DEFRO®
technika grzewcza









new quality of heating...

operating manual
air heater
NP

issue I
January 2013
original manual

Dear Customer,

We would like to inform you that we make every efforts to offer products of quality fulfilling the most restrictive standards and warranting operational safety. All boilers are produced in accordance with the requirements of relevant EU directives and have CE safety mark confirmed by the Declaration of Conformity EC.

CE

We appreciate your comments and proposals regarding our level of service. We appreciate your comments and proposals regarding our devices and the level of service provided by our Partners and Technical Support/Service.

P.W. DEFRO

Content of this Operating Manual is a property of P.W. DEFRO. Any copying, duplicating, publishing of content of this Manual without prior written consent of P.W. DEFRO is forbidden.

Dear Customer,

We would like to thank you for choosing the high quality DEFRO product, which will ensure you safety and operational reliability.

As our customers, you can always count on help of the DEFRO Service Centre, which is ready to ensure continuous efficiency of your boiler.

Please note that in order to use the heating boiler safely and efficiently, it is crucial to get familiar with the following directions.

•Get familiar with this Operating Manual - useful remarks concerning proper operation of the boiler can be found there.
•Determine if all parts have been delivered or the boiler was not damaged during transport.
• Check data on the rating plate against the warranty card.
•Prior to starting the boiler, check central heating and flue connections against connection recommendations included in this manual and in appropriate national regulations.
•Basic boilers usage rules are to be obeyed while using the boiler. Do not open the door during operation of the boiler.

DEFRO Service Centre or Authorized DEFRO Service should be always contacted when any intervention is necessary because only these parties have original spare parts and are properly trained within the scope of installation and operation of DEFRO boilers.

For your safety and boiler use convenience please get acquainted with this operating manual and send back **correctly filled** copy of the Warranty Card to the following address:

P.W. DEFRO - Centrum Serwisowe
Ruda Strawczyńska 103a
26-067 Strawczyn

fax 41 303 91 31

serwis@defro.pl

By sending back your Warranty Card, you will be registered in our DEFRO products users database and we will be able to provide you quick and professional technical support.
If you do not sent back a **correctly filled in Warranty Card** and the product quality and completeness receipt within the period of up to two weeks after the date of installation but no longer than within six months, after purchasing, the warranty will become invalid. This results in delays with repairs and the necessity of **covering costs** of service and travelling expenses.

Thank you for understanding.
Yours sincerely,

P.W. DEFRO

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1. GENERAL INFORMATION.

Operating manual is an integral and essential part of the product and must be forwarded to the user also in case when the property is transmitted. User should carefully read the manual and save it for the future because all remarks included there are important guidelines concerning safety during installation, usage and maintenance.

Installation of heater must be carried out in accordance with the mandatory standards in country of destination, according to guidelines of the manufacturer and by qualified personnel. Improper installation of the device can be a reason of personal injuries and damage of property for which the manufacturer is not liable.

Air heater can be used only for the purpose it was explicitly intended. Any other use should be treated as inappropriate and in consequence as dangerous.

In case of error during installation, usage or maintenance works caused by non-observance of the legislation, regulations in force or instructions contained in this manual (or others, delivered by the manufacturer) the manufacturer rejects any contractual or non-contractual liability for resulting damages and the warranty for the device becomes void.

Choice of heating units for heating of facilities is made based on building heat balance, putting special attention to losses resulting from heat transfer to the facilities.

All the most important information included in the operating manual are distinguished by marks pointing out user's attention to hazards which can be present during operation of the boiler. Symbols used in the text are explained below:

Danger!
Direct threat to life of health!

Danger!
Electric shock danger!

Attention!
Possible threat to equipment and natural environment!

Danger!
Burn risk!

Hint!
Useful information and hints

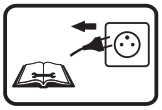
Information, warning and prohibiting pictographs indicating types of hazards are located also on the heater.

Read the Operating Manual prior to starting the device.

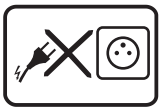
A t t e n t i o n !
Hot surface! Burn risk

Never stand in front of the heater d o o r w h i l e o p e n i n g . Burn risk!

All connėctions to the electric system can be executed only by the electrician having suitable certifications /of Polish Electricians Association to 1kV./



Pull out plug from socket before any service or repair operations.



Do not connect the device to network if connector and socket are damaged.

It is forbidden to take off covers of the electronic controller or fan and to make any interventions or modification in electrical connections

2. INTENDED USE OF HEATER.

Air heater ***NP*** is intended for preheating of air in rooms of small and medium cubage in buildings without central heating water system. Heat is generated because of combustion, while thermal energy is transferred from flue gases to the fresh air through metal wall of combustion chamber and heat exchanger.

Air heaters are equipment ideally ready for:

- industrial halls, workshops,
- warehouses, shops, supermarkets, storerooms,
- discotheques , restaurants, clubs,
- pools, tennis courts, sport arenas,
- exhibition tents, exhibition pavilion, glasshouses, hen houses,
- religious buildings.

