PART 03

PVA水溶膜涂布生产线

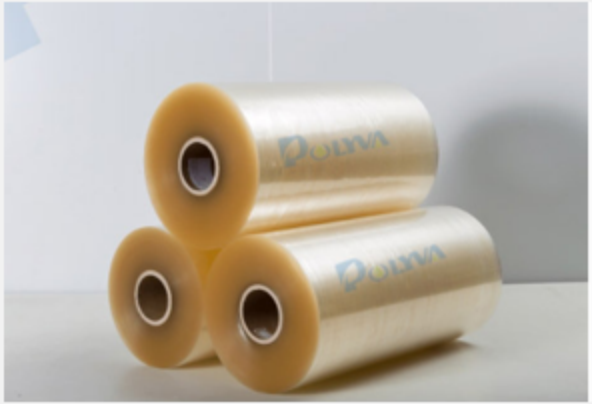
PVA Water-Soluble Film Coating Machine

金纬机械PVA水溶膜生产线
JWELL PVA Water-Soluble Film Production Line

金纬机械PVA水溶膜生产线
PVA Water-Soluble Film Overview:

PVA水溶膜，水溶解完全、无残留，最终降解产物为 CO2 和 H2O

Completely water-soluble: No residue, eco-friendly, and non-polluting
Final degradation products: CO_2 and H_2O



金纬机械PVA水溶膜生产线

JWELL PVA Water-Soluble Film Production Line

PVA水溶膜是什么?

What is PVA Water-Soluble Film?

材料特点

1特殊高分子聚合物

·聚乙烯醇 (PVA或PVOH) 是一种可水溶的“塑料”

·具耐溶剂性、阻气性、高透明、抗静电等优异性能

2绿色环保材料

·完全生物降解，降解产物为CO_2 和H_2O

·无毒，对环境卫生无影响，还能改善土壤质量

市场与生产现状

1国际认可

·被欧美和日本等国家环保部门认可

·生物耗氧量(BOD)远低于淀粉

2中国市场优势

·中国为PVA最大产国，水溶膜技术已发展20余年

·原料多为PVA1788或PVA1799，部分厂商采用进口原料（如可乐丽公司）生产高质量快速溶解膜

Material Characteristics

Polyvinyl alcohol (PVA or PVOH) is a water-soluble "plastic"

·Solvent resistance, gas barrier properties, high transparency, and anti-static qualities

Eco-friendly material

·Fully biodegradable into CO_2 and H_2O

·Non-toxic, with no negative impact on environmental hygiene, and improves soil quality

Market and Production Status

Globally recognized

·Approved by environmental agencies in the US, Europe, Japan

·Biochemical oxygen demand (BOD) is much lower than starch

China’s market advantage

·Largest producer of PVA, with over 20 years of water-soluble film development

·Common raw materials include PVA1788 and PVA1799, with some manufacturers using imported materials for premium quality films

金纬机械PVA水溶膜生产线
JWELL PVA Water-Soluble Film Production Line

PVA水溶膜应用
Applications of PVA Water-Soluble Film

主要为水溶性产品包装：农药、化肥、颜料、染料、清洁剂、水处理剂、矿物添加剂、洗涤剂、混凝土添加剂
洗衣凝珠膜 用于洗衣凝珠，水溶后直接释放清洁剂
刺绣与假发载体 作为织物衬托载体，方便清理刺绣或假发的制作残留
大理石脱模膜 用于快速脱模，在模具内衬水溶膜即可轻松实现
曲面印刷(水转印) 可用于曲面印刷，印刷图案能转印至复杂形状表面
种子袋 种子按固定间隔包装埋入土壤，节省种子且避免间苗工作
医院洗涤袋 可整包放入洗衣机清洗，避免接触污染衣物
公共座侧垫片 用作卫生座垫，避免细菌感染
热水溶膜 适用于服装包装，特别是高端服饰保护
食品保鲜包装 与其他塑料复合后可用于食品保鲜膜与气垫袋
农药环保包装袋 可溶性包装避免剧毒农药对人体和环境的危害
水泥添加剂包装 适用于强碱、强酸的水泥添加剂，避免对工人和环境的危害

