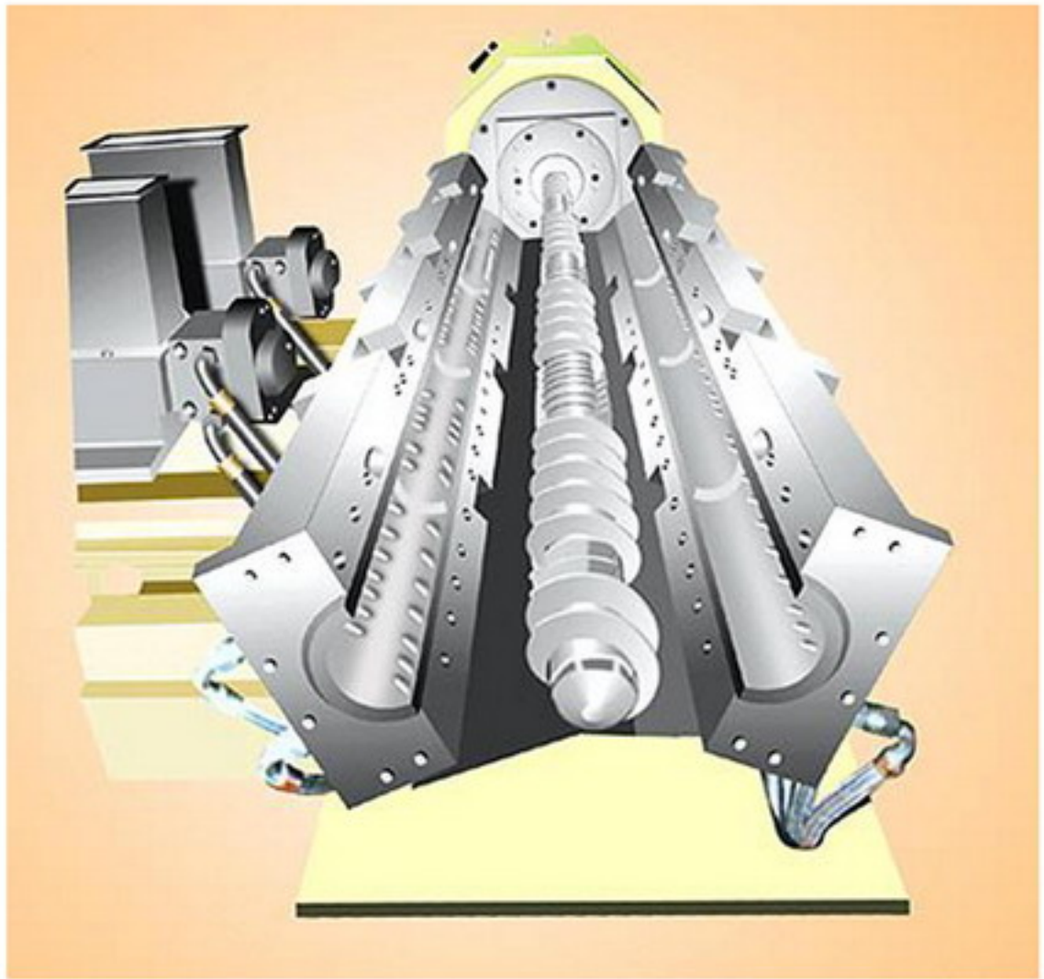
中国第一，世界第二

THE FIRST IN CHINA,THE SECOND IN THE WORLD

- Engineering plastics and masterbatch 工程塑料和母粒
- PVC pelletizing and calendar feeding PVC造粒和压延喂料
- Wire&Cable compounds 电缆料
- Powder coatings and toners 粉末涂料和磁粉
- Thermoset plastics 热固性材料
- Food processing 食品加工
- Chemical reaction 化学反应
- Filling 填充料