Hint!

NP heater is a device generating heat from combustion of solid fuel (wood, alternatively coal) directly from a tube of heat exchanger to the ambient without intermediate liquids. Smoke and other gases discharged to through a chimney are released during combustion.

Air heaters type **NP** installed in accordance with the recommendations of this operating manual are not subject to commissioning by the Office of Technical Inspection.

Electronic controller is used to control heating process course in heater **NP**. Thanks to this combustion and heating process in the room is controlled. Supervision over the heater and combustion process is required in accordance with the regulations in force.

Attention!

Supervision of the device in form of control of operation parameters is required on grounds of the specificity of central heating solid fuel-fired air heater's operation

3. DESCRIPTION OF HEATER.

Air heater **NP** consists of the following components: combustion chamber body, heat exchanger body, confusor, shield, ash-pan, fan unit, control system.

Heat is generated because of combustion process in furnace chamber equipped with cast iron grates. Thermal energy is transferred from flue gases to the fresh air on natural and forces convection way.

Air and flue gases passes through the separate channels, which are welded and properly sealed. Flue gases formed because of fuel combustion are, after cooling down, removed through a channel which should be connected to the chimney or smoke duct. Chimney or smoke duct diameter should be sufficiently big to guarantee effective removal of flue gases. Air consumed in combustion process is taken directly from the heated room or building. For this reason, it is of utmost importance to ensure appropriate ventilation of the heated room or building, guaranteeing supply of sufficient amount of the fresh air. Ash formed because of combustion falls down and can be easily removed from this place. Heated air is distributed in the room thanks to directional knee, which is assembled in the upper part of the air heater.

Electronic controller is responsible for control of the fan and hot air distribution process. When the set temperature is achieved by the heater body, fan and blowing of hot air to the room is switched on. The controller switches off fan, if the real temperature falls down by 2° C below the set temperature (set using potentiometer). Thanks to this a cyclic switchover of the fan does not occurs (what has negative influence on its lifetime) because of temperature fluctuations.

Hint!

Detailed description of construction, operation and work of the electronic controller and fan is included in the operating manuals enclosed to this documentation. Recommendations of operating manual of controller and fan should be unconditionally observed.

4. EQUIPMENT OF HEATER.

Air heaters type **NP** are delivered in assembled state, with charging and ash-pan and furnace doors and with protective jacket made of steel sheet.

Table 1. Equipment of **NP** heater.

Standard equipment of NP heater.	unit	quantity
Heater operating manual	pcs.	1
Operating manual and warranty card for electronic controller	pcs.	1
Warranty card for blowing fan	pcs.	1
Electronic controller	pcs.	1
Blowing fan	pcs.	1
Flue extension with a throttling valve	pcs.	1
Cast-iron grate protecting embers	pcs.	1
Tools for servicing the heater	set	1
Cast-iron grate	set	1
Doors masking frame	pcs.	2
Levelling legs*	pcs.	4
Earthing set /without conductor/*	set	1

* installation on your own scope acc. to the assembly manual on page 33.

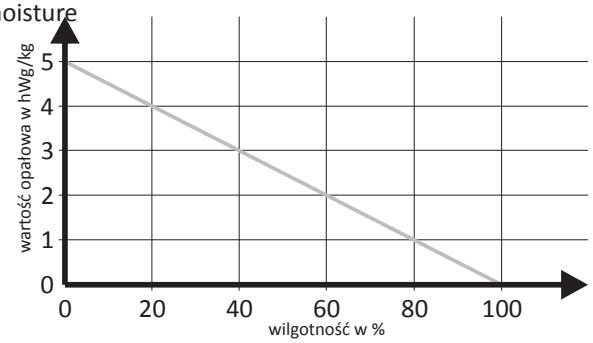
5. FUEL PARAMETERS.

Firewood in form of chunks of wood is used a primary fuel for the heaters. Seasoning under the roof for at least two years and humidity from 15 to 20 %. Dependency of calorific value from wood moisture is presented on the below diagram.

Hint!

Wood should be weathered for at least one year. Wood moisture over 25% can cause energy losses and can damage the boiler

Diagram 1. Dependency of calorific value from wood moisture



It is allowed to use substitute fuels of different qualitative parameters and break-up degree as additives to the primary fuel, to the maximally 10% of chunks such as wood wastes. During combustion of fine pieces of wood wastes user should pay attention to interleave them with firewood.

Hint!

Heater type DEFRO NP is not a furnace intended for combustion of wastes and forbidden fuels cannot be combusted in it.

Hint!

P.W. DEFRO does not accept liability for damage caused or improper burning of fuel if the fuel used is prohibited.

Attention!

Continuous use of some wet fuels with simultaneous maintenance of low temperature of flue gases (below 160°C) leads to accelerated wear of the boiler, corrosion of convection channels, furnace sheets, flue and tar deposits on these surfaces. It is caused by condensation of combustion products: water, nitrogen oxides and sulphur oxides creating very aggressive environment favouring accelerated corrosion.

