QUANTUMETA

Beyond Performance

BEIJING QUANTUMETA AMT CO., LTD

北京量子天地新材料科技有限公司

ADD: Building 1# Chengying center, Wangjing, Chaoyang, Beijing, PR.China, 100102

地址: 北京市朝阳区望京来广营西路诚盈中心1号楼

Tel: 010-85926517

Email: sales@quantumeta.com

ZHEJIANG QUANTUMETA AMT CO., LTD

浙江全米特新材料科技有限公司

ADD: No.888, Zikai West Road, Shimen, Tongxiang, Zhejiang Province, PR.China, 314512

地址: 浙江省桐乡市石门工业区子恺西路888号

Tel: 0573-89386328

Email: sales@quantumeta.com

www.quantumeta.com

QuanCles™ 海格隆™

The strongest membrane in the world

QuanCles™ SALVAGE BUOYANCY AIRBAG

海格隆™ 打捞浮力气囊

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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

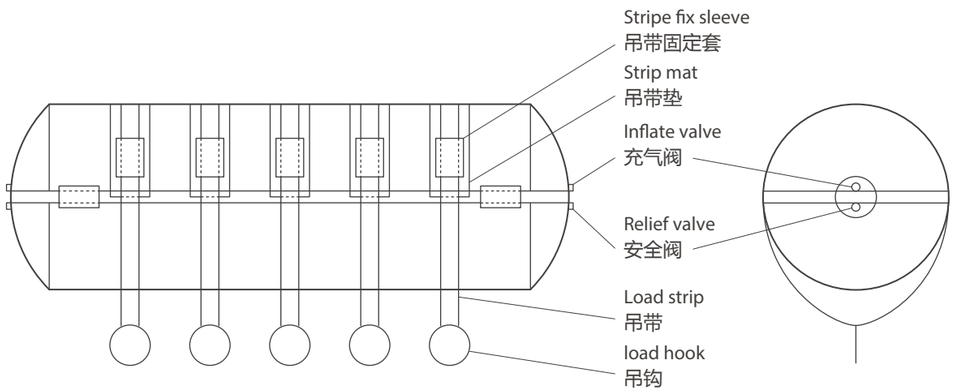
QUANTUMETA has technical expertise of high performance fabric design and application solutions. Its product portfolio covers UHMWPE fiber, high performance fabrics, prepregs, and composite parts. With unique value proposition of “lighter-and-stronger composites”, QUANTUMETA serves a wide range of markets 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。

AIRBAG STRUCTURE / 气囊结构图



PROPERTIES / 性能特点

Super Light

Quancles™ Salvage Buoyancy Airbag is made by welding UHMWPE fiber reinforced TPU membrane and coating with polyurea. the material density is only about 1 g/cm^3, which is close to that of water. Therefore, to provide same buoyancy, it weighs only 1/10 of rubber buoyancy airbag, and 1/30 of steel pontoon, which makes it far easier to operate and transport.

超轻

海格隆™打捞浮力气囊的主体由超高分子量聚乙烯纤维增强的TPU膜材焊接而成，外层喷涂聚脲保护层，整体密度约1g/cm3，密度与水接近。海格隆™打捞浮力气囊的结构简单，重量超轻，在提供同等浮力下自身重量仅为橡胶气囊的1/10，钢制浮筒的1/30.，便于操作和运输。且可用于直接嵌入船舱内部，提供内浮力。

Quancles™ Salvage Buoyancy Airbag is easily handled in water when divers install it especially into ship cabin because it is light and foldable. It is also easily loaded by truck or air container for a quick response to emergency salvage action.

Ultra-strong

Quancles™ Salvage Buoyancy Airbag can provide up to 300 tonnes buoyancy with 5 meters diameter structure due to its high inner pressure capacity benefited from the ultra-high tensile strength, tear strength and burst strength of Quancles™ membrane.

Wear-resistant, Corrosion-resistant, Aging-resistant

Reinforced by UHMWPE fiber, protected by polyurea, Quancles™ Salvage Buoyancy Airbag is strong with excellent wear resistance, corrosion resistance and aging resistance, which makes it durable and reusable.

