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INNOVATIVE SOLUTIONS, LIGHTER-AND-STRONGER



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QuantaFlex™

LIGHTER-AND-STRONGER
高性能复合材料解决方案

www.quantumeta.com



ABOUT QUANTUMETA 公司简介

QUANTUMETA is an innovative solution provider of high performance composites. Our goal is to meet customer's ever-increasing demand on lighter-and-stronger composite materials in every industry, product and application by our unique knowhow of advanced materials and application solutions.

北京量子天地新材料科技有限公司（公司简称“量子天地”）成立于2015年，通过创新的高性能复合材料解决方案立足于先进复合材料领域。公司将生产基地和研发中心建设于浙江省桐乡市，成立了浙江全米特新材料科技有限公司，设计引进最先进的生产实验设备，工艺水平领先，研发实力雄厚。公司的研发人员和技术服务团队广泛贴近市场，倾听客户需求，用定制化的解决方案满足客户的产品性能需求，帮助客户挖掘和提升产品的商业价值。

TECHNOLOGY 技术专长

QUANTUMETA has technical expertise of high performance fabric design and application solutions. Its product portfolio covers UHMWPE fiber, high performance fabrics, prepregs, and composite parts. With unique value proposition of "lighter-and-stronger composites", QUANTUMETA serves a wide range of markets and applications like marine engineering, lightweight vehicles, inflatable structures, sports equipment, new energy and etc.

QUANTUMETA's product applications compose of two major categories, i.e. rigid composite and flexible composite. Its high performance fabrics used as reinforcement can effectively reduce weight of composites, improving strength and impact resistance. Its high performance membrane, QuanCles™, is the world's strongest membrane with extremely high strength to weight ratio and excellent properties, bringing flexible composite fields many more possibilities.

量子天地拥有高性能织物设计专长和应用技术专长，通过创新的材料技术为市场提供具有轻质、高强、高性能等优异性能的复合材料产品和应用解决方案。公司产品涵盖高性能纤维、高性能增强织物、预浸料、高性能膜材和复合材料制件，广泛服务于海洋工程、特种建筑、轻量化交通、体育休闲和新能源等应用市场。

量子天地的产品主要分为两大应用方向，硬质复合材料和柔性复合材料。在硬质复合材领域，量子天地的高性能增强解决方案可以显著降低复合材料的重量，提升复合材料的强度和耐冲击韧性；在柔性复合材料领域，海格隆™柔性复合膜材性能突破了传统膜材的最高水平，其超高的比强度和优异的性能为柔性复合材料领域带来了更多的可能。

QuantaFlex™

UHMWPE Fiber Based High Performance Fabrics
以超高分子量聚乙烯纤维为基体的高性能增强织物

PRODUCT DESCRIPTION / 产品介绍

QuantaFlex™ is a series of UHMWPE-based hybrid fabrics including UHMWPE/glass fabric, UHMWPE/carbon fabric, and pure UHMWPE fabric, with warp-knitted multi-axial structure or plain-woven structure. QuantaFlex™ is mainly designed as hard composite reinforcement. UHMWPE fiber has excellent properties of high strength, lightweight, high modulus and flexible. Glass fiber and carbon fiber are rigid and appropriate for hard composite. QUANTUMETA effectively combined them together and developed a series of high performance fabrics. With QuantaFlex™ solutions, you can effectively reduce weight of your composites and gain higher performance composites with higher strength and flexibility.

QuantaFlex™是量子天地特有的高性能织物，主要用于硬质复合材料增强，实现为复合材料增强、减重、增韧的效果。QuantaFlex™产品包括UHMWPE/玻璃纤维混编织物，UHMWPE纤维/碳纤维混编织物和UHMWPE纤维织物三个产品系列，编织结构有经编多轴向结构和平纹结构。QuantaFlex™充分利用了UHMWPE纤维高强轻质、高模、柔韧的特性，与玻璃纤维和碳纤维的刚性相结合，可以有效提升复合材料的综合性能。与传统材料制备的复合材料相比，用QuantaFlex™制备出的高性能复合材料具有更高的强度、更轻的质量和更优秀的耐冲击韧性。QuantaFlex™具有可设计性，客户可以根据实际需求进行方案调整以达到最佳性能平衡。