Table 2. Calorific values of large timber seasoned on air expressed in kWh/kg for the individual grades (for moisture from 15 to 20% of dry mass).

Wood grade	calorific value kWh/kg
hornbeam	4,2
oak	4,2
ash	4,2
birch	4,3
pine	4,4
spruce	4,4
fir	4,4

Hard coal for energetic purposes, nut coal assortment class 24/12, type 31-2, acc. to the standard PN-91/G-04510 can be used as a substitute fuel for air heater type NP. The designation given 24/12 applying to fuel characteristics specifies the calorific value equal to 24 000 kJ/kg and ash content of 12%. Use of this fuel gives a warranty that declared power will be obtained.

As a substitute fuel a blend of hard coal, in weight ratio 70% of nut coal class 24/12 and 30% of coal assortment class 21/15 acc. to the above-mentioned standard, can be used.

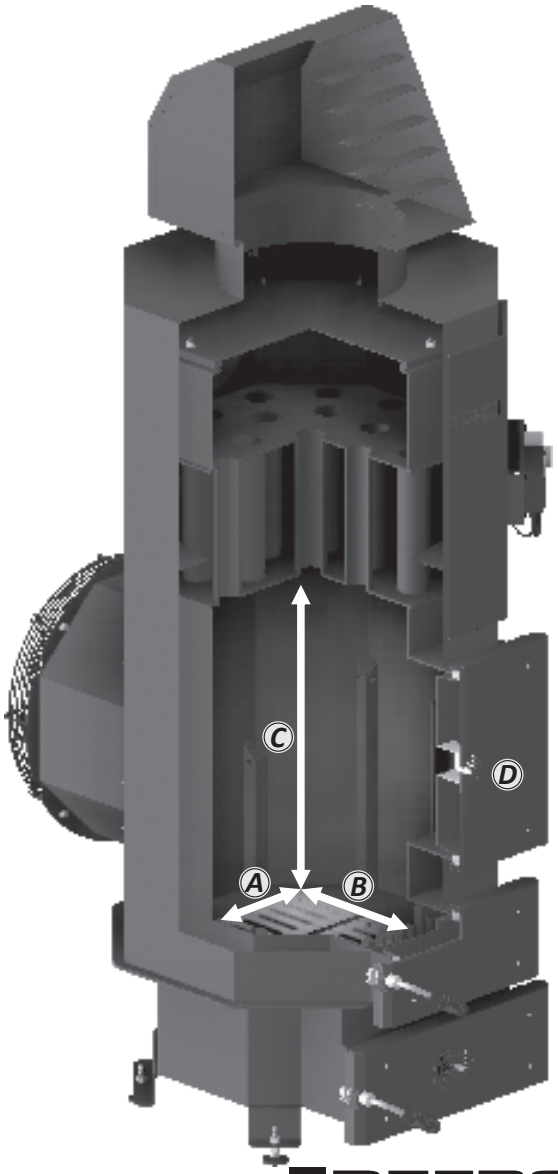
6. TECHNICAL DATA

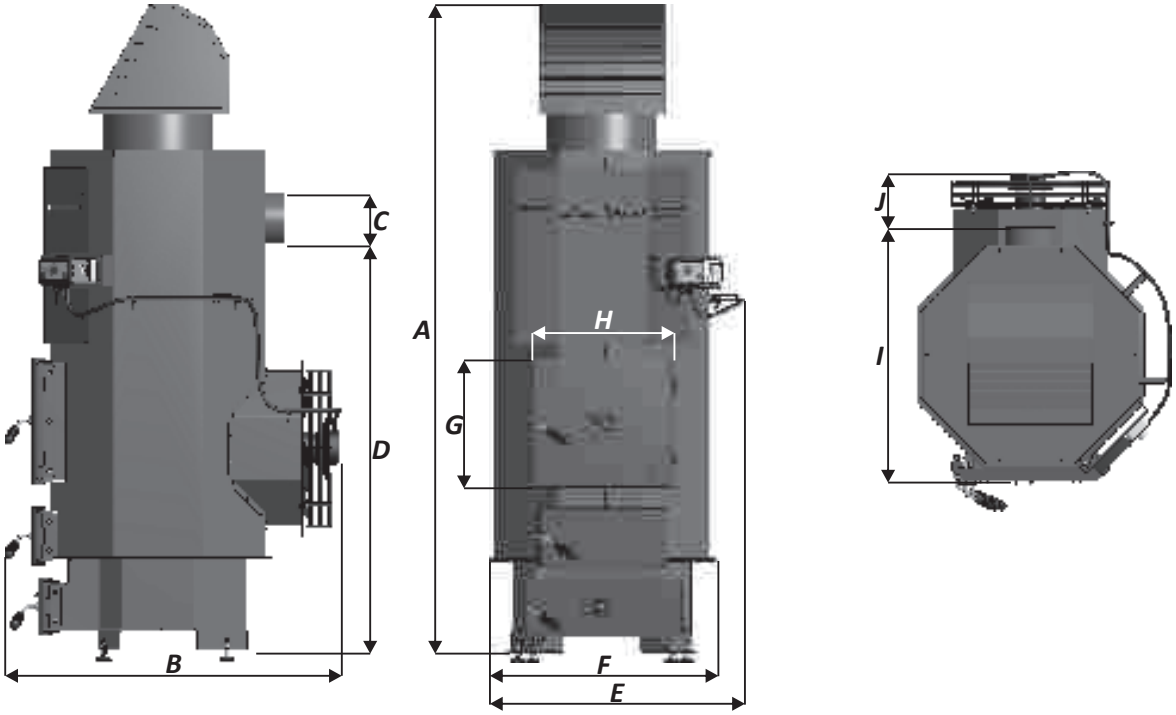
Dimensions of charging hole and substitute combustion chamber are given in the table below.

