

# ENSA

构建未来的固废处置与资源循环系统  
Establish Future Solid Waste Disposal & Recycling System

**PASTE FILLING DREDGING**  
膏体充填 清淤疏浚

**UNDERGROUND WORKS**  
地下工程



**集团公司总部**  
Group Location

北京 | Beijing

**固体废物处置运营公司**

sub. Enterprises for Solid Waste Disposal

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北京恩萨工程技术有限公司  
Beijing ENSA Engineering Co., Ltd.



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旨在构建未来的固废处置与资源循环系统  
Establish Future Solid Waste Disposal & Recycling System



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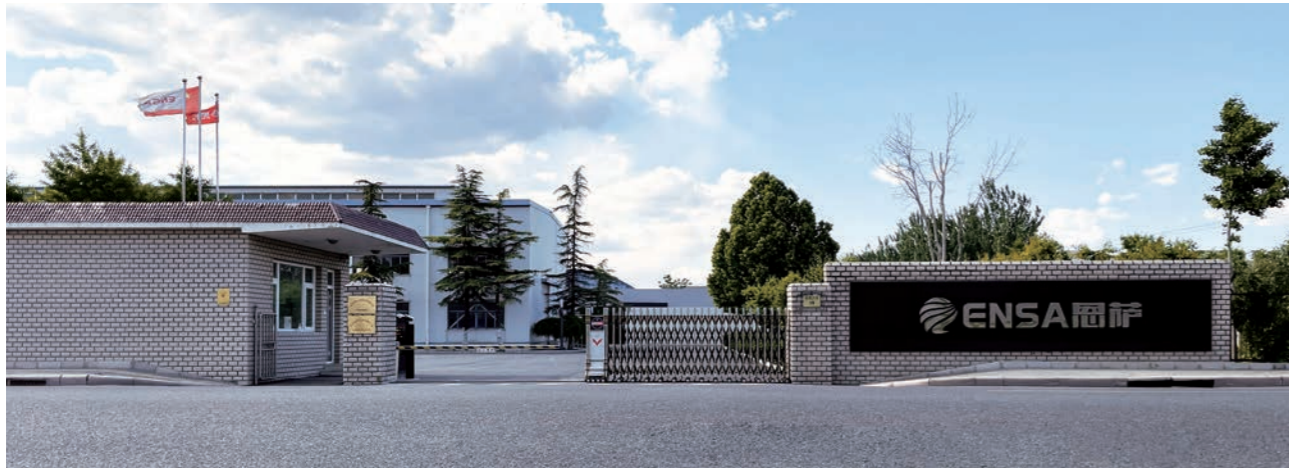
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## 关于恩萨 ABOUT ENSA

北京恩萨工程技术有限公司（以下简称“恩萨”）成立于2009年，聚焦固体废物处置与资源化领域，以核心装备制造为基础，为客户提供先进的整体解决方案，是集工程设计、项目建设和运营服务为一体的生态环境治理综合服务商。

近年来，恩萨已在工业危险废物、污泥、餐厨垃圾、厨余垃圾、陈腐垃圾、飞灰、污染土等不同的细分领域，为国内外近500家客户提供了高可靠性、高性价比的装备系统和整体解决方案，为客户和合作伙伴持续创造价值的同时，对践行绿水青山就是金山银山的生态环境保护大政方针作出积极贡献。

作为国家高新技术企业和北京市专精特新“小巨人”企业，恩萨自2017年至今先后获得金沙江联合资本等国内外知名机构战略投资，并作为北京市环保装备制造重点扶持和培养对象，于2021年底成功入驻北京经济技术开发区。目前，恩萨已拥有数十项自主知识产权，产品通过了ISO9001-2015质量体系认证和欧盟CE认证。

目前，恩萨旗下已拥有9家从事危险废物和飞灰无害化处置的项目公司，已规划总处置能力近200万吨/年。

恩萨以“知行合一、利他主义、创造价值”为价值观，以“固废安全处置、资源高效循环”为使命，与客户和合作伙伴共同努力，旨在构建未来的固废处置与资源循环系统。

Beijing ENSA engineering technology co., Ltd. (Hereinafter referred to as "ENSA") was established in 2009, focusing on the field of solid waste disposal and recycling, based on the R&D and manufacturing of core equipment, to provide customers with advanced overall solutions. , Project construction and operation services as one of the integrated ecological environment management service provider.

