

废机油精炼汽柴油方案

Converting Waste Engine Oil to Diesel Oil and Gasoline Solution

废机油裂解汽柴油技术分类：

1.目前国内外对于废机油综合利用技术大致上可以分为两大类：

(1)废机油直接裂解汽柴油：采用中高温裂解，使废机油碳链裂解成小分子汽柴油。

(2)废机油催化裂解汽柴油：采用中温催化重整得到柴油。

由于废机油成分复杂，本身含油多种添加剂，很难找到合适的催化剂，限制了催化裂解的应用。河南亚太科技股份有限公司多所大学院校和科研单位合作，研发出了废机油直接裂解汽柴油工艺设备。

1. Technical classification of used engine oil cracking gasoline and diesel

At present, for the comprehensive utilization of used engine oil at home and abroad, technology generally can be divided into two categories:

(1)used engine oil crack gasoline and diesel directly: use the medium and high temperature cracking, make the carbon chain of used engine oil into small molecule of gasoline and diesel.

(2)Used engine oil catalytic cracking gasoline and diesel: use the medium temperature catalyzing reforming diesel.

Due to the complex composition of used engine oil, and oil contains various additives, so it is difficult to find suitable catalyst, which limit the application of

the catalytic cracking.

二、基本工艺

本工艺采用中高温裂解废机油使其转化成为柴油，将需要深加工的废机油通过油泵泵至裂解釜，常压加热裂解，裂解出来的汽油、柴油通过精馏塔分割，油气分别冷凝为汽油和柴油，不凝气经过水封和阻火器通入到裂解炉燃烧加热裂解釜，回收热量利用，定期排放残渣。

II Basic Process

This process adopts medium and high temperature cracking used engine oil to turn it into diesel, and makes used engine oil pump into the cracking kettle through oil pump, heat and crack under the normal pressure. Then gasoline and diesel after cracking will be separated by distillation tower. Oil gas will be condensed into gasoline and diesel. The non condensable gas will go through water sealing and flame arrester into cracking furnace to heat reactor, recycling of heat utilization, regularly discharging of residues.

三、生产工艺

生产过程主要包括 1、燃烧加热系统 2、裂解系统 3、精馏塔系统 4、冷凝冷却系统 5、循环水系统 6、电控系统 7、压力、温度报警系统 8、废气回烧系统 9、烟气处理环保系统 10、预处理系统。

收集来的各种废机油首先通过预处理系统过滤，沉降去掉废机油中的机械杂质和水分（根据废油油品质，杂质和水分少可以省略此步骤），然后通

过油泵将废机油泵至精馏塔塔顶换热，再通过烟气换热器与烟气换热，然后进入脱水塔脱除废机油中的水分，经过两级预热、除杂后的废机油泵至裂解釜进行裂解，裂解釜采用燃料直接加热，加热速度快，能量利用率高。产生的裂解气进入精馏塔精馏分割，塔顶采出汽油，通过冷凝器冷凝进入汽油接收罐，塔中液相采出为柴油，通过冷却器冷却后进入柴油接收罐。不凝气经水封罐、阻火器等安全措施处理后去燃烧加热裂解釜，裂解釜定期排放的残渣作为产品沥青。

III Productive Process

Productive process mainly includes: 1, burning heating system 2, cracking system 3, distillation system 4, condensing cooling system 5, water recycling system 6, electronic control system 7, pressure and temperature alarm system 8, waste gas burn-back system 9, flue gas processed environment protection system 10, pretreatment system

All the collected used engine oil will be filtered by pretreatment system, remove mechanical impurities and water in the oil (According to the quality of used oil, if impurities and water are less, this step can be omitted). Then pump used engine oil into the top of distillation tower by oil pump to exchange the heat, and then exchange the heat with flue gas through flue gas exchanger, then enter the dehydrating tower to remove the water in the oil. Used engine oil is pumped to the cracking kettle for cracking After two stages of preheating and removing impurities. Cracking kettle uses fuel material to heat directly, heating fast and

making full use of energy. The cracking gas enter into the rectification tower, it will be gasoline at the top of the tower, through condenser cooling , enter into gasoline collection tank. It will be diesel at the medium of the tower, through condenser cooling, enter into diesel collection tank. The non condensable gas will go to heat cracking kettle after water sealing tank frame arrester process. Cracking kettle regularly discharge residues as asphalt products.