Table 3. Dimensions of combustion chamber and charging hole.

type/dimension	*A width*	*B depth*	*C height*	*D width x height*
35	500	500	610	360x360
70	700	700	760	360x360

Pic. 1 Dimensions of combustion chamber and fuel charging hole of heater.



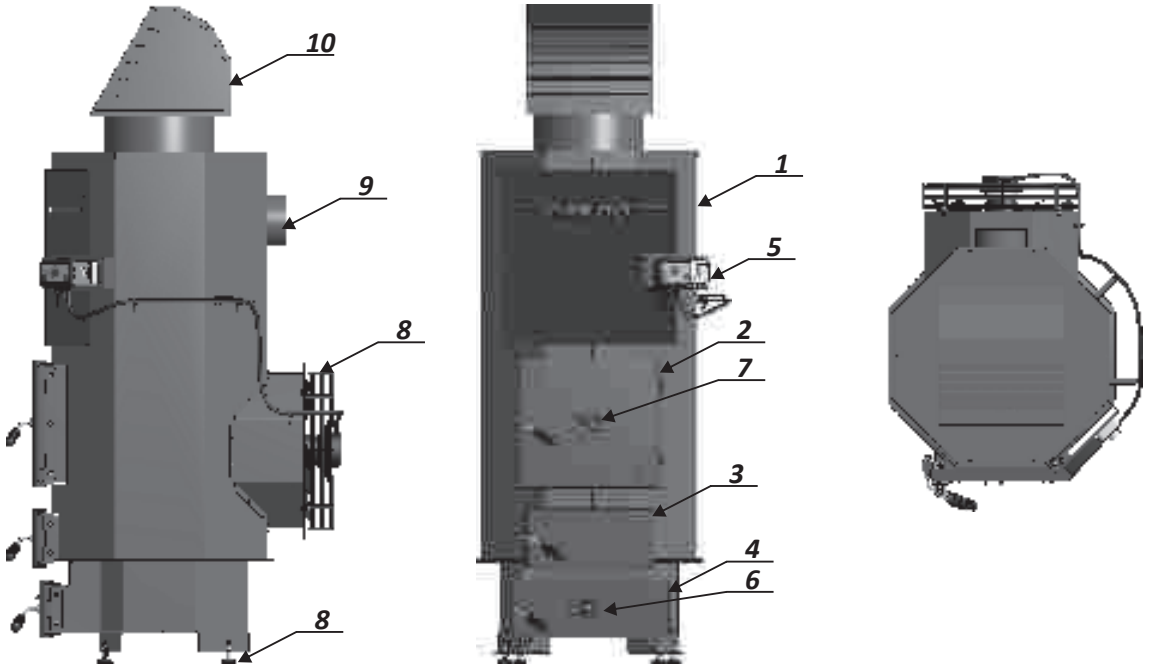


Pic. 2 Basic dimensions of boilers.

ATTENTION! The manufacturer reserves the right to introduce constructional modifications and changes in documentation of heater connected with is modernization and improvement.

Table 4. Basic dimensions of boilers.

type/dimension	A	B	C	D	E	F	G	H	I	J
35	2048	1062	Ø159	1286	805	719	360	360	761	172
70	2463	1282	Ø194	1633	1005	919	360	360	963	172



Pic. 3 Basic dimensions of heater.

1-steel body with thermal insulation; 2-charging doors; 3-furnace doors; 4;ash pan doors; 5-controllers; 6-primary air control; 7-secondary air control; 8-axial fan; 9-flue; 10-directional knee; 11-levelling legs;

