



# Henan Lanning Technology Co.,Ltd

## Waste plastics, waste tires recycling - pyrolysis technology

**Project address:**

**Project name:** waste plastics, waste tires recycling.

**Output:** 3-15T/D

**Supplier:** Henan Lanning Technology Co.LTD.

**Address:** Ningling industrial zone, Shangqiu city, Henan province.

**Contact:** Kelly Feng

**Telephone:** 008618837001680

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## Project background

With the modernization of the society, on the one hand, the rubber industry is booming, and rubber products are commonly used in various industries. On the other hand, due to the non-corrosive nature of rubber, the amount of used tires is increasing day by day and has become a major environmental hazard. It is known as “black pollution”. Compared with the developed countries, China still lacks certain experience in dealing with pollution in this area. Capital and markets are also big problems. At present, China’s annual tire production ranks third in the world, with more than 130 million tires. The number of used tires produced annually exceeds 65 million, and it grows at a double-digit rate each year. Among them, 70% of the waste tire resources have not been recycled and reused, and the recycling rate of waste biased tires is also less than half.

With the rapid development of the plastics industry, the application of plastic products has become more and

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more widespread. The large number of applications of plastics has brought many conveniences to people's lives, but also caused many problems. It is difficult to decompose in the natural environment, and a large amount of waste causes serious environmental pollution Known as "white pollution". The main disposal methods for plastic waste are mostly landfill, incineration, and waste plastic recycling. However, landfill and incineration will cause secondary pollution, while the recycling scope of waste plastics is very limited. Waste plastics such as household waste and waste paper from the paper mills cannot be recycled. With the continuous rise of international crude oil prices, the use of waste plastics to refine fuel oil has attracted the attention of countries in the world. Waste plastics refining can avoid environmental pollution caused by waste plastics, and it can bring about certain economic benefits.

With the growing awareness of environmental protection throughout the world, the issue of recycling of waste plastics has increasingly attracted the attention of all walks of life. The research on the harmless and resourceful treatment technologies of waste plastics has become an important issue faced by the environmental protection

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and resource communities. Our Henan Lanning Technology Co., Ltd. newly developed waste plastics pyrolysis plant which will make use of waste catalytic cracking technology to produce industrial fuel and carbon black. This high-tech technology has created good economic and social benefits and has become a major discovery in the world's energy regeneration.

In many countries, used tires and plastics are free of charge. In some countries, the government even gives a subsidy of 2-3 US dollars per tire or kilogram tires. For example: Canada, Australia, Venezuela, etc. Scrap tires, plastics are piled up and left unattended in many countries in Africa. Users only need to collect and transport waste plastics for using. In Malaysia, the government adopts a unified national recycling of used tires and plastics, and provide them to relevant companies for free. It also stipulates that all products made of used tires and plastics will be subject to tax incentives. Moreover, as a non-renewable resource, oil has been rising in recent years. So waste recycling is the trend of the future.

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## Solution---Pyrolysis

Pyrolysis, also named cracking, thermal cracking, high temperature pyrolysis, refers to the pyrolysis reaction of organic substances in the absence of oxygen, which is capable of converting a sample (mainly a polymer compound) into several other substances (mainly Refers to the chemical process of low molecular compounds.)

The pyrolysis of tires or plastics is a process that decomposes tires or plastics into hydrocarbons, non condensable gases, and biochar (carbon black) by heating. After that, the oil and gas are cooled to fuel by the cooling system. The non-condensable flammable gas can be directly recycled to the heating of the reactor.

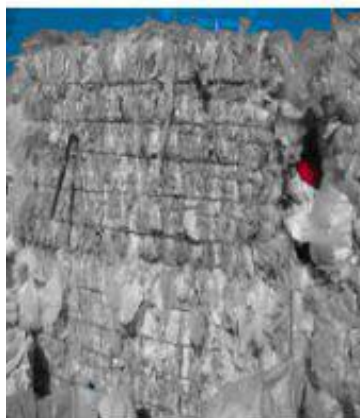
Excess gas can also be collected and stored for heating in other industries. Carbon black can be directly pressed into the ball or used as an additive for rubber products.