In recent years, ENSA has provided highly reliable and cost-effective products for nearly 500 customers at home and abroad in different segments such as industrial hazardous waste, sludge, restaurant waste, kitchen waste, stale waste, fly ash, contaminated soil etc. Equipment systems and overall solutions, while continuing to create value for customers and partners, make positive contributions to the implementation of the ecological environmental protection policy of "lucid waters and lush mountains are invaluable assets".

As a national high-tech enterprise and a "little giant" enterprise specializing in specialization and new in Beijing, ENSA has successively obtained strategic investment from well-known domestic and foreign institutions such as Jinshajiang United Capital since 2017, and has become a key support and training object for Beijing's environmental protection equipment manufacturing industry. , And successfully settled in Beijing economic and technological development zone by the end of 2021. At present, ENSA has dozens of independent intellectual property rights, and its products have passed ISO9001-2015 quality system certification and EU CE certification.

At present, ENSA has 9 project companies engaged in the harmless disposal of hazardous waste and fly ash, with a planned total disposal capacity of nearly 2 million tons per year.

With the values of "unity of knowledge and action, altruism, and value creation" and the mission of "safe disposal of solid waste and efficient recycling of resources", ENSA works with customers and partners to establish future solid waste disposal & recycling system.



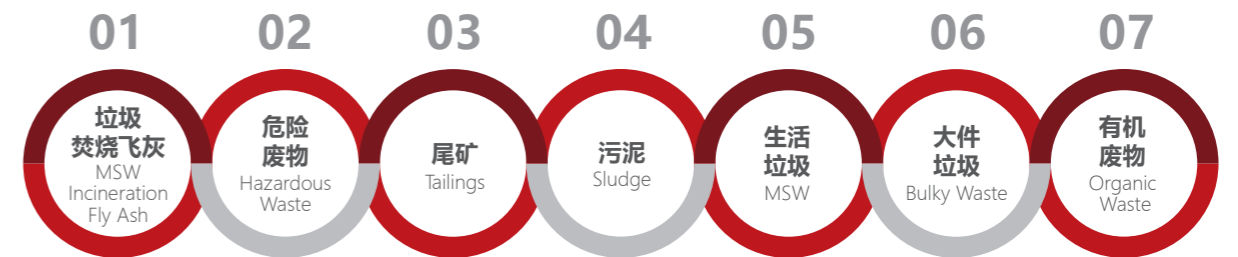
- 丰富经验**  
Professional Experience
- 实力团队**  
Solid Team
- 先进技术**  
Advanced Technology
- 服务至上**  
Service & Reputations

### 3 大板块 3 Major Sections



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针对不同种类的固体废物，恩萨可为客户提供技术先进的高可靠性和高性价比的**预处理系统和整体解决方案**  
For different types of solid wastes, ENSA can provide customers with advanced, highly reliable and cost-effective pretreatment systems and overall solutions



### 不同预处理环节 Different Pretreatment Steps



### HONORS / 企业荣誉



# ENSA

## 膏体充填与地表堆存技术

Paste Backfill & Surface Displacement

### 恩萨 PB/SD 尾矿膏体充填与地表堆存技术

ENSA PB/SD Tailings Paste Backfill & Surface Displacement Technology

#### 优势特点 / Features

- 有效避免地表塌陷，利于三下开采，提升资源开采效率。  
Effectively avoid surface subsidence, conducive to three-shot mining, and improving the efficiency of resource mining.
- 因地制宜，充填材料选择灵活。  
According to local conditions, the choice of filling material is flexible.
- 优化的整体解决方案，高可靠性、长距离、高压、高浓度管道输送，实现更低的运营成本。  
Optimized solutions, high reliability, long distance, high pressure, high concentration pipeline transportation to achieve lower operating costs.
- 实现对尾矿的安全环保处置，杜绝尾矿库溃坝风险，延长尾矿库使用年限。  
Realize safe & environmentally friendly disposal of tailings, eliminate risk of dam failure of tailings ponds, extend service life of tailings ponds.

