

UHMW-PE

超高分子量聚乙烯制品

基于获中国专利金奖的ERE智造技术

Based on ERE technology won the China Invention Patent Gold Award



实现超高分子量聚乙烯的高效、高性能加工

Succeeded in High Efficiency Processing of UHMW-PE with Superior Performance

广东星联科技有限公司

SIICO TECHNOLOGY CO., LTD.

公司成立于 2015 年, 注册资金 6000 万元, 由星联投资、华南理工大学院士团队、战略投资人及经营团队共同出资成立, 是一家聚焦高分子材料智能制造装备、高性能新材料的研发、生产、销售和服务的国家高新技术企业。公司位于广东省佛山市南海区三山新城, 地处粤港澳大湾区内, 靠近广州南站、毗邻港澳。

公司拥有中国工程院院士瞿金平教授发明的“基于拉伸流变的高分子材料塑化输运方法及设备”专利技术, 并研制出具有自主知识产权的“拉伸流变挤出设备”(简称 **ERE**), 目前公司主营产品有:

- 让超高分子量聚乙烯制品实现高效、高性能加工的 **ERE** 拉伸流变挤出设备
- 为高分子材料研发提供全新实验方案的 **ERE** 实验设备
- 对高分子防水卷材行业生产工艺带来重大突破的 **ERE** 连续法胶粘剂生产系统
- 实现高效、高性能加工的超高分子量聚乙烯制品
- 更易加工的食品级全生物降解复合材料
- 终结农用地膜白色污染的“高强度高耐候易回收地膜”——高堡膜

公司秉承“专业专注、共创共享”的核心价值观, 以“推广普及拉伸流变技术, 不断开创高分子材料应用的新领域”为使命, 推动“拉伸流变挤出技术”全面产业化, 力争成为高分子材料加工技术的领跑者。

Established with registered capital of 60 million in 2015, Siico Technology is a National High-Tech Enterprise jointly funded by XL Investment, Academician Team of South China University of Technology, Strategic Investors and Management Team, focusing on R&D, production, sales and service of intelligent manufacturing equipment for polymeric materials and new high performance material. We are located in Sanshan New City, Foshan, Guangdong Province, which lies at the Guangdong-Hong Kong-Macao Greater Bay Area, close to Guangzhou South Railway Station and adjacent to Hong Kong & Macao.

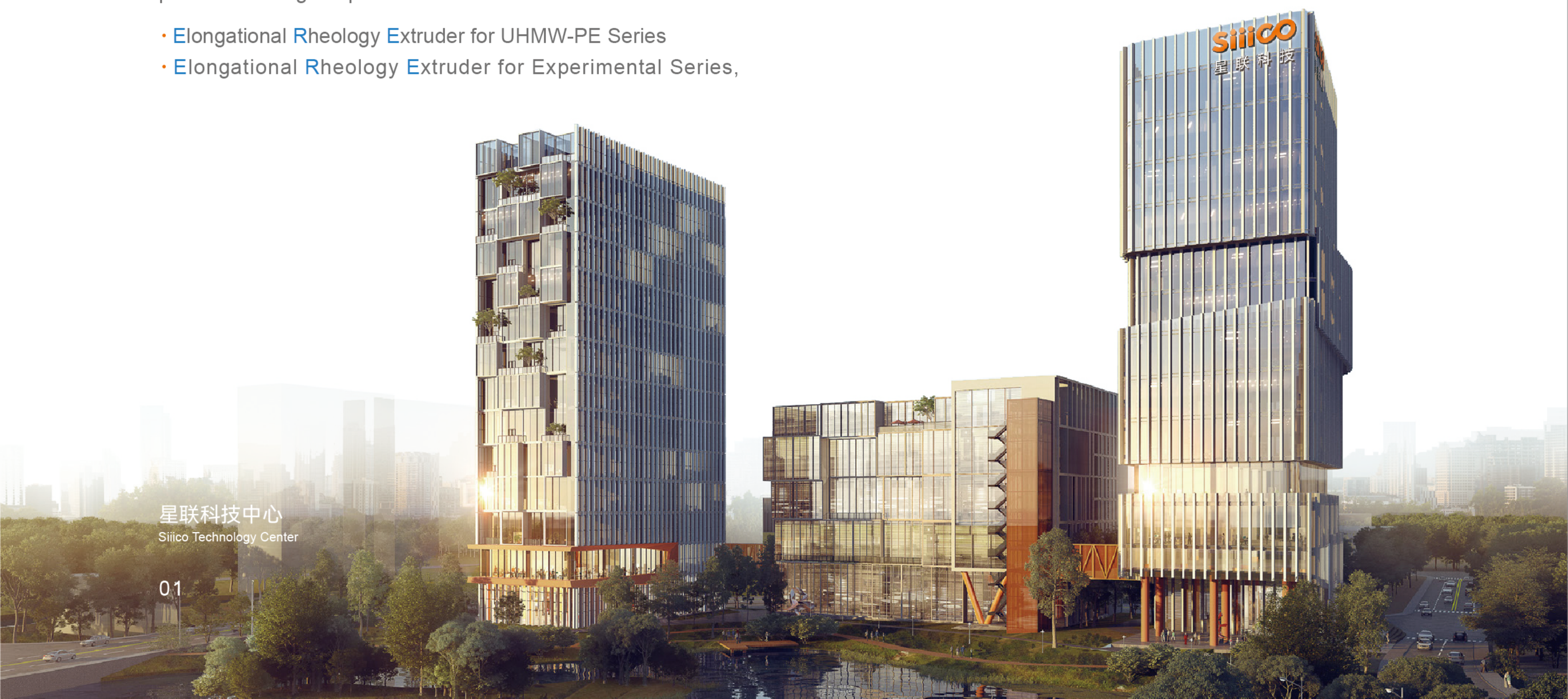
Owning the patented technology of “Method and a Device for Plasticizing and Transporting Polymer Material based on Elongation Rheology” invented by Qu Jinping, who is the Academician of China Academy of Engineering, Siico has successfully developed “Elongational Rheology Extruder (referred to as **ERE**)” with independent intellectual property rights. Our comprehensive range of products include :

