CLICK BOND

victrex®

Click Bond's VICTREX® PEEK™ Cable Ties Withstand Highly Aggressive Environments

When Click Bond wanted to develop a cable tie for bundling and securing wires and cables in high temperature applications, they chose VICTREX PEEK because of its ability to **perform in highly aggressive environments**. VICTREX PEEK cable ties **provide a solution** for fast, secure and stable wire and cable management.

INDUSTRY APPLICATIONS

With its outstanding mechanical properties and resistance to chemicals, abrasion and radiation, along with its flame and smoke properties, VICTREX PEEK is ideal for cable ties in a broad range of industries including:

- Oil Drilling
- Nuclear
- Aerospace
- Electronics
- Automotive
- Chemical Processing
- Military and Defense

According to Richard Moore, Click Bond Midwest Regional Sales Manager, "Wires and cables running the length of an aircraft's fuselage or around an electric pump motor need to be bundled so they don't come in contact with a heat source or rub up against a sharp edge. For many applications, cable ties made with nylon work well, but in high temperature applications such as oil drilling equipment where cable ties are used to secure small wire bundles to extraction tubes, the nylon tends to melt and interfere with the pumping apparatus. We need the heat resistance properties of VICTREX PEEK to provide our customers with cable ties that **maintain their integrity**."

"In deep drilling situations," explains Andrew Ragan, Victrex Global Leader—Industrial, "Temperatures can approach 200°C (392°F). The oil industry has chosen VICTREX PEEK as the only material able to perform well in such a demanding environment. VICTREX PEEK can **withstand temperatures as high as 260°C (500°F)** and has excellent resistance to electricity, radiation and chemically aggressive environments."

Even at elevated temperatures, VICTREX PEEK has excellent resistance to the chemicals in salt water and crude oil says Moore. It offers long-term reliability after prolonged exposure to high pressure and steam.

The low moisture absorption and low outgassing of VICTREX PEEK makes it **particularly suitable for aerospace applications**, explains Ragan. "Low moisture absorption ensures the dimensional integrity of the cable ties. In addition, VICTREX PEEK **contains no halogens** and exhibits very low levels of smoke and toxic gas during combustion."

"Durability is important," adds Moore. "VICTREX PEEK has **excellent mechanical properties**. It gives us the strength we need and allows us to mold a part that is much stronger than one made from nylon." The tie's one-piece, injection molded construction provides maximum strength and adjustability for securing different size bundles.

Abrasion can be a major problem for electrical wiring, particularly in aircraft, says Moore. "When wires are encapsulated in a plastic coating, the sharp edges of nylon cable ties tend to fray the coating. This does not happen with the way we mold our VICTREX PEEK cable ties." Because VICTREX PEEK is an inherently lubricious material, it is **highly abrasion resistant**.

Properties of VICTREX 381G, 150GL30 and 150CA30

VICTREX 381G is an unfilled PEEK, VICTREX 150GL30 is a 30% glass filled PEEK, and VICTREX 150CA30 is a 30% carbon fiber PEEK.

