

4203L

TORLON 4203L polyamide-imide (PAI) resin is an un-reinforced, all purpose grade, which contains 3% titanium dioxide and 0.5% fluoropolymer. It has the best impact resistance and greatest elongation of all the TORLON grades. It is one of the few thermoplastics that is strong and reliable at temperature up to 500°F (260°C).

TORLON 4203L resin offers outstanding electrical properties, which makes it ideal for high performance parts

such as connectors, switches and relays. In addition TORLON 4203L polyamide-imide can be used in applications such as thrust washers, spline liners, valve seats, bushings, bearings, wear rings, cams and other applications requiring strength at high temperature and resistance to wear.

This injection molding material is available in high flow (HF) and low flow (LF) grade.

Typical Properties of TORLON 4203L Resin

Properties	ASTM Test Method	Typical Properties ⁽¹⁾			
		U.S. Customary units		SI Units	
		Value	Units	Value	Units
Mechanical					
Tensile Strength	D 1708	27.8	kpsi	192	MPa
Tensile Modulus	D 1708	0.71	Mpsi	4.9	GPa
Tensile Elongation	D 1708	15	%	15	%
Flexural Modulus at 73°F (23°C)	D 790	0.73	Mpsi	5.0	GPa
Flexural Modulus at 450°F (232°C)	D 790	0.52	Mpsi	3.6	GPa
Flexural Strength at 73°F (23°C)	D 790	34.9	kpsi	241	MPa
Flexural Strength at 450°F (232°C)	D 790	17.1	kpsi	118	MPa
Izod Impact Strength, Notched	D 256	2.7	ft-lbs/in	140	J/m
Izod Impact Strength, Unnotched	D 256	20	ft-lbs/in	1,070	J/m
Compressive Strength	D 695	32.1	kpsi	221	MPa
Compressive Modulus	D 695	0.58	Mpsi	4.0	GPa
Thermal					
Deflection Temperature at 264 psi (1.8 MPA)	D 648	532	°F	278	°C
Thermal Conductivity	C 177	1.8	Btu in/hr- ft ² °F	0.26	W/mK
Coefficient of Thermal Expansion, flow direction	E 831	17	ppm/°F	31	ppm/°C
Electrical					
Dielectric Strength	D 149	580	V/mil	24	kV/mm
Dielectric Constant at 60 Hz	D 150	4.2		4.2	
Dielectric Constant at 1 MHz	D 150	3.9		3.9	
Dissipation Factor at 60 Hz	D 150	0.026		0.026	
Dissipation Factor at 1 MHz	D 150	0.031		0.031	
Volume Resistivity	D 257	2 x 10 ¹⁷	ohm-cm	2 x 10 ¹⁷	ohm-cm
Surface Resistivity	D 257	5 x 10 ¹⁸	ohm	5 x 10 ¹⁸	ohm
General					
Specific Gravity	D 792	1.42		1.42	
Water Absorption after 24 hours	D 570	0.33	%	0.33	%
Poisson's Ratio		0.45		0.45	
Mold Shrinkage	D 955	6.0-8.5	mil/in	6.0-8.5	µm/mm

(1) Actual properties of individual batches will vary within specification limits.

Drying

Drying TORLON resin to a moisture content of 500 ppm or lower is required to avoid molding problems, like brittle parts and foaming. The resin should be dried in a circulating air oven equipped with a desiccant system. Place the resin in layers no more than 2 to 3 inches (5 to 8 cm) deep in drying trays. Minimum drying times are: 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C)..

Injection Molding

The injection molding press should be equipped with a screw having a length to diameter (L/D) ratio between 18:1 and 24:1 and a compression ratio between 1:1 and 1.5:1. Check devices are not recommended.

Recommended barrel temperatures are 580°F (304°C) in the feed zone increasing to 700°F (371°C) at the nozzle. The mold temperature should be adjusted until the temperature of the surface measures between 390°F (199°C) and 420°F (216°C).