- Elongational Rheology Extruder for UHMW-PE Series
- Elongational Rheology Extruder for Experimental Series,

which provides a new experimental option for the optimization of polymeric processing technology

- **ERE** Continuous Adhesive Production System, which has brought a major breakthrough in the production process of polymer waterproofing membrane industry
- UHMW-PE Products with superior performance
- Food-grade Fully Biodegradable Composite Materials, which can be easier to process
- Terminator for White Pollution on Mulch Film —— “High strength, Weather resistant & Easy-to-recycle Mulch Film” (Gaobao Film)

Adhering to the core value of “Professionalism & Dedication, Mutual Creation & Sharing”, Siico has persisted in the mission of “promote elongational rheology technology and explore new application for polymer” to propel comprehensive industrialization of the elongational rheology technology and strive for the leader of the processing technology of polymeric materials.



专利技术

PATENTED TECHNOLOGY

广东星联科技有限公司拥有华南理工大学瞿金平院士发明的“基于拉伸流变的高分子材料塑化运输方法及设备”专利技术（简称 ERE 技术），实现了从基于剪切流变的加工原理到基于拉伸流变加工原理的技术变革，是颠覆百年传统技术的发明，在高分子材料加工技术发展史中具有里程碑式的意义！

ERE 技术相关成果经国家部委鉴定为“国际首创、国际领先”水平，先后获得 2014 年中国发明专利金奖，2015 年国家技术发明二等奖，2020 年中国国际工业博览会 CIIF 大奖。核心技术已获得中国、美国、日本、欧洲等 13 个国家和地区的国际专利授权。

Siiico Technology owns the patented technology of “Method and a Device for Plasticizing and Transporting Polymer Material based on Elongation Rheology” (referred to as ERE technology) invented by Academician Qu Jinping of South China University of Technology, which has realized technological revolution from the processing principle based on the shearing rheology to elongational rheology. This revolutionary invention breaks through traditional technology over one hundred years and will be a milestone for polymer processing.

The core technology of ERE was awarded with “Gold Award of Chinese Outstanding Patented Invention” in 2014, “the Second Prize of National Award for Technological Invention” in 2015 and “CIIF Award in the 22th Session China International Industry Fair” in 2020, which has been identified as “International Initiative and Leading Level” by Departments of National Ministries and granted patents in more than 13 countries and regions including China, U.S.A, Japan and Europe etc.



