class Rating         2         mm         UL 94           UL	Melt Flow Rate, 300°C/5.0 kgf	18	g/10 min	ASTM D1238
Moisture Absorption (23°C / 50%RH)         0.5         %         ISO 62           Melt Volume Rate, MVR at 300°C/5.0 kg         15         cm³/10 min         ISO 1133           ELECTRICAL.¹¹           Volume Resistivity         1.E+16         0.cm         ASTM D257           Dielectric Strength, in air, 1.6 mm         23.2         MV/mm         ASTM D149           Comparative Tracking Index (IU) (PLC)         2         PLC Code         UL 746A           Comparative Tracking Index (4°)         425         mm         UL 746A           High Amp Arc Ignition (HAI), PLC 0         23         mm         UL 746A           High Voltage Arc Track Rate (PLC)         2         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         2         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         2         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         5         TU PL Code         UL 746A           UL Vellow Card Link         F121562-100033074         -         -           UL Vellow Card Link 2         F121562-100731737         -         -           UL Recognized, 94-V-0 Flame Class Rating         2         mm         UL 94           UL Recognized, 94-V-0 Flame	Density	1.21	g/cm³	ISO 1183
Melt Volume Rate, MVR at 300°C/5.0 kg         15         cm²/10 min         ISO 1133           ELECTRICAL (¹¹)         Volume Resistivity         1.E+16         Ω.cm         ASTM D257           Dielectric Strength, in air, 1.6 mm         23.2         W/mm         ASTM D149           Comparative Tracking Index (UL) (PLC)         2         PLC Code         UL 746A           Comparative Tracking Index ( <sup>41</sup> )         425         V         IEC 60112           High Amp Arc Ignition (HMI), PLC 0         83         mm         UL 746A           Hot-Wire Ignition (HWI), PLC 0         23         mm         UL 746A           High Avoitage Arc Track Rate (PLC)         2         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         6         PLC Code         ASTM D495           FLAME CHARACTERISTICS (²²)         VL         VL         Ye           UL Yellow Card Link         £121562-100033074         -         -           UL Recognized, 94-SVA Flame Class Rating         ≥2         mm         UL 94           UL Recognized, 94-V-1 Flame Class Rating         ≥1.5         mm         UL 94           UL Recognized, 94-V-1 Flame Class Rating         ≥0.8         mm         UL 94           UL Recognized, 94-V-1 Flame Class Rating         ≥0.8 </td <td>Water Absorption, (23°C/saturated)</td> <td>3.8</td> <td>%</td> <td>ISO 62-1</td>	Water Absorption, (23°C/saturated)	3.8	%	ISO 62-1
	Moisture Absorption (23°C / 50% RH)	0.5	%	ISO 62
Volume Resistivity         1.€+16         Q.cm         ASTM D257           Dielectric Strength, in air, 1.6 mm         23.2         kV/mm         ASTM D149           Dielectric Strength, in oil, 1.6 mm         24.4         kV/mm         ASTM D149           Comparative Tracking Index (UL) (PLC)         2         PLC Code         UL 746A           Comparative Tracking Index ( <sup>4)</sup> 425         V         IEC 60112           High Amp Arc Ignition (HMI), PLC 0         8         mm         UL 746A           High Voltage Arc Track Rate (PLC)         2         PLC Code         UL 746A           High Voltage Arc Track Rate (PLC)         2         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         6         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         5         V         STM D495           ELAME CHARACTERISTICS (**)         ************************************	Melt Volume Rate, MVR at 300°C/5.0 kg	15	cm³/10 min	ISO 1133
