

## 密 炼 机

### Internal Mixer

我公司生产的密炼机为目前世界最先进机型之一，其各项技术指标均达国际同类产品先进水平。该机设计合理，结构先进，制造质量高，使用可靠，寿命长。适用于轮胎、橡胶行业对各种胶料及橡塑共混等所需原料的塑炼、混炼和终炼，尤其适合子午胎胶料的混炼和终炼。

The internal mixer manufactured by our company is one of the most advanced in the present world with international standard performances. It is of reasonable design, advanced structure, high manufacturing quality, reliable operation and long service life. It is suitable for tire and rubber industries to plasticization, master-batch and final mixing, especially for mixing of radial tire compound.



GK190E型密炼机 GK190E Internal Mixer

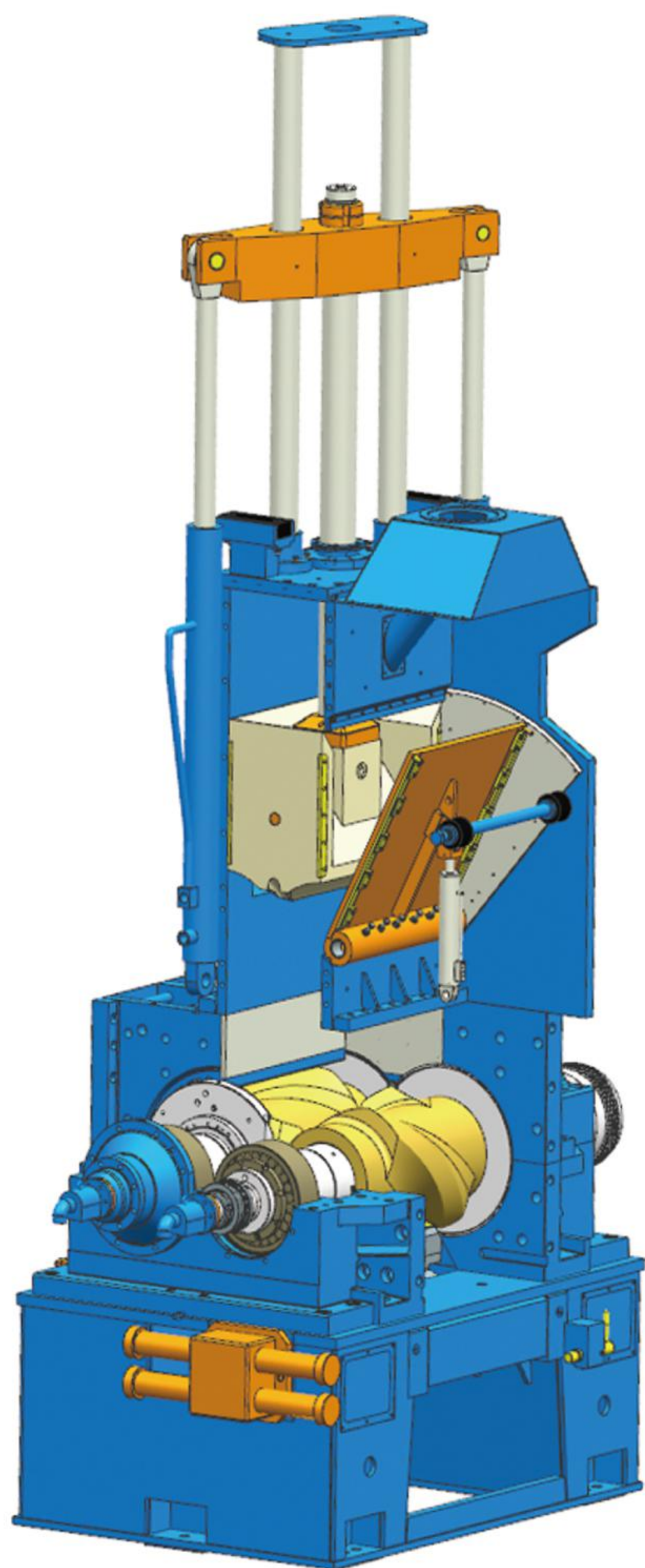


GE420型密炼机 GE420 Mixer



### 特点:

1. 采用积木式结构，可互相旋转180°，容易适用安装场地，方便维修。
2. 转子形式有圆筒啮合型、四棱切线型、ZZ2型、NST型等多种结构，适合于不同胶料的塑炼、混炼和终炼。
3. 凡与胶料接触的部位均通水循环冷却，冷却面积大，并配备了恒温控制的水温调节系统，选用其适当的水温，能有效的保证所炼各种胶料的质量稳定。
4. 传动系统由电机、高精度全硬齿面减速机、鼓形齿联轴器和高速联轴器组成，采用直流电机无级变速和交流电机，减速机换档变速以及交流高低压变频电机拖动，交流永磁同步电机驱动等多种形式。整机具有传动平稳、噪音低、寿命长等优点。
5. 控制系统采用PLC，具有手动和自动功能，切换方便，可实现时间、温度、能量的控制，并有完善的信号检测、反馈和安全保护，更有效的控制炼胶质量，缩短辅助时间，降低劳动强度。
6. 密炼机上顶栓有气动和液压形式、转子轴端密封形式有机械式和液压式可供选择。



### Features:

1. The machine adopts with modular structure, its parts can be rotated 180° on each direction, which is convenient for installation site and maintenance.
2. The rotor design includes intermeshing type, 4-wing tangential type, ZZ2 type and NST type, which are suitable for plasticization, master batch and final batch mixing of various kinds of compounds.
3. All parts contact with compound are equipped with large cooling area water circulation, and constant temperature control TCU is equipped, the mixing quality of all kinds of compound can be ensured by choosing the correct water temperature.
4. Drive system consists of motor and high precision full hard teeth surface gearbox with drum type teeth coupling and high-speed couplings. It takes many kinds of forms for changing speed: DC motor, AC motor, High or Low voltage AC motor with inverter, and Permanent magnetic synchronized AC motor drive. The machine has the advantages of smooth-driving, low-noise and a long service life, and etc.
5. Control system adopts PLC with both manual and automatic functions with easy shift. It can realize to the control of time, temperature and energy. Signal checking, feedback as well as safety protection are provided so as to control mixing quality of compounds more effectively, to shorten assistant time and to reduce labors intensity.
6. Internal Mixer's ram has two forms available: Pneumatic ram and hydraulic ram. The rotor end dust stop also has two choices: mechanical seal and hydraulic seal.

