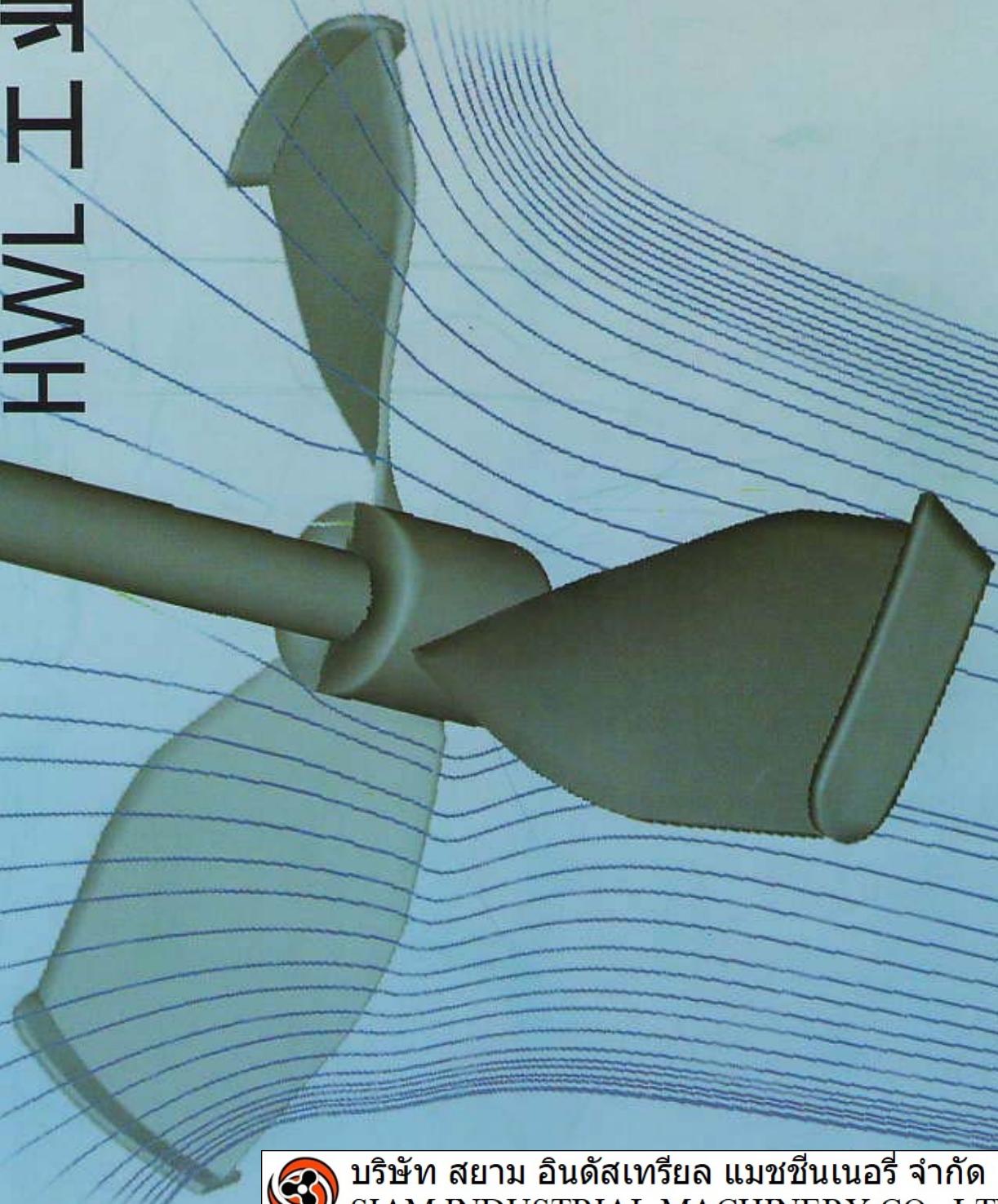


HWL Industrial Agitators

HWL 工業 搅拌机

EKATO



บริษัท สยาม อินดัสเตรียล แมชชีนเนอรี่ จำกัด
SIAM INDUSTRIAL MACHINERY CO., LTD.

5/15 หมู่ 6 ถนนนา-{ตัว}ราด กม.15 ต.บางโฉลง อ.บางพลี จ.สมุทรปราการ 10540 โทร 02-312-5300 #215 โทรสาร 02-312-5410

5/15 Moo 6 , Km 15 Bangna-Trad Highway, Bangchalong, Bangplee, Samutprakarn 10540 Tel 02-312-5300 #226 Mr.Kirachai (Sales)