中国 江阴市新达塑料机械有限公司

江苏 JIANGYIN XINDA PLASTICS MACHINERY CO.,LTD

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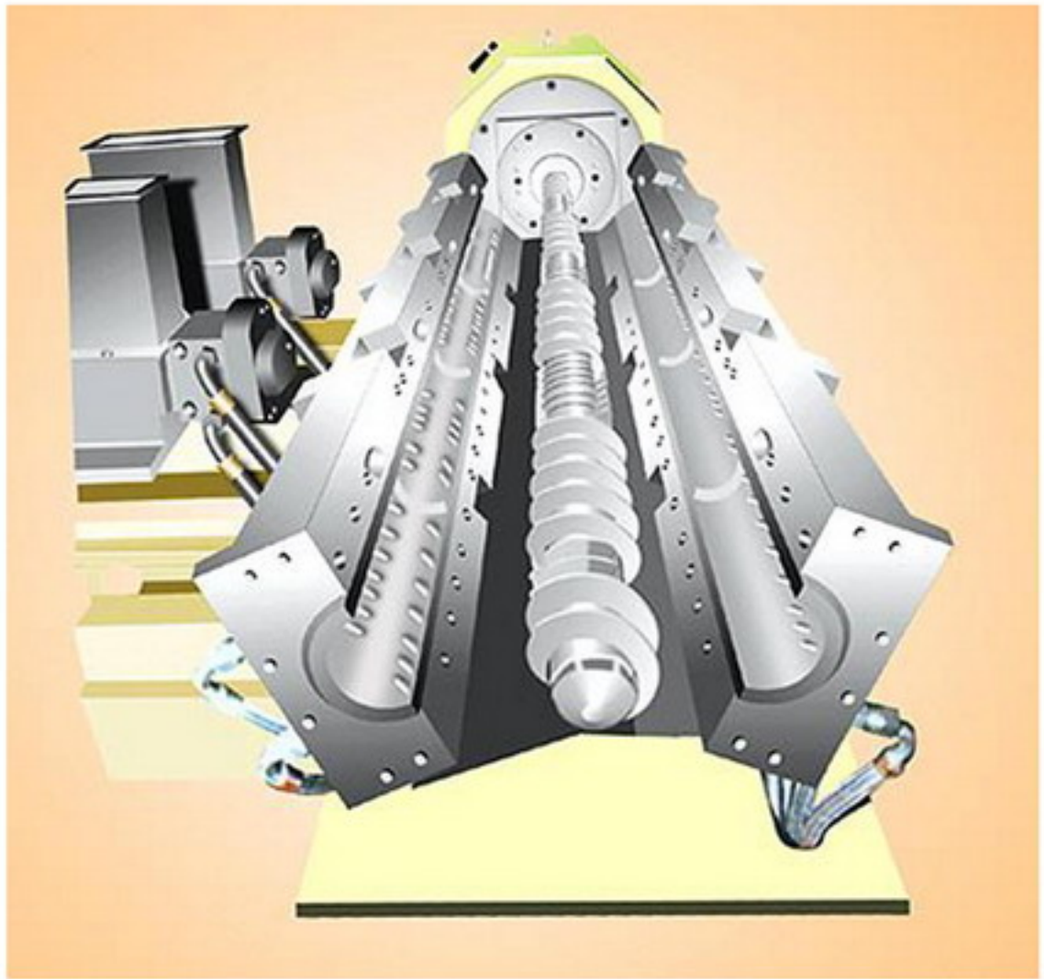

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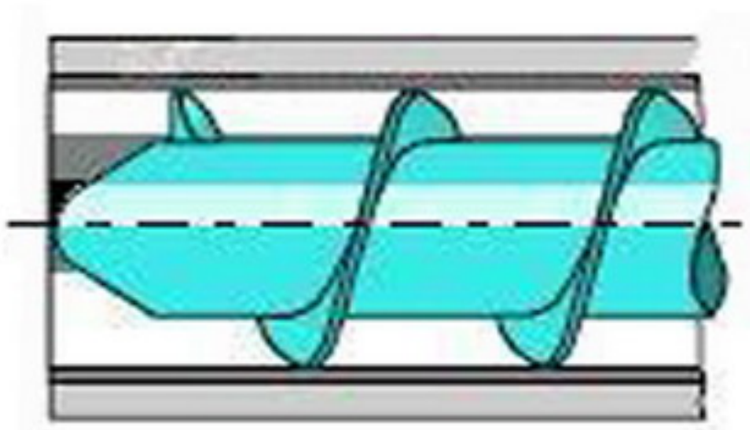
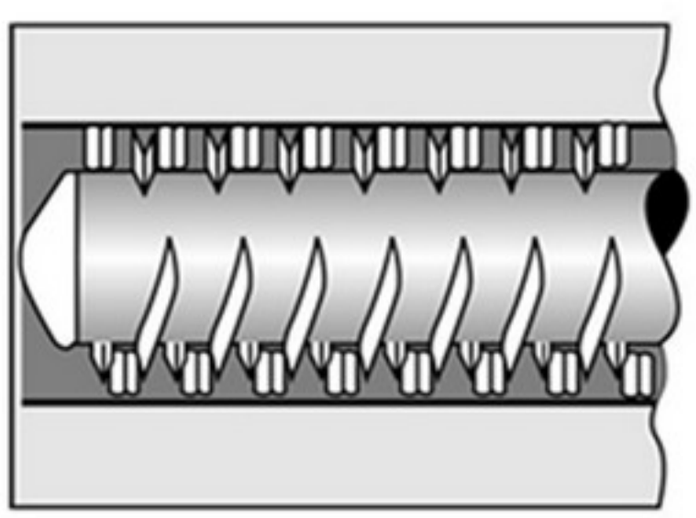
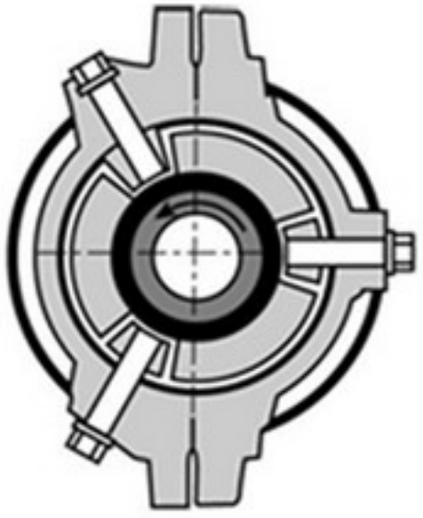
往复式单螺杆混炼挤出机与普通单螺杆比较
SJW-Kneader VS Single Screw