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## RAW MATERIALS



## OUTPUTS



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## Pyrolysis process

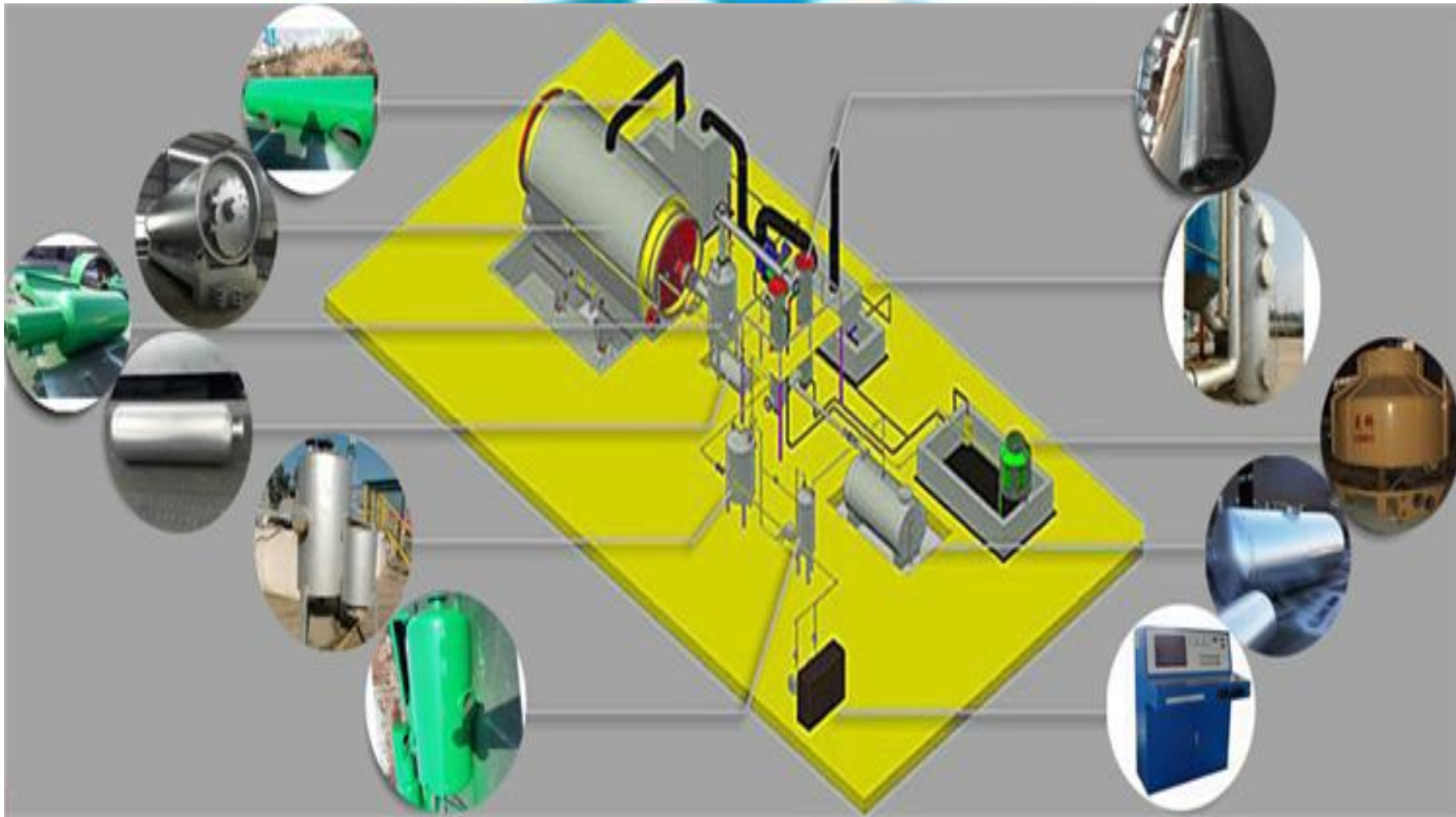
- Feeding material,requires 1-2 hours,tire size less than 1.4meter can feed into reactor directly,bigger tire needs cutting first,plastic can use auto feeder or conveyor belt to feed.
- Heating ,needs 6-8 hours or so,as usual when reactor temperature reach up 180 degree,oil gas will start come out,when temperature reach to 240 degree to 260 degree,a large amount of oil gas will come out.
- Cooling, oil gas will go through cooling system,after cooling will become fuel oil.
- Waste gas recycled,during the processing,except oil gas,there will be partly combustible but can not cooled gas,we called waste gas,which can return to furnace for heating reactor so that can save fuel material.
- Carbon black and steel wire,in the end of processing,oil gas come out all,need discharge slag which contain carbon black and steel wire.