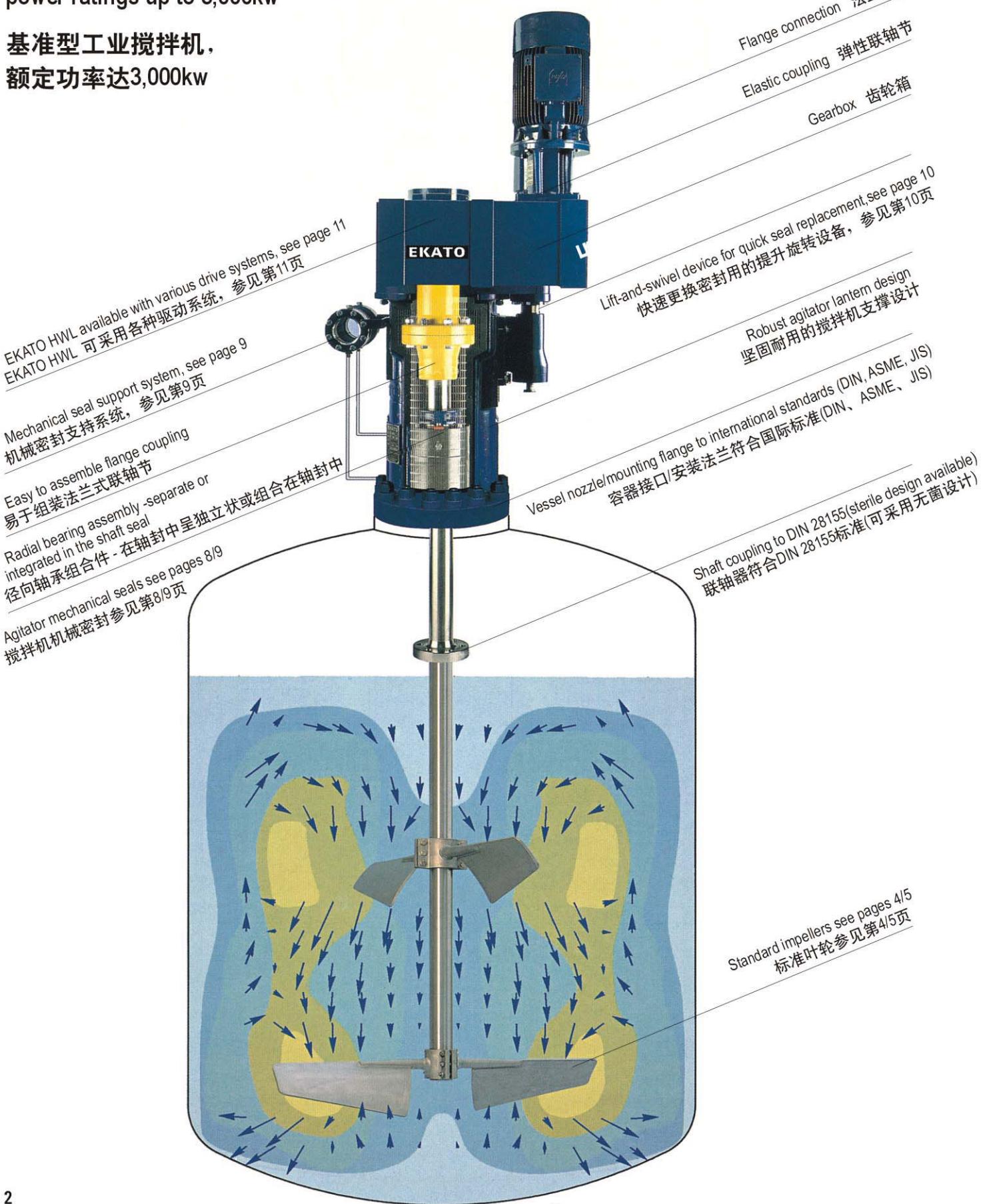
Contact us :	Mr.Kirachai Lengudomlap	Sales Department	M : 061-269-9269	Email : kirachai@siamind.co.th
				Email : kirachaijob@gmail.com

EKATO HWL –

the benchmark industrial agitator for
power ratings up to 3,000kw

基准型工业搅拌机，
额定功率达3,000kw

EKATO HWL 2080 N in GMP compliant design ▷
EKATO HWL 2080N 按照GMP设计 ▷





EKATO

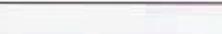
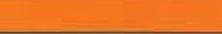
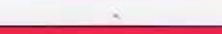
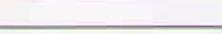
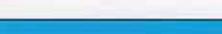
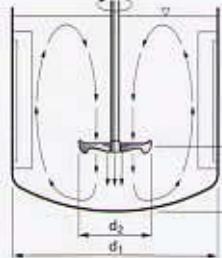
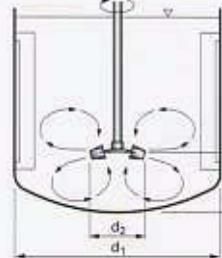
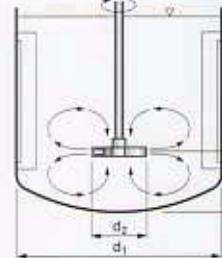
XAVER

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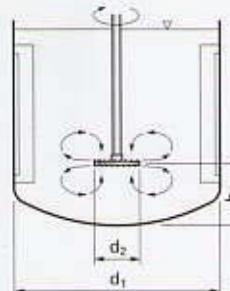
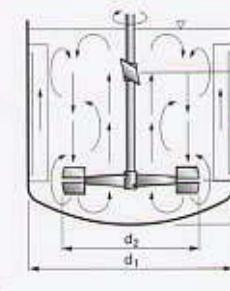
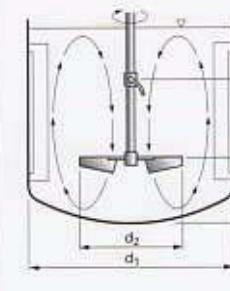
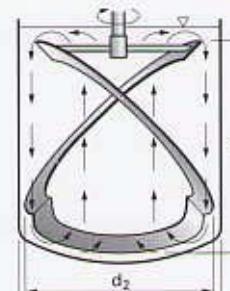
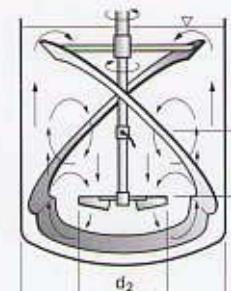
EKATO standard impellers

EKATO 标准叶轮

EKATO Mixing system EKATO 混合系统		EKATO ISOJET®	EKATO PHASEJET®	EKATO GASJET®
Blending	混合			
Suspending	悬浮			
Dispersion	分散			
Heat transfer	传热			
Gassing	充分			
Flow diagram	流型			
d ₁ /d ₂	0.05 to(至) 0.5	0.2 to(至) 0.5	0.2 to(至) 0.5	
H _s /d ₂	0.3 to(至) 3	0.3 to(至) 3	Depending on Submergence 根据浸没程度而定	
Speed 速度	High 高	Medium 中等	High 高	
u [m/s]	2 to(至) 15	4 to(至) 10	8 to(至) 15	
η [mPa · s]	Up to(最高至) 10,000	Up to(最高至) 10,000	Up to(最高至) 10,000	
No.of blades 叶片数	2	6	-	
No.of stages 层数	1/2	1	1	
No.of baffles 挡板数	2	2/4	2/4	
Primary flow direction 初始排液方向	Axial 轴向	Radial 径向	Radial 径向	
Flow range 流动状态	Turbulent 湍流	Turbulent 湍流	Turbulent 湍流	