Product Code 产品代码	Material Type 材料类型	Woven Pattern 编织结构	Areal Weight 面密度
PECT-S190	UHMWPE Fiber Carbon Fiber	Twill weaving	190 ± 10 g/m ²
PECUL-S190	UHMWPE Fiber Carbon Fiber	Warp-knitted Unidirectional 经编单向	190 ± 10 g/m ²
PEGLT-A330	UHMWPE Fiber Glass Fiber	Warp-knitted Multi-axial 经编多轴向	330 ± 10 g/m ²
PEP-A172	UHMWPE Fiber	Plain-woven 平纹编织	172 ± 10 g/m ²

QuantaFlex™

PECT / PECUL

UHMWPE / 碳纤维混编织物

PRODUCT DESCRIPTION / 产品介绍

Carbon fiber is widely used in lightweight composites because it is light and rigid, but it is not strong enough. In some applications that face large impact load, carbon fiber is prone to be fracture instantly with brittle deformation. To improve the flexibility of carbon composites, QUANTUMETA found way to combine carbon fiber with UHMWPE fiber to get a higher performance reinforcement fabric. UHMWPE has the highest strength-to-weight ratio among high performance fibers and the best impact-resistance. It weighs 2/3 of aramid fiber and only 1/2 of carbon fiber. Therefore, composites reinforced with this hybrid fabric not only can achieve higher impact-resistant, but also are lighter than pure carbon composites.

碳纤维的质量轻、刚性好，是新一代的增强纤维，被广泛应用于轻量化复合材料领域。但碳纤维的韧性较差，在受到较大冲击力后容易发生脆性断裂，使其应用性受到挑战。为了解决碳纤维韧性不足的问题，量子天地创新的将UHMWPE纤维与碳纤维进行混编，从而得到了综合性能更高的织物产品。UHMWPE纤维是三大高性能纤维中比强度最高的纤维，密度只有芳纶纤维的2/3，碳纤维的1/2，抗冲击韧性也居于三者之首，因此，由UHMWPE/碳纤维混编织物增强的复合材料不仅抗冲击性得以有效提高，其重量也大幅降低，是高端复合材料构件的最佳选择。

PERFORMANCE FEATURES / 产品特点

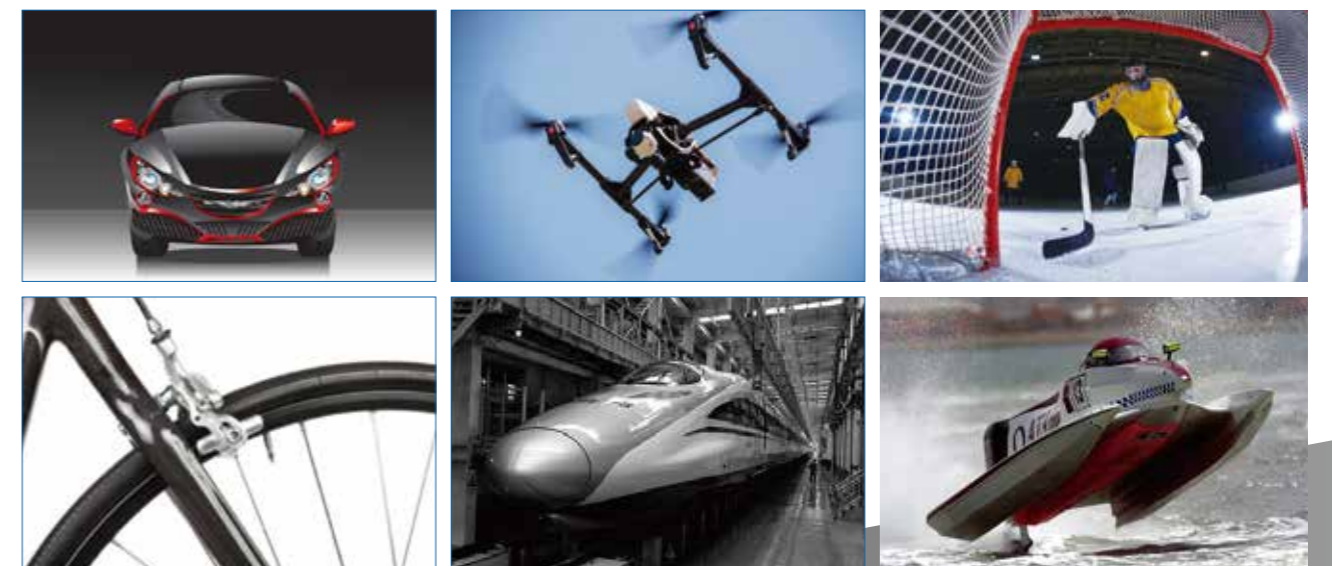
- More impact-resistant
- Lighter weight
- High strength
- Vibration-damping
- 抗冲击韧性更好
- 质量更轻
- 高强度
- 减振性更好

