

Mini converter carbons and wastes for Biogas production and Energy Cogeneration model «ПТК-52»



Team: System processing of raw materials, thermochemical conversion reactor.

Features:

- the team is a model designed for an average family house of 108 m², our company gives this team for free nustrors representatives to show that conciste the pyrolysis

process, but this team is far from the technology used in the model lek, is a way to introduce and explain the process.

- The net energy required by the power generation system is 31.75 kWh / day, which added to the energy required to meet gas consumption (25.87 kWh / day), it follows that the syngas must deliver a total energy of 57.6 kWh / day.
- Raw materials and daily operation time operation

Performance	70%	40%	90%	
Total daily biomass	49.50	86.63	38.50	Kg/d
Wok time	12.83	23	10	h/d
biomass flow	3.81	3.77	3.85	Kg/h
Syngas flow	21.25	12.01	27.62	Nm3/h
Char Flow	1.142	2.26	0.385	Kg/h

- As a closed system to use mini , works at low temperatures (225C) unlike the lek model that works at high temperatures. (We recommend this model not exceed 300 degrees C)
- It is a closed and compact, with a nice design and components are distributed as efficiently as possible.

1.INTRODUCTION

The use of everyday waste generated by a single family home , away duly ceramic and metal waste , waste likewise submit humad superior to 15% keeping the proportion of at least 45 % of biomass should not be included .

The methods applied so far for the use of waste (burial and burning) have proved inadequate and have led many countries outside environmental disasters .

In addition, the common parent of such waste is coal. Coal is the main energy source of modern civilization , which determines the strong possibility of reuse.

In the past 20 years , in parallel with the growth in oil prices , has been widely developed gasification technology . Gasification waste can produce synthesis gas or producer gas (a mixture of CO and H₂ to heat capacity), an

alternative to natural gas , oil and coal in steam boilers and diesel fuel in diesel that serves universal raw material in the production of organic chemistry including second generation fuel engine generators.

2. TECHNOLOGY

The **BIOREX™** technology presents the idea of interaction with nature in the use of waste and preparation of mineral resources, and the union of several methods of production in a highly efficient technological line in a totally free waste cycle , corresponding to the requirements more stringent environmental laws . The model 52 is a mini ПТК model that explains the process of their limiting reactors in dimensiones and safety equipment to be home.

without waste recycling many materials. Autonomous , modular, mobile , in sizes from 1 * 1 * 0.5 , its assembly requires no previous job settings before construction or commissioning .

The installation mode lets you change the properties of the product according to customer requirements at the time of purchase and increase , or change , their chances in the process of exploitation.

The difference with the installation of similar equipment is that , it is ready for construction, and is not a project under development. Building solutions have substantially reduced the size , mass and correspondingly reduce the value of installation of the series.

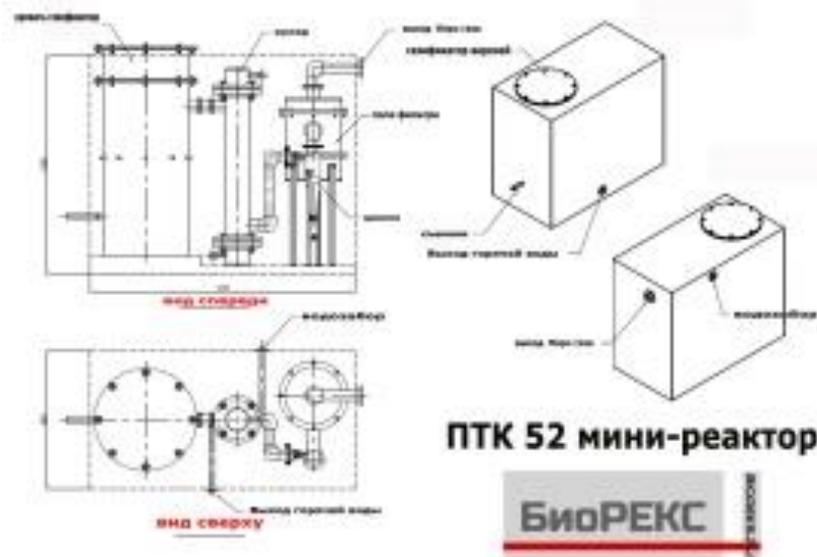
The complexes were prepared under the principle of " complete technology " as article factory pass tests in production workshops , possess a passport and instructions for use , and are subject to an agreement between technical inspection bodies .

