



公司简介
Company Profile



哈尔滨哈普电气技术有限责任公司成立于2005年，是哈尔滨理工大学国家科技园首批进驻的国家级高新技术企业，依托高校拥有一支由机、电、化科技专家组成的具有产、学、研一体化能力的队伍，掌握最新技术，专业优势显著，技术检测手段齐全，生产工艺成熟，目前已成功地开发并向工业界推出了RM系列聚合物材料转矩流变仪、实验室挤出机、实验室薄膜成型机、SCD系列膜质量检测系统以及UV系列LED紫外光辐照电缆交联设备等。哈普电气技术公司是目前国内唯一自主研发成功紫外光交联电缆生产装置制造的企业，也是国内唯一研制成功微波激励紫外辐照源的企业，本公司系统掌握具有自主知识产权的高压电缆料超净生产技术、洁净度评价方法和紫外光交联电缆生产装置制造技术。公司主营产品为高分子材料及电线电缆行业服务，在业内具有广泛的知名度和影响力。产品足迹遍布国内大江南北包括香港、台湾等地区，国际市场涵盖了俄罗斯、白俄罗斯、乌克兰、美国、德国、加拿大、澳大利亚、意大利、匈牙利、南非、巴拿马、墨西哥、阿根廷、巴西、智利、哥伦比亚、埃及、沙特阿拉伯、土耳其、菲律宾、印度、伊朗、马来西亚、泰国、新加坡、韩国、日本、越南等二十几个国家。

Founded in 2005, Harbin Hapro Electric Limited is a high-tech company located in National Universities Science Park in Harbin University of Science and Technology, Harbin, China. The products from Hapro are instruments, equipment which related to polymer industry and cable industry. Hapro keeps a good relation with Harbin University of Science and Technology. Joint working together with professors in the university, Hapro can also provide project solutions in cable industry and polymer industry. The products from Hapro Electric include Torque Rheometer System. Polymer Film Quality Inspection System. UV-Series LED Irradiation Cross-linking Equipment, etc. The products from Hapro were not only sold domestic (Hong Kong and Taiwan) but also distributed all over the world, Russia, Belarus, Ukraine, the United States, Germany, Canada, Australia, Italy, Hungary, South Africa, Panama, Mexico, Argentina, Brazil, Chile, Colombia, Egypt, Saudi Arabia, Turkey, the Philippines, India, Iran, Malaysia, Thailand, Singapore, South Korea, Japan, Vietnam and other more than 20 countries .



哈尔滨哈普电气技术有限责任公司自创建以来，励精图治，创新进取。公司承诺，愿以专业化技术为您生产高品质产品，愿以高科技成果为您创造更高价值，愿以诚挚迅速的服务为您排忧解难！哈尔滨哈普电气技术有限责任公司愿与您携手共创辉煌未来！

Since the foundation of Harbin Hapro Electric Technology Co., Ltd. We have been doing our best to develop technology and products. Hapro is willing to provide high quality products by the professional and technical ability and bring more benefits by the high-tech productions to customers. Hapro looks forward to cooperating with you to build a brighter future together.

转矩流变仪
Torque Rheometer System



RM-200C系列转矩流变仪采用积木式组合结构，由测控主机与功能平台组合而成。功能平台主要有两类：混炼平台和挤出平台。混炼平台与测控主机组成混炼式转矩流变仪，挤出平台有单螺杆挤出平台、锥形双螺杆挤出平台、平行双螺杆（异向或同向旋转）挤出平台以及橡胶挤出平台；相配合的设备有实验室3/4/5辊压延机、实验室流延膜机、实验室压光机、实验室吹膜机、膜质量检测系统、开炼机、平板硫化机、塑料切粒机、线缆包覆机、动态老化测试仪以及皮带牵引机等；可以实现从原材料到制品成型的整个过程中的测试与实验。

RM-200C Torque Rheometer System consist of a main unit and function units, generally assembled by block models. The function units include the Mixer, Single Screw Extrusion unit, Conical Twin-screw Extrusion unit, Parallel Twin-screw (co and counter rotating) Extrusion unit, Rubber Extrusion unit. Downstream auxiliary equipment include Laboratory Film Blowing Machine, Laboratory Film Casting Machine, Laboratory Film Calender Machine, Film Quality Inspection System, High-pressure capillary rheometer, Wire coating machine, Two-Roller Mills, Platen Presses, Pelletizer, Dynamic testing oven, Sample cutter and Belt conveyor, etc. System can not only simulate actual process of polymer, evaluate machining performance, optimize process parameters, but also completing simulation experiment to match different die heads and auxiliary equipment.



RM-200 C 主机平台技术参数 / Main unit technology parameters			
电机功率 Power of motor	5.0/7.0 kW	动力输出转速 Speed range	0.1~150 / 200 / 250 r/min
转矩测量量程 Torque range	0 ~ 200 / 240 / 320 Nm	转速控制精度 Speed accuracy	0.05%F.S
转矩测量精度 Torque accuracy	0.1%F.S	动态温度控制精度 Dynamic controlling accuracy of temp	± 0.5° C
转矩测量方法 Torque measuring method	悬臂式动态扭矩测量 Cantilever	熔体压力测量量程 Melt pressure range	0.1 ~ 100 Mpa (规格可定制) specifications customizable



混炼式
转矩流变仪
The Mixer Unit

混炼式转矩流变仪用于研究材料的流动、塑化、热、剪切稳定性能。在与密炼机相同的功能下，混炼平台可测量转矩与温度、转速与时间的关系，同时对数据进行分析，用它进行配方设计和指导工艺条件的选择，节省大型实际生产试验时间与实验物料。

The Hapro Mixer of Torque Rheometer system serve for testing the rheological behavior properties and extrusion ability of polymers and for analyzing and emulating production process in the laboratory. It is an ideal instrument and system in research and development as well as in practical application, for searching the material liquidity, plasticizing, heating and shear stability, etc. Save the time of practical production and the quality of material.

技术参数 Technology parameters				
	Mix-20	Mix-60	Mix-200	Mix-300
容积 Chamber volume	20ml	60ml	200ml	300ml
转子类型 Kinds of rotor	Roller 标准 Standard (Banbury、Cam、Delta、Sigma 可选 Available)			
转子速比 Speed ratio	3: 2			
最大扭矩 Max.torque	80Nm	200 / 240 / 320 Nm		
温控系统 Temp control system	RKC system			
温度传感器 Temp sensor	J 型热电偶 (K 型及其它可选) / J type thermocouple			
加热方式 Heating	3 区，电加热 / 3 Zones, Electric heating			
冷却方式 Cooling	空气冷却 Compress air cooling			
最高温度 Max.temp	350℃			
最大转速 Max. rotor speed	100 r/min	150 or 200 or 250 r/min		
压料方式 Loading	手动 (气动可选) Manually+Pneumatic			
安全设置 Security settings	电气 + 机械，双重保护 Electricity+Machinery+Safety key			



混炼式转矩流变仪由测控主机与混炼平台组合而成，混炼器由三个单独控温区间组成密闭腔室，腔室内置一对转子，转子异向旋转提供高强度的混炼与剪切，同时通过改变腔室体积，转子类型以及加载方式以实现不同应用。为方便教学与演示，另外配备了可视化窗口。

Mixer of Torque Rheometer System is constituted by main unit and mixer unit. The mixer chamber is consist of three sections which are independently temperature controlled. There is a pair of rotors in it. Counter-rotating rotors provide high strength mixing and shearing action. Customer can choose the different chamber volumes, the different rotor types and loading ways to implement different applications. For teaching and demonstration, the visualization window can be configured.

● 转子类型
Kinds of Rotors

图例 Photo	名称 Name	功能 Function
	Roller	用于混合热塑性材料，如聚烯烃、聚氯乙烯、工程塑料等。 It is usually used in mixing thermoplastic materials, for example: PO, PVC, Engineering plastics, etc.
	Banbury	用于混合热塑弹性体，橡胶行业中应用更为普遍。 It is usually used in mixing thermoplastic elastomer and rubber material.
	Delta	用于热固性材料的混合和交联。 It is usually used in mixing and cross-linking thermoset polymer.
	Cam	用于混炼热塑料、陶瓷复合物、食品等粘稠高扭矩的物料。 It is usually used in mixing thermoplastic polymer, ceramic composites, food and other high-torque materials.
	Sigma	用于食品、药品和塑料溶胶等扭矩较小物料的混合。 It is usually used in mixing food, medicine and plastisol materials which have low-torque.

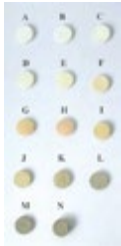
混炼式转矩 流变仪典型应用

Application of the
mixer unit

可视化视窗
Visual window for mixing



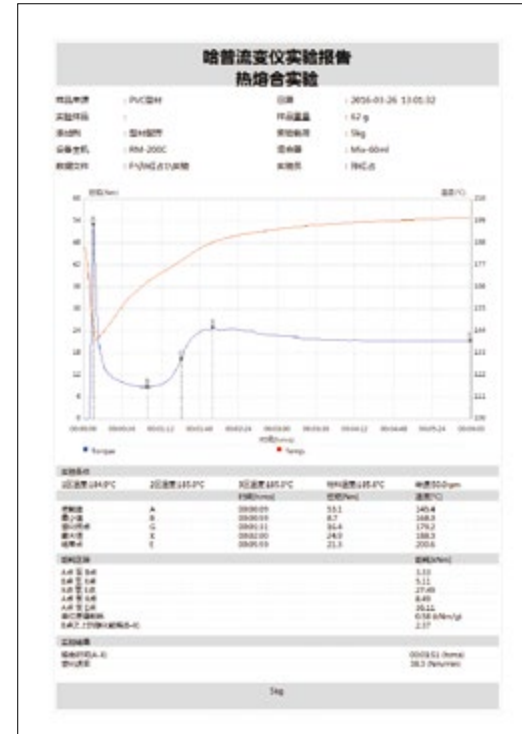
制样机
Sample tablet tool for
PVC thermal stability test



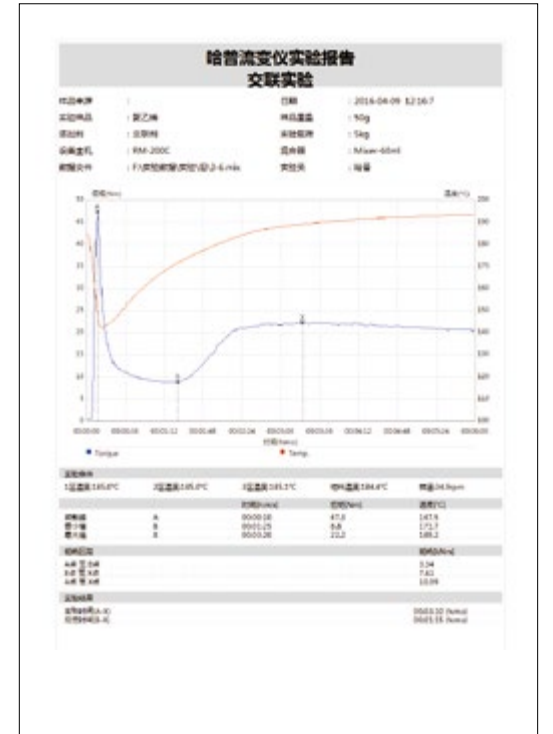
- 质量控制和原材料检测;
Quality control and testing of raw materials;
- 产品开发和配方优化;
Product development and recipe optimization;
- 加工性能研究与工艺优化;
Investigation and optimization of processing conditions;
- 共混料的流变特性测试;
Measurement of the rheological properties of blends and compounds;
- 热固性材料的交联(固化)特性测试;
Measurement of cross-linking and curing process of thermoset resin;
- 教学科研应用。
Applications in the field of teaching and research.

