



PYROLYSIS MACHINE INTRODUCTION

——Devoted in the field of Pyrolysis and Distillation Machine——

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一、 What is Pyrolysis Machine?

Pyrolysis equipment, also named as cracking equipment, one type of oil refining equipment which can refine varieties raw material into fuel oil, end production fuel oil can be sold directly with good commercial value. Pyrolysis fuel oil can be used directly as industrial heating fuel, or can be further distilled into diesel fuel.

二、 National Standard of Pyrolysis Machine

GB/T 32662-2016 <Complete set of pyrolysis equipment for waste rubber and waste plastic to oil>.

三、 Related Policy

1. The Ministry of Industry and Information Technology's "Industry Standards for Comprehensive Utilization of Waste Plastics" (No. 81, 2015);
2. The Ministry of Industry and Information Technology's "Interim Measures for the Administration of Announcement of Standard Conditions for the Comprehensive Utilization of Waste Plastics Industry" (No. 81, 2015).



四、 Raw Material Applicable for Pyrolysis Machine

Raw material can be processed as below: Waste Plastic, waste aluminium foil, waste PMMA, waste resin, waste buttons, waste cable sheaths and other waste materials. (Note:Different material can be processed by different pyrolysis machine configurations according its different characteristics).





五、End production & Function (Eg. waste plastic)

No.	Name	Yield	Function	Photo
1	Plastic Oil	40-75%	① Sell directly ② Further distillation to get diesel ③ Used as industrial fuel oil directly	
2	Carbon Black	20-55%	① Sell directly ② Further refine to get refined carbon black which can be used as raw material of rubber or plastic productions. ③ Make Carbon pellets to be used as fuel.	
3	Syn gas	5%	① Recycled to be used as heating fuel. ② Extra syn gas can be stored by gas storage system.	

Note:(1)Plastic oil and Carbon black as main production for selling.
 (2)If different raw material to be processed, will get different end production and yield.
 (3)If want to increase end production commercial value, our factory can provide the different further refine technology and machine.

六、Operating Time

No.	Model	Time(Hours)				Totally (hour)
		Feeding	Pyrolysis (Heating)	Reactor Cooling	Carbon Discharge	
1	8TPD (NP-2800*6600)	1	9	5	1	16
2	12TPD (NP-2800*7500)	1.5	11	6	1.5	20
3	15TPD (NP-2800*8000)	2	14	7	2	25



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Note: Machine Operating time different according its feeding quantity and cold/hot weather, above sheet data only for reference, take local site situation as final data. Optional parts 'Air cooling system' can reduce reactor cooling time effectively, increase production efficiency.

七、Equipment Energy Consumption(Fuel, Power, Water)

1.Fuel Type and Consumption

No.	Fuel Type	Auxiliary Tool	Consumption per batch	Note
1	Pyrolysis Oil (Self Produced)	Oil Burner	Around 400kg	Less if more machine running
2	Natural Gas	Gas Burner	Around 600m ³	Less if more machine running

Note: If more machine running at same time, can recycle 100% the self produced syn gas, so less energy consumed.

2. Power Consumption (15TPD Model eg.)

No.	Design	One Set Machine	6 Sets Machine	Note
1	Standard	32.5 KW	195 KW	Eco-friendly
2	High	45 KW	220 KW	Eco-friendly
3	Top	67 KW	210 KW	Eco-friendly

Note: When multiple machine installed, some system will be public shared, and the corresponding energy consumption can also be reduced.

3. Water Consumption(Eg. One set 15TPD)

Water consumption mainly focus on two places: the cooling system and flue gas treatment system. Cooling system use water for cooling oil gas into liquid oil. One time filled into the cooling circulation pool (about 100m³), no loss while using. Flue gas treatment system mainly use water for purify the flue gas. In the early stage, one time filled the flue gas treatment circulating pool (about 10m³), few qty will evaporate while machine running, for processing one ton





raw material, will evaporate around 0.15m³. When the water volume decreases, timely replenish it is OK.