Construction деД ПТК 52 is subject to a triple guarantee of uninterrupted work of the complex: daily fuel reserves , duplicate key blocks off alternative possibility for prevention, and gas meters or dispensable for storage of reserve fuel (optional) receptor .

- Fully autonomous modules that require only a timely supply of raw materials , work - based own energy balance and require no external connections ;
- Selection of equipment for heat recovery from the combustion of natural gas is not limited to the boiler steam or water is also possible to adapt a mini generator do times.
- The proposed scheme is easier to fit the processing of existing industrial infrastructure such as natural gas can be fed into the existing furnace for complete or partial replacement of the fuel used today.
- A very high level of energy conversion. One kilogram of raw material produces 1KW 2KW electric and thermal power .
- Absence of toxic gas into the atmosphere .

2.1. Description of technical process

Scheme based composition ПТК 52 module is presented in drawing 2.



After the Prebio free of trash, is entered in the front hatch. Must be kept open and start the process using a combustion diesel or as paper until it is verified with the heat gun that the process is stable, use an exhaust gas or vacuum pump that allows the entry of oxygen to the reactor chamber and accelerates the process of gas extraction in the system. This process can take 5 to 20 minutes, after which the team will be fully operational and will begin to generate biogas to reach the temperature of 200 C.

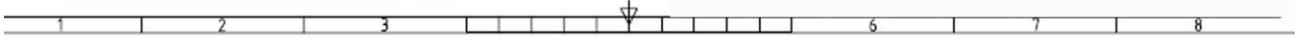
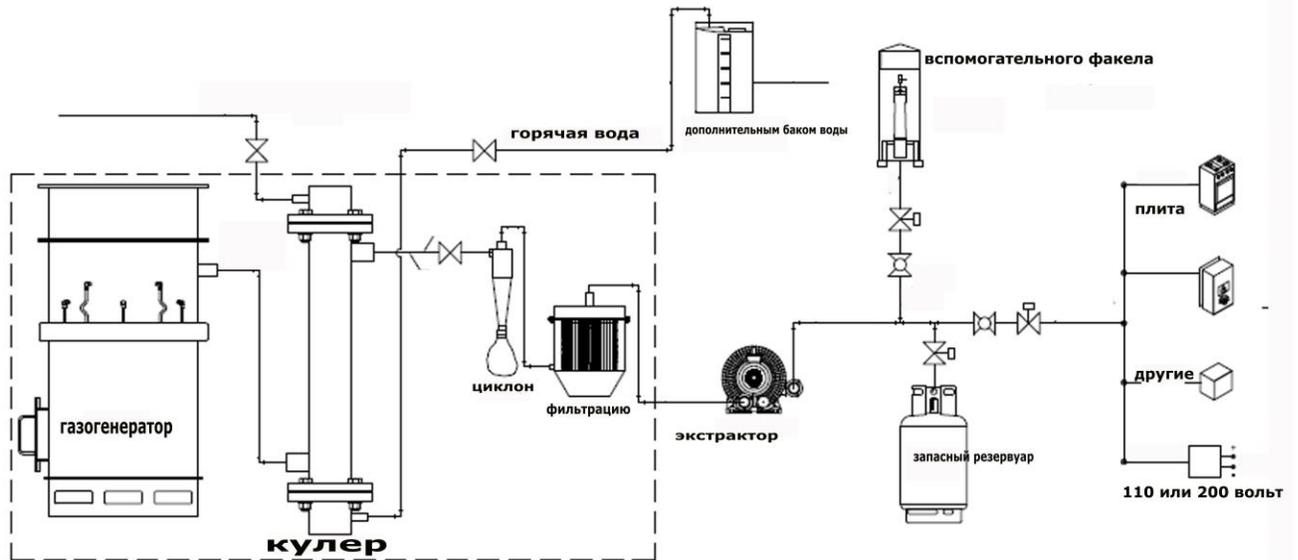
It is recommended for commissioning plastic mixing timber and and other debris. Check the composition table of garbage.