Key Applications:
Water-Soluble Packaging for products such as pesticides, fertilizers, pigments, dyes, detergents, water treatment agents, mineral additives, etc. Laundry Pods Film、Embroidery and Wig Carriers、Marble Demolding Film、Curved Surface Printing (Water Transfer Printing)、Seed Bags、Hospital Laundry Bags、Public Seat Liners、Hot Water-Soluble Film、Food Preservation Packaging、Eco-Friendly Pesticide Bags、Cement Additive Packaging

金纬机械PVA水溶膜生产线
JWELL PVA Water-Soluble Film Production Line
难溶性PVA薄膜应用
Applications of Low-Solubility PVA Film

产品临时保护包装:用于运输中的产品保护，防止划伤和灰尘。
电子元器件包装:尤其适合高性能干电池等电子产品的防尘包装。
液晶偏光片制造:可用于液晶显示器偏振片的制造工艺。
纺织品包装:提供高透明和优良耐用性的包装材料。
金属保护膜:有效防护金属表面免受氧化或污染。
复合膜制造:与聚乙烯、聚丙烯、尼龙等材料复合，提升薄膜性能。
汽车零部件脱模剂:在制造汽车零件、槽罐等热固性树脂制品时作为优质脱模剂。
食品保鲜膜:优异的隔氧和透气性能，使其成为高效食品保鲜材料。
双向拉伸PVA薄膜:通过双向拉伸处理后，该薄膜在以下方面具有广泛应用：食品包装、离型膜、耐油、耐溶剂包装、电子部件包装、农业材料
双向拉伸提高了结晶度，增强了耐水性和韧性，使其适用于多种工业与日常用途。

Key Application Areas: Temporary Protective Packaging: Protects products during transport, preventing scratches and dust.
Electronics Packaging、LCD Polarizer Manufacturing、Textile Packaging、Metal Surface Protection Film、Composite Film Manufacturing、Automotive Parts Mold Release Agent、Food Preservation Film

Biaxially-Oriented PVA Film: Food Packaging、Release Film、Oil and Solvent-Resistant Packaging、Electronics Packaging、Agricultural Materials
Biaxial stretching enhances crystallinity, water resistance, and toughness, making it suitable for various industrial and daily applications.

金纬机械PVA水溶膜生产线
JWELL PVA Water-Soluble Film Production Line
PVA水溶膜生产工艺
PVA Water-Soluble Film Production Methods

PVA是一种多羟基聚合物，因其规整的结构和强分子内氢键，使其具有高结晶度，导致熔融温度高于分解温度，加工难度较大。

PVA薄膜的主要生产方法包括以下几种：

1)溶液流延法：将PVA溶解成稀溶液，添加增塑剂以改善加工性能。溶液通过缝隙流延或辊式涂布器均匀涂布在干燥滚筒或皮带上。原液蒸发水分后形成干燥薄膜。

特点：厚度精密度高，透明度和光泽度好。设备占地面积大、能耗高，生产效率较低。

现状：市售PVA薄膜大多采用此方法，但因设备成本高，应用受到限制。

2)加水熔融挤出法：在PVA树脂中加入适量水和增塑剂降低熔体黏度，增强可塑性。

经熔解脱泡后，通过T型机头挤出、干燥和热处理成膜。

特点：原料水溶液浓度高，生产效率优于溶液流延法。

3) 无水熔融挤出法:将PVA树脂加热熔融后，通过T型机头挤出，并迅速冷却成膜。

特点:薄膜透明度和光泽度优良，生产速度快，厚度调节方便。

适用于易取向薄膜，但设备成本较高，主要用于共聚合树脂成膜。

PVA Water-Soluble Film Production Methods

1. Solution Casting

Process: PVA dissolved, cast on drying drum.

