

优质成品砂：级配、粒型、含粉量可控
Quality Sand: Controllable Gradation,
Particle Shape and Filler Content



世邦工业科技集团股份有限公司
SHIBANG INDUSTRY & TECHNOLOGY GROUP CO., LTD.

中国上海浦东金桥南区建业路416号
No.416 Jianye Road, South Jinqiao Area,
Pudong New District, Shanghai, China
邮编 / Postcode: 201201

国际市场部 / International Trade Department
Tel: 0086-021-58386176 0086-021-58386189
Fax: 0086-021-58386211
Email: sbm@sbmchina.com

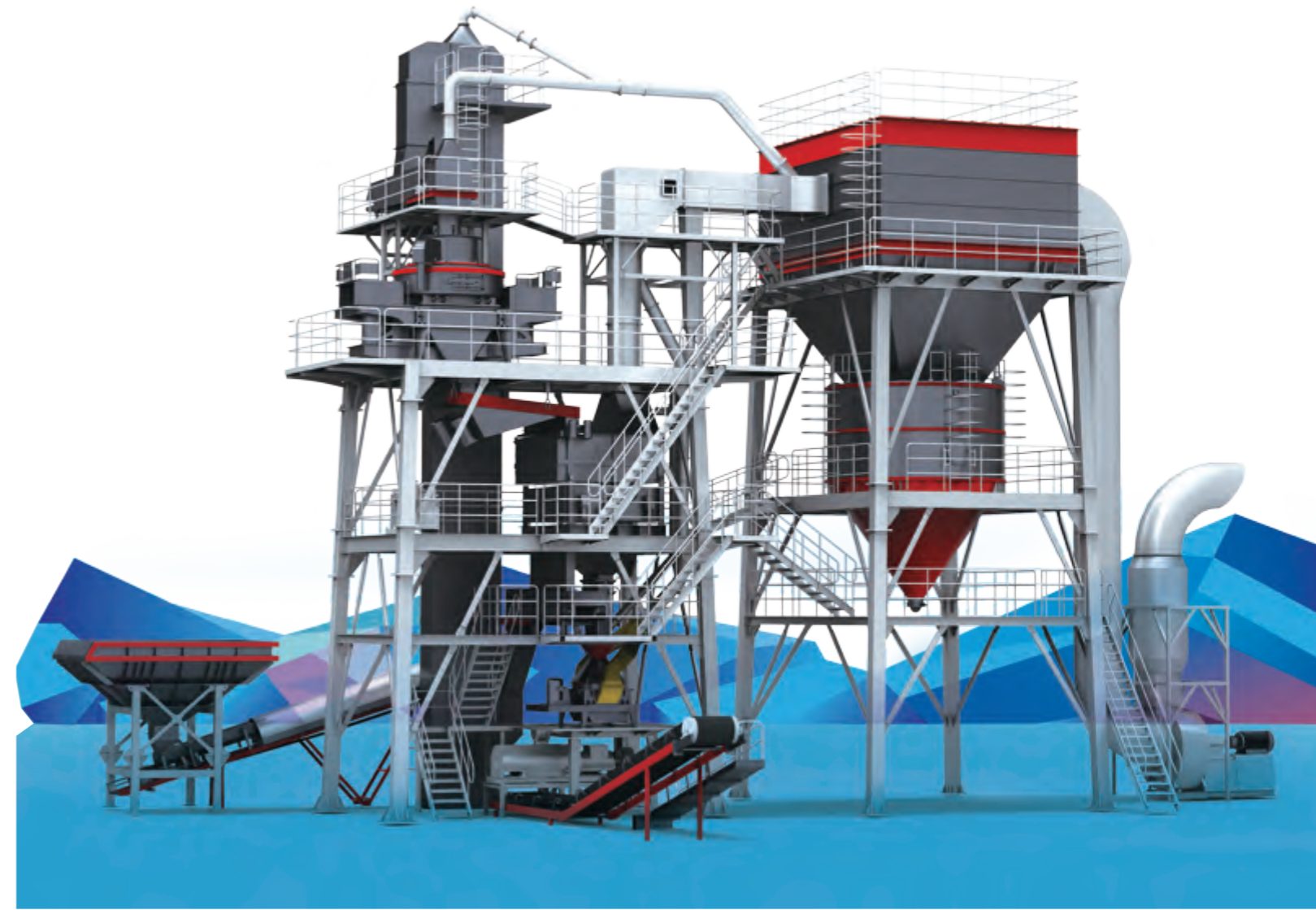
国内市场部：
Tel: 400-696-1899 (24小时销售热线)
021-58386699
Fax: 021-58385681
Email: info@shibang.cn



中英 CV2-P2-1609

VU 骨料优化系统

AGGREGATE OPTIMIZATION SYSTEM
TOP DRY-PROCESS SAND-MAKING PLANT
顶级干式制砂成套设备



博大的荟萃，VU系列骨料优化系统

Masterpiece of Sand-making Process, VU Series Aggregate Optimization System

混凝土的要求 Requirements on Concrete

混凝土泵送现场 Concrete Pumping Site

强度、流动性和耐久性是现代混凝土的核心性能要求和指标。

Strength, flowability and durability are core indicators of modern concrete performance.

混凝土组成 Composition of Concrete

细骨料（砂）是混凝土的主要原材料，对其性能和配制成本影响显著。

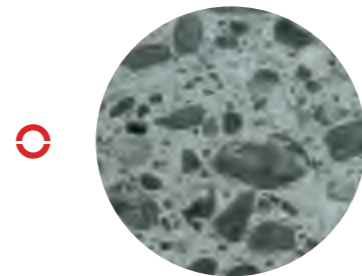
The main raw material of concrete is the fine aggregate (sand). Its performance has a significant influence on the performance and cement-cost of concrete.

传统制砂的问题 Problems with Conventional Sand-making Technique and Equipment

湿法制砂工艺 Wet-progress Sand-making Technique

传统工艺和设备难以调控成品砂的品质，易产生粉尘污染及污水淤泥处理问题。

The conventional sand-making technique and equipment experience difficulty in controlling the quality of manufactured sand. In addition, they often cause dust pollution. Especially, they lack of capability of effectively handling the waste water and sludge.

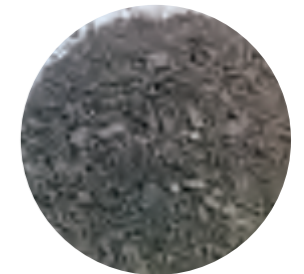


传统机制砂问题

Problems of Manufactured Sand using Conventional Technique and Equipments

级配不合理，含粉、含泥量过高，粒型呈扁平、长条状，不满足混凝土要求。

The manufactured sand, due to unreasonable gradation, excessively high filler and clay content, and flat strip shape of particles, does not comply with the requirements on concrete.