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## Final products usage and profit analysis

- **Fuel oil**
  - Can be used for boilers,such as steel plate factory,cement factory,glass factory,etc.
  - Can be distilled into diesel which can use for generator,ship,heavy-duty car,trucks etc.
- **Carbon black**
  - Can be made into balls used for burning instead of coal.
  - Can be grinded into different grades powder for wider usage,paint pigment,rubber products' additive.
- **Steel wire**
  - Can be sold to recycle bin.
  - Can be sold to steel plate factory.

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## Profit analysis

Profit analysis( Take LN-2800-6000 for example)	
<b>cost/day</b>	
used tyres	10T * 550RMB/T = 5500 RMB
fuel cost <i>Choose one is OK</i>	1) coal: 0.5T * 800RMB/T = 400RMB 2) oil: 0.4T * 3000RMB/T = 1200RMB 3) gas: 150m <sup>3</sup> * 2.25RMB/m <sup>3</sup> = 337.5 RMB
Electricity cost	15Kw*15h*1RMB/Kwh = 225RMB
Water cost	Water Cyclic utilization, little consumption
Worker salary	3 labor*150RMB = 450 RMB
<b>Output /day</b>	
fuel oil	4.5T * 3000RMB/T = 13500RMB
carbon black	3.5T: 3.5 T*300RMB/T = 1050RMB
steel wire	1T * 1200RMB/T = 1200RMB
<b>Profit/day</b>	<b>9175RMB/day</b>

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## Disposal of emissions

Industrial pollution is generally divided into waste water and exhaust gas pollution.

### Waste water

Waste tire pyrolysis plant produced by our company, whether it is cooling water or dedusting water all use recycled water, to ensure that the production process to achieve zero discharge of waste water.

### Cooling water

This equipment is designed with the coil pipes pond or the tube-type condensers. The oil is inside the tube while the water is outside, thus water and oil are in zero contact. The cooling water can be used recycled without emissions. This design not only protects the environment, but also increases the cooling area, so that oil and gas can be fully cooled.

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## **Dust water**

The equipment is equipped with a professional water film dust remover. Two layers of high-pressure nozzles spray, so that the small solid particles in the smoke are fully flushed and discharged into the dust tank as the water flows. As the smoke is acidic, it is necessary to put proper amount of quicklime and desulfurizer in the water tank before reuse. The acid-base neutralization can purify the dust water. Then using the principle of the communicator, the purified water is collected through the filtering water tank and pumped again into the dust collector for recycling.

## **Exhaust gas**

Exhaust gas pollution of waste tire pyrolysis project mainly comes from the exhaust gas produced during the production process. The main components of tail gas are non-condensable but highly flammable gas such as C1-C4. Under normal circumstances, the exhaust gas can be directly recycled to heat the pyrolysis reactor and

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to save other fuels. However, the tail gas also contains a small amount of contaminating gases, such as H<sub>2</sub>S, NO<sub>x</sub>, CO<sub>x</sub>, SO<sub>x</sub>, etc. Among them, H<sub>2</sub>S gas is a flammable acid gas under standard conditions. It is colorless and smells of rotten eggs at low concentrations. It is poisonous. If it is directly discharged into the air, it will not only have a pungent odor, but it will also be harmful to the human body. In response to this contaminated gas, the company launched a desulfurization and odor removal system that is specifically designed to remove H<sub>2</sub>S gas, as well as remove some NO<sub>x</sub>, CO<sub>x</sub>, and SO<sub>x</sub> gases, helping customers to completely solve the problem of factory odor. Currently, the equipment has been subjected to Domestic and foreign customers alike.

