HENG HUI

Fibre Reinforced Composite

ZHEJIANG HENGHUI MACHINERY CO.,LTD

- Fiber Reinforced Composites Solution
- 纤维增强复合材料解决方案

浙江恒惠机械有限公司
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携手共进 合作共赢

WORK TOGETHER WIN-WIN COOPERATION

企业简介

Enterprise introduction

恒惠创立于1999年，拥有一批具有丰富聚氨酯设备生产经验的工程技术人员。企业于2003年6月通过ISO9001:2000国际质量体系认证，现年生产各类聚氨酯设备百余台套，目前有几千台套设备在世界各地运行。

通过紧密合作的方式，使客户能优化生产工艺和改善工业化，从而使恒惠的产品得到大量用户的信任。

恒惠拥有自己的机械、电控和软件开发设计队伍，大量的库存备件，这些都有力地保证给您最优化及时的服务。

恒惠不断地为客户提供更高性能、更实用的生产设备、生产工艺的实践和经验，使我们有能力向客户进行全面的支持，与客户共同进行产品开发。

Founded in 1999, Henghui has a group of engineers and technicians with rich experience in the production of polyurethane equipment. The enterprise passed the ISO9001:2000 international quality system certification in June 2003, and now produces more than one hundred sets of all kinds of polyurethane equipments annually, and thousands of sets of equipments are currently in operation all over the world.

Through close cooperation, customers are able to optimize production processes and improve industrialization, thus enabling Henghui's products to gain the trust of a large number of users.

Henghui has its own mechanical, electronic control and software development and design team, a large number of spare parts in stock, all of which strongly guarantee to give you the most optimized and timely service.

The practice and experience of Henghui in providing customers with higher performance and more practical production equipment and production processes make us capable of providing customers with comprehensive support and working together with customers in product development.



服务宗旨
Service Tenet

恒惠人在致力于产品研发与质量提升的同时，追求市场协同、资源共享的客户关系，力求以良好的服务让客户满意，并建立长久的伙伴关系。

我们不断提高员工的工作效率，培育一支高素质的员工队伍进行客户间的有效沟通；来自客户的任何建议与反馈，使我们得以持续提升产品品质、深化服务，致力于长期使客户满意。

Henghui is committed to product development and quality improvement while pursuing market synergy and resource-sharing customer relationships. We endeavor to satisfy our customers with good service and establish a long-lasting partnership.

We continue to improve the efficiency of our staff and cultivate a high-quality workforce for effective communication between customers. Any suggestions and feedback from customers allow us to continue to improve the quality of our products, deepen our services, and commit ourselves to long-term customer satisfaction.



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R-RIM 增强反应注射成型

R-RIM – Reinforced Reaction Injection Molding

采用R-RIM时，使用伺服/液压式活塞用来计量多元醇和异氰酸酯，驱动速度受伺服液压控制。在加工前，可向原料系统中添加短纤维（玻璃纤维、碳纤维、硫酸钡、碳酸钙、石灰石）或填充材料。混合物被注入封闭模具中发生反应。

在一些特殊应用的场合可设计成连续供料模式，如低浇注量的场合。

With R-RIM, a servo/hydraulic type piston is used to meter the polyol and isocyanate, and the drive speed is controlled by servo-hydraulics. Short fibers (glass fibre, carbon fibre, barium sulphate, calcium carbonate, limestone) or filler can be added to the material system prior to processing. The mixture is injected into a closed mold for reaction.

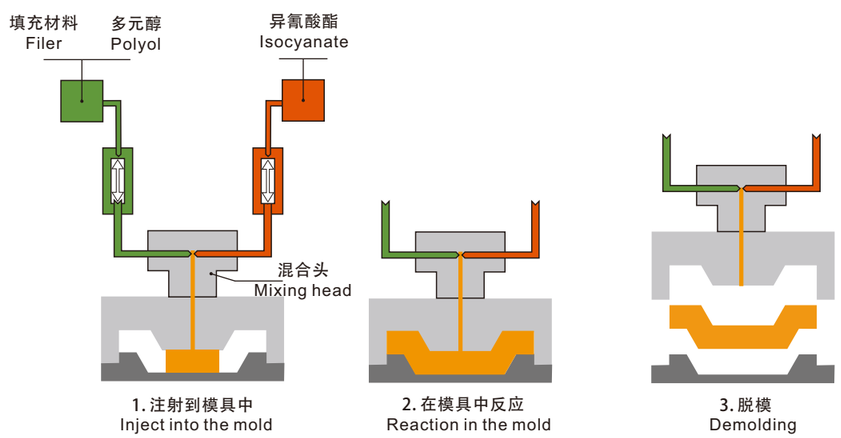
It can be designed in continuous feeding mode for some special applications, e.g. for low pouring volumes.