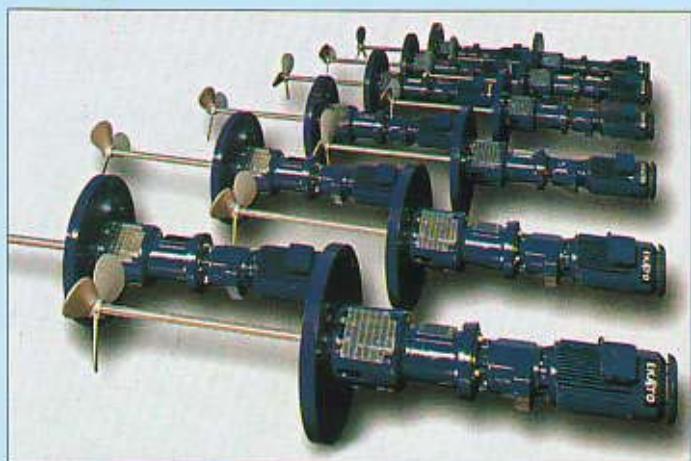
Depending on the requirement, industry standard or custom impellers are available upon request.
根据需要，可提供工业用标准型叶轮或定制叶轮。

EKATO

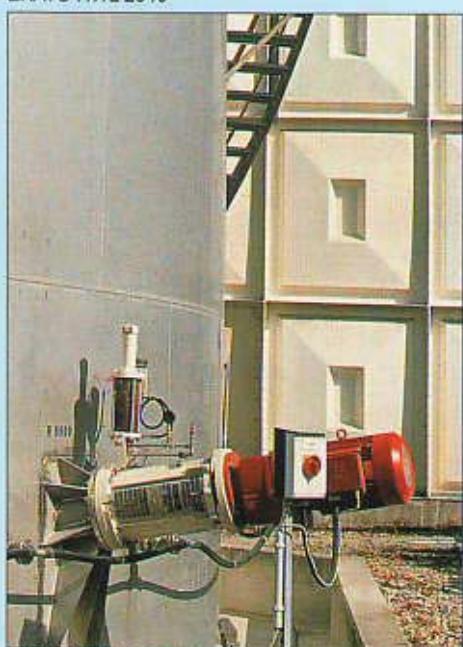
EKATO MIZER	EKATO INTERMIG®	EKATO VISCOPROP®	EKATO PARAVISC®	EKATO COAXIAL®
				
				
0.2 to(至) 0.5	0.5 to(至) 0.95	0.3 to(至) 0.7	0.9 to(至) 0.98	-
0.3 to(至) 1	0.3 to(至) 0.5	0.3 to(至) 1	-	-
High 高	Medium 中等	Medium 中等	Low 低	Low/High 低/高
8 to(至) 30	1 to(至) 9	3 to(至) 10	<2	-
Up to(最高至) 10,000	Up to(最高至) 80,000	Up to(最高至) 100,000	Above(高于) 20,000	Up to(最高至) 500,000
-	2	2/3/4	2-bladed 装有2个叶片	-
1	2	1/2	-	1/2
0/2/4	0/2/4	0/2	-	-
Axial 轴向	Axial 轴向	Axial/Radial 轴向/径向	Axial 轴向	Axial/Radial 轴向/径向
Turbulent 湍流	Turbulent/Laminar 湍流/层流	Turbulent/Laminar 湍流/层流	Laminar 层流	Turbulent/Laminar 湍流/层流

EKATO HWL agitators in various sizes for all process-related and technical requirements, shaft diameters from 40 to 420 mm

