

# NORYL GTXTM RESIN GTX973

## **REGION AMERICAS**

#### **DESCRIPTION**

NORYL GTX973 resin is a conductive, non-reinforced alloy of Polyphenylene Ether (PPE) + Polyamide (PA). This injection moldable grade is optimized to allow for in- or on-line primer-less electrostatic and powder coat painting. NORYL GTX973 resin exhibits high impact resistance and strength and is an excellent candidate for automotive painted applications such as body panels, fenders, and tank flaps.

GENERAL INFORMATION	
Features	Chemical Resistance, Electrically Conductive, Hydrolytic Stability, Low Warpage, Low Shrinkage, Low Moisture Absorption, Low Specific Gravity, Aesthetics/Visual effects, Dimensional stability, High stiffness/Strength, High temperature resistance, Impact resistant, No PFAS intentionally added
Fillers	Conductive agent
Polymer Types	Polyphenylene Ether + PA (PPE+Nylon)
Processing Techniques	Injection Molding

INDUSTRY	SUB INDUSTRY	
Automotive	Automotive Exteriors	

## **TYPICAL PROPERTY VALUES**

Revision 20231109

PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
MECHANICAL (1)			
Tensile Stress, yield, 50 mm/min	64	MPa	ISO 527
Tensile Stress, break, 50 mm/min	56	MPa	ISO 527
Tensile Strain, yield, 50 mm/min	4.8	%	ISO 527
Tensile Strain, break, 50 mm/min	41	%	ISO 527
Tensile Modulus, 1 mm/min	2300	MPa	ISO 527
Flexural Stress, yield, 2 mm/min	99	MPa	ISO 178
Flexural Modulus, 2 mm/min	2380	MPa	ISO 178
Tensile Stress, yld, Type I, 50 mm/min	61	MPa	ASTM D638
Tensile Stress, brk, Type I, 50 mm/min	54	MPa	ASTM D638
Tensile Strain, yld, Type I, 50 mm/min	5	%	ASTM D638
Tensile Strain, brk, Type I, 50 mm/min	37	%	ASTM D638
Tensile Modulus, 50 mm/min	2300	MPa	ASTM D638
Flexural Modulus, 1.3 mm/min, 50 mm span	2230	MPa	ASTM D790
IMPACT (1)			
Izod Impact, notched 80*10*4 +23°C	13	kJ/m²	ISO 180/1A
Izod Impact, unnotched 80*10*4 +23°C	NB	kJ/m²	ISO 180/1U
Izod Impact, notched 80*10*4 -30°C	7	kJ/m²	ISO 180/1A
Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm	14	kJ/m²	ISO 179/1eA
Charpy -30°C, V-notch Edgew 80*10*4 sp=62mm	6	kJ/m²	ISO 179/1eA
Charpy 23°C, Unnotch Edgew 80*10*4 sp=62mm	NB	kJ/m²	ISO 179/1eU
Izod Impact, notched, 23°C	138	J/m	ASTM D256



PROPERTIES         TYPICAL VALUES         UNITS         TEST METHODS           Izad Impact, notched, 23°C         88         Jin         A7M DASS           Instrumented Durt Impact Total Energy, 23°C         90         Jun         A7M DATS           Instrumented Durt Impact Total Energy, 23°C         80         C         60 /5 /pl           HOTJAL, 38 MP Flath 90°10°4 spe-4mm         190         C         60 /5 /pl           HOTJAL, 38 MP Flath 90°10°4 spe-4mm         26         C         60 306           Victa Softening Framp, Rate A/50         26         C         60 306           Victa Softening Framp, Rate A/50         28-60         1/°C         80 306           Victa Softening Framp, Rate A/50         92-60         1/°C         80 11359-2           HOT, 42 MPA, 3.2 mm, unannealed         198         C         A5M MD64           HOT, 7, 3.2 MPA, 3.2 mm, unannealed         199         C         A5M MB31           Victa Softening Tramp, Rate B/50         199         C         A5M MB31           CE, 27°C to 60°C, flow         95-60         1/°C         A5M MB31           CE, 28°C to 60°C, flow         95-60         1/°C         A5M MB31           CE, 28°C to 60°C, flow         95-60         1/°C         A5M MB31 <t< th=""><th></th><th></th><th></th><th></th></t<>				
izod impact, unnotched, 23°C         M3         A510 A763         A510 A763 <th>PROPERTIES</th> <th>TYPICAL VALUES</th> <th>UNITS</th> <th>TEST METHODS</th>	PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Instrumented Data Impact Total Energy, 23°C         50         15         A 50 75 56           THERMAL®         THERMAL®         C         60         50 75 56           HDTJB, Ada Rhaftek 80*10*4 spedama         198         6         60         50 75 56           HDTJB, Ada Mpa Flatek 80*10*4 spedama         198         6         60         50.05           Vical Softening Temp, Rate 4/50         20         6         60         50.03           CHZ 25°C to 60°C, flow         30         70         10°C         50.1359-2           DTD, Ada SMRa, 3, zam, unamealed         189         6         A 51M Del 48           HOT, Ada SMRa, 3, zam, unamealed         199         6         A 51M Del 35           CHZ, 25°C to 60°C, sflow         92.05         17°C         A 51M Ba3           CHZ, 25°C to 60°C, sflow         95.05         17°C         A 51M Ba3           CHZ, 25°C to 60°C, sflow         95.05         17°C         A 51M Ba3           CHZ, 25°C to 60°C, sflow         95.05         17°C         A 51M Ba3           CHZ, 25°C to 60°C, sflow         95.05         17°C         A 51M Ba3           CHZ, 25°C to 60°C, sflow         95.05         17°C         A 51M Ba3           CHZ, 25°C to 60°C, sflow         95.05 <td>Izod Impact, notched, -30°C</td> <td>80</td> <td>J/m</td> <td>ASTM D256</td>	Izod Impact, notched, -30°C	80	J/m	ASTM D256