Table 5. Technical data of ***HEATER NP.***

Specification / heater type	unit	35	70
Nominal power	kW	35	70
Heat transfer surface - rinsing air	m²	2,8	5,6
Heat transfer surface - thermal of covers	m²	3,2	5,9
Maximum consumption of fan	m³/h	5700	8268
CO emission in combustion products		<1%	
Primary fuel	wood chunks, moisture 15-20%		
Capacity of charging chamber	dm³	246	597
Fuel consumption*	kg/h	-	-
Optimum thermal efficiency	%	~90%	
Required flue gas draught	Pa	31	38
Flue gas temperature for nominal power	°C		
Flue gas stream for nominal power	g/s	25	53
Temperature adjustment range	°C	45-85	
Heater weight	kg	246	500
Chimney dimensions	cm x cm Ø mm	18x18 210	25x25 290
Minimum chimney height	m	7	9
Width	mm	805	1005
Depth	mm	1062	1282
Height **	mm	2048	2463
Dimensions of charging hole	mm	258x188	308x238
Flue size	mm	159	194
Supply	V/Hz	230/50	
Power consumption	W	246	500

* Fuel consumption for wood of calorific value 14 700±300kJ/kg and operation with rated power.
**Height of heater can be additionally adjusted by means of provided levelling legs. The regulation varies from 28 to 40 mm.
n.d. - no data

ATTENTION! The manufacturer reserves the right to introduce constructional modifications and changes in documentation of heater connected with is modernization and improvement.

7. HEATER TRANSPORT AND INSTALLATION

7.1. TRANSPORT AND STORAGE.

Heaters are delivered on a pallet, foil-wrapped and are fully assembled. Blowing system and control system are disconnect during transport. **Installation of electrical components is to be executed by authorized electrician.**

The remaining components are to be installed by the user according to the enclosed manuals.

Appropriate lifts are to be used for lifting and lowering the boiler. For transport, the heater is to be secured against moving and tilting on a vehicle's platform by means of belts, wedges and wooden blocks.

Hint!
The heater is to be stored in a vertical position!

The boiler is to be stored in a non-heated room, under a roof and with efficient ventilation.
Prior to installation, it is to be determined if all parts have been delivered and if they are in good technical condition.

7.2. INSTALLATION REQUIREMENTS.

Before installation of the heater user should be acquainted with the requirements of this manual and requirements of the national regulations.

Observation of the recommendations included in the manual during the assembly and operation of the heater will allow long and problem-free operation of the heater and will allow achieving appropriate technical parameters.

It is recommended that system was design, equipment was selected and installed by the professional fitting company having appropriate authorizations. Installation of the equipment should be preceded by consultation with chimneysweep and firefighter specialist.

It is recommended to have an expertise applying to insulation and building interior and chimneysweep expertise applying to flue gases discharge (chimney), before starting the installation.

Attention!
The professional fitting company in accordance with the regulations in force should install heater!

Attention!
Installation of heater outside the buildings (outdoor) is forbidden!

Fuel

Fuel should be stored in the separated technical room near the boiler or in room where the boiler is located, but not closer than 400 mm from boiler.

Attention!

It is forbidden to use mechanical exhaust ventilation in the room.

Ventilation

In place where heater, consuming air for combustion purposes from room and with gravitational discharge of flue gases and also in the room, where inlets to flue gases are located, is installed it is forbidden to use blowing fans.

Use of individual blowing fans in rooms directly adjacent to the fireplace installation location can also cause generation of negative pressure and uncontrolled outflow from fireplace to the room.

Exhaust-blowing ventilation should be ensured in fireplace installation location. Such installation can cause generation of negative pressure in the room.

Blowing system should ensure inflow of air for combustion purposes in amount not smaller than 10 m3/hour for 1kW of installed rated power of furnaces and not smaller than 20 m3/hour for person expected for permanent stay in the room.

Pressure and exhaust ventilation holes should be covered by means of a steel mesh and designed in such way that clogging is impossible. Location of grids should be cause draughts.

Attention!

It is forbidden to use mechanical exhaust ventilation in the room.

Danger!

Inflow of sufficient amount of fresh air to the boiler room should be ensured. Lack of sufficient inflow of fresh air can cause so-called incomplete combustion and formation of carbon monoxide.

7.3. SETTING OF HEATER IN THE ROOM

Heaters type ***NP*** does not required special foundations, but it should be remembered about precise levelling. Heater should stand on level, stable floor, with sufficient bearing capacity. In case when this bearing capacity is not sufficient, then user should take proper measures to achieve sufficient bearing capacity.

Floor in the room, where boiler is located, should be made of incombustible materials.

In case of floor made of combustible materials it should be covered with steel sheet of thickness min. 0.7 mm, at min. 1 m distance from boiler edge.

During setting of heater user should take into account fire protection conditions. It is recommended that:

- maintain safe distance min. 1.5m from easily flammable materials during installation and operation of the boiler,
- for easily combustible materials, with fire fating C3, which combust quickly and easily even when ignition source is removed, then this distance grows 2 times, that is min .3m,
- if fire rating is not known, then also safe distance should be doubled.