Set the injection pressure to achieve a rapid fill. On most machines, this will be near the maximum injection pressure available. Fill the entire mold with primary injection boost and then drop off to a hold pressure. Begin hold pressure at a high setting 6,000-8,000 psi (41.37-55.16 MPa), for several seconds, then drop off to 3,000-5,000 psi (20.69-34.48 MPa), for the duration of the hold pressure sequence. This will help minimize or eliminate any internal porosity or sink. If part defects, such as blistering at the gate, color change and degradation, splay and surface delamination, or gas burning at the knit lines and vents, are encountered, the injection fill rate may be too high.

Use moderate back pressure, approximately 1,000 psi (6.90 MPa), and lower screw recovery speeds (50-100 rpm). Avoid intermittent feeding and screw slippage which can lead to overheating and possible polymer degradation.

Total cycle time should be as short as possible to reduce residence time in the barrel. Excessive residence time will cause an increase in melt viscosity, reducing flow. Cycle time consistency is important for successful molding for TORLON parts and automatic operation is highly recommended.

Molds should be designed for smooth part ejection, avoiding undercuts and providing adequate draft.

Post-Cure

TORLON polymers are unique in that they are supplied at a relatively low molecular weight to facilitate processing, and the molded parts **must be post cured** to achieve a high molecular weight and optimum properties. The post-curing process involves placing the molded articles in a forced air oven and thermally treating them to a series of increasing temperatures for various times. Contact your Solvay Advanced Polymers' representative for a specific recommendation for post-curing your part.

Standard Packaging and Labeling

TORLON 4203L resin is packaged in lined cardboard boxes containing 25 kg (55.115 pounds) of material. Special packaging can be supplied upon request. Individual packages will be plainly marked with the product number, the color, the lot number, and the net weight.

Precautionary Labeling

On the basis of the toxicological, physical, and chemical properties of TORLON 4203L resin, labeling used on containers is as follows:

Caution! Handling and/or processing this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose, and throat.

Product Safety and Emergency Service

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1 (800) 621-4557
1 (770) 772-8880 outside of U.S.

For information or help in an emergency such as a spill, leak, fire or explosion, call day or night:

Emergency Health Information

1 (800) 621-4590
1 (770) 772-5177 outside of U.S.

Emergency Spill Information

CHEMTREC 1 (800) 424-9300
1 (703) 527-3887 outside of U.S.
collect calls accepted

For Additional Information

Technical Service
1 (800) 621-4557

Customer Service
1 (800) 848-9744

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5030

TORLON 5030 is a 30% glass fiber reinforced polyamide-imide resin. The material exhibits high strength and stiffness, retention of stiffness at temperatures up to 500°F (260°C), and very low creep.

It is available in high flow (HF), low flow (LF), and extrusion (E) grades.

TORLON 5030 resin is used in applications such as aerospace vents, gears, valve plates, impellers, terminal strips, insulators, brackets, and semiconductor test sockets.

Typical Properties of TORLON 5030 Resin

Properties	ASTM Test Method	Typical Properties ⁽¹⁾			
		U.S. Customary units		SI Units	
		Value	Units	Value	Units
Mechanical					
Tensile Strength	D 1708	29.7	kpsi	205	MPa
Tensile Modulus	D 1708	1.56	Mpsi	10.8	GPa
Tensile Elongation	D 1708	7	%	7	%
Flexural Modulus at 73°F (23°C)	D 790	1.70	Mpsi	11.7	GPa
Flexural Modulus at 450°F (232°C)	D 790	1.43	Mpsi	9.9	GPa
Flexural Strength at 73°F (23°C)	D 790	48.3	kpsi	333	MPa
Flexural Strength at 450°F (232°C)	D 790	26.2	kpsi	181	MPa
Izod Impact Strength, Notched	D 256	1.5	ft-lbs/in	80	J/m
Izod Impact Strength, Unnotched	D 256	9.5	ft-lbs/in	505	J/m
Compressive Strength	D 695	38.3	kpsi	264	MPa
Compressive Modulus	D 695	1.15	Mpsi	7.9	GPa
Thermal					
Deflection Temperature at 264 psi (1.8 MPA)	D 648	539	°F	282	°C
Thermal Conductivity	C 177	2.5	Btu in/hr- ft ² °F	0.37	W/mK
Coefficient of Thermal Expansion, flow direction	E 831	9	ppm/°F	16	ppm/°C
Electrical					
Dielectric Strength	D 149	840	V/mil	34	kV/mm
Dielectric Constant at 60 Hz	D 150	4.4		4.4	
Dielectric Constant at 1 MHz	D 150	4.2		4.2	
Dissipation Factor at 60 Hz	D 150	0.022		0.022	
Dissipation Factor at 1 MHz	D 150	0.050		0.050	
Volume Resistivity	D 257	2 x 10 ¹⁷	ohm-cm	2 x 10 ¹⁷	ohm-cm
Surface Resistivity	D 257	1 x 10 ¹⁸	ohm	1 x 10 ¹⁸	ohm
General					
Specific Gravity	D 792	1.61		1.61	
Water Absorption after 24 hours	D 570	0.24	%	0.24	%
Mold Shrinkage	D 955	1.0-2.5	mil/in	1.0-2.5	µm/mm