世邦的积累和突破 Breakthrough of SBM

世邦机器的实力 Strength of SBM

融合130多个国家的工程经验和30多年破碎、制砂和磨粉行业积累。

Reputation built for more than three decades in the grinding, crushing and sand-making industry and experience gained from projects in more than one hundred countries



VU系统实验场

Test Site of VU System:

开辟专门的骨料优化实验区，攻克了优化工艺中破、磨、选的难题。

Test site for aggregate optimization is designated. Difficulties in crushing, grinding and separation are overcome for aggregate optimization.

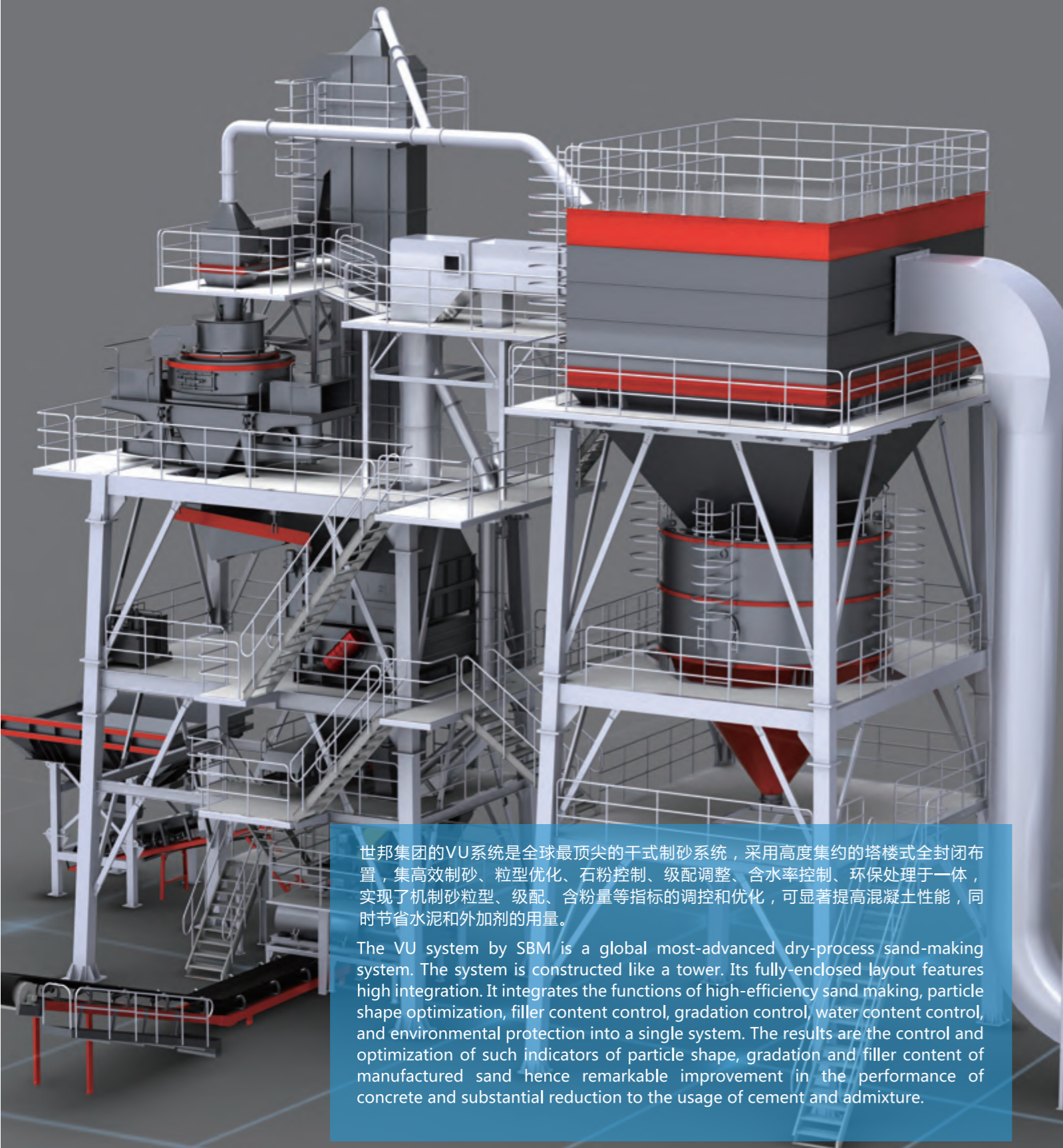


三十多年的破磨行业积累
Reputation Built for More than Three Decades in Grinding and Crushing Industry

一百多个国家的工程经验
Experience Gained from Projects Located in More than One Hundred Countries

VU系统，干式制砂成套设备

VU system,
The Optimal Solution for Dry Sand-making



世邦集团的VU系统是全球最顶尖的干式制砂系统，采用高度集约的塔楼式全封闭布置，集高效制砂、粒型优化、石粉控制、级配调整、含水率控制、环保处理于一体，实现了机制砂粒型、级配、含粉量等指标的调控和优化，可显著提高混凝土性能，同时节省水泥和外加剂的用量。

The VU system by SBM is a global most-advanced dry-process sand-making system. The system is constructed like a tower. Its fully-enclosed layout features high integration. It integrates the functions of high-efficiency sand making, particle shape optimization, filler content control, gradation control, water content control, and environmental protection into a single system. The results are the control and optimization of such indicators of particle shape, gradation and filler content of manufactured sand hence remarkable improvement in the performance of concrete and substantial reduction to the usage of cement and admixture.

01

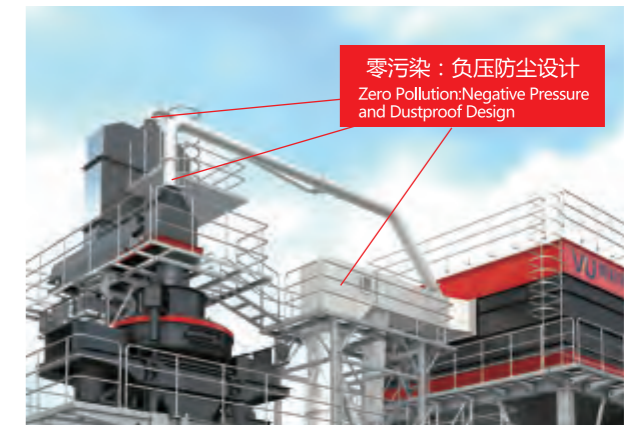
高环保，VU系统刷新制砂行业形象

Environmental Protection --- VU System Polishes Image of Sand-making Industry

工艺环保

Environmental Protection in Technique

- ◆ 全封闭输送、生产，以及负压除尘设计，使生产现场无扬尘。
- ◆ 全干法生产和筛选工艺，零污水、零淤泥排放。
- ◆ The fully-closed delivery and production and vacuum-based dust collection ensure no flying dust on the production site.
- ◆ The dry-process crushing, grinding and screening technique ensure no waste water or sludge is discharged.