EKATO HWL 搅拌机，规格众多，满足各种相关工艺和技术要求，轴直径从 40 到 420 毫米。



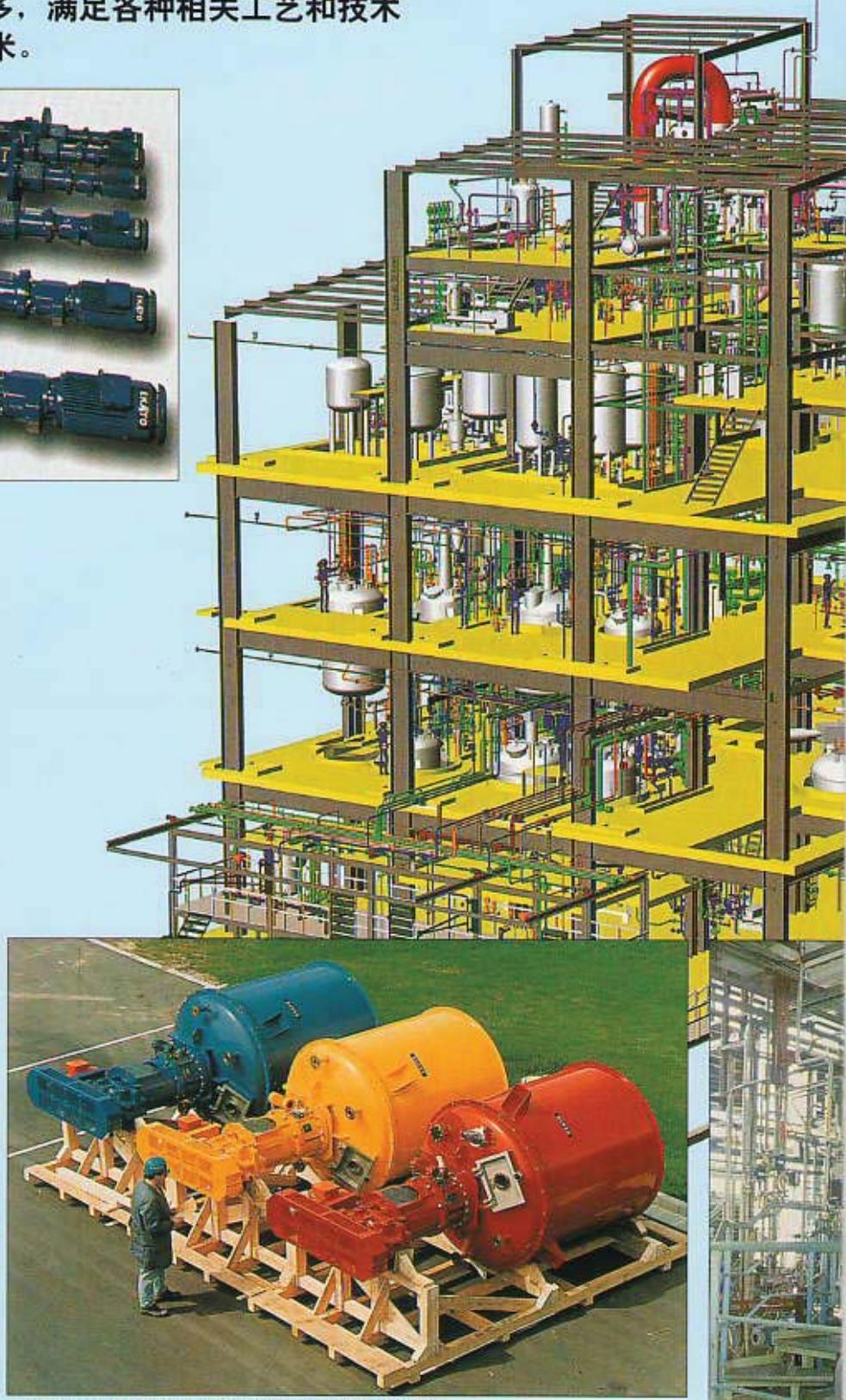
EKATO HWL 2040



EKATO HWL 2060 side entry(侧入式)



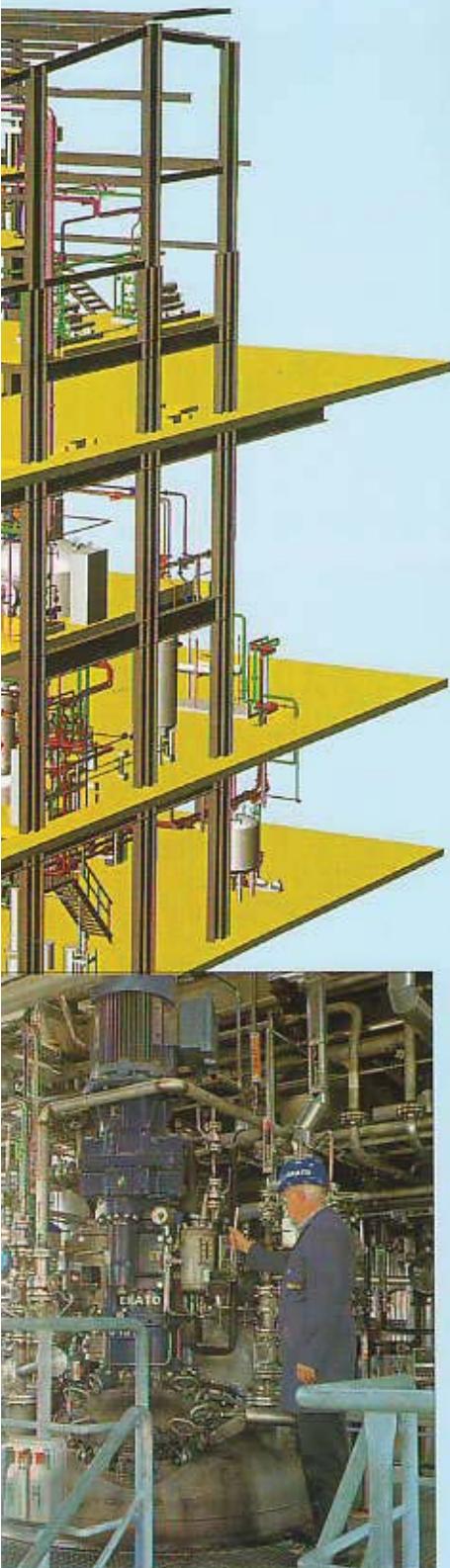
EKATO HWL 2100



EKATO HWL 2100, parallel shaft gearbox with V-belt drive
EKATO HWL 2100, 平行轴齿轮箱加V形皮带传动

EKATO HWL 2100

EKATO



90 kW (123 HP)



EKATO HWL 2160 D



EKATO HWL 2160 U



EKATO HWL 2360, 1,500 kW (2,000 HP)



EKATO HWL 2140 N

EKATO shaft seals and accessories for every size and process requirement

满足各种规格和工艺要求的EKATO轴封和附件。

The right seal system provides added safety during the process, avoids emissions, handles high pressures, high temperatures and radial shaft deflections.

合适的密封系统提供更可靠的操作安全性，防止泄漏，能承受高压、高温及径向轴偏摆。



EKATO HWL 2000 with geared motor(带齿轮电机)

Examples of preferred seals with the EKATO HWL:

EKATO HWL 常用密封举例：

1. operating pressure abs. 操作绝对压力
2. max.seal ring speed 最大密封环速度
3. max.operating temperature 最高操作温度

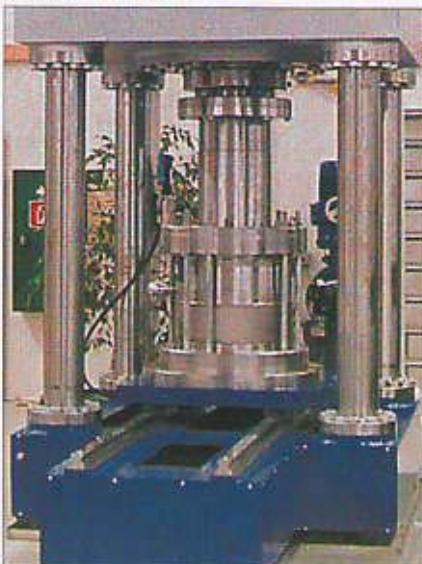
ESD34 N

Mechanical seal for low operating pressures

低操作压力下用的机械密封

1. vacuum -7 bar 真空-7巴
2. 2.5m/s
3. 400°C

Mechanical seal ESD34 G on a seal test stand for shafts Ø≤500mm and pressures ≤200 bar
在轴封试验台上的机械密封ESD34 G，轴径Ø≤500mm，压力≤200巴。



ESD34 G

A seal system for use in a rugged industrial environment to meet high availability and safety requirements