● 混炼实验报告

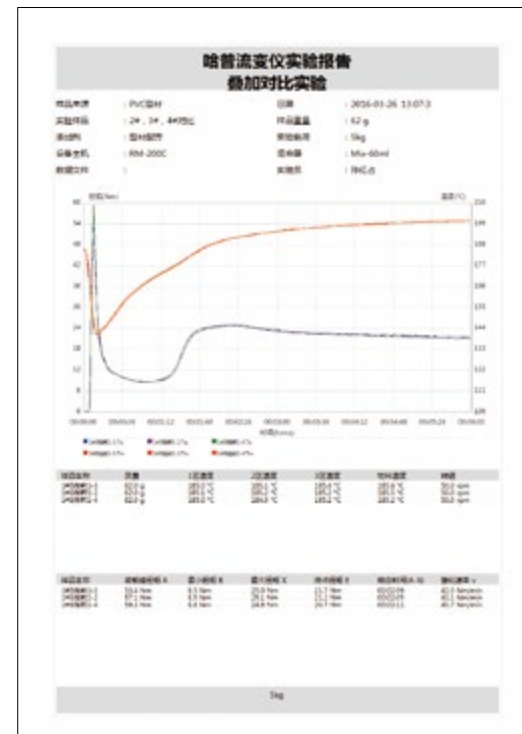
Mixer Test Report



熔合实验
Fusion test report



交联实验
Cross-linking test report



叠加实验
Compare test report



热稳定实验
Thermal stability test report



锥形双螺杆挤出平台

The Conical Twin-screw Extrusion unit

实验室锥形双螺杆挤出机由测控主机与锥形双螺杆挤出平台组成，是一种高效的混炼、挤出设备。采用独特的结构设计，使实验后的清理更加方便快捷。该设备可配不同模具和辅机组成各种小型实验线，可以实现各种热塑性材料板材、管材、异型材的挤出以及共混造粒等。

Laboratory Conical Twin-screw Extruder can be integrated by main unit and conical twin-screw extrusion unit. That can be used to simulate real production process in the laboratory. Because of its special structure, the residual material can be cleaned quickly. In the measuring extrusion unit, the sample material begin plastify under practice-oriented conditions and extruded through the die head. Matched well with different die heads, it's used for extruding the Belt, Tube, PCPO and granulation.

技术参数 Technology parameters			
螺筒分离结构 Barrel structure	拉出回转式 Pull and turn	螺杆类型 Screw type	普通型或双锥型 Normal or Biconical shape
螺杆材质 Screw material	38CrMoAlA 渗氮 or SKD11 渗钛	螺杆直径 Screw diameter	20-40mm
螺杆长度 Screw length	325mm	螺杆转速 Screw speed	200r/min
加热方式 Heating	电加热 5 区 双 PID Electrical heating,5 zones, Double PID	温控系统 Temp control system	RKC system
温度传感器 Temperature sensor	J 型热电偶 (K 型及其他可选) J type thermocouple	冷却方式 Cooling	压缩空气 Air compression
加热总功率 Heating power	3.5kW	压力范围 Pressure range	0-100Mpa (30Mpa 可选)
最高温度 Max. temp	350℃	产量 Output	1-10kg/hr



锥双螺杆
Conical twin-screw



平模模具
Flat Die



造粒模具
Strand Die



挤管模具
Pipe Die

平台结构特点

Extrusion unit structure features

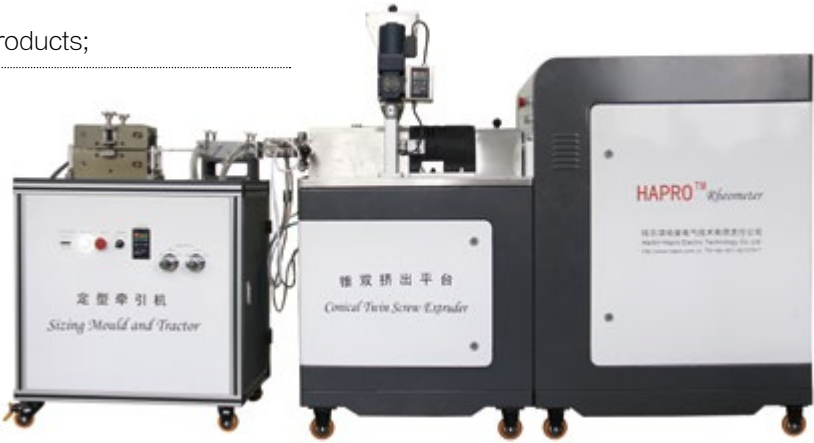
- 拉出回转式，便于清洁、分离与组装；
It's convenient to separate and assemble;
- 高精度滑轨以及旋转支撑，设备高稳定性；
High precision slides and bearing ,the higher equipment stability;
- 清洁时电气不分离，加热不间断；
No electric separation and heating uninterrupted;
- 防尘密封性好；
Dust proof sealed well;
- 清料托盘架自动弹出。
Automatic pop-up the tray rack.



锥型双螺杆挤出机典型应用

Application of The Conical Twin-screw Extrusion unit

- 质量控制和原材料检测；
Quality control and testing of raw materials;
- 配方开发与优化；
Testing the processing behavior during recipe development and optimization;
- 不同物料的挤出加工性能测试；
Testing of the extrusion ability of different materials;
- 加工工艺参数优化；
Investigation and optimization of processing conditions;
- 混料的流变性能和黏度性能测量；
Measurement of the rheological or viscosity properties of blends and compounds;
- 挤压降解产品；
Extrusion of degradable products;
- 小规模生产。
Mini-test/production.



单螺杆挤出平台

The Single Screw Extrusion unit

实验室单螺杆挤出机由测控主机和单螺杆挤出平台组成，根据加工物料的不同多种结构、直径、长径比、压缩比的螺杆可选，在实验室环境下进行多种功能性实验。配不同模具及其他辅机设备可实现模拟挤条、挤片、挤管、压延、流延、吹膜等加工过程，从而评价物料的加工性能以及优化加工工艺参数。

Laboratory Single Screw Extruder can be integrated by main unit and single screw extrusion unit. The screw with different structure,diameter, length-diameter ratio and compress ratio can be chosen depending on the sample material. Integrating different extruding dies and other auxiliary equipment, the system could simulate many functional experiments in the laboratory.

配以毛细管模具，挤出系统可以像其他毛细管流变仪一样测定一定范围内剪切速率下的熔体粘度，用挤出机测量熔体压力的优点是更真实地模仿了材料的挤出过程。通过改变挤出机转速和更换不同长径比模芯，获得不同转速下的熔体流量和入口压力，并通过软件（HPVisco1.2）进行口模校正和非线性校正，可获得剪切速率和粘度的关系。

Equipped with capillary dies, the extrusion unit could be used to measure the melt viscosity over a usual shear rate range. This so called extruding capillary Rheometer could obtain the viscosity information closed to extruding process. The melt flow and die pressure can be obtained under different rotation speed, by changing the screw speed and die cores with different length-diameter ratio, the relation between shear rate and melt viscosity can be calculated with software after dies entrance pressure calibration and nonlinear calibration.



毛细管模具
Capillary Die



平模模具
Flat Die



线缆包覆模具
Coating Die



流延膜模具
Film Casting Die



吹膜模具
Film Blowing Die



挤管模具
Pipe Die

技术参数 Technology parameters	
螺杆直径 / Screw diameter	20/25/30 mm
螺杆压缩比 / Screw compression	2.4:1 或 3.6:1 (2.0~4.0 可选 / available)
螺杆长径比 / Screw L:D	25 :1/ 30:1
螺杆转速 / Screw speed	200 r/min 可调 / adjustment
加热方式 / Heating	电加热, 双 PID / Electrical heating, Double PID
最高温 / Max. temp	350℃
压力范围 / Pressure range	0~100 Mpa



单螺杆
Single Screw

橡胶挤出平台

Rubber Extrusion Unit



实验室橡胶挤出机由测控主机和橡胶挤出平台组成，主要用于橡胶、塑胶及化工原料的挤出。配备特制螺杆以及不同模具，可在实验室环境下模拟橡胶制品的挤出过程。作为橡胶工业的一种基本设备，在轮胎和橡胶制品的生产过程中起着非常重要的作用。

Laboratory Rubber Extruder can be integrated by main unit and rubber extrusion unit. Mainly used for the extrusion of rubber, thermosetting plastic and chemical raw materials.Integrating different extruding screw and dies heads, the system could simulate rubber products production process in the laboratory.



挤橡螺杆
Rubber Screw



Garvey 模具
Garvey Die



圆柱模具
Column Die

技术参数 Technology parameters			
螺杆直径 Screw diameter	30mm	温控系统 Temp control system	RKC system
螺杆压缩比 Screw compression	3:1	加热方式 Heating	电加热,3 区 Electrical heating,3 Zones
长径比 Screw L:D	12 :1	温度传感器 Temperature sensor	J 型热电偶 J type thermocouple
螺杆转速 Screw speed	150 r/min	压力范围 Pressure range	0~100 Mpa
最高温度 Max. temp	200℃	冷却方式 Cooling	压缩空气 /Air compression

平行同向双螺杆挤出平台

The Parallel CO-rotating Twin-screw Extrusion unit



造粒模具
Strand Die



流延模具
Film Casting Die



实验室平行同向双螺杆挤出机是一种高效的混合、挤出设备。螺杆采用积木式组合设计原理，使得在加工中根据材料的特性，改变螺杆长度和元件的组合方式，有效的适应各种工艺要求，广泛应用于橡塑和工程树脂的填充、共混、分散、改性、增强、氯化聚丙烯和高吸水性树脂的脱挥处理等，专用于共混挤出造粒、成型加工工艺实验。

Parallel twin screw extrusion unit (co-rotating), widely used in rubber and engineering resin blends, dispersion, modification, enhancement, chlorinated polypropylene and high water absorbing resin devolatilization, dedicated to the extrusion forming process, for example the blending and granulation experiments.