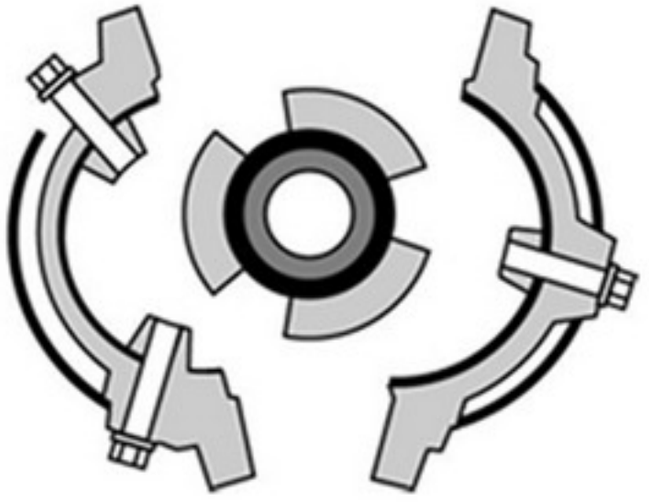


普通单螺杆挤出机
Common single screw extruder

往复式单螺杆混炼挤出机
SJW-Kneader







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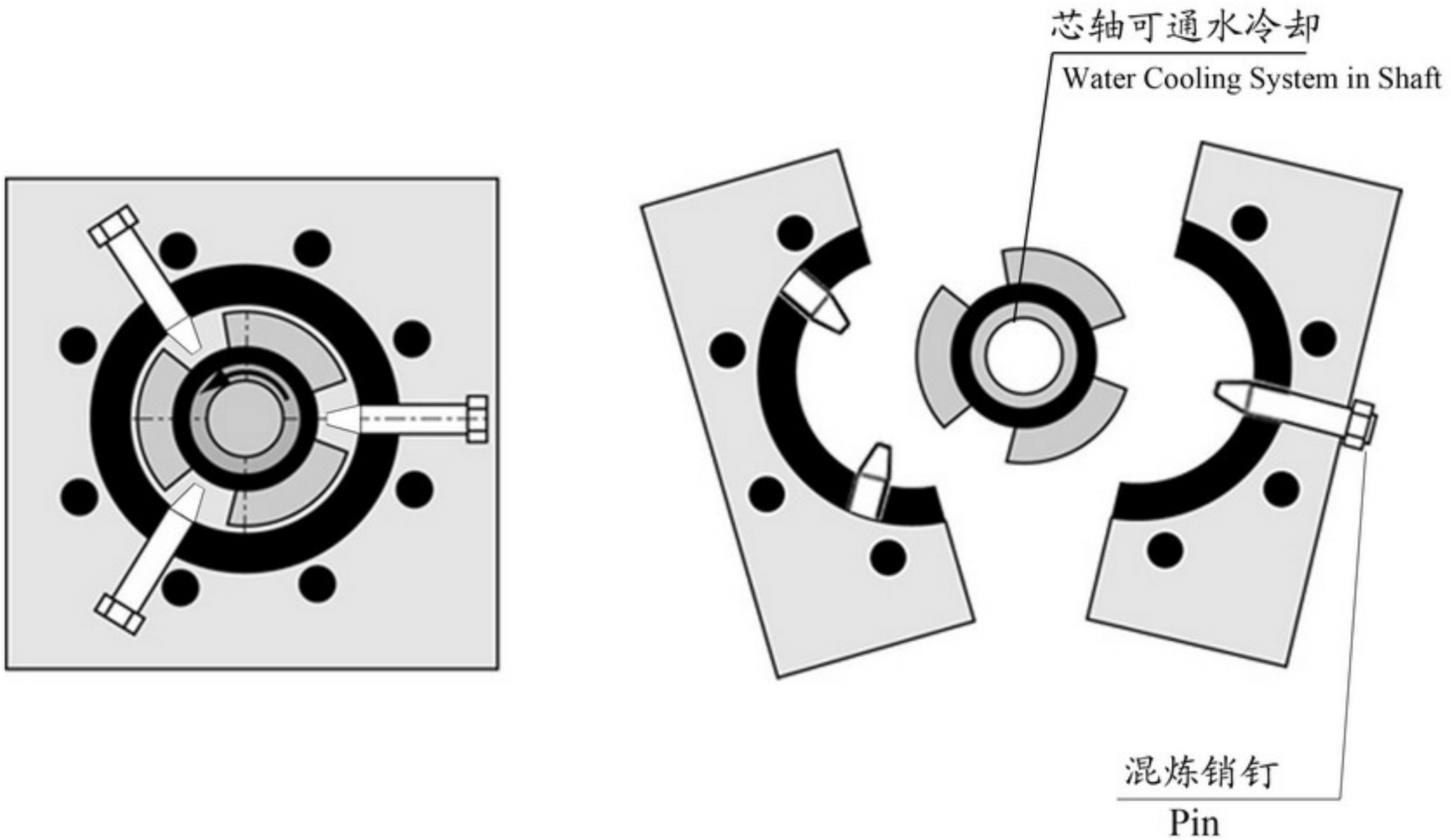
Compounding Systems