用在工业环境恶劣的密封系统，满足高适用性和安全要求

1. Vacuum -41 bar 真空-41巴
2. 2.5m/s
3. 400°C

ESD42

Mechanical seal for slurry (side-entry)
浆料用的机械密封(侧入式)

1. Vacuum -7 bar 真空-7巴
2. 2.4m/s
3. 380°C

ESD34 H

High pressure mechanical seal especially designed for PTA and hydrometallurgy

高压机械密封，专门为PTA和湿法冶金设计

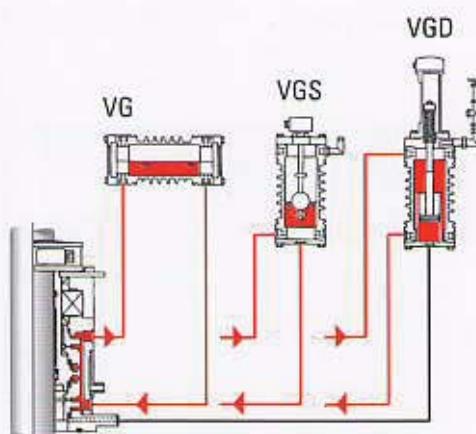
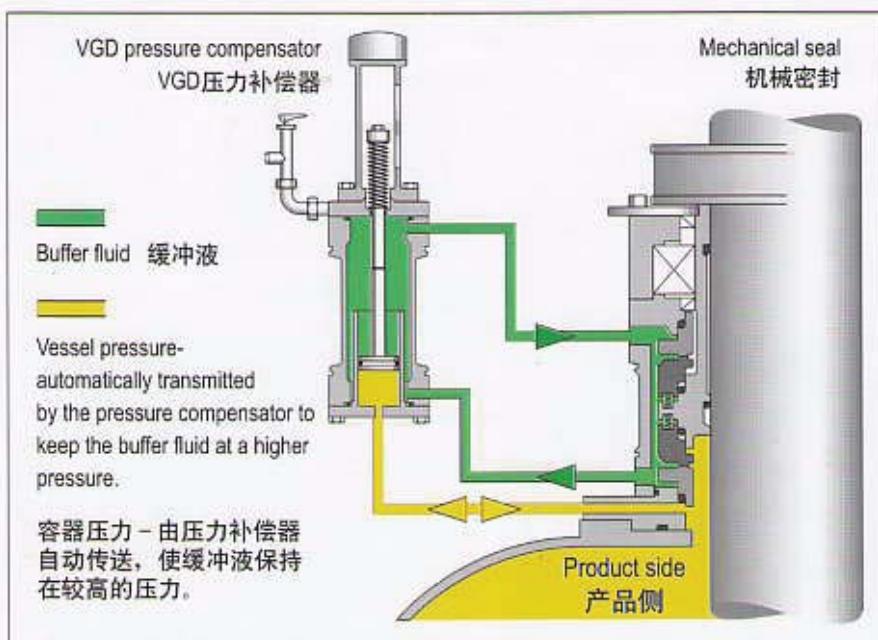
1. Vacuum -71 bar 真空-71巴
2. 2.5m/s
3. 400°C



Reducing maintenance costs and system downtime
with the EKATO VGD pressure compensator

采用EKATO VGD 压力补偿器，大大降低维护成本及系统停机时间。

EKATO



ESD44

Mechanical seal system for sterile designs, adhesives or scaling media, including abrasive slurries (side-entry)
机械密封系统适用于无菌设计，胶粘或磨蚀介质，包括磨蚀染料(侧入式)

1. Vacuum -17 bar 真空-17巴
2. 5m/s
3. 200°C



Stuffing box

填料密封(SD)

For non-critical seal requirements
Packing rings with graphite/PTFE
用于非关键密封要求
密封环采用石墨/PTFE

1. 10⁻¹ bis 4 bar 10⁻¹至-4巴
2. 2m/s
3. 130°C

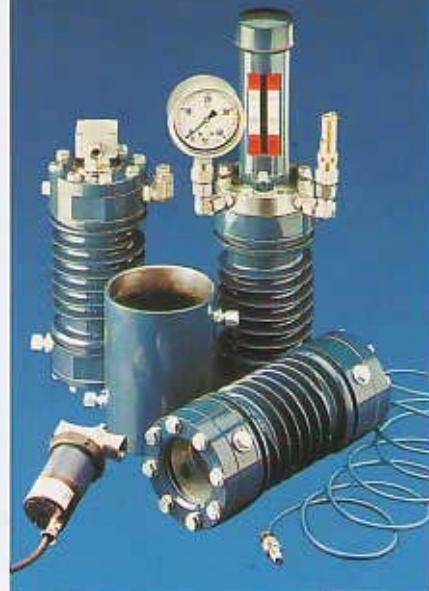


Auxiliaries

Hydraulic vessels,
Buffer fluid systems,
Pressure compensator,
Heat barriers,
Shut-off systems,
Flushing systems,
Instrumentation,
Forced circulation

附件

液压容器。
缓冲液系统。
压力补偿器。
热障。
关闭系统。
冲洗系统。
仪器仪表。
强制环流



Easy seal replacement even on large agitators

Seal removal from above:

The drive on the HWL lantern is jacked up by one person using the easy to operate lift-and-swivel device and is swung to one side.
The seals then pulled upwards off the shaft.
(The shaft diameter in this case is 200 mm).

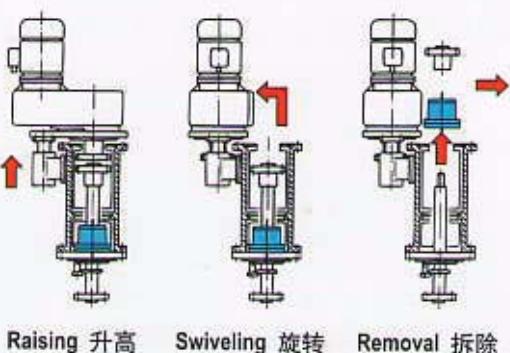


1. Lifting drive unit 提升驱动设备

在大型搅拌机上，更换密封也非常容易

从机器上部拆除密封：

提升和旋转设备极易操作，一个人使用就可以把HWL搅拌机机座上的驱动设备顶起来，并转到一侧去。
然后向上拉，把密封从轴中拉出来。
(本例中的轴直径为200毫米)。



2. Swiveling drive unit to side
把驱动设备旋转到一侧去



3. Seal removal 拆除密封

Seal removal from the side:

The split coupling is first removed to gain space for removal of the seal which is then pulled upwards off the shaft.