采用耐磨装备的R-RIM

R-RIM with wear-resistant equipment

在一个预混站中，将填料混入一个组分（通常为多元醇）。使用柱塞式样计量机进行计量，加入填料的多元醇与异氰酸酯在混合头中高速碰撞混合，注入闭合模具。R-RIM是直接在组分中添加填料的工艺，混合头和计量泵均采用耐磨耐腐蚀结构。

In a premixing station, a filler is blended into a component (usually a polyol). Dosing is carried out using a plunger-type dosing machine, and the polyol and isocyanate to which the filler has been added collide and mix at high speed in the mixing head and are injected into a closed mold. R-RIM is a process in which the filler is added directly to the component, and the mixing head and dosing pumps are of wear- and corrosion-resistant construction.





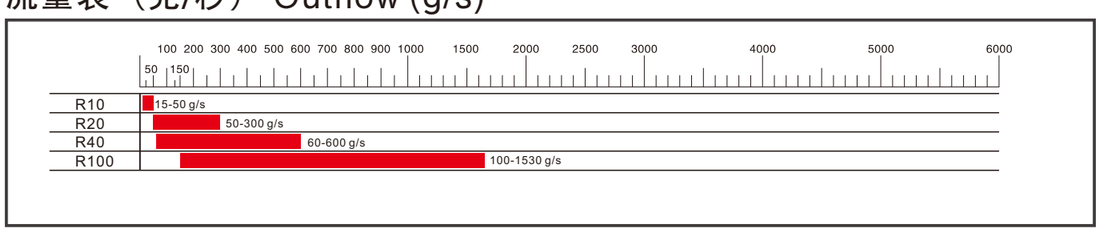
优势一览

Advantage

-自由流动的材料可加工成薄壁部件
-即使在高温下也具有尺寸稳定性和固有刚度
-模具投资少
-提高受热时的刚性和尺寸稳定性

-Free-flowing materials can be processed into thin walled parts
-Dimensional stability and inherent stiffness even at high temperature
-Low investment in molds and tooling
-Improvement of rigidity and dimensional stability under heat

流量表（克/秒） Outflow (g/s)



SCS 结构件喷涂

SCS – Structural Component Spraying

运用SCS工艺时，向由纤维毡和蜂窝板构成的多层结构上喷涂未增强的PU材料，然后放入模具中，合模压紧。

With the SCS process, unreinforced PU material is sprayed onto a multilayer structure consisting of fibre mats and honeycomb panels, which are then placed into the mold and pressed together.

蜂窝结构上的涂层

Coating on honeycomb structures

准备一个三明治结构,在蜂窝板的两个表面分别铺上纤维毡。将三明治结构用一个边框固定后，对其表面进行PU喷涂。将三明治结构与边框一起放入模具内，合模。纤维毡在压制时被PU材料浸润，在固化时与纤维材料结合。

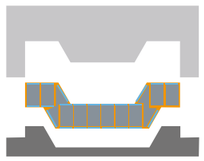
通过互相匹配的骨架和芯层，生产重量特别轻且刚度和抗弯强度高的部件。

Prepare a sandwich structure by laying fibre mats on each of the two surfaces of the honeycomb panel. Fix the sandwich structure with a frame and spray the surface with PU. Place the sandwich structure together with the frame into the mold and close the mold. The fibre mats are impregnated with the PU material during pressing and combine with the fibre material during curing.

Production of particularly lightweight components with high stiffness and flexural strength by means of mutually matched skeletons and core layers.



1.装配三明治式多层结构
Assemble the sandwich

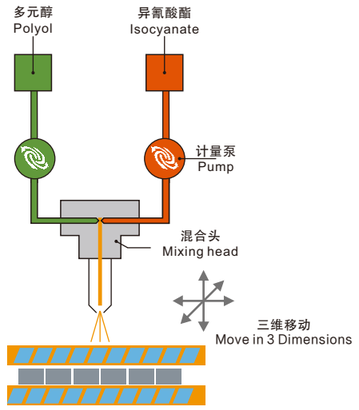


4.成品件送往后续工序
Finished parts for next process

2.双面喷涂
Sprary a PU layer on both sides

3.部件及表面材料的反应成型
Reactive forming of components and surface materials







应用

Application

-应用于轻量化聚氨酯复合材料承重板（聚氨酯蜂窝纸夹芯板）
-应用于汽车内饰件及其他高品质产品聚氨酯表皮的喷涂

-Applied to lightweight polyurethane composite load-bearing plate (polyurethane honeycomb paper sandwich panel).
-Applied to automotive interior trim and other high quality products polyurethane skin.