往复式单螺杆混炼挤出机加工段可开放式机筒设计
Kneader mixing section open and closed barrel



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Compounding Systems

往复式单螺杆混炼挤出机的技术与剪切原理
The SJW-Kneader technology and shear mechanism

断开的螺纹元件

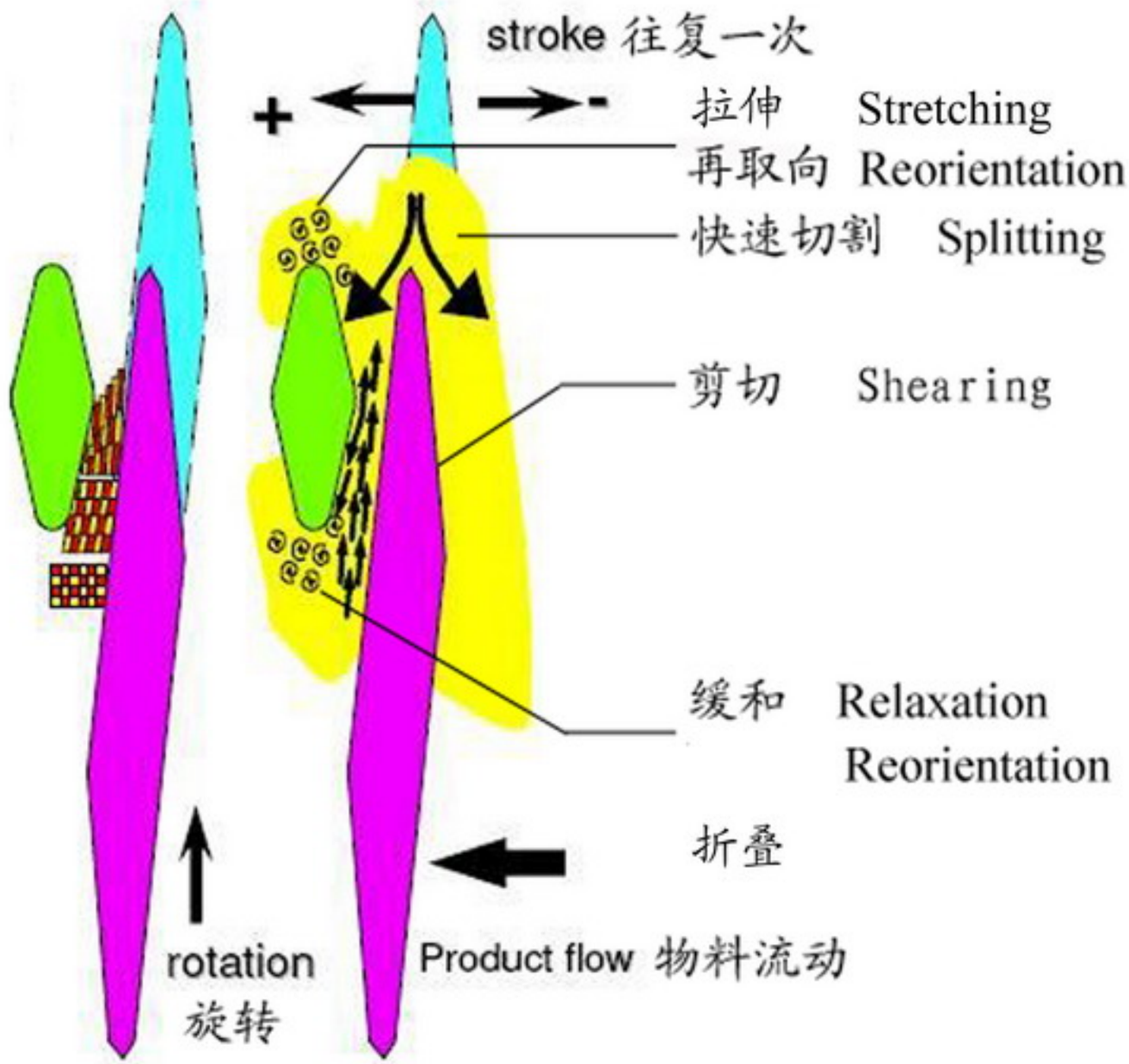