#### 应用领域 / Application

- 金属矿山全尾砂膏体充填及地表干堆  
Full tailings paste backfill & surface dry stacking of metal mines
- 煤矿煤矸石膏体充填  
Coal mine gangue paste backfill



### 充填开采法 - 保障矿山开采安全

Filling Mining Method - Ensure the Safety of Mining

充填采矿法又被称作充填开采技术，充填采矿法适用于开采围岩不稳固的高品位、稀缺、贵重矿石的矿体；适用于地表不允许陷落，开采条件复杂，如水体、铁路干线、主要建筑物下面（例如：煤矿“三下”压煤）的矿体和具有自燃火灾危险的矿体等；也是深部开采时控制地压的有效措施。

**方式：**在矿房或矿块中，随着回采工作面的推进，向采空区送入充填材料，以进行地压管理、控制围岩崩落和地表移动，并在形成的充填体上或在其保护下进行回采。

The backfill mining method is also known as the backfill mining technology. The backfill mining method is suitable for mining high-grade, scarce & valuable ore bodies with unstable surrounding rocks; The ore bodies under the main buildings (for example: "three lower" coal pressing in coal mines) & the ore bodies with the risk of spontaneous combustion, etc.; it is also an effective measure to control the ground pressure during deep mining.

**Method:** In the mine room or ore block, with the advancement of the mining face, the filling material is sent to the goaf to manage the ground pressure & control the surrounding rock collapse. Falls & moves on the surface & is recovered on or under the protection of the formed infill.

**优点：**适应性强，矿石回采率高，贫化率低，作业较安全，能利用工业废料，保护地表等。

**Advantages:** strong adaptability, high ore recovery rate, low dilution rate, safer operation, industrial waste recycling, the surface protection, etc.

对于煤矿充填开采，充填物料的组成包括破碎后的煤矸石、粉煤灰、用户在当地容易获得的其他骨料，以及少量水泥。从物料配比试验开始，恩萨为您提供全套解决方案，帮助用户以更低的运行成本实现卓越的膏体充填和地表堆存。

For backfill mining of coal mines, the composition of backfill materials includes crushed coal gangue, fly ash, other aggregates that are readily available locally by users, and a small amount of cement. Beginning with material ratio testing, ENSA provides you with a complete solution to help users achieve excellent tailings paste backfill & surface storage at lower operating costs.



井下施工

EPP/EPS 泵可用于井下混凝土施工，例如：底板铺设、沿空留巷、巷旁支护等。

EPP/EPS pump can also be used for underground concrete construction, such as floor laying, gob side entry retaining, roadway side support, etc.

### 膏体充填泵送系统

Paste Filling Pumping System

#### 产品特点 / Features

- 适用高浓度料浆的超长距离输送（含固率可达 80%）  
Suitable for Extra-long Distance Transportation of High Consistency Slurry (up to 80% solid content)
- 适应苛刻的工作环境 Sutable for Tough Applications
- 超强物料适应能力 Super Material Adaptability
- 输送压力可达 150bar Output Pressure up to 150bar
- 处理量可达 400m<sup>3</sup>/h Pumping Capacity up to 400m<sup>3</sup>/h
- 安全可靠 Safe & Reliable Operation
- 恩萨 ECP 系统可实现连续流 ECP System Realize Continuous Flow
- 使用寿命长 Long Lifetime



EPP 双活塞泵 EPP Double Piston Pump (‘s’ 摆管技术) (“S-swing Tube” Technology)



EPS 双活塞泵 EPS Double Piston Pump (提升阀 / 锥阀技术) (Poppet Valve Technology)

### 混合搅拌系统

Mixing & Stirring System

混合搅拌是膏体制备工艺的核心，通过搅拌使物料混合均匀，实现流态化，为管道输送提供条件。

**特点：**适用性强、膏体制备质量稳定，连续性运行。

Mixing & stirring is the core of the paste preparation process. Through stirring, the materials are mixed evenly, fluidization is realized, & conditions are provided for pipeline transportation.

