

ADVANCED

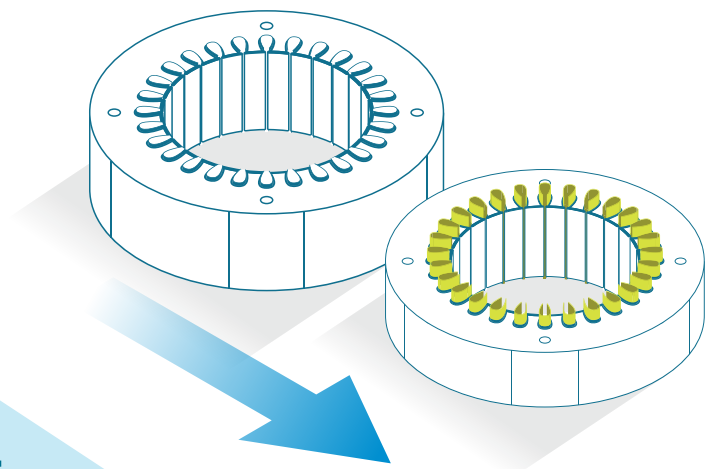
APTIV™ FILM ELECTRICAL INSULATION

FOR COST-EFFECTIVE,
HIGH POWER DENSITY E-MOTORS

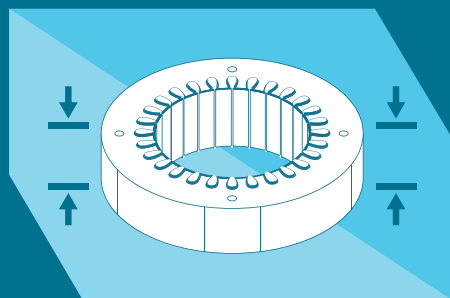
THE FUTURE IS ELECTRIC

E-mobility brings along a variety of technical impacts and challenges, which all share the common need for cost-effective, high power density electric motors.

Victrex' high-performance PEEK polymer solutions have some outstanding properties that can enable improved machine performance, reduce overall manufacturing cost or a combination of both. Using VICTREX™ PEEK based APTIV™ insulation film as a slot liner, with improved thermal conductivity, enables motor manufacturers to potentially increase the copper density and improve thermal management, in turn delivering higher power density motors at a reduced size which can offer valuable material savings on expensive rare earth magnets and electrical steel.

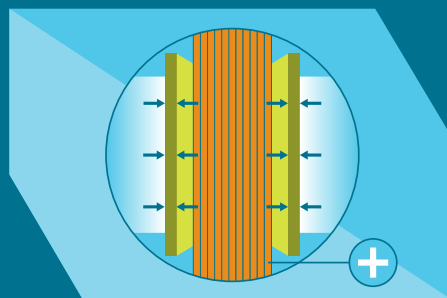


STAY COOL WITH COST-EFFECTIVE APTIV FILM SLOT LINERS FOR ELECTRICAL INSULATION



COST-EFFECTIVENESS

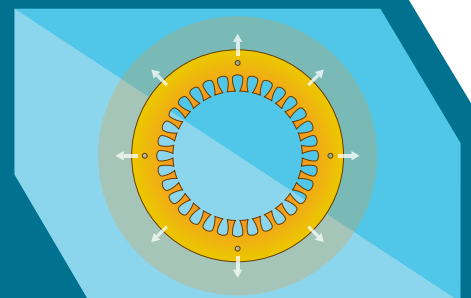
6\$ SAVINGS per e-motor in a smaller motor with same power output by reducing axial length (less utilisation of rare earth magnets)



POWER DENSITY

2% INCREASED COPPER CONTENT through a 40% thinner film format

5% INCREASED CONTINUOUS TORQUE OUTPUT in same size motor



THERMAL MANAGEMENT

THE EXCELLENT THERMAL CONDUCTIVITY of APTIV™ film enables improved thermal management and reduction of peak winding temperatures by 2-3 °C vs. Meta-Aramid/PET laminates