八、Equipment Employers & Area Covered

No.	Machine Qty	Employers	Area covered	Auxiliary Area	Note
1	1 set	4 persons	300 m ²	500 m ²	No office or Green area covered
2	2 sets	6 persons	600 m ²	800 m ²	
3	4 sets	8 persons	1200 m ²	1600 m ²	
4	6 sets	10 persons	1800 m ²	2500 m ²	
5	8 sets	14 persons	2400 m ²	3000 m ²	
6	10 sets	16 persons	3000 m ²	3500 m ²	

Note: (1) Number of employers can be determined according to employer's proficiency

(2) The equipment area showed in above table is recommended area. Different layout can be less area according the site conditions.

(3) Factory building height recommend to be above 8 meters.

(4) Different Equipment capacities require similar area.

九、Main system of Pyrolysis Machine

No.	System Name	Note
1	Feeding system	Can be shared by multiple machines
2	Pyrolysis System	Reactor, insulation cover and furnace finished assembled before delivery.
3	Oil Gas Recycling System	Oil-gas separator, cooling, oil storage system, etc...



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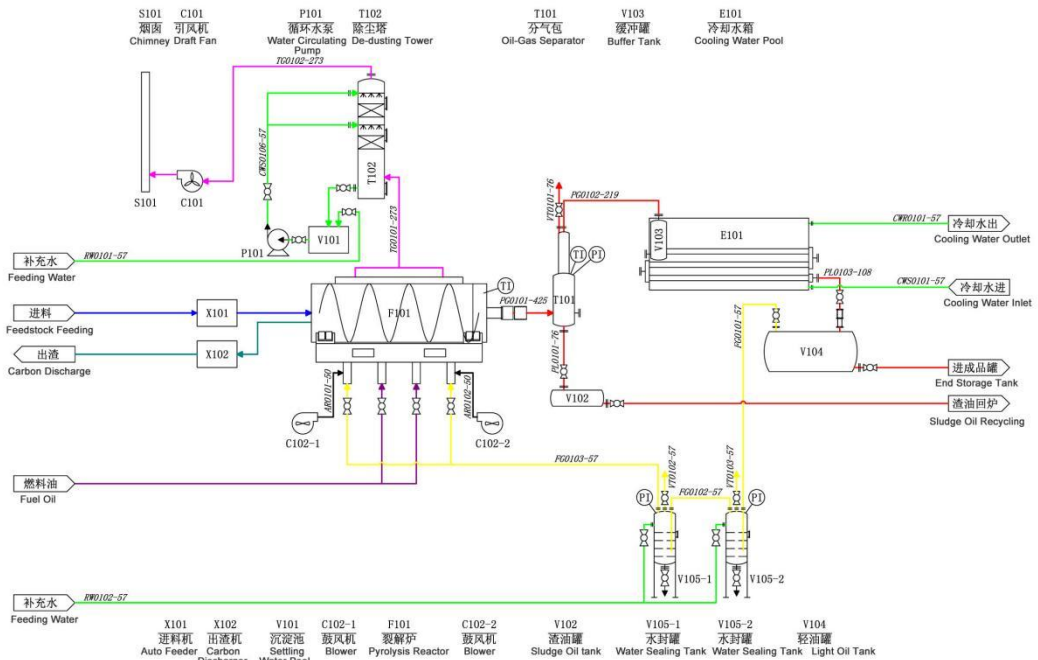
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4	De-dusting system	Draft fan(SS material), Desulfurization and denitrification tower(SS material), circulating water pump;
5	Heating System	Burner, Air compressor, etc...
6	Ash Output system	Carbon Discharger, Carbon Vacuum Air Delivery, etc...
7	Auxiliary System	Electric-control System, Pressure meter, Thermometer, Valves, Flanges, pipes, etc...

十、Equipment Technology Flow Chart

Pyrolysis Equipment technical flow chart shown in below figure. Some optional parts are listed in the figure. The specific equipment is subject to the final ordered equipment.



Note: Different configuration will be designed according to different raw material to be processed,



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十一、Machine Operating Process

1. Take waste plastic as example, its process flow chart as below, other material similar.

(1) Feeding—Customers who choose hydraulic feeder can use the grabber for feeding waste plastic into the hopper of hydraulic feeder, then push them into pyrolysis reactor via remote controlling hydraulic feeder. Customers who does not have hydraulic feeder can Use conveyor belt or grabber for loading materials, choose most appropriate and efficient feeding way according to the raw materials different shapes, close the feeding door after finishing loading.