Features: High precision, good transparency.

Limitations: Low efficiency, high energy use.

2. Water-Added Melt Extrusion

Process: PVA mixed with water, extruded and dried.

Features: Higher production capacity.

3. Water-Free Melt Extrusion

Process: PVA melted, extruded and rapidly cooled.

Features: Fast production, good transparency.

Limitations: High equipment cost.

金纬机械PVA水溶膜生产线
JWELL PVA Water-Soluble Film Production Line
PVA水溶膜生产工艺
PVA Water-Soluble Film Production Methods

4) 加水熔融挤出吹塑:含水20%-60%的PVA溶液经挤出混炼后，通过环状机头挤出并吹塑成型。
通过干燥和收卷形成含水量少于7%的薄膜。
特点:制得的薄膜在强度、稳定性和外观上优于T型机头制得的薄膜。
5)连续双轴取向法:结合管形法与双轴拉伸工艺，在最佳湿度和温度下加工，提高结晶度与物理性能。
特点:提升薄膜取向平衡性，降低水含量，增强湿度稳定性。
生产效率高，成本逐步降低，具备工业化应用潜力。
6)干法挤出吹塑法: PVA与改性剂混合后造粒，经挤出、脱泡、吹膜和定型处理成膜。
特点:工艺已实现工业化，产品性能稳定，适合多种应用需求。
这个版本精简且逻辑清晰，专业性较强，适合PPT展示用。

4. Water-Added Melt Extrusion Blowing
Process: Extruded, blown, then dried.
Features: Stronger, more stable film.
5. Continuous Bi-Axial Orientation
Process: Combine tube forming with bi-axial stretching.
Features: High efficiency, balanced orientation, improved physical properties.
Future: Expected to see large-scale industrial use.
6. Dry Extrusion Blowing
Process: Vacuum dry PVA, mix with additives, extrude, and blow film.
Features: Industrialized, high-quality film production.

金纬机械PVA水溶膜生产线
JWELL PVA Water-Soluble Film Production Line
设备参数
Equipment Parameters