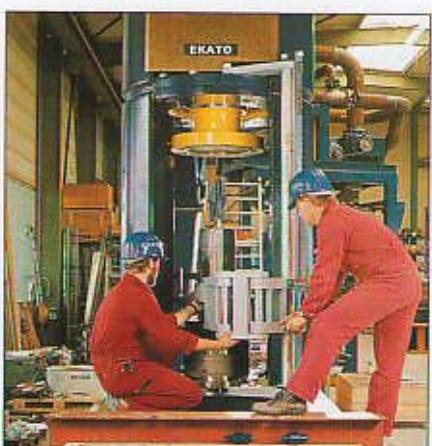
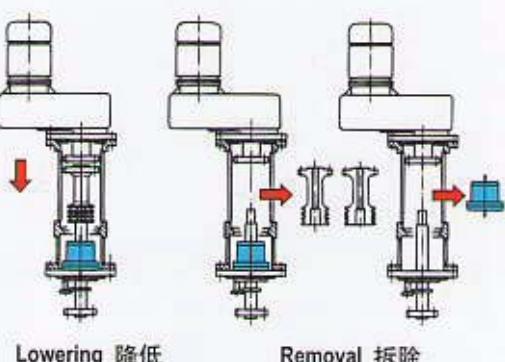
1. Raising coupling 提升联轴节

从机器侧边拆除密封：

首先拆除对开联轴节，让出地方来拆除密封，然后向上拉，从轴中拉出密封。



2. Swiveling coupling to side
把联轴节旋转到一侧去

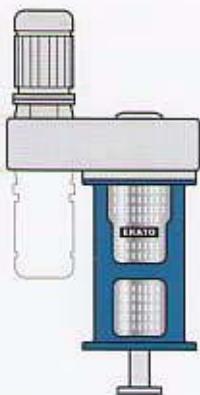


3. Seal removal 拆除密封

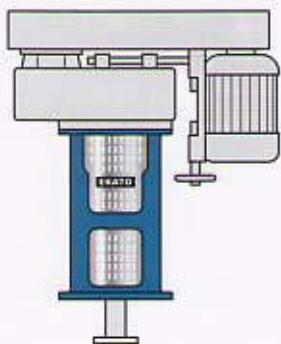
HWL 2000 –

drive and mounting configurations

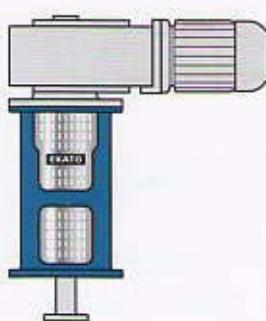
驱动和安装配置



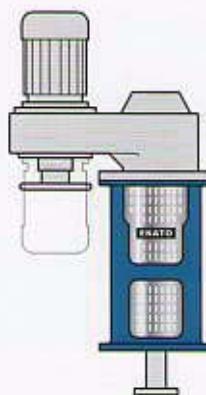
Parallel shaft gearbox
平行轴齿轮箱



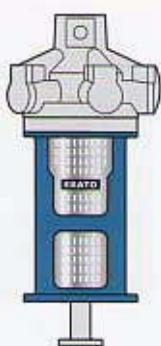
Parallel shaft gearbox with V-belt drive
平行轴齿轮箱加V形皮带传动



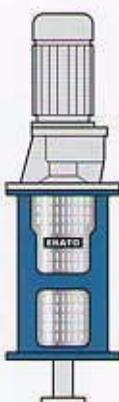
Right angle shaft gearbox
直角传动齿轮箱



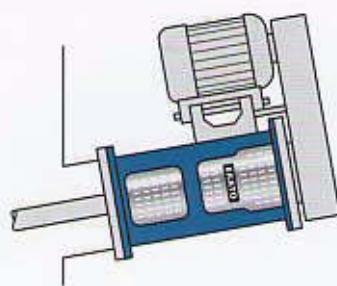
Mechanical variable speed gearbox
机械变速齿轮箱



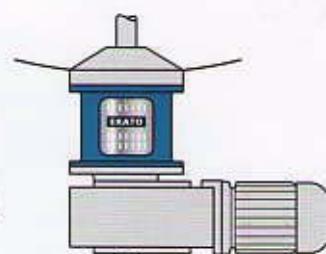
Hydraulic drive
液压驱动



Geared motor
齿轮电机



Side entry
侧入式



Bottom entry
底入式

Ancillary equipment:

- frequency converters
- shaft speed measurement systems
- shaft torque measurement systems
- noise enclosures
- oil supply systems
- safety alarms and interlocks

辅助设备：

- 频率变换器
- 轴速度测量系统
- 轴扭矩测量系统
- 噪声罩
- 供油系统
- 安全报警和联锁

Design data:

The following data are available on request to assist you in designing your process plant:

- dimensions of all connections
- nozzle forces
- nozzle moments
- headroom requirements
- weights
- utilities requirements

设计数据：

为了帮助您设计，下列数据承索即寄：

- 所有连接的尺寸
- 接管受力
- 接管力矩
- 净空要求
- 重量
- 公用工程要求

How to find the best mixing solution for demanding process requirements

A great variety of requirements are placed on agitators such as:

- to achieve temperature homogeneity of <0.5 °C in polymer melts with 1,000Pas and more,
- to achieve high mass transfer with multiphase mixtures,
- to guarantee process heat removal at rates up to 1MW/m³,
- to maintain a high quality of suspension in vessels holding several thousand cubic meters at minimum power input.

A complex set of circumstances exist when combining the different economic and technical factors in selecting the right mixing system.

In such cases the mixing technology experts are able to track down the known physical and chemical regularities which impact the process and with the aid of the tools shown below come up with a successful solution to fulfill the process requirements.