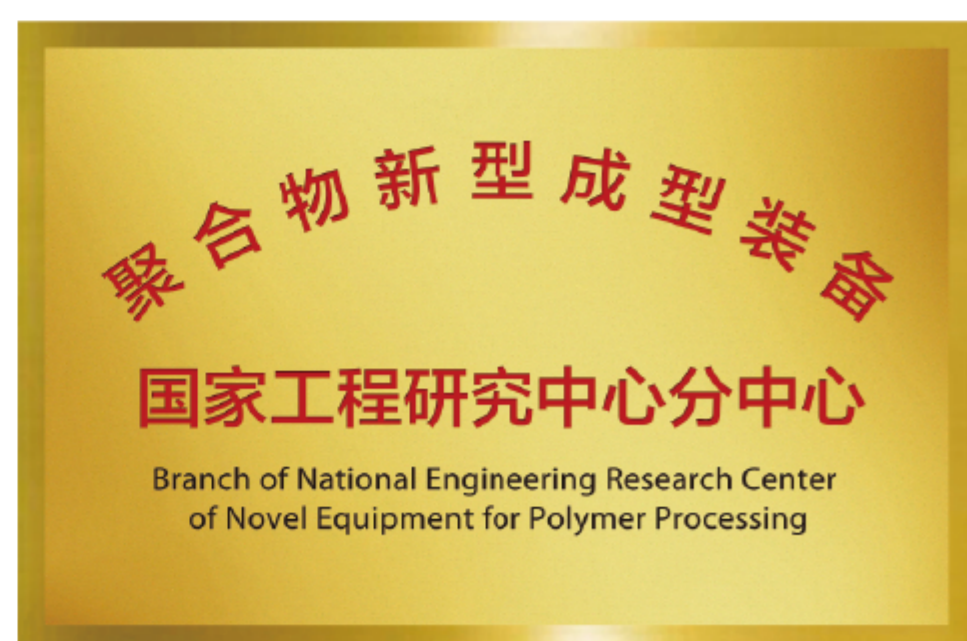
中国发明专利金奖
WIPO-SIPO Award for Chinese Outstanding Patented Invention



国家技术发明二等奖
The Second Prize of National Award for Technology Invention



中国发明专利金奖、国家技术发明奖、专利证书
China Invention Patent Gold Award, National Technology Invention Award, Patent Certificates



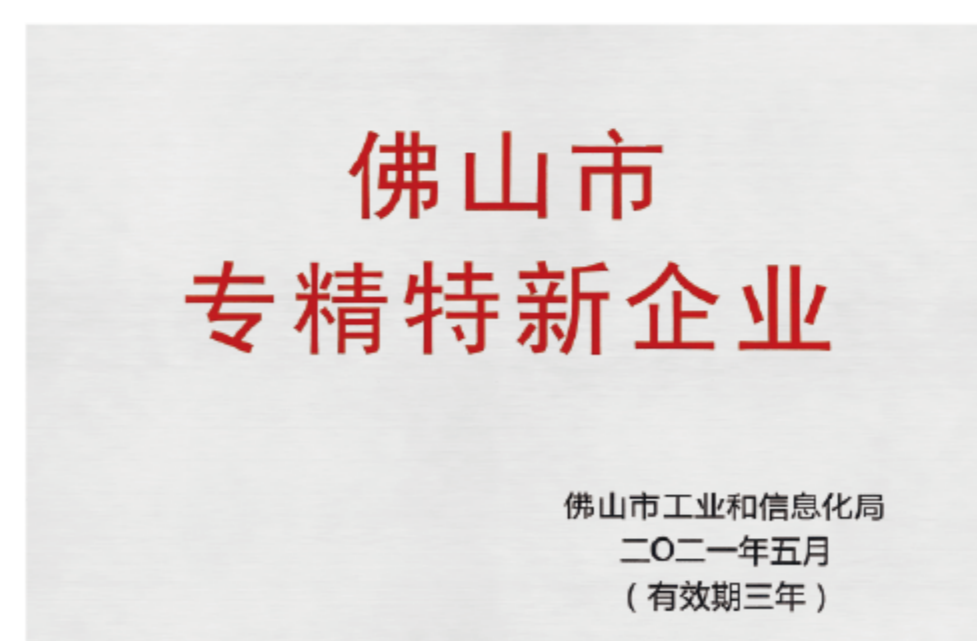
聚合物新型成型装备
国家工程研究中心分中心
Branch of National Engineering Research Center of Novel Equipment for Polymer Processing



广东省高分子产品智造
技术研究院分院
Branch of Guangdong Intelligent Manufacturing Research Institute for Polymer Product