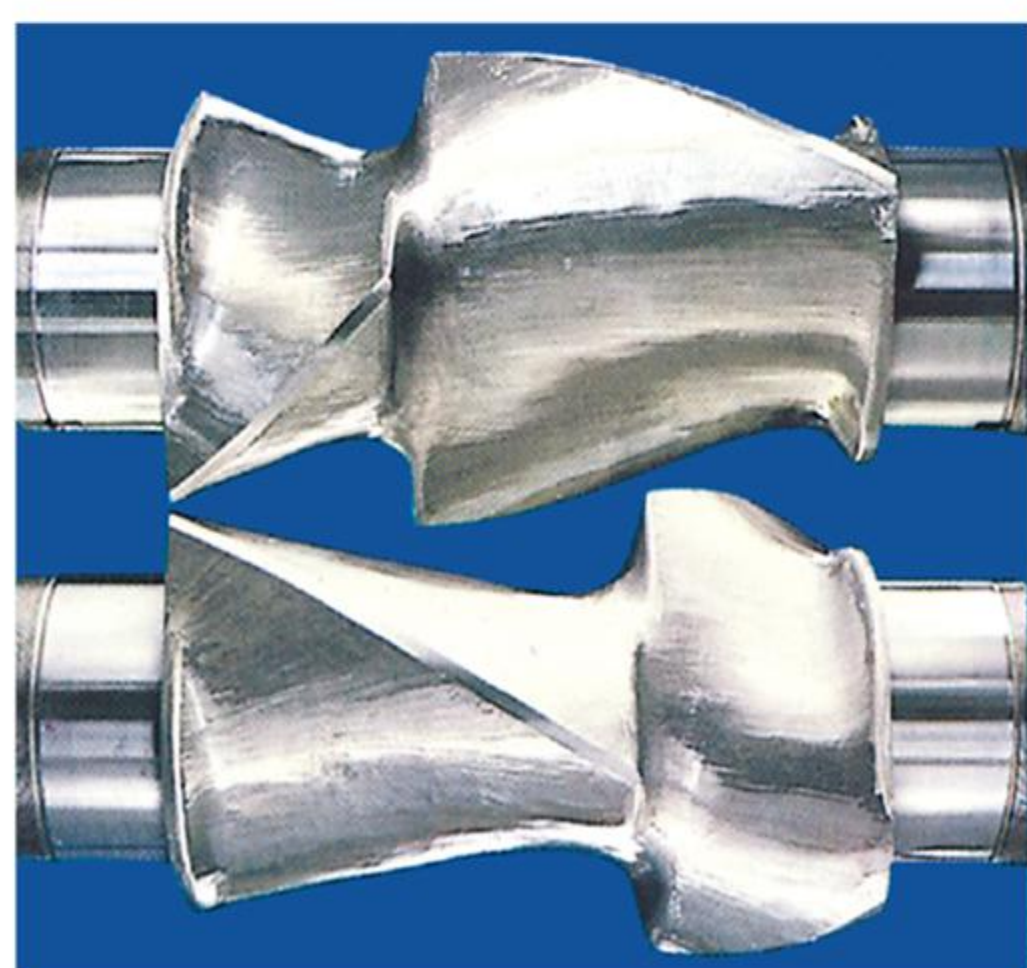


## 转子 Rotors:



ZZ<sub>2</sub>型转子已获国家专利，它具有排胶温度低、效率高、分散性好(碳黑分散度可达A5)等特点，其炼胶性能均优于其它类型密炼机，特别适用于子午胎胶料的终炼。

ZZ<sub>2</sub> rotors have obtained national patent and possess advantages as follows: high efficiency, low temperature compound-discharging, good dispersion. Its mixing performance is superior to other type internal mixer. It is specially suitable for the final mixing of the compound of radial tire.



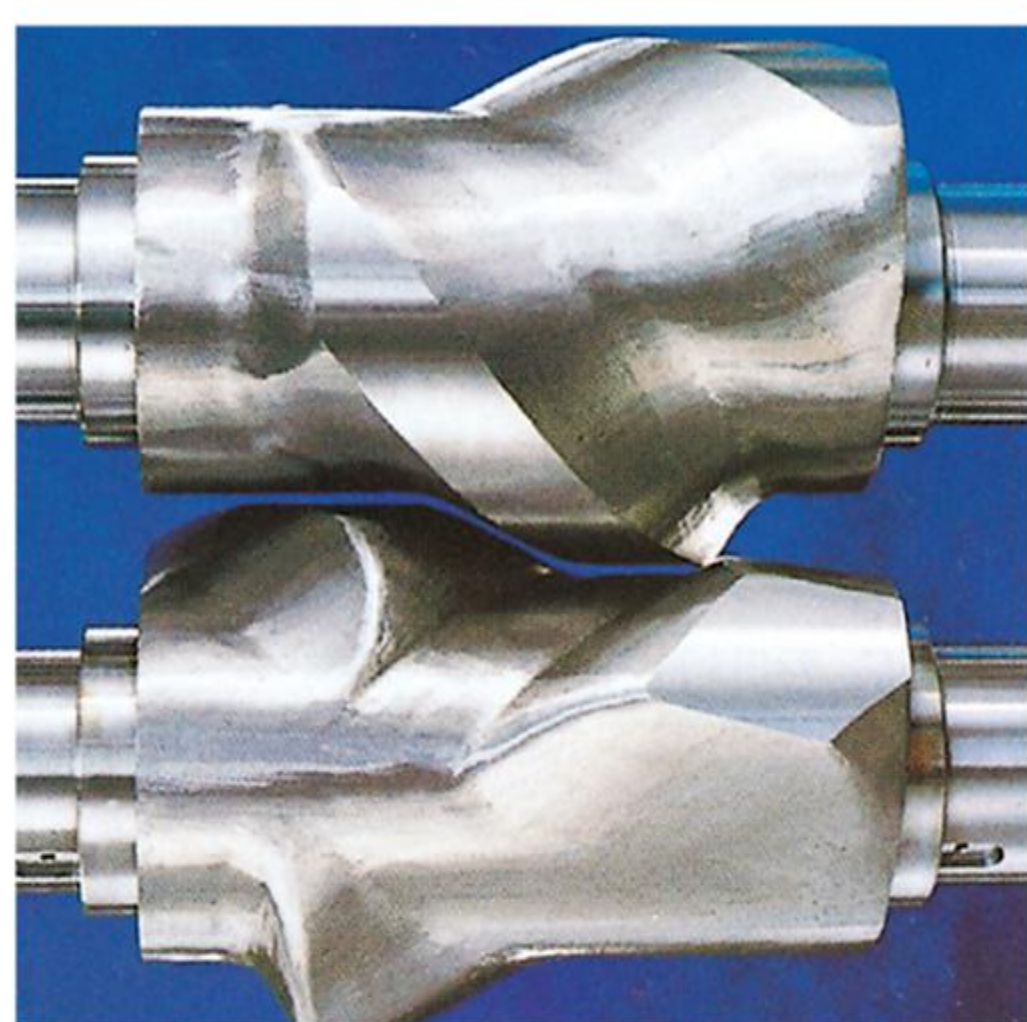
4-Wing 为四棱切线型转子，它具有较大的填充系数和能量输入，由于胶料在混炼室内得到最充分的流动，使其具有较高的出胶量和炼胶质量。

The 4-Wing tangential rotor has high fill factor and energy input. Due to compounds' more intensive flow inside the mixing chamber, it has higher output and mixing quality.