Workable in Extreme Environment

Quancles™ Buoyancy Airbag keeps its performance and remains flexible in extreme climate conditions especially in low temperature place, for instance, polar region.

Based on those performance advantages, Quancles™ Salvage Buoyancy Airbag are widely used in deep water salvage, counterweight water bag, jacking airbags, inflatable dams, pipe blanking plug and etc.

超强

海格隆™膜材的超高拉伸强度、撕裂强度和顶破强度，赋予了海格隆™打捞浮力气囊超高的承压能力，可以制备更大吨位软体浮力气囊，适用于更深海域的打捞作业。海格隆™打捞浮力气囊的最大直径可以做到5m，单体浮力可达300吨。

耐磨、耐腐蚀、耐老化

海格隆™膜材的耐磨和耐腐蚀性能优异，膜材表面的聚脲涂层进一步增强了气囊的耐磨、耐腐蚀和耐老化性能，使气囊可重复使用，降低了使用成本。

优异的耐低温性能

海格隆™膜材和聚脲的组合，在-30℃-70℃正常使用并保持柔性，不会变硬，强度不损失，可在极寒地区如极地地区使用。

安装操作方便，易于折叠

海格隆™打捞浮力气囊具有柔性好，便于安装操作，易于折叠，占用空间小，运输和储存方便。

基于各种性能优势，海格隆™打捞浮力气囊可广泛用于深海打捞、配重吊袋、顶升气囊、充气大坝和管道截流等领域。

TECHNICAL DATA SHEET / 技术参数表

	Unit 单位	Data 参数	Test standard 检测标准
Material 膜材料	QuanCles™ UHMWPE/TPU Membrane 海格隆™超高分子量聚乙烯纤维/TPU膜材		
Surface Treatment 表面处理	Polyurea 聚脲		
Density 密度	g/cm^3	1	GB 1033-1986
Diameter 直径	m	0.5 / 1 / 2 / 3 / 4 / 5	ISO 2286-2
Length 长度	m	>1	ISO 2286-2
Tensile Strength 拉伸强度	N/5cm	9500 / 9000	ISO 1421
Elongation 伸长率	%	<10	ISO 1421
Tear Strength 撕裂强度	N	1200 / 1200	ISO 4674-1
Bursting Strength 顶破强度	MPa	>20	GB / T 14800-2010
Flame Resistance 阻燃等级	/	B1	GB 8624-2012
Temperature Range 使用温度	℃	-30 ~ 70	GB / T 18426-2001

CASE STUDY / 应用案例

Twenty-nine QuanCles™ airbags provided 1500 tonnes buoyancy for salvage of Korean “SEWOL”

29个海格隆™打捞浮力气囊为韩国“世越号”沉船打捞提供约1500吨浮力

In the world-known salvage of Korean “SEWOL”, to make sure the ship can be lifted stably, twenty-nine QuanCles™ salvage airbags were installed in the cabin and they provided about 1500 tonnes of buoyancy for the salvage. QuanCles™ airbag is super light with material density close to water; therefore, it can stay at any depth in water and can be handled by only one diver, which means a great improving of working efficiency.

The salvage of “SEWOL” had experienced a long time due to long-term preparation. Benefits from the high strength and excellent properties of QuanCles™ membrane, the twenty-nine inflated salvage airbags successfully survived the low temperature and high corrosion of ocean, the abrasion from surroundings in cabin, and near one-year’s high pressure from both inside and outside in deep ocean, offering the mission a perfect end.

在韩国”世越号”沉船打捞项目中，为了使沉船可以被平稳起吊，潜水员将29个海格隆™打捞浮力气囊安装于船舱内部，为沉船起吊提供了约1500吨浮力。海格隆™打捞浮力气囊的重量轻，密度接近于水密度，可放置在水中任意高度进行作业，单人即可进行操作，大大提高了本次打捞的施工效率。

由于“世越号”的打捞准备期较长，充气后的海格隆™打捞气囊不仅要长期承受来自气囊内部和外部海底的双重压力，更要经受海底的低温、腐蚀和船舱的反复磨损。得益于海格隆™膜材优异的性能，在海底浸泡近一年的海格隆™打捞浮力气囊无一破损，完美的完成了打捞任务。