对于工艺要求非常苛刻的情况，找出最佳混合方案的方法

对搅拌机有各种各样的要求，诸如：

- 在大于等于1,000Pas的聚合物熔体中，要实现温度均一性<0.5 °C
- 对于多相混合物，要实现高传质。
- 保证工艺传热速率高达1MW/m³。
- 采用最小功率输入，在容纳几千立方米的容器中维持高质量悬浮。

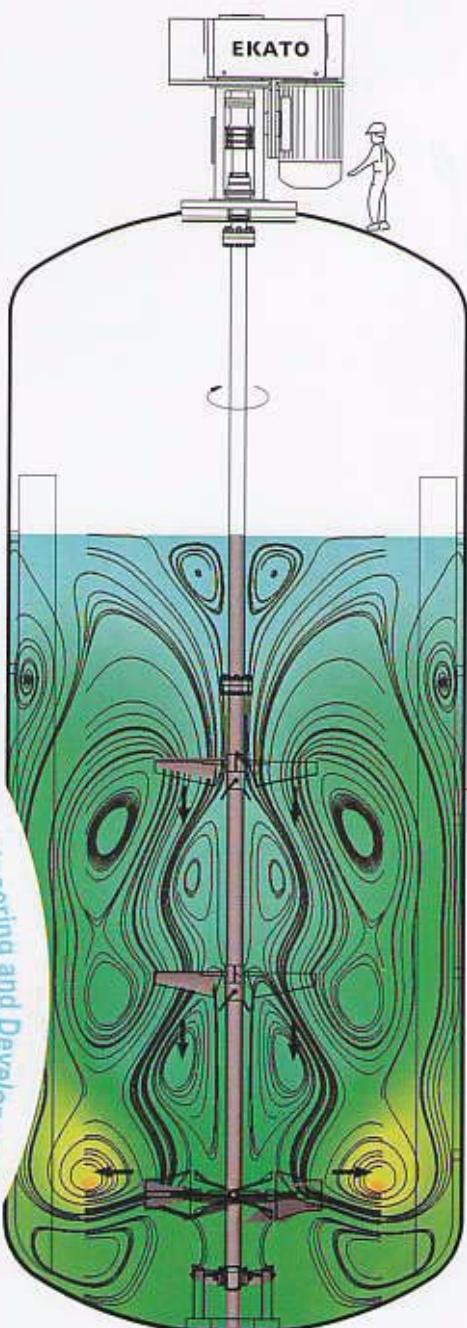
把各种经济和技术因素综合起来考虑，以便选择正确的混合系统时，需要复杂的综合考虑。

在这种情况下，混合技术专家能够找出已知的影响工艺的物理和化学规律，并借助下面所示的工具，提出一套满足工艺要求的解决方案。

Optimizing the process using 《EKATO Scale-up》

使用《EKATO 工程放大技术》 使工艺最优化

Flow pattern analysis by means of CFD:
通过CFD进行的流型分析：



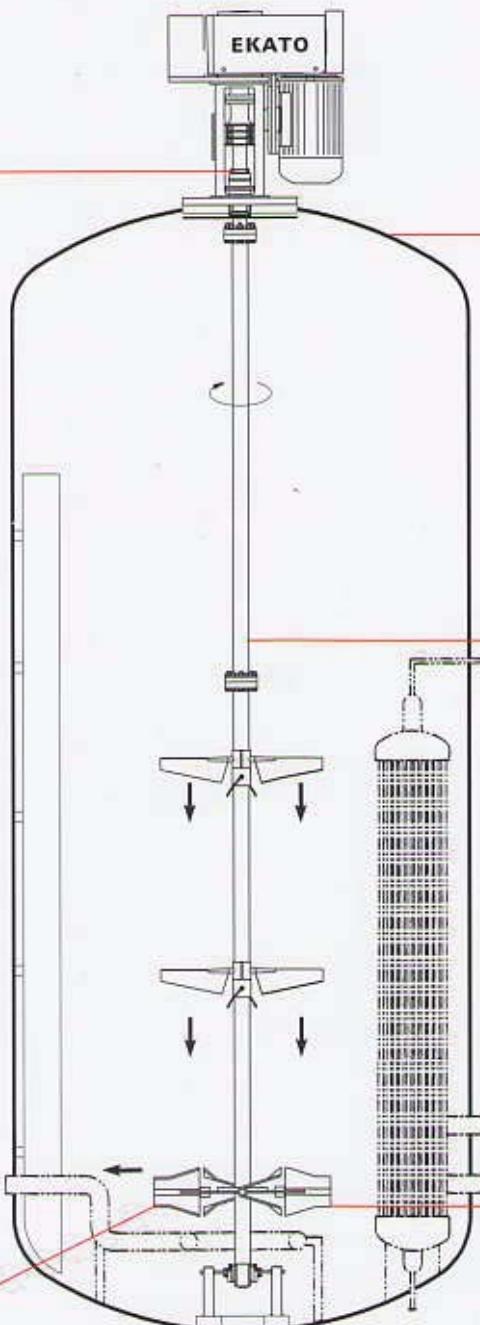
Process and mechanical engineering development, Optimization of components Special designs, GMP design

工艺和机械工程研制,
部件的最优化特殊设计,
GMP设计



Mechanical seal system for sterile designs
无菌设计用的机械密封系统

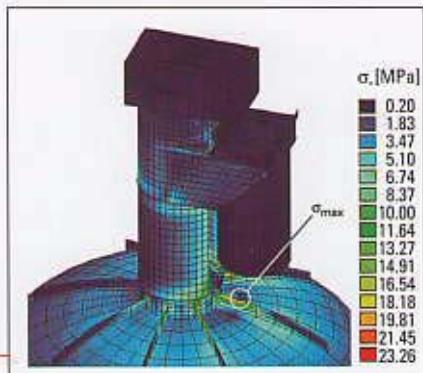
Fermentation as an example
以发酵为例



EKATO PHASEJET®

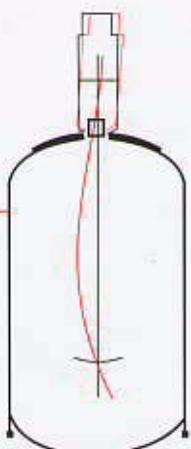
Optimization of components with Finite Element Method (FEM) - Calculation of stress distribution for determining critical zones for the agitator and vessel arrangement.

