

# ENSA

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

## 恩萨替代燃料制备方案 RDF/SRF

STALE REFUSE

陈腐垃圾

MSW

生活垃圾

BULKYWASTE

大件垃圾

OTHER SOLID WASTE

其他固废



### 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

百色·广西 | Baise-Guangxi  
贺州·广西 | Hezhou-Guangxi  
永安·福建 | Yong'an-Fujian  
曲靖·云南 | Qujing-Yunnan  
唐山·河北 | Tangshan-Hebei

### 装备制造子公司

sub. Enterprise for Manufacturing

重庆 | Chongqing  
北京·亦庄 | Beijing · Etown

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北京恩萨信息技术有限公司  
Beijing ENSA Engineering Co., Ltd.

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知行合一  
Integrating Knowledge & Action  
利他主义  
Benefiting Others  
创造价值  
Creating Values

## 使命 Mission

固废安全处置 资源高效循环  
Solid Waste Safe Disposal & Recycling  
Efficiently

## 愿景 Vision

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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## 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业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



## 7 大业务领域 7 Business Areas

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



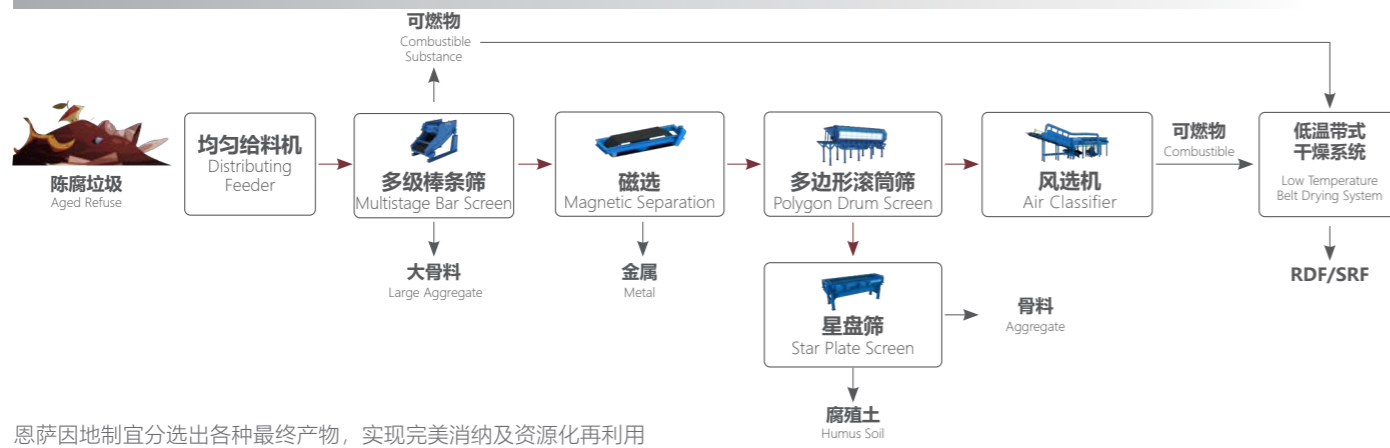
# 01

陈腐垃圾

## 陈腐垃圾 Stale Refuse



### 工艺流程 | Process



恩萨因地制宜分选出各种最终产物，实现完美消纳及资源化再利用  
ENSA sorted out various final products according to local conditions to achieve perfect consumption and resource recycling



- 金属回收利用**  
Metal Recycling
- 骨料回填或水泥窑协同处置**  
Aggregate Backfill or Cement kiln co-disposal
- 可燃物 RDF**  
Combustible RDF
- 腐殖土 园林绿化**  
Humus Landscaping

### 针对陈腐垃圾筛分难点恩萨处置系统的优势

ENSA Disposal System Advantages for the Difficult Problem of Stale Refuse Screening

- 布局紧凑合理，有效减少占地面积和投资  
Compact and reasonable layout, effectively reduce the footprint and investment
- 实现自动化、模块化、智能化设计  
Realize serialization, modularization, intelligent design
- 处置效率高，适应性强，使用范围广  
High disposal efficiency, strong adaptability, wide range of use
- 结合优良的现场运营管理，大幅提升处置量，单条处置线处置量可达 3000m<sup>3</sup>/d  
Combined with excellent on-site operation management, disposal capacity is greatly increased, disposal capacity of a single disposal line can reach 3000m<sup>3</sup>/d



