

ARLON® 3000 XT: SUPERIOR INSULATIVE PERFORMANCE FOR HIGH POWER CONDUCTORS

High voltage applications demand better insulative materials. Failure could be catastrophic to equipment and machinery, create unscheduled down time, or worse, cause harm to those working with it.

Today, for high power conductors, there is an alternative insulative solution from Greene, Tweed – a non-filled, cross-linked PEEK known as Arlon® 3000 XT. This new material promises improved volume resistivity / insulation properties in high voltage applications, resulting in higher performance over existing PEEK and PEK in an over-molded solution.

BRIEF TEST DATA

Greene, Tweed performed extensive testing on Arlon® 3000 XT to demonstrate its electrical resistivity properties. The first test performed was to measure volume resistivity at 400° F. Here, a sample disc was placed between electrodes that sent pulses of electricity at increasing voltages. The samples were virgin PEEK, PEK and Arlon® 3000 XT. The results clearly established that Arlon® 3000 XT showed significant insulation resistance: Over 100 times better than PEEK, and 30 times better than PEK. As an initial test, the samples were exposed to 5 kV DC.

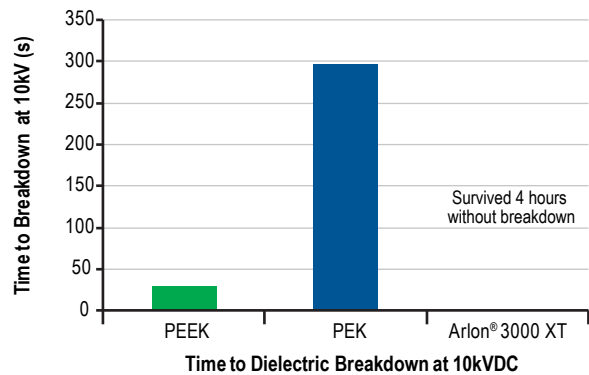
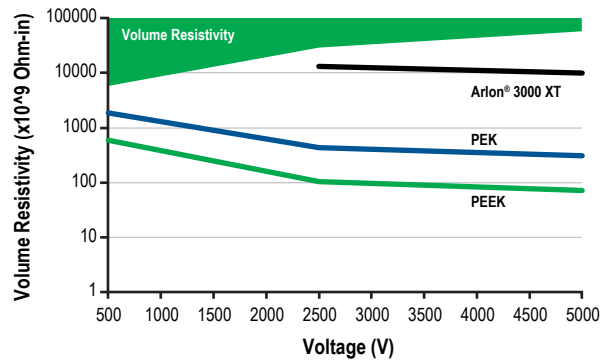
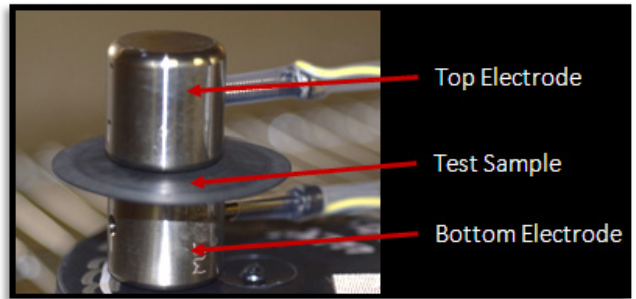
The second set of tests focused on time-dependent dielectric breakdown at high temperatures. Each sample was tested up to four hours or until sample was destroyed, at a constant 10 kV DC. At 450° F, the PEEK and PEK samples were both destroyed at an average of 28.5 seconds and 297.5 seconds, respectively. But not Arlon® 3000 XT. In fact, with testing envelope pushed further to 500° F, the material was not destroyed even after four hours of 10 kV DC exposure.

INVITATION

Don't take our word for it: You be the judge. While the test data set supports some of our customers' requirements, we invite you to join us in expanding the testing envelope further, to 15 kV (AC/DC) or higher. Let us take the next step together and put the material to the test. Please contact your local representative or visit www.arlon3000xt.com for more information.



Black conductor is Arlon® 3000 XT, tan conductor is PEK.