TECHNICAL DATA SHEET / 技术参数表

Code 代码	Material Type 材料构成	Woven Pattern 编织方式	Areal-weight 面密度(g/m ²)	Interface Energy 表面能(mN/m)	Resin Compatibility 树脂兼容性
PECT-S190	UHMWPE Fiber Carbon Fiber	Twill weaving 斜纹编织	190 ± 10	>72	UP, EP, VE
PECUL-S190	UHMWPE Fiber Carbon Fiber	Warp-knitted Unidirectional 经编单向	190 ± 10	>72	UP, EP, VE

APPLICATIONS / 应用领域

New Energy Vehicle / Drone / High Speed Boat / High Speed Railway / Sports Equipment
新能源汽车、无人机、高速艇、高速列车、体育器材



QuantaFlex™

PEGLT

UHMWPE / 玻璃纤维混编织物

PRODUCT DESCRIPTION / 产品介绍

Glass fiber is widely used in composite reinforcement because it is rigid and lighter than steel. However, glass fiber is not light and strong enough, and in some high-end applications where further lightweight and higher strength are required, glass fiber can no longer meet the requirement. UHMWPE fiber is far lighter, stronger and more flexible, which can be combined to glass fiber through warp-knitted multiaxial structure. With this hybrid fabric, customers can produce composites with lighter weight, higher strength and impact-resistance. QuantaFlex™ is designable and our engineers will provide you tailor-made solutions to meet your product requirement with the most economical way.

玻璃纤维具有良好的刚性而密度轻于钢材，被广泛应用于复合材料领域。然而玻璃纤维的强度低、脆性大、耐磨性差，往往不能满足更高端复合材料产品的性能要求。UHMWPE纤维具有高强高模、轻质柔韧的特点，性能优异。量子天地将UHMWPE纤维和玻璃纤维通过多轴向经编结构进行混编，使织物获得了更高的综合性能，在结构设计中替代或部分替代纯玻纤织物可以有效减轻复合材料重量，增强复合材料的强度和抗冲击性。量子天地为客户提供涵盖了高性能织物设计，树脂浸润和应用方案设计等系列产品解决方案，可以结合客户需求进行方案调整以达到刚性、减重、韧性以及经济性的平衡。

PERFORMANCE FEATURES / 产品特点

- Lighter weight
- Corrosion-resistant
- 重量更轻
- 优秀的耐腐蚀性
- Higher strength
- Insulated
- 强度更高
- 优秀的绝缘性
- Flexible, impact resistant
- High transmissivity
- 柔韧性好，抗冲击
- 高透波率

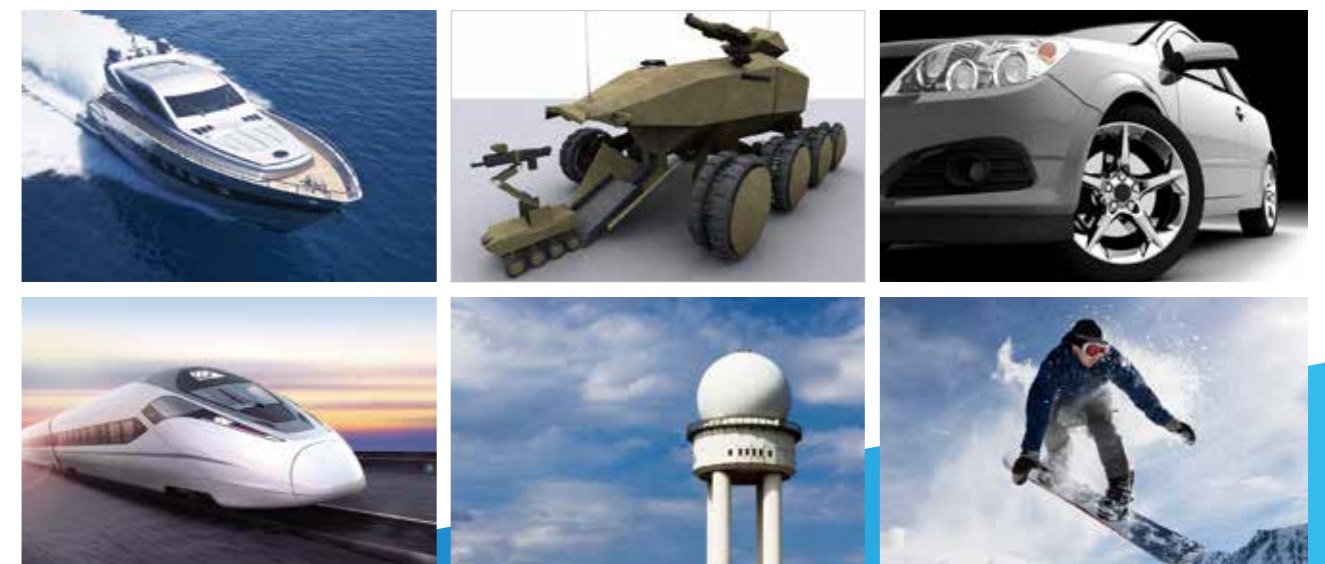
[PEGLT-A330]