高新技术企业
National High-Tech Enterprise



佛山市专精特新企业
Foshan Specialized, Refinement, Differential and Innovation Enterprise

产品介绍

DESCRIPTION OF PRODUCT

超高分子量聚乙烯一般是指相对分子量150万以上的聚乙烯，属于热塑性工程塑料，应用范围与尼龙、聚甲醛、聚四氟乙烯等高分子材料相近。我们采用拉伸流变挤出设备加工成型的UHMWPE制品，具有极高的综合性能。应用在输送机械、食品加工、包装机械、建筑用塑料模板、作为用于固体、液体、颗粒等各种腐蚀性介质的管道输送、船舶外立面保护材料、各种耐磨零件的生产制造、工业用毛刷、去披锋、抛光磨料等领域，可降低能耗、噪音，提高产品使用寿命、提升产品品质。

Ultra-high molecular weight polyethylene (shorten as UHMW-PE) belongs to thermoplastic engineering plastics and generally refers to polyethylene with a relative molecular weight of more than 1.5×10^6 . The application range of UHMW-PE is similar to polymer materials such as nylon (PA), polyoxymethylene (POM) and Teflon (PTFE) etc. The UHMW-PE products processed by Siiico's **ERE** are showing extremely high comprehensive performance and widely used in different fields: conveying machinery, food processing, packaging machinery, building templates, pipeline transportation for various corrosive media such as solids, liquids, and particles etc., surface protection materials, manufacturing of various wear-resistant parts, industrial brushes, front-removing and polishing abrasives etc. to reduce energy consumption, noise, improve the quality and service life of product.

星联科技，实现超高分子量聚乙烯的高效、高性能加工！

Siiico Technology, succeeded in high efficiency processing of UHMW-PE with high-performance!



极高耐磨性

Extreme wear resistance / long service life

耐磨性是PA66的5倍、HDPE与PVC的10倍、碳钢的7倍、黄铜的27倍，分子量越高，其耐磨性越好。

The wear resistance of UHMW-PE is 5 times that of PA66, 10 times that of HDPE and PVC, 7 times that of carbon steel, 27 times that of brass, the higher the molecular weight of material is used, the better the wear resistance of the product will be.



良好耐低温性

Good low temperature resistance

在液氮温度（零下269℃）下仍具有延展性，保持稳定工作性能。

UHMW-PE profiles extruded by **ERE** are used in a large number of applications involving high and very low temperatures, such as spiral frosters or cold stores, especially still malleable at liquid nitrogen temperature (minus 269°C) and maintains stable working performance.



优异自润滑性

Outstanding slide characteristics

极低的摩擦系数，与金属所制成的零部件配合工作时更顺畅，不粘附。

The low slide friction coefficient of UHMW-PE enables profiles extruded by **ERE** to reduce the driven energy required in conveyor system and increase the stability of processes without sticking.



耐腐蚀性

Very high resistance to chemicals

除强氧化性酸液外，在一定温度和浓度范围内能耐各种腐蚀性介质及有机介质。

Except for strong oxidizing acid, UHMW-PE can withstand various corrosive media and organic media in a certain temperature and concentration range.



卫生无毒性

Hygienic and non-toxic

可作为输送轨道用于接触食物与药物，符合美国FDA食品级认证。

UHMW-PE is in line with the US FDA food grade certification and can be used as conveyor track to contact food and medicine.



防水绝缘性能

Waterproof and insulating properties

极低的吸水率仅为0.01%以下，并且具有良好的电绝缘性能。

Almost no moisture absorption (below 0.01%), and UHMW-PE has good electrical insulation performance.



极强耐冲击性

Extremely impact resistant

耐冲击性是PC的2倍、ABS的5倍，POM与PBTP的12倍，特别在零下低温环境中（零下195℃）都具有很强的耐冲击强度。

The impact resistance of UHMW-PE is 2 times that of PC, 5 times that of ABS, 12 times that of POM & PBTP, and especially keeps strong impact resistance in the subzero low temperature environment (minus 195°C).



降噪吸音

Sound absorption and noise reduction

吸能降噪消音效果在塑料中最好，提升产品品质，降低噪声污染。

The best performance of sound and noise absorption among all plastics can improve product quality and reduce noise pollution.