穿轴式结构的NST转子，属于分布式的剪切型同步转子，转子将更多胶料推向中间搅合，均匀分布作用加大。可以调整前后转子的相位，在0° - 0° 度时，转子的剪切强度最大，适用于胶料的母炼和再炼；在0° - 90° 时，适用于终炼胶和一步法炼胶，可以得到最佳的胶料均匀性。

The shaft-through type NST rotor, is dispersed tangential synchronization rotor type, the rotors push the compound toward to the center position and mix it, the uniform distribution effect is enhanced. The phases of front & rear rotors can be adjusted, in 0° - 0°, the shearing strength of rotors is at its maximum stage, which is suitable for the master batch mixing and re-milling; when it's in 0° - 90°, we can get the best compound uniformity and suitable for final batch mixing and one-step mixing.



PES啮合型转子，它有较宽的棱部，能使胶料沿螺旋型棱部不断更新胶面，能消除流动很小的滞流区。它混炼均匀，温升低，适合炼制各种质量要求较高的胶料和塑料。

The PES intermeshing rotors have wider wing-tips and can make compound surface continuous renewed along the direction of helical line, which will remove the dead zone where there is little flow. The rotor is of the following characters: uniformly mixing and low temperature-rise, and is suitable for the mixing of high quality rubber compounds and plastics.