THERMAL III         INTERIOLAS MAR FLATAK 801104 speAdmm         190         €C         80.75 f/ml           NCAL 5.04 MAR FLATAK 801104 speAdmm         190         €C         80.75 f/ml           NCAL 5.04 Eming Temp, Rate Aj50         245         €C         80.306           NCAL 5.04 Eming Temp, Rate Aj50         92.76 5.00         1/°C         80.306           CE, 23°C 10 60°C, cllow         92.76 5.00         1/°C         80.11359-2           CE, 23°C 10 60°C, cllow         198         °C         AIM 1048-8           NEDT, 1, 28 May, 2, 27 mm, unannesied         199         °C         AIM 1048-8           NET, 1, 28 May, 2, 27 mm, unannesied         199         °C         ASTM 10152-5           CE, 23°C to 60°C, flow         59.605         1/°C         ASTM 831           CE, 23°C to 60°C, flow         95.605         1/°C         ASTM 831           CE, 40°C to 40°C, flow         95.605         1/°C         ASTM 831           CE, 40°C to 40°C, flow         95.605         1/°C         ASTM 831           CE, 40°C to 40°C, flow         95.605         1/°C         ASTM 831           CE, 40°C to 40°C, flow         95.005         1/°C         ASTM 831           CE, 40°C to 40°C, flow         95.005         1/°C         ASTM 831<	Izod Impact, unnotched, 23°C	NB	J/m	ASTM D4812
INDITAL SAMPA FISHAN 80°10'4 spe64mm         196         "C         50.75/AC           NOTAL SAMPA FISHAN 80°10'4 spe64mm         126         "C         50.73/AC           Vicat Softening Temp, Rate 8/50         20         "C         50.306           Vicat Softening Temp, Rate 8/50         20         "C         50.306           CTC_23°C to 60°C, flow         9.80         17°C         80.11399-2           RDT_1, 23°C to 60°C, flow         198         "C         ASTM D648           HDT_1, 15, 24°C to 60°C, flow         198         "C         ASTM D648           HDT_1, 15, 24°C to 60°C, flow         196         "C         ASTM D648           CE_23°C to 60°C, flow         9.80         17°C         ASTM 2018           CE_23°C to 60°C, flow         9.80         17°C         ASTM 831           CE_23°C to 60°C, flow         9.80         17°C         ASTM 831           CE_23°C to 60°C, flow         9.80         17°C         ASTM 831           CE_23°C to 60°C, flow         9.80         18°C         MIN 831           CE_23°C to 60°C, flow         9.80         18°C         18°C           CE_23°C to 60°C, flow         9.80         18°C         18°C           CE_23°C to 60°C, flow         18°C         18	Instrumented Dart Impact Total Energy, 23°C	50	J	ASTM D3763
INDITAL 1.8 MPR Flat W80*10*4 speakman         126         "C         05 78/M           Vicat Softening Temp, Rate AJ50         245         "C         05 306           CITE, 23°C to 60°C, flow         2.260         17°C         05 11359-2           CITE, 23°C to 60°C, flow         9.543         17°C         AST 1059-8           CITE, 23°C to 60°C, flow         136         °C         AST 10648           HDT, 0.45 MPs, 3.2 mm, unannealed         198         °C         AST 10648           Vicat Softening Temp, Rate BJ50         199         °C         AST 10648           Vicat Softening Temp, Rate BJ50         199         °C         AST 10648           CITE, 23°C to 60°C, flow         9.560         17°C         AST 1881           CITE, 23°C to 60°C, flow         9.560         17°C         AST 1881           CITE, 40°C to 40°C, flow         8.540         17°C         AST 1881           CITE, 40°C to 40°C, flow         9.560         10°C         AST 1881           CITE, 40°C to 40°C, flow         2.2         KS 25         KS 26           CITE, 40°C to 40°C, flow         2.0         KS 26         KS 26           Most Strike BJ50         2.2         KS 26         KS 26           Most Strike BJ50         2.	THERMAL (1)			