**Features:** strong applicability, stable quality of paste preparation, continuous operation.



EM 单轴卧式搅拌器  
EM Single Shaft Horizontal Mixer

# ENSA

## DBS 清淤疏浚与黑臭水体底泥治理

DBS Integrate Solution For Dredging & Bottom Sludge from Municipal Black & Malodour Water Body

恩萨 DBS 系统用于黑臭水体以及河道、港口、湖泊等清淤疏浚领域的固体废弃物处理和处置。

The ENSA DBS system is applied for solid wastes disposal in the fields of black & malodour water bodies, river channels, ports, lakes & other dredging areas.

恩萨为客户提供高性价比和高效、高可靠性的装备和整体解决方案。整体解决方案包含底泥暂存、远距离输送、混合调质、深度脱水、最终处置等环节。

ENSA provides customers with cost-effective, efficient & reliable equipment & solutions. Solutions include bottom sludge, temporary storage, long-distance transportation, mixed conditioning, deep dehydration, final disposal & other links.



1

### 底泥预处理单元

Bottom Sludge Pretreatment Unit

抓斗抓取淤泥，将淤泥直接卸入设置于清淤船上的接收料斗入口处，经恩萨预处理单元筛分处理后，大块杂物（垃圾、石块等）被清除，仍然含有较多杂物的淤泥在预处理单元实现均质和临时储存。

The grab grabs the sludge & directly discharges it into the inlet of the receiving hopper set on the dredger. After screening & processing by the ENSA pretreatment unit, large pieces of debris (garbage, stones, etc.) are removed. The bottom sludge still containing more debris is homogenized & temporarily stored in the pretreatment unit.



2

### 高浓度、远距离底泥泵送单元

High Concentration & Long Distance Bottom Sludge Pumping Unit

对于水域开阔、水位较深的黑臭水体，断水排干难以实施，水上作业成为唯一途径，开挖后的淤泥通过挖泥船上的大功率污泥泵吸入并进入输泥管道，经全封闭管道输送至指定卸泥区。

For the black & malodour water body with open water area & deep water level, it is difficult to implement water cutoff & drainage, & water operation becomes the only way. The excavated sludge is sucked in by the high-power sludge pump on the dredger & enters the sludge pipeline, & is transported to the designated sludge unloading area through a fully enclosed pipeline.



### 性能特点 / Features

- 可适应含固率高达 85% 的清淤疏浚淤泥与黑臭水体底泥的输送需求  
It can adapt to the transportation demand of dredging sludge with a solid content up to 85% & the bottom sludge in black & malodour water bodies
- 具有极强的杂物适应能力，杂物粒径最大可达 150mm  
It has strong adaptability to sundries, & the maximum particle size of sundries can reach 150mm
- 有效输出压力可达 150bar，最远输送距离可达 20km  
The effective output pressure can reach 150bar, & the maximum transmission distance can reach 20km
- 排量大，可达 400m<sup>3</sup>/h  
Large discharge capacity, up to 400m<sup>3</sup>/h
- 优越的抗磨蚀性，使用寿命长  
Superior abrasion resistance & long service life
- 泵体结构设计科学，振动小  
The pump body structure is designed scientifically with low vibration
- 密封性能优异，无泄漏  
Excellent sealing performance, no leakage



EPS 系列双活塞泵  
EPS Double Piston Pump



EPP 系列液压柱塞泵  
EPP Series Hydraulic Piston Pump

恩萨致力于提供更具性价比的高浓度、远距离底泥泵送单元解决方案，为客户创造更大价值！

ENSA is committed to providing more cost-effective solutions for high concentration & long-distance bottom sludge pumping units, creating greater value for customers!