### 低温带式干燥系统

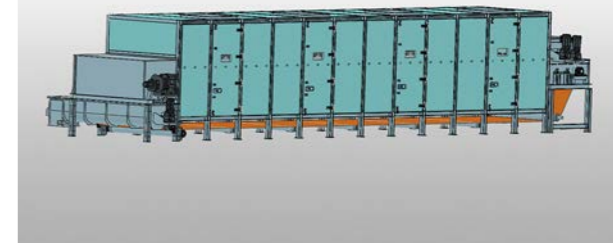
Low temperature belt drying system

#### 产品特点 / Features

- 利用高速热风带走物料层物料的水分，布料均匀，烘干效果好。  
High speed hot air is used to take away the moisture of the material layer. material well distributed and drying effect is excellent
- 维护成本低。无需后续布袋除尘，烘干带更换成本极低，破损区域可局部修补。  
Low maintenance cost. no need for subsequent bag dedusting. The cost of replacing the drying belt is extremely low, and damaged area can be partially repaired
- 多种热源可利用：滤袋尘器后的热风、电滤尘器后的热风等  
Various heat sources can be used: hot air behind the bag filter, hot air behind the electric dust filter, etc
- 安全可靠，密封好，无粉尘外泄及漏料，无爆炸风险  
Safe & reliable, sealed well, without dust leakage & material leakage, without explosion risk
- 模块化设计可轻松扩容、夹层设计  
Modular design allows easy expansion, modular interlayer design