Vical Softening Temp, Rate AJS0         49         °C         60         60           Vical Softening Temp, Rate BJS0         200         °C         60         60           CE, 23°C to Go°C, How         92-05         1,1°C         60         1359-2           HDT, 1-26 MPA, 32-mm, unamonaled         198         °C         ATM D648           NUTL 1, 82 MPA, 32-mm, unamonaled         199         °C         ATM B048           NUTL 1, 82 MPA, 32-mm, unamonaled         99-0         °C         ATM B048           NUTL 1, 82 MPA, 32-mm, unamonaled         99-0         "C         ATM B048           CE, 23°C to Go°C, How         92-0         11°C         ATM B041           CE, 23°C to Go°C, How         95-0         11°C         ATM B181           CE, 23°C to Go°C, How         95-0         11°C         ATM B181           CE, 24°C to Go°C, How         95-0         10°C         ATM B181           CE, 24°C to Go°C, How         95-0         10°C         ATM B181           CE, 40°C to 40°C, How         95-0         95-0         10°C           CE, 40°C to 40°C, How         95-0         95-0         10°C           CE, 40°C to 40°C, How         50         95-0         10°C           CE, 40°C to 40°C, H	HDT/Bf, 0.45 MPa Flatw 80*10*4 sp=64mm	190	°C	ISO 75/Bf
Victa Softening Temp, Rate 8/50         90.00         1°C         100.00 <td>HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm</td> <td>126</td> <td>°C</td> <td>ISO 75/Af</td>	HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm	126	°C	ISO 75/Af
CTC, 23°C to 60°C, 160w         9.260         1°C         10°L         1	Vicat Softening Temp, Rate A/50	245	°C	ISO 306
CT 23°C to 60°C, vilow         9500         1°C         AST ND 648           HDT 0, 43 MPa, 3.2 mm, unannealed         198         °C         AST ND 648           Vicat Softening Temp, Rate pl50         199         °C         AST ND 1525           CTC, 23°C to 60°C, flow         9.50 G         1°C         AST MESI           CTE, 23°C to 60°C, flow         9.50 G         1°C         AST MESI           CTE, 24°C to 60°C, flow         8.50 G         1°C         AST MESI           CTE, 40°C to 40°C, flow         8.50 G         1°C         AST MESI           CTE, 40°C to 40°C, flow         8.50 G         1°C         AST MESI           CTE, 40°C to 40°C, flow         8.50 G         1°C         AST MESI           CTE, 40°C to 40°C, flow         8.50 G         1°C         AST MESI           CTE, 40°C to 40°C, flow         8.50 G         1°C         AST MESI           CTE, 40°C to 40°C, flow         8.50 G         1°C         8.50 G           Ball Pesu Lot 1, 23°C (24 m)         8.50 G         1°C         8.50 G           Mol Shrinkas Storotton (23°C/50 KH/24 fts)         8.11 G         8.50 G         1.50 G           Mol Shrinkage, flow, 24 hrs <sup>10</sup> 1.9         8.50 G         1.50 G           Mol Shrinkage,	Vicat Softening Temp, Rate B/50	200	°C	ISO 306
HDT, 0.45 MPa, 3.2mm, unanealed         198         °C         ASTM D648           HDT, 1.42 MPa, 3.2mm, unanealed         136         °C         ASTM D152           CHZ, 23°C to 60°C, flow         9.2-05         1°C         ASTM B131           CTE, 23°C to 60°C, flow         5.5-05         1°C         ASTM 831           CTE, 40°C to 40°C, flow         5.5-05         1°C         ASTM 831           CTE, 40°C to 40°C, flow         5.5-05         1°C         ASTM 831           CTE, 40°C to 40°C, flow         5.5-05         1°C         ASTM 831           CTE, 40°C to 40°C, flow         5.5-05         1°C         ASTM 831           Ball Presure Test, 125°C γ-2°C         5.5-05         1°C         ASTM 838           Ball Presure Test, 125°C γ-2°C         5.0         5.0         5.0           Bolisture Assorption, (23°C/50% RH/24ms)         6.1         5.0         5.0           Molisture Assorption, (23°C/50% RH/24ms)         6.1         5.0         5.0           Mol Shrinkage, flow, 24 hrs <sup>10</sup> 1.6         5.0         5.0           Mol Shrinkage, flow, 24 hrs <sup>10</sup> 1.9         5.0         5.0           Mel Volume Rate, MW at 280°C/2.16 kg         2.4         5.0         5.0           Mel Volume Rat	CTE, 23°C to 60°C, flow	9.2E-05	1/°C	ISO 11359-2
HDT. 1.82 MPq.3.2mm, unannealed         136         °C         ASIM DE48           Vicat Sorbering remp, Rate [50         92-65-5         1/°C         ASIM DE33           CTE, 23°C to 60°C, flow         55-65         1/°C         ASIM E831           CTE, 24°C to 40°C, flow         55-65         1/°C         ASIM E831           CTE, 40°C to 40°C, flow         55-65         1/°C         ASIM E831           CTE, 40°C to 40°C, flow         55-65         1/°C         ASIM E831           CTE, 40°C to 40°C, flow         55-65         1/°C         ASIM E831           CTE, 40°C to 40°C, flow         55-65         1/°C         ASIM E831           Ball Pressure Fett, 125°C (+)         50-62         ASIM E831           Ball Pressure Fett, 125°C (+)         50-62         SC           Molt Shrinkage, flow, 24 hrs (125°C)         2.1         \$0.0         SC           Molt Shrinkage, flow, 24 hrs (125°C)         1.6         \$0.0         SC           Mold Shrinkage, flow, 24 hrs (125°C)         1.2         ∞10 min         SC         SC           Mold Shrinkage, flow, 24 hrs (125°C)         1.2         ∞10 min         SC         SC           Mold Shrinkage, flow, 24 hrs (125°C)         2.2         X         X         MIN DE32	CTE, 23°C to 60°C, xflow	9.5E-05	1/°C	ISO 11359-2
