imited liability company
«NIKOTERM»
Code 41025990, 54034, Mykolaiv region, Mykolaiv city, Proezd B, bldg. 7, phone (0512) 45 50 48

List of boiler house equipment 1.0 MW



MMBH 1000 - mobile modular boiler house with a capacity of 1000 kW manufactured by "NIKOTERM"

MMBH - mobile modular boiler room consists of functionally autonomous heat generating modules fully ready for operation and completed in factory conditions. Modules can be connected in cascade, and their number is calculated depending on the needs of the consumer and in accordance with the connected thermal load of the heating network. If necessary, the MMBH can be equipped with an additional pump module with network pumps and a module for filtering flue gases.

MMBH works in fully automatic mode without the constant presence of service personnel, all processes are controlled thanks to a modern WAGO digital controller, and remote visual external and internal control is carried out by the dispatcher through a protected main or backup Internet communication channel of a cellular or satellite network. Maintenance, such as cleaning, repair and technical inspection, is performed by the service department in accordance with the work regulations.

MMBH is built on the platform of a 40-foot sea container model HC ISO 1496-5:2018, which allows rapid movement by all types of transport: both by land and by sea, without obtaining additional permits and special means.

MMBH - thanks to its modular design, it allows complete assembly/disassembly in 1-2 days on a pre-prepared site with a hard surface without arranging foundations and capital construction. Containers are placed one above the other in two or three tiers. The container of the first tier is a boiler module, which houses the main and auxiliary equipment, internal heat networks, shut-off valves and control system.

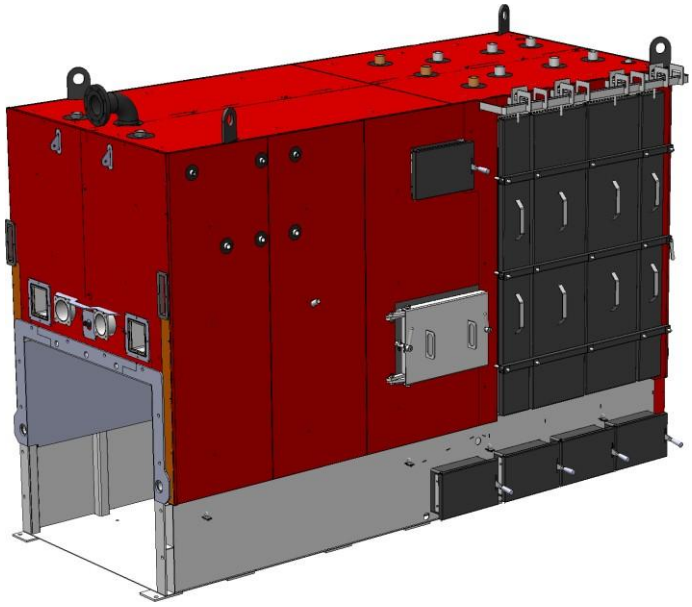
The containers of the second and third tiers perform the function of an enlarged fuel bunker with an internal volume of 76m3 or 152m3, which is used to store solid fuel in the form of pellets, is equipped with an automatic fuel supply system and is designed for 4-14 days of autonomous operation of the MMBH at the maximum production load in mode 0.5-1.0 MW/24/7.

Boiler module «NIKOTERM»

The thermal circuit of the boiler module is made according to the isolated circuit. The boiler circuit is isolated from the heat network by a heat exchange device, which ensures independence of hydraulic and water-chemical modes, as well as protection of boiler equipment from contamination. In the event of an emergency power outage, the boiler circuit is filled with a non-freezing liquid - a 40 percent solution of ethylene glycol. The boiler module contains a solid fuel boiler with a maximum capacity of 1.0 MW, which is equipped with a burner with movable grates, a monocyclone flue gas removal and filtration system, a TIROS 8p fire alarm system, a remote and automatic control system, metering devices, a set of thermomechanical equipment with pumping equipment, a heat exchanger , volume compensator, pipelines, pipeline fittings, heat meter and other related boiler equipment.