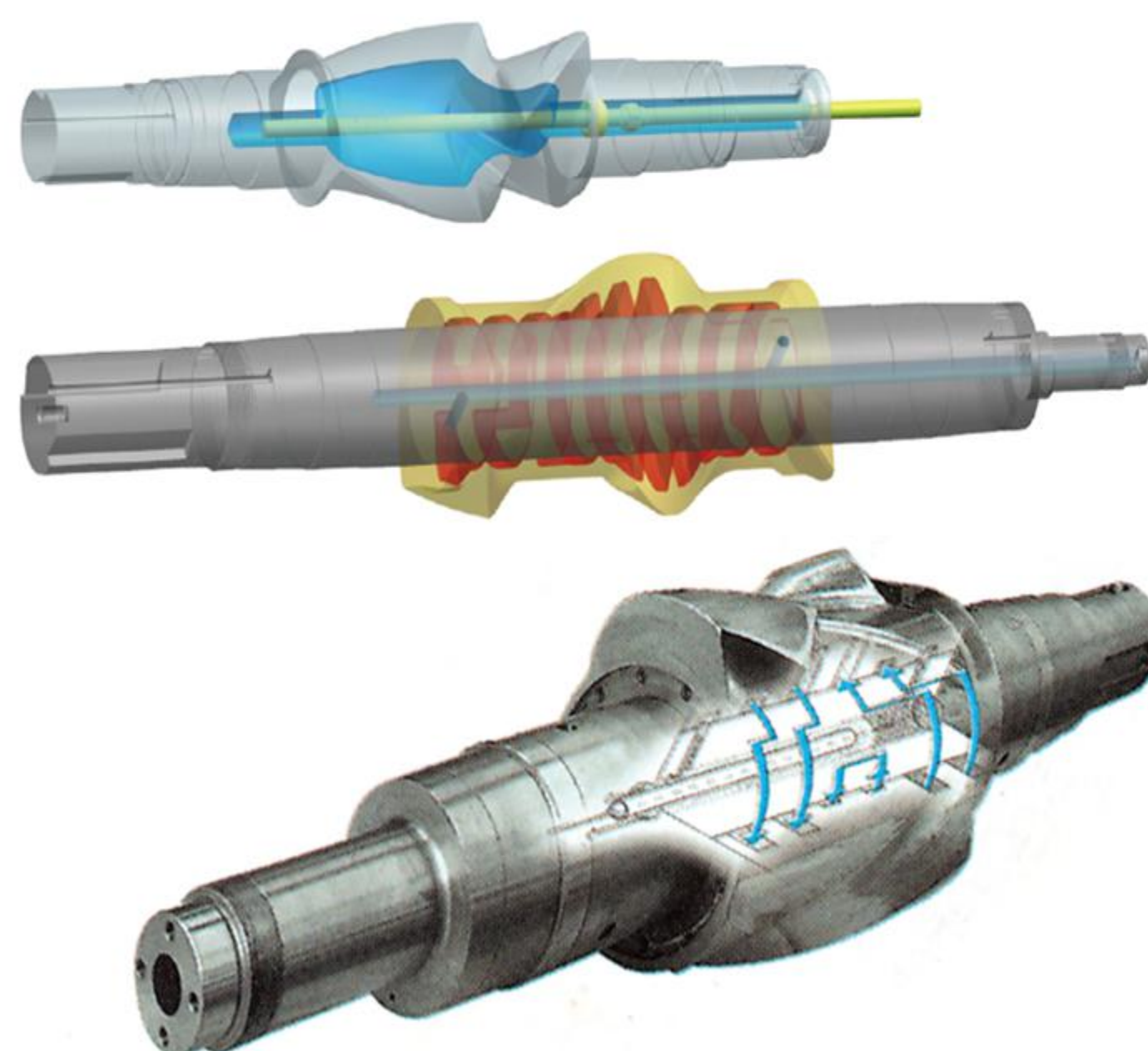
密炼机转子有整体铸造和组合式结构两种形式。

组合式结构由合金钢铸成的转子体和合金钢长轴组成，转子内孔为螺旋槽强制循环冷却。

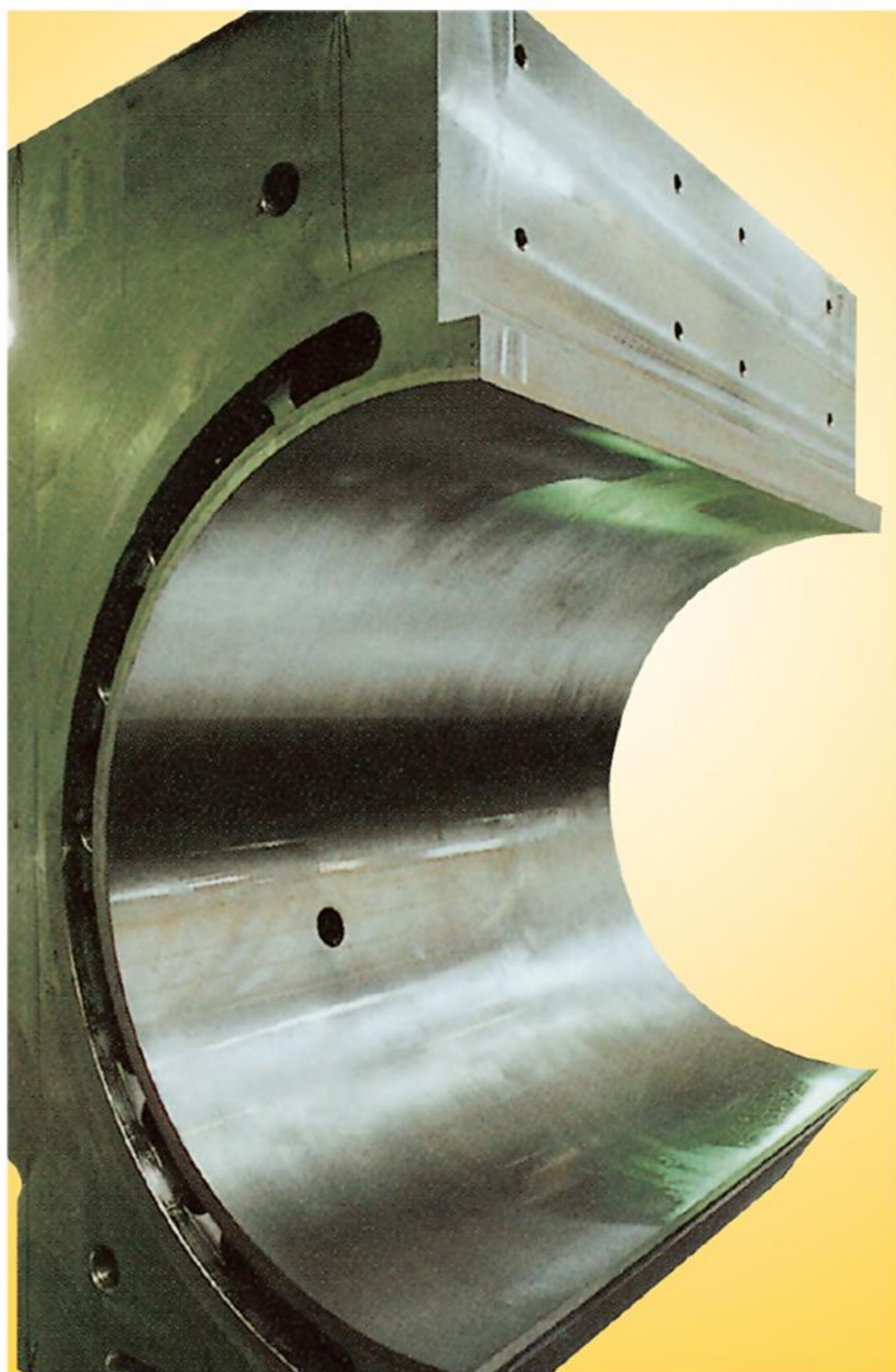
整体铸造转子为合金钢铸造而成，采用中空喷淋冷却。

The rotors of Internal Mixer have two kinds of structure: one is integral-casting structure; the other is combined structure.

The combined rotor is assembled by alloy steel casting rotor body and alloy steel long shaft. Inside holes of rotors use grow-type forced cooling. Integral-casting rotor is made of alloy casting steel. It uses hollow spray cooling.







混炼室 Mixing Chamber

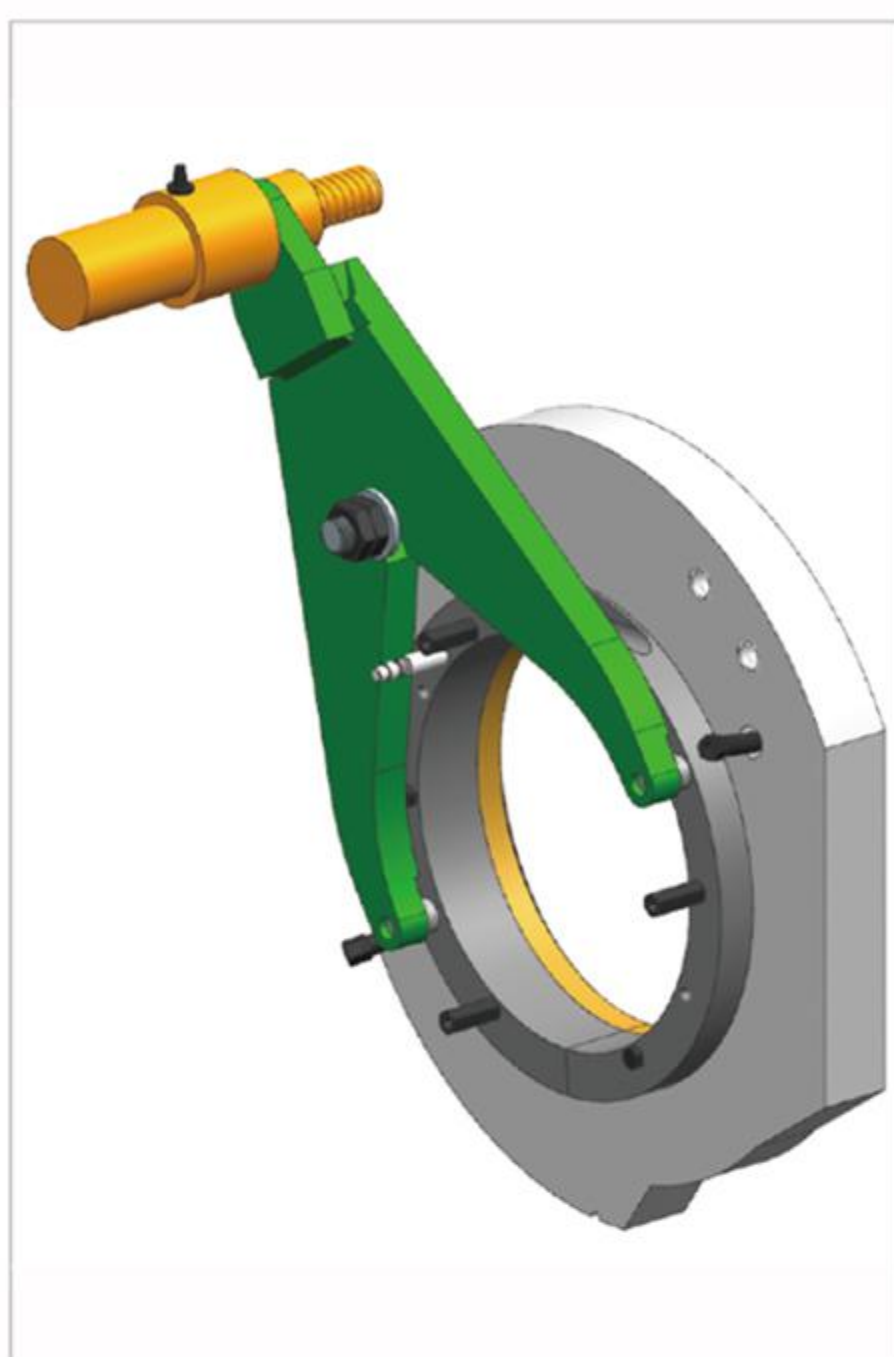
### 混炼室:

1. 混炼室除上下顶栓外共有六大块组成，前后正面室和左右侧面壁，侧面壁轴承座为剖分式。压料装置不移开可拆下前后室。前后室内壁堆焊耐磨合金。
2. 混炼室前后室钻孔冷却。保证一定的流速，冷却效果显著。
3. 侧面壁耐磨板钻孔冷却，内侧堆焊耐磨合金。

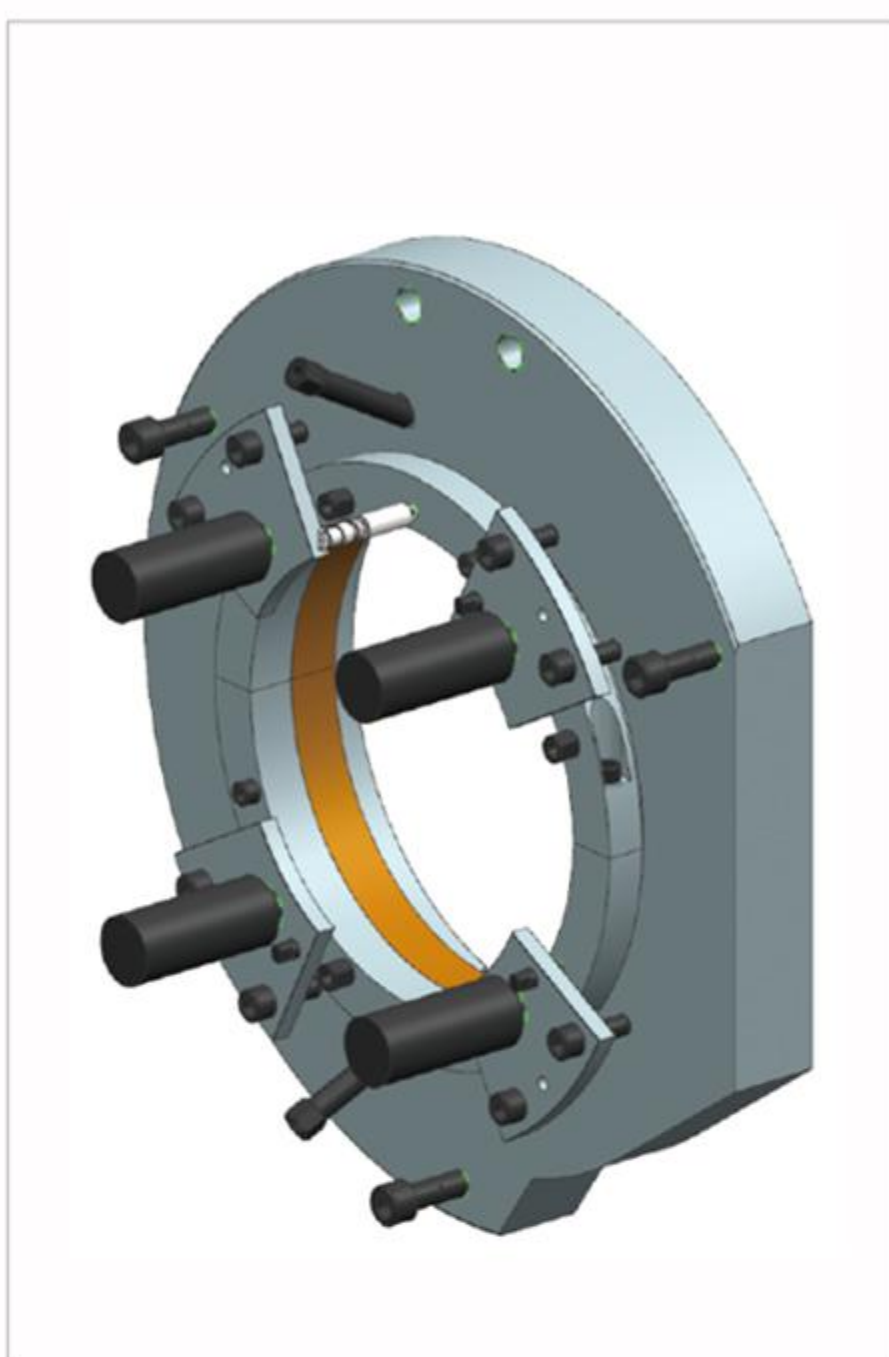
### Mixing Chamber

1. The mixing chamber consists of six main blocks besides the ram and drop door, including the front & rear chamber, and left & right side wall. The side wall bearing base is split type. The front & rear chamber can be removed without moving the ram device. The inner surface of front & rear chamber is stack welded with wearing resistant alloy.
2. The cooling holes are drilled on front & rear chamber, which can ensure a certain flow speed and with good cooling performance.
3. Wearing plate of side wall is drilled with cooling holes, inner surface is stack welded with wearing resistant alloy. e drilled holes for cooling, inside stack-welded anti-wearing hard alloy.

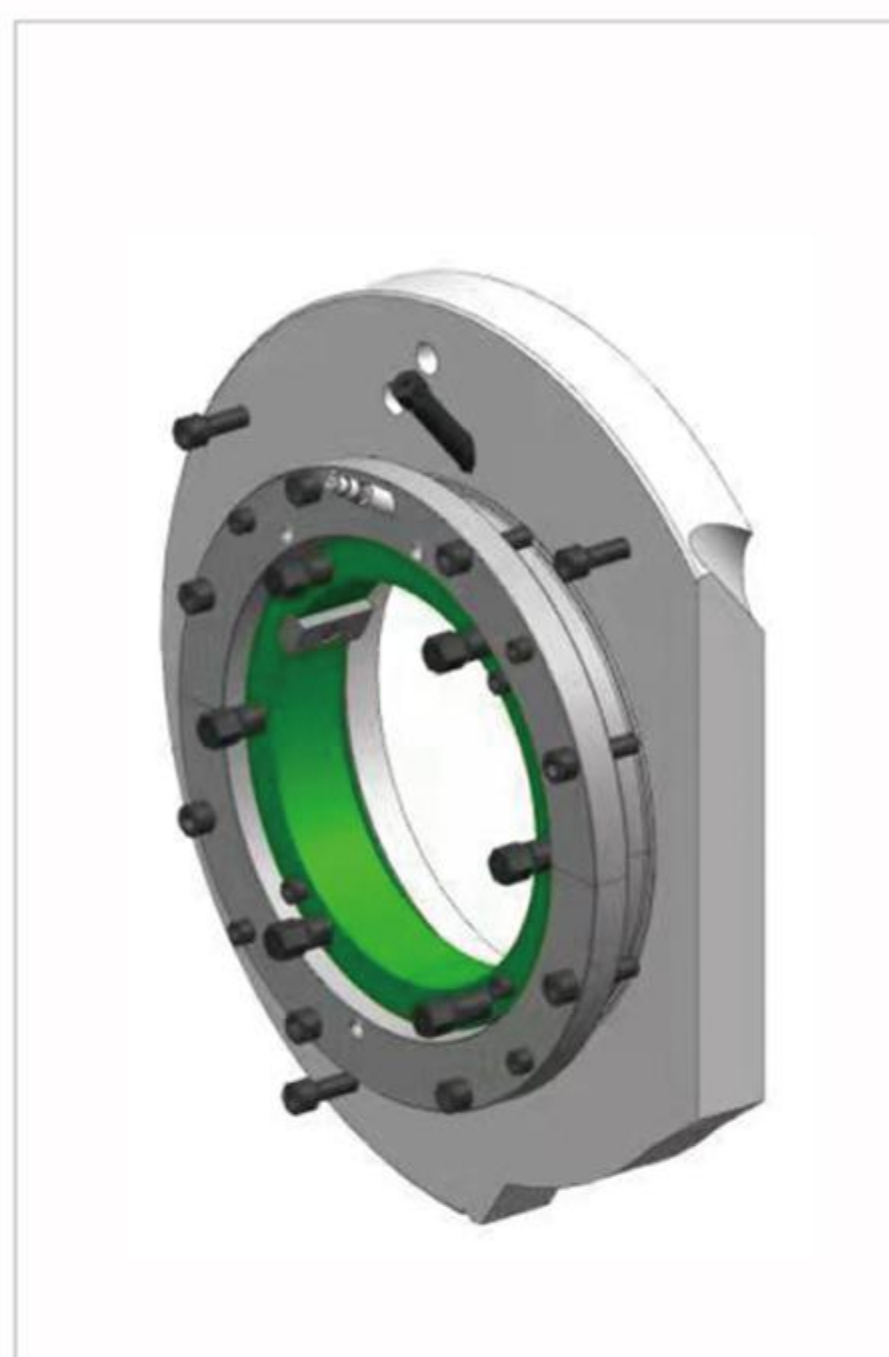
### 密封装置:



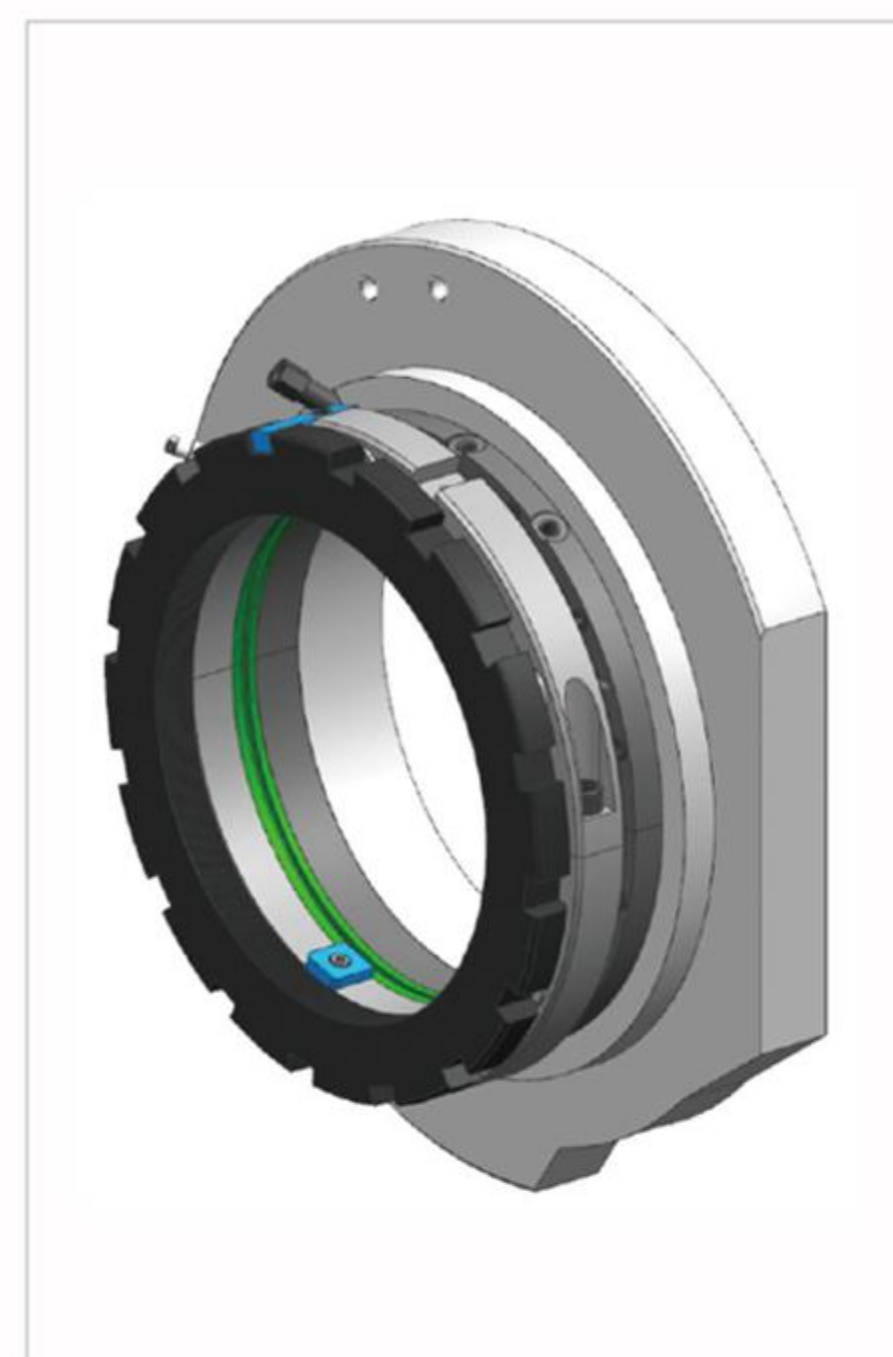
拨叉式液压密封  
Fork type hydraulic dust seal



油缸式液压密封  
Multi-cylinder stype dust seal



内压式机械密封  
Inner Pressure type hydraulic dust seal



外压式机械密封  
Outer pressure type hydraulic dust seal

密封装置有机械外压式、机械内压式和液压式三种。其中液压密封又可分为拨叉式和多油缸式两种，密封摩擦面注润滑油，环形通道注软化油，分别由两个多头油泵或电动高压泵供给。密封表面堆焊耐磨合金，具有耐磨、寿命长、性能好等特点。

### Dust Stop:

There are three kinds of dust stop □ Mechanical Outer-press/Inner-press/Hydraulic. Among them hydraulic sealing can be divided into two kinds such as multi-cylinders and forklike. The seal fraction surface is injected by lubricating oil and the throat injected by softening oil. They are provided oil by two multiple-head pumps or electrical high-pressure pump. The seal surface is anti-wearing, long-life and well-performance.