(1) Actual properties of individual batches will vary within specification limits.

Drying

Drying TORLON resin to a moisture content of 500 ppm or lower is required to avoid molding problems, like brittle parts and foaming. The resin should be dried in a circulating air oven equipped with a desiccant system. Place the resin in layers no more than 2 to 3 inches (5 to 8 cm) deep in drying trays. Minimum drying times are: 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C)..

Injection Molding

The injection molding press should be equipped with a screw having a length to diameter (L/D) ratio between 18:1 and 24:1 and a compression ratio between 1:1 and 1.5:1. Check devices are not recommended.

Recommended barrel temperatures are 580°F (304°C) in the feed zone increasing to 700°F (371°C) at the nozzle. The mold temperature should be adjusted until the temperature of the surface measures between 390°F (199°C) and 420°F (216°C).

Set the injection pressure to achieve a rapid fill. On most machines, this will be near the maximum injection pressure available. Fill the entire mold with primary injection boost and then drop off to a hold pressure. Begin hold pressure at a high setting 6,000-8,000 psi (41.37-55.16 MPa), for several seconds, then drop off to 3,000-5,000 psi (20.69-34.48 MPa), for the duration of the hold pressure sequence. This will help minimize or eliminate any internal porosity or sink. If part defects, such as blistering at the gate, color change and degradation, splay and surface delamination, or gas burning at the knit lines and vents, are encountered, the injection fill rate may be too high.

Use moderate back pressure, approximately 1,000 psi (6.90 MPa), and lower screw recovery speeds (50-100 rpm). Avoid intermittent feeding and screw slippage which can lead to overheating and possible polymer degradation.

Total cycle time should be as short as possible to reduce residence time in the barrel. Excessive residence time will cause an increase in melt viscosity, reducing flow. Cycle time consistency is important for successful molding for TORLON parts and automatic operation is highly recommended.

Molds should be designed for smooth part ejection, avoiding undercuts and providing adequate draft.

Post-Cure

TORLON polymers are unique in that they are supplied at a relatively low molecular weight to facilitate processing, and the molded parts **must be post cured** to achieve a high molecular weight and optimum properties. The post-curing process involves placing the molded articles in a forced air oven and thermally treating them to a series of increasing temperatures for various times. Contact your Solvay Advanced Polymers' representative for a specific recommendation for post-curing your part.

Standard Packaging and Labeling

TORLON 5030 resin is packaged in lined cardboard boxes containing 25 kg (55.115 pounds) of material. Special packaging can be supplied upon request. Individual packages will be plainly marked with the product number, the color, the lot number, and the net weight.

Precautionary Labeling

On the basis of the toxicological, physical, and chemical properties of TORLON 5030 resin, labeling used on containers is as follows:

Caution! Handling and/or processing this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose, and throat.

Product Safety and Emergency Service

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1 (800) 848-9744

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4435

TORLON 4435 polyamide-imide resin is specifically designed to provide exceptionally low wear performance in non-lubricated applications even at high pressure and velocity (PV) conditions. Not only is TORLON 4435 particularly suited to applications where lubrication is impossible or undesirable, it provides an additional margin of safety for lubricated systems in the event that lubrication is lost.