产品应用

APPLICATIONS

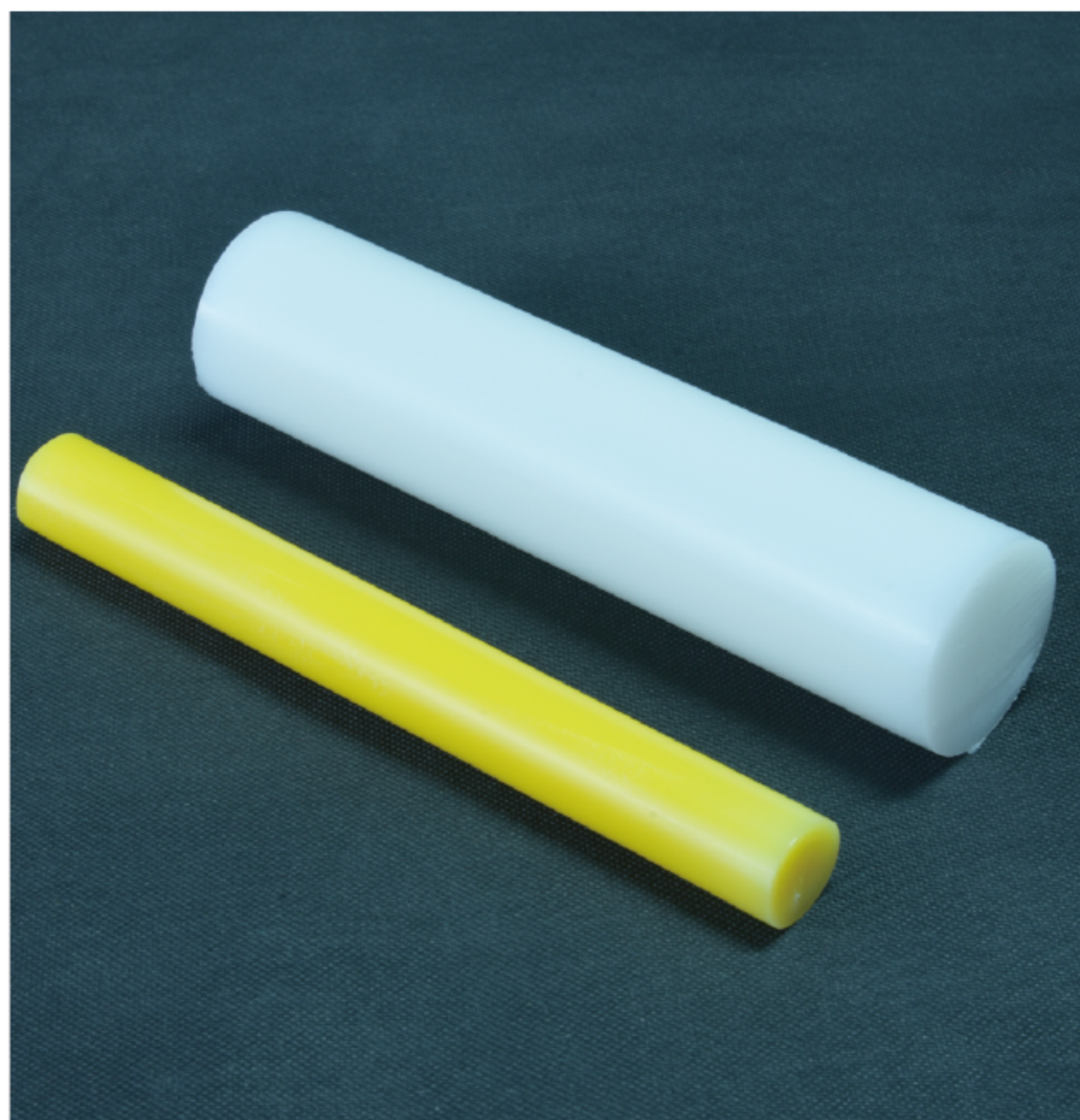


片材 / 薄膜

Thin Sheet / Film

行业应用: 用于脚垫、绝缘材料、耐磨垫片、家具垫片、滑道、耐磨面板等需要滑动的工作面。

Industries of application: floor mats, insulating materials, wear-resistant gaskets, furniture gaskets, slideway, wear-resistant panels and other working surfaces that required to slide.