采用有限元方法使部件最优化 - 应力分布计算以便确定搅拌机和容器布置临界区。



FEM

Finite element model of a large reactor
大型反应器的有限元模型



Modal analysis 模型分析

for calculating critical natural frequencies and the location and size of the rotating mass.
计算旋转质量的临界自然频率、位置和大小。



Gassing reactor model in the EKATO test center
EKATO 试验中心的充气反应器模型

Own Manufacture Quality Assurance

自己制造，品质保证

EKATO PHASEJET®
gassing test 充气试验

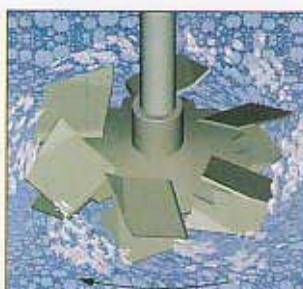
EKATO HWL 2240
mounting agitator 装配搅拌机



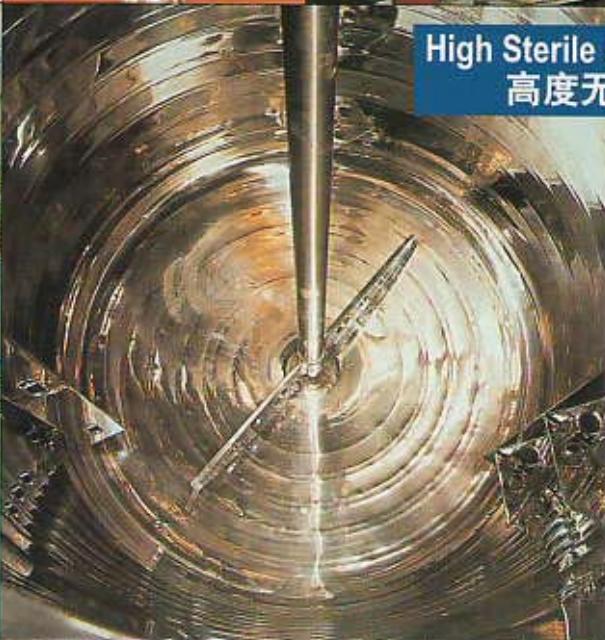
Welding titanium 钛材料的焊接



Special Materials
特殊材料



High Sterile Requirements
高度无菌要求



Test Pit
试验井

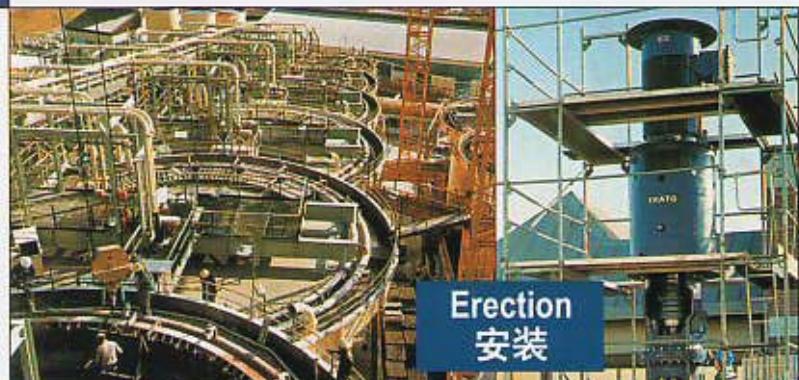
EKATO HWL 160D at the test pit 在试验井处的 EKATO HWL 160D

Machining titanium, shaft length 12 m 钛材料的机械加工，轴长12米



Test Run
试运行

Test run of the EKATO gassing system
EKATO 充气系统的试运行
EKATO GASJET®



Hydrometallurgy 湿法冶金

EKATO HWL 2240

EKATO Rühr- und Mischnachnik GmbH
EKATO 搅拌技术有限公司

Hohe-Flum-Str.37
79650 Schopfheim
Germany

Tel. +49 (0) 7622 29-0
Fax +49 (0) 7622 29-213
E-mail: info@ekato.com
www.ekato.com



Reliability, ease of maintenance and operational safety are top priorities for the EKATO Group in the field of mixing technology.

在混合技术领域，可靠性、易于维护性、操作安全性是EKATO集团最优先考虑的事。

EKATO Delivers(提供):

Process optimization and process reliability through EKATO's scale-up expertise.

通过EKATO的放大专业技术提供工艺最佳化和工艺可靠性的完美组合。

From our product range 我们的产品范围

EKATO EM	Standard agitator 标准搅拌机
EKATO HWL	Industrial agitator 工业搅拌机
EKATO ESM	Safety magnetic drive agitator 安全磁力传动搅拌机
EKATO COAXIAL	For rheologically difficult media 用于强流变特性的介质
EKATO SOLIDMIX	For solids applications 用于固体混合

EKATO全球服务电话

+49 171 771 9494

国内24小时服务电话

+86 400 649 2966

**Worldwide Sales and Service
Network of the EKATO Group:
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41469 Neuss
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91224 Pommelsbrunn
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**EKATO Affiliated Companies:
EKATO 附属公司:**

FLUID Misch- und
Dispergiertechnik GmbH
Im Entenbad 8 79541 Lörrach
Germany
Phone : +49 76 21 58 09-0
Fax : +49 76 21 58 09-16
e-mail: fluid@ekato.com

EKATO SYSTEMS GmbH
Käppelemattweg 2
79650 Schopfheim
Germany
Phone : +49 76 22 29 400
Fax: +49 76 22 29 600
e-mail: systems@ekato.com



伊喀拓(上海)搅拌设备有限公司
EKATO (Shanghai) Agitation Equipment Co., Ltd.

伊喀拓(上海)商贸有限公司
EKATO (Shanghai) Commercial & Trading Co., Ltd.

中国上海市闵行区中辉路60号第10幢, 邮编201111
Bldg.10, No. 60 Zhonghui Rd. Minhang District,
Shanghai, 201111. China

电话TEL: +86-21-6495 2966 - ext
Email: china@ekato.com, www.ekato.com.cn