Vect Softening Temps, Rate 8750         199         °C         ASIM D1525           CTE, 23°C to 60°C, flow         9,260 S         1,°C         ASTM B81           CTE, 23°C to 60°C, flow         8,560 S         1,°C         ASTM B81           CTE, 40°C to 40°C, flow         8,560 S         1,°C         ASTM B81           CTE, 40°C to 40°C, flow         8,560 S         1,°C         ASTM B81           Ball Pressure Test, 125°C+7.2°C         8585 S         1,°C         ASTM B81           Ball Pressure Test, 125°C+7.2°C         8585 S         9,°C         ASTM B81           Bolt Year Absorption, (23°C/50% RH) [cullibrium)         0.9         9,°C         50.624           Moisture Absorption, (23°C/50% RH) [cullibrium)         0.61         \$         50.624           Mater Absorption, (23°C/50% RH) [cullibrium)         0.81         \$         50.624           Mater Absorption, (23°C/50% RH) [cullibrium)         2.4         \$         50.624           Mater Absorption, (23°C/50% RH) [cullibrium)         1.6         \$         50.924           Mold Shrinkage, flow, 24 hrs <sup>(1)</sup> 4.7         cm.) [cull millibrium]         \$         50.924           Mel Volume Rate, MWR at 280°C/2.16 kg         2.4         cm.) [cull millibrium]         \$         ASTM D570	HDT, 0.45 MPa, 3.2 mm, unannealed	198	°C	ASTM D648
CFC, 23°C to 60°C, flow         9,260 5         1/°C         ASTM E831           CFC, 23°C to 60°C, flow         9,560 5         1/°C         ASTM E831           CFC, 40°C to 40°C, flow         9,605         1/°C         ASTM E831           CFC, 40°C to 40°C, flow         9,605         1/°C         ASTM E831           Ball Pressure Test, 125°C+/-2°C         PMSSS         •         10°C         ASTM E831           Ball Pressure Test, 125°C+/-2°C         MSSS         •         •         C60695-102           PHYSICAL ***         ****         *****         *****         C60695-102           PHYSICAL ***         ****         ****         ****         ****           Moisture Absorption, (23°C/50K RH/Equilibrium)         0.21         \$         \$***         ***         ***         ***         ***         ***         ***         ***         ***         ***         ***         ***         ***         **         ***	HDT, 1.82 MPa, 3.2mm, unannealed	136	°C	ASTM D648
CTE, 43°C to 60°C, sflow         95.850         1/°C         ASTM E831           CTE, 40°C to 40°C, flow         85.05         1/°C         ASTM E831           CTE, 40°C to 40°C, sflow         95.05         1/°C         ASTM E831           CTE, 40°C to 40°C, sflow         2005         1/°C         ASTM E831           Ball Pressure Test, 125°C+/-2°C         95.85         20         100 collection           PHYSICAL***           Ball Pressure Test, 125°C+/-2°C         70         30         50 collection           Both State All Collections of State All Collection	Vicat Softening Temp, Rate B/50	199	°C	ASTM D1525
CFL, 40°C to 40°C, flow         85.69         1°C         ASTM E831           CFL, 40°C to 40°C, flow         9.695         1°C         ASTM E831           Ball Pressure Test, 125°C+, 2°C         9.695         1°C         ASTM E831           PHYSICAL®           Emsity         1.09         g/cm³         S0 183           Moisture Absorption, (23°C/50% RH/Equilibrium)         0.21         %         50 €24           Moisture Absorption, (23°C/50% RH/Equilibrium)         0.81         %         50 €24           Water Absorption, (23°C/50% RH/Equilibrium)         2.40         %         50 €24           Water Absorption, (23°C/50% RH/Equilibrium)         2.40         %         50 €24           Water Absorption, (23°C/24mrde)         2.40         %         50 €24           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.60         %         9         62 €2           Mel Volume Rate, MVR at 280°C/5.0 kg         1.20         %         100 ±3         100 ±3         100 ±3           Specific Gravity         1.09         2.00         3 KTM D570         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3         100 ±3 <t< td=""><td>CTE, 23°C to 60°C, flow</td><td>9.2E-05</td><td>1/°C</td><td>ASTM E831</td></t<>	CTE, 23°C to 60°C, flow	9.2E-05	1/°C	ASTM E831