MORPHOLOGICAL STRUCTURE AND THE AVERAGE AVERAGE SIZE OF BEADS SOLID WASTE

Material	Generals	Content, %		
		size, mm		
		+200	-200+80	-80

Waste paper or paperboard	22,00	6,60	200,40	4,00
Organic waste	35,00	0,00	90,20	25,80
textiles	5,50	3,30	300,00	0,20
Plastics	2,00	0,15	200,60	0,25
polymer	4,00	1,45	200,50	0,05
Leather, elastic	1,50	0,05	10,45	0,00
wood	1,50	1,30	200,20	0,00
bones	1,00	0,00	0,30	0,70

VIEW OF REACTOR ПТК MINI 52 WITH ITS APPLICATIONS



1.2 Technical characteristics of the module 52 ПТК

DESIGNATION	ПТК52
productivity	57 kw/h dia Consumo de materia prima del reactor después de clasificación y 3.85 kg/h
raw material	Carbonos , incluyendo los residuos domesticos
Quantity of raw material for their own energy consumption	hasta 0%
Moisture of raw material	hasta 15%
Amount of ash raw materials	hasta 15%
Annual working hours	8 000
Production of gas	12-27 nm3/h
temperature	200-300 °C
gas temperature	40-30 °C
Electric power cogeneration	52kw/h
Heat power cogeneration	104 kw/h
Power Consumption	0 KW
Water consumption	10 litros , el agua circula
area required	2 m2
Dimensions L-W (m)	1x 1x 0.5 mts
General weight	100 kg
health Zone The complex is safe, can be located in any area of the house.	4 m
emissions atmosphere soil water	no

Other:

a. Size of the heat exchange chambers - 1000 * 200mm.

Two. Size of the filter box cameras - 350 * 200mm.

Three. The gas pressure in the entire system is from - 1000 to 1500 Pa, the gas pressure in the gas container is 300-500 Pa, all the gas cleaning system operates under negative pressure. Requires a vacuum pump creates a negative pressure to the gas flow through the purification step.

2.3. Requirements for raw materials

Correct preparation of the raw materials is a very important point for gasification and similarly for Obtaining gas, quality control, a high level of productivity and for the purification of the gas.

The dimensions of the raw material may vary Depending on the type of biomass but the humidity can not Exceed 15%. It Should be taken into account:

- a. Check the size chart of the raw materials
- b. Humidity not greater than 15%
- c. Mixing various types of raw material or waste:

The technology allows effective BioREKS process household waste. The design characteristics of the reactor allows to gasify raw material to 10 mm and 250 mm long.

By designing **BioREKS** reactors can process various types of carbons at the same time.

The module can process biomass gasification:

Household waste (produced by the company), various carbon sources (industrial, agricultural, municipal, etc.), Including municipal solid waste classified.

Minerals of organic origin, such as coal, peat, etc., Natural raw materials of organic origin (biomass) such as wood, manure, garbage, etc..

2.4 . Preparation system and airflow

The airflow system becomes a vacuum pump not included . Wherein the air before entering the reactor passes through the heat exchanger where the maximum temperature reaches 300 ° C. The mixture of air enters the working area of the reactor through pipes in a row.

2.5. Purification and cooling block syngas

The requirements for the purification of the synthesis gas varies depending on the composition of the feedstock. Before passing the synthesis gas generator , the gas is cooled to 150 ° C at 30 -40oC .

For purification of the gas passing through the same separation systems , which clean the gas oils , soot and acids.

To replace the natural gas , diesel fuel or heating oil in the synthesis gas is performed a simple purification . The gas used for heating water or steam boilers burn completely , leaving no pollution.