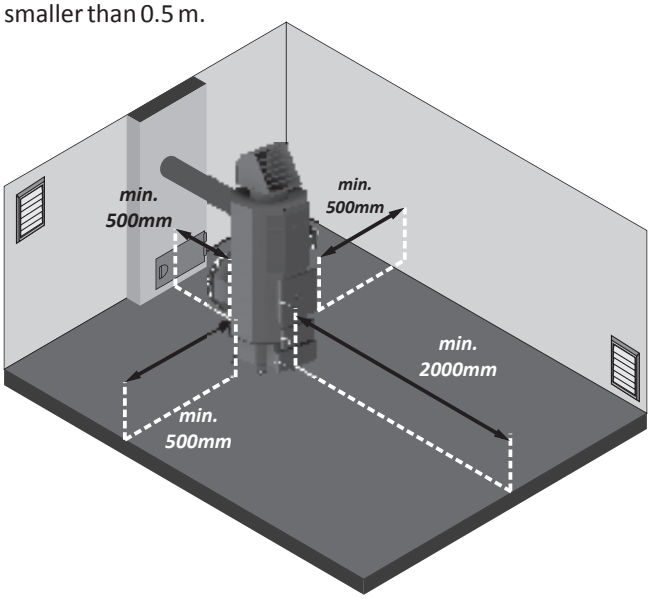
Table 6. Fire rating for building compounds and materials.

Fire rating for building compounds and materials	Building compounds and materials
A-non flammable	sandstone, concrete, brick, fireproof plaster, mortar, ceramic tiles, granite
B-hardly flammable	wooden-cement boards, glass fibre, mineral insulation
C_1-hardly flammable	beech wood, oak wood, plywood
C_2-medium flammable	pine wood, larch wood, spruce wood, cork, sawn wood boards, rubber carpet
C_3-easily flammable	asphalt ply, celluloid mass, polyurethane, polystyrene, polyethylene, plastic material, PVC

Exemplary location of the heater is presented on pic.

4. This location should enable its easy cleaning and direct access from all sides.

Heater's distance from the opposite wall should not be smaller than 2 m and distance from sidewalls should not be smaller than 0.5 m.



Picture 4. Setting of heater in room

7.4.SELECTION OF HEATER FOR THE ROOM

Heating system in the industrial facility should ensure suitable thermal comfort. Temperature suitable for the type of executed work (work methods and physical effort necessary to perform it) should be ensured in accordance with the regulations, but it should not be lower than 14°C. While in workrooms, where light physical work is performed, and in office rooms, temperature cannot be lower than 18°C. To select heater properly user should specify heat demand. The first step is to determine heat balance for the building, that is specification of heat losses through walls, doors, windows, entrance gates etc. and taking into account head gains, which can exist from machine operating inside the building, people or animals staying inside (e.g. in the stock building). This procedure is quite complicated, so there is a formula allowing to select the heater

$$P = [q_v \times W \times (tw - tz)] \times 0{,}001$$

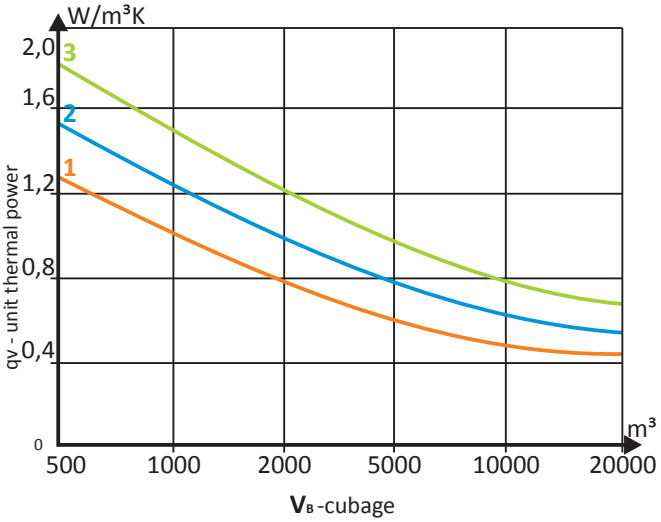
Where:

P - heat demand [kW];

qv - unit heating power depending on building cubage and approx. insulating power of walls [W/(m3K)], W - building cubage (length x width x height);

tw - required temperature inside the building [°C];

tz - computational external temperature, for the given area of Poland in accordance with the standard PN-82/B-02403 [°C]. User should pay attention to determine unit heating power for the given facility. It depends on cubage and insulating power of building's walls.



1 - increased insulating power
2 - small area of windows and doors
3 - large area of windows and doors

Diagram 2. Unit heating power depending on cubage of facility and level of insulating power of constructional barriers.

Picture 5. Climatic map of Poland

Table 7. External design temperature in Poland

Climatic zone	I	II	III	IV	V
External design temperature °C	5,5	6	6	7	7

Example: production hall from 70s, 20th century in Gdańsk, weak insulating power (large are of doors and windows), cubage 1200 m3. Required temperature inside - 16°C.

Read from the diagram (1) value qv = 1.5 W/m3-K. On map (2) we see that Gdańsk is in I climatic area, computational external temperature is equal to 16°C. We calculate:

$$Q = 1{,}5 \cdot 1200 \cdot [16 - (-16)] \cdot 0{,}001 = 57{,}6\ kW$$

Therefore, we can assume one heater of power equal to 60 kW or two of power 30 kW. The second solution is better. It allows locating heaters and direct air streams in such way that the best efficiency will be achieved.

