Torlon® 4435
polyamide-imide

Torlon® 4435 is a polyamide-imide resin 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 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.

- High flow: Torlon® 4435-HF

General

Material Status	• Commercial: Active	
Availability	• Africa & Middle East • Asia Pacific • Europe	• Latin America • North America
Features	• Chemical Resistant • Creep Resistant • Flame Retardant • High Heat Resistance • High Temperature Strength	• Low Friction • Self Lubricating • Semi Conductive • Wear Resistant
Uses	• Aerospace Applications • Aircraft Applications • Automotive Applications • Bearings • Bushings • Cams • Gears • Industrial Applications • Industrial Parts	• Machine/Mechanical Parts • Metal Replacement • Rollers • Sealing Devices • Seals • Thrust Washer • Transmission Applications • Washer
RoHS Compliance	• RoHS Compliant	
Forms	• Pellets	
Processing Method	• Injection Molding • Machining	• Profile Extrusion

Physical	Typical Value	Unit	Test method
Density / Specific Gravity	1.59		ASTM D792
Molding Shrinkage - Flow	0.14	%	ASTM D955
Water Absorption (24 hr)	0.12	%	ASTM D570

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Mechanical	Typical Value	Unit	Test method
Tensile Modulus			
--	14500	MPa	ASTM D638
--	9720	MPa	ASTM D1708
Tensile Strength	93.8	MPa	ASTM D638
Tensile Stress	110	MPa	ASTM D1708
Tensile Elongation			
Break	1.0	%	ASTM D638
Break [1]	6.0	%	ASTM D1708
Flexural Modulus			ASTM D790
23°C	14500	MPa	
232°C	10300	MPa	
Flexural Strength			ASTM D790
23°C	152	MPa	
232°C	89.6	MPa	
Compressive Modulus	8550	MPa	ASTM D695
Compressive Strength	138	MPa	ASTM D695
Poisson's Ratio	0.42		
Coefficient of Friction			ASTM D3702
-- [2]	0.29		
-- [3]	0.27		
Wear Factor			ASTM D3702
Dry: 0.25 m/s, 3.4 MPa (50 fpm, 500 psi)	21.0	in³·min^-10/ ft·lb·hr	
Dry: 4 m/s, 0.2 MPa (800 fpm, 31.25 psi)	17.0	in³·min^-10/ ft·lb·hr	

Impact	Typical Value	Unit	Test method
Notched Izod Impact	43	J/m	ASTM D256
Unnotched Izod Impact	220	J/m	ASTM D4812

Thermal	Typical Value	Unit	Test method
Deflection Temperature Under Load			ASTM D648
1.8 MPa, Unannealed	278	°C	
Thermal Conductivity	0.81	W/m/K	ASTM C177
Coefficient of Linear Thermal Expansion	1.4E-5	cm/cm/°C	ASTM D696

Electrical	Typical Value	Unit	Test method
Surface Resistivity	6.0E+6	ohms	ASTM D257
Volume Resistivity	2.0E+7	ohms·cm	ASTM D257

Injection	Typical Value	Unit
Drying Temperature	177	°C
Drying Time	3.0	hr
Suggested Max Moisture	0.050	%
Rear Temperature	304	°C

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Injection	Typical Value	Unit
Nozzle Temperature	371	°C
Mold Temperature	199 to 216	°C
Back Pressure	6.89	MPa
Screw Speed	50 to 100	rpm
Screw L/D Ratio	18.0:1.0 to 24.0:1.0	

Injection Notes

Minimum drying conditions: 3 hours at 350°F, 4 hours at 300°F, or 16 hours at 250°F.
Compression Ratio: 1:1 to 1.5:1

Begin hold preasure at 6000-8000 psi for several seconds, then drop off to 3000-5000 psi for the duration of the hold pressure sequence.

Molded parts must be post cured.

Notes

Typical properties: these are not to be construed as specifications.

[1] ASTM Test Method D1708 has been used to measure the tensile properties of PAI and similar materials because the small test specimen conserved material. Today the most widely used specimen is the Type 1 bar of ASTM D638.
These D1708 values are included for historical purposes and they should not be compared to the D638 values.

[2] Dry: 0.25 m/s, 3.4 MPa (50 fpm, 500 psi)

[3] Dry: 4 m/s, 0.2 MPa (800 fpm, 31.25 psi)

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Safety Data Sheets (SDS) are available by emailing us or contacting your sales representative. Always consult the appropriate SDS before using any of our products.