运行环保

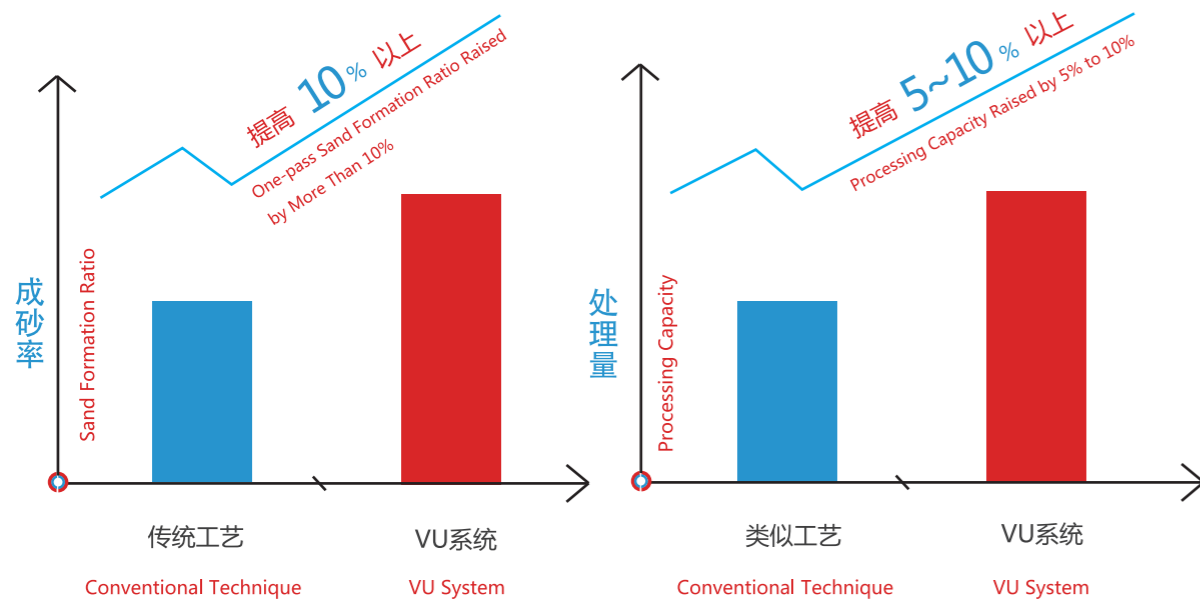
Environmental Protection in Operation

- ◆ 配备加湿搅拌机（可选），保证成品砂含水率合格，不易产生扬尘。
The moisture content control machine (optional) is provided to ensure the compliance of water content of manufactured sand, removing the possibility of flying dust.
- ◆ 粉仓储料监控和自动伸缩排料设计，保证石粉转运过程无溢出。
The design of automatic monitoring and discharge of powder hopper ensures no filler overflows during transfer.
- ◆ 干式除粉选粉技术，保证石粉的干燥和洁净，易于处理和综合利用。
The dry-process filler separating technology ensures the filler is both dry and clean, facilitating the collection and utilization.

02

高效率，VU系统引领制砂革命

High Efficiency --- VU System Brings about Revolution in the Sand-making Industry

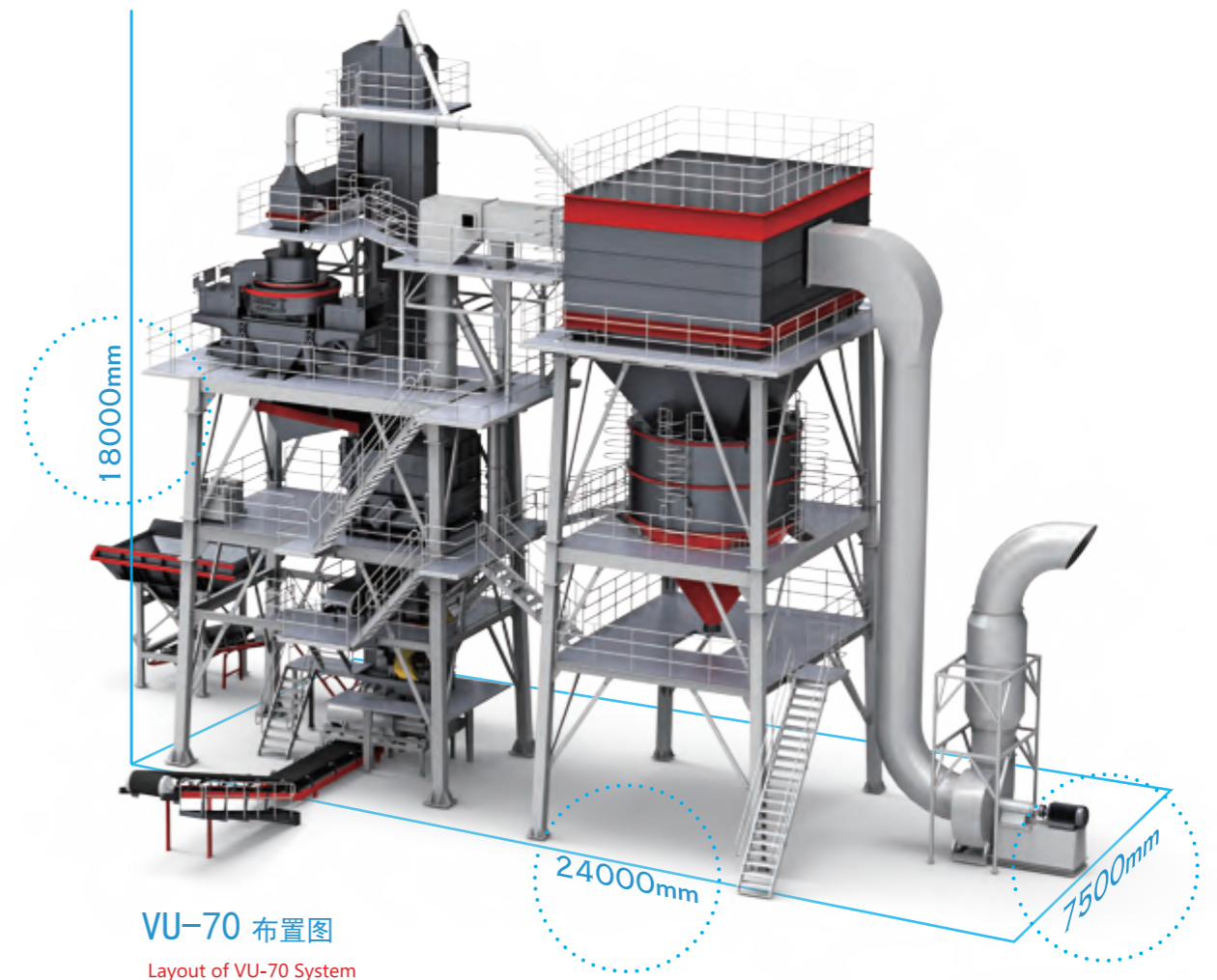


生产高效 High Efficiency in Production

- ◆ 破磨技术的全面革新，使破碎成砂率大幅提升10%以上。
Innovation in crushing and grinding technologies, greatly raising the sand formation ratio by more than 10%.
- ◆ 集成化的干法筛分技术，使筛分效率大幅提升，筛网面积比传统工艺减小50%以上。
Integration of dry-process screening technology, greatly raising the screening efficiency while reducing screen area by more than 50% compared to the conventional technology.
- ◆ 单设备性能的提升和工艺的合理衔接，使吨电耗明显降低，处理量提高5~10%。
Improvement in performance of each equipment and reasonable arrangement of processes, greatly reducing the electricity consumption per ton of sand while raising processing capacity by 5% to 10%.