优势一览

Advantage

-自由流动的材料可加工成薄壁部件
-即使在高温下也具有尺寸稳定性和固有刚度
-即使在高达 180 摄氏度的温度下也具有良好的喷涂能力
-模具投资少
-提高受热时的刚性和尺寸稳定性

-Free-flowing materials can be processed into thin walled parts
-Dimensional stability and inherent stiffness even at high temperature
-Good paint ability, even at temperature up to 180 degree Celsius
-Low investment in molds and tooling
-Improvement of rigidity and dimensional stability under heat.

FCS 纤维复合材料喷涂

FCS – Fiber Composite Spraying

运用FCS工艺时，通过独立层次喷涂PU。是一种非常灵活的工艺，适用于小批量生产。

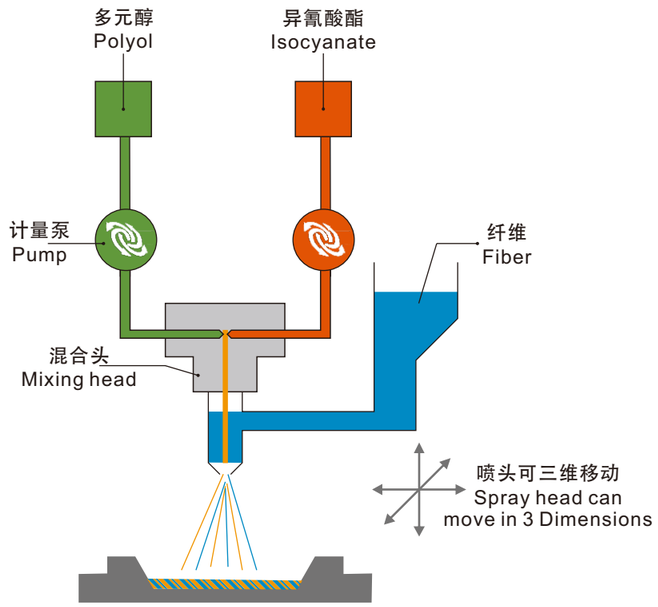
With applying the FCS process, PU is sprayed in separate layers, which is a very flexible process for small batch production.

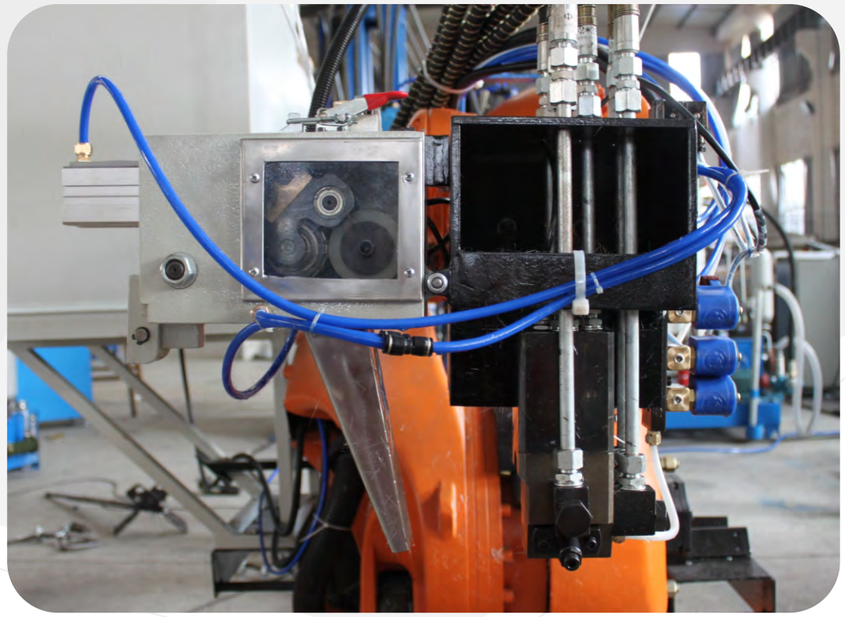
模块化设计

Modularised design

使用双组分混合头，用于生产薄壁或者泡沫型PU产品。使用多组分混合头可以提高生产的灵活性。纤维材料和聚氨酯组分通过喷涂头进行同轴喷涂，可以确保纤维最佳地被浸润。玻纤材料以线束形式进行加工，按照设定要求进行截断，也可以使用预处理的纤维段进行生产。