The impressive flexural and compressive stiffness from cryogenic to elevated temperatures allows it to be used for demanding load-bearing applications. The low

coefficient of thermal expansion provides the ability to meet close tolerances over a wide temperature range.

Due to its electrically dissipative property, this grade may also be considered for anti-static functions.

Specific applications where TORLON 4435 resin may be used are thrust washers, seal rings, sliding vanes, bobbins, bushings, clutch rollers and pistons. The resin can be injection molded into complex shapes.

It is available in high flow (HF), low flow (LF), and extrusion (E) grades.

Typical Properties of TORLON 4435 Resin

Properties	ASTM Test Method	Typical Properties ⁽¹⁾			
		U.S. Customary units		SI Units	
		Value	Units	Value	Units
Mechanical					
Tensile Strength	D 1708	16	kpsi	110	MPa
Tensile Modulus	D 1708	1.41	Mpsi	9.7	GPa
Tensile Elongation	D 1708	6	%	6	%
Flexural Modulus at 73°F (23°C)	D 790	2.1	Mpsi	14.8	GPa
Flexural Modulus at 450°F (232°C)	D 790	1.5	Mpsi	10.3	GPa
Flexural Strength at 73°F (23°C)	D 790	22	kpsi	152	MPa
Flexural Strength at 450°F (232°C)	D 790	13	kpsi	91	MPa
Izod Impact Strength, notched	D 256	0.8	ft-lbs/in	40	J/m
Izod Impact Strength, unnotched	D 256	4.1	ft-lbs/in	220	J/m
Compressive Strength	D 695	20.0	kpsi	138	MPa
Compressive Modulus	D 695	1.24	Mpsi	8.6	GPa
Thermal					
Deflection Temperature at 264 psi (1.8 MPa)	D 648	532	°F	278	°C
Thermal Conductivity	C 177	5.6	Btu in/hr-ft ² °F	0.8	W/mK
Coefficient of Thermal Expansion, flow direction	E 831	8	ppm/°F	14.4	ppm/°C
Electrical					
Volume Resistivity	D 257	2 x 10 ⁷	ohm-cm	2 x 10 ⁷	ohm-cm
Surface Resistivity	D 257	6 x 10 ⁶	ohm	6 x 10 ⁶	ohm
General					
Specific Gravity	D 792	1.59		1.59	
Poisson's Ratio		0.42		0.42	
Water Absorption after 24 hours	D 570	0.12	%	0.12	%
Mold Shrinkage	D 955	1.4	mil/in	1.4	µm/mm
Wear					
Wear Factor at 50 fpm (0.25 m/s) 1,000 psi (6.89 MPa)		28 x 10 ⁻¹⁰	in ³ min/ft-lbhr	20 x 10 ⁻¹⁰	mms/Pa-mhr
at 50 fpm (0.25 m/s) 2,000 psi (13.8 MPa)		28 x 10 ⁻¹⁰	in ³ min/ft-lbhr	20 x 10 ⁻¹⁰	mms/Pa-mhr
at 800 fpm (4.1 m/s) 62.5 psi (0.43 MPa)		84 x 10 ⁻¹⁰	in ³ min/ft-lbhr	60 x 10 ⁻¹⁰	mms/Pa-mhr
at 800 fpm (4.1 m/s) 125 psi (0.86 MPa)		49 x 10 ⁻¹⁰	in ³ min/ft-lbhr	35 x 10 ⁻¹⁰	mms/Pa-mhr

(1) Actual properties of individual batches will vary within specification limits.

Drying

Drying TORLON resin to a moisture content of 500 ppm or lower is required to avoid molding problems, like brittle parts and foaming. The resin should be dried in a circulating air oven equipped with a desiccant system. Place the resin in layers no more than 2 to 3 inches (5 to 8 cm) deep in drying trays. Minimum drying times are 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C).

Injection Molding

The injection molding press should be equipped with a screw having a length to diameter (L/D) ratio between 18:1 and 24:1 and a compression ratio between 1:1 and 1.5:1. Check devices are not recommended.