Fig.6 Exterior view of the purification system and syngas cooling

Specifications of cleaning and cooling the synthesis gas :

Heat exchanger	Cools, and removes ash particles of gas
Filter cyclone	Removes resin gas
Filter box	Removes resin gas
Vacuum pump	Creates suction of gas through the purification and gasification system and provides a gas pressure storage. (Not included)

The studies on the presence of toxins (dioxin) in the gases showed that gasification and combustion produced in the gas generator burner or the combustion engine , contains toxins in the combustion gases at a magnitude below the permissible values Europe .

2.6 . Modulo ash processing

The problem of processing waste ash thermal decomposition is scarce worldwide . The ash residues and consist of a mixture of metal oxides .

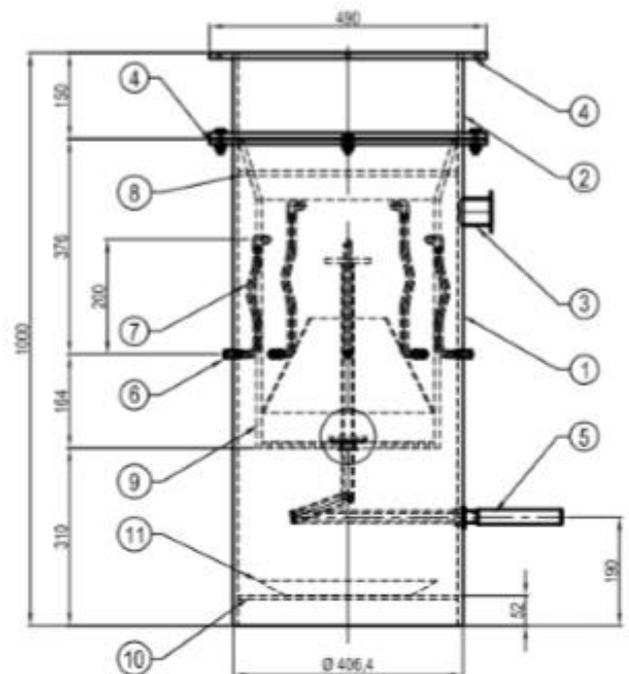
A request can have a module to process the ash. It's another one of our teams in our production line for separation of ash and metals.

2.7 . Energy generator electrical system (not included)

For the production of electric power generators are used to rebound 52kW / h . Their selection and combination depends entirely on customer needs in terms of energy resources. During the transformation of conventional fuel generators syngas down engine power by 10-15 % and increased use of unit labor by 30-40 % is shown .

3. Details of the reactor

- 1) External cylinder
- 2) Receptor biomass
- 3) Check gas filter system
- 4) Cover receptor biomass
- 5) Removal of biomass
- 6) Check the feed air
- 7) Air Duct Feeder
- 8) Seal feeder biomass
- 9) pyrolysis chamber
- 10) bed
- 11) tray reciduos



4.Ecology

BIOREX™ technology presents the idea of interaction with nature in the use of waste and preparation of mineral resources, and the union of several methods of production in a highly efficient technological line in a totally free waste cycle , corresponding to the more stringent requirements of environmental laws .

Before turning to the generator, the synthesis gas is purified by a vapor mixture . All fractions filtered to re-enter the reactor to be removed. Ash is the only residue left after the thermochemical conversion process , which becomes a dark gray mass , which contains no carbon . Finding municipal waste mercury lamps , batteries and other items containing heavy metals.

The study showed that the ashes of the volatile compounds of heavy metals that are dangerous to human health associated after going through the process of thermochemical conversion become types of salts. Moreover it was found that the glass from the trash , promotes crystallization of heavy metals and their conservation.

5 WARRANTY

5.1 . Thermochemical Conversion Reactor

Warranty: 2 years or 8000 hours after launched

Continuous working period : 720 hours

Internal Maintenance : 1 to year, recess and inspection every 3 months

Purification system and cooling : 1 year after launched , you need to stop and check it once a month .

6. IMPORTANT

The technical description is not a public offer or commitment to sign a contract , aims to familiarize the customer with the basic technical characteristics of our equipment.

This is a computer model and is offered at no cost from our - being only responsible for transportation costs of the team.