The above information have only pictorial character and it is recommended to entrust equipment selection to the fitting company, which will select appropriate equipment power.

7.5. CONNECTION TO ELECTRIC SYSTEM.

Electric and control system of boiler is intended for supplying with network voltage 230V/50Hz. Boiler room, where the boiler is installed, should be equipped with electrical system 230V/50Hz executed as TN-C or TN-S systems (with protective conductor or protective-neutral conductor) according to the regulations in force. Electric system (without regard for type of installation made) should be ended with plug-in socket equipped with protective conductor contact.

Danger!

Using socket without connected protective terminal causes electric shock hazard !

Plug-in socket should be located in the safe distance from heat emission source. It is recommended to lead separate electric system's circuit to boiler supply.

Danger!

All connections to the electric system can be executed only by the electrician having suitable certifications /of Polish Electricians Association to 1kV./

Danger!

User is forbidden to take off covers of the electronic controller or fan and to make any interventions or modification in electrical connections

Hint!

Hater protective earthing is to be made in location marked with information pictograph. Connection can be made only by authorized electrician.

7.6. CONNECTION OF HEATER TO CHIMNEY

Method of connection of flue and connection to it should be in accordance with the requirements of Regulation of the Minister of Infrastructure of 12 March 2009 on technical conditions which should be fulfilled by buildings and its location /Journal of Laws 56/2009 item 461/ . Equipment cannot be connected to the chimney with other furnaces.

In case of installation of the heater in a country other than Poland connection to the chimney should fulfil the requirements of standards and legal regulations in force in the country of destination.

In order to connect the heater to the chimney, a steel section of appropriate intersection and shape is to be used. This section should be sealed on flue gases outlet from boiler and outlet of boiler and the length should not exceed 1000 mm. The connection should be made from steel plate of thickness of at least 3 mm. The connection should incline towards the boiler.

Appropriate height and intersection of chimney as well as precision of its execution have significant impact on maintenance of required chimney draught. In case when the already existing chimney is used, when value of draught exceeds value in table 4, then user should use controller maintaining negative pressure with the set value with accuracy ±2Pa. Usability of chimney for operation should be confirmed by the authorized chimneysweep. Flue dimensions have been presented in Table 8.

Table 8. Correct height and dimensions of the chimney.

Heater power [kW]	35	75
Min. chimney height [m]	7	9
chimney dimension [cm x cm] / [Ø mm]	18x18 / 210	25x25 / 290

Hint!

Too weak chimney draught causes deposition of steam on walls of the heat exchanger, what leads to quick destruction of the boiler.

It can also cause smoking from upper doors and cleaning holes of the heater.

The below equation allows for choosing correct chimney intersection.

$$F = \frac{0{,}03 \times Q \times 0{,}86}{\sqrt{h}}$$

where :

F - chimney intersection [m2]

Q - thermal power of 1 or a set of heaters connected to one flue [kW]

h - chimney's height measured from grate to output [m]

It is essential that chimney will start from the level of boiler room floor because flue gases getting out the boiler should have reflection possibility. It is also important to have a cleaning hole with tight closure in the lower part of the chimney.

The chimney should be at least 150 cm higher than the roof. Flue's walls should be smooth, tight, without neckings and bends, and free from other connections. A new chimney must be dried and heated before starting up the heater. In case of any doubts, chimney's condition is to be assessed by a chimneysweep. Chimneys made from steel pipes should be about 15-20% higher than brick chimneys.

Hint!

To connect the heater to the chimney, only flue gas extensions recommended by the manufacturer should be used. Using non-genuine elements may invalidate warranty for the device.

Maintaining of chimney draught within the recommended limits is one of the most factors guaranteeing achievement of proper technical-operational parameters of the heater.

Hint!

Due to high efficiency, for the NP heaters it is recommended to use chimney inserts made of stainless heat-resistant steel.

8. HEATER USAGE AND OPERATION.

8.1. HEATER'S FIRST START-UP /INFORMATION FOR SERVICE/.

Hint!

On the user's request boiler's first start-up can be carried out by a trained Manufacturer's service - paid service.

Prior to the start-up, the steps below are to be followed:

- check chimney system tightness;
- check correctness of chimney connection;
- check tightness of contact surface of fan and cleaning holes;
- method of connection to the electrical system.
- Boiler's start-up sequence of operation:
- start the heater;
- start the furnace according to instructions provided herein - point 9.3.;
- check operation of control desk - set temperature for
- switching on the fan.
- heat the heater to the set temperature;
- control heater tightness once again; control tightness of chimney system once again;
- carry out a heating test run according to the standards;
- instruct the user in correct operation;
- make appropriate annotation in the Warranty Card.

Hint!

Information about installation and the test run is to be noted in the Warranty Card.

A filled in Warranty Card is to be sent by the user to the manufacturer in order to register the user in the Company's database.