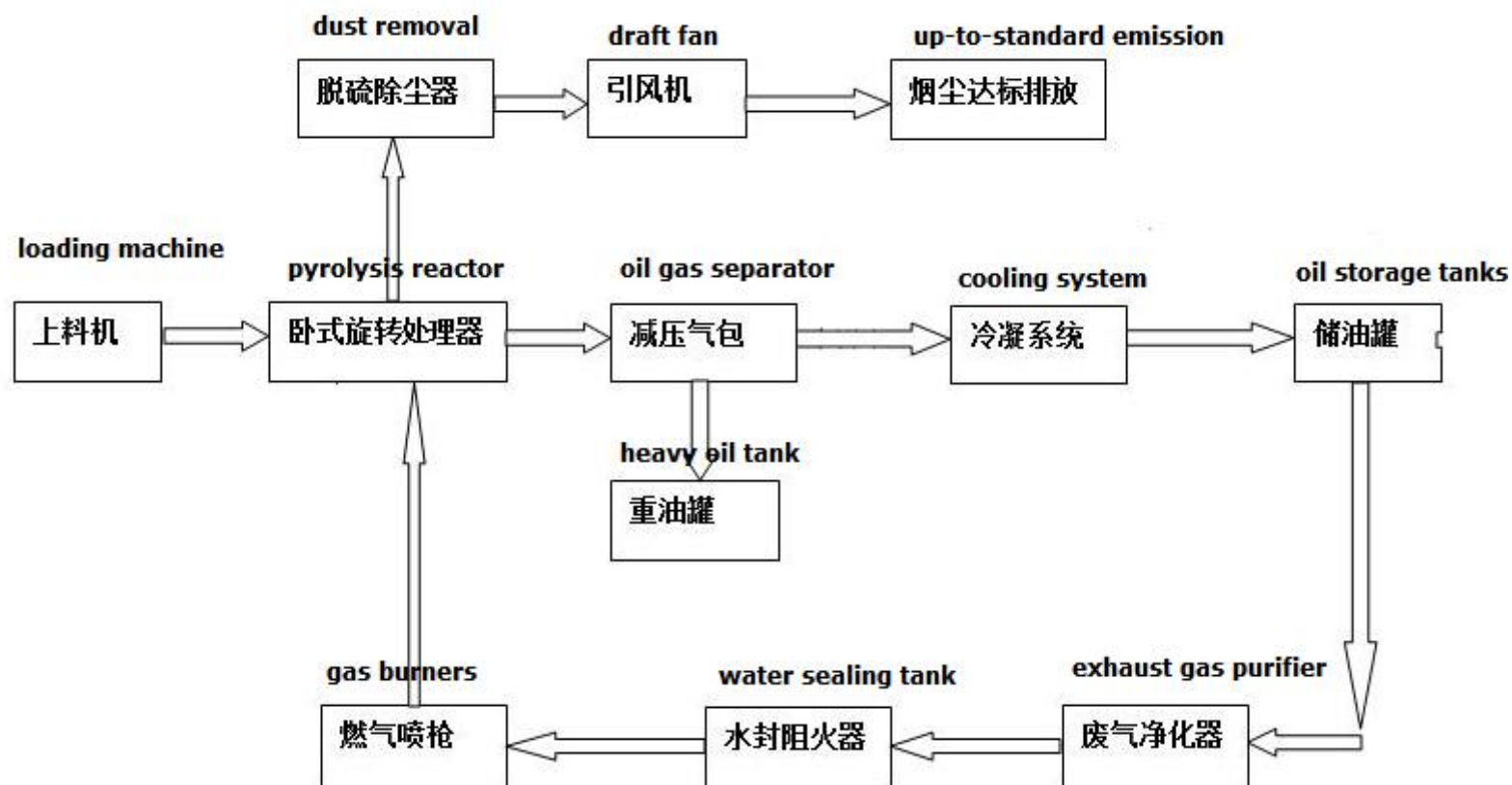
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## Process flow chart