Use two-component mixing heads for thin-walled or foam type PU products. The use of multi-component mixing heads increases the flexibility of production. Applying coaxial spraying of the fiber material and the PU component through the spraying head ensures optimum wetting of the fibers. The glass fiber material is processed in coils, truncated according to set requirements, or can be produced using pre-treated fiber segments.





应用

Application

FCS工艺适用于生产量少，拥有高度抗弯性的坚硬大面积可见部件。不需要使用模架，使用简单的模具。模具和投资成本较低。

The FCS process is suitable for hard, large visible parts with a high degree of flexural resistance in low production volumes. Simple molds are used without the need for mold holders with a low mold and investment costs.

优势一览

Advantage

-经济的小批量生产，也适用于生产大型部件
-工艺简单，可结合模内喷漆（IMP）
-多层结构实现高刚度和强度

-Economical production of small batches, also suitable for the production of large parts
-Simple process, which can be combined with in-mould painting (IMP)
-Multi-layer construction for high rigidity and strength.

LFI 长纤维注射成型

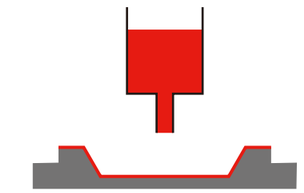
LFI – Long Fiber Injection Molding

运用LFI工艺（长纤维注射成型）时，将长纤维连续（无捻粗纱）输入一个切割机构。玻纤被切割后，通过吹气功能分成众多单丝。切割后，纤维立即与混合头中的PU材料汇聚并浸润。

通过机器人进行轨迹浇注，玻璃纤维与PU材料浇注到模具中。在浇注结束后，合模，混合材料反应固化。

With the LFI process (Long Fibre Injection Molding), a continuous long fibre (untwisted roving) is fed into a cutting mechanism. The glass fibers are divided into numerous monofilament by means of a blowing function after the cutting. After the cutting process, the fibers converge with the PU material in the mixing head and are impregnated immediately.

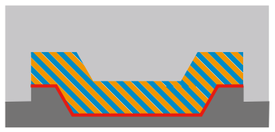
Tracking pouring is carried out by means of a robot and the glass fibre and PU material are poured into the mold. At the end of the casting, the mold is closed and the mixed material reacts and cures.



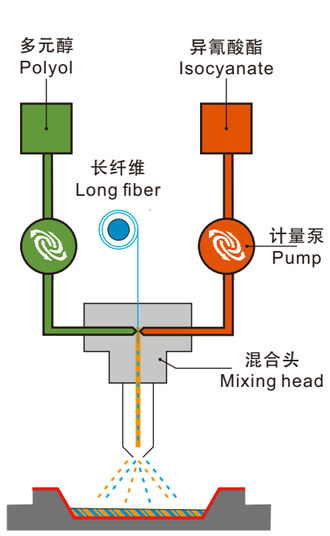
1. 模内喷漆或者膜
In mold painting or film



4. 脱模
Demolding



3. 固化
Curing



2. LFI导入
LFI pour





应用
Application

长纤维浇注注射成型的应用范围广泛，适用于汽车内部的饰板件和大型结构件。利用LFI在同一个模次中也能加工带蜂窝状结构的芯层的高强度夹芯件，如后窗台板和大型立体件。

使用密实和发泡型PU系统，可获得类似SMC的性能特点。

Long fibre injection molding has a wide range of applications for trim parts and large structural parts for automotive interiors. With LFI it is also possible to process high-strength sandwich parts with honeycomb core layers in the same mold batch, such as rear sill plates and large three-dimensional parts.

Performance characteristics similar to those of SMC can be achieved using compact and foamed PU systems.