运营高效 High Efficiency in Operation

- ◆ 集约化的塔楼设计，使占地面积大幅减小，如VU-70系统仅需7.5m × 24m即可完成主机部分的布置。
The tower design of integration brings great reduction to floor area required. For example, the VU-70 system requires merely a floor area of 7.5m × 24m for the arrangement of its main body.
- ◆ 全新的防磨损设计和材料的升级，使耐磨件寿命显著延长，停机检修时间大幅降低。
The innovative design of wear resistance and the use of materials of higher performance remarkably extend the service life of wear parts thus greatly reduce the duration of outage for overhaul.
- ◆ 集成化的控制系统和在线调节设计，可在运行中调节系统设置，实现成品砂质量和产量提高的同时，降低人力需求。
The integration of control system and the design of online adjustment enable adjustment to the settings while the system is in operation. It improves the quality and output of manufactured sand while cuts the demand for labor force.



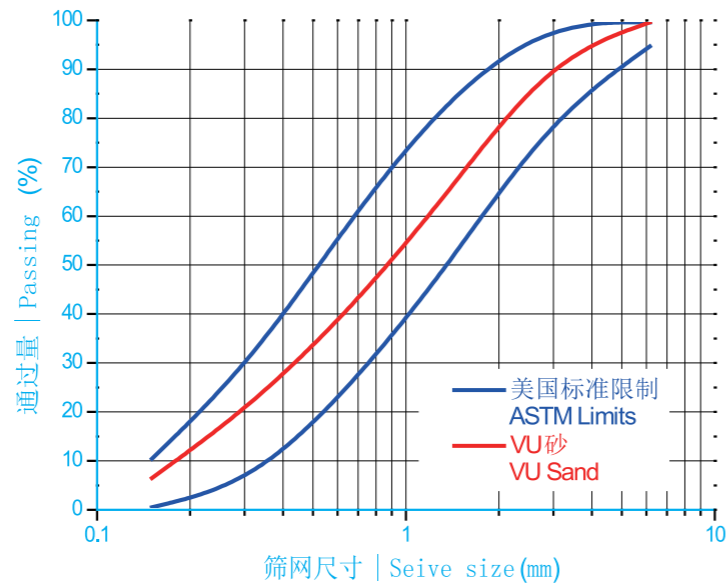
03

高品质，VU砂完全符合混凝土标准 High Quality --- VU Sand Complete Complies with the Concrete Standard

级配合理 Reasonable Gradation

- ◆ 综合的破磨作用和灵活的筛选设计，使成品砂级配连续、可调控，0.15-0.6mm细砂占比大幅提升，2.36~4.75mm粗砂占比下降，符合美国标准ASTM C33、中国标准JGJ52二区和印度标准IS 383二区等行业标准的限制。

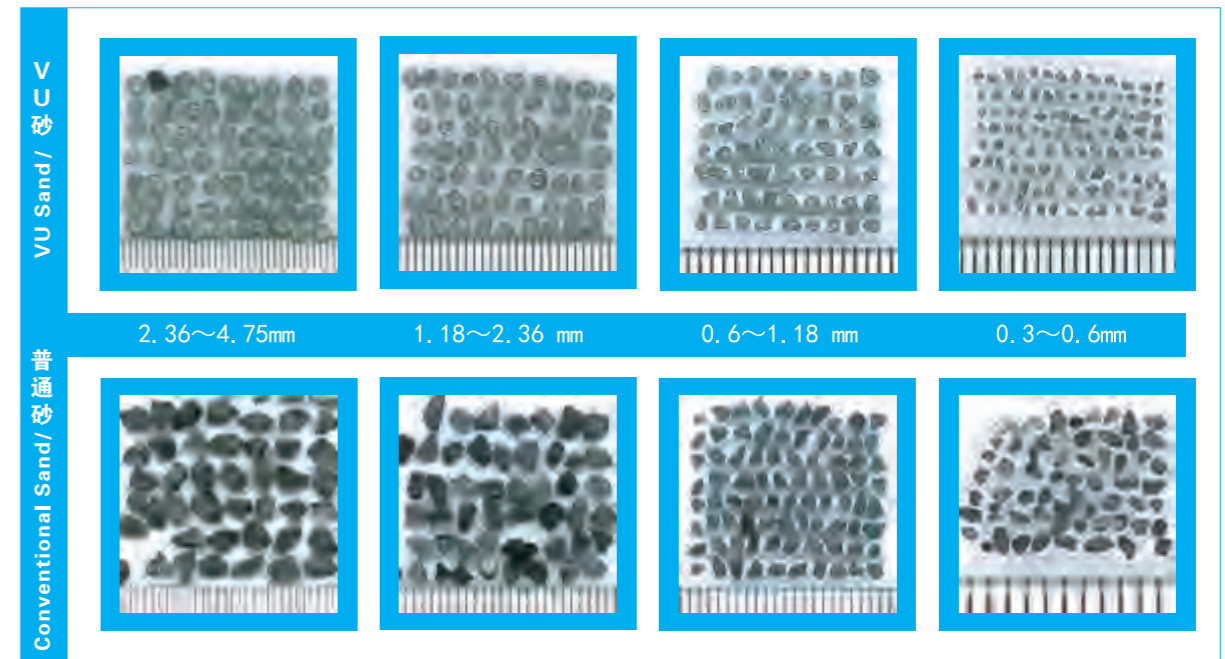
Interaction of crushing and grinding with flexible design of screening makes the gradation of manufactured sand continuous and controllable, with ratio of fine sand (0.15- 0.6 mm) increased greatly and that of coarse sand (2.36 - 4.75 mm) decreased, complying with the US standard ASTM C33, the Chinese standard JGJ52 (grading zone II) and the Indian standard IS 383 (grading zone II).