四、工艺特点:

(1) 节能: a 废机油裂解汽柴油采用釜式连续裂解精馏工艺, 不凝气去裂解釜燃烧, 不但处理了废气还节省了燃料。b 原料的两级换热不但减轻了冷却水负荷, 降低的烟气温度还节省了大量热能。c 裂解釜直接加热, 避免了热量转换和输送的热量损失, 热能利用率高。d 采用连续式生产, 减少了开停炉, 提高了热效率。

(2) 环保: 主要是 a 裂解产生的废气全部燃烧, 避免了废气的排放。烟气通过除尘脱硫净化处理装置后, 废气达标排放。b 水循环利用, 减少了废水对环境的危害, 实现无废水排放。c 整个生产过程基本上处于全密封操作, 减少了废气的无组织排放。

(3) 安全: a 不凝气在回燃过程中有①水封罐②阻火器③燃气烧嘴三道安全设施, 确保了废气回燃的安全。b 系统设有温度表, 压力表、液位计等检测仪表, 可以实时检测生产过程状态参数。c 系统根据需要设置自控系统, 保证系统安全, 降低了劳动强度, 降低了生产成本。

(4) 高效: 由于采用釜式连续裂解工艺, 废机油在裂解釜中受热裂解,

大空间有利于裂解气挥发出来，连续进出料避免了废机油高温结焦带来的危害。

(5) 原料适应性强：不但可以裂解处理废机油还可以处理废轮胎，废塑料炼制的毛油。

综合以上特点，连续釜式废机油裂解汽柴油工艺处理废机油在带来经济利益的同时，还具有节能减排，保护环境意义

IV Process Characteristics

(1) energy saving: a, used engine oil cracking gasoline and diesel adopts Kettle type continuous pyrolysis and distillation process, non condensable gas heat the cracking kettle, which not only process waste gas, but also save fuel material. b, two stages of heat exchanger of raw material not only reduce the cooling load, reduce the temperature of the flue gas, but also save a large amount of heating energy. C, cracking kettle heat directly to avoid the heat transformation and transmission of heat loss and to make full use of heat energy. d, Using continuous production, reduces the boiler stop, improves the thermal efficiency.

(2) Environment protection: waste gas generated by the cracking of the a is completely burnt, and the emission of the waste gas is avoided. Flue gas is processed to guarantee dust emission standard through the dust removal and desulfurization purification treatment device. b, water recycling reduce the harm of wastewater to the environment and achieve no waste water

discharging. c, The whole production process is basically in a fully sealed operation, reducing the exhaust emissions of non organizations.

(3) Safety: a, non condensable have three safety facilities(① water sealing tank ② flame arrester ③ gas burner) to ensure the safety of gas combustion. b, system is equipped with thermometer, pressure gauge, liquid level meter and so on, which can detect parameters of the production process at any time. c, system can set up the automatic control system according to the need, to ensure the safety of the system, to reduce the labor intensity and reduce the production cost.

(4) high efficiency: Due to the adoption of the kettle type continuous cracking process, used engine oil crack by heating in the cracking kettle, large space is conducive to cracking gas coming out, continuous feeding and discharging avoid the harm caused by used engine oil coke under high temperature.

(5) Raw material strong adaptability: Not only can pyrolysis processing used engine oil, but also process crude oil refined by waste tire and waste plastic.

According to the above characteristics, Continuous kettle type used engine oil cracking gasoline and diesel not only have economic benefits, but also have the meaning of energy conservation, emissions reduction and environmental protection.

五、主要设备系统组成

1、燃烧加热系统 2、裂解系统 3、精馏塔系统 4、冷凝冷却系统 5、循环水系统 6、电控系统 7、压力、温度报警系统 8、废气回烧系统 9、烟气处理环保系统 10、预处理系统

V Main Equipment System Components

1, burning heating system 2, cracking system 3, distillation system 4, condensing cooling system 5, water recycling system 6, electronic control system 7, pressure and temperature alarm system 8, waste gas burn-back system 9, flue gas processed environment protection system 10, pretreatment system

六、系统说明

1、燃烧加热系统

由于客户采用燃料不同，可根据客户的燃料情况再具体定，一般采用燃重油或废油与燃气相结合。

2、裂解系统

裂解系统为废机油裂解的主要设备，釜式裂解系统易维护，连续裂解操作稳定。釜式连续裂解系统相比釜式间歇裂解系统提高了生产效率，降低了操作劳动强度，减少环境污染，提高了热能利用效率。