The barrel temperature should be set to 580°F (304°C) in the feed zone, the intermediate zones set progressively higher to a maximum of 700°F (371°C) at the nozzle. The mold temperature should be adjusted until the temperature of the surface measures between 390°F (199°C) and 420°F (216°C).

Set the injection pressure to achieve a rapid fill. On most machines, this will be near the maximum injection pressure available. Fill the entire mold with primary injection boost and then drop off to a hold pressure. Begin hold pressure at a high setting 6,000-8,000 psi (41.37-55.16 MPa), for several seconds, then drop off to 3,000-5,000 psi (20.69-34.48 MPa), for the duration of the hold pressure sequence. This will help minimize or eliminate any internal porosity or sink. If part defects, such as blistering at the gate, color change and degradation, splay and surface delamination, or gas burning at the knit lines and vents, are encountered, the injection fill rate may be too high.

Use moderate back pressure, approximately 1,000 psi (6.90 MPa), and lower screw recovery speeds (50-100 rpm). Avoid intermittent feeding and screw slippage which can lead to overheating and possible polymer degradation.

Total cycle time should be as short as possible to reduce residence time in the barrel. Excessive residence time will cause an increase in melt viscosity and reduce flow. Cycle time consistency is important for successful molding for TORLON PAI parts and automatic operation is highly recommended.

Molds should be designed for smooth part ejection, avoiding undercuts and providing adequate draft.

Post-Cure

TORLON polymers are unique in that they are supplied at a relatively low molecular weight to facilitate processing. The molded parts **must be post cured** to achieve a high molecular weight and optimum properties. The post-curing process involves placing the molded articles in a forced air oven and thermally treating them to a series of increasing temperatures for specified times. Contact your Solvay Advanced Polymers' representative for a specific recommendation for post-curing your part.

Standard Packaging and Labeling

TORLON 4435 resin is packaged in lined cardboard boxes containing 25 kg (55.115 pounds) of material. Special packaging can be supplied upon request. Individual packages will be plainly marked with the product number, the color, the lot number, and the net weight.

Precautionary Labeling

On the basis of the toxicological, physical, and chemical properties of TORLON 4435 resin, labeling used on containers is as follows:

Caution! Handling and/or processing this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose, and throat.

Product Safety and Emergency Service

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1 (800) 621-4557

1 (770) 772-8880 outside of U.S.

For information or help in an emergency such as a spill, leak, fire or explosion, call day or night:

Emergency Health Information

1 (800) 621-4590

1 (770) 772-5177 outside of U.S.

Emergency Spill Information

CHEMTREC 1 (800) 424-9300

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For Additional Information

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4301

TORLON 4301 polyamide-imide resin is designed as a general purpose, low friction and low wear compound. The resin composition contains 12% graphite and 3% fluoropolymer.

It is available in high flow (HF) and low flow (LF) injection molding grades.

It is engineered to meet the needs of the bearing manufacturer with high strength, performance at elevated temperatures to 500°F (260°C) and excellent chemical resistance.

Typical applications include bearings, thrust washers, rings, seals, vanes, and valve seats.