PROPERTY	CONDITIONS	TEST METHOD	UNITS	VICTREX 381G	VICTREX 150GL30	VICTREX 150CA30
General						
Color			n/a	Natural/Beige	Natural/Beige	Black
Density	Crystalline Amorphous	ISO 1183	g/cm^3	1.30 1.26	1.51	1.40
Typical Crystallinity		n/a	%	35	30	30
Water Absorption	24 h, 23°C (73°F) Equilibrium, 23°C (73°F)	ISO 62	%	0.50 0.50	0.11	0.06
Mechanical						
Tensile Strength	Yield, 23°C (73°F) Break, 23°C (73°F)	ASTM D638 tV ASTM D638 tV	MPa (psi) MPa (psi)	97 (14,000)	168 (24,300)	230 (33,300)
Tensile Elongation	Break, 23°C (73°F) Yield, 23°C (73°F)	ASTM D638 tV	%	65 5	2	1.8
Tensile Modulus	23°C (73°F)	ASTM D638 tV	GPa (psi)	3.5 (507,500)	9.7 (1,406,500)	22.3(3,200,000)
Flexural Strength	23°C (73°F)	ASTM D790	MPa (psi)	157 (23,000)	241 (34,900)	345 (50,100)
Flexural Modulus	23°C (73°F)	ASTM D790	GPa (psi)	4.1 (600,000)	11 (1,550,000)	20 (2,900,000)
Shear Strength	23°C (73°F)	ASTM D3846	MPa (psi)	53 (7,685)	97 (14,000)	85 (12,500)
Shear Modulus	23°C (73°F)	ASTM D3846	GPa (psi)	1.3 (188,500)	2.4 (348.000)	
Compressive Strength	Parallel to Flow, 23°C (73°F) Transverse to Flow, 23°C (73°F)	ASTM D695	MPa (psi)	118 (17,000) 119 (17,250)	215 (31,180) 149 (21,605)	240 (34,800) 153 (22,185)
Poisson's Ratio	23°C (73°F)	ASTM D638 tV		0.4	0.4	0.44
Rockwell Hardness	M Scale	ASTM D785		99	103	107
Charpy Impact Strength	2 mm (0.08 in) notch, 23°C (73°F) 0.25 mm (0.01 in) notch, 23°C (73°F)	ISO 179 -1/1e	kJ m^{-2} (ft lb in^{-1})	35 (6.4) 8.2 (1.5)		
Izod Impact Strength	0.25 mm (0.01 in) notch, 23°C (73°F) Unnotched, 23°C (73°F)	ASTM D256	Jm^{-1} (ft lb in^{-1})	87 (1.65) No break	94 (1.79) 567 (10.8)	110 (2.09) 577 (11.0)
Thermal						
Melting Point		DSC	°C (°F)	343 (649)	343 (649)	343 (649)
Glass Transition (T_g)		DSC	°C (°F)	143 (289)	143 (289)	143 (289)
Specific Heat Capacity		DSC	kJ kg^{-1} °C^{-1} (Btu lb^{-1}°F^{-1})	2.16 (0.52)	1.7 (0.41)	1.8 (0.44)
Coefficient of Thermal Expansion	Below T_g Above T_g	ASTM D696	10^{-5} °C^{-1} (10^{-5} °F^{-1})	4.7 (2.6) 10.8 (6.0)	2.2 (1.2)	1.5 (0.8)
Heat Deflection Temperature	1.8 MPa (264 psi)	ISO 75	°C (°F)	152 (306)	315 (599)	315 (599)
Thermal Conductivity		ASTM C177	W m^{-1} °C^{-1} (Btu in h^{-1} ft^{-2}°F^{-1})	0.25 (1.73)	0.43 (2.98)	0.92 (6.38)
Continuous Use Temperature	Electrical Mechanical w/o impact Mechanical w/impact	UL 746B	°C (°F)	260 (500) 240 (464) 180 (356)	240 (464) 240 (464) 220 (428)	 240 (464) 200 (390)
Fire, Smoke & Toxicity						
Flammability Rating		UL94	n/a	V-0@3.0 mm (0.118 in)	V-0@0.75 mm (0.03 in)	V-0@0.75 mm (0.03 in)
Limiting Oxygen Index	0.4 mm (0.0157 in) thickness 3.2 mm (0.126 in) thickness	ISO 4589	% O_2	24* 35*		
Electrical Properties						
Dielectric Strength	50 µm (0.002 in) film	IEC 248	kV mm^{-1}	190	175	
Loss Tangent	23°C (73°F), 1 MHz	IEC 112	n/a	0.003	0.004	
Dielectric Constant	50 Hz, 0-150°C (32-302°F) 50 Hz, 200°C (392°F)	IEC 250 IEC 250	n/a n/a	3.2 4.5	3.7	
Volume Resistivity		IEC 93	10^{16} Ω cm	4.9	1.0	

*Results based on VICTREX 450G

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VICTREX USA Inc., is a division of Victrex plc., the sole manufacturer and supplier of the PEEK™ brand polymer worldwide. PEEK™ is a trademark of Victrex plc.

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CLICK BOND

Click Bond manufactures fasteners specifically designed for adhesive bonding to structure. It also provides adhesive systems and dispensing tools.

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