Discontinuous screw flight

机筒凸出的固定销钉

Fixed pins protruding form barrel

螺杆径向旋转何轴向往复运动

Rotational and axial screw motion



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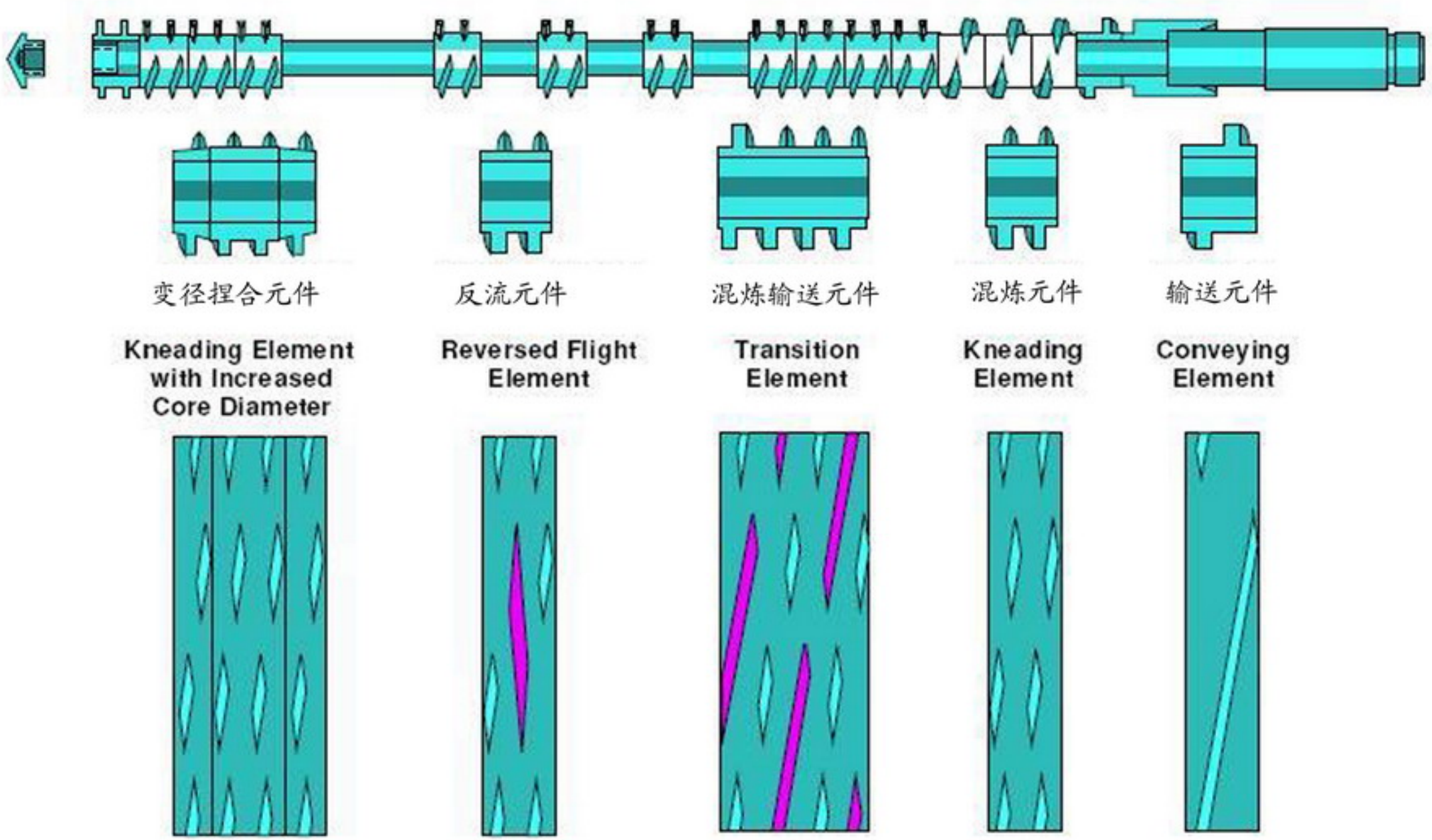
螺纹元件类型
Element types