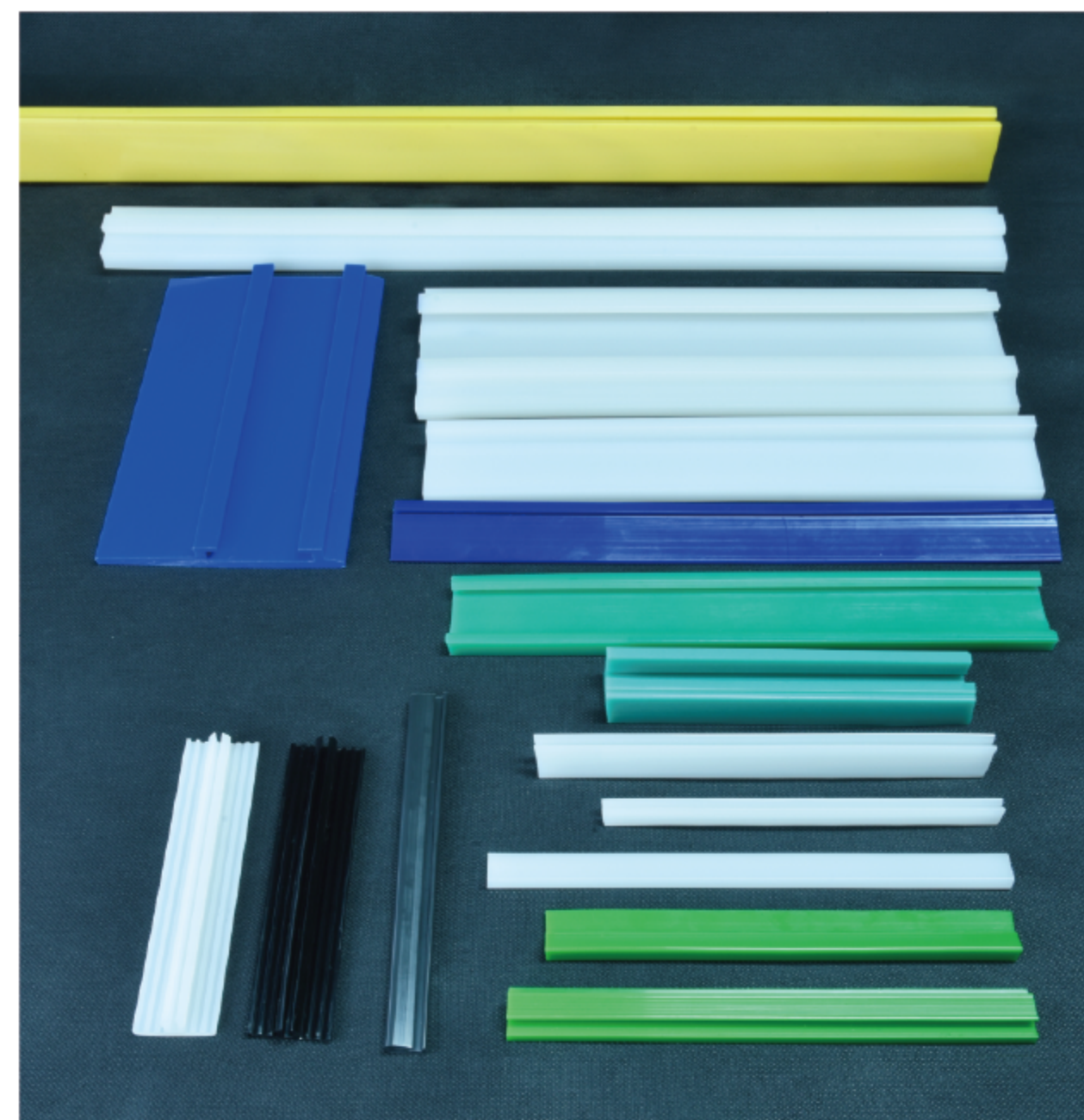


棒材

Rod

行业应用: 用于饮料生产及食品包装等轻工业中，利用其特性制造不同形状和结构的滚轮、星轮、齿轮、导块、轴套等。

Industries of application: light industries such as beverage production and food packaging by taking advantage of special characteristics to manufacture roller, wheel, gear, guide block, shaft sleeve with different shapes and structures.



异型材

Profile

行业应用: 用于传动输送设备、食品机械、纺织机械、包装机械的导轨、衬条、导向条、嵌条、链条、垫轨、齿轮等需耐磨损的部位零件。

Industries of application: guide rails, wear strips, slide guide profiles, clip-profiles, chains, pad rails, gears and other parts required wear resistance in transmission and conveyor equipment, food machinery, textile machinery, and packaging machinery etc.