粒型圆润 Smooth and Round Particle Shape

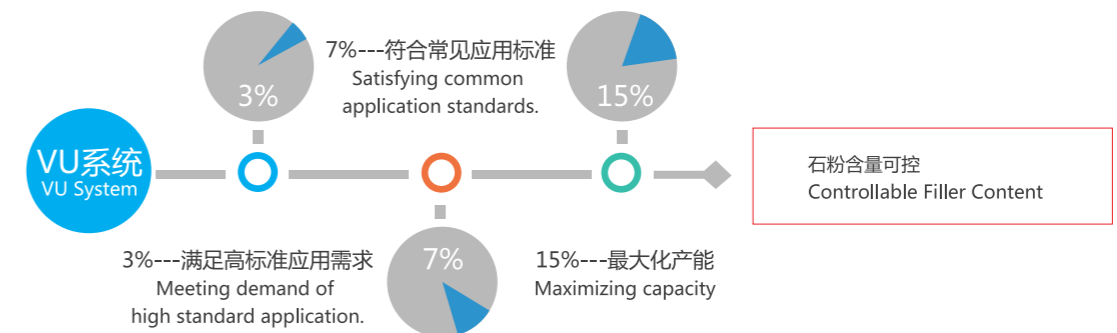
- ◆ 完全独创的研磨技术和瀑落整型技术，使成品砂粒型以高方形度和球形度为主，表面棱角、毛刺最大程度地减少，明显降低了表面积和空隙率，提高了流动性。

- ◆ Innovative grinding and cascade self-grinding shaping technology allows manufactured sand mainly in perfect cubic or spherical shape, minimizing the sharp edges, angles and burrs on the surface, clearly reducing the surface area and porosity ratio and enhancing flowability.



含粉可控 Controllable Filler Content

- ◆ 干法除粉技术，可使成品砂中的含粉量（0-0.15mm）保持稳定，并在3~15%间可调控。
Thanks to the use of the dry-process powder-separating technology, the filler (0 to 0.15mm in size) content in the manufactured sand is stable and controllable within the range of 3% to 15%.
- ◆ 干法分离的石粉，干燥、洁净，便于统一回收和综合利用。
Filler obtained from dry-process separation is dry and clean, facilitating collection and utilization.



04

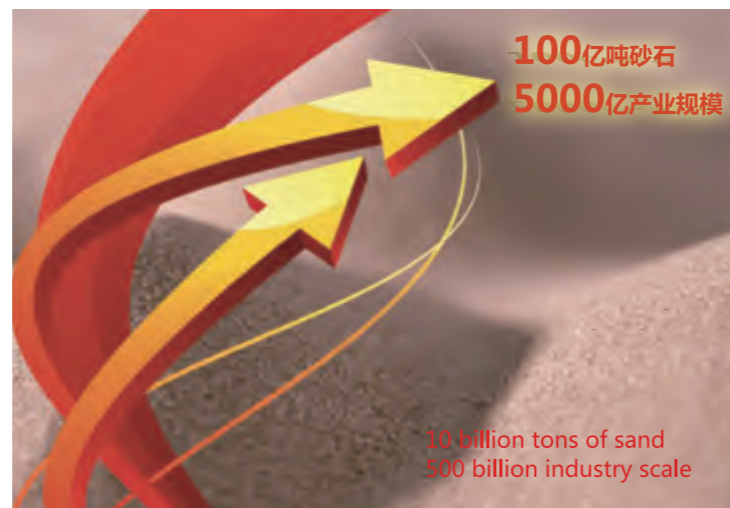
高投资回报，VU系统提升企业综合竞争力

High Return on Investment --- VU System Enhances Comprehensive Competitiveness of Enterprise

需求大 Increasing Demand

- ◆ 砂石是基本的建材原料，用量大，以中国为例，砂石年产量超过100亿吨，产业规模在5000亿元以上。

Sand and stone are the basic construction materials used in large quantities. In China, the annual output of sand and stone exceeds 10 billion ton, and the sand and stone industry is more than RMB 500 billion in scale.



- ◆ 受限于分布、总量和品质等因素，天然砂难以满足全部使用需求，而传统机制砂性能指标不合格。
Due to the restrictions in respect of geological distribution, amount and quality, natural sand is unable to fully meet the construction requirements. The manufactured sand from conventional system also fails to meet the performance requirements.
- ◆ VU砂符合混凝土和砂浆用砂标准，可满足市场对优质砂的巨大需求。
The sand manufactured with VU system complies with the standard of sand for concrete and mortar. It is able to satisfy the increasing demand for quality sand on the market.



收益高 Considerable Benefit

- ◆ VU系统可把廉价易得的“石屑”、“瓜子石”等原料加工成高价值的优质砂，以中国为例，加工毛利可达30~50元/吨。
- ◆ 以VU砂配制混凝土，在同等性能指标下可明显节约水泥用量，以中国C30混凝土标准为例，配比成本可降低5~10元/方。
- ◆ 干燥洁净的石粉可作为沥青混合料、混凝土掺料、电厂钢厂脱硫吸收剂、煤矿防爆材料等，创造额外的附加值。

- ◆ The VU system is capable of converting the cheap and readily available chip stone and peastone into quality sand of high value. In China, the gross profit of such quality sand is at the rate of RMB30 to 50 per ton.
- ◆ The use of VU system manufactured sand in concrete preparation means the substantial saving of cement without degrading the performance of concrete. For example, such sand can cut the cost of Chinese C30 concrete preparation by RMB5 to 10 per cubic meter.
- ◆ The dry and clean filler can be used as mixture in asphalt, admixture in concrete, desulfurization absorber in power plants and steel plants, or explosion-proof material in coal mines. This indicates its additional value.

成本低 Low Investment Cost

- ◆ 高效率的系统设计，吨电耗降低5~10%，人力成本降低40%以上。
The high-efficiency system is designed to reduce the electricity consumption per ton of sand by 5% to 10%, and cut labor cost by more than 40%.
- ◆ 高环保的干法工艺，免去传统湿法工艺中污水淤泥处理的麻烦和巨大投入。
The dry-process technique gives full consideration to environmental protection. It creates no waste water or sludge, unlike the conventional wet-process technique, hence saves a lot of cost.
- ◆ 全自主研发的核心技术，系统性能达到国际先进水平，与同类产品相比一次性投资节省30%以上。
The independently-developed core technology brings the VU system performance to the internationally-advanced level. The VU system is capable of cutting the initial investment by more than 30% compared to any competitor systems.