Boiler module equipment:



Boiler "NIKOTERM BIO"

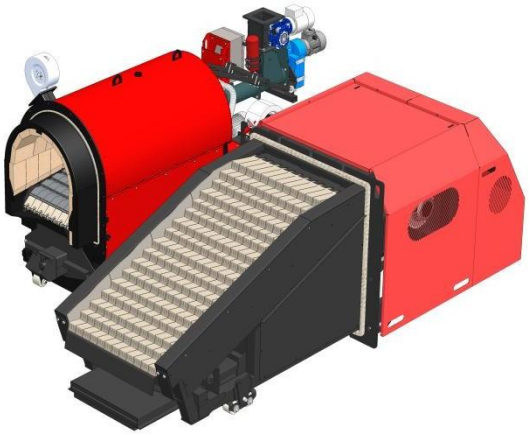
Solid fuel water heating boiler with a capacity of 1000 kW is made of P265GH steel using the Fronius (Austria) welding system and has a fully welded rectangular structure. The boiler is equipped with a furnace with movable grates and a mechanical fuel filler. The convective part is made in the form of vertical gas ducts, which allows for periodic cleaning of the surfaces of the boiler panels from soot and ash deposits through the hatches in the insulation casing of the boiler.

Indicators:

- coolant outlet temperature – 110°C;
- nominal coolant flow rate (at a temperature difference of 25°C) – 26.6 m3/h
- maximum coolant pressure – 0.4 MPa;
- flue gas temperature – 120°C-190°C;
- dimensions (with burner):

  length – 5560 mm
  width – 1660 mm
  height – 2560 mm
  dry weight – 8480 kg

Burner "NIKOTERM Multi"



The solid fuel burner was designed and manufactured according to the MULTI-fuel principle. Due to the design features and the equipment of movable grates made of heat-resistant cast iron CIChr32, which are located completely inside the furnace, have a powerful hydraulic drive with three cylinders and individual control, which allows setting the operating modes for different types of fuel, as well as three-level inflation of the combustion zone, the burner is able to burn effectively different types of solid fuel, even wet and low-calorie.

Indicators:

• main fuel - wood chips of various grades, pellets, sunflower husks, rapeseed husks, peat, coal, agricultural waste of 3 categories;
• thermal power - 1000 kW;
• regulation coefficient - 0.4;
• excess air coefficient - 1.2
• nominal air pressure before the burner - 600 Pa

Heat exchange device TERMOPROM



The TERMOPROM STA-19 1000 kW heat exchanger consists of fixed and pressed milled plates, between which there is a package of stamped plates 0.5 mm thick made of AISI316L steel. Sealing material EPDM HT. Pressure loss on the heating side and on the heated side 0.3 bar. The temperature difference between the heating and heating medium is 5°C.

Volume compensators "WATES"

Expansion tank "DAN-WATES" volume 750 l, manufactured by WATES (Turkey).
Indicators:
• maximum pressure – 10bar;
• dimensions:
diameter – 800mm;
height – 1850mm;
weight – 110 kg