技术参数 Technical parameters

螺杆直径 Screw diameter	20 mm	长径比 Screw L:D	40:1/48:1 (其他规格可定制) specifications customizable
加热方式 Heating	电加热, 8区, 双PID Electrical heating, 8 Zones, Double PID	排气 Exhaust	真空排气 Vacuum
温控系统 Temp control system	RKC system	加热总功率 Heating power	6.4 kW
最高温 Max. temperature	450°C	螺杆转速 Max. speed of screw	480 r/min
温度传感器 Temperature sensor	J型热电偶 (其它型号可选) J type thermocouple	冷却方式 Cooling	压缩空气 Air compression
产量 Output	1 - 15 kg/ hr	压力范围 Pressure range	0-100 Mpa (30Mpa、50MPa、70MPa 可选)

同向平台结构特点 Structure features of co-rotating extrusion unit

- 螺杆元件采用“积木式”结构, 可根据物料和加工工艺的不同, 任意互换、组合使用;
Screw element use the "building block" structure, interchangeable and combination according to the different materials and processing technology;
- 筒体选用氮化钢、双金属材料, 耐磨、耐腐蚀, 延长使用寿命;
Barrels choose bimetallic material, wear-resisting, corrosion resistance and increasing the service life;
- 物料分散均匀, 混炼塑化效果好, 物料滞留时间短, 输送效率高;
Evenly material dispersion, better mixing plasticizing effect, short material residence time, high transmission efficiency;
- 采用加热冷却双PID, RKC温控系统, 反应灵敏, 温控精度高;
RKC temperature control system has a sensitive response and high precision of temperature control;
- 喂料方式多种可选, 可适用于颗粒料、粉料、液体料。
A variety of optional feeding way according to the particles, powder, liquid material.

失重式
计量喂料
系统

Loss-in-
weight feeder
system



失重式计量喂料系统, 应用于实验室中小型同向平双挤出物料与助剂配方的混配, 系统是由若干微小流量型失重秤组合而成, 失重秤中称重传感器的量程及输料螺杆类型可根据喂料实际需要选配组合, 实现输送不同物料的种类和多种流量范围的高精度流量控制, 所有失重秤的流量可联动调节, 实现实时设置材料配方不同组分的混配比例。

Loss-in-weight feeder system is used for the compounds of polymer materials and auxiliary formulations by medium and small parallel co-rotating twin-screw extruder in laboratory. The system is composed of several small-flow loss in weight feeder. The range of the weighing sensors and the type of feeding screws in the weight sensor scales can be combined according to the actual needs of the feeding, to achieve high-precision flow control of different types of materials and a variety of flow ranges, and the flow of all weight loss scales can be adjusted in tandem to achieve real-time setting of the mixing ratio of different compounds of the material formula.

技术参数 Technical parameters

电源 PowerSupply	AC220V 50Hz/60Hz	料斗容量 Hopper Capacity	3L
传感器量程 Sensor Range	20Kg	喂料螺杆 Feeder Screws	单螺杆 / 双螺杆 single screw/twin screw
传感器精度等级 Sensor Accuracy level	C3	最小流量范围 Minimum Flow rate	2g/min
最小分辨率 Minimum Resolution	1g	强制喂料螺杆 Forced-Feeder Screw	双螺杆喂料 twin-screw feeder
喂料类型 Feeding Type	粒料 / 粉料 grain/powder	强制喂料最大速度 Maximum Feeding Speed	75r/min

熔体泵
Melt pump

熔体泵主要用于将来自挤出机的高温塑料熔体经增压、稳压后稳定地送入机头模具中。将它与挤出机串联使用时, 整条生产线的稳定性显著提高。

Melt pump is mainly used in high temperature and high viscosity polymer melt transportation, pressurization, metering. The melt pump pressurizes and stabilizes pressure of hot melt polymers coming from the extruder, then send them into extruder dies.



技术参数 Technical parameters

转速 Speed range	0-50 r/min adjustment
伺服驱动系统 Servo drive system	台达 Delta
减速机 Reducer	APEX
入口压力传感器 Input pressure sensor	0~30 MPa
加热棒 Heating bar	1 kW
齿形 Gear shape	直齿 /Straight tooth 斜齿 /Helical tooth
最高温度 Max. temp	350°C
出口压力传感器 Output pressure sensor	0~30 / 50 / 70 / 100Mpa (available)

平行异向双螺杆挤出平台

The Parallel counter rotating
Twin-screw Extrusion unit

实验室平行异向双螺杆挤出机相较于锥形双螺杆挤出机，有更好的挤出塑化效果，广泛应用于热塑性类材料的成型加工工艺实验，如PVC树脂挤出片材，管材，以及造粒。

The parallel twin screw extrusion unit (counter rotating) has a better plasticizing effect compared to the conical twin screw extruder. It is widely used in forming process of thermoplastic materials, for example the extrusion of sheet and pipe, or granulation for PVC resin.

技术参数 Technical parameters

螺杆直径 Screw Diameter	25 mm	螺杆转速 Max. speed of screw	200 r/min
螺杆长径比 Screw L:D	28:1	冷却方 Cooling	压缩空气 Air Compression
温控系统 Temp control system	RKC from Japan	压力范围 Pressure range	0~100 Mpa
温度传感器 Temp sensor	J type thermocouple	喂料速度 Feeding speed	手动调节 Manual adjustment
加热方式 Heating	电加热 / 6 Electrical Heating/6 Zones	喂料方式 Feeding	螺杆计量 Screw metering feed
加热功率 Heating power	4.8 kW	产量 Output	1 - 10 kg/ hr
最高温度 Max. Temperature	350℃	Die heads	Flat Die (L × W:60 × 1.5 mm)
重量 Weight	200 kg		Strand Die (Φ3 × 2)
尺寸 Dimension (L × W × H)	2000 × 500 × 1550 mm		Pipe Die(Inner Φ10, Outer Φ12.5)



平模模具
Flat die



造粒模具
Strand die



挤管模具
Pipe Die

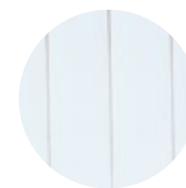


平模定型牵引机

Sizing Mould and Tractor

技术参数 Technical parameters

成型宽度 Sizing width	75 mm
成型厚度 Sizing thickness	0.8~2.0 mm
牵引速度 Traction speed	0.24~2.5 m/min, Manual adjustment
牵引方式 Mode of traction	皮带牵引 Belt traction
总功率 Total power	1.0 kW
冷却方式 Cooling	水冷 Water
电压 Power supply voltage	1-phase 220V
重量 Weight	100 kg
尺寸 Dimension (L × W × H)	1200 × 600 × 1000 mm



辅机成型设备

Auxiliary forming
equipment

PVC片材
PVC sheet sample

真空定径箱

Vacuum sizing tank

技术参数 Technical parameters

定径套尺寸 Dimension set size	Φ12、Φ20 (其他规格可定制) specifications customizable	冷却方式 Cooling	水冷 Water
定型方式 Sizing	真空定径 Vacuum sizing	电压 Power supply voltage	3-phase 380V
真空度 Max. vacuum	-80Kpa	重量 Weight	130 kg
总功率 Total power	1.0 kW	尺寸 Dimension (L × W × H)	2000 × 600 × 1300 mm

管材牵引机

Tube tractor

技术参数 Technical parameters

牵引速度 Traction speed	Max. 2.5 m/min, Manual adjustment
牵引方式 Mode of traction	皮带牵引 Belt traction
总功率 Total power	1.0 kW
电压 Power supply voltage	1-phase 220V
重量 Weight	60 kg
尺寸 Dimension(L × W × H)	2000 × 600 × 1300 mm



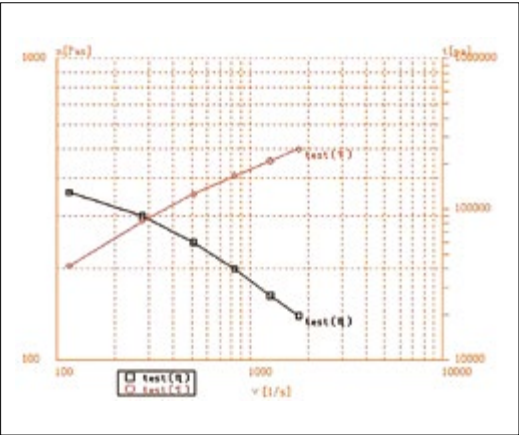
PVC管材
PVC pipe sample



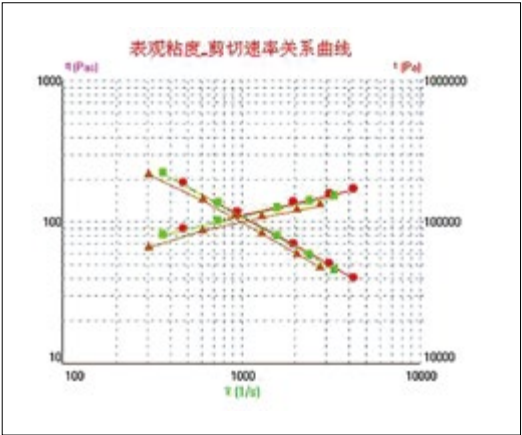
锥双挤出报告
Conical twin-screw extrusion unit test report



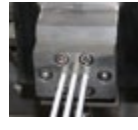
平双挤出报告
Parallel twin-screw extrusion unit test report



材料剪切速率与粘度关系曲线
Shearing rate and viscosity curve



两种材料的粘度曲线对比
Compare between two different material' s viscosity curve

图片 Photo	名称 Name	适用机型 Applicable	功能 Function
	平模模具 1 Flat Die	单螺杆平台 Single screw extrusion unit	适用于片材挤出。 It is used for sheet extrusion.
	毛细管模具 Capillary Die	单螺杆平台 Single screw extrusion unit	适用于材料的剪切粘度测量。 It is used for measuring shear viscosity.
	挤管模具 Pipe Die	单螺杆 / 锥双平台 Single or conical extrusion unit	适用于管材挤出。 It is used for pipe extrusion.
	电线包覆模具 Coating Wire Die	单螺杆平台 Single screw extrusion unit	适用于电线、电缆包覆实验生产线。 It is usually used for wire and cable coating experimental production line.
	平模模具 2 Flat Die	锥双平台 Conical extrusion unit	适用于片材挤出。 It is used for sheet extrusion.
	挤条造粒模具 Strand Die	锥双 / 平双平台 Conical or Parallel extrusion unit	适用于材料的共混造粒。 It is used for mixing and pelleting.
	流延膜模具 Film Casting Die	单螺杆 / 平双平台 Single or parallel extrusion unit	配合流延膜机完成流延加工过程。 It is used for film casting process .
	吹膜模具 Film Blowing Die	单螺杆 / 平双平台 Single or parallel extrusion unit	配合吹膜机完成薄膜的吹制过程。 It is used for film blowing process.
	Garvey 模具 Garvey Die	橡胶挤出平台 Rubber extrusion unit	适用于橡胶类型材料的挤出。 It is used for the extrusion of rubber materials.
	圆柱模具 Column Die	橡胶挤出平台 Rubber extrusion unit	适用于橡胶类型材料的挤出。 It is used for the extrusion of rubber materials.