Dielectric Strength, in air, 1.6 mm         23.2         KV/mm         ASTM D149           Dielectric Strength, in oil, 1.6 mm         24.4         KV/mm         ASTM D149           Comparative Tracking Index (UL) {PLC}         2         PLC Code         UL 746A           Comparative Tracking Index (⁴)         425         V         IEC 60112           High Amp Arc Ignition (HAI), PLC 0         ≥3         mm         UL 746A           High Voltage Arc Track Rate {PLC}         2         PLC Code         UL 746A           High Voltage Arc Track Rate {PLC}         2         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         6         PLC Code         ASTM D495           HAMC TERISTICS (²)         UL 746A         ASTM D495           UL Yellow Card Link         £121562-100033074         -         -           UL Yellow Card Link 2         £121562-1000731737         -         -           UL Recognized, 94V-0 Flame Class Rating         ≥1.5         mm         UL 94           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94           Glow Wire Flammability Index, 1.0 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 2.0 mm         960         °C         IEC 60695-	ELECTRICAL (1)			
Dielectric Strength, in oil, 1.6 mm         24.4         W/mm         ASTM D149           Comparative Tracking Index (UL) (PLC)         2         PLC Code         UL 746A           Comparative Tracking Index ( <sup>41</sup> )         425         V         IEC 60112           High Amp Arc Ignition (HAVI), PLC 0         0.8         mm         UL 746A           Hot-Wire Ignition (HWI), PLC 0         ≥3         mm         UL 746A           High Voltage Arc Track Rate {PLC}         2         PLC Code         UL 746A           Arc Resistance, Tungsten (PLC)         6         PLC Code         ASTM D495           FLAME CHARACTERISTICS ( <sup>2</sup> )         UL Y46D         ASTM D495           UL Yellow Card Link         £121562-100033074         -         -           UL Recognized, 94-5VA Flame Class Rating         ≥2         mm         UL 94           UL Recognized, 94V-0 Flame Class Rating         ≥1.5         mm         UL 94           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 96           Glow Wire Flammability Index, 1.5 mm         800         °C         EC 60	Volume Resistivity	1.E+16	Ω.cm	ASTM D257
Comparative Tracking Index (UL) (PLC) 2 2	Dielectric Strength, in air, 1.6 mm	23.2	kV/mm	ASTM D149
Comparative Tracking Index (4)         425         V         IEC 60112           High Amp Arc Ignition (HAI), PLC 0         0.8         mm         UL 746A           Hot-Wire Ignition (HWI), PLC 0         ≥3         mm         UL 746A           High Voltage Arc Track Rate {PLC}         2         PLC Code         UL 746A           Arc Resistance, Tungsten {PLC}         6         PLC Code         VEX Code         ASTM D495           FLAME CHARACTERISTICS (2)         V         **         **         **           UL Yellow Card Link         £121562-100033074         -         **         **           UL Yellow Card Link 2         £121562-100731737         **         **         **           UL Recognized, 94-5VA Flame Class Rating         ≥2         mm         UL 94         **           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94         **           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94         **           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94         **           UL Willow Wire Flammability Index, 1.0 mm         800         **         **         **         **         **         **         **         **	Dielectric Strength, in oil, 1.6 mm	24.4	kV/mm	ASTM D149
High Amp Arc Ignition (HAI), PLC 0  ≥3  mm UL 746A  High Voltage Arc Track Rate {PLC}  Arc Resistance, Tungsten (PLC)  FLAME CHARACTERISTICS (2)  UL Yellow Card Link  UL Yellow Card Link 2  LI 121562-100033074  E121562-100033074  E121562-100033074  UL Recognized, 94-5VA Flame Class Rating  ≥2  UL Recognized, 94-5VA Flame Class Rating  ≥1.5  UL Recognized, 94V-0 Flame Class Rating  ≥0.8  Mm  UL 94  UL 94  UL Recognized, 94V-1 Flame Class Rating  ≥0.8  Mm  UL 94  UL 9	Comparative Tracking Index (UL) {PLC}	2	PLC Code	UL 746A