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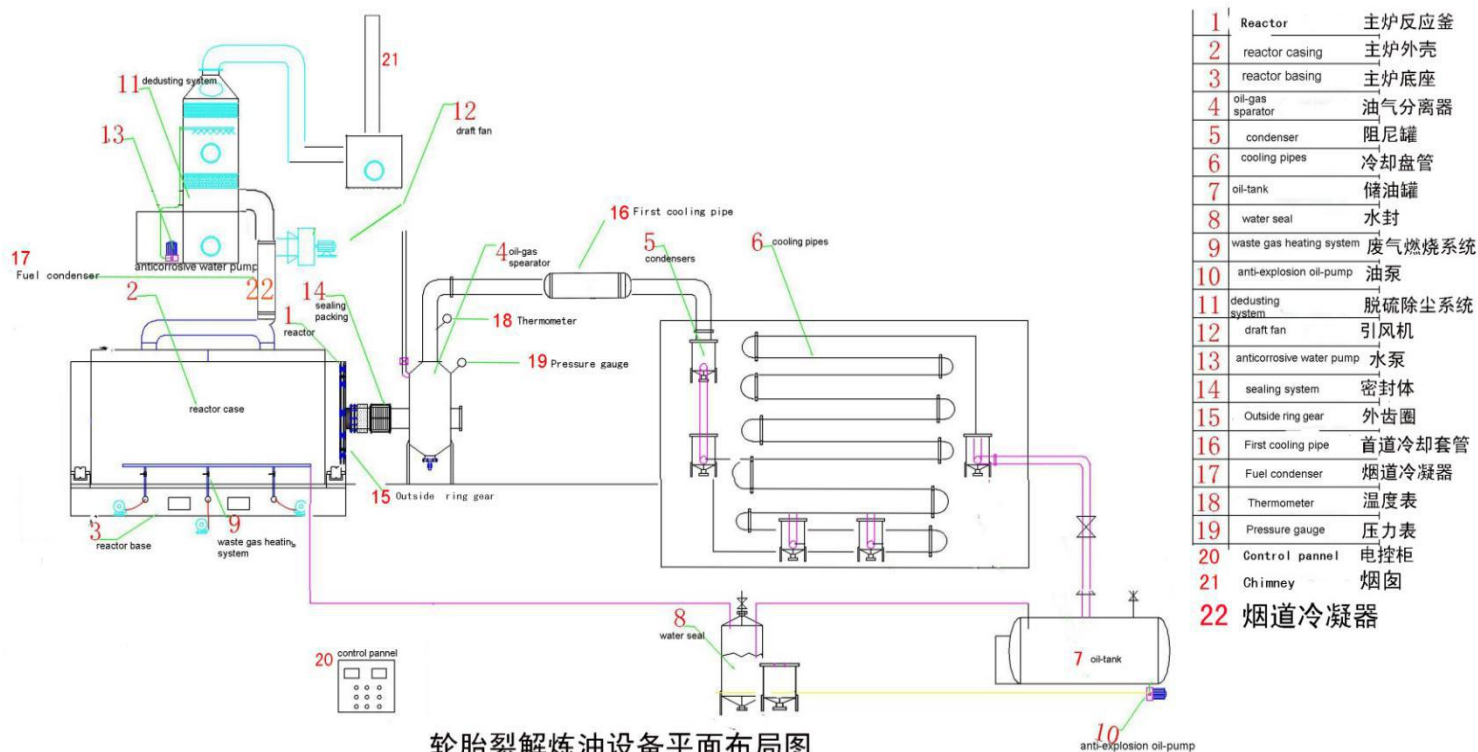
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## Installation layout



1	Reactor	主炉反应釜
2	reactor casing	主炉外壳
3	reactor basing	主炉底座
4	oil-gas separator	油气分离器
5	condenser	阻尼罐
6	cooling pipes	冷却盘管
7	oil-tank	储油罐
8	water seal	水封
9	waste gas heating system	废气燃烧系统
10	anti-explosion oil-pump	油泵
11	dedusting system	脱硫除尘系统
12	draft fan	引风机
13	anticorrosive water pump	水泵
14	sealing system	密封体
15	Outside ring gear	外齿圈
16	First cooling pipe	首道冷却套管
17	Fuel condenser	烟道冷凝器
18	Thermometer	温度表
19	Pressure gauge	压力表
20	Control pannel	电控柜
21	Chimney	烟囱
22	烟道冷凝器	





轮胎裂解炼油设备平面布局图  
Tire pyrolysis to oil plant layout diagram

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## Configuration







名称name	图片 picture	规格 size	数量No.				
reactor 主炉		直径 diameter 2200/2600/2800m m 长 lenth 6600/6600/8000m m, 国 标钢板 Q245R, 厚度 16mm thick	1套 set	气包 oil gas separator		直径 900mm 长度 1800mm 厚度 6mm diameter length thickness	1个 piece
cover 保温壳		厚度: 6mm thickness: 6mm	1套 set	渣油罐 heavy oil tank		直径 700mm 长度 1500mm 厚度 4mm diameter length thickness	1个 piece
耐火水泥 cement			45 袋 bags	冷却盘管 coil pipes		直径 108mm/159mm 长度 6000mm 厚度 2mm diameter length thickness	22 根
耐火砖 bricks			240 块 pieces				
耐火沙 sand			80 袋 bags				
耐火石子 stones			80 袋 bags				

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<p>冷却塔 cooling tower</p>		<p>直径 2200mm 高 2900mm 容量 30 吨/天 Diameter height volume</p>	<p>1 个 set</p>	<p>脱硫除尘器 dust removal</p>		<p>直径 900mm 长度 4500mm 厚度 4mm diameter length thickness</p>	<p>2 个 set</p>
<p>储油罐 oil storage tank</p>		<p>直 径 1600/1800mm 长 度 3500/4500mm 厚度 4mm diameter length thickness</p>	<p>1 个 set</p>	<p>水箱 water tank</p>		<p>长 度 1000mm 宽度 1000mm 高度 1000mm length width height</p>	<p>2 个 set</p>
<p>水封 water seal tank</p>		<p>直径 800mm 长度 1500mm 厚度 4mm diameter length thickness</p>	<p>1 个 set</p>	<p>烟囱 chimney</p>		<p>直径 273mm 高度 12000mm diameter height</p>	<p>1 个 set</p>