转矩流变仪 软件

Software of The Torque
Rheometer System

HPRheo3.1
控制软件

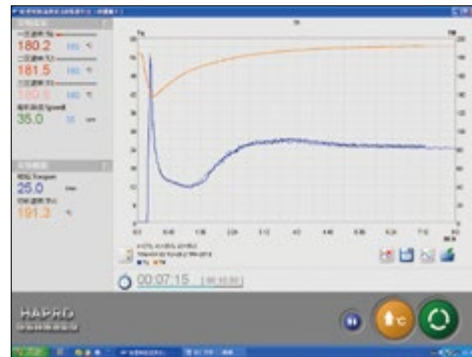
HPMixer1.4.3
混合数据处理软件

HPExtruder1.2.3
挤出数据处理软件

HPVisco1.2
表观粘度软件

HPRheo Ext
平行双螺杆控制软件

- Win7操作系统，人性化控制界面美观实用；
Windows 7, humanized control interface, beautiful show, practical, operating easy;
- 实时显示温度、压力、转矩、加热功率；
Real-time show temperature, pressure, torque and power of heat;
- 压力、扭矩报警功能，报警同时自动停止电机；
Pressure, torque alarm function and auto stop motor;
- 自定义坐标轴功能；
Custom axis of coordinates, make data show on Y1 or Y2;
- 实时比较功能；
Real-time comparing of data;
- 自定义编辑启动平台的初始化参数；
User can edit data of platform initialize;
- 可提供纯数据文件用于高级分析。
Save all data to txt or excel file for analyze.



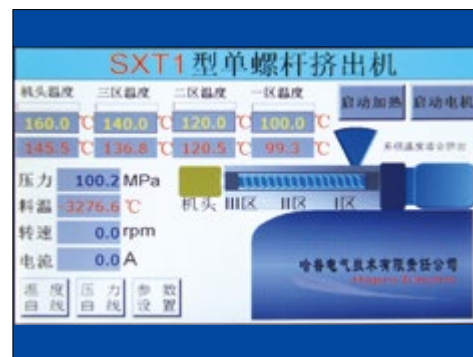
混炼平台控制界面
Mixer control interface



挤出平台控制界面
Extrusion unit control interface



平行双挤出平台控制界面
Parallel twin-screw extrusion unit control interface



SXT-I单螺杆挤出机HMI操控界面
SXT-I single screw extruder control interface

转矩流变仪仿真模拟系统

Torque rehometer simulation system

本公司生产的转矩流变仪主控单元配合各功能单元，可以根据聚合物材料的生产工艺需求，自由组合成若干实验室尺寸的全功能生产模拟系统，仿真模拟聚合物材料的实际生产与加工过程。如聚合物的配方、共混、挤出产品成型、在线检测等一体化的生产过程仿真系统。该系列仿真系统的产品构成如图所示：

Lab formulation blending extrusion products forming and on line examination system: The Hapro Torque Rheometer system, consisting of a main control unit and all kinds of function units. These units can be assembled free to constitute some fully functional simulation system of the practical production process, according to the different production and technique demands of polymer. For example, formulation, blending, extrusion, products molding, on line examination, etc.



由测控主机、平行双螺杆挤出平台（具有多个体积喂料的方式）、熔体泵、产品成型机（例如：压延机、流延机、吹膜机、线缆包覆机、造粒机等）组成，搭配在线检测设备，实现一体化仿真模拟生产过程。

The Hapro simulation system, consisting of a main control unit, parallel twin-screw extrusion unit and melt pump based on formulation blending and extrusion with volume feeding, final products molding machine, such as Film casting machine, Film calendering machine, Film blowing machine, Wire coating machine, Pelletizer, Sample cutter, etc.

实验室压延机
Laboratory Film Calendering Machine



实验室压延机由压延机和牵引卷取机组成。压延辊数量为五辊，压延辊的排列形式为45 ° 倒L形，压延辊采用油加热方式,加热速度快，控温精度高，压延辊控温油路可在串联、并联和混联的不同联接方式间快速更改，通过驱动间隙指示器直接调节压延辊间隙，每个压延辊采用独立伺服驱动，可实现相邻两辊间转速差的无级调节，根据需要可实现任意压延辊压延扭矩的测量。也可配备视觉系统，对PVC透明薄膜进行质量缺陷检测。

Laboratory Film Calendering system adopts precision extrusion and high-performance tape calendering technology. The polymer material is extruded by conical-twin extrusion unit, through into heating calender rollers to get film. The equipment use oil heating method by mould temperature controller. Calender system is suitable for polymer materials film, such as PE, PP, PS, ABS, PVC, PET, PC, etc. A film quality inspection system can be equipped on the traction and take-up unit, used for inspecting the quality defects.

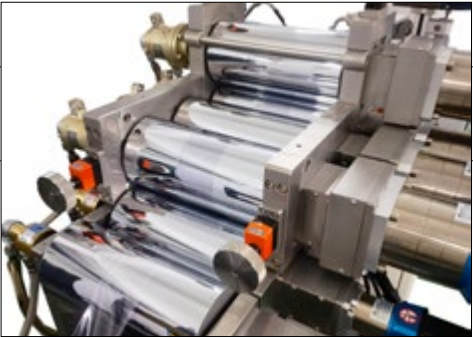
Table with 4 columns: Component, Specification, Component, Specification. Rows include Rolling structure, Diameter of roller, Roller width, and Distance between rollers.

Table with 4 columns: Component, Specification, Component, Specification. Rows include Heating method, Max. temp of roller, Power of mould temp controller, and Tubing connection.

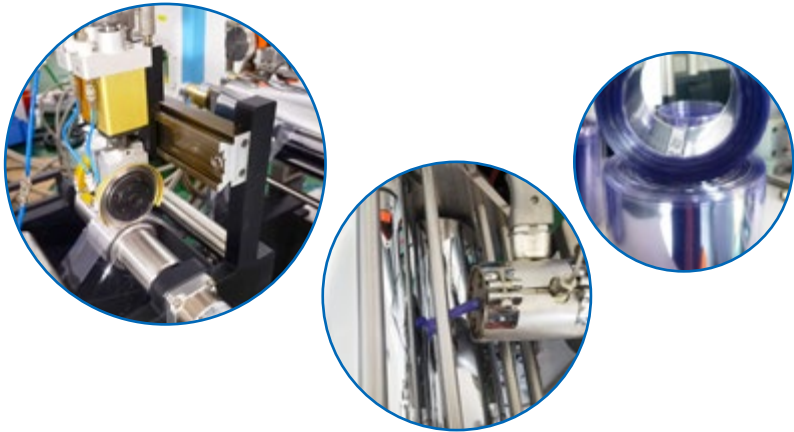
Table with 4 columns: Component, Specification, Component, Specification. Rows include Pull and charge motor, AC motor, Charge control, and Tension adjustment.

触摸屏操作界面
Human machine interface

- 可设置手动模式与联动模式;
Manual mode and linkage mode;
- 设置压辊之间的转速比引离辊与牵引辊之间膜速比;
Setting the speed ratio between the roller , speed radio between the doff roller and pull roller;
- 实时监控回油温度;
Real time monitoring the feed back oil temperature;
- 可扩展视觉测量单元对膜进行检测;
Extensible visual measurement unit to test the film quality.



压延辊结构
Roller structure



触摸屏操作界面
Human machine interface



实验室压延系统
Laboratory Film Calendering System

实验室压延机组：由测控主机搭配锥形双螺杆挤出平台或单螺杆挤出平台、压延成型机、牵引卷取机以及在线检测系统而成。该设备采用精密挤出和高性能压延成型技术，适用于PE、PP、PS、ABS、PVC、PET、PC等高分子材料的压延膜成型。配备视觉系统，可在实验室范围内实现高分子材料的压延膜成型以及在线检测等一体化仿真模拟生产过程，是高精度、高性能薄膜成型的理想实验设备。

Laboratory Film Calendering system, consisting of a main control unit, a conical twin-screw extrusion unit or single screw extrusion unit , a film calendering machine, a traction and take-up unit, on line inspect and detect unit. Profit from the precision extrusion and high-performance tape calendering technology. This system can be simulation of the practical production process.

应用领域
Application Field

可用于演示压延的工艺过程;
Demonstrating technological process of calendering;

材料配方研究与发展;
Material formulation research and development;

模拟压延实际生产过程;
Production process simulation;

聚合物材料质量控制。
Quality control of compounds and polymers.



实验室流延膜机
Laboratory Film Casting Machine

设备采用精密挤出和高性能流延成型技术，适用于PE，PP，PS，ABS，PVC，PET，PC等常用高分子材料的流延膜成型。成型原理是将挤出机中经塑化均匀的塑料熔体，经模头挤出敷在流延辊上，经定型拉伸、冷却成型。

Film casting system adopts precision extrusion and high-performance tape casting technology. The extrudate leaving the Film casting die head can be made a thin film or sheet through forming and cooling. Suitable for polymer materials such as PE, PP, PS, ABS, PVC, PET, PC, etc.

技术参数 Technical parameters	
流延膜模具 Film casting die	150 × 1 mm, 1.8 kW (0-2.5mm 厚度可调 adjustment)
成膜厚度 Film thickness	0.02-0.5mm
成膜宽度 Max. film width	120mm
流延辊直径 Diameter of upside roller	200mm
流延调速 Roller speed	0-110mm/s
卷取方式 Crimp ways	张力控制 Tension adjustment
冷却方式 Cooling	水冷 Water
自动切边装置 AUTO cutting-edge device	



实验室塑料吹膜机
Laboratory Film Blowing Machine

热塑性聚合物在螺杆挤出机中被熔化并定量挤出，熔体通过环形口膜成型，再通入空气而膨胀为膜管、被牵引辊拉伸、卷取装置收取。

Thermoplastics Polymer have been melt and quantitative extrusion by the film blowing die in the extrusion unit. Then through ring cooling wind, blowing the herringbone plate, traction roller, coiling roller. Eventually made into film.

