



## NRY Waste Engine&Lubrication Oil Recycling machine



(Sold to Pakistan, the capacity is: 20,000Liters per day.)



(Sold to Libya, the capacity is 4,000Liters per day. we are making another machine for Mexico, whose needed capacity is 10,000Liters per day, we will finish it next month, welcome to visit us)

## Application



Tengpu NRY Used Oil Regeneration System is particularly suitable to regenerate used internal-combustion engine oil including diesel engine oil, gasoline engine oil, motor oil, ship engine oil, truck oil, and used hydraulic oil, other used machinery lubrication oil, it is also suitable for used fuel oil, such as fuel oil for boiler and burning. This machine can remove water, impurity, acid base, and tiny impurity dispersed in oil such as carbon particles, heavy metal ions, deep oxides, as well as bad substance such as colloid and bitumen. Thus, the clarity of oil is recovered, engine oil quality improved, performance of engine restored, abrasion reduced, these would ensure correct operation of lubricant system of a engine and extend the life time of engine oil and engine as well. This kind of purifier is applicable to purification of various mixtures of used car engine oil (diesel engine oil, gasoline engine oil), motor oil, ship oil, truck oil and other industrial oil. The treated oil is base oil, oil index is near to new base oil.

## Edges of NRY

- ◆ Two main filtration tanks to guarantee the continuing operation with each batch.
- ◆ Environmentally friendly whereas no acids used during operation.
- ◆ The filters in filtering systems are made of stainless steel. It can extend lifetime of filtering systems. Traditional filter is made of fabric or paper which need to be replaced frequently. So using stainless steel filter can largely decrease operation cost for customers.
- ◆ Exhaust gas removing systems can remove exhaust gas quickly and efficiently and make operation more environmentally friendly.
- ◆ Heat preservation material which can keep heating high efficient. Reducing operation cost.
- ◆ Purify blended oils.
- ◆ Low maintenance and replacement cost.
- ◆ Low operation cost.
- ◆ High regeneration rate.
- ◆ Automatic reverse-washing system will extend the lifetime of filters and improve the performance of the filters.
- ◆ High performance security system including pressure protection device and automatic temperature controller makes purifier operate safely.
- ◆ Small size, light weight, low noise.

## Features

1. High precision stainless steel net is used as purifying material which is corrosion-proof, high temperature resistant and has a good mechanical strength with longer life time, capable of removing oils' tiny impurity in more depth.
2. Remove of water high accurately and effectively
3. Capable of recovering the clarity of engine oil back to the clarity of new oil.
4. This purifier adopts physical and chemical action, eliminate polar electric charge in waste oil, letting them gather to be big particle and be separated out, and remove bad substance such as

carbon particles, heavy metal ions, deep oxides, as well as colloid and bitumen. At the same time, it can remove exhaust

gas by Gas treatment system and remove remnant water by vacuum system, thus can gain the purpose both cleaning oil and remaining helpful component in oil.

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5. Strong condensation technology is applied to the drawn out mixed harmful gas, which increases effective output and extend lifetime of vacuum pump.

### Working principle and flow

Contaminated oil get into the primary filter by the pressure difference outside and inside, large particles are removed first, then the oil get into oil reactor and start to heat, certain amounts additives are added into the reactor, it can agglomerate remove the tiny impurities, heavy metals, carbon particles, deep oxides, as well as bad substance such as colloid and bitumen, and free water, and free carbon, will make a polymerization reacting by the function of physical and chemical methods. Then the oil will go to the filter system, all polymeric carbon, colloid, impurities will be removed. The gas will be removed by gas treater and vacuum tank under the function of degassing and dewatering. Then, the oil passes through the high precision filter to filter off impurities, getting purified oil similar with new one. The treated oil is base oil.

### Questions & Answers

#### ◆How NRY can run continuously?

NRY regenerate waste oil by batch. Tongrui design two main filtering systems in the NRY which can ensure that NRY work continuously by turns.

#### ◆Can NRY regenerate mixed oils?

Yes, NRY can regenerate mixed oil including used car engine oil(diesel engine oil, gasoline engine oil), motor oil, ship oil, truck oil and other industrial oil.

#### ◆What residues or by-products NRY produce after regeneration?

For NRY series, there are some residues or by-products, such as graphite and bitumen. Customer can directly bury it or burn is as fuel, or can utilize it on by other ways. For example, the graphite is a very valuable substance, customer can extract graphite from residues by themselves. Besides, customer

can buy our ZJY oil pressing machine, which can press the residue and get clean oil from it. The residue after pressing by ZJY machine, its oil content is within 0.5%, it becomes stone condition, cement color, can be used for paving road, or as construction material, very environment friendly.