Perfect Dry-process Sand-making Technique

VU系统，浑然天成的干法制砂工艺

VU系统工艺流程
Technique Process of VU System

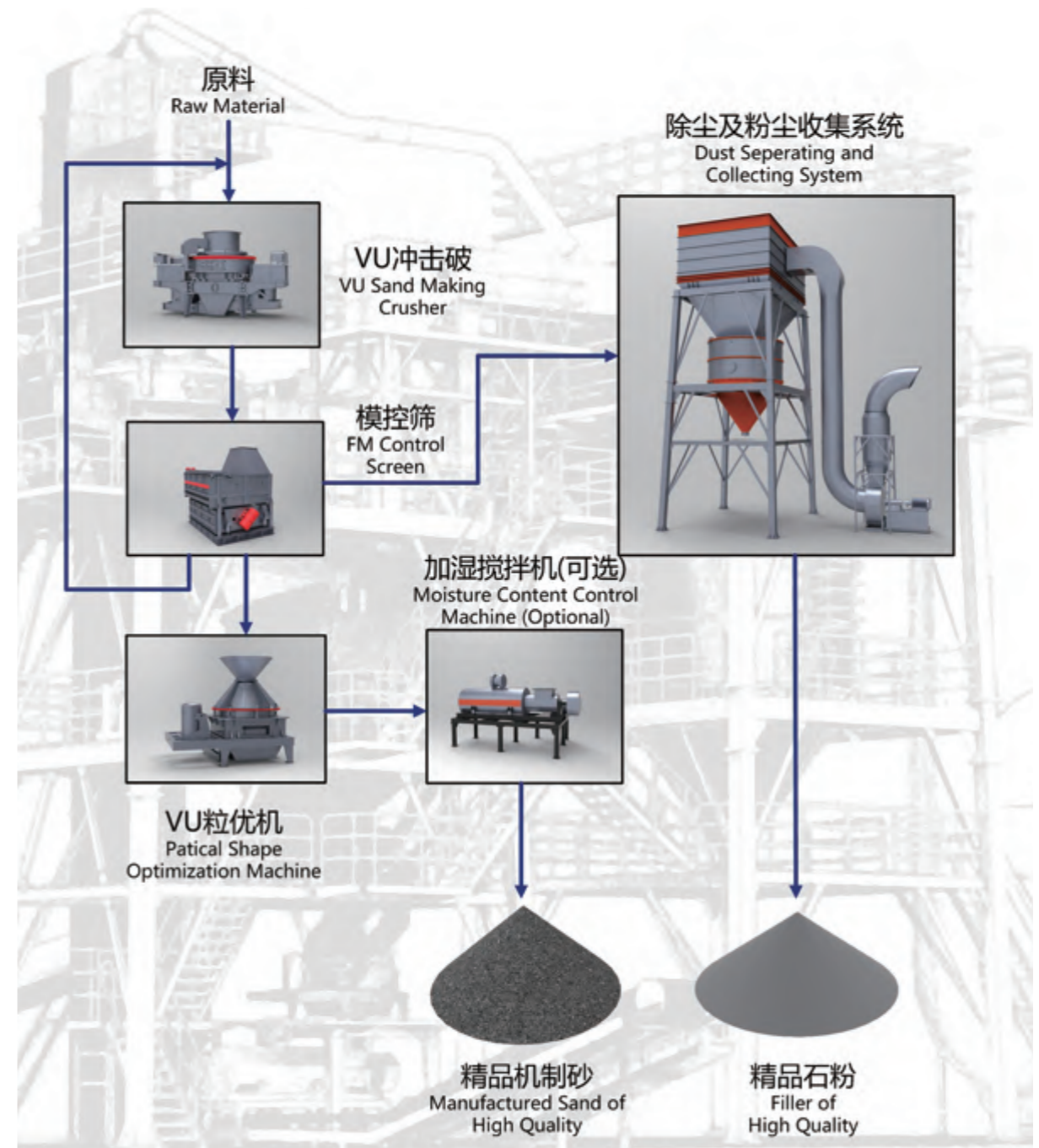


VU系统以最合理的干法工艺，最大程度再现天然砂形成过程中的自然破碎、侵蚀摩擦、自然洗选等作用，使成品砂性能大幅提升。

Using the most reasonable dry-process technique, the VU system maximizes the reproduction of natural crushing, erosion, friction, washing and separation of natural sand. The result is the considerable improvement in the performance of manufactured sand.

-15mm的原料（可以是石屑、瓜子石等廉价易得的原料）经过VU系统合理高效的处理后，产出级配合理、粒型圆润、含粉量可控的成品砂，以及干燥洁净、可进行统一回收利用的高附加值石粉（根据原料决定可应用范围）。

Owing to the reasonable and highly-efficient processing in the VU system, the raw materials less than 15mm in size (for example, the cheap and readily available chip stone and peastone) are converted into the manufactured sand with reasonable gradation, smooth and round particle shape and controllable filler content, as well as the dry and clean filler that is of high added-value and can be collected and utilized (the application of powder depends on the raw material).



Key Technologies

VU系统，六大核心模块

VU冲击破， 高效制砂机的 再度极致提升

VU Sand-making Crusher ---
Vast Improvement from the
High-efficiency Sand-making
Machine



制砂效率高

基于中国第一品牌VSI制砂机，结合首创的高频“石打石”和“物料云”研磨技术，推出新一代VU冲击破，成砂率和细砂产率较VSI冲击破提高10%以上。

成砂粒型好

新型冲击破内全新的研磨和整型作用，可有效消除针片状物料，去除砂粒中尖锐的棱角，使成品砂粒型大幅改善。

High Sand-making Efficiency

The new-generation VU sand-making crusher is developed by referring to the VSI sand-making machine, the most popular brand in China, and creating the high frequency “stone-on-stone” and “material cloud” grinding technology. Its sand formation ratio and fine sand ratio can be increased by more than 10% compared to the VSI sand-making machine.

Ideal Particle Shape

The innovative grinding and shaping of the new-type sand-making crusher can effectively remove the elongated and flaky materials and the sharp edges and angles of sand particles. The outcome is the great improvement in the particle shape of manufactured sand.

VU模控筛， 筛选完美结合 细度模数可控

VU FM Control Screen ---
Perfect Combination of
Screening and Separation
and Control over Fineness
Module



效率高

结合成熟的破碎筛分和磨机选粉的理念，在全封闭、负压除粉、均布筛分等设计的基础上，在一个设备中出色地同时完成了物料筛分和石粉去除的任务，极大提高生产效率，且无扬尘和淤泥处理等传统湿法筛选的问题。

可调可控

通过改变风量和流道，实现在线精确调节，无需更换筛网和部件，且可连续调节，使成品砂细度模数可以随时调节，例如2.5~3.5，而含粉量可在3~15%之间调节。

High Efficiency

The proven philosophy of crushing, screening and separating is employed. The design includes the fully-closed layout, vacuum filler separating, and uniform screening. The material screening and filler separating can be wonderfully completed within the same equipment. This greatly raises production efficiency, and causes no sludge or flying dust, as presented to the conventional wet-process technique.

Accurate Adjustment

The air flow and path can be changed to achieve accurate online adjustment, without replacing any screen or component. In addition, continuous adjustment is available, which enables adjustment at any time to the fineness module of manufactured sand, for example, F.M. 2.5 to 3.5. And the filler content is adjustable within the range of 3% to 15%.