技术参数 Technical parameters	
吹膜模具 Film blowing die	Φ25 / Φ30 / Φ40 mm (规格可定制 specifications customizable)
模口间隙 Gap of die lip	0.6 / 1.0 mm
吹膜调速 Roller speed	0-140 mm/s
成膜折径 Film fold diameter	50-120 mm (规格可定制 specifications customizable)
成膜厚度 Film thickness	0.03-0.3 mm
卷取方式 Take off	重力收取 Gravity charge



桌式单螺杆挤出机

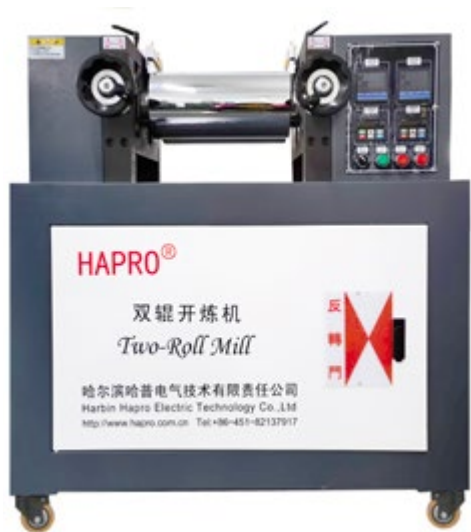
Table single screw extruder



技术参数 Technical parameters	
控制界面 Control surface	触摸屏 HMI
电机功率 Motor power	1.5 kW
螺杆直径 Screw diameter	16 mm
螺杆长径比 Screw L:D	25 :1
螺杆压缩比 Screw compression	2.4:1 或 3.6:1
螺杆转速 Screw speed	100 r/min
加热方式 Heating	电加热,4 区 / 4 Zones,Electrical heating,PID
最高温 Max. temp	350℃
熔体压力测量量程 Pressure range	0.1 ~ 100 Mpa

双辊开炼机

Two-Rollers Mills



技术参数 Technical parameters	
辊筒尺寸 Size of roller	160mm×L350mm
混合容量 Mixing weight	500g-1000g
辊筒间隙 Rollers gap	0.1- 8 mm 可调 Adjustment
温度范围 Temp range	室温 RT ~ 300℃
控温精度 Temp precision	± 2.0℃
辊筒速比 Roller speed ratio	可调
转速控制 Speed control	单辊独立调速 Independent speed regulation
转速范围 Speed range	0-30 r/min
加热方式 Heating	电加热 / 油加热 / 水冷却 Electric / Oil heating,PID
总功率 Total power	10 kW
安全装置 Safety device	反转装置,安全防护罩, 急停按钮 Reversible rollers and kicking at the door

技术参数 Technical parameters

流延膜模具 Film casting die	150×1 mm,1.6 kW (0-2 mm 厚度可调)
成膜厚度 Film thickness	0.02-0.5mm
成膜宽度 Max. film width	70mm
流延调速 Roller speed	0-110mm/s
流延辊直径 Diameter of upside roller	140mm
卷取方式 Crimp ways	张力控制 Tension adjustment
冷却方式 Cooling	水冷 Water
自动切边装置 AUTO cutting-edge device	

桌式流延膜机

Table film casting machine



桌式吹膜机

Table film blowing machine



技术参数 Technical parameters

吹膜模具 Film blowing die	Φ 15 mm
模口间隙 Gap of die lip	0.3~1.0mm
吹膜调速 Roller Speed	0-120 mm/s
成膜折径 Film fold diameter	47~70mm
成膜厚度 Film thickness	0.02-0.3mm
卷取方式 Take off	重力收取 Gravity charge

平板硫化机

Platen Presses

技术参数 Technical parameters

容量 Capacity	30 T
加热方式 Heating	电加热 Electric heating
温度范围 Temp range	室温 RT ~ 300℃
温度精度 Accuracy temp	± 1.0℃
加热板 Size heating board	300×300mm
冷却板 Size cooling board	300×300mm
工作层数 Working floors	2 层, 上层加热下层冷却 2 Upper heating, lower cooling
总功率 Total power	7 kW
操作方式 Operation model	全自动 Auto
冷却方式 Cooling	自来水冷却 Nature water



SXT-I 单螺杆挤出机
SXT-I single screw extruder



技术参数 Technical parameters	
控制界面 Control interface	触摸屏 HMI
电机功率 Motor power	1.5 kW
螺杆长径比 Screw L:D	25 :1 (30:1 可选 Available)
螺杆压缩比 Screw compression	2.4:1 或 3.6:1 (2.0~4.0 可选 Available)
螺杆直径 Screw diameter	20mm (25,30 可选 Available)
螺杆转速 Screw speed	100 r/min
加热方式 Heating	电加热 ,4 区 /5 区 Electrical heating,4 /5 Zones,PID
最高温度 Max. temp	350℃ 可根据使用定制不同温度 Customizable according to the use temperature
产量 Output	1 - 10 kg/ hr

实验室双驱动切粒机
Laboratory dual-drive Pelletizer



技术参数 Technical parameters	
电机 Power	伺服双驱动 Servo drive
电机功率 Motor power	2.2 kW
刀盘外径 External diameter ofrotary knife	140 mm
最大切割直径 Max.Cutting diameter	3.5 mm
刀盘转速 Speed of rotary knife	0~100 r/min
粒子长度 Particle length	0.5~6 mm (可调)
产量 Max.cutting capacity	10 kg/hr

技术参数 Technical parameters

平模模具 Flat die	60*1.5 mm(可定制) Customizable
成膜宽度 Film width	50mm
成膜厚度 Film thickness	0.3~1.0 mm
辊间距 Distance between rollers	0.2~2.5mm
卷取方式 Crimp ways	张力控制 Tension adjustment
冷却方式 Cooling	水冷 Water

三辊压光机
3-Rollers Calender Machine



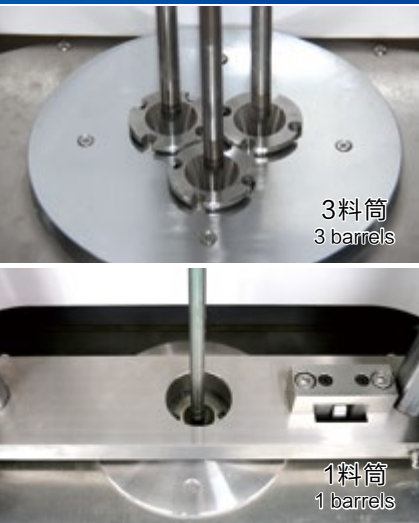
皮带牵引机
Belt Conveyor

技术参数 Technical parameters

传送速度 Speed of transfer	0 ~ 6.7m/min
传送角度 Transfer angel	± 30° 可调 adjustable
电动机功率 Power of motor	0.4 kW
皮带宽度 Width of belt	160mm
皮带材质 Material of belt	铁氟龙 (硅橡胶可选) PTFE (Teflon)



高压毛细管
流变仪
High Pressure Capillary
Rheometer

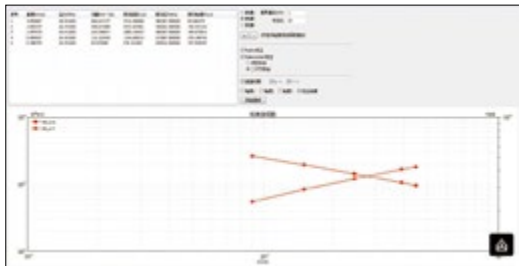


高压毛细管流变仪用于测量物料在恒定温度、恒定速度或以一定规律变化的速度条件下，经熔融挤出后，通过入口压力校正以及流变学模型，从而计算出在不同剪切速率下熔体的剪切黏度，剪切速率测量范围： 10^{-2} – 10^6S^{-1} 。

The measurement in the shear rate region over app 10^{-2} – 10^6S^{-1} , which allows the simultaneous measurement at three different die lengths. The multi-functional equipment generation with unique characteristic data and highest possible precision, applied for quality control or research and development – a complete program range, covering nearly all needs!



操控界面
Control interface



实验报告
Test report

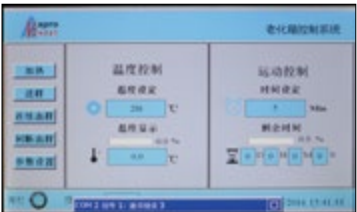
技术参数 Technical parameters			
电机 Motor	施耐德伺服电机 Schneider servo	料筒数量 Number of barrels	1/2/3
最大载荷 Max. load	50 KN	料筒直径 Barrel diameter	9.5 (标配) /12/15mm
活塞速度 Piston speed	31.75 $\mu\text{m/s}$ –21.66mm/s	料筒长度 Barrel length	200mm(Customizable)
动态速比 Speed ratio	1: 200000	总功率 Total power	5.5 kW
最高温度 Max.temp	350℃	熔体压力量程 Melt pressure range	0.01 –100 Mpa
温度控制 Temp control	加热 / 冷却 3 区 Heating cooling,3Zones,PID	毛细管模芯 Capillary core	Φ : 1.0,1.27,2.0 mm L:D:10:1,20:1,30:1,40:1

动态老化测试仪
Dynamic testing oven

动态老化测试仪主要用于对未加工的高聚物粉料、粒料以及加工成型后的管状、薄板状试样等进行热稳定性测试。具有连续出样以及间断出样的功能，可以直观地看到不同老化时间下试样颜色变化的过程，相比于传统的烘箱至少节约三分之二的测试时间，操作简单且效率高。还可以把试样长度转化成时间标尺，再用色差仪比对不同时间所对应的颜色变化，以此评价材料的热稳定性能，进一步提高生产工艺和优化产品配方等。

Mainly used for testing the thermal stability of polymer powder, pellet, tubular, laminated samples. Dynamic testing oven can send the sample continuous or discontinuous, Experimenter could observe the process of sample color changes under different aging time. Testing oven can save the two thirds of test time compared to the traditional oven and turn the sample length into the time scale. Evaluating thermal stability properties of materials by contrasting the color change with color meter, Further improve the production process and optimize the product formula, etc.