N型密炼机主要性能参数

N Type internal mixer technical specification

型 号 Model		GK1.5N	GN60	GN160	GN255	GK270N	GN300	GK400N	GN430	GN580	GN700
技术参数 Specification											
密炼机总容量 Total volume of Mixer	L	1.5	56	147	255	243 (4wing) 250 (ZZ-2)	278 ( ZZ-2) 257 (4wing) 276 (NST)	412 (ZZ-2) 397 (4wing)	416 (NST)	578 (NST)	699 (4wing)
填充系数 Fill factor		0.75	0.75	0.75	0.75	0.75	0.7~0.75	0.75	0.7~0.75	0.7~0.75	0.7~0.75
转子转速 Rotor speed	r/min	8-80 10-100	6-60	6-60	4-40 5-50 6-60	4-40 5-50 6-60	4-40 5-50 6-60	6-60	6-60	5-50 6-60	5-50 6-60
压砵对胶料压力 Specific ram pressure	MPa	0.57	0.59	0.59	0.58	0.58	~0.6	0.6	0.6	0.58	0.58
最大生产能力 Max productive capacity	t/h	0.3	1.01	2.64	4.5	4.5	5.3~6	~7.4	8.6~9.2	~10	~12
冷却水压力 Cooling water pressure	MPa	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4
主机冷却水消耗量 Cooling water consumption of main machine	m³/h	5	20	~30	~50	~50	~50	~70	~90	~100	~120
主电机功率 Power of main motor	直流 DC	22、30	280	750	1250 2×750 2×660 2×900	1000、1100 1250、1500 2×750、2×900	1250、1500 2×750	2×1250	2×1250	2×1250 2×1500	2×1500
	交流 AC	22、30	280	750	1120、1250 1500、1800	1000、1120 1250、1500	1120、1250 1500、1800	2300/2500	2300/2500	2500/3000	3000/3600
设备外形尺寸 Dimensions	长 Length (mm)	2030	3500	4600	5030	4960	5320	5800	5800	5980	6250
	宽 Width (mm)	1020	2850	3600	3730	3550	3800	4340	4680	5600	5910
	高 Height (mm)	1773	3380	5000	5770	5710	5693	6094	6100	6995	7050
主机重量(不包括电机、减速机) Weight (not including motor and gearbox)	t	1.8	9.4	18	26/28	28.5	33	46	48	60	70

备注：实际填充系数受胶料配方，上顶栓压力，转子转速等因素影响。  
Remarks : The actual fill factor is influenced by factors like recipes, ram pressure and rotor speed.

E型密炼机主要性能参数

E Type internal mixer technical specification

型 号 Model		GE5	GE20	GE45	GK90E	GE135	GK190E	GE250	GE320	GE420	GE580
技术参数 Specification											
密炼机总容量 Total volume of Mixer	L	5	20	~50	~90	~140	~200	~250	~330	~440	~580
填充系数 Fill factor		~0.65	~0.65	~0.65	~0.65	~0.65	~0.65	~0.65	~0.65	~0.65	~0.65
转子转速 Rotor speed	r/min	8-80	6-60	4.5-45 6-60	3-30、4-40 5-50、6-60	4-40、5-50 6-60	4-40、5-50 6-60	5-50 5.5-55	4-40 5-50 6-60	6-60	4.5-45 5-50
压砵对胶料压力 Specific ram pressure	MPa	0.45	0.5	0.5	0.55	0.58	0.58	0.58	0.62	0.58	0.58
最大生产能力 Max productive capacity	t/h	0.08	0.32	0.72	1.36	2.2	3.04	3.9	5	7.6	10.3
冷却水压力 Cooling water pressure	MPa	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2~0.4	0.2-0.4
主机冷却水消耗量 Cooling water consumption of main machine	m³/h	5	15	20	25	30	40	40-50	50-60	60-70	70-80
主电机功率 Power of main motor	直流 DC	55	110	220、280	280、350 450、520	500、630 750	750、1000 1100、1250	1250	1250、1500 2×750 2×900	2×1250	2×1250
	交流变频 AC	55	110	250	280、350 450、500	500、630 750	750、1000 1120、1250	1250	1250、1500 1800	2300 2500	2500 2550
设备外形尺寸 Dimensions	长 Length (mm)		3280	3910	3640	4400	5000	5150	5320	6240	6730
	宽 Width (mm)		1830	2435	2540	3100	3400	4000	4050	4300	4420
	高 Height (mm)		3300	3750	4615	5275	5600	6100	6460/6070	6350	7000
主机重量(不包括电机、减速机) Weight (not including motor and gearbox)	t	3	5	8.5	12	17	28	33	42/40	52	60

备注：实际填充系数受胶料配方，上顶栓压力，转子转速等因素影响。  
Remarks : The actual fill factor is influenced by factors like recipes, ram pressure and rotor speed.



## 串联式密炼机

### Tandem Mixer

串联式密炼机即为两台啮合型密炼机上、下串联使用，上面的密炼机带上顶栓，下面的密炼机不带上顶栓，而是带一个接料槽。上面的密炼机用于胶料的混炼及恒温炼胶，下部密炼机被设计成具有非常好的分布混炼功能以及极好的温度控制性能，最优化的通风和最大的冷却面积以及快速排料功能，主要用于恒温炼胶。混炼的时间分布在上下两台密炼机上；

串联式密炼机处于一个封闭式系统，粉尘对环境污染小；

由于下部的密炼机没有加压系统，不加任何小料油料等，因此可以转子防尘密封采用无油密封装置，减小了润滑油对胶料及环境的污染，同时减少了油料的消耗；其次，由于没有上顶栓，下密炼机功率消耗很低，设备使用寿命大大延长；

由于串联式密炼机上、下密炼机采用现场在线控制，因此减少了人为因素的影响，胶料质量的波动很小；

串联技术的使用免除了多级混炼的要求及母料的储存及供应；

串联式密炼机特别适合全钢或半钢胶料的混炼或终炼，跟切线型密炼机相比，物料的分散度提高10%以上，混炼胶能够一段完成，生产效率提高约80%以上，节约电能30-50%，减少厂房和设备投资20-30%。

The tandem mixer is a type of mixer that assembled by two sets of intermeshing type mixers, divided into upper and lower parts; the upper mixer equips with ram assembly while the lower mixer equips with a tank instead of ram assembly. The upper mixer is used for compound mixing and constant temperature mixing; the lower mixer is designed for constant temperature mixing and with excellent distributing mixing function, outstanding temperature control function, best optimized ventilation, largest cooling area and fast dumping function. The mixing time is distributed over the upper & lower mixers.