CFL-40°Ct A10°Ct A10	CTE, 23°C to 60°C, xflow	9.5E-05	1/°C	ASTM E831
Ball Pressure Test, 12°C+ J- 2°C         Mostical Chill         Pressical Chill         Inchession         Jonation	CTE, -40°C to 40°C, flow	8.5E-05	1/°C	ASTM E831
Physical. <sup>(1)</sup> Density         1.09         g/m³         150 1183           Moisture Absorption, (23°C/50% RH/24hrs)         0.21         4         50 62-4           Moisture Absorption, (23°C/50% RH/Equilibrium)         0.61         2         60 62-4           Water Absorption, (23°C/54hrs)         0.61         2         50 62-1           Water Absorption, (23°C/54hrs)         2.24         60         50 62-1           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.69         2         60 92-4           Melt Volume Rate, MVR at 280°C/2.0 kg         1.2         2         70 10 min         50 133           Melt Volume Rate, MVR at 280°C/2.16 kg         1.09         3         50 133         133           Melt Yolume Rate, MVR at 280°C/2.16 kg         1.09         3         50 133         133           Melt Folume Rate, MVR at 280°C/2.16 kg         1.09         3         50 133         133           Muser Absorption, (23°C/54hrs)         1.09         3         50 133         133         133         134         140         140         140         140         140         140         140         140         140         140         140         140         140         140         140         140         140 <th< td=""><td>CTE, -40°C to 40°C, xflow</td><td>9.E-05</td><td>1/°C</td><td>ASTM E831</td></th<>	CTE, -40°C to 40°C, xflow	9.E-05	1/°C	ASTM E831
Density         10.90         g/m²         10.1183           Moisture Absorption, (23°C/50% RH/Equilibrium)         0.61         8         10.624           Water Absorption, (23°C/50% RH/Equilibrium)         0.61         8         10.624           Water Absorption, (23°C/50% RH/Equilibrium)         2.24         8         10.62           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.6         8         10.294           Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup> 1.69         2m/10 min         10.1133           Melt Volume Rate, MVR at 280°C/2.16 kg         4.7         m/10 min         10.1133           Specific Gravity         9.9         4.7         2.0         ASTM D792           Water Absorption, (23°C/54trated)         1.60         9.0         ASTM D957           Water Absorption, (23°C/54trated)         1.60         9.0         ASTM D957           Water Absorption, (23°C/54trated)         1.60         9.0         ASTM D957           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.60         9.0         ASTM D955           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.61         1.61         ASTM D955           Melt Flow Rate, 280°C/2.16 kgf         1.62         1.61         ASTM D133           Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 1.62 <td>Ball Pressure Test, 125°C +/- 2°C</td> <td>PASSES</td> <td>-</td> <td>IEC 60695-10-2</td>	Ball Pressure Test, 125°C +/- 2°C	PASSES	-	IEC 60695-10-2
Moisture Absorption, (23°C/50% RH/Equilibrium)         0.21         %         ISO 62-4           Moisture Absorption, (23°C/50% RH/Equilibrium)         0.61         %         ISO 62-4           Water Absorption, (23°C/24hrs)         0.81         %         ISO 62-1           Water Absorption, (23°C/24hrs)         2.24         %         ISO 62-1           Mold Shrinkage, filow, 24 hrs <sup>(2)</sup> 1.6         %         ISO 294           Mold Shrinkage, filow, 24 hrs <sup>(2)</sup> 1.2         cm³/10 min         ISO 133           Melt Volume Rate, MVR at 280°C/5.0 kg         1.2         cm³/10 min         ISO 1133           Specific Gravity         1.09         -         ASTM D792           Water Absorption, (23°C/24hrs)         0.81         %         ASTM D792           Water Absorption, (23°C/24hrs)         1.09         3         ASTM D792           Water Absorption, (23°C/24hrs)         2.24         %         ASTM D792           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.60         %         ASTM D795           Melt Flow Rate, 280°C/5.0 kgf         20         gl on in         ASTM D1238           Melt Flow Rate, 280°C/5.0 kgf         1.4-1.7         %         ASTM D1238           Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 1.2-1.5         %<	PHYSICAL (1)			