涂布头宽度 (Coating head width)：1250mm

浆料产量 (Slurry output)：150-200kg/h

最大制品宽度 (Max product width)：1250mm

制品厚度 (Product thickness)：0.08mm

湿膜厚度 (Wet film thickness)：0.56mm

干膜宽度 (Dry film width)：1250mm

模具有效宽度 (Effective mold width)：1200mm

辊筒有效宽度 (Effective roller width)：1500mm

辊筒直径 (Roller diameter)：1400mm

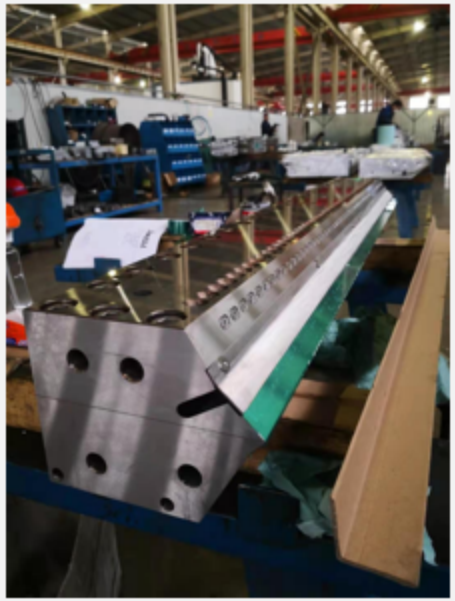
钢带宽度 (Steel belt width)：1200-1500mm

机械线速度 (Mechanical line speed)：35m/min

设备核心单元介绍
Core Unit Introduction
精密狭缝涂布头
Precision Slot Die Coating Head

特点：挤出核心部件采用金纬机械自主研发的超高精度涂布头（直线度±3微米）。
技术优势：结合三坐标模头架，确保出料厚薄的高度均匀性。

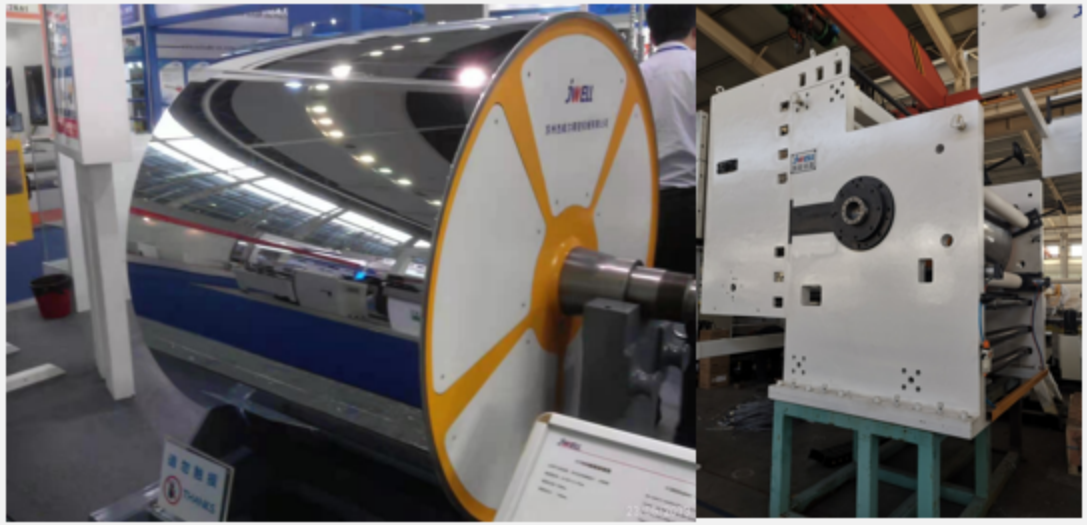
Features: The extrusion core components adopt Jwell's independently developed ultra-high-precision coating head (linearity ±3 microns).
Technical Advantage: Combined with the three-coordinate die head frame, it ensures excellent uniformity of material thickness.



设备核心单元介绍
Core Unit Introduction
钢带支撑辊筒
Steel Belt Support Roller

钢带支撑辊筒采用金纬机械，自主研发的超高精度辊筒，辊面跳动精度±5微米，轴头高强度支撑

The steel belt support roller features Jwell Machinery's independently developed ultra-high-precision roller with surface runout accuracy of ±5 microns. The shaft head is reinforced with high-strength support to ensure stable operation and efficient production.



设备核心单元介绍
Core Unit Introduction
烘箱
Oven

烘箱由金纬机械自主研发，分组分段控制温度，充分利用热量回收，把设备能耗降到最低

The oven is independently developed by Jwell Machinery, featuring segmented and zoned temperature control. It maximizes heat recovery to minimize energy consumption and enhance overall production efficiency.

PVA水溶膜设备照片
PVA water soluble film equipment

PVA水溶膜前景

广泛应用与市场潜力

PVA水溶膜的应用非常广泛，常规用途包括凝珠膜、转印膜、刺绣膜、洗涤包装袋等。随着市场需求的不断增长，现有市场设备在配方兼容性和产能方面存在一定局限，而产品的利润较高，因此未来几年国内市场有望迎来一定量的增长。

技术突破与设备优势

目前，苏州金纬片板膜智能装备有限公司已经研发出多条采用涂布法生产的设备，其产能远超市场上现有设备。同时，公司未来还计划开发全熔融流延法与吹膜法生产工艺，为行业提供更多先进的解决方案。

Broad Applications

Widely used in laundry pods, transfer films, embroidery films, and washing bags. High demand, low production capacity, and high profits indicate growth potential in the domestic market.

Technological Advantages

JWELL's coating method production lines offer superior capacity, with plans to develop molten casting and blown film methods for future innovations.