3、精馏塔系统

精馏塔为汽柴油分离的关键设备，分割裂解出来的汽柴油。自主设计填

料塔采用优质不锈钢填料具有分离效率高、耐腐蚀特点。设计先进，工艺精良，产品质量好。

4、冷却系统

采用物料冷却与水冷却相结合，冷却效果好、热能回收利用率高、空间利用合理。

5、循环水系统

采用了大流量的循环水系统，保证了循环水的供给率，水经过开放式冷却塔散热，循环水降温效果好。

6、电控系统

采用集成式电控柜，使整个系统动力操作更安全方便。

7、压力、温度警示统

根据系统各观测点仪表的数值，及时调整各控制阀及控制器的动作和热源加热温度。使压力及温度在可控范围内。

8、废气回燃系统

在裂解废机油的过程中，会产生一些小分子不凝气，这些不凝气如果不进行搜集处理，排入大气，势必造成污染。我公司自主研发的废气燃烧系统，很有效的解决了这一难题，废气通过水封—阻火器—燃烧嘴三道安全装置，在鼓风机的增氧状态下，在炉底能完全充分燃烧，一方面可以防止大气污染，另一方面可节约大量的燃料，节约了能源。

9、烟气处理环保系统

烟尘：我公司设计的湿式除尘系统，除尘率达 95%以上，彻底解决了冒

黑烟不环保的难题。经湿式除尘器除去烟尘，达标排放，由于采用了引风机装置，所以排烟系统不憋压，运行安全，烟尘排放可达到大气污染物综合排放标准（GB16297—1996）相关标准。

10、预处理系统

原料废机油通过预处理系统去除机械杂质，水分。同时利用余热把原料加热。

VI System Description

1, burning heating system

As clients use different fuels, can make it specific according to the customer's fuel , generally it adopts the combination of gas and burning heavy oil or waste oil.

2, cracking system

Cracking system is the main equipment of used engine oil cracking. Kettle type cracking system is easy to maintain, continuous cracking operation is stable. Kettle type continuous cracking system improve production efficiency compared with the kettle type intermittent cracking system, reduce the operation labor intensity, reduce environmental pollution, and improve the utilization efficiency of the heat

3, distillation system

Distillation tower is the key equipment of gasoline and diesel separation which can separate gasoline and diesel. Independent design packing tower is made of

high quality stainless steel with high separation efficiency, and corrosion resistance characteristics. Design is advanced, technology is sophisticated, and the quality of the product is good!

4, cooling system

Using the combination of material cooling and water cooling, the cooling effect is good, the heat energy recovery and utilization rate is high, the space utilization is reasonable

5, water recycling system

Large flow of circulating water system is adopted to ensure the supply rate of circulating water. The water is cooled by the open type cooling tower, and the cooling effect is good

6, electronic control system

Using integrated electric control cabinet, make the whole system power operation more safe and convenient.

7, pressure and temperature alarm system

According to the numerical value of each observation point of the system, adjust the control valve and the controller action and the heating temperature of heat source, so that the pressure and temperature can be in the controllable range.

8, waste gas burn-back system

During the cracking process of used engine oil, it can produce some small molecule of non condensable gas, if non condensable gas is not collected and



discharged into the atmosphere, it will cause pollution. Our company has independently developed exhaust gas combustion system, which effectively solve this problem. Waste gas will go through three safety devices that are water sealing, flame arrester and gas burner. In the blower aeration condition, waste gas can be complete combustion at the bottom of the furnace, on the one hand it can prevent pollution of the atmosphere, on the other hand it can save a lot of fuel, saving energy.