Moisture Absorption, (23°C/50% RH/Equilibrium)         0.61         %         150 62-1           Water Absorption, (23°C/24hrs)         0.81         %         150 62-1           Water Absorption, (23°C/saturated)         2.24         %         150 62-1           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.69         %         50 294           Melt Volume Rate, MVR at 280°C/2.0 kg         12         cm³/10 min         150 1133           Melt Volume Rate, MVR at 280°C/2.16 kg         4.7         cm³/10 min         150 1133           Water Absorption, (23°C/24hrs)         0.81         %         ASTM D570           Water Absorption, (23°C/24hrs)         1.69         %         ASTM D570           Water Absorption, (23°C/24hrs)         1.69         %         ASTM D570           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.29         1.29         1.20         Mol min         ASTM D570         Mol m	Density	1.09	g/cm³	ISO 1183
Water Absorption, (23°C/24hrs)         0.81         % 0.62-1           Water Absorption, (23°C/saturated)         2.24         % 0.62-1           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.6         % 0.92-4           Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup> 1.69         % 0.93-10 min         50.294           Melt Volume Rate, MVR at 280°C/5.0 kg         12         cm³/10 min         50.1133           Melt Volume Rate, MVR at 280°C/5.0 kg         4.7         cm³/10 min         50.1133           Specific Gravity         1.09         3.7         ASTM D709           Water Absorption, (23°C/24hrs)         8.81         \$ 35TM D570           Water Absorption, (23°C/54hrs)         2.44         \$ 35TM D570           Water Absorption, (23°C/54hrs)         1.60         \$ 35TM D570           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.69         \$ 35TM D570           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 2.2         1.69         \$ 10 min         ASTM D570           Melt Flow Rate, 280°C/5.0 kgf         3.2         1.69         \$ 10 min         ASTM D1238           Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 1.2 min	Moisture Absorption, (23°C/50% RH/24hrs)	0.21	%	ISO 62-4
Water Absorption, (23°C/saturated)         2.44         %         ISO 62-1           Mold Shrinkage, flow, 24 hrs (2)         1.69         %         ISO 294           Mold Shrinkage, xflow, 24 hrs (2)         1.69         cm²/l O min         ISO 294           Melt Volume Rate, MVR at 280°C/5.0 kg         1.2         cm²/l O min         ISO 1133           Specific Gravity         1.09         - m²/l O min         ISO 1133           Water Absorption, (23°C/Saturated)         2.24         %         ASTM D570           Water Absorption, (23°C/Saturated)         1.60         %         ASTM D570           Mold Shrinkage, flow, 24 hrs (2)         1.60         %         ASTM D570           Mold Shrinkage, xflow, 24 hrs (2)         1.69         %         ASTM D570           Mold Shrinkage, xflow, 24 hrs (2)         1.69         %         ASTM D570           Melt Flow Rate, 280°C/5.0 kgf         2.2         9/10 min         ASTM D1238           Mold Shrinkage, xflow, 3.2 mm (2)         1.4-1.7         %         ASIM D1238           Mold Shrinkage, xflow, 3.2 mm (2)         1.2-1.5         %         ASIM DETAIL           Mold Shrinkage, xflow, 3.2 mm (2)         1.2-1.5         %         ASIM DETAIL           Volume Resistivity         1.69         2.2 </td <td>Moisture Absorption, (23°C/50% RH/Equilibrium)</td> <td>0.61</td> <td>%</td> <td>ISO 62-4</td>	Moisture Absorption, (23°C/50% RH/Equilibrium)	0.61	%	ISO 62-4
Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.69         \$ 10.99         \$ 10.99         \$ 10.90 <t< td=""><td>Water Absorption, (23°C/24hrs)</td><td>0.81</td><td>%</td><td>ISO 62-1</td></t<>	Water Absorption, (23°C/24hrs)	0.81	%	ISO 62-1
Mold Shrinkage, xflow, 24 hrs (2)1.69%150 294Melt Volume Rate, MVR at 280°C/5.0 kg12cm³/10 min150 1133Melt Volume Rate, MVR at 280°C/2.16 kg4.7cm³/10 min150 1133Specific Gravity1.09-ASTM D792Water Absorption, (23°C/24hrs)0.81%ASTM D570Water Absorption, (23°C/Saturated)2.24%ASTM D570Mold Shrinkage, flow, 24 hrs (2)1.60%ASTM D955Mold Shrinkage, xflow, 24 hrs (2)1.69%ASTM D955Melt Flow Rate, 280°C/5.0 kgf20y/10 minASTM D1238Mold Shrinkage, flow, 3.2 mm (2)1.4-1.7%ASIM D1238Mold Shrinkage, flow, 3.2 mm (2)1.4-1.7%ASIM D1238Mold Shrinkage, xflow, 3.2 mm (2)1.2-1.5%ASIM D1238Mold Shrinkage, xflow, 3.2 mm (2)1.2-1.5%ASIM D1238ELECTRICAL (1)2.2-1.5%ASIM D1238NIECTION MOLDING (3)*ASIM D1238Dying Temperature100-120C*Dying Temperature2-3HrsMaximum Moisture Content90-7%Melt Temperature200-320%	Water Absorption, (23°C/saturated)	2.24	%	ISO 62-1