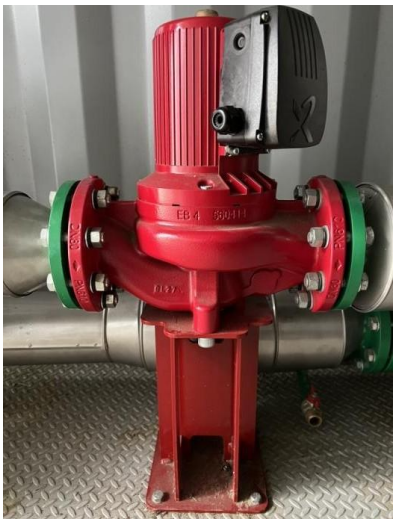




Metering devices Sempal

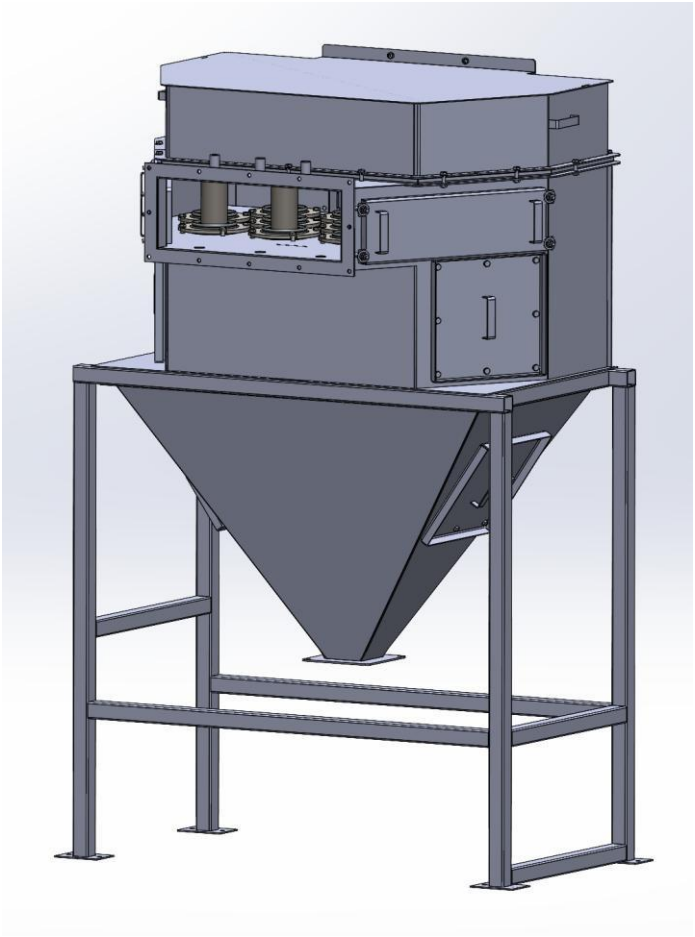
The Sempal SVTU 10-M1 heat meter is designed to determine the amount of heat energy supplied to the final consumer.

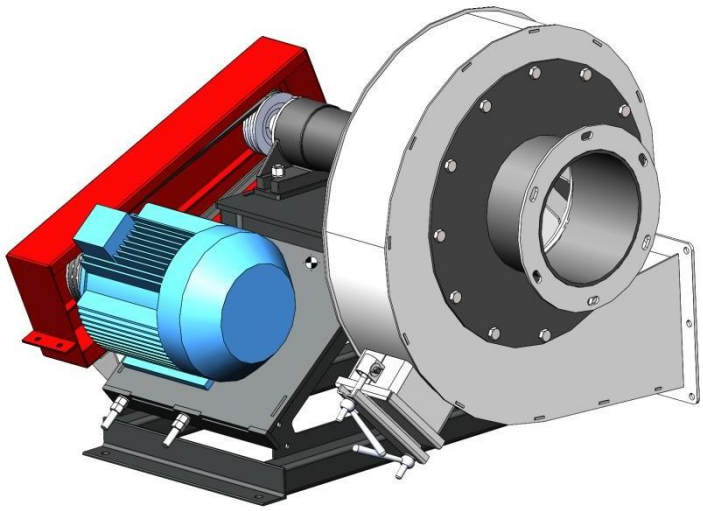
Pumping equipment Grundfos
Circulation pump Grundfos UPS 80-120F.
Indicators:
• productivity – 20…58 m3/h;
• total pressure – 93…40 kPa;
• maximum power – 1500 W;
• head 8 m;
• dimensions:
length – 360 mm;
width – 290 mm;
height – 391 mm;
weight – 39 kg



Flue gas cleaning system "NIKOTERM MULTI cyclone"