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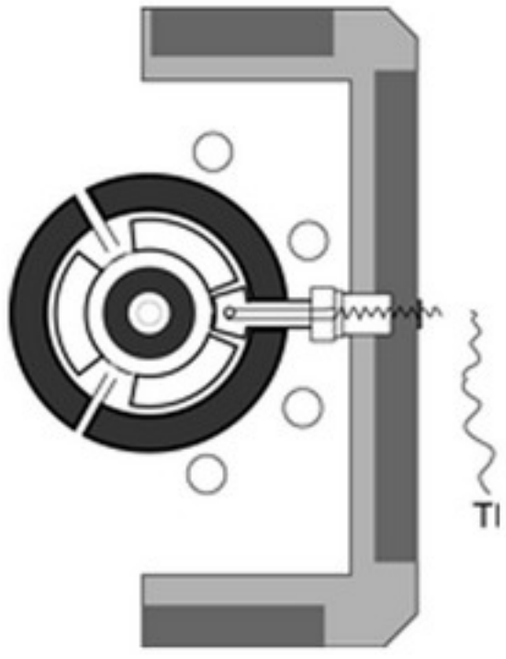
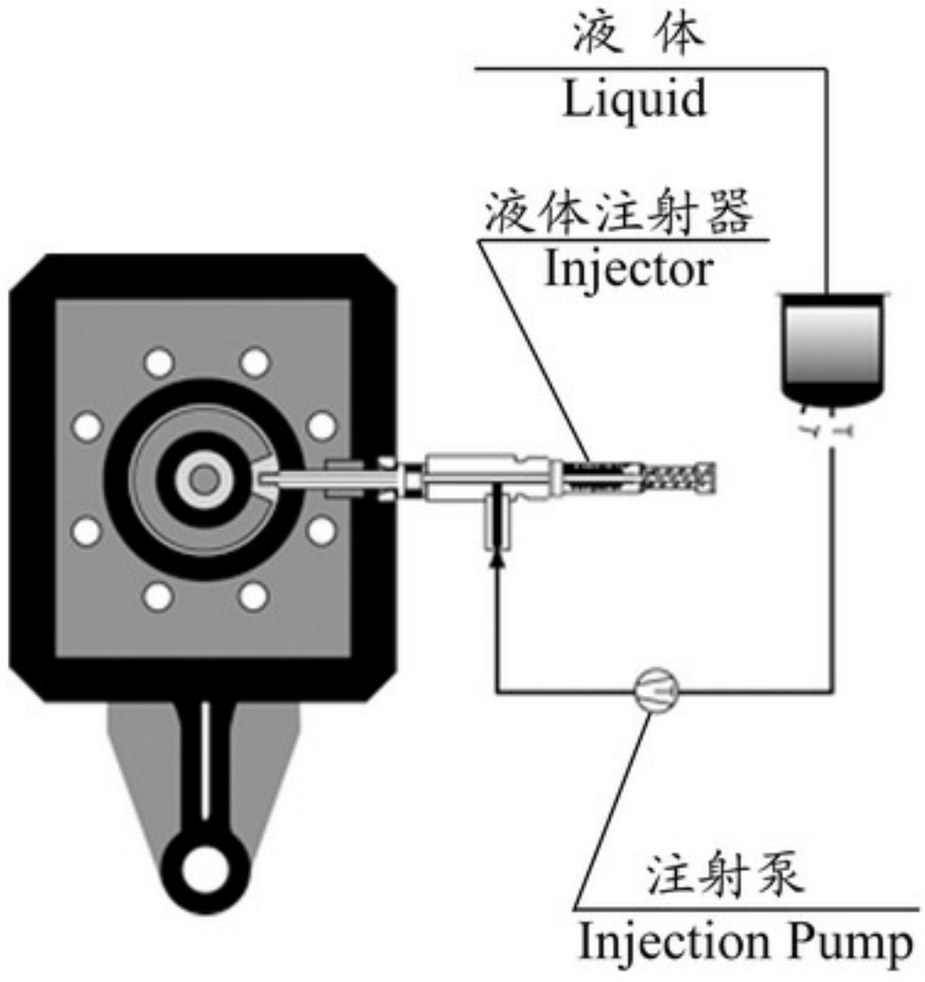
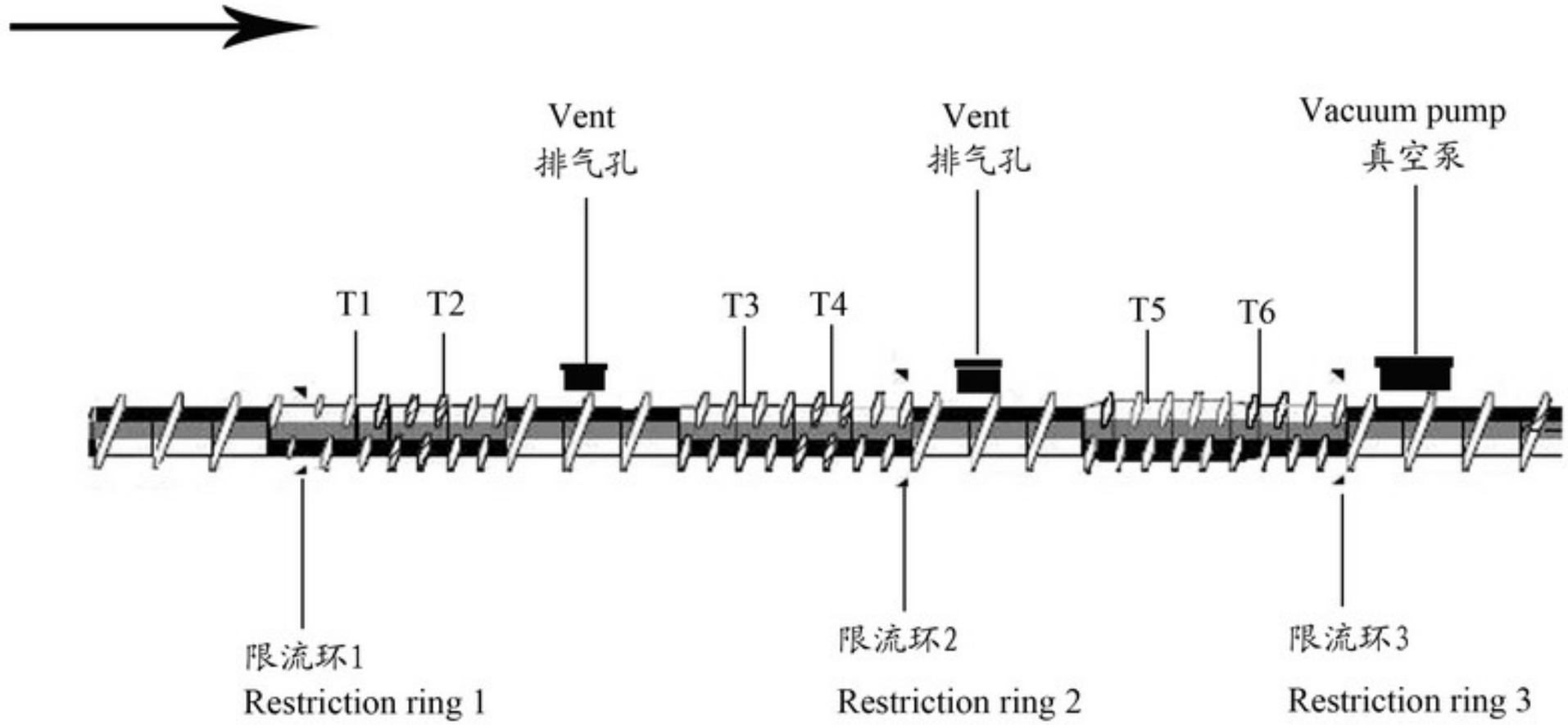