#### ◆Is every times treated oils performances the same?

It depends on waste oil. If each batch of waste oils performance is the same, the treated oils performance is the same.

#### ◆What is regeneration rate?

It depends on compositions of waste oil that you want to treat. If there is lots of water, impurities or other matters in waste oil, the regeneration rate is low. Generally speaking, the rate is from 70%-90%. It is up to the quality of waste oil.

#### ◆ What is treated oil?

The treated oil is base oil; the grade of treated oil is a little lower than virgin oils.

#### ◆ What are treated oil applications?

The treated oil can be used as machinery lubrication oil, diesel engine oil, gasoline engine oil and other lubrication oil. Customers can add additives to treated oil according to definite applications before reuse. Treated oil can also be used as fuel.

#### ◆ What are differences between virgin oil and treat oil?

If the waste oils properties (before me) are high, the treated oils properties are also high. Generally, the regeneration process doesn't affect main performances of oil. Some indexes are lower than new oils, some indexes are the same as new ones.(Please refer to test report)

#### ◆ Are there any chemical materials needed during processing?

Yes, there are some chemical materials needed in the process. We at least add three necessary chemicals into the waste oil. Because the waste engine oil from different country and regions are different. Both contamination level and mixture oil types are also different, some region's waste engine oil is too much bad, so maybe our engineer will select one or two more kinds of chemicals to add into the waste oil, to help improve oil quality and recover color. The specific chemicals types and quantity should confirmed after several times experiments by our engineer.

#### ◆ How long is lifetime of NRY plant?

The lifetime can last several years under proper operation.

#### ◆ How about the maintenance of NRY?

The maintenance is very simple. Replace lubrication oil for vacuum pump every year. Check the filters, valves, and gaskets periodically.

#### ◆ Does NRY needs professional engineers to operate?

The operation of NRY is very simple. Generally, two or three workers can operate it after two days' training.

## ◆ **Does NRY need auxiliary equipments?**



No, our machinery is a whole set of equipment, include the reactors, filters and the exhaust gas treatment system(used for removing bad gas and odor of the oil).

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## ◆ **How to install NRY? (After-sale service)**

Customer can install NRY according to operation manual. For NRY product line, we will dispatch engineers

Go to customers work site to supervise installation and provide training. We also provide turnkey project

for customers. We will design factory layout for customer, help establish a workshop for customers including auxiliary facilities.(Round-back air tickets and accommodation should be paid by buyer)

## ◆ **What space does NRY need?**

It depends on the customer's required capacity, different NRY models are for different capacity. We can design different dimension of NRY machine for customer's request.

## ◆ **How long is the delivery time?**

For standard NRY models, it needs 35 days to 75 days(according to machine capacity) production period in our factory. And the total delivery time is from 45 days – 85 days, because inspection by government department and apply for custom need another 10 days. For special order, we need 3 days to design, and then manufacturing it.

## ◆ **What kinds of engine oil NRY can not regenerate?**

Generally, NRY can regenerate most engine oils, and the color will reach No.2. But for some very high grade gasoline engine oil, NRY can remove colloid, oxid, acid, pitch, particles, impurities, water, gas.

But the color of treated oil is No.3 after treatment. Customers should mix it with used diesel engine oil

or used hydraulic oil before treatment in order to get good treatment oils color.

## ◆ **What kind of heating system is installed in NRY?**

There are two heating devices in our machinery, one is using electricity power for heating, and another

is the boiler (steam water), our standard device is electricity oil heater, so if you want to use boiler

(steam water), you can buy and install boiler by yourselves, or order it from us.

## ◆ **What reasons influence treatment capacity?**

There are several reasons such as environment temperatures, efficiency of operator, water, Impurities in used oil, properties of used oil and so on.

#### ◆ How long is warranty period?

Tongrui warrants the plant supplied under this specification against defects in material and workmanship under normal use service for a period of twelve (12) months after the start up of the system.

#### ◆ What is the other cost for NRY system working?

Electricity cost, chemical cost, manpower cost, and repairing, maintenance cost.