The ash catcher produced by "NIKOTERM" LLC is a MULTI-cyclone, consisting of 13 cyclones with a diameter of 125 mm with blade swirlers. Cyclone parts are made of AISI310 steel. The design of the ash catcher body is designed taking into account the possibility of cleaning and replacing the cyclones.
The MULTI-cyclone serves to remove the remains of microparticles of ash and dust from the flow of flue gases, which allows to reduce the amount of emissions of pollutants into the air, which in turn minimizes the negative impact on the external environment.
Indicators:
• throughput – 2000m3/h;
• efficiency - 85...98% (dust particles from 10 microns)
• hydraulic resistance coefficient – 182;
• permissible inlet temperature – 300°C;
• dimensions:
length – 1025mm;
width – 1420mm;
height – 2342mm;
weight – 124 kg





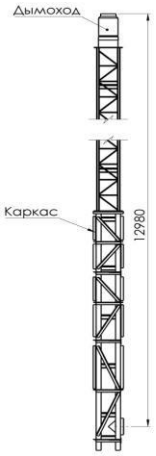
Smoke extractor "NIKOTERM VENTS"

The D-400 smoke extractor has a capacity of 2000 m³/h, a pressure of 2800 Pa. AIR100L2 IM1081 electric motor, 5.5 kW, 3000 rpm. The impeller, with a rotation speed of 5200 rpm, closed type with blades bent back, is made of AISI310 steel, which prevents contamination and ensures long-term operation at high flue gas temperatures – 300^0 C.
• dimensions:
length – 825mm;
width – 724mm;
height – 700mm;
weight – 200 kg

Thermal pipeline network

The pipelines of the boiler module are made of steel pipes with a diameter of 100 mm, covered with thermal insulation of polyurethane foam or mineral wool and a protective layer of stainless steel.





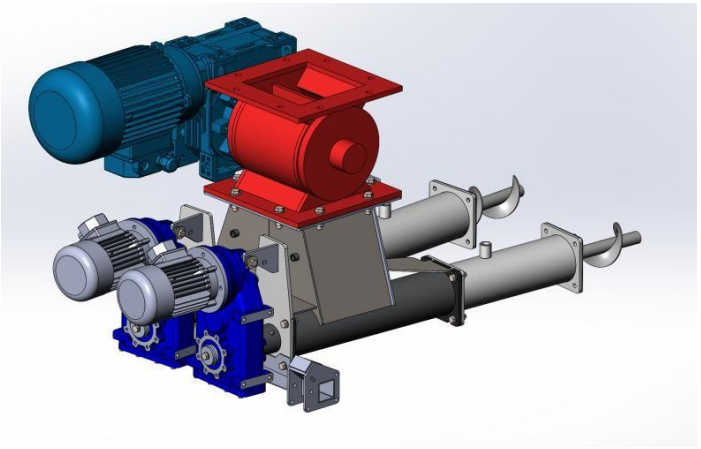
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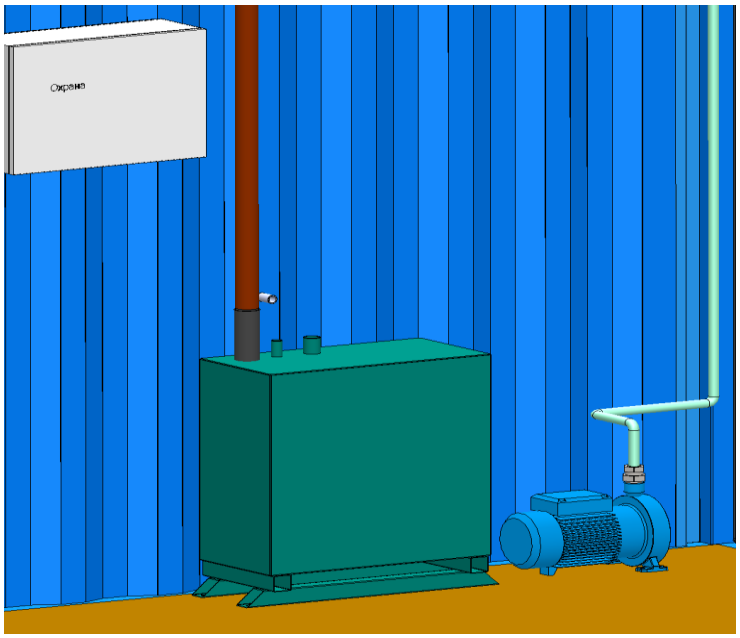
The MMBH supply package includes a 15-meter smoke pipe with a diameter of 300 mm, made of galvanized and stainless metal, has a self-supporting frame and a set of fasteners for the first and second tiers of the boiler room. In order to comply with fire safety regulations, the chimney is equipped with a lightning protection system.