3

### 底泥脱水单元

Bottom Sludge Dewatering Unit



土工管袋脱水  
Dewatering of Geotextile Bag



板框压滤脱水  
Plate & Frame Filter Press Dehydration



叠螺式脱水  
Cascade Dehydration



离心脱水  
Centrifugal Dewatering

4

### 储存、缓存单元

Storage & Buffer Unit

模块化设计的储存 / 缓存料仓，配备液压破拱滑架、自清洁卸料螺旋等便于卸料的装置，确保 100% 完成卸料任务。

The storage / buffer silo with modular design is equipped with hydraulic arch breaking carriage, self-cleaning discharge screw & other devices to facilitate unloading, so as to ensure 100% completion of unloading tasks.



应用于不同含固率淤泥或底泥的储存 / 缓存

Used for storage / buffering of sludge with different solid content or bottom sludge

# ENSA

## 地下工程 Underground Engineering



### EPP-TS 隧道排泥泵

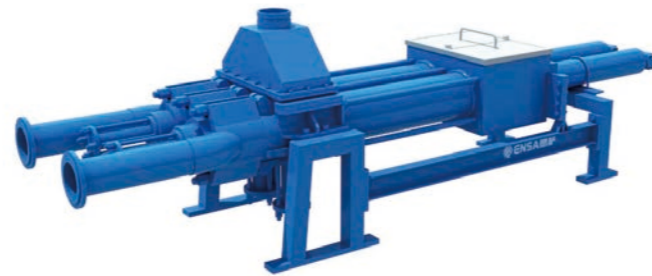
EPP-TS Tunnel Sludge Pump

盾构机在掘进过程中，开挖仓内的渣土与泥浆混合物，通过EPP-TS 柱塞泵输送到隧道外的泥水分离站，经分离后水重复使用。

During the shield tunneling, the muck & mud mixture in the excavation silo is transported to the mud water separation station outside the tunnel through EPP-TS pump, the water is recycled after separation.

#### 优势特点 / Features

- 效率高，节省空间，稳定性高，使用寿命长  
High Efficiency, Space Saving, High Stability, Long Lifetime



### EPS 隧道注浆泵

EPS Tunnel Grouting Pump

盾构机在掘进过程中，管片与洞体之间出现的空隙需要及时注浆充填，防止地层变形，且形成有效防水层，也有利用于盾构机方向控制。

During the shield tunneling, the gap between segment & tunnel body needs to be filled with grouting in time to prevent formation deformation and form an effective waterproof layer, and also beneficial for the direction control of the shield machine.

#### 优势特点 / Features

- 全液压控制，节省空间 Full Hydraulic Control, Space Saving
- ECP 系统可实现连续流 ECP system Realize Continuous Flow
- 高效、稳定、可靠 Efficient, Stable and Reliable
- 使用寿命长 Long Lifetime

## 出口德国 - 盾构机排泥泵项目

Export To Germany - Shield Machine Sludge Pump Project

处置能力 50m<sup>3</sup>/h，将盾构机开挖仓内的渣土与泥浆混合物通过 EPP-TS 柱塞泵输送到隧道外的泥水分离站。



The disposal capacity is 50m<sup>3</sup>/h, & the muck & mud mixture in the excavation silo of the shield machine is transported to the mud water separation station outside the tunnel through the EPP-TS plunger pump.

# ENSA

## 海上钻井平台 Offshore



恩萨料仓与泵送系列为海上钻井平台岩屑处理、钻井泥浆循环提供高可靠性整体解决方案。目前已成功应用于中石油海上钻井平台（南海、渤海项目）。

ENSA silo & pumping series provide high availability overall solutions for cuttings treatment & drilling mud circulation of offshore drilling platforms. At present, it has been successfully applied to CNPC offshore drilling platforms (South China Sea & Bohai Sea projects).

## 南海、黄海海上钻井平台油泥输送项目

Oil Sludge Transportation Project Of Offshore Drilling Platform In South China Sea & Yellow Sea

处置能力 1-5m<sup>3</sup>/h，海上钻井平台油基岩屑的输送。

Disposal capacity 1-5m<sup>3</sup>/h. Transportation of oil-based cuttings from offshore drilling platforms.