优势一览
Advantage

-可轻松集成夹具和其他连接元件
-可局部改变纤维含量和长度
-纤维混合最少，强度高
-通过简单的工艺组合（IMP、薄膜）实现出色的表面效果
-模具、机器和原材料成本较低

-Clips and other connecting elements can be integrated easily
-Fiber content and length are changeable locally
-Minimal fiber mixing with high strength
-Excellent surface with simple process combinations (IMP, film)
-Moderate mold, machine and raw material cost

HP-RTM 高压树脂传递模塑成型机

HP-RTM – High Pressure Resin Transfer Molding Machine





应用
Application

- 最佳的表面质量，为可见部件提供高质量的外观
- 满足最高要求的轻质件，比钢轻约50%
- 高压技术允许使用快速固化系统
- 高压确保了极佳的混合效果和快速响应时间
- 可在混合头添加脱模剂组分
- 可实现全自动批量生产

- The best surface quality for visible parts with high-quality appearance
- Extremely lightweight structure components for the highest demand
- High pressure technology allows the use of a fast-curing system
- High pressure ensures very good mixing and fast response times
- Mold release agent component can be added to the mixing head
- Process can be fully automated for volume production

优势一览
Advantage

碳纤维和玻璃纤维增强的轻量化高性能部件批量化生产。

热塑性部件表面采用优质聚氨酯/环氧树脂/不饱和树脂，具有类似皮革的质感、只需一个工艺步骤即可生产出具有特殊外观或高抗划伤性的热塑部件。

Mass production of lightweight, high-performance parts reinforced with carbon and glass fibers.

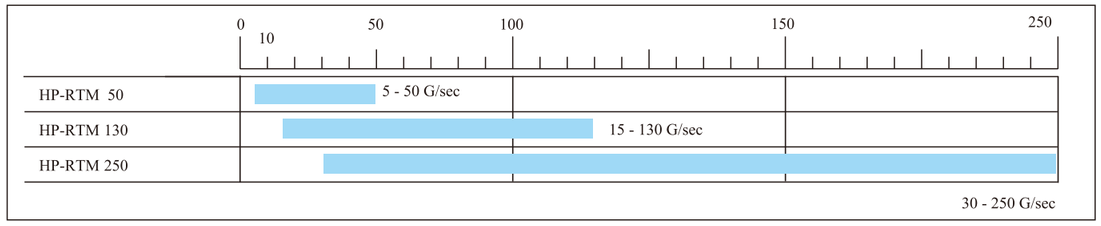
High-quality polyurethane/epoxy/unsaturated resins are used for the surfaces of thermoplastic parts, which have a leather-like texture and can be created in a single process step to produce thermoplastic parts with a distinctive appearance or a high degree of scratch resistance.







流量表（克/秒） Outflow (g/s)



HP-RTM 高压树脂传递模塑成型

HP-RTM – High Pressure Resin Transfer Molding

运用HP-RTM工艺（高压树脂传动模塑成型）时，首先要使纤维预先成型。

With the HP-RTM process (High Pressure Resin Transmission Molding), the fibers are pre-shaped.



卷材切割
Coil cutting

材料处理
Material process

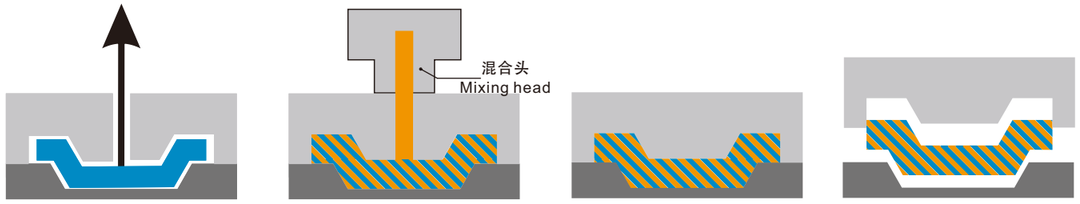
转移到预成型
Transfer to preforming

预成型
Preforming

转移到HP-RTM工位
Transfer to HP-RTM station

该预成型件由碳纤维或玻璃纤维组成，可采用编织或粘合剂固定织物层，使纤维保持正确的定向。将该预成型件放入模具内，闭合模具，抽取真空，无气泡浸渍纤维。接着将一种低粘度的聚氨酯/环氧树脂或环浇注尼龙注入模腔内，通过加温和保压使产品成型。

The preform consists of carbon or glass fibers, and braid it or apply adhesives to hold the fabric layers in place so that the fibers remain correctly oriented. Place the preform in a mold, the close the mold. Extract vacuum to make the fibers are impregnated without air bubbles. Next, a low viscosity polyurethane / epoxy resin or cast nylon is injected into the mold cavity, forming of the product by heating and pressurized.