Melt Volume Rate, MVR at 280°C/5.0 kg12cm³/10 minISO 1133Melt Volume Rate, MVR at 280°C/2.16 kg4.7cm³/10 minISO 1133Specific Gravity1.09-ASTM D792Water Absorption, (23°C/24hrs)0.81%ASTM D570Water Absorption, (23°C/Saturated)2.24%ASTM D570Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.60%ASTM D955Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup> 1.69%ASTM D955Melt Flow Rate, 280°C/5.0 kgf20g/10 minASTM D1238Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 1.4-1.7%ASTM D1238Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 1.2-1.5%ASIM CmethodMold Shrinkage, xflow, 3.2 mm <sup>(2)</sup> 1.2-1.5%ASIM CmethodELECTRICAL <sup>(1)</sup> 2.0cmASIM CmethodVolume Resistivity1.6-9.3 - 1.6+040.cmASIM CmethodINJECTION MOLDING <sup>(3)</sup> 2.5ASIG CmethodDrying Temperature1.00-120°CDrying Temperature2.3HrsMaximum Moisture Content0.07%Melt Temperature2.00-320°C	Mold Shrinkage, flow, 24 hrs <sup>(2)</sup>	1.6	%	ISO 294
Melt Volume Rate, MVR at 280°C/2.16 kg4.7cm³/10 minISO 133Specific Gravity1.09-ASTM D792Water Absorption, (23°C/24hrs)0.81%ASTM D570Water Absorption, (23°C/Saturated)2.24%ASTM D570Mold Shrinkage, flow, 24 hrs (2)1.60%ASTM D955Mold Shrinkage, xflow, 24 hrs (2)1.69%ASTM D955Melt Flow Rate, 280°C/5.0 kgf20g/10 minASTM D1238Melt Flow Rate, 280°C/2.16 kgf3.2g/10 minASTM D1238Mold Shrinkage, flow, 3.2 mm (2)1.4 - 1.7%ASIM D1238Mold Shrinkage, xflow, 3.2 mm (2)1.2 - 1.5%ASIM D1238BLECTRICAL (1)LEUTRICAL (2)XASIM D1238INJECTION MOLDING (3)XASIM D123Tyring Temperature100 - 120CDrying Time2 - 3HrsMaximum Moisture Content0.07%Melt Temperature200 - 320C	Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup>	1.69	%	ISO 294
Specific Gravity1.09-ASTM D792Water Absorption, (23°C/24hrs)0.81%ASTM D570Water Absorption, (23°C/Saturated)2.24%ASTM D570Mold Shrinkage, flow, 24 hrs (2)1.60%ASTM D955Mold Shrinkage, xflow, 24 hrs (2)1.69%ASTM D955Melt Flow Rate, 280°C/5.0 kgf20g/10 minASTM D1238Melt Flow Rate, 280°C/2.16 kgf3.2g/10 minASTM D1238Mold Shrinkage, flow, 3.2 mm (2)1.4 - 1.7%SABIC methodMold Shrinkage, xflow, 3.2 mm (2)1.2 - 1.5%SABIC methodELECTRICAL (1)2.0 cmSABIC methodINJECTION MOLDING (3)INJECTION MOLDING (3)Prying Temperature100 - 120°CDrying Time2 - 3HISMaximum Moisture Content0.07%Melt Temperature200 - 320°C	Melt Volume Rate, MVR at 280°C/5.0 kg	12	cm³/10 min	ISO 1133
Water Absorption, (23°C/24hrs)         0.81         %         ASTM D570           Water Absorption, (23°C/24hrs)         2.24         %         ASTM D570           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.60         %         ASTM D955           Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup> 1.69         %         ASTM D955           Melt Flow Rate, 280°C/5.0 kgf         20         g/10 min         ASTM D1238           Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 3.2         g/10 min         ASTM D1238           Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 1.4 − 1.7         %         ASBIC method           Mold Shrinkage, xflow, 3.2 mm <sup>(2)</sup> 1.2 − 1.5         %         ASBIC method           ELECTRICAL <sup>(1)</sup> 2. − 1.5         %         ASBIC method           INJECTION MOLDING <sup>(3)</sup> Cm         ASBIC method           Drying Temperature         100 − 120         °C           Drying Time         2 − 3         Hris           Maximum Moisture Content         200 − 320         °C	Melt Volume Rate, MVR at 280°C/2.16 kg	4.7	cm³/10 min	ISO 1133
Water Absorption, (23°C/Saturated)         2.24         %         ASTM D570           Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> 1.60         %         ASTM D955           Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup> 1.69         %         ASTM D955           Melt Flow Rate, 280°C/5.0 kgf         20         g/10 min         ASTM D1238           Melt Flow Rate, 280°C/2.16 kgf         3.2         g/10 min         ASTM D1238           Mold Shrinkage, xflow, 3.2 mm <sup>(2)</sup> 1.4 – 1.7         %         SABIC method           Mold Shrinkage, xflow, 3.2 mm <sup>(2)</sup> 1.2 – 1.5         %         SABIC method           ELECTRICAL <sup>(1)</sup> SABIC method           INJECTION MOLDING <sup>(3)</sup> Drying Temperature         100 – 120         °C            Drying Time         2 – 3         Hrs            Maximum Moisture Content         0.07         %            Melt Temperature         290 – 320         °C	Specific Gravity	1.09	-	ASTM D792