技术参数 Technical parameters			
驱动电机 Motor	Schneider 伺服 servo	人机界面 HMI	触摸屏 Delta touch screen
电机功率 Power of motor	400 W	动态速比 Dynamic speed ratio	1:200000
电机转速 Motor speed	8000r/min	老化温度 Aging temperature	室温到 300℃ RT ~300℃
配备托盘 Tray,L×H×W	托盘 A 7 条: 260×7×26 mm 托盘 B 8 条: 260×8×14 mm	温度控制 Temp control system	RKC system
预热时间 Preheating time	可以设定 Setable	加热方式 Heating	电加热 Electrical heating
进样时间 Sampling time	1min	加热功率 Heating power	200W×20
老化时间 Aging time	1min 到 2 个月 1min~ two months	测温传感器 Temperature sensor	J 型热电偶 ×4 J type thermocouple ×4



人机界面/HMI



托盘/Tray



由高性能、高速工业级线扫描摄像机与高亮平滑LED线光源组成的高精度测量系统应用在流延膜、压延膜以及吹膜系统上，构成膜质量检测系统，可以检查膜或带中的外来异物及鱼眼。对于高性能产品严格限制外来杂质的材料，如高压电缆绝缘材料或高质量制膜材料。这种检查对评定聚合物材料的质量很重要。

When an industrial high-speed and high-performance electronic camera was equipped on the film casting unit or a chill roller unit, a film or tape quality inspection system was constructed. This system can be used to inspect the foreign contamination particles and “fish eye” in the materials. This inspection is important to some high quality membrane material, for instance the high voltage cable insulation materials.

光学系统 / Optical system

镜头品牌 Camera Lens brand	德国 Scheide	相机品牌 Camera brand	美国 DALSA
采集卡 Capture card	美国 DALSA	工作模式 Sync modes	半 / 全工作模式 Base, Medium, Full, and Deca Camera Link
分辨率 Resolution	16384 × 1 Valid Pixels	增益设置范围 Gain range	1X~10X
像素尺寸 Pixel size	3.5 μm	数据输出精度 Data format	8bit / 20bit 数据可设置 Configurable
最高行频 MAX. Line rate	48 KHz	数据输出格式 Output format	串行数据格式 1Tap camera link base
光谱响应特性 Spectral response	400nm ~1000nm Typical	动态范围 DR for response	>65 dB

测量系统 / Measuring system

测量厚度 Measurement thickness	0.04~2 mm	分辨率 Resolution	20 μm
视场宽度 Field width	Calendering 0~50 mm Casting 0~100 mm	检出率 Detection rates	100%
测试速度 Speed of measurement	>1Kg/h	精度 Accuracy	1.0%F.S
室内环境 Indoor environment	一万级 The class of ten thousand	电源 Power supply	3 φ AC 380V
使用温度 Operating temperature	0 ~ +40℃	收膜速度 Charging film speed	0~110mm/s
环境湿度 Environment humidity	< 65%	辊筒冷却方式 Roller cooling	水冷 Water
成膜方式 Film-forming methods		压延或流延 Calendering or Casting	

成膜系统 / Film formation system

压延式杂质检测仪 Contamination detector for film calendaring		流延式杂质检测仪 Contamination detector for film casting	
压延辊直径 Calendering roller diameter	110mm	流延辊直径 Casting roller diameter	200mm
压延辊间距 Calendering roller distance	0.2~2.5mm	流延辊中心高 Center height of casting roller	1 m
平模模具尺寸 Flat die	60 × 1.5mm,0.8kW (可定制 customizable)	流延膜模具尺寸 Film casting	150 × 0.02~2.5mm 厚度可调 / Thickness adjustable
压延成膜宽度 Film width of calendaring	< 60 mm	流延成膜宽度 Film width of casting	< 120 mm
压延成膜厚度 Film thickness of calendaring	0.3~1.0mm	流延成膜厚度 Film thickness of casting	0.02~0.5mm
卷取控制方式 Charging control	恒张力控制 Constant tension	切边装置 Cutting-edge device	自动 AUTO



压延式杂质检测仪
Contamination Detector For Film Calendaring



流延式杂质检测仪
Contamination Detector for Film Casting

● 杂质检测仪特点

Characteristics of Contamination Detector

- 高性能，60MHz输出速度，线扫描工业相机；
High performance, up to 60MHz output, line scan industrial camera;
- 高速PCI数据采集系统；
High speed PCI data capture system;
- 亮度可调高亮LED线光源；
High light density LED linear light source(density adjustable);
- 张力反馈控制收取电机。
Tension feedback used to control crimp.



操控界面 / Control interface



高压电缆半导体屏蔽料带材
表面光洁度检测系统

Surface finish detection system of high-voltage
cable semiconductive material strip

技术背景 ●

Technology background

交联聚乙烯绝缘高压电力电缆绝缘系统是由绝缘层与半导体层组成，半导体材料是聚烯烃弹性体材料和高结构炭黑共混而成，作为电缆绝缘层电场存在的边界层。由于半导体层与绝缘层的物理性质高度相近，又是在生产工艺中共同挤出制成，界面不会产生气隙，使从线芯屏蔽层的高电位到外屏蔽层的低电位间绝缘中的电场都处于完美的交联聚乙烯绝缘中，可承受较高的运行电压和使用寿命，根据等电位面上曲率半径小处会有较高的电场强度的原理，半导体层面向绝缘的界面如有凸起物，就会引起电场强度的高度增加，危害绝缘，因此对于半导体材料和电缆绝缘系统制造，要求严格限制半导体层表面突起物的数量和尺寸。具体落实到质量控制体系上，就是要控制半导体屏蔽料挤带成型品表面凸起物的数量和尺寸。

The structure of XLPE high voltage cable insulation is composed of an insulative layer and semiconductive layers. The semiconductiv material is a blend of polyolefin elastomer material and carbon black, which is used for the boundary layer of the electric field of the cable insulation layer. Since the physical properties of the semiconductive layer and the insulative layer are similar, they are also co-extruded in the production process, there is no air gap at the interface. The electric field in the insulation from the high potential of the core shielding layer to the low potential of the external shielding layer is perfect in XLPE insulation layer, which can withstand higher operating voltage and service life. According to the principle of higher electric field strength at the small curvature radius of the equipotential surface, the semi-conductive layer faces the insulation. If there are protrusions on the interface, it will cause the increase of the electric field strength to damage the insulation. Therefore for, the production of semi-conductive materials and cable insulation systems, it is required to limit the number and size of the protrusions on the surface of the semi-conductive layer strictly. The specific implementation of the quality control system is to control the number and size of the protrusions on the surface of the semiconductive material strip.



● 产品特点

Features

高压电缆半导体屏蔽料表面光洁度检测系统开发基于高分子材料低温挤出流延技术，和电子摄像光学检测技术（或称机器视觉技术）。系统配备高速视觉相机以及特殊的LED扫描光源，实时监测凸起尺寸信息，图像处理能力为1500 万像素/秒。可实现高速高分辨力测量，同时，摄像系统具有宽视场、高像素，可以在对试品测量同时，同步对标定区测量，实现实时标定校准。

The development of high-voltage cable semi-conductive shielding material surface finish detection system is based on low-temperature extrusion and casting technology of polymer materials, and electronic camera optical detection technology (or machine vision technology). The system is equipped with a high-speed vision camera and a special LED line-light source to detect size information of the protrusion in real time. The image processing capacity is 15 million pixels per second. It can achieve high-speed and high-resolution measurement. At the same time, the camera system has a wide field of view and high pixels. It can synchronous measure the calibration area while measuring the sample to calibrate real-time.

挤出系统 / Extrusion system	
电源 Power supply	3×380V,50/60 Hz ,+N +PE
电机 Motor	施耐德伺服电机 Schneider servo motor
电机功率 Power of motor	1.8 kW
减速比 Reduction ratio	1:35
螺杆直径 Screw diameter	20mm
螺杆长径比 Screw L:D	25 :1
螺杆材质 Screw material	进口高强度合金钢 Imported high-strength alloy steel
螺杆压缩比 Screw compression	1.5:1
温控系统 Temperature control system	日本 RKC, 加热冷却双 PID 控制 RKC company of Japan, heating and cooling dual PID control
喂料方式 Feeding	体积喂料 Volumetric feeder
最高可控温度 Maximum controllable temperature	350℃
温度传感器 Temperature sensor	J 型热电偶 J type thermocouple
加热区 Heating zone	4 区加热 (螺筒 3 区加热冷却, 模具 1 区加热) 4 zone heating (3 zone heating and cooling of the screw barrel, heating zone 1 of the die)
加热方式 Heating	电加热 Electrical heating
加热总功率 Heating power	4.0kW
冷却方式 Cooling	风冷 Wind
模具 Die	口模尺寸 60mm×1.5mm lip of die 60mm×1.5mm

成膜系统 / Film Casting system	
电源 Power supply	3×380V,50/60 Hz ,+N +PE
流延辊尺寸 Size of casting roll	Φ200mm×200mm
流延辊中心高 Center height of casting roller	1022 mm
流延成膜宽度 Reduction ratio	25~30 mm
流延成膜厚度 Thickness film of casting	0.5mm±0.02
流延辊控温方式 Method of casting roll temperature control	冷热一体机恒温控制 constant temperature control of the cooling and heating integrated machine
流延辊驱动电机 Casting roller drive motor 功率 power	伺服电机 servo motor 640W
牵引辊驱动电机 Traction roller drive motor 功率 power	伺服电机 servo motor 640W

光学检测系统 / Optical inspection system	
测量厚度 Thickness of measurement	0.4~0.5 mm
凸起高度分辨率 Resolution of protrusion height	20 μ m
视场宽度 Width of field	0~75 mm
检测宽度 Width of detection	44mm
最小成像宽度 Width of the minimum imaging	10 μ m
最小测量尺寸宽度 Width of the minimum measurement size	30 μ m
检出率 Detection rates	100%
测试速度 Speed of measurement	>1kg/h
室内环境 Work environment	一万级 The class of ten thousand
使用温度 Operating temperature	0 ~ +40℃
收膜速度 Film-drawing speed	0~110mm/s
环境湿度 Environment humidity	< 65%
测量辊参数 Measuring roller parameters	
直径 Diameter	40mm
同轴精度 Coaxial accuracy	3 μ m
测试光源 Test light source	220mm 长线扫描光源 220mm line-scanning light source



绕包模塑式高压电缆软接头
绝缘带和屏蔽带制备系统
Insulating tape and shielding tape production
system for molded high-voltage cable flexible joint

绕包模塑软接头制备方法，与挤出模塑式方法相辅相成，用于高压海缆软接头制备，是十分有效的，特别是故障修复时，绕包模塑方法更加便捷有效。另外，国外报道，138kV 以下电缆接头，更趋向于全部使用绕包模塑技术，对于国内110kV 以下系统应用更有意义。绝缘和屏蔽层绕包带制备系统开发基于高分子材料挤出流延分切一体化技术，配备以电子摄像绝缘带杂质实时检测系统。

绝缘带制备系统组成：无缺陷单螺杆挤出机、流延分切一体机、流延模具、电子摄像式杂质测量仪、双通道独立模温机。

The preparation method of the wrap-around molded flexible joint is complementary to the extrusion molding method. It is very effective for the preparation of the high-voltage cable flexible joint. Especially when the fault is repaired, the wrap-around molding method is more convenient and effective. In addition, foreign reports indicate that all cable joints below 138kV tend to use wrap-around molding technology, which is more meaningful for domestic system applications below 110kV. The insulation and shielding layer wrapping tape production system are developed based on the integrated technology of polymer material extrusion, casting and slitting, equipped with a real-time detection system for impurities in the insulation tape with electronic cameras.