Typical Properties of TORLON 4301 Resin

Properties	ASTM Test Method	Typical Properties ⁽¹⁾			
		U.S. Customary units		SI Units	
		Value	Units	Value	Units
Mechanical					
Tensile Strength	D 1708	23.7	kpsi	164	MPa
Tensile Modulus	D 1708	0.95	Mpsi	6.6	GPa
Tensile Elongation	D 1708	7	%	7	%
Flexural Modulus at 73°F (23°C)	D 790	1.00	Mpsi	6.9	GPa
Flexural Modulus at 450°F (232°C)	D 790	0.72	Mpsi	5.0	GPa
Flexural Strength at 73°F (23°C)	D 790	31.2	kpsi	215	MPa
Flexural Strength at 450°F (232°C)	D 790	16.2	kpsi	112	MPa
Izod Impact Strength, Notched	D 256	1.2	ft-lbs/in	60	J/m
Izod Impact Strength, Unnotched	D 256	7.6	ft-lbs/in	405	J/m
Compressive Strength	D 695	24.1	kpsi	166	MPa
Compressive Modulus	D 695	0.77	Mpsi	5.3	GPa
Thermal					
Deflection Temperature at 264 psi (1.8 MPA)	D 648	534	°F	279	°C
Thermal Conductivity	C 177	3.7	Btu in/hr- ft ² °F	0.53	W/mK
Coefficient of Thermal Expansion, flow direction	E 831	14	ppm/°F	25	ppm/°C
Electrical					
Volume Resistivity	D 257	8 x 10 ¹⁵	ohm-cm	8 x 10 ¹⁵	ohm-cm
Surface Resistivity	D 257	8 x 10 ¹⁷	ohm	8 x 10 ¹⁷	ohm
General					
Specific Gravity	D 792	1.46		1.46	
Water Absorption after 24 hours	D 570	0.28	%	0.28	%
Mold Shrinkage	D 955	3.5-6.0	mil/in	3.5-6.0	µm/mm

(1) Actual properties of individual batches will vary within specification limits.

Drying

Drying TORLON resin to a moisture content of 500 ppm or lower is required to avoid molding problems, like brittle parts and foaming. The resin should be dried in a circulating air oven equipped with a desiccant system. Place the resin in layers no more than 2 to 3 inches (5 to 8 cm) deep in drying trays. Minimum drying times are: 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C)..

Injection Molding

The injection molding press should be equipped with a screw having a length to diameter (L/D) ratio between 18:1 and 24:1 and a compression ratio between 1:1 and 1.5:1. Check devices are not recommended.

Recommended barrel temperatures are 580°F (304°C) in the feed zone increasing to 700°F (371°C) at the nozzle. The mold temperature should be adjusted until the temperature of the surface measures between 390°F (199°C) and 420°F (216°C).

Set the injection pressure to achieve a rapid fill. On most machines, this will be near the maximum injection pressure available. Fill the entire mold with primary injection boost and then drop off to a hold pressure. Begin hold pressure at a high setting 6,000-8,000 psi (41.37-55.16 MPa), for several seconds, then drop off to 3,000-5,000 psi (20.69-34.48 MPa), for the duration of the hold pressure sequence. This will help minimize or eliminate any internal porosity or sink. If part defects, such as blistering at the gate, color change and degradation, splay and surface delamination, or gas burning at the knit lines and vents, are encountered, the injection fill rate may be too high.

Use moderate back pressure, approximately 1,000 psi (6.90 MPa), and lower screw recovery speeds (50-100 rpm). Avoid intermittent feeding and screw slippage which can lead to overheating and possible polymer degradation.

Total cycle time should be as short as possible to reduce residence time in the barrel. Excessive residence time will cause an increase in melt viscosity, reducing flow. Cycle time consistency is important for successful molding for TORLON parts and automatic operation is highly recommended.

Molds should be designed for smooth part ejection, avoiding undercuts and providing adequate draft.

Post-Cure

TORLON polymers are unique in that they are supplied at a relatively low molecular weight to facilitate processing, and the molded parts **must be post cured** to achieve a high molecular weight and optimum properties. The post-curing process involves placing the molded articles in a forced air oven and thermally treating them to a series of increasing temperatures for various times. Contact your Solvay Advanced Polymers' representative for a specific recommendation for post-curing your part.

Standard Packaging and Labeling

TORLON 4301 resin is packaged in lined cardboard boxes containing 25 kg (55.115 pounds) of material. Special packaging can be supplied upon request. Individual packages will be plainly marked with the product number, the color, the lot number, and the net weight.

Precautionary Labeling

On the basis of the toxicological, physical, and chemical properties of TORLON 4301 resin, labeling used on containers is as follows:

Caution! Handling and/or processing this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose, and throat.

Product Safety and Emergency Service

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1 (800) 848-9744

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4275

TORLON 4275 polyamide-imide resin is designed as a low friction and low wear compound, similar to TORLON 4301 resin with better performance at higher velocities and pressures up to 75,000 ft-lb/min-in². The resin composition contains 20% graphite and 3% fluoropolymer.