#### 应用范围 / Application

垃圾衍生燃料、生物质、污泥  
Refuse derived fuel, biomass, sludge



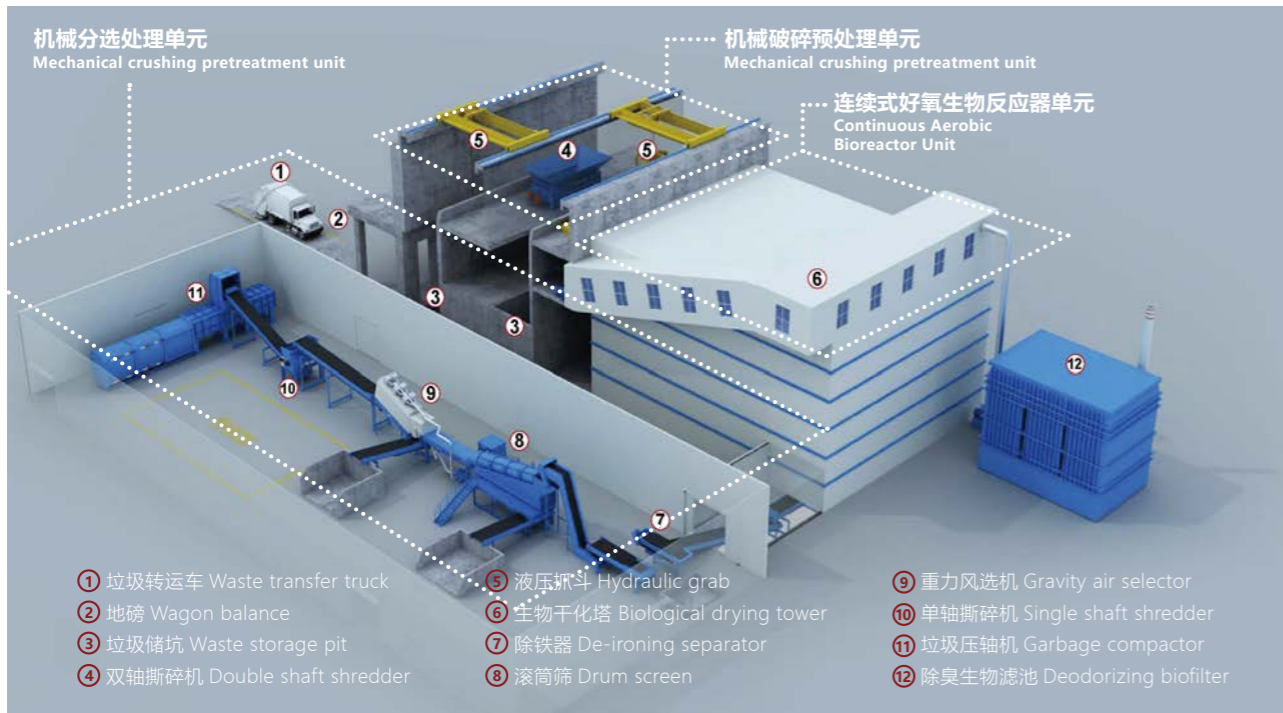
# 02

生活垃圾

## 生活垃圾 MSW

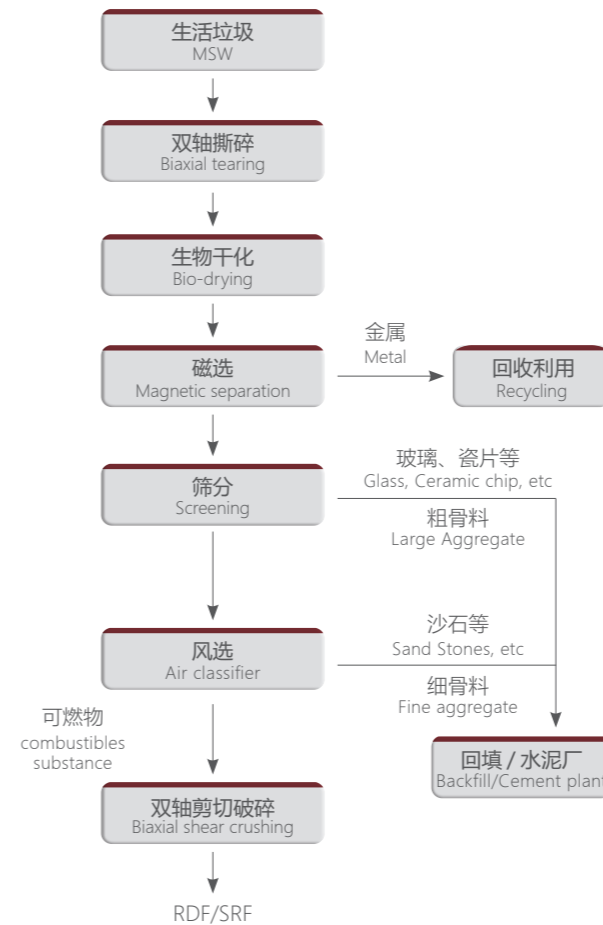
### 大规模智能连续好氧机械生物处理技术 (C-MBT®)

Large Scale Intelligent Continuous Aerobic Mechanical Biological Treatment Technology (C-MBT®)



## 恩萨 C-MBT® 制备 RDF 工艺图

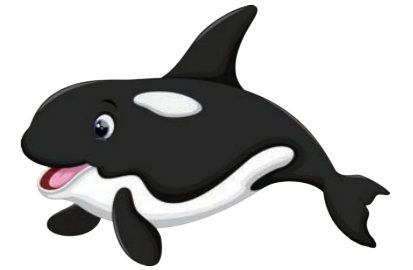
ENSA C-MBT® Process Diagram for Preparing RDF



### 工艺介绍 / Process Introduction

市政生活垃圾经垃圾转运车运送至预处理厂区，经初级破碎、生物干化、磁选、筛分、重力分选、二级破碎等工艺单元，将生活垃圾一方面进行破碎和干化，另一方面分选为金属物、可燃物和惰性物等组分。金属物可以回收再利用，可燃物直接进行焚烧发电或者制作 RDF 作为水泥厂、火电厂、燃煤锅炉等的替代燃料，惰性物料作为水泥生产的生料辅料利用或垃圾填埋场填埋处理。

Municipal domestic waste is transported to the pretreatment plant by garbage transfer vehicles, and is crushed and dried on the one hand through process units such as weighing, primary crushing, biological drying, magnetic separation, screening, and gravity separation. RDF is produced as an alternative fuel for cement plants, thermal power plants, coal-fired boilers, etc., and inert material are used as raw materials for cement production or landfill disposal.

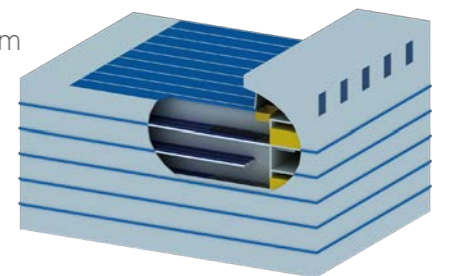


## 核心装备系统 | Products

### 恩萨 OBR 连续式高效好氧生物反应器系统

ENSA OBR Continuous High Efficiency Aerobic Bioreactor System

恩萨在好氧生物发酵技术的基础上研发出连续式高效好氧生物反应器系统 (OBR)，是实现垃圾好氧发酵及好氧干化的核心设备系统。ENSA has developed a continuous and efficient aerobic bioreactor system (OBR) based on aerobic biological fermentation technology, which is the core equipment system for realizing the aerobic fermentation and aerobic drying of materials.