抽取真空（选装）
Vacuum extraction
(Optional)

树脂注射
Resin injection

固化
Curing

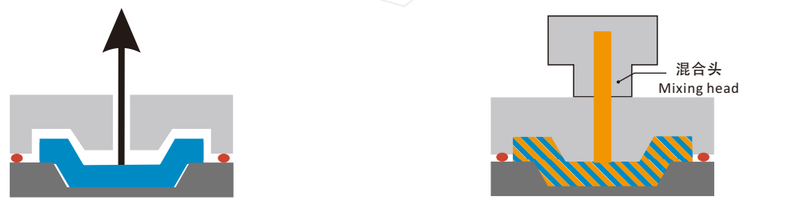
部件取出
Part remove

C-RTM 压缩树脂传递模塑成型

C-RTM – Compression Pressure Resin Transfer Molding

C-RTM工艺（压缩树脂传递模塑成型）与HP-RTM工艺（高压树脂传递模塑成型）的主要区别在于，树脂混合材料不是直接注射到闭合的模具中，而是注射到间隙打开的模具中。该模具在注射过程中不是处于完全闭合状态。预成型件已部分由树脂浸渍，在注射后的模具压缩行程中，树脂穿透并完全浸渍预成型件。

The main difference between the C-RTM process (Compression Resin Transfer Molding) and the HP-RTM process (High Pressure Resin Transfer Molding) is that the resin material is not injected directly into a closed mold, but into a gap-open mold. The mold is not in a completely closed state during the injection process. The preform is already partially impregnated by the resin, which penetrates and fully impregnates the preform during the compression stroke of the mold after injection.



在压缩行程上合模抽取真空（选装）
Close the die on the compression stroke
Vacuum extraction
(Optional)

树脂注射至间隙打开的模具
Resin injected into the open mold



压缩
Compression

固化
Curing

部件取出
Part remove

彩钢聚氨酯/酚醛/岩棉复合板材连续生产线

Color steel polyurethane/phenolic/rock wool composite panel continuous production line

在彩钢或其他硬质的基材表面连续均匀注入聚氨酯/酚醛等反应混合物，在双履带的压力下连续运行，经过聚合反应后一起复合固化成型。复合板材可以按照预先设定的长度按需切断。

The polyurethane reaction mixture is injected continuously and uniformly on the surface of the color steel or other rigid substrate, and then run continuously under the pressure of the double track, and then composite and cured and molded together after the polymerization reaction. The composite sheet can be cut on demand according to the pre-set length.



聚氨酯混合反应系统（2-6 组分）
Polyurethane mixing reaction systems (2-6 components)

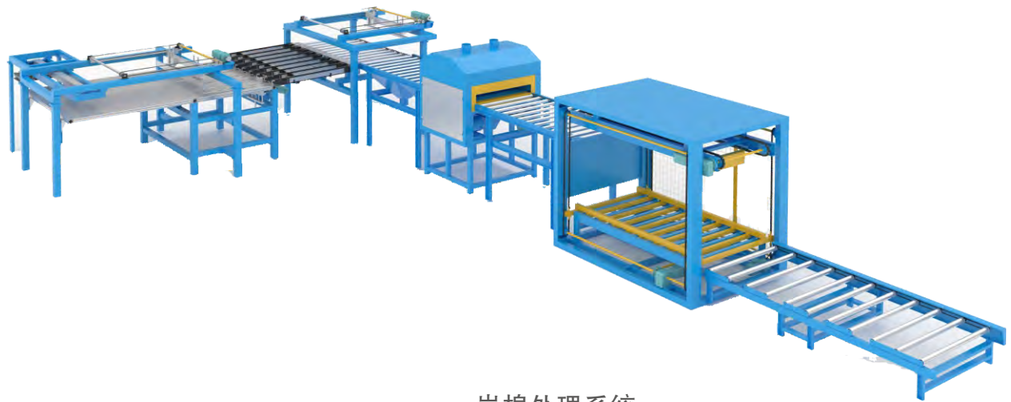


系统组成

System Components

- 基面板成型系统
- 聚氨酯混合反应系统（2－6组分）
- 连续移动压力成型系统（6－42m）
- 切割系统
- 岩棉处理及涂胶封边系统
- 码垛系统

-plate forming system
- Polyurethane mixing and reacting systems (2 – 6 components)
- Continuous pressure molding convey system (6 – 42m)
- Cutting system
- Rock wool processing and gluing/sealing system
- Stacking system