Its high strength, performance at temperatures up to 500°F, and excellent chemical resistance make this grade an excellent choice for demanding rotating and sliding applications.

Typical uses include bearings, thrust washers, rings, seals, vanes, and valve seats.

It is available as a standard injection molding grade.

Typical Properties of TORLON 4275 Resin

Properties	ASTM Test Method	Typical Properties ⁽¹⁾			
		U.S. Customary units		SI Units	
		Value	Units	Value	Units
Mechanical					
Tensile Strength	D 1708	19	kpsi	131	MPa
Tensile Modulus	D 1708	1.13	Mpsi	7.8	GPa
Tensile Elongation	D 1708	7	%	7	%
Flexural Modulus at 73°F (23°C)	D 790	1.06	Mpsi	7.3	GPa
Flexural Modulus at 450°F (232°C)	D 790	0.74	Mpsi	5.1	GPa
Flexural Strength at 73°F (23°C)	D 790	30	kpsi	207	MPa
Flexural Strength at 450°F (232°C)	D 790	16	kpsi	110	MPa
Izod Impact Strength, Notched	D 256	1.6	ft-lbs/in	85	J/m
Izod Impact Strength, Unnotched	D 256	4.7	ft-lbs/in	250	J/m
Compressive Strength	D 695	18	kpsi	124	MPa
Compressive Modulus	D 695	0.58	Mpsi	4.0	GPa
Thermal					
Deflection Temperature at 264 psi (1.8 MPA)	D 648	536	°F	280	°C
Thermal Conductivity	C 177	4.5	Btu in/hr- ft ² °F	0.6	W/mK
Coefficient of Thermal Expansion, flow direction	E 831	14	ppm/°F	25	ppm/°C
Electrical					
Volume Resistivity	D 257	8 x 10 ¹⁵	ohm-cm	8 x 10 ¹⁵	ohm-cm
Surface Resistivity	D 257	4 x 10 ¹⁷	ohm	4 x 10 ¹⁷	ohm
General					
Specific Gravity	D 792	1.51		1.51	
Water Absorption after 24 hours	D 570	0.33	%	0.33	%
Mold Shrinkage	D 955	2.5-4.5	mil/in	2.5-4.5	µm/mm

(1) Actual properties of individual batches will vary within specification limits.

Drying

Drying TORLON resin to a moisture content of 500 ppm or lower is required to avoid molding problems, like brittle parts and foaming. The resin should be dried in a circulating air oven equipped with a desiccant system. Place the resin in layers no more than 2 to 3 inches (5 to 8 cm) deep in drying trays. Minimum drying times are: 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C)..

Injection Molding

The injection molding press should be equipped with a screw having a length to diameter (L/D) ratio between 18:1 and 24:1 and a compression ratio between 1:1 and 1.5:1. Check devices are not recommended.

Recommended barrel temperatures are 580°F (304°C) in the feed zone increasing to 700°F (371°C) at the nozzle. The mold temperature should be adjusted until the temperature of the surface measures between 390°F (199°C) and 420°F (216°C).

Set the injection pressure to achieve a rapid fill. On most machines, this will be near the maximum injection pressure available. Fill the entire mold with primary injection boost and then drop off to a hold pressure. Begin hold pressure at a high setting 6,000-8,000 psi (41.37-55.16 MPa), for several seconds, then drop off to 3,000-5,000 psi (20.69-34.48 MPa), for the duration of the hold pressure sequence. This will help minimize or eliminate any internal porosity or sink. If part defects, such as blistering at the gate, color change and degradation, splay and surface delamination, or gas burning at the knit lines and vents, are encountered, the injection fill rate may be too high.

Use moderate back pressure, approximately 1,000 psi (6.90 MPa), and lower screw recovery speeds (50-100 rpm). Avoid intermittent feeding and screw slippage which can lead to overheating and possible polymer degradation.

Total cycle time should be as short as possible to reduce residence time in the barrel. Excessive residence time will cause an increase in melt viscosity, reducing flow. Cycle time consistency is important for successful molding for TORLON parts and automatic operation is highly recommended.