### 应用范围 / Application

- 混合料生活垃圾 Mixed household waste
- 餐厨、厨余垃圾残渣和沼渣 Kitchen, kitchen waste and biogas residue
- 生物质 Biomass
- 脱水污泥、干化半干化污泥 Dehydrated sludge, desiccated sludge and semi-desiccated sludge
- 畜禽粪渣 Livestock and poultry dung slag

### 优势与特点 / Features

- 节省占地、投资 Save land & investment
- 高效、稳定，实现物料连续的自动化移动与翻抛 Efficient & stable, realize continuous automatic movement and turnover of materials
- 可靠性高，生物干化技术提高了垃圾的可机械分选性，为后续生活垃圾的精细化分选提供保障。 High reliability, bio-logical drying technology improves the mechanical sorting ability of garbage and provides a guarantee for the subsequent fine sorting of MSW.

### 工艺特点 Process Feature

#### 系统集成化 System integration

智能化、模块化、自动化、24h 连续进料，无人值守。  
Intelligent, modular and automatic, with 24-hour continuous feeding and unattended

#### 无害化处理 Harmless treatment

生活垃圾经高温干化处理，完成消毒灭菌，水分降至 30% 以下。MSW is subject to high temperature drying treatment, disinfection & sterilization are completed, and moisture content is reduced to less than 30%

#### 占地面积小 Small area

主体设备采用多层回转塔式结构，占地仅为同等规模的常规生物好氧干化设施的 30%。  
Main equipment adopts multi-layer rotary tower structure, floor area is only 30% of the conventional biological aerobic drying facilities of the same scale

#### 无需外供热源、能耗低 Low energy consumption

生物好氧发酵过程中自产热，无需外供热源；物料在仓内自动化移动与翻抛，能耗低，同时除臭系统节能 30% 以上。  
No need for external heat source, low energy consumption, heat is generated by itself in the process of biological aerobic fermentation, materials are automatically moved and dumped in the warehouse, and the deodorization system can save more than 30% energy

#### 密闭设计、无二次污染

The whole process is design, no secondary pollution

#### 处理周期短 Short processing cycle

恩萨优化的生物好氧干化工艺，处理周期由常规的 20 天 缩短至 7~10 天。  
Short processing cycle, ENSA's optimized biological aerobic drying process reduces the treatment period from 20 days to 7-10 days

# 03

大件垃圾

## 大件垃圾 Bulky Waste

针对大件垃圾体积庞大、人工拆解效率低、资源利用水平不高的问题，恩萨研制了大件垃圾资源化自动化处理系统，通过恩萨特制破碎机将大件垃圾破碎成小块物料，再经过磁选、筛分等精细化处置，将其中有回收再利用价值的成分回收，剩余物料送往垃圾焚烧发电厂焚烧或水泥厂、电厂等协同处置。经过这样的分选程序，使床垫、沙发等大件生活垃圾分解并实现资源化。

In response to the above problems, ENSA has developed an automatic processing system. The valuable components are recycled and reused. The remaining materials are sent to waste incineration power plants for incineration or co-processing in cement plants and power plants. After such a sorting process, large household wastes such as mattresses and sofas are decomposed and recycled.

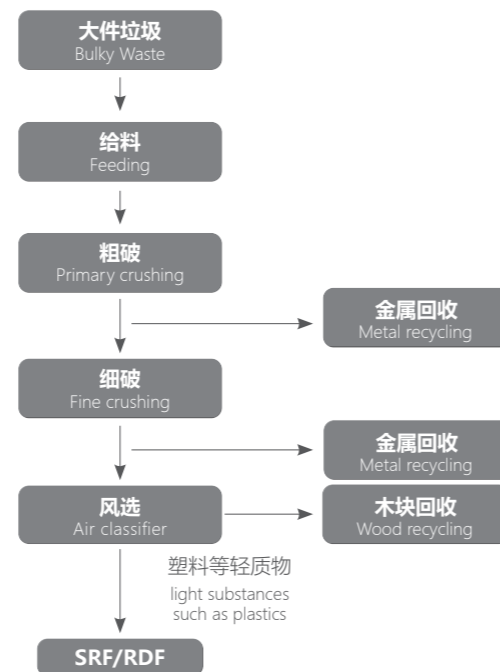
### BWT 大件垃圾处理系统 BWT bulky Waste Disposal System