热电偶插入销钉直接
反应熔体温度

Thermocouple located
in pin and directly
immersed into
polymer



热电偶位置的可选择性
Flexibility in thermocouple positioning



T1,T3,T5 测试熔体温度　　T1,T3,T5 for melt materials

T2,T4,T6 测试机筒温度　　T2,T4,T6 for barrels

XINDA
Compounding Systems

SJW-往复式单螺杆混炼挤出机
Reciprocating kneading and extruding system

介 绍 Introduction	特 别 优 势 Specific benefits	主 要 特 点 Main features
积木式单螺杆上的螺线，每一圈分成三个螺片；机筒内装有对应的固定销钉；螺杆作径向旋转和轴向摆动的复合运动。 A single screw shaft with the screw flight interrupted at three points per turn and stationary pins concurrently located in the barrel.The screw moves both radially and axially.	易于聚合物降解的产品 Products,prone to polymer degradation 物理结构易受破坏的产品 Products,prone to physical rupture 高填充的产品 Products,requiring high filler loading capacity 高黏性的材料 High viscous materials	受控均匀的剪切混合 Controlled and equal shear mixing 高效的分布混合 Highly effective distributive mixing efficiency 高填充的加工能力 High filler loading capacity 精确的温度控制 Accurate temperature control 停留时间分布窄 Narrow residence time distribution 液体组分的有效加入 Effective feeding of liquids

混合工艺的四个关键步骤
Four key steps to the minxing process

- 将粉料加入熔体中
  Incorporation of powder into liquid
- 粉料的湿润
  Wetting of powder
- 附聚合和可能的聚合体的分离
  Separation of agglomerates and possibly aggregates
- 均化
  Homogenization

超大颗粒的影响
Effect of oversized particles

- 分散不充分
  Inadequate dispersion
- 色强度和色相波动
  Fluctuations in color intensity and deviations in shade
- 色条纹
  Color streaking
- 可见颜料团形成色斑
  Presence of visible pigment agglomerates as color specks
- 堵塞过滤网
  Clogging of screen packs
- 吹膜挤出时撕裂汽泡
  Tearing the bubble during blown film extrusion
- 纤维，单丝和胶粘带破损
  Breakage of fibres,.monofilaments and tapes
- 表面的不均匀性造成印刷方面的问题
  Printing problems due to inhomogenities at the surface
- 机械性能下降
  Reduced mechanical strength

XINDA
Compounding Systems

配混设备的种类
The range of available compounding equipment

内混合机
Internal mixers

连续混合机
Continuous mixers

单螺杆和捏合混炼机
Single screw and kneaders

XINDA
Compounding Systems

颜料和助剂的添加量
Concentration ranges for pigmenets and additives concentrates

添加物 Substance added	典型的添加物范围（重量百分比） Typical concentration range(wt%)	最大的添加量（重量百分比） Maximum concentration(wt%)
无机颜料 Inorganic pigments	30~40	50
碳 黑 Carbon black	20~40	50
钛白粉 Titaniuum pigments	40~60	80
有机颜料 Organic pigmenets	10~30	40
助 剂 Additives	5~60	---

往复式单螺杆混炼挤出机的工作原理及特点
Work principle &construction characteristic of SJW-Kneader

----适用于聚合物和高粘性材料的灵活和混炼系统

----Flexible Kneading System be fit for Polymer and High-viscous materials

螺杆的运动（径向和轴向）

The motion of Screw(Radial&Axial)

设备特征 Characteristic

往复式单螺杆混炼挤出机与双螺杆挤出机有本质不同！螺块在一个螺距内断开三次，形成混炼螺块，同时在机筒上对应地装有三派静止的混炼齿或销钉。

The SJW-Reciorocating Single Screw Kneading and Extruding System is different form the common Single Screw and Twin-Screw in essence!The spiral of the screw is three times interrupted at the circumference and forms so called Kneading flights,and the stationary Kneading pins are fixed in the kneading casing.