Molds should be designed for smooth part ejection, avoiding undercuts and providing adequate draft.

Post-Cure

TORLON polymers are unique in that they are supplied at a relatively low molecular weight to facilitate processing, and the molded parts **must be post cured** to achieve a high molecular weight and optimum properties. The post-curing process involves placing the molded articles in a forced air oven and thermally treating them to a series of increasing temperatures for various times. Contact your Solvay Advanced Polymers' representative for a specific recommendation for post-curing your part.

Standard Packaging and Labeling

TORLON 4275 resin is packaged in lined cardboard boxes containing 25 kg (55.115 pounds) of material. Special packaging can be supplied upon request. Individual packages will be plainly marked with the product number, the color, the lot number, and the net weight.

Precautionary Labeling

On the basis of the toxicological, physical, and chemical properties of TORLON 4275 resin, labeling used on containers is as follows:

Caution! Handling and/or processing this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose, and throat.

Product Safety and Emergency Service

For product safety information or a Material Safety Data Sheet on a product of Solvay Advanced Polymers

1 (800) 621-4557

1 (770) 772-8880 outside of U.S.

For information or help in an emergency such as a spill, leak, fire or explosion, call day or night:

Emergency Health Information

1 (800) 621-4590

1 (770) 772-5177 outside of U.S.

Emergency Spill Information

CHEMTREC 1 (800) 424-9300

1 (703) 527-3887 outside of U.S.

collect calls accepted

For Additional Information

Technical Service

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Customer Service

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7130

TORLON 7130 is a polyamide-imide (PAI) compound containing 30% carbon fiber reinforcement. This melt-processable, high performance engineering thermoplastic has extraordinary strength and stiffness at temperatures up to 500°F (260°C).

Of all the TORLON resins, this grade has the best fatigue resistance. The applications for this resin include metal replacement, sliding vanes, aerospace parts, impellers, shrouds, pistons, and housings.

TORLON 7130 resin is available in injection molding and extrusion grades.

Typical Properties of TORLON 7130 Resin

Properties	ASTM Test Method	Typical Properties ⁽¹⁾			
		U.S. Customary units		SI Units	
		Value	Units	Value	Units
Mechanical					
Tensile Strength	D 1708	29.4	kpsi	203	MPa
Tensile Modulus	D 1708	3.23	Mpsi	22.3	GPa
Tensile Elongation	D 1708	6	%	6	%
Flexural Modulus at 73°F (23°C)	D 790	2.88	Mpsi	19.9	GPa
Flexural Modulus at 450°F (232°C)	D 790	2.28	Mpsi	15.7	GPa
Flexural Strength at 73°F (23°C)	D 790	50.7	kpsi	350	MPa
Flexural Strength at 450°F (232°C)	D 790	25.2	kpsi	174	MPa
Izod Impact Strength, Notched	D 256	0.9	ft-lbs/in	50	J/m
Izod Impact Strength, Unnotched	D 256	6.4	ft-lbs/in	340	J/m
Compressive Strength	D 695	36.9	kpsi	254	MPa
Compressive Modulus	D 695	1.43	Mpsi	9.9	GPa
Thermal					
Deflection Temperature at 264 psi (1.8 MPA)	D 648	540	°F	282	°C
Thermal Conductivity	C 177	3.6	Btu in/hr- ft ² °F	0.52	W/mK
Coefficient of Thermal Expansion, flow direction	E 831	5	ppm/°F	9	ppm/°C
General					
Specific Gravity	D 792	1.48		1.48	
Water Absorption after 24 hours	D 570	0.26	%	0.26	%
Mold Shrinkage	D 955	0-1.5	mil/in	0-1.5	µm/mm

(1) Actual properties of individual batches will vary within specification limits.

Drying

Drying TORLON resin to a moisture content of 500 ppm or lower is required to avoid molding problems, like brittle parts and foaming. The resin should be dried in a circulating air oven equipped with a desiccant system. Place the resin in layers no more than 2 to 3 inches (5 to 8 cm) deep in drying trays. Minimum drying times are: 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C)..

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