Insulation tape production system composition: defect-free single screw extruder, casting and slitting machine, film casting die, electronic camera impurity inspection, dual-channel independent mold temperature machine.

挤出系统 / Extrusion system	
电源 Power supply	3 × 380V,50/60 Hz ,+N +PE
电机 Motor	3 kW 伺服电机 3kW servo motor
减速比 Reduction ratio	1:15
螺杆直径 Screw diameter	30mm
长径比（L:D） Screw L:D	25 :1
螺杆材质 Screw material	38 CrMoAlA
温控系统 Temp control system	日本 RKC, 加热冷却双 PID 控制 RKC company of Japan, heating and cooling dual PID control
最高可控温度 Maximum controllable temperature	350℃
温度传感器 Temperature sensor	J 型热电偶 J type thermocouple
喂料方式 Feeding	体积喂料 Volumetric feeder
加热区 Heating zone	8 区电加热（螺筒 3 区加热冷却，机颈 1 区，模具共 4 区加热） 8 zones of electric heating (3 zones for heating and cooling of the screw barrel, 1 zone for the machine neck, 4 zones for the die heating)
加热总功率 Heating power	6.0kW
冷却方式 Cooling	风冷 Wind

流延模具 / Film casting die			
模具总体尺寸 Overall die size	320 × 250 × 170mm	模口宽度 Width of die lip	250mm
模具模口可调尺寸 Adjustable size of die lip	0.02~2.5mm	成膜厚度 Thickness of film	0.02~0.5mm

流延分切系统 / Casting slitting system			
电源 Power supply	3 × 380V,50/60 Hz ,+N +PE	流延辊直径 Casting roller diameter	150mm
流延辊中心高 Center height of casting roller	1022 mm	流延膜模具尺寸 Film casting	150mm*0.02~2.5mm 厚度可调 Adjustable thickness
流延成膜宽度 Film width of casting	< 120 mm	流延成膜厚度 Film thickness of casting	0.08~0.5mm
流延辊冷却方式 Casting roller cooling method		水冷（水温可控） Water(controllable water temperature)	

杂质检测光学系统 / Impurity detection optical system			
测量厚度 Measurement thickness	0.04~1 mm	分辨率 Resolution	20 μ m
视场宽度 Field width	0~100 mm	检出率 Detection rates	100%
测试速度 Speed of measurement	>1kg/h	室内环境 Work environment	一万级 The class of ten thousand
使用温度 Operating temperature	0 ~ +40℃	收膜速度 Charging film speed	0~110mm/s
环境湿度 Environment humidity		< 65%	

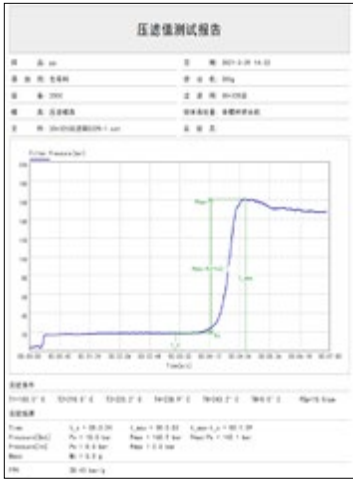


熔体压滤 测试仪

Melt pressure
filter tester

系统由单螺杆挤出机单元、熔体泵、压滤模具共同组成，其挤出原理为由色母料和基础测试聚合物组成的测试混合物，通过具有熔体泵和分配板过滤网组合的挤出机，在滤网前配有熔体压力传感器，用初始压力和最大压力之间的差值计算过滤值，用以评定着色剂的分散性能。为了保证熔体泵完全充满且熔融完全均匀，本系统具有压力反馈功能。

The system consists of a single screw extruder unit, a melt pump and a pressure filter die. The extrusion principle is a test mixture composed of a color masterbatch and a basic sample polymer. Through an extruder equip a melt pump and a plate filter, a melt pressure sensor is installed in front of the filter, and the filter value is calculated by the difference between the initial pressure and the maximum pressure to evaluate the dispersion performance of the colorant. In order to ensure that the melt pump is completely full and the melting is completely uniform, the system has the function of pressure feedback.



单螺杆挤出机 / Single screw extruder

驱动方式 Driving mode	伺服驱动 servo drive	电机功率 Power of motor	3kW
减速器品牌 Reducer	APEX	减速比 Reduction ratio	25:1
螺杆转速 Screw speed	120r/min	挤出模式 Extrusion mode	恒速 / 恒压模式 constant speed / constant pressure mode
螺杆加热区 Screw barrel heating zone	4 区 4 zone	模具加热区 Die heating zone	1 区 1 zone
加热总功率 Heating power	5.6kW	螺杆直径 Screw diameter	25mm
螺杆长径比 Screw L:D	30:1	螺杆压缩比 Screw compression	3.6:1
螺杆材质 Screw material	38CrMoAlA 渗氮电镀 38CrMoAlA nitriding plating	控制方式 Control mode	触摸屏 / 电脑 touch screen / computer
挤出最高温度 Maximum extrusion temperature	350℃	压力测量范围 Pressure measuring range	0.1~100Mpa
模具 Die	压滤模具 filter Die	冷却方式 Cooling	喂料口水冷，螺杆气冷 feed mouth water cooling, screw tube air cooling
PLC		台达 / 西门子 Delta / Siemens	

熔体泵 / Melt pump

泵送能力 Pumping capacity	6~10kg/h	加热棒 Heating rod	4* 250W
转速 Rotation speed	0~50 r/min (转速可调) 0~50 r/min (adjustable)	齿形 Gear shape	直齿 / 斜齿 Straight tooth / Helical tooth
伺服驱动系统 Servo drive system	台达 Delta	伺服驱动器功率 Servo driver power	1kW
控温传感器 Temperature control sensor	热电偶 thermocouple	减速器 Reducer	APEX
最高温度 Max. temperature	350℃	入口压力传感器 lutput pressure sensor	0~30 MPa
出口压力传感器 Output pressure sensor	0~30 MPa (100Mpa 可选) 0~30 Mpa (100Mpa available)	产量 Output	2~8 kg/ 小时 2~8 kg/hr
尺寸 (L×W×H) Dimension (L×W×H)		1000×500×550 mm	

压滤模具 / Pressure filter die

压滤模具 Press filter die	Φ4mm	滤网规格 Filter size	2 层 30/325, 2 层 30/400, 3 层 30/60/200 2-layer 30/325, 2-layer 30/400, 3-layer 30/60/200
模具加热功率 Die heating power		800W	



高温 3D 打印线材
挤出实验仿真线

Experimental simulation line of high temperature 3D printing wire extrusion

系统由高温挤出单元、冷却定型单元、测径单元、牵引收取单元组成。高温挤出单元其最大挤出温度为400℃，通过触摸屏控制挤出温度、螺杆转速，并且可以实时显示挤出过程中温度、转速、压力的变化。以测得的实时直径为目标，通过测径装置控制牵引速度，实现挤出Φ1.75mm或者Φ3mm直径的线材，其直径误差≤0.05mm。

The system consists of a high temperature extrusion unit, a cooling setting unit, a diameter measuring unit and a traction collection unit. The maximum extrusion temperature of the high temperature extrusion unit is 400 °C. The extrusion temperature and screw speed are controlled by the touch screen, and the changes of temperature, speed and pressure in the extrusion process can be displayed in real time. Taking the measured real-time diameter as the target, the traction speed is controlled by the diameter measuring device to extrude the wire with the diameter of 1.75mm or 3mm, and the diameter error is less than 0.05mm.

高温单螺杆挤出机 / High temperature single screw extruder			
驱动方式 Driving mode	伺服驱动 servo drive	电机功率 Power of motor	1.5kW
减速器减速比 Reducer deceleration ratio	15:1	螺杆转速 Screw speed	95r/min
加热区 heating zone	5 区 5 zone	温度范围 Temperature range	室温 ~400℃ room temperature ~400℃
温控精度 Temperature control precision	±0.5℃	压力测量范围 Pressure measuring range	0.1~100Mpa
螺杆直径 Screw diameter	20mm	长径比 Screw L:D	30:1
压缩比 Compression ratio	3:1	冷却方式 Cooling	喂料口水冷，螺筒气冷 water cooling for feed zone, air cooling for barrel

线材模具 / Wire die			
线材模具 Wire die	Φ2.25mm	模具处理 Die treatment	内表面镀铬并镜面抛光 hard chrome plating on the inner surface and mirror polishing
制品规格 Product specification	直径 DN1.75mm diameter DN1.75mm	制品公差 Product tolerance	±0.05mm



冷却水槽 / Cooling tank

水槽长度 Tank length	1m	水槽高度 Tank height	可升降（升降范围：870~1200mm） can rise and fall (range: 870~1200mm)
水箱容积 Tank volume	60L	水泵功率 Water pump power	72W
水槽材质 Tank material	304 不锈钢 304 stainless steel	除水方式 Dry method	压缩空气吹干 compressed air drying

牵引控制装置 / Traction control device

电机 Motor	伺服电机 servo motor	电机功率 power of motor	750W
牵引控制方式 Traction control mode	与测径仪做闭环反馈控制 closed-loop feedback control with caliper	牵引辊直径 Diameter of traction roller	48mm
牵引辊最大线速度 Max. linear speed of traction roller	60m/min	收卷控制 Crimp ways	张力控制 Tension adjustment
收卷方式 Winding ways	自动排线 Automatic wiring	收卷辊直径 Diameter of winding roller	90mm
收卷最大线速度 Maximum linear speed of winding	56m/min	径仪 Diameter	高精度测径仪 high-accuracy Diameter
测量范围 Measuring range	0.2~10mm	测量精度 Measurement accuracy	±0.05mm

行星混合器单元
Planetary mixer unit

行星混合器适用于液与液、固与液、膏体与膏体、粉与膏体以及密度比例悬殊大、从低黏度到高黏度等物料的反应、混合、分散共混的设备，由行星搅拌桨叶和刮壁刀组成。

特点：混合充分、结构简单、便于拆装、通过替换桨型可满足不同的混合目的，效果是普通混合机的十几倍。

Planetary mixer is suitable for the reaction, mixing, dispersing and blending of materials such as liquid and liquid, solid and liquid, paste and paste, powder and paste, as well as materials with a wide disparity in density, from low viscosity to high viscosity. It is composed of planetary mixing blade and scraper.