9, flue gas processed environment protection system

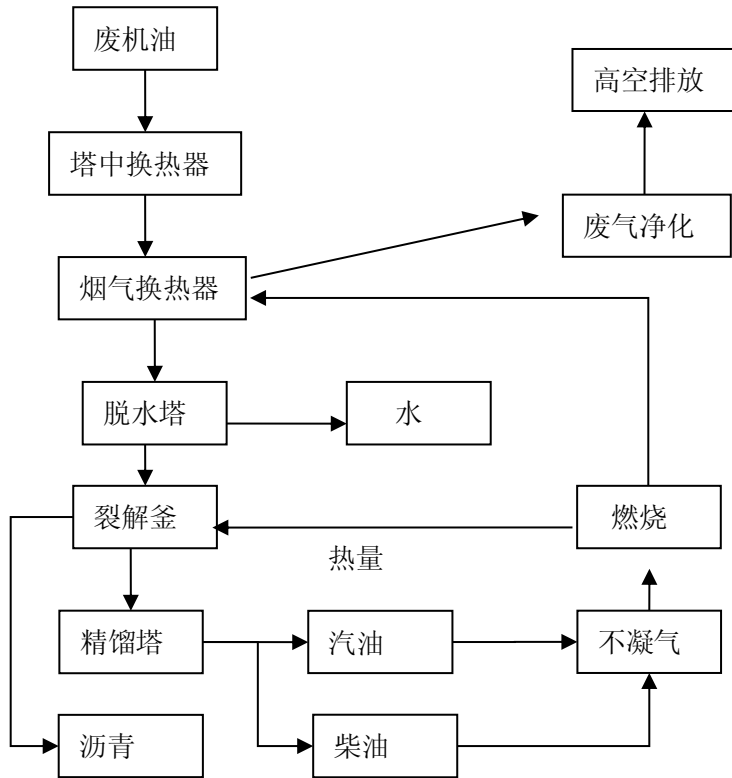
Flue gas: My company's design of wet dust removal system solve the problem completely of smoke environmental pollution, and dust removal rate is more than 95%. After the wet dust remover remove the dust, discharging will be standard. Smoke removal system is not over pressure due to the adoption of the induced draft fan device, which is safe operation. Dust emission can achieve comprehensive atmospheric pollutants emission standards (GB16297—1996) .

10, pre-treatment system

Raw material of used engine oil remove mechanical impurities and water by the pretreatment system. At the same time, making use of waste heat heating raw material.

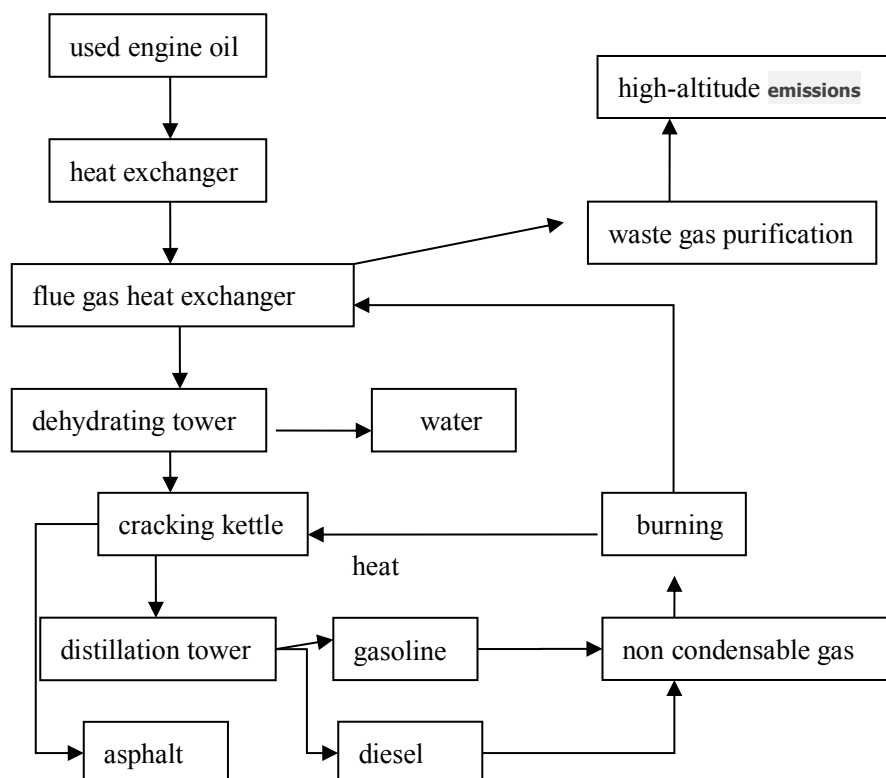
七、生产工艺流程框图

废机油裂解汽柴油工艺框图如下



VII Production Technological Process Sketches

Used engine oil cracking gasoline and diesel process sketches as follows:



八、参数及型号

序号	项目	内 容			
1	设备型号	JX-10 型	LX-20 型	LX-30 型	LX-50 型
2	原材料	废机油			
3	结构形式	卧式带塔	卧式带塔	卧式带塔	卧式带塔
4	加热方式	直接加热	直接/间接加热	直接/间接加热	间接/间接加热
5	24 小时处理量 (不低于)	10 吨原材料	20 吨原材料	30 吨原材料	50 吨原材料
6	工作形式	间歇式作业	连续式作业	连续式作业	连续式作业
7	工作压力	常压	常压	常压	常压
8	出油率(不低于)	80%	80%	80%	80%
9	配备动力	22.7kw	31kw	40.0kw	50.0kw
10	冷却方式	水冷	水冷	水冷	水冷
11	冷却水循环量	40	60	80	100

	(T/h)				
12	安装方式	有基础	有基础	有基础	有基础
13	噪声 dB (A)	≤85	≤85	≤85	≤85
14	设备制造周期	30 天	40 天	40 天	40 天

VIII. Parameters and Models:

No.	Item	Parameters			
1	Equipment Model	JX-10	LX-20	LX-30	LX-50
2	Raw material	Waste engine oil			
3	Structural style	Horizontal type with tower			
4	Heating method	Direct heating	Direct/Indirect heating		
5	24h handling capacity(≥)	10t raw materials	20t raw materials	30t raw materials	50t raw materials
6	Working form	Batch	Continuous		
7	Working pressure	Normal pressure			
8	Oil yield(≥)	80%	80%	80%	80%
9	Power	22.7kw	31kw	40.0kw	50.0kw
10	Cooling mode	Water cooling			
11	Cooling water circulation quantity (T/h)	40	60	80	100
12	Installation	With foundation			
13	Noise dB (A)	≤85	≤85	≤85	≤85
14	Manufacturing date	30days	40days	40days	40days

九、经济效益分析:

以处理废机油 10 吨/天系统国内市场为例, 计算每天经济效益分析:
项目支出和产出表人民币

序号	项目	数量	单价	合计(元)
1	原材料	10 吨	1800	18000
2	人工	10 人	100	1000
3	燃料	1 吨	2000	2000
4	电费	30 度	1	17.4

5	水费	10 吨/小时	2	528
6	其他支出（管理费等）			1000
7	税收			0
8	支出总成本			22545
9	柴油	8.5 吨	3000	25500
10	财政环保补贴	10 吨/天	100	1000
12	日总利润			3955
13	月利润	30 天		118650
14	年利润	300 天		1186500

VIII. Economic Benefit Analysis

We take converting 10TPD waste engine oil to diesel oil system Domestic market for example to count the economic benefit per day.