(2) Heating-- Heating Fuel can be pyrolysis oil or natural gas. When using pyrolysis oil, can firstly purchase some fuel oil or heavy diesel for first time ignition, then use pyrolysis oil for heating after the oil is refined. Turn on the burner for evenly heating pyrolysis reactor, keep heating to specified temperature, raw materials in pyrolysis reactor will be heated and converted into oil gas. Oil gas will enter the cooling system via gas outlet which located at center of reactor, after liquefied into oil, finally go to intermediate oil tank.

(3) Cooling Reactor-- Turn off the burner after finishing pyrolysis process, then cool down the reactor, couldn't discharge carbon black until reactor temperature cooled down to be 50°C (Suggesting safe temperature).

(4) Ash output(Carbon Black)-- After cooling down the reactor, open carbon black discharging door for discharging ash, our machine equipped with high efficiency automatic ash discharger, can pack the ash by bags directly; also can choose ash vacuum air delivery system, which equipped with pulse



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dust removing system, can deliver the carbon black to ash stock warehouse via sealed pipes and blowers, which ensure no dust while ash output,once finish discharging ash, can go ahead for next operating process.

2. Other Operating parts while Pyrolysis working

(1) Syn gas Recycled--While oil pyrolysis out, non-condensable gas (C1-C4) also enters the oil tank along with the oil. Machine equipped with recycling system which can recycle the non-condensable gas to be used as heating fuel, it will go to heating furnace for heating via 2 layers water-sealing tank and fire-stopping system. By this way, not only ensure environmental friendly and safe, but also saves a lot of fuel.

(2) De-dusting system--Machine equipped with 2 kinds of de-dusting system for choice, which mainly treat the flue gas generated during heating process. The processed flue gas is white water vapor without black particles. Also can meet emission standards required by national or local environmental protection requirements as per customer requirement.

十二、Benefit Analysis

Take 8TPD Model NP-2800*6600 Waste Plastic as raw material, below sheet take Korean waste plastic as raw material,based on the 2023 November market price of Korea.

No.	Item Name	Qty(Person, tons, KW)	Unit Price(CNY)	Totally (CNY)
一、Input(Daily)				
1	Labor	2	¥ 1000	¥ 2000





2	Fuel Oil	0.5	¥ 3600	¥ 1800
3	Water	1.2	¥ 1.75	¥ 2.1
4	Power	600	¥ 1.2	¥ 720
5	Waste Water Treat Cost	1	¥ 1600	¥ 1600
6	Waste residue Treat Cost	3	¥ 800	¥ 2400
Daily Cost				¥ 8522.1
二、 Output (Daily)				
1	Government subsidies for waste plastic	8	¥ 900	¥ 7200
2	Pyrolysis Plastic Oil	4	¥ 3600	¥ 14400
Daily Output				¥ 21600
三、 Profit				
1	Daily Profit			¥ 13,077.90
2	Monthly Profit(25 days)			¥ 326,947.50
3	Yearly Profit(10 months)			¥ 3,269,475.00
Min capacity machine in Korea		Yearly profit around 3.27Million CNY		
四、 Other				
1	Running cost for per ton plastic	(Exclude the waste plastic)		¥ 1,065.26
2	Net profit of per ton plastic	(Cover government susidies)		¥ 1,634.74

Note: Different market price based on different area, can calculate the project benefit according local market price based on above calculating way.



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十三、 Company Introduction

Shangqiu Mingsen Environmental Protection Equipment Co., Ltd is a modern factory combined R&D, Manufacturing and Selling, company focus on the pyrolysis and distillation area, own professional 4 R&D personals, 8engineers, 18 technicians, our company insist on the principal of ‘Service First, Quality First’, with high qualitative production, good reputation and Excellent Service, production has been sold to more than 20 provinces in local market, exported to Malaysia, Thailand, Korea, Philippines, Portugal, Russia, Middle East etc... more than 60 countries.

Our company main production: Pyrolysis equipment for Waste plastic, waste tire, waste rubber and other solid waste, Distillation equipment for waste engine oil, crude oil, etc. Since 15 years ago, our equipments has upgraded from the first-generation to currently eighth-generation products. Meanwhile established perfect service system, from pre-sales technical guidance to door-to-door installation and after-sales training, our company adheres to the principle of lifelong service for customers to ensure that they have no worries about technology while using our machines.