岩棉处理系统
Rock wool processing and gluing/sealing system

连续玻纤增强聚氨酯泡沫生产线
Continuous Glass Fiber Reinforced Polyurethane Foam Production Line

在玻纤毡上连续均匀注入聚氨酯反应混合物，在双履带的压力下连续运行，经过聚合反应后一起复合发泡固化成型。泡沫可以按照预先设定的长度按需切断。

The polyurethane reaction mixture is continuously and uniformly injected into the fiberglass mat, which is continually run under the pressure of the double track, and after the polymerization reaction with the composite foam curing and molding. The foam can be cut according to the pre-set length on demand.



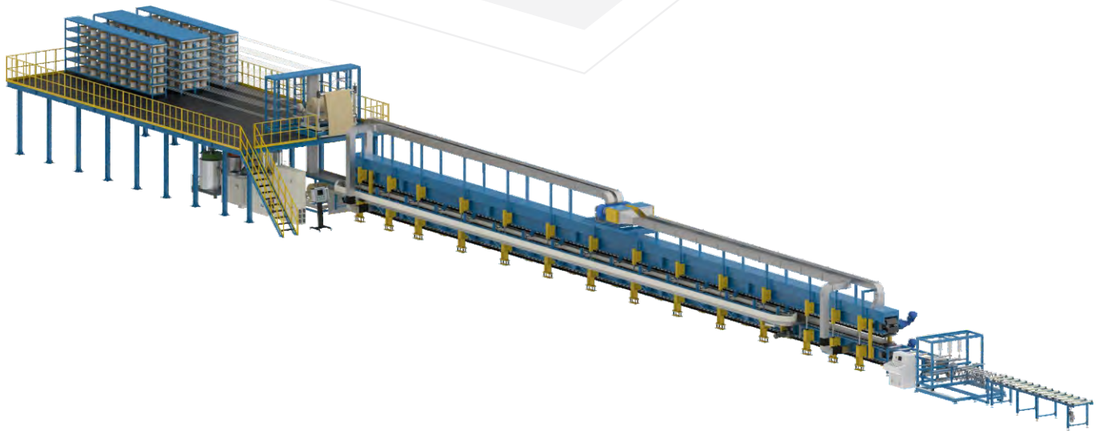
应用于：LNG液货围护系统聚氨酯绝缘层,液化天然气输送管道保温等

Application: Polyurethane insulation layer for LNG liquid cargo enclosure system, LNG pipeline insulation, etc.

大型复合型材拉挤生产线
Large-Scale Composite Profile Extrusion Production Line

大型复合型材拉挤生产线，是指将玻璃纤维增强材料（纤维束、纤维布、毡）、聚氨酯经过浸泡后，在双履带的压力下连续运行，经过聚合反应后固化成型。复合型材可以按照预先设定的长度按需切断。

Large-Scale Composite profile Extrusion production line, is a production line in which glass fiber reinforcing materials (fiber bundles, fiber cloths, mats) and polyurethane are soaked and then cured and molded after polymerization reaction by continuous running under the pressure of double tracks. The composite profile can be cut on demand according to a pre-set length.



应用于：新型合成轨枕，高强度复合板材等。

Applications: new synthetic railroad ties, high-strength composite panels, etc.

聚氨酯低压发泡机
Polyurethane Low Pressure Foaming Machine



二组分低压发泡机
Two-component Low Pressure Foaming Machine



三组分低压发泡机
Three-component Low Pressure Foaming Machine

应用
Use

方向盘、汽车座垫、填充材、板材、玩具、健身器材、保温品等。

Handwheel, vehicle seat cushion,fillings,slab materials, toys, gym equipments, insulating device etc.

聚氨酯高压发泡机
Polyurethane High Pressure Foaming Machine



二组分高压发泡机
Two-component High Pressure Foaming Machine



三组分高压发泡机
Three-component High Pressure Foaming Machine

应用
Use

- 汽车内饰、外饰件
  Car inside and outside gadget
- 水箱保温
  Water tank Insulation
- 保温板
  Heated board
- 家具行业软、硬泡及自结皮，
  Soft、hard foam or self -tegument in furniture
- 管道保温
  Piping insulation
- 工艺专用件
  Special items for technics



大流量高压发泡机
Mass-flow High Pressure Foaming Machine