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软连接 soft link		直径 425mm diameter	1 个 set	密封体 sealing		直径 425mm diameter	1 个 set
炉条 furnace bars		长度 1500mm length	30 个 set	温度表 temperature guage		范围 0-500 度 test range 0-500 degree	3 个 set
燃气喷枪 gas burners			4 个 set	压力表 pressure guage		test range 范围 0-10Kpa	3 个 set

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引风机 draft fan		power 功率: 7.5 kw	1 台 set	电控柜 electric control cabinet			1 台 set
鼓风机 blowers		power 功率 0.25kw	4 个 set	speed reducer 减速机		power 功率 5.5kw	1 台 set
油泵 oil pumps		power 功率 1.5kw	1 个 set	carbon cover 自动出渣接口			1 个 set
水泵 water pumps		power 功率 1.5kw	2 个 set				

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model	specification	Reactor material	Daily capacity	Working form	power
LN-2200-6000	2200MM*6000MM	Q245R boiler plate	5 T	Batch type	12KW
LN-2200-6600	2200MM*6600MM	Q245R Boiler plate	6 T	Batch type	12KW
LN-2600-6000	2600MM*6000MM	Q245R Boiler plate	8 T	Batch type	18KW
LN-2800-6000	2800MM*6000MM	Q245R Boiler plate	10 T	Batch type	23.25KW
LN-2800-6600	2800MM*6600MM	Q245R Boiler plate	12 T	Batch type	23.25KW
LN-2800-8000	2800MM*8000M	Q245R Boiler plate	15 T	Batch type	23.25KW

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## Successful cases



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## Company introduction

Henan Lanning Technology Co., Ltd. is located in the historical and cultural city of China - Shangqiu. Located at the junction

of the four provinces of Henan, Shandong, Jiangsu, and Anhui (with the entrance to Lianhuo Expressway), the transportation is very convenient and it has a unique geographical advantage. Our company belongs to government

investment attraction project. We specialize in the production of waste tyre pyrolysis plant, used plastics pyrolysis machine and

waste oil distillation equipment. It uses waste rubber, waste plastics, and waste oil as raw materials to produce fuel oil. It has

won environmental certification and patents.

Our company has strong technology power and good management ability. We have advanced submerged arc

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welding machine, ultrasonic wave flaw detection machine, CO vapor protection welding machine, silicon arc welding machine and other advanced operating equipment. The product quality is improving continually, and become very popular both at home and abroad. The government gave us the honor certificate” Strictly Observe Contracts, Keep Promises”, “Advanced Manufacturing Management Enterprise”. We have created good social and economic benefits. Our enterprise culture is “leading in the same industries, pay more attention to integrity, innovate and realize win-win results;we develop and expand the enterprise spirits” harmony, science and make progress”, we also perfect our enterprise system, standardize enterprise behavior, build “Lanning” brand and improve our competitiveness, try our best to provide customers perfect service.

Henan Lanning Technology Co., Ltd. is converted from the former Ningling Lanning Technology Co., Ltd., capital increase and restructuring, is a collection of technology research and development, production, sales and after-sales service in one of the environmental protection refining equipment manufacturing enterprises. Since its establishment, the company has continuously broken through innovation, broke through industry barriers,

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mastered the core technologies of solid waste refining and waste oil refining, and reached partnerships with many universities and scientific research institutions. It has applied for a number of invention patents and utility model patents. Adhering to the corporate philosophy of “Leading Technology, People-Oriented, Environmental Products, and Customer First”, it eliminates black and white garbage, achieves energy conservation and emission reduction, and contributes to the establishment of an environment-friendly society, achieving a win-win result for ecological and economic benefits. The company has a professional design and manufacturing team and after-sales service team. With the continuous improvement of design capabilities and continuous upgrading of products, the company provides customers with "turnkey" projects and all-around solutions that completely eliminate customers' worries. The whole set of equipment is sold to all parts of the country and exported to more than 60 countries and regions such as Southeast Asia, East Asia, Eastern Europe, Africa, the Middle East, South America, Central and North America, etc., and has been praised by customers at home and abroad.

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