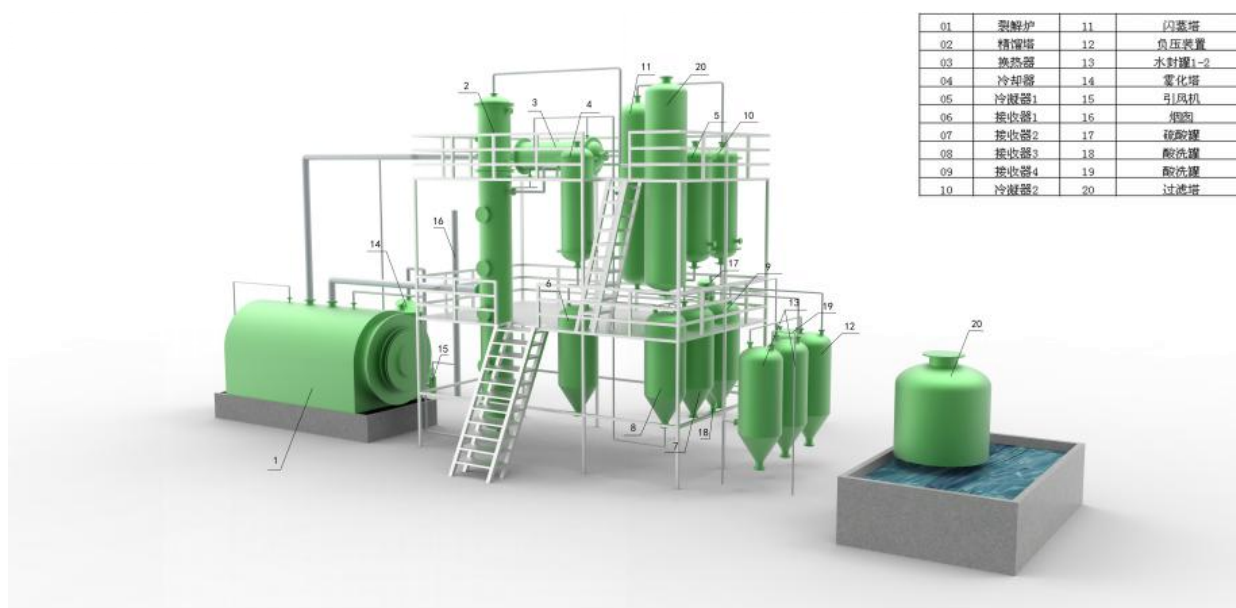
Project Costs and Income List



No.	Item	Quantity	Unit price	Amount(RMB)
Costs				
1	Raw material	10 tons	2000	2000
2	Labor	10	100	1000
3	Fuel	1tons	2000	2000
4	Energy charge	30KWH	1	17.4
5	Water charge	10t/h	2	528
7	Other costs(management cost, etc.)			1000
8	Tax revenue			0
9	Total costs/day			22545



Income				
10	Diesel base oil	8.5TON	3000	25500
11	Financial subsidy	10t/d	100	1000
12	Total income/day			3955
14	Monthly profit	30 days		118650
15	Annual profit	300days		1186500

六、工艺设备及 3D 图及设备详细清单



3D Drawing & Equipment List












N o.	Item	Size	Quantity	Unit	kg	Material	Remark	
1	Tube furnace 裂解炉	Φ 2000*6.600	1	pc	21660	锅炉钢		
2	Distillation tower 精馏塔	Φ 700×9000	1	pc	2600	碳钢	含冷凝器，填料 with condenser filling material	





3	Dehydrating tower 脱水塔	Φ 800×2200	1	pc	1730	碳钢	含堆积材料 with filling material	
4	Receiving oil tank 接收罐	0.5M ³	4	pcs	531	碳钢		

5	Water seal 水封罐	0.5M ³	1	set	376	碳钢	
6	Residual oil tank 渣油罐	1.5M ³	1			碳钢	
7	Overhead condenser 塔顶 换热器	DN800×2500 (40m ²)	1	pcs	1873	碳钢	

8	Middle of tower cooling machine 塔中冷却器	DN700×2500 (20 m ²)	1	pcs	3810	碳钢		
9	Dehydrating tower cooling machine 脱水塔冷却器	DN600×2500 (20 m ²)	1	pcs	1090	碳钢		

10	HIGH Temperature hot oil pump 高温热油泵	3.0m ³ /h, H=30M	1	pcs	50	P101 P105	耐高温 350°	
11	齿轮泵	3.0m ³ /h, H=20M	1	pcs	160	P102		
12	除尘水泵	6.3m ³ /h, H=32M	1	pcs	160	P103 P104 P106		
13	化工水泵	6.3m ³ /h, H=32M	3	Pcs	160			
14	热油泵	6.3m ³ /h, H=22M	1	pcs	100		耐高温 350°	
15	Cooling water pump 冷却水泵	100m ³ /h	1	pcs	100	P109	Clarified water pump	
16	Water circulating pump 水循环真空泵		1	pcs		P107		

17	Centrifugal pump 离心水泵	20m ³ /h	1	pcs		P108		
18	Valve 阀门	1200*1000*1200	1	set	1000		全系统共有阀门(含高温阀, 垫片, 螺丝)	
19	Pipeline fire barrier 管道阻火器	DN40	2	pcs				
20	Atomizing dusting tower 雾化除尘塔	Φ800×4800	1	pcs	1280	碳钢		
21	Draft fan 引风机	4KW	1	pcs	30			

22	Cooling tower 凉水塔	200m ³ /h	1	pcs		玻璃钢	
23	Power distribution system 配电系统	1000*1200*750	1	set	80		
24	Instruments 仪器仪表		1	set			
25	Chimney 烟囱 1	Φ400×1500	1	set	350	碳钢	
26	Spray water pump 喷淋 水泵	2.2kw	1	set	20		

27	Non-condensable gas buburner 不凝气燃烧器		3	Pcs			不凝气体回燃	
28	操作平台		1					

此清单图片仅供参考

[the pictures of the item listed just for reference](#)