#### ◆ What is the electric power requirements and consumption per day?

NRY system use in different countries, it depends on local industrial power supply whether we need prepare transformer together with NRY equipment.(Our country's industrial power supply is 380V, 50HZ, 3-Phase. If yours is different, we will provide you with a transformer)

### Optional accessories

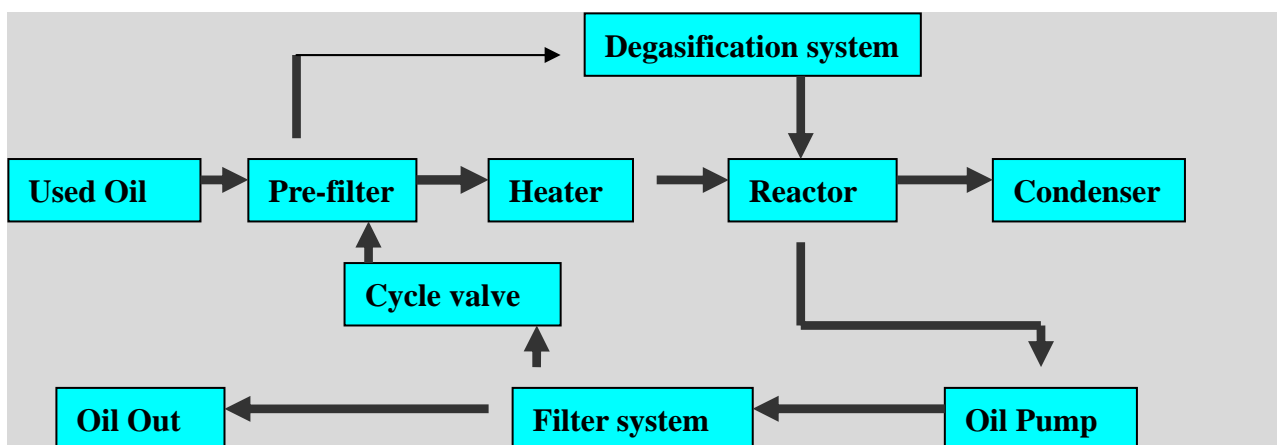
#### ◆ Chemicals:

Tongrui will introduce professional chemical supplier to customer.

#### ◆ ZJY Residue Oil Pressing Machine

ZJY oil pressing machine can press the residue from NRY system and get clean oil from it. The residue after pressing by ZJY machine, its oil content is within 0.5%, it becomes stone condition, cement color, can be used for paving road, or as construction material, very environment friendly.

### Flow Chart of Machinery



## Technical Index

Item	Unit	Theory index	Treated oil index
flow viscosity	100°C mm <sup>2</sup> /s	12.5-16.3	11.6
Flash point (open)	≥	220	232
Acid mgkoH/g	≤	2.0	0.04
Impurity %	≤	0.01	0.006
Water-solubility acid or alkali	/	/	no
viscosity index	≥	80	91
Pour point °C	≤	-10	-26
Sulfate ash	/	/	0.172

## Machine Picture:



The capacity is 1000 Liters per day to 3000 Liters per day; the working hour is 8 hours per day.



This is the smallest one with capacity 500Liters per day, and there is the same sample machine in our factory, if you come to China to visit us, we will run this small machine for you face-to-face

This is NRY-II(Capacity:4000-8000Liters per day)



This is NRY-V(Capacity:10,000Ton per day)







## Additives specification

### 1. Additive I: (Adding Percentage: 0.5%-1%)

Name	Tetraethylenepentamine / tetraethylene
Abbreviation	<b>TEPA</b>
Molecular formula	$C_8H_{23}N_5$
Density	0.998
Molecular weight	189.30
Content (%)	$\geq 90\%$
Melting point	- 30 °C
Boiling point	340.3°C

### 2. Additive II: (Adding Percentage: 1%-2%)

Name	Water glass
Molecular formula	$Na_2O.mSiO_2$
Density(200c)g/cm <sup>3</sup>	1.368-1.394
Sodium oxide( $Na_2O$ ) content ( % $\geq$ )	$\geq$
Silicon dioxide content ( % $\geq$ )	$\geq$
Baume degree	4
Quality standard (conform to)	GB/T4209-1996

### 3. Additive III: (Adding Percentage: 10%-20%)

(1) Name: Active white clay

(2) Specification:

Item	Specification demand			Analyzing method
	Best	Better	Eligible	
Decolorization Ability $\geq$	$\geq 95$	$\geq 92$	$\geq 90$	Q/SH 006.5.01-1998
Activation ( ml/100g)	$\geq 225$	$\geq 220$	$\geq 200$	Q/SH 006.5.01-1998
Free Acid (calculated as	$\leq 0.2\%$			Q/SH 006.5.01-1998
Moisture (%)	$\leq 8.0$			Q/SH 006.5.01-1998
Granularity(200 mesh) $\geq$	$\geq 90\%$			Q/SH 006.5.01-1998
Leaching rate(ml/min) $\geq$	$\geq 4.0$			HG/T2568-94
Pile Density (g/ml)	<b>0.7-1.1</b>			HG/T2568-94

These three kinds of chemical are necessary, but from different region's waste engine oil quality is different, so maybe it will adopt some other chemicals together with this three kinds chemicals. We will send our chief engineer to customer's factory to install the machine and train workers and will provide the complete chemical details after the client purchase our machine.