加湿搅拌器（可选）

Moisture Content Control
Machine (Optional)

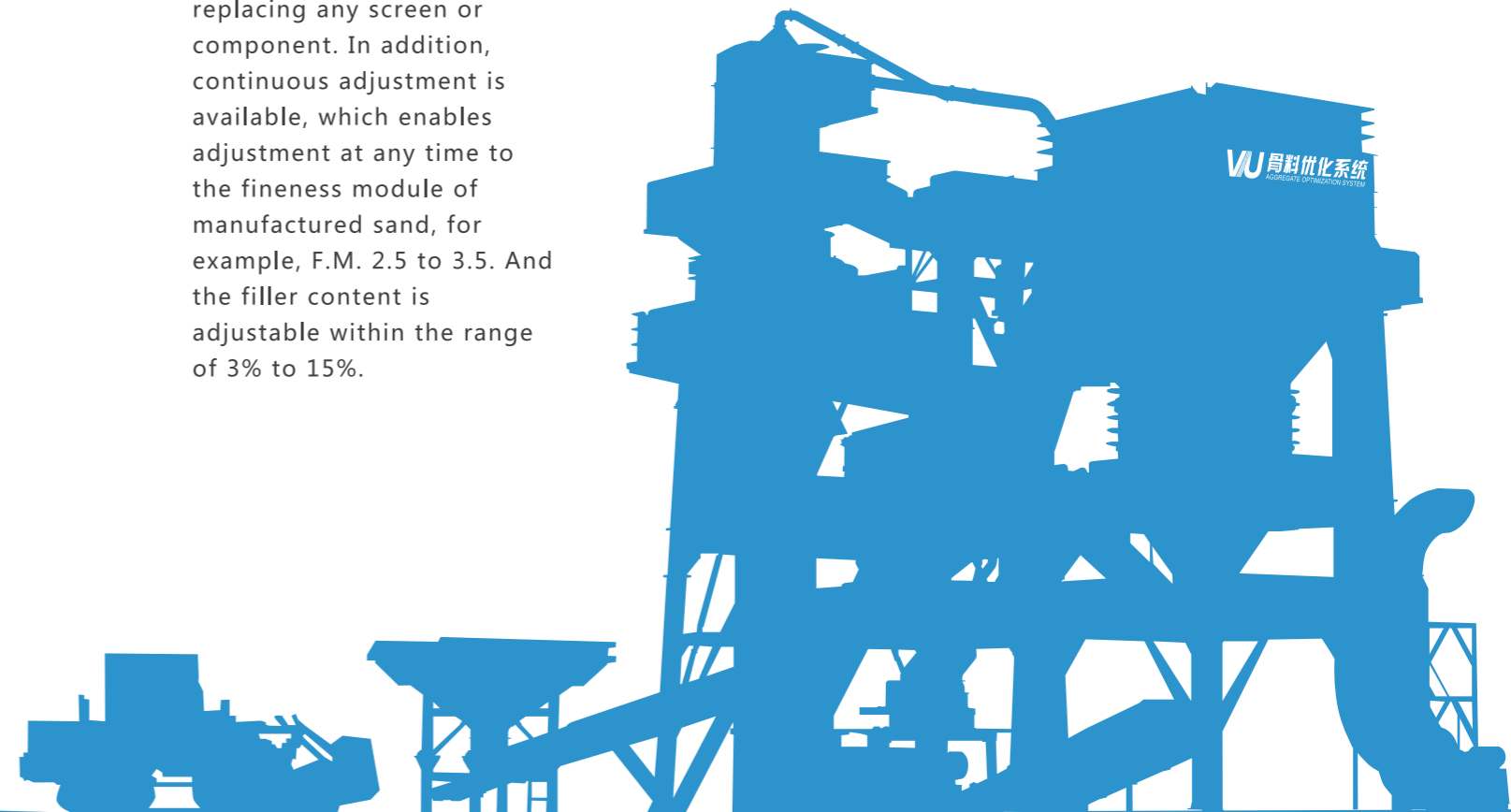


保证稳定优质

自动化的控制设计，保证加水量稳定，使成品砂含水率合格，成分均匀、不易离析。

Ensuring High Quality of Manufactured Sand

The automatic control design ensures stable moisture content. The manufactured sand has compliant water content, and is homogeneous without segregation.



Key Technologies

VU系统，六大核心模块

除尘集粉模块

Dust Separating and Filler Collecting Module



环保

采用负压式除尘器，结合全流程密封操作，包括从粉矿仓到粉罐车的输送过程，保证现场无扬尘，环保指标达到国家标准。

智能

粉矿仓采用自动监测和卸料设计，使粉料储存和转运过程仅需一个按钮即可完成，极大降低了工人劳动强度和运营成本。

Environmental Protection

The vacuum dust collector is used. All the procedures, from storage in filler hopper to conveyance by the tank truck, are conducted in closed manner. This ensures no flying on the site, and compliance with the national environmental protection standard.

Smart Design

The design of automatic monitoring and discharge of filler hopper enables the filler storage and transfer to be operated with just a button. This greatly reduces the labor intensity and operation cost.

VU粒优机，世界首创的高效粒型优化技术

VU Particle Shape Optimization Machine – Internationally Innovative High-efficiency Particle Shape Optimization Technology



成本低

全新的、针对性的破碎整形技术，使粒优机功耗低，易损件寿命长，运营成本低。

粒型优化

效法天然砂形成工艺，采用世界范围内首创的“低能量破碎整形技术”和“瀑落自磨刷技术”，有效地去除准成品砂表面的毛刺和残余棱角，且可增加-0.6mm细料，实现级配和粒型的再次优化，空隙率降低1%-2%，流动时间降低5%。

Low Cost

The use of up-to-date highly-relevant crushing shaping technology results in the reduction to power consumption, extension to life of wear parts and reduction to operation cost.

Particle Shape Optimization

The technology of low-energy crushing shaping and “cascade self-grinding shaping” is firstly used in the world, which is imitation of shaping process of natural sand. It is popular for effectively eliminating sharp edges, angles and burrs from the surface of quasi-manufactured sand. Moreover, the technology can increase the content of fine materials 0.15 to 0.06 mm in size, re-optimizing gradation and particle shape, lowering porosity ratio by 1% to 2%, and enhancing flowability by 5%.