#### 工艺优势 / Features

- 布置紧凑，有效减少占地和投资  
Compact layout, effectively reducing land occupation and investment
- 自动化程度高，有效降低劳动强度  
High automation, effectively reducing labor intensity
- 撕碎与破碎有效组合，通过反复冲击、剪断、破碎，产物均质，有效分离硬性和柔性物料  
Effective combination of shredding and crushing, through repeated impact, shearing and crushing, the product is homogeneous, and the hard and flexible materials are effectively separated
- 破碎产品精细化程度高，利用价值及燃烧热值高  
High refinement degree of crushed products, high utilization value and high combustion calorific value
- 恩萨 BWT 系统全封闭设计、包含除尘、降噪、消防等  
ENSA BWT system is fully enclosed design, including dust removal, noise reduction, fire protection, etc.
- 标准模块化设计，可根据业主需要及大件特点因地制宜定制解决方案  
Standard modular design, solutions can be customized according to the needs of the owner and the characteristics of large parts

#### 工艺流程 | Process



## 核心装备系统 | Products

### 初级破碎 Primary crushing

#### EST 双轴撕碎机 / 初碎机

EST Double Shaft Shredder / Primary Shredder

双轴撕碎机，即初碎机，液压驱动或电驱，利用刀盘之间的相互剪切、撕裂、挤压等作用对各类固体废弃物进行破碎处理，达到减小尺寸的目的。尤其适用于废旧沙发、床垫、家具等大件垃圾的破碎减容处理。

Dual-shaft shredders, namely primary shredders, hydraulically driven or electrically driven, use the mutual shearing, tearing, squeezing and other effects between the cutter heads to shred all kinds of solid waste to achieve the purpose of reducing size. It is especially suitable for the crushing and volume reduction of waste sofas, mattresses, furniture and other large wastes.

#### 应用范围 / Application

陈腐垃圾 / 生活垃圾 /  
大件垃圾 / 生物质 /  
秸秆 / 园林废物 / 废轮胎



Stale Refuse / MSW / Bulky Waste / Biomass /  
Straw / Garden Waste / Waste Tires

#### 产品特点 / Features

- 撕碎初破，坚固结构  
Primary shredding, Durable Structure
- 高强适应性，安全可靠  
High-strength adaptability, Safe & reliable

### 二级破碎 Secondary crushing

#### ESD 双轴回转剪切破碎机

ESD Double Shaft Rotary Shredder

双轴回转剪切式破碎机，由液压站或者电机提供动力源，利用刀盘之间的相互剪切、撕裂、挤压等作用对各类固体废弃物进行破碎处理，达到减小尺寸的目的，对软硬物料均能达到优质的破碎效果。恩萨提供包括接收料斗、防爆密封舱、液压驱动双轴破碎机、新型防爆输送单元和连续投料单元的全部核心设备，确保实现稳定安全的处理处置。

The double-shaft rotary shearing crusher is powered by a hydraulic station or a motor, and uses the mutual shearing, tearing, and squeezing between the cutter heads to shred all kinds of solid waste, so as to reduce the size of the solid waste. The purpose is to achieve high-quality crushing effect on both soft and hard materials. ENSA provides all core equipment including receiving hoppers, explosion-proof containment chambers, hydraulically driven dual-shaft crushers, new explosion-proof conveying units and continuous feeding units to ensure stable and safe disposal.

#### 应用范围 / Application

大件垃圾 / 生活垃圾 / 陈腐垃圾  
Bulky Waste / MSW / Stale Refuse  
餐厨垃圾 / 厨余垃圾 / 有机废物  
Restaurant Waste / Kitchen Waste / Organic Waste  
废塑料 / 废包装物 / 废纸 / 造纸废物  
Waste Plastic / Packing Waste / Waste Paper / Paper Waste  
电子废物 / 废旧家电 / 废轮胎  
E-Waste (WEEE) / Waste Household Appliances / Waste Tires  
废桶 / 桶装废物 / 废吨箱  
Waste Drum / IBC Waste  
工业和危险废物 / 医疗垃圾  
Industry & Hazardous Waste / Medical Waste