4 HR DIELECTRIC BREAKDOWN TESTING (Test sample thickness: 0.020", voltage: 10 kV DC)

Temperature	PEEK	PEK	Arlon® 3000 XT
400° F	None	None	None
450° F	28.5 s	297.5 s	None
500° F	Not tested	Not tested	None

Compound No./Material Name:

ARLON® 3000 XT

Material Description:

Enhanced PEEK

Manufacturing Method:

Injection Molded

DESCRIPTION (ASTM Standards)	TYPICAL					
Physical & Mechanical Properties	Arlon® 3000 XT			PEEK		
Color	Black			Tan		
Specific Gravity (D792)	1.29			1.30		
Hardness, Shore D, Points (D2240)	88			87		
Izod Impact, Notched, ft-lbf/in [J/m] (D4812)	1.64 [87.6]			1.38 [73.7]		
Izod Impact, Unnotched, ft-lbf/in [J/m] (D256)	37.8 [2,018.5]			no break		
Water Absorption @ 24 Hrs., Change in weight, % (D570)	0.09			0.07		
Coefficient of Friction Dynamic, PV=5000 psi-ft/min (D3702)	0.60			0.56		
Wear Factor (PV=5000 psi-ft/min), $\times 10^{-10}$ in ³ min/(ft-lb-hr) (D3702)	110.6			451.4		
Heat Deflection Temperature @ 264 psi (1.83 MPa), °F [°C] (D648)	>572 [>300]			338 [170]		
DSC, Melting Point (Tm), °F [°C] (D3418)	665 [352]			649 [343]		
Temperature Properties	75°F (23°C)	392°F (200°C)	500°F (260°C)	75°F (23°C)	392°F (200°C)	500°F (260°C)
Tensile Yield Strength, psi [MPa] (D638-Type1)	17,100 [117.90]	4,820 [33.23]	3,820 [28.27]	14,900 [102.73]	4,200 [28.96]	2,600 [17.93]
Tensile Strength at Break, psi [MPa] (D638-Type1)	16,900 [116.50]	7,620 [52.54]	5,380 [37.09]	14,100 [97.22]	6,300 [43.44]	6,100 [42.06]
Elongation at Break, % (D638-Type1)	8–15	>25	>25	25–35	>40	>40
Tensile Modulus, psi [MPa] (D638-Type1)	559,000 [3,854.17]	175,160 [1,207.69]	88,100 [607.43]	595,000 [4,102.4]	57,300 [395.07]	38,700 [266.83]
Flexural Strength at 5% Strain, psi [MPa] (D790)	23,300 [160.65]	5,880 [40.54]	3,740 [25.79]	25,700 [177.20]	3,400 [23.44]	2,300 [15.86]
Flexural Modulus, psi [MPa] (D790)	628,000 [4,329.91]	158,000 [1,089.37]	90,200 [621.91]	654,000 [4,509.17]	76,000 [524.00]	50,300 [346.81]
Compressive Strength, psi [MPa] (D695)	22,000 [151.68]	10,300 [71.02]	5,500 [37.92]	19,900 [137.21]	4,080 [28.13]	2,590 [17.86]
Compressive Modulus, psi [MPa] (D695)	525,000 [3,619.75]	226,000 [1,558.22]	132,000 [910.11]	592,200 [4,083.08]	75,200 [518.49]	16,900 [116.52]
Shear Strength (test performed on flex bars), psi [MPa] (D732)	15,300 [105.49]	9,050 [62.40]	6,880 [47.44]	12,700 [87.56]	4,100 [28.27]	3,300 [22.75]

DESCRIPTION (ASTM Standards)	TYPICAL	
Thermal Properties	Arlon® 3000 XT	PEEK
Coefficient of Thermal Expansion (Axial), $\mu\text{m}/(\text{m}^\circ\text{C})$ (E831)	55.4 (T<T _g), 120 (T>T _g)	46.8 (T<T _g), 135 (T>T _g)
Electrical Properties	Arlon® 3000 XT	PEK
	Room Temp	Room Temp
Dielectric Strength, kV/mm, thickness = 3mm (D149)	15.2	15.4

Note

** Tests performed with flex bars.

Unless otherwise noted, all tests performed on ASTM standard samples.

Arlon 3000 XT is patent pending. Arlon® 3000 XT by Greene, Tweed based on VESTAKEEP®, an Evonik product

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