管材

Pipe

行业应用: 用于密封、输送煤粉矿浆固液混合物、固体颗粒粉末等松散物料、各种腐蚀性介质、天然气、成品油、港口供排水。

Industries of application: used for sealing, conveying coal slurry solid-liquid mixture, solid particle powder and other loose materials, various corrosive media, natural gas, refined oil, port water supply and drainage.



板材

Sheet

行业应用: 运输、食品、包装、造纸机械、粮仓料斗、污水处理设备的耐磨配件，可用于制作各种规格型号的导轨、导条、护栏、滑块等。

Industries of application: can be used to make various types of guide rails, handrail, guide bars, sliding block and wear-resistant accessories for transportation, food, packaging, papermaking machinery, granary hoppers and sewage treatment equipment etc.



原丝 / 线材

Fiber Precursor / Wire

行业应用: 用于制备具有高强度的超高纤维，以及具有优良综合性能的细丝。

Industries of application: can be used for the preparation of ultra-high fiber with high strength and fine filament with excellent comprehensive properties.

应用场景

APPLICATION FIELDS



核能发电行业

Nuclear power generation industry

可制成防伽马射线、防中子辐射的新型屏蔽材料，防止辐射给个人及社会造成的危害。

New type of shielding material against gamma rays and neutron radiation can be made with combination of UHMW-PE to prevent the harm caused by radiation to individuals and society.



风力发电行业

Wind power industry

可用作风电设备上的叶片，延长设备使用寿命，同时提高发电效率。

The blades with UHMW-PE can be used to extend the service life of the equipment and improve the efficiency of power generation.



通讯基站行业

Telecommunication base station industry

可保护通讯基站设备在各种恶劣天气下正常运行。

UHMW-PE can protect the telecommunication base station equipment from various worse weather and work properly.



污水处理行业

Waste-water treatment industry

可用于污水处理设备上的挡刮板，以塑代钢，降低成本、减少更换频率，提升效率。

In primary and secondary WWTP processing applications, UHMW-PE is the best choice for sedimentation and clarifier tank components. No other material can match the benefits and long service life in high abrasion and high impact applications.



汽车工程行业

Automotive engineering industry

可减少高精度的零件在输送过程中与设备摩擦所造成的破损，延长其使用寿命。

UHMW-PE can reduce the damage of high-precision parts caused by the friction with equipment in the process of conveying and prolong the service life of the parts.



物流分拣输送线

Logistics sorting conveyor line

可有效的降低噪音与能耗成本，大大延长设备使用寿命。

UHMW-PE can effectively reduce noise & energy costs, and greatly extend the service life of the equipment.



烟草输送线

Tobacco conveying line industry

可解决烟盒外包装易磨损的问题，更能有效提高产线效率。

Thanks to the advantages of very high wear resistance and low slide friction coefficient, UHMW-PE can solve the problem of quick-wearing on cigarette packing and effectively improve the efficiency of conveyor line.



食品、饮料包装输送线

Food and beverage packaging conveyor line

可直接与食品接触，防止包装破损、划伤，减少配件磨损，降低噪音与能耗成本。

UHMW-PE is in line with FDA food grade, and can be used as conveyor parts to contact food and prevent packaging from damage, scratch, decrease the abrasion of accessories, noise and cost of energy consumption.



各种机械设备的零部件

Parts and components of various machinery

可制作成零部件广泛应用在各种机械设备上，耐用程度居工程塑料之首。

UHMW-PE can be manufactured into parts and components, and widely used in various machinery owing to the characteristic of durability ranking first among all engineering plastics.

产品参数力学性能

PHYSICAL PROPERTIES

分子式 Molecular Formula	- (-CH ₂ -CH ₂ -) -n-	邵氏硬度 Shore Hardness	60 ~ 65HD
分子量 Average Molecular Weight (g/mol)	150~1000万 (1.5×10 ⁶ ~ 10×10 ⁶)	拉伸强度 Tensile Strength	≥ 30MPa
密度 Density	0.920 ~ 0.964g/cm ³	冲击强度 Impact Strength	NB (No broken)
熔点 Melting Temperature	130 ~ 136°C	断裂伸长率 Elongation at Break	350% ~ 500%
热变形温度 Heat Deflection Temperature	85°C	砂浆磨损率 Sand-slurry Wear	≤ 0.35%
工作温度 Service Temperature	-169°C ~ 85°C	线胀系数 Coefficient of Linear Expansion	(1.5 ~ 2.5) 10 ⁻⁴ C ⁻¹
摩擦系数 Friction Coefficient	0.08	模拟滑动摩擦磨损率 Simulating Thrust Wear	< 0.1%