### ESF 四轴回转剪切破碎机

ESF Four-shafts Rotary Shredder

ENSA 四轴回转剪切破碎机体现了剪切式破碎机制造能力的高剪切力水平，应对更加恶劣的工作环境、更加复杂的物料性质以及更加严苛的破碎要求。液压系统输出的强大动力，在低转速大扭矩的液压马达作用下，传递给破碎机刀轴，通过主副轴的剪切作用实现对物料的精细化破碎目标。

ENSA four-shaft rotary shear crusher embodies the high shear force level of shear crusher manufacturing capabilities, and can cope with harsher working environments, more complex material properties and more stringent crushing requirements. The powerful power output by the hydraulic system is transmitted to the cutter shaft of the crusher under the action of the hydraulic motor with low speed and high torque.

#### 产品特点 / Features

- 精细化破碎  
Fine crushing
- 坚固耐用  
Strong and sturdy
- 高强适应性  
High adaptability
- 安全可靠  
Safe and reliable
- 高效剪切破碎  
Efficient shear crushing

#### 应用范围 / Application

餐厨废弃物 Restaurant Waste  
有机废物 Organic Waste  
危险废物 Hazardous Waste  
医疗垃圾 Medical Waste  
电子废物 E-Waste  
废轮胎 Waste Tires  
废金属 Scrap Metal  
废塑料 Waste Plastics  
废纸 Wastepaper  
造纸废物 Paper Waste



ENSA 刀具采用高强度合金钢，经多次锻打 + 热处理加工工艺，淬硬层深度 ≥ 3mm，抗拉强度 ≥ 1050MPa，硬度达到 HR58~62

The ENSA tool is made of high-strength alloy steel. After multiple forging + heat treatment of the hardened layer is ≥ 3mm, the tensile strength is ≥ 1050MPa, and the hardness reaches HR58~62

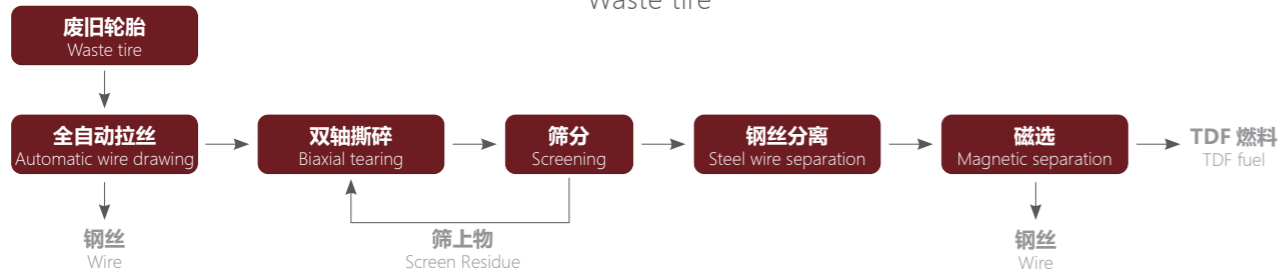
# 04

其他固废

## 其他固废 Other solid waste

### 废旧轮胎

Waste tire



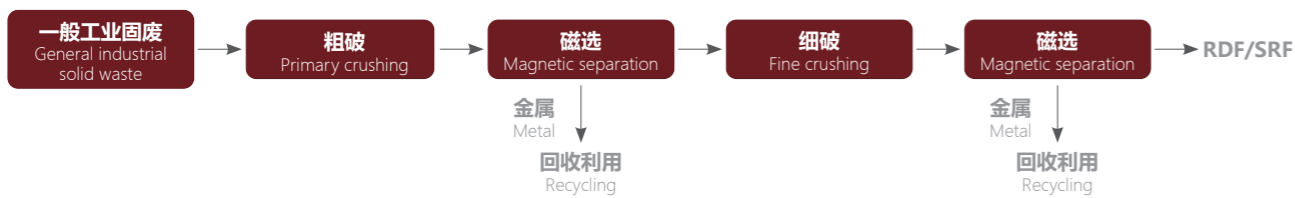
废旧轮胎 tire derived fuel 简称为 TDF 能源，由于含碳高、高热值（达到 35.6MJ/kg）和低水分等优势，作为水泥厂、发电厂、造纸厂等能源密集型产业替代燃料潜力巨大。恩萨废旧轮胎替代燃料工艺采用专用破碎机通过对废旧轮胎的破碎、筛分和磁选，实现钢丝的分离，最终得到高热值胶粒，实现资源可循环利用。

Waste tires, abbreviated as TDF energy, have great potential as alternative fuels for energy intensive industries such as cement plants, power plants, and paper mills due to their high carbon content, high calorific value (up to 35.6MJ/kg), and low moisture content. The Ensa waste tire alternative fuel process uses a dedicated crusher to separate steel wires through crushing, screening, and magnetic separation of waste tires, ultimately obtaining high calorific value rubber particles and achieving resource recycling.