Fuel supply unit "NIKOTERM"

The fuel supply unit consists of two feeding screws and a sluice feeder. The fuel from the bunker enters through a vertical pipe into the receiving box of the feeding screws through the sluice feeder. There is an optical fuel level sensor in the receiving box, the signals of which control the fuel supply from the bunker. Feed screws of individual production with a variable pitch of 100/122 mm.

Augers are driven by PLM65 motor-reducers with 4kW electric motors. Gateway feeder RWN 05-20 of the TOREX company (Italy). The volumetric productivity is 400 l/m, the engine power is 1.1 kW. The characteristics of the augers and sluice gate allow the use of various organic fuels with a bulk density of 250-750 kg/m³ (wood chips, pellets, coal, peat, agricultural waste, soybean husks, rapeseed, rice).



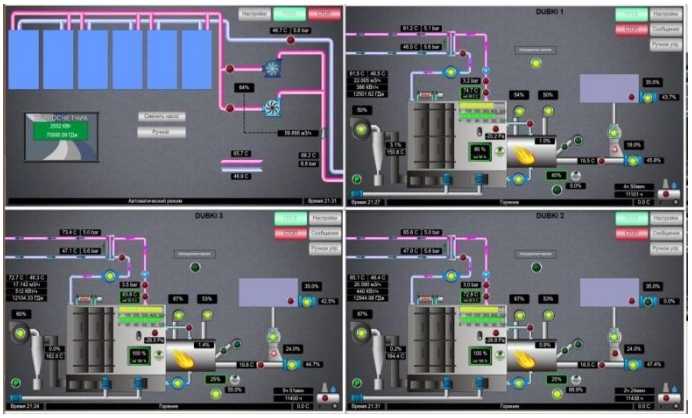


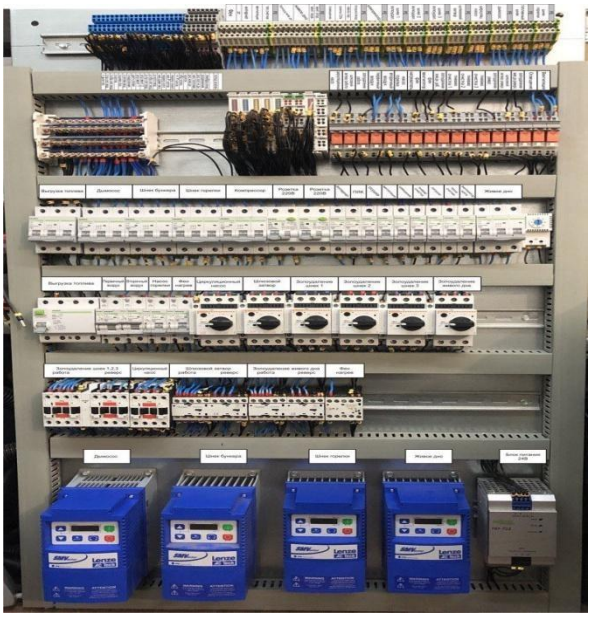
Auxiliary equipment "NIKOTERM"

The internal hydraulic system of the module is made according to the scheme of two circuits that interact through a heat exchanger, which allows you to extend the life of the boiler room and connect to old and polluted heat supply networks without loss of operational potential.
In the event of an emergency power outage, during the winter period of operation of the MMB, the boiler circuit is filled with a non-freezing liquid - a 40 percent solution of ethylene glycol, therefore, in order to comply with environmental standards, the module is equipped
a tank for collecting ethylene glycol produced by "NIKOTERM", which is necessary for the operation of safety valves, for purging and repairing equipment, fittings and pipelines of ethylene glycol.