TECHNICAL DATA

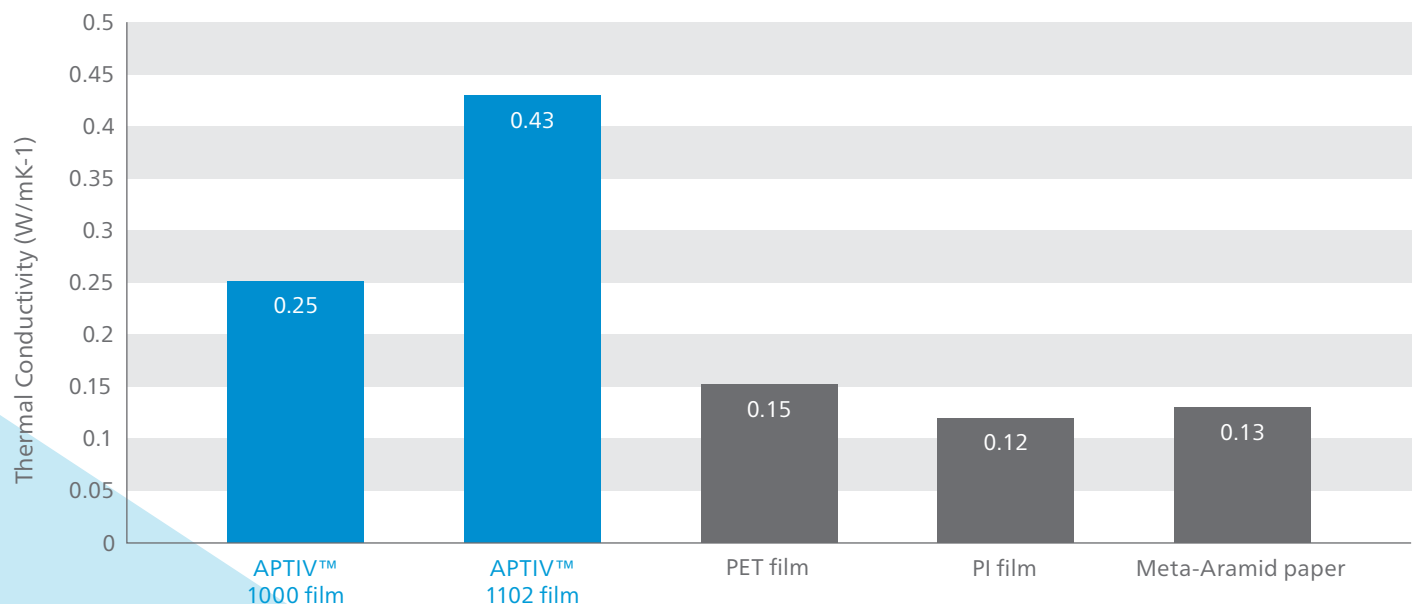
In the insulation application of slot liners for high-performance eMotors (specifically Permanent Magnet Synchronous Machines) when compared to traditional slot liner paper/laminate insulations, APTIV film has been found to offer:

- ▲ Higher dielectric strength
- ▲ Available in thinner fit for purpose formats – 150 micron and below
- ▲ Improved tear initiation strength
- ▲ Excellent puncture resistance
- ▲ Double thermal conductivity
- ▲ Better heat resistance and long term endurance, UL certification of 240 °C for APTIV vs 180 °C for PET paper laminates or 220 °C for Meta-Aramid paper (single layer)
- ▲ Improved retention of electrical properties in elevated temperature environments cooled by ATF or rich in moisture

MECHANICAL DATA	CONDITIONS	TEST METHOD	UNITS	TYPICAL VALUE	
				APTIV™ 1000 SERIES	APTIV™ 1102 SERIES
Tensile Strength	Yield, 23°C	ISO 527	MPa	130	100
Tensile Elongation	Break, 23°C	ISO 527	%	>150	>100
Puncture Strength	At yield, 23°C	Def Stan 81-75	kJ/m ²	135	5
Tear Strength	At 23°C	ISO 6383-1	N/mm	4	4,4

ELECTRICAL PROPERTIES				APTIV™ 1000 SERIES	APTIV™ 1102 SERIES
Dielectric Strength	23°C	ASTM D149	kV / mm	189	200*
Dielectric Constant	23°C	ASTM D150	N/A	3,5	3,6
Loss Tangent	23°C	ASTM D150	N/A	0,002	0,001
Volume Resistivity	23°C	ASTM D257	Ohm cm	4.00E +16	1.00E +16

*Tests conducted on 50 micron thick film samples



USING A HIGHER VALUE INSULATION MATERIAL MAY ALLOW MACHINE PERFORMANCE BENEFITS THAT ENABLE A TOTAL MATERIAL COST SAVING.

Confidence Through Reliable, Proven
and Cost-Effective Material Solutions



3/4
Mio+

high-powered generators on the
road already rely on APTIV slot liners

35+

years

of collaboration with
market leaders along
the value chain



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Victrex is an innovative world leader in high-performance polymer solutions with products sold under the brand names of VICTREX™ PEEK, VICOTE™ Coatings, APTIV™ film and VICTREX Pipes™. With production facilities in the UK and USA backed by sales and distribution centers serving more than 40 countries worldwide, our global sales and technical support services work hand-in-hand with OEMs, designers and processors offering assistance in the areas of processing, design and application development to help them achieve new levels of cost savings, quality, and performance.

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