备注：以上所有资料仅供参考，最终以双方达到的协议为准。



New Energy Opener

website: <http://ytny.en.alibaba.com>

email: uyjd_grace@126.com

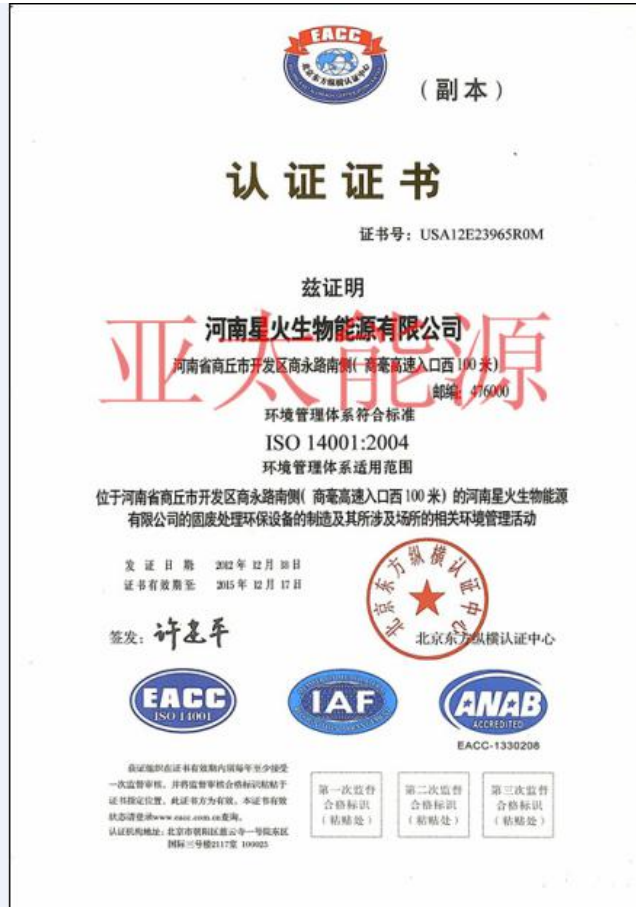




New Energy Opener

website: <http://ytny.en.alibaba.com>

email: dyjd_grace@126.com



CERTIFICATE No. : 0647/IN-IST-13
IS1350-0499(AOQ)AKC/501742



**EC-ATTESTATION CERTIFICATE
OF MACHINE SAFETY**

Date/Place of Issue : 23.06.2013 / Istanbul
Valid Until : 23.06.2016

Name of Applicant : Henan Xinghuo Bio-Energy Co., Ltd.
Address of Applicant : South Side of 500m West of Entry to Uguang Motorway, Muji Rd., Economic Development Area, Shangqiu City, Henan Province, China
Name of Manufacturer : Henan Xinghuo Bio-Energy Co., Ltd.
Address of Manufacturer : South Side of 500m West of Entry to Uguang Motorway, Muji Rd., Economic Development Area, Shangqiu City, Henan Province, China

Description of Product : Pyrolysis Plant
Model(s) : # WXLL-12; WXLL-16; WXLL-19; WXLL-22; WXLL-26; WXLL-30 #
Assessment Performed : Conformity to Annex I's Applicable Paragraphs of 2006/42/EC Machinery Directive.
Standard(s) : # EN ISO 12100:2010, EN 60204-1:2006/AC:2010 #
Conditions Subject to Issue : Acceptance of Information Detailed in Technical File TCF-130619-115 and Referenced Against Job File IS1350-0499.
Declaration : In the Opinion of SGS the Submitted Technical File TCF-130619-115 Satisfies the Requirements of the Machinery Directive 2006/42/EC Annex-VII.
Assessor ID No. : TR-IND-S20
Date/Place of Assessment : 06.06.2013 / Henan - China

Test reports in technical file TCF-130619-115 and referenced against job file IS1350-0499/501742 (OUCE 13873) are reviewed and found to be acceptable. This certificate is valid as long as the relevant directives and harmonised standards written above are current. The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

CE

This EC-Attestation Certificate is only valid for the equipment and configuration described in conjunction with the data detailed above. It refers only to the sample submitted to SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş. for testing and certification. Any modifications made to the product shall immediately be reported to SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş. office in order to examine whether this certificate remains valid. This certificate shall not be reproduced except in full without the written approval of SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş.

For and on behalf of
SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş.

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