运动次序 Motion sequence

不同于单螺杆和双螺杆设备，往复机的螺杆在做圆周运动的过程中，同时做轴向的往复运动。每旋转一周，轴向往复一次。由于这种独特的运作方式，物料在混炼螺块之间被剪切，而且被往复输送。

Different form the common Single Screw and the Twin-screw equipment,superimposed to the rotation of the Kneading screw is a sunchronously oscillating movement.Thanks to the motion and the intermeshing kneading pins between the kneading flights,the product is not only sheared between the pins and kneading flights but additionally inverted

有机颜料
Principle organic pigments

化学分类 Chemical category	黄 Yellow	红 Red	紫罗兰 Violet	兰 Bule	绿 Green
偶氮类颜料 Azo pigments	耐晒黄 Hansa yellow	甲苯胺红 Toluidine red			
	二氧基联苯 Benzidine	Litile red			
	镍华 Nickel areen/gold				
	偶氮氧化物颜料 Azocondensation pigments				
金属铬化物颜料 Metal complex pigments	金属铬化物 黄/红 Metal complex yellow/red			酞菁兰 Phthalocyanine	酞菁绿 Phthalocyanine green
含有氧化剂多环有机颜料 Polycyclic pigments Oxidizing	蒽 醌 Anthrapyrinidine	硫靛二苯嵌苯 Thioindigo-Perylene	异蒽酮紫 Isoviolanthron	阴丹士林兰 Indathrene blue	
含有氧化剂多环有机颜料 Polycyclic pigments Non-oxidizing	异 氮 茚 基 Isoindolinone		二氧化紫 Dioxazine		
		喹吖二酮 Quinacridone			

无机颜料
Principle inorganic pigmenet

化学分类 Chemical category	白 White	黑 Black	黄 Yellow	红 Red	蓝 Blue	绿 Green
硫化物，硒化物 Sulfides ,selenides	硫化锌 Zinc sulfides		硫化镉 Cadmium sulfide	晒化镉 Cadmium selenide	群青 Ultramarine	
氧化物 Oxides	钛白粉 Titanium dioxide	氧化铁黑 Iron oxide black	镍黄/钛黄，铁黄 Nickel/titanium yellow,Iron oxide yellow	氧化铁红 Iron oxide red	钴蓝 Cobalt blue	氧化铬绿，钴绿 Chromium oxide, Cobalt green
铬酸盐 Chromates			铬 颜料 Chromate Pigments			混合绿 Mixed green
碳 Carbon		碳黑 Carbon blacks				

往复式单螺杆挤出机SJW混炼生产线的范围
Reciprocating kneading and extruding system, range of compounding line

设备 类型 Plant type	机筒尺寸（直径/毫米） Barrel size(diameter in mm)
实验室/开发 Laboratory/Development	45
中试/生产 Pilot plant/Production	70
生产 Production Unit	100
	140
	200

结 论
Conclusions

• 对原材料处理温和	Gentle treatment of raw materials
• 杰出的混合效率	Excellent mixing efficiency
• 低能耗	Low energy costs
• 工艺放大安全可靠	Safe scale up process section
• 加工段容易触及	Easy access to process
• 配方转换时间短	Low downtimes for formulation changes
• 高分子材料降解少	Less degradation of polymer
• 产品质量稳定和重见性	Consistent and reproducible product

往复式单螺杆混炼挤出机的工作原理及特点
Work principle &construction characteristic of SJW-Kneader

设备优点 Advantage

- 最佳的分散均化效

  Optimum dispersive and distributive mixing

- 加工工艺参数的准确测控

  Accurately measure the technics parameter

- 能加工多种配方，无需螺杆结构

  Process multi formulation without changing screw configuration

- 机筒可打开，加工元件容易触及

  Barrel can be opened,and elements can be touched easily

自洁性 Self-cleaning

附图显示了螺杆旋转和轴向往复运动而形成的螺片运动轨迹，螺片多次重复刮过所有的自由表面，这就是往复机具有的出色自洁性的原因所在。

The figure displays the movement track of kneading flights when the screw rotates and reciprocates.The kneading flight scrapes all free surface repeatedly,this is the reason why the SJW-Kneader has excellent self-cleaning.

工艺放大和剪切率 Magnify technics&Shear rate

根据剪切率定义，往复机的剪切率公式:

Based on the definition of the shear rate, the Rate Formula of SJW Kneader:

$$\gamma = \frac{\pi \cdot D \cdot n}{60 \cdot S}$$

往复式单螺杆混炼挤出机的工作原理及特点
Work principle &construction characteristic of SJW-Kneader

S=Cgeom • D

式中 In the formula:

D: 螺杆直径 Screw diameter

S: 螺片与销钉间隙 Gaps between the kneading pins and kneading flights

N: 螺杆转速 Screw rotate speed

Cgeom: 几何参数 Geometry Parameter

因此 So

$$\gamma = \frac{\pi \cdot D}{60 \cdot Cgeom \cdot D} \cdot n = C_{Buss} \cdot n$$

由此可见，往复机的剪切率仅仅取决于设定的螺杆转速，对所有不同尺寸的设备，相同的转速产生相同的剪切率，工艺放大简便又准确。

Thus it can be seen,the shear rate SJW-Kneader is only depended on the setting screw rotate speed, to all the different size equipments,the same rotate speed bring the same shear rate,magnify technics and accurately.

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