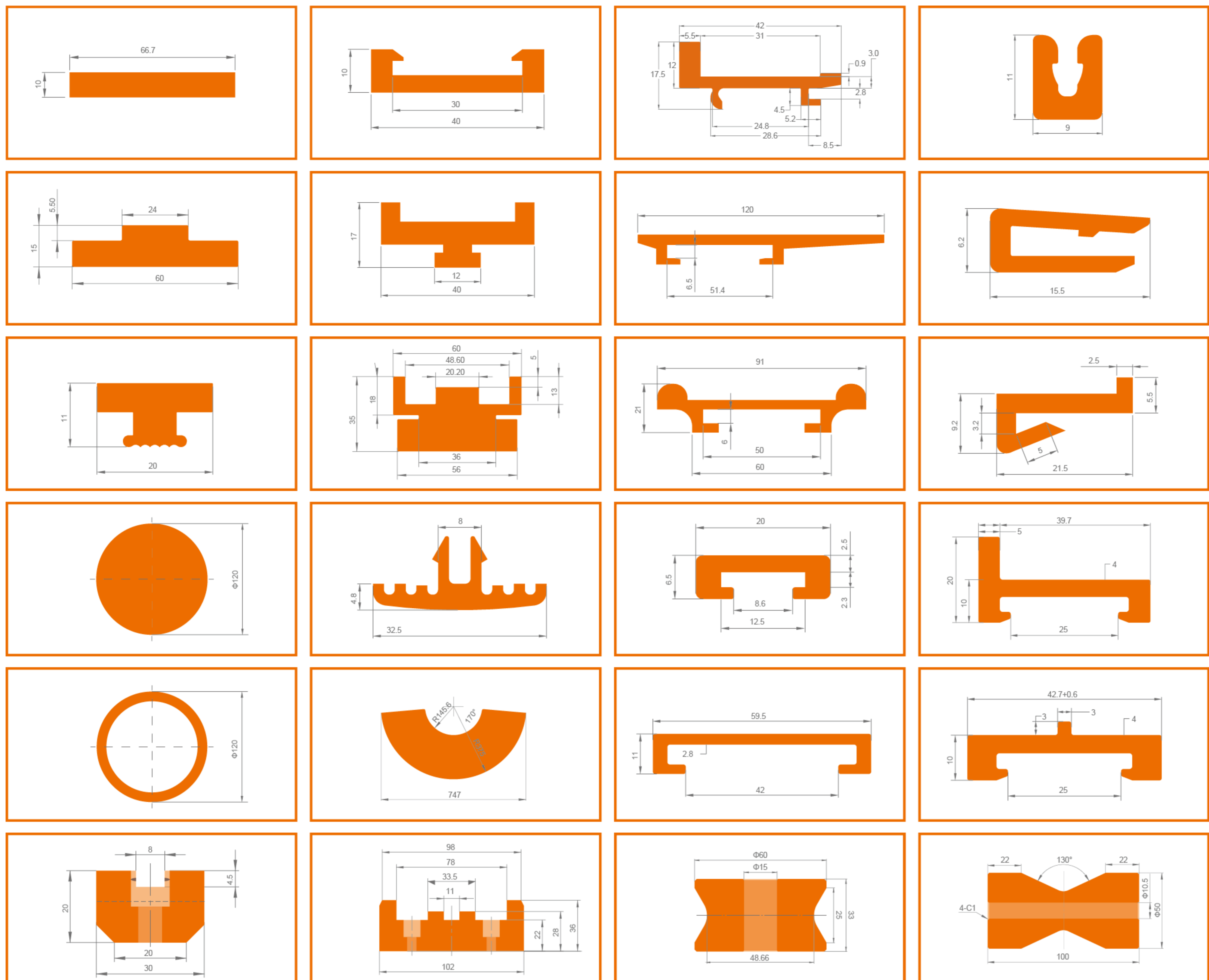
※ 支持更高性能定制 Higher performance can be customized

图纸尺寸

Drawing Diagram

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UHMW-PE制品资料
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