Hot-Wire Ignition (HWI), PLC 0  ≥3  mm  UL 746A  LU 1746  LU 1746  LU 174  LU	Comparative Tracking Index (4)	425	V	IEC 60112
High Voltage Arc Track Rate {PLC} 2 PLC Code UL 746A  Arc Resistance, Tungsten {PLC} 6 PLC Code ASTM D495  FLAME CHARACTERISTICS (2)  UL Yellow Card Link E121562-100033074	High Amp Arc Ignition (HAI), PLC 0	0.8	mm	UL 746A
Arc Resistance, Tungsten {PLC} 6 PLC Code ASTM D495  FLAME CHARACTERISTICS (2)  UL Yellow Card Link	Hot-Wire Ignition (HWI), PLC 0	≥3	mm	UL 746A
FLAME CHARACTERISTICS   2	High Voltage Arc Track Rate {PLC}	2	PLC Code	UL 746A
UL Yellow Card Link 2         E121562-100033074         -         -           UL Recognized, 94-5VA Flame Class Rating         ≥2         mm         UL 94           UL Recognized, 94V-0 Flame Class Rating         ≥1.5         mm         UL 94           UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94           Glow Wire Flammability Index, 1.0 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 1.5 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 2.0 mm         960         °C         IEC 60695-2-12           Glow Wire Flammability Index, 3.0 mm         960         °C         IEC 60695-2-12           Glow Wire Ignitability Temperature, 1.0 mm         800         °C         IEC 60695-2-13           Glow Wire Ignitability Temperature, 1.5 mm         800         °C         IEC 60695-2-13	Arc Resistance, Tungsten {PLC}	6	PLC Code	ASTM D495
UL Yellow Card Link 2  UL Recognized, 94-5VA Flame Class Rating  ≥2  mm  UL 94  UL 94  UL Recognized, 94V-0 Flame Class Rating  ≥1.5  mm  UL 94  UL 94  UL 94  UL Recognized, 94V-1 Flame Class Rating  ≥0.8  mm  UL 94  Glow Wire Flammability Index, 1.0 mm  800  °C  IEC 60695-2-12  Glow Wire Flammability Index, 1.5 mm  800  °C  IEC 60695-2-12  Glow Wire Flammability Index, 2.0 mm  960  °C  IEC 60695-2-12  Glow Wire Flammability Index, 3.0 mm  960  °C  IEC 60695-2-12  Glow Wire Ignitability Temperature, 1.0 mm  800  °C  IEC 60695-2-12  Glow Wire Ignitability Temperature, 1.5 mm  800  °C  IEC 60695-2-13	FLAME CHARACTERISTICS (2)			
UL Recognized, 94-5VA Flame Class Rating ≥1.5 mm UL 94  UL Recognized, 94V-0 Flame Class Rating ≥0.8 mm UL 94  UL Recognized, 94V-1 Flame Class Rating ≥0.8 mm UL 94  Glow Wire Flammability Index, 1.0 mm 800 °C IEC 60695-2-12  Glow Wire Flammability Index, 1.5 mm 800 °C IEC 60695-2-12  Glow Wire Flammability Index, 2.0 mm 960 °C IEC 60695-2-12  Glow Wire Flammability Index, 3.0 mm 960 °C IEC 60695-2-12  Glow Wire Flammability Index, 3.0 mm 800 °C IEC 60695-2-12  Glow Wire Ignitability Temperature, 1.0 mm 800 °C IEC 60695-2-13  Glow Wire Ignitability Temperature, 1.5 mm 800 °C IEC 60695-2-13	UL Yellow Card Link	<u>E121562-100033074</u>	-	-
UL Recognized, 94V-0 Flame Class Rating ≥1.5 mm UL 94  UL Recognized, 94V-1 Flame Class Rating ≥0.8 mm UL 94  Glow Wire Flammability Index, 1.0 mm 800 °C IEC 60695-2-12  Glow Wire Flammability Index, 1.5 mm 800 °C IEC 60695-2-12  Glow Wire Flammability Index, 2.0 mm 960 °C IEC 60695-2-12  Glow Wire Flammability Index, 3.0 mm 960 °C IEC 60695-2-12  Glow Wire Ignitability Temperature, 1.0 mm 800 °C IEC 60695-2-13  Glow Wire Ignitability Temperature, 1.5 mm 800 °C IEC 60695-2-13	UL Yellow Card Link 2	E121562-100731737	-	-
UL Recognized, 94V-1 Flame Class Rating         ≥0.8         mm         UL 94           Glow Wire Flammability Index, 1.0 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 1.5 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 2.0 mm         960         °C         IEC 60695-2-12           Glow Wire Flammability Index, 3.0 mm         960         °C         IEC 60695-2-12           Glow Wire Ignitability Temperature, 1.0 mm         800         °C         IEC 60695-2-13           Glow Wire Ignitability Temperature, 1.5 mm         800         °C         IEC 60695-2-13	UL Recognized, 94-5VA Flame Class Rating	≥2	mm	UL 94