Features: Full mixing, simple structure, easy disassembly and assembly, different mixing purposes can be met by replacing the paddle type, and the effect is better than ordinary mixers.



技术参数 / Technology parameters

容积 Chamber volume	3200ml	搅拌桨 Number of agitators	两个 Two
行星比 Planetary ratio	31:14	气缸行程 Cylinder stroke	260mm
加热方式 Heating	油水循环加热 Oil and water circulation heating	加热媒介 Heating medium	模温机 the die temperature
模温机功率 The power of the die temperature	9KW	最高温度 Max. temp	220℃
冷却方式 Cooling	水循环冷却 Water circulation cooling	温度传感器 Temperature sensor	J 型热电偶 J type thermocouple
安全设置 Security Settings	隔热套、机械锁装置 Insulation sleeve、Mechanical lock device	外观尺寸 Size	60*60*1100



真空管材(微管)
成型系统
Vacuum pipe (Micropipe)
forming system

真空管材（微管）成型系统由转矩流变仪主机单元、单螺杆挤出单元、真空管材成型单元，测径单元，收取单元组成，挤出机可选配耐高温、耐腐蚀材质，适用于PP、PE、PVDF等材料,能直观有效的模拟管材的挤出成型。

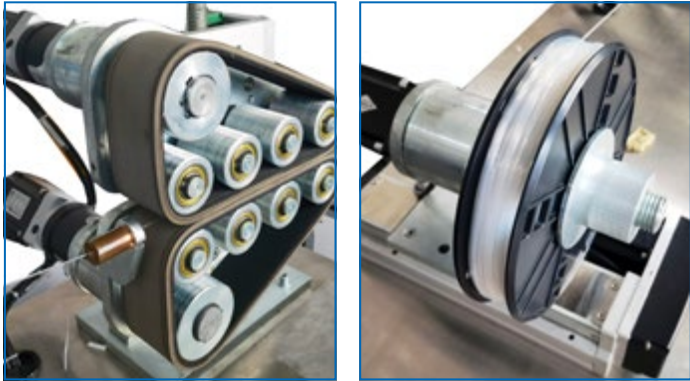
The vacuum pipe (Micropipe) forming system is composed of torque rheometer main unit, single screw extrusion unit, vacuum pipe forming unit, diameter measuring unit and Belt Conveyor. Extruder can be equipped with high temperature and corrosion resistant materials, suitable for PP, PE, PVDF and other materials .It can simulate pipe extrusion forming intuitively and effectively.

可移动式测控主机平台 / Movable Platform of Main unit	
性能指标 Performance Index	性能参数 Performance Parameter
电机功率 Power of Motor	5.0 kW
电机速度 Motor Speed	3000 r/min
减速比 Reducer ratio	1:15
动力输出转速 PTO speed	0.1~200 r/min
转速精度 Speed Accuracy	0.05% F.S
扭矩范围 Torque Range	0~240 Nm
扭矩精度 Torque Accuracy	0.1% F.S
静态温度控制精度 Static Measurement Accuracy of Temp	0.1℃
动态温度控制精度 Dynamic Measurement Accuracy of Temp	+0.5℃
熔体压力量程 Melt pressure Range	0.1~100 Mpa
压力精度 Melt pressure Accuracy	0.5% F.S

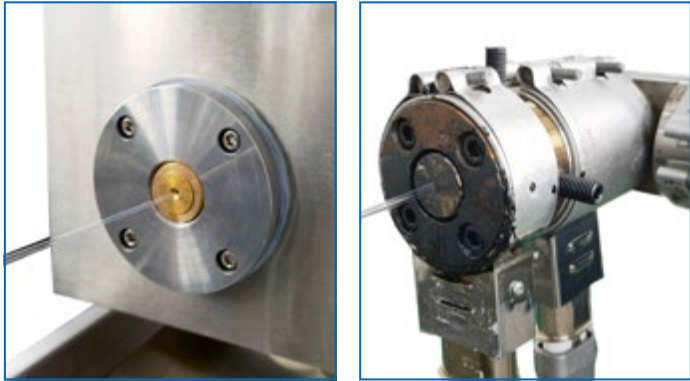
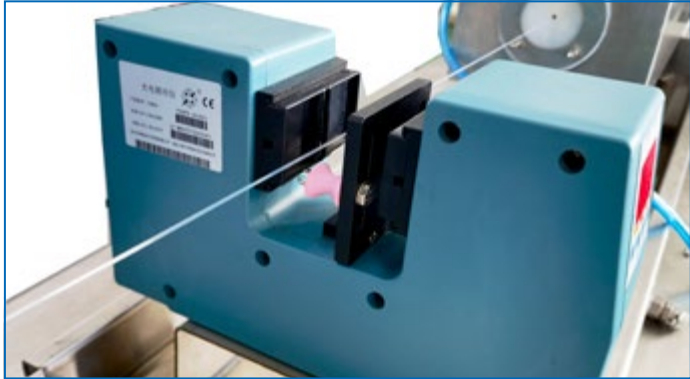


可移动式挤塑平台 / Movable Platform of Single screw Extruder	
性能指标 Performance Index	性能参数 Performance Parameter
螺杆结构 Screw configuration	等距变深 Isometric darker
螺杆长径比 Screw L:D	30:1
螺杆直径 Screw Diameter	20 mm
螺杆压缩比 Compression Ratio	3.6:1
温控系统 Temp control system	日本 RKC / RKC from Japan
加热 / 螺筒 5 区 Heating	电加热 Electrical Heating / barrel 5 Zones
加热功率 Heating power	4.6 kW
最高温度 Max.Temperature	300℃
喂料方式 Feeding	体积喂料 Volumetric feeder

真空管成型设备 / Vacuum pipe forming unit	
性能指标 Performance Index	性能参数 Performance Parameter
水槽总长 Water trough length	1500mm
真空段长 Vacuum section length	500mm
水槽宽度 Water trough width	200mm
真空泵 Vacuum pump	水环式 Water ring
成管直径 Final pipe diameter	1.3~1.5mm
壁厚 Wall thickness	0.1mm



皮带式牵引机 / Belt Conveyor	
性能指标 Performance Index	性能参数 Performance Parameter
牵引有效长度 Effective hauling length	200mm
牵引有效宽度 Effective traction width	60mm
牵引速度 Traction speed	2~20m/min adjustment
收取方式 taken mode	自动收卷 Automatic winding
收卷线速度 Winding line speed	20m/min
适用管径规格 Applicable pipe diameter specifications	≤ Within Φ2 mm
测径仪测量范围 Measuring range of caliper	0~15mm
测量精度 Measurement accuracy	±0.03mm





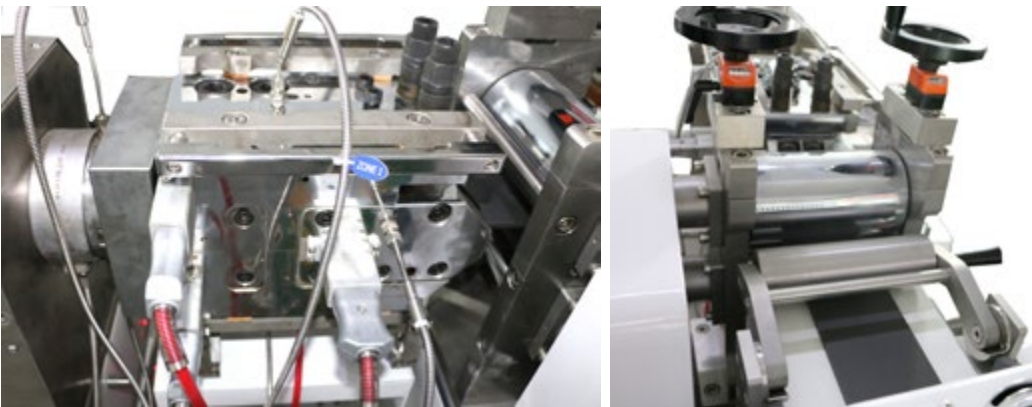
实验室高聚物挤出成型测试系统

Laboratory polymer extrusion molding test system

主要用于常规及高填充UPVC配方的板材、片材、管材及异型材的挤出成型测试，可完成应用锥形双螺杆挤出生产的模拟。

Mainly used for extrusion testing of conventional and high filling UPVC formula sheet, pipe and profile. It can complete the simulation of extrusion production with conical twin screw.

可移动式主控平台 / Movable platform of Main unit	
性能指标 Performance Index	性能参数 Performance Parameter
电机功率 Power of Motor	11.0 kW
电机速度 Motor Speed	1500 r/min
减速比 Reducer Rate	1:10
速度范围 Speed Range	0.1~150 r/min
转速精度 Speed Accuracy	0.05% F.S
扭矩范围 Torque Range	0~900 Nm
扭矩精度 Torque Accuracy	0.1% F.S
静态温度控制精度 Static Measurement Accuracy of Temp	0.1℃
动态温度控制精度 Dynamic Measurement Accuracy of Temp	+0.5℃
熔体压力量程 Melt pressure Range	0.1~30 MPa
压力精度 Melt pressure Accuracy	0.5% F.S



可移动式锥形双螺杆挤出平台 / Movable platform of Conical Twin Screw Extruder	
性能指标 Performance Index	性能参数 Performance Parameter
螺杆组合方式 Barrel combination	气动分离螺杆筒，方便清理螺杆 Pneumatic pull and push barrel and convenient to clean the screw
双螺杆规格 Twin-screw specifications	前端直径 little-end:35 mm 后端直径 Big-end:81mm
螺棱长度 Screw arris length	865mm
温控系统 Temp control system	RKC from Japan
加热 Heating	Electrical Heating/8 Zones (Barrel 4,Die head 4)
螺杆加热功率 Barrel heating power	9 kW
模具 Die head	T- Die W×T : 100×4~6mm adjustable
最高温 Max.Temperature	350℃
冷却 Cooling	压缩空气 Air Compression
排气 Exhaust way	真空 Vacuum
压力量程 Pressure range	0~30 Mpa

板材成型实验机 PVC sheet forming machine	
性能指标 Performance Index	性能参数 Performance Parameter
辊轮规格 Roller specification	直径和长度 Φ110×190mm
辊转速 Roller rotation speed	0.1~40 rpm
辊温控 Roller temperature control mode	水温机 Mold temperature machine, medium is water
温度范围 Temp. Range	5~90℃
最大成型宽度 Max. Forming width	120 mm
成型厚度 Range of forming thickness	1~7.0 mm
牵引速度 Traction speed	0.1~10 m/min
冷却 Cooling	水冷 Water