### 一般工业固废

General industrial solid waste



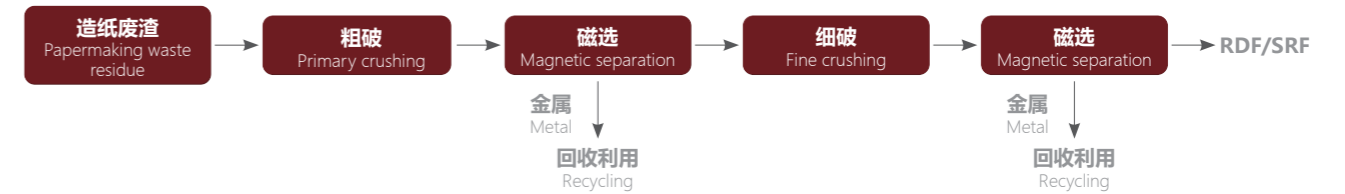
恩萨一般工业固废资源化处理系统能够将皮革边角料、布匹边角料、废织物等一般工业固废，制备成 SRF 或者 RDF 燃料棒，从而实现垃圾到资源的转化。该系统采用了双轴 + 四轴的双级破碎理念，破碎后的物料尺寸可以达到 30-80mm（根据项目需求），即使复杂原料，也能保证出料 95% 的粒径达标率。

The Ensa general industrial solid waste resource treatment system can prepare general industrial solid waste such as leather scraps, cloth scraps, and waste fabrics into SRF or RDF fuel rods, thereby achieving the transformation of waste into resources. The system adopts a dual axis+four axis dual stage crushing concept, and the size of the crushed material can reach 30-80mm (according to project requirements). Even for complex raw materials, it can ensure a 95% particle size compliance rate for the discharge.



### 纸厂废料

Paper plant waste



绞绳是造纸厂再生造纸过程中，水力碎浆机中的绞绳机将废纸浆料中的各种杂质，如铁丝，塑料，细绳，棉纱等不断缠绕绞集而成。绞绳同时含有 40% 的铁丝和 55% 的纸厂废料，混合缠绕，分类回收处理有一定的难度。

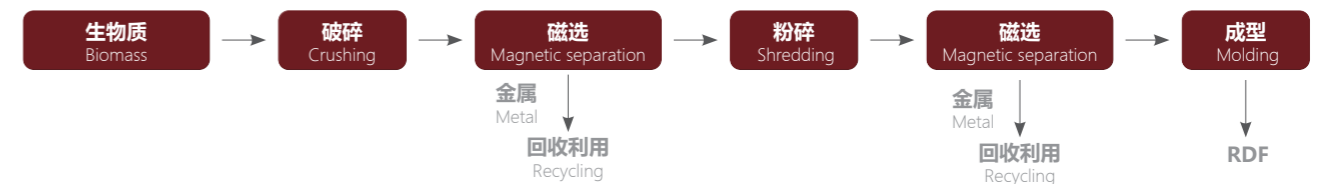
Twisting rope is generated during the recycled papermaking process in which various impurities in the waste paper pulp, such as iron wire, plastic, fine rope, cotton yarn, etc., are continuously wrapped and twisted by the twisting rope machine in the hydraulic pulp crusher. The twisted rope contains 40% iron wire and 55% paper mill waste at the same time, and it is difficult to mix and wrap, classify and recycle for treatment.

恩萨绞绳资源化处理生产线通过两级破碎、振动筛分和磁选工艺的组合，使物料中的金属、其他混合物与可燃物（SRF）充分分离。既实现了资源再生，又创造了价值。The Ensa twisted rope resource utilization production line utilizes a combination of two-stage crushing, vibration screening, and magnetic separation processes to fully separate metals, other mixtures, and combustible materials (SRF) from the material. It not only achieves resource regeneration but also creates value.