Mold Shrinkage, flow, 24 hrs <sup>(2)</sup> Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup> Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup> Melt Flow Rate, 280°C/5.0 kgf  Melt Flow Rate, 280°C/5.0 kgf  Melt Flow Rate, 280°C/2.16 kgf  Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> Mold Shrinkage, xflow, 3.2 mm <sup>(2)</sup>	Water Absorption, (23°C/24hrs)	0.81	%	ASTM D570
Mold Shrinkage, xflow, 24 hrs (²)1.69%ASTM D955Melt Flow Rate, 280°C/5.0 kgf20g/10 minASTM D1238Melt Flow Rate, 280°C/2.16 kgf3.2g/10 minASTM D1238Mold Shrinkage, flow, 3.2 mm (²)1.4 - 1.7%ABIC methodMold Shrinkage, xflow, 3.2 mm (²)1.2 - 1.5%ABIC methodVolume Resistivity1.6+03 - 1.6+04\(\Delta\).ABIC methodDrying Temperature100 - 120\(\Cappa\).ABIC methodDrying Time2-3HrsMaximum Moisture Content0.07%Melt Temperature90 - 320\(\Cappa\).\(\Cappa\).	Water Absorption, (23°C/Saturated)	2.24	%	ASTM D570
Melt Flow Rate, 280°C/5.0 kgf20g/10 minASTM D1238Melt Flow Rate, 280°C/2.16 kgf3.2g/10 minASTM D1238Mold Shrinkage, flow, 3.2 mm (2)1.4 – 1.7%SABIC methodMold Shrinkage, xflow, 3.2 mm (2)1.2 – 1.5%SABIC methodELECTRICAL (1)Volume Resistivity1.E+03 – 1.E+040.cmSABIC methodINJECTION MOLDING (3)CDrying Temperature100 – 120°CDrying Time2 – 3HrsMaximum Moisture Content0.07%Melt Temperature290 – 320°C	Mold Shrinkage, flow, 24 hrs <sup>(2)</sup>	1.60	%	ASTM D955
Melt Flow Rate, 280°C/2.16 kgf3.2g/10 minASTM D1238Mold Shrinkage, flow, 3.2 mm (2)1.4 – 1.7%SABIC methodMold Shrinkage, xflow, 3.2 mm (2)1.2 – 1.5%SABIC methodELECTRICAL (1)Volume Resistivity1.E+03 – 1.E+04\(\Omegactor{\text{CM}}\)SABIC methodINJECTION MOLDING (3)\(\Omegactor{\text{CM}}\)CDrying Temperature100 – 120\(\Omegactor{\text{CM}}\)HrsDrying Time2 – 3HrsMaximum Moisture Content0.07\(\Omegactor{\text{CM}}\)\(\Omegactor{\text{CM}}\)Melt Temperature290 – 320\(\Omegactor{\text{CC}}\)\(\Omegactor{\text{CC}}\)	Mold Shrinkage, xflow, 24 hrs <sup>(2)</sup>	1.69	%	ASTM D955
Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> Mold Shrinkage, xflow, 3.2 mm <sup>(2)</sup> Mold Shrinkage, xflow, 3.2 mm <sup>(2)</sup> L2 – 1.5  Nolume Resistivity  Nolume Resistivity  NIJECTION MOLDING (3)  Drying Temperature  Drying Time  2 – 3  Maximum Moisture Content  Maximum Moisture Content  2 – 3  Melt Temperature  Mold Shrinkage, flow, 3.2 mm <sup>(2)</sup> 1.4 – 1.7  1.2 – 1.5	Melt Flow Rate, 280°C/5.0 kgf	20	g/10 min	ASTM D1238
Mold Shrinkage, xflow, 3.2 mm (2)  ELECTRICAL (1)  Volume Resistivity  ILEHO3 – ILEHO4  NUBECTION MOLDING (3)  Drying Temperature  Drying Time  2-3  Maximum Moisture Content  Moth Temperature  1.2 – 1.5  1.2 –	Melt Flow Rate, 280°C/2.16 kgf	3.2	g/10 min	ASTM D1238
ELECTRICAL (1)Volume Resistivity1.E+03 – 1.E+04\(\Omega:\text{CM}\)SABIC methodINJECTION MOLDING (3)Drying Temperature100 – 120\(\Cappa:\text{C}\)CDrying Time2 – 3HrsMaximum Moisture Content0.07\(\Cappa:\text{C}\)CMelt Temperature290 – 320\(\Cappa:\text{C}\)C		1.4 – 1.7	%	SABIC method
Volume Resistivity         1.E+03 – 1.E+04         Q.cm         SABIC method           INJECTION MOLDING <sup>(3)</sup> C           Drying Temperature         100 – 120         °C         C           Drying Time         2 – 3         Hrs         C         C           Maximum Moisture Content         0.07         %         C         C           Melt Temperature         290 – 320         °C         C         C	Mold Shrinkage, xflow, 3.2 mm <sup>(2)</sup>	1.2 – 1.5	%	SABIC method
Drying Temperature 100 – 120 °C Drying Time 2 – 3 Hrs Maximum Moisture Content 200 °C Melt Temperature 200 – 320 °C  Melt Temperature 200 – 320 °C	ELECTRICAL (1)			
Drying Temperature         100 – 120         °C           Drying Time         2 – 3         Hrs           Maximum Moisture Content         0.07         %           Melt Temperature         290 – 320         °C	Volume Resistivity	1.E+03 – 1.E+04	Ω.cm	SABIC method
Drying Time2-3HrsMaximum Moisture Content0.07%Melt Temperature290-320°C	INJECTION MOLDING (3)			
Drying Time 2-3 Hrs  Maximum Moisture Content 0.07 %  Melt Temperature 290-320 °C		100 – 120	°C	
Melt Temperature         290 – 320         °C	Drying Time	2 – 3	Hrs	
·	· ·	0.07	%	
Nozzle Temperature 280 – 310 °C	Melt Temperature	290 – 320	°C	
	Nozzle Temperature	280 – 310	°C	



PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Front - Zone 3 Temperature	290 – 320	°C	
Middle - Zone 2 Temperature	280 – 300	°C	
Rear - Zone 1 Temperature	260 – 280	°C	
Hopper Temperature	60 – 80	°C	
Mold Temperature	100 – 120	°C	

- (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) 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.
- (3) 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.

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