十四、 After-sale Service

No.	Type	Detailed Info
1	Warranty	One year warranty for whole set machine, and lifetime maintenance support;
2	Installation and Training	We will send engineer to buyer site for installation guidance, commissioning and training.
3	Product Upgrade	Lifetime guiding customer on machine upgrading.





4	Spare Parts	Lifetime providing the spare parts(lower than market price)
5	Raw material supplier	Help provide the raw material supplier contact info.
6	End production selling channel	Help provide the end production buyer contact info.
7	Change machine installation place	If buyer need change machine installation place, can send engineer to customer site for guiding.

十五、 Equipment Security Measures

Our company's products have been inspected and tested by multiple inspection agencies to ensure the equipment safe performance. Our machine has been equipped with anti-blocking device, pressure gauge, alarm, safety valve, and over pressure/ temperature alarm system. The normal operation of the equipment is at normal pressure. The equipment safety hazard mainly lies in non-liquefiable chemical components C1 and C4 alkanes, which are dangerous if burn directly. Before burning them, they must firstly pass through two safety devices and flame arresters. , via second safety device gas nozzle, ensure its safety performance reaches full combustion.

In addition, the equipment is equipped with pressure gauges, automatic alarms and temperature gauges. When the pressure in the furnace exceeds a certain range, it will automatically relieve the pressure and alarm.

Equipment need equipped with exhaust gas combustion and reuse device to ensure it is odorless. Dust collector ensure no black smoke emission. The entire circulating cooling system water is recycled and there is no waste water discharge. The waste residue has been treated at a high temperature of more than 400 degrees and has no toxicity. Different fire channels are scientifically





designed according to different types of reactor materials to ensure maximum combustion utilization and energy saving. The noise is also lower than the national emission standards.

十六、 Briefly Introduction for De-dusting system

This system mainly focus on treating the smoke and dust generated by heating process of the pyrolysis machine, first-level dust removal system used for dust reduction, which equipped with stainless steel spiral nozzles and filled with Ball porcelain ring fillers. Mainly remove particulate matter of the flue gas by water spray method. The treated gas will be rapidly cooled down by primary flue gas condenser and secondary flue gas condenser, then once again enter the cyclone dust removal system, ensure the particulate matter be completely removed, after that, flue gas enters alkali washing system for neutralizing some sulfur and acidic substances in the gas. The treated gas enters the air cooling tower to cool down the steam, and then enters the gas-water separator to neutralize the flue gas. The moisture and gas are separated, and the separated gas enters the UV photolysis activated carbon adsorption and filtration system. This system mainly adopt special high-energy high-ozone UV ultraviolet beam to irradiate the molecular bonds of odorous gases, such as sulfides, etc., to make them free. The pollutant molecules in the state are combined with ozone oxidation into small harmless or low-harm compounds, such as CO₂, H₂O, etc.

Also adopts high-energy, high-ozone UV light for decomposing oxygen molecules in the air to produce free oxygen, which is active oxygen. Because the positive and negative electrons carried by free oxygen are unbalanced, they need to combine with oxygen molecules to generate ozone. $UV+O_2 \rightarrow O+O^*$ (active oxygen) $O+O_2 \rightarrow O_3$ (ozone). It is well known that



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ozone has a strong oxidizing effect on organic matter and has a strong removal effect on odorous gases and other irritating odors. The purification equipment uses high-energy UV ultraviolet beams and ozone to perform a collaborative decomposition and oxidation reaction on the odorous gases, so that the odorous gas substances are degraded and converted into low molecular compounds, water and carbon dioxide, and then discharged outdoors through the exhaust duct. High-energy UV beams are used to crack the molecular bonds of bacteria in malodorous gases, destroy bacterial nucleic acids (DNA), and then perform oxidation reactions through ozone to completely achieve the purpose of deodorizing and killing bacteria.

After the above multiple treatment procedures, the gas which meet local environmental protection requirements can be emission via chimney by the induced draft fan.





十七、 Delivering Machine



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十八、 Successful Projects



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