Software "NIKOTERM VISUAL"

For convenient management and control of MMBH, software was individually developed that displays all stages and parameters of equipment operation.





Electrical equipment

The MMBH is fully equipped with modern analog and digital measuring instruments, pressure, temperature and liquid flow sensors, thermal relays, which, thanks to the control panel with the WAGO controller, ensures autonomous operation and allows remote control of the operation of the boiler room via the Internet using the SCADA program. Installed Lenze frequency converters minimize power consumption.



Hydro station "MOTORIMPEX" LLC

The hydraulic station provides oil supply to drive the burner grate at a pressure of up to 160bar, the pump capacity is 7l/min. The power of the pump drive motor is 3 kW. The control of four hydraulic cylinders is carried out by hydraulic valves with electromagnetic control. The operation modes of hydraulic cylinders are controlled by the main controller of the system.

Fuel module

Fuel module "NIKOTERM"

The MMBH includes a fuel bunker of standard size 76 m3 or enlarged 152 m3, which is used to store any solid fuel, equipped with an automatic fuel supply system and designed for 4-14 days of autonomous operation of the complex.



Basic parameters and dimensions of boiler modules

General technical characteristics MMBH-1000

Indicator	module #1 (boiler)	module #2 (fuel)	module #3 (fuel)
maximum heat output, MW	1.0*		
types of fuel	*various types of wood chips, pellets, sunflower husks, rapeseed husks, peat, coal, agricultural waste of 3 categories		
fuel supply when working with maximum heat output, days	4-14		
working pressure of the coolant in to the heating system, no more than MPa	0,4		
coolant temperature at the outlet, °C	110		
nominal consumption of the coolant (at a temperature drop of 25°C), m3/h	26,6		
flue gas temperature, °C	120-190		
height of the chimney, m	15		
electric power, ~380B, no more, kW	23		
service life, not less than one year	15		
warranty period of operation, months	24		
dimensions:			
dry mass of the thermal module (with equipment and boiler), kg	18800	4000	4000
length, mm	12192	12192	12192
width, mm	2438	2438	2438
height, mm	2895	2895	2895
internal volume, m3	76	76	76

Specification of the boiler room

Complete set	Unit	Number
boiler module, 1 container with a volume of 76m3	pieces	1
fuel module, 2 containers with a total volume of 152m3	pieces	1
"NIKOTERM BIO" boiler with a capacity of 1000 kW.	pieces	1
Burner «NIKOTERM Multi»	pieces	1
heat exchanger TERMOPROM CTA-19 1000 kW	pieces	1
circulation pump Grundfos UPS 80-120F	pieces	1
membrane tank «DAN-WATES» volume 750 l	pieces	1
heat meter Sempal СВТУ 10-М1	pieces	1
autonomous control system (control panel with WAGO controller using SCADA program)	pieces	1
Software «NIKOTERM VISUAL»	pieces	1
flue gas cleaning system «NIKOTERM MULTI cyclone»	pieces	1
smoke extractor D-400 "NIKOTERM VENTS", productivity 2000m³/h, pressure 2800Pa	pieces	1
A 15-meter smoke pipe with a diameter of 300 mm, self-supporting in a frame	pieces	1
water storage tank	pieces	1
pipelines of all systems	pieces	1
internal power grid system and control and measuring devices	pieces	1
a system of internal insulated pipelines	pieces	1
internal and external lighting system	pieces	1
extinguisher	pieces	1
fuel supply unit «NIKOTERM»	pieces	1
hydro station "MOTORIMPEX"	pieces	1
passport of the boiler house	pieces	1
manufacturer's declaration of conformity	pieces	1