TECHNICAL DATA SHEET / 技术参数表

Material Type 材质类型	Layer Construction 铺层	Areal-weight 面密度(g/m ²)	Stitching Pattern 缝编结构	Stitching Material 缝编材料
UHMWPE Fiber E-glass Fiber	0°/ 90°	330±10	Tricot 经编织物	PET
Resin Compatibility 树脂兼容性			Interface Energy 表面能(mN/m)	
UP, EP, VE			>72	

APPLICATIONS / 应用领域

High-speed boat / Armored vehicle / Automobile / Rail train / Padome / Sport equipment
 高速艇、装甲车辆、汽车、轨道列车、雷达罩、体育器材



QuantaFlex™

PEP
UHMWPE 织物

PRODUCT DESCRIPTION / 产品介绍

UHMWPE fiber has density of 0.97g/m^3 , the lightest among reinforcement fibers, 2/3 of aramid fiber and half of carbon fiber. UHMWPE fiber is also the strongest among high performance fibers. Therefore, fabric made with UHMWPE fiber is not only light but also has excellent tensile strength and tear strength. UHMWPE fiber is flexible, and absorbs energy during plastic deformation. Its ability of absorbing is 1.8 times of carbon fiber, 2.6 times of aramid fiber and 33 times of glass fiber. Compared with UD structure, fabric with woven structure can be better combined with resin, therefore is more suitable for composite reinforcement. UHMWPE fabric also has excellent properties of low temperature resistance, corrosion resistance, UV resistance, and high transmissivity, bring composites better performance. It is suitable for both hard composite reinforcement and flexible composite reinforcement.

UHMWPE纤维是最轻的增强纤维，其密度为 0.97g/m^3 ，是芳纶纤维的2/3，碳纤维的1/2，其比拉伸强度是高性能纤维中最高的。用UHMWPE纤维制成的织物质量轻，具有优异的拉伸强度和撕裂强度。UHMWPE纤维柔韧性好，在塑性变形过程中吸收能量，冲击能量吸收能力分别是碳、芳纶和E玻璃纤维的1.8、2.6和33倍。与无纬UD相比，UHMWPE编织结构可以更好的与树脂结合，更适用于复合材料应用。除此之外，UHMWPE纤维织物还具有优异的耐低温、耐腐蚀、耐紫外和高透波率等优异性能，适用环境广泛，可用于增强硬质复合材料或柔性复合材料。

PERFORMANCE FEATURES / 产品特点

- High tensile strength and tear strength
- Light weight
- Flexible
- Energy absorbing
- High resistant
- High transmissivity
- 超高拉伸强度、撕裂强度
- 质量轻
- 柔韧性好
- 能量吸收力强
- 高阻抗，性能稳定性强
- 高透波率

[PEP-A172]

TECHNICAL DATA SHEET / 技术参数表

Material Type 材质类型	Woven Pattern 编织方式	Areal-weight 面密度(g/m^2)	Interface Energy 表面能(mN/m)	Resin Compatibility 树脂兼容性
UHMWPE Fiber 超高分子量聚乙烯纤维	Plain weaving 平纹编织	172 ± 10	>72	UP, EP, VE

APPLICATIONS / 应用领域

UAV / Body protection / Radome / Airship / Sail / High-speed boat
无人机、个人防护、雷达罩、飞艇、船帆、高速艇