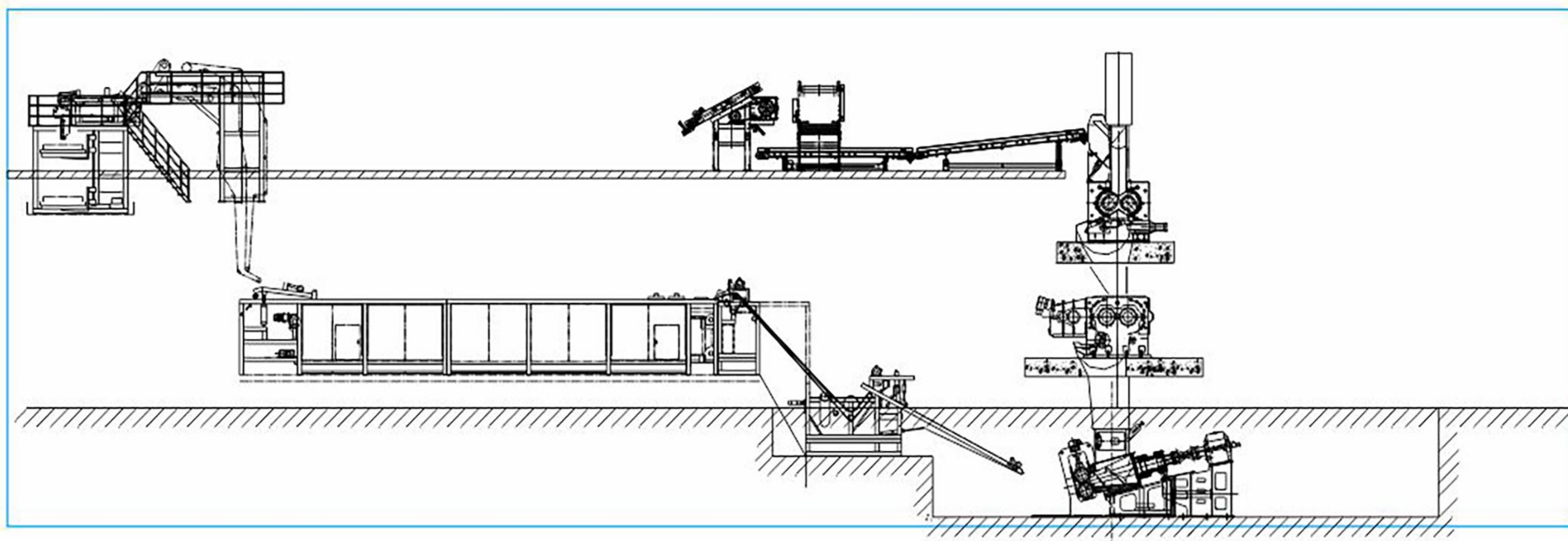
The tandem mixer locates in a closed system, its dust pollution to the enviroment is limited.

Since the lower mixer doesn't equipped with pressing system and no small compounds and oils are fed, the no oil sealing device can be used on rotor dust seal, this design will reduce the pollution of compound and enviroment, meantime the service life of the equipement can be significantly extended.

The tandem mixer adopts on-site online control on its upper & lower mixers, the compound quality will be stable due to the reducing of effect of human factor.

The use of tandem technology avoids the requirements of multi-stage mixing, storage and supply of raw materials.

The tandem mixer is perfectly suitable for the mixing or final mixing of PCR or TBR compound, comparing with tangential mixer, the compound dispersity can be more than 10% higher, the compound mixing can be finished in one stage, the production efficiency can be more than 80% higher, 30-50% electric energy can be saved and 20-30% of the investment on workshop & equipment can also be saved.







串联式密炼机组合形式 Tandem mixer combining type  
GK90E/GE180T, GE320/GE590T  
GE420/GE800T, GE580/GE1000T



## 串联密炼机主要性能参数 Technical specification of tandem internal mixer

型 号 Model		组合形式Combining Form		组合形式Combining Form		组合形式Combining Form		组合形式Combining Form		组合形式Combining Form	
		GK90E	GE180T	GK190E/K6	GE360T	GE320	GE590T	GE420	GE800T	GE580	GE1000T
技术参数 Specification											
密炼机总容量 Total volume of Mixer	L	87	180	200/206	360	330	590	430	810	560	1000
填充系数 Fill factor		~0.65	~0.32	~0.65	~0.38	~0.65	~0.36	~0.65	~0.36	~0.65	~0.36
转子转速 Rotor speed	r/min	5-50	5-50	6-60	5-50	5-50/6-60	5-50	6-60	5-50	5-50	5-50
压砵对胶料压力 Specific ram pressure	MPa	0.58	/	0.6	/	0.6	/	0.58	/	0.58	/
最大生产能力 Max productive capacity	t/h	~1		~3.1		~4.1		~5.6		~7.4	
冷却水压力 Cooling water pressure	MPa	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4
主机冷却水消耗量 Cooling water consumption of main machine	m <sup>3</sup> /h	30	40	40	50	50-60	50-60	60-70	60-70	70-80	70-80
主电机功率 Power of main motor	直流 DC	450	355	1100	500	1500/2x900	800	2 x1250	1250	2x1250	1500
	交流变频 AC	450	355	1100	500	800	800	2300/2500	800	2500/2550	1500
设备外形尺寸 Dimensions (不包括电机) (excl. motor)	长 Length (mm)	3640	2940	5000	5000	5320	6100	6600	7500	7500	8000
	宽 Width (mm)	2540	1660	3400	3950	4050	3200	4650	3200	4800	3500
	高 Height (mm)	4615	1620	5600	2000	6460/6070	2100	6500	2800	7500	2500
设备重量(不包括电机、减速机) Weight (not including motor and gearbox)	t	12	17	28	30	40	43	52	52	60	55

备注：①其上所有组合的密炼机转子均为圆筒啮合型；②实际填充系数受胶料配方，上顶栓压力，转子转速等因素影响。

Remarks: ①The mixer rotors of the above combining forms are cylindrical intermeshing types.

②The actual fill factor is influenced by factors like recipes, ram pressure and rotor speed.



## 一步式智能炼胶系统

### One-Step Intelligent Mixing System

一步式智能炼胶系统是我公司根据橡胶行业绿色、安全、节能、智能化的发展趋势而自主研发的炼胶生产线，可满足汽车零部件、密封件、电线电缆、胶管胶带等橡胶制品行业的需求。

One-step intelligent mixing system is the mixing line equipment developed by Yiyang Rubber & Plastics Machinery Group base on the trend of green, safety, energy saving and intelligence of mixing industry. It can satisfy the requirements of rubber products industry such as auto parts, sealing parts, rubber cable, rubber hose & belt and etc.

### 一步式智能炼胶系统组成

#### System Composition of One-step intelligent mixing system

一步式炼胶采用上辅机、小粉料称量系统，串联式密炼机，带自动摆胶、捣胶装置，大循环及连续出片的自动开炼机组、在线过滤机、及胶片冷却机组串联，从而实现整条生产线自动运行。

One-step intelligent mixing system adopts upstream, chemical weighing system, tandem mixer, automatic open mill unit with auto stock blender, blending device, big circulation and auto sheeting, online strainer and batch off unit, thereby to realize automatic running of the mixing line.



一步式智能炼胶生产线模型

Model of one-step intelligent mixing production line