中央控制系统

Central Control System



稳定便利

所有设备的控制和检测集成到中央控制系统中，极大简化了操作控制的流程，保证安全、连续、稳定生产。

效率高

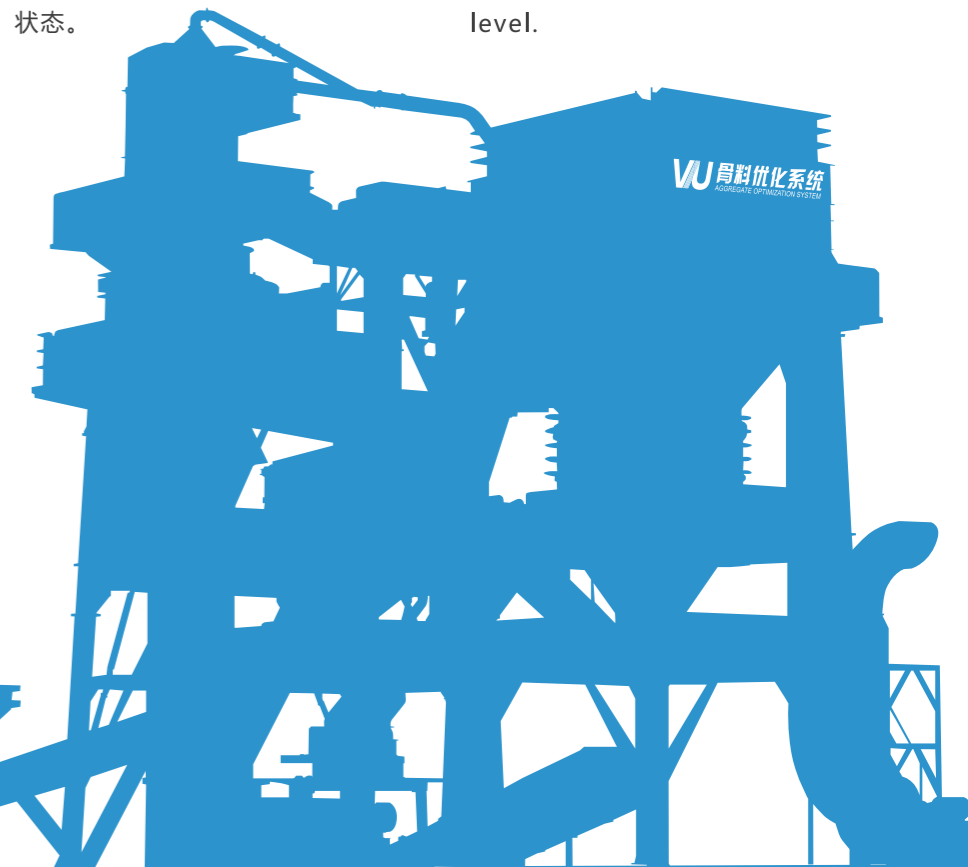
可快速设置并保持最优运行参数，使产品质量稳定，实现生产能力最大化，使系统整体效率保持在最高状态。

High Stability and Convenience

All items of equipment are controlled and tested through the central control system. This greatly simplifies the control and testing operation and safety, continuousness and stability production can be ensured.

High Efficiency

Rapid setting of optimum operation parameters is possible. The product quality is stable. The production capacity is maximized. The overall efficiency of the system is maintained at the highest level.



Technical Parameters

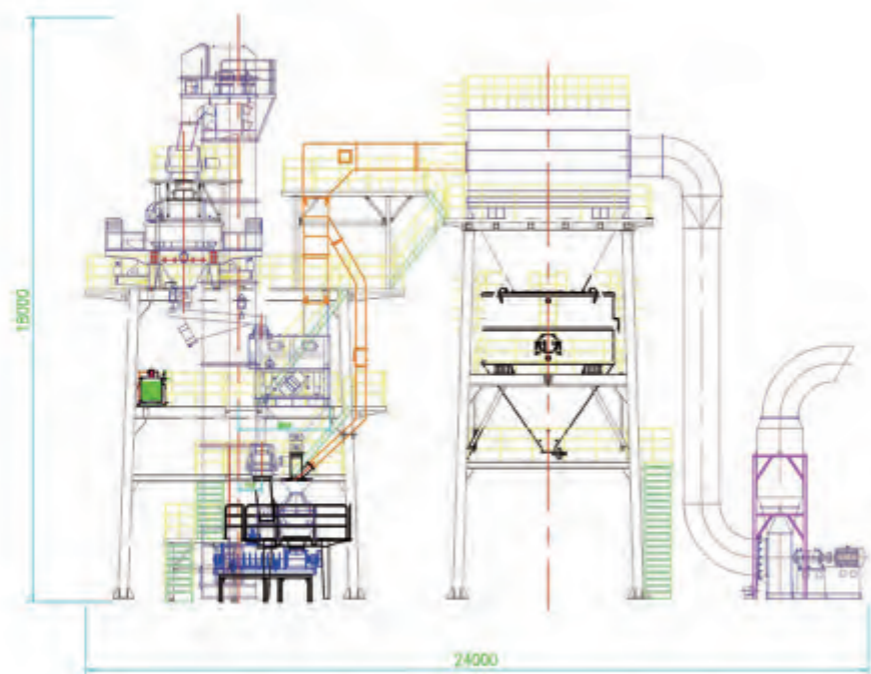
技术参数

VU系统是最先进的干法制砂系统，可作为独立生产线或与其他破碎模块配合，专门解决优质机制砂的生产问题。有关不同物料和生产线配置方案，请咨询世邦机器技术工程师。

VU system, one of the most advanced dry-process sand-making system, can work as an independent production line or cooperate with other crushing modules, specializing in providing high quality manufactured sand. About different materials and solutions, please consult the technical engineers of SBM.

系统布置图 | Layout of VU

VU-70布置图 | VU-70 Lay-out



VU-70	长 L	24000 mm
	宽 W	7500 mm
	高 H	18000 mm

性能参数 | Specifications:

参数名称 Parameter	型号 Model	
	VU-70	VU-120
入料粒径 Size of Raw Material (mm)	0-15	0-15
原料投入量 Feed Rate of Raw Material (t/h)	65-70	110-120
机制砂产量 Output of Manufactured Sand (t/h)	60-65	100-110
石粉含量 (可调) Filler Content (Adjustable)	3-15%	3-15%
装机功率 Installed Power (kw)	450	830
VU型冲击破 VU Sand-making Crusher		
模控筛 FM Control Screen		
除尘器 Dust Collector		
主要设备 Main Equipment	粒优机 Particle Shape Optimization Machine	
	中央控制系统 Central Control System	
	加湿搅拌机 (可选) Moisture Content Control Machine (optional)	
	斗式提升机 Bucket Elevator	
辅助设备 Auxiliary Equipment	皮带机 Belt Conveyor	
	连接管道 Connecting Pipes	
	钢架 Steel Rack	

备注：

该表显示的产量随系统参数和原料性能的改变而改变。

原料含水率在3%以下。

技术参数如有变动，恕不另行通知。

有关特定工况下的系统配置和产量信息，请咨询世邦机器技术工程师。

Note:

The outputs given in the table may vary with the parameters of VU system and the performances of raw material.

The water content of raw material is less than 3%.

No notice will be given should any change is made to the technical parameters.

For the configuration of VU system and the outputs under specific operating conditions, please contact the technology engineering of SBM.



生产现场
Production site



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