### 生物质

Biomass



生物质 RDF 是以农林废弃物（如秸秆、锯末、木材等）为原料，经过破碎、粉碎，烘干，挤压成型、冷却等工艺，制成的颗粒状可直接燃烧的新型清洁燃料。生物质 RDF 热值大约 3000-3300kcal/kg，燃烧灰烬可集中制成钾肥，实现零排放。

Biomass RDF is a new type of clean fuel made from agricultural and forestry waste (such as straw, sawdust, wood, etc.) through crushing, crushing, drying, extrusion molding, cooling, and other processes, which can be directly burned in granular form. The RDF calorific value of biomass is approximately 3000-3300kcal/kg, and the combustion ash can be concentrated to produce potassium fertilizer, achieving zero emissions.

生物质秸秆、树枝等物料通过输送设备进入破碎机，在破碎机剪切、撕裂、挤压作用下对物料进行破碎处置，破碎后的物料进入粉碎机粉碎至更小粒度，达到成型机入料尺寸要求。物料进入成型机之前设置磁选装置将金属物料选出，最后经过成型机制成生物质 RDF。整套生产系统可以实现密闭输送、负压降尘、清洁生产。

Biomass straw, branches, and other materials enter the crusher through conveying equipment, and are crushed and disposed of under the shearing, tearing, and squeezing effects of the crusher. The crushed material enters the crusher and is crushed to a smaller particle size, meeting the feeding size requirements of the molding machine. Before the material enters the molding machine, a magnetic separation device is set up to select the metal material, and finally, it is prepared into biomass RDF through the molding mechanism. The entire production system can achieve closed transportation, negative pressure dust reduction, and clean production.





### 华北陈腐垃圾筛上物作替代燃料项目

An obsolete Stale Refuse sieve in North China is used as an alternative fuel project

处置种类: 陈腐垃圾、污泥

处置规模: 180t/d

Materiel: Stale Refuse、Sludge

Scale: 180t/d



### 华南生活垃圾资源化项目

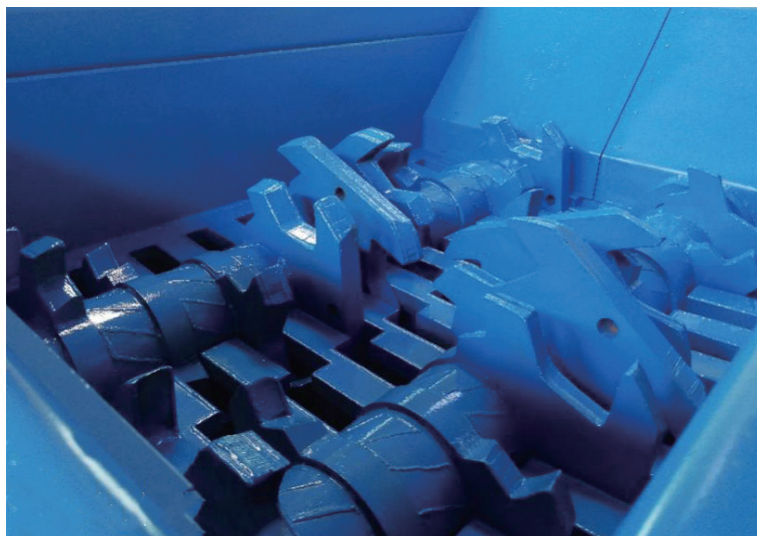
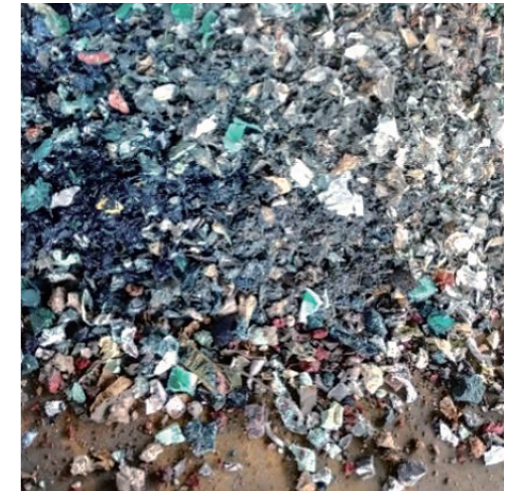
MSW Recycling Project in South China

处置种类: 生活垃圾

处置规模: 180t/d

Materiel: MSW

Scale: 180t/d



### 华东生活垃圾资源化项目

MSW Recycling project in East China

处置种类: 生活垃圾

处置规模: 500t/d

Materiel: MSW

Scale: 500t/d