Glow Wire Flammability Index, 1.0 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 1.5 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 2.0 mm         960         °C         IEC 60695-2-12           Glow Wire Flammability Index, 3.0 mm         960         °C         IEC 60695-2-12           Glow Wire Ignitability Temperature, 1.0 mm         800         °C         IEC 60695-2-13           Glow Wire Ignitability Temperature, 1.5 mm         800         °C         IEC 60695-2-13	UL Recognized, 94V-0 Flame Class Rating	≥1.5	mm	UL 94
Glow Wire Flammability Index, 1.5 mm         800         °C         IEC 60695-2-12           Glow Wire Flammability Index, 2.0 mm         960         °C         IEC 60695-2-12           Glow Wire Flammability Index, 3.0 mm         960         °C         IEC 60695-2-12           Glow Wire Ignitability Temperature, 1.0 mm         800         °C         IEC 60695-2-13           Glow Wire Ignitability Temperature, 1.5 mm         800         °C         IEC 60695-2-13	UL Recognized, 94V-1 Flame Class Rating	≥0.8	mm	UL 94
Glow Wire Flammability Index, 2.0 mm         960         °C         IEC 60695-2-12           Glow Wire Flammability Index, 3.0 mm         960         °C         IEC 60695-2-12           Glow Wire Ignitability Temperature, 1.0 mm         800         °C         IEC 60695-2-13           Glow Wire Ignitability Temperature, 1.5 mm         800         °C         IEC 60695-2-13	Glow Wire Flammability Index, 1.0 mm	800	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0 mm 960 °C IEC 60695-2-12 Glow Wire Ignitability Temperature, 1.0 mm 800 °C IEC 60695-2-13 Glow Wire Ignitability Temperature, 1.5 mm 800 °C IEC 60695-2-13	Glow Wire Flammability Index, 1.5 mm	800	°C	IEC 60695-2-12
Glow Wire Ignitability Temperature, 1.0 mm 800 °C IEC 60695-2-13 Glow Wire Ignitability Temperature, 1.5 mm 800 °C IEC 60695-2-13	Glow Wire Flammability Index, 2.0 mm	960	°C	IEC 60695-2-12
Glow Wire Ignitability Temperature, 1.5 mm 800 °C IEC 60695-2-13	Glow Wire Flammability Index, 3.0 mm	960	°C	IEC 60695-2-12
	Glow Wire Ignitability Temperature, 1.0 mm	800	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 2.0 mm 800 °C IEC 60695-2-13	Glow Wire Ignitability Temperature, 1.5 mm	800	°C	IEC 60695-2-13
	Glow Wire Ignitability Temperature, 2.0 mm	800	°C	IEC 60695-2-13



PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Glow Wire Ignitability Temperature, 3.0 mm	800	°C	IEC 60695-2-13
UV-light, water exposure/immersion	F1	-	UL 746C
INJECTION MOLDING (5)			
Drying Temperature	95 – 105	°C	
Drying Time	3 – 4	Hrs	
Drying Time (Cumulative)	8	Hrs	
Maximum Moisture Content	0.07	%	
Minimum Moisture Content	0.02	%	
Melt Temperature	280 – 305	°C	
Nozzle Temperature	280 – 305	°C	
Front - Zone 3 Temperature	275 – 305	°C	
Middle - Zone 2 Temperature	270 – 305	°C	
Rear - Zone 1 Temperature	265 – 305	°C	
Mold Temperature	75 – 120	°C	
Back Pressure	0.3 – 1.4	MPa	
Screw Speed	20 – 100	rpm	
Shot to Cylinder Size	30 – 50	%	
Vent Depth	0.013 - 0.038	mm	

- (1) The information stated on Technical Datasheets should be used as indicative only for material selection purposes and not be utilized as specification or used for part or tool design.
- (2) UL Ratings shown on the technical datasheet might not cover the full range of thicknesses, colors and regions. For details, please see the UL Yellow Card.
- (3) 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.
- (4) Value shown here is based on internal measurement.
- (5) Injection Molding parameters are only mentioned as general guidelines. These may not apply or may need adjustment in specific situations such as low shot sizes, large part molding, thin wall molding and gas-assist molding.

#### **ADDITIONAL PRODUCT NOTES**

No PFAS intentionally added: The grade listed in this document does not contain PFAS intentionally added during Seller's manufacturing process and is not expected to contain unintentional PFAS impurities. Each user is responsible for evaluating the presence of unintentional PFAS impurities.

#### **DISCLAIMER**

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