P.W. DEFRO - Centrum Serwisowe
Ruda Strawczyńska 103a
26-067 Strawczyn

fax 41 303 91 31

serwis@defro.pl

8.2. HEATER START-UP AND OPERATION. (INFORMATION FOR USER).

Prior to the start-up, the steps below are to be followed:

- checking system patency,
- correctness of operation of the ventilation system

1. In case of next firing up user should remove ash from charging chamber. Charcoal remaining on the chamber can be used as first firing up layer.

2. Put layer of wood, not filling more than 50% of the furnace, on the residues of the charcoal.

3. Put layer of fine slivers with addition of squeezed paper from the top. Then put a layer of shavings and several pieces of soft wood.

4. Start-up of the heater should begin with switching on controller's switch.

5. Fire up paper and after this, close the charging doors leaving it slightly opened for a few seconds.

6. To facilitate access of bigger amount of air during firing up user should set amount of primary air (control of ash-pan doors) and secondary air (control in charging doors) to the maximum.

7. When wood is inflamed (after approx. 20-30 min.) user can supplement chamber with the proper amount of wood - approx. 60% of charging chamber, close charging doors.

8. Further combustion process will be based on successive refilling of fuel and control of combustion process by adjustment of primary and secondary air.

9. Do not leave heater without any control!

Attention!

It is forbidden to disconnect supply from the equipment, when it is hot, because accumulated energy can damage the fan and heat exchanger!

Danger!

Heater parts - especially external shields - are hot during operation and it is recommended to exercise caution!

Danger!

Never stand in front of the boiler door while opening. Burn risk.

Hint!

Only genuine spare parts purchased from P.W. DEFRO can be used. DEFRO.

P.W. DEFRO does not accept liability for incorrect work of boilers caused by non-genuine parts.

Attention!

In case of lack of electric voltage, it is forbidden to fire up a heater, thermal energy can damage the fan and heat exchanger!

Danger!

Furnace chamber and ash-pan should always be closed, except of start-up period, charging and removal of combustion wastes.

8.3. PERIODICAL SERVICE OF HEATER - CLEANING AND MAINTENANCE

Hint!

In order to maintain satisfactory combustion efficiency, the convection channels and sheets in the furnace chamber are to be clean. Soot, dust and ash created because of combustion reduce effectiveness and efficiency of the combustion process.

Danger!

Certain elements of the heater can reach the temperature of 400°C!

In order to clean the heater it is necessary to switch it off and wait necessary period of time required for decrease of heat exchange surface temperature.

Danger!

Before starting service and maintenance operations supply of the boiler should be switched off.

Danger!

Any service and maintenance works are to be carried out with meticulous care and only by adults. The boiler should not be cleaned in the presence of children. To carry out any tasks, protective gloves, glasses and headgear are to be worn.

In furnace chamber the special attention should be put to precise removal of ash and slag from slots of grate and chamber walls. Cleaning should be also carried out before each start-up of the boiler. Before cleaning, the heater should be switched off using main switch and user should wait period necessary for cooling down the surfaces of the heater.

Cleaning of flue gas ducts, where fly ashes are depositing, should be performed through cleaning holes every 7-14 days depending on quality and moisture of the fuel.

Hint!

It is recommended to clean the heater before each starting, what will significantly decrease fuel consumption.

Plates of flue gas ducts, sidewalls of heat exchanger should be cleaned through an upper cleaning hole. For this purposes user should remove a directional knee and cover of flue gas covers. Surface of tubular heat exchanger should be cleaned using enclosed tools. Accumulated ash and dust should be removed though ash-pan doors.

Service tools delivered with the boiler should be used to clean the boiler. Cleaning doors should be tightly closed after cleaning flue gas ducts. Cleaning of flue is also important for correct operation of the boiler.

Danger!

Flue gases coming out of blocked chimney are dangerous. Chimney and connector should be kept clean. They should be cleaned before each heating season.

8.4. HEATER EMERGENCY SHUT-DOWN.

In emergency cases or emergency states,

The recommendations below are to be followed:

1) remove fuel from the furnace chamber and place it in a metal container; risk of burning or asphyxiation! (do not spend much time in the boiler room; if possible, open the door and ventilation holes). Removing embers from the furnace chamber should be carried out only in the presence of another person. The fire brigade is to be called if too much smoke makes removing embers impossible. The furnace chamber can be covered with dry sand. It is strictly forbidden to pour water onto embers in the furnace chamber. Pouring water is acceptable only outside the boiler room, on fresh air, from a distance exceeding 3 m;

2) determine reasons of fault and after removal thereof and checking correctness of operation of the heater and the whole system, begin cleaning and carry out the start-up process of the equipment.

Danger!

In case of boiler's emergency stoppage, safety of people and obedience to fire-fighting regulations is of the highest priority.

8.5 MEASURES IN CASE OF FIRE IN THE FLUE /SOOT IGNITION/.

Hint!

Systematic cleaning of smoke ducts should be performed to prevent soot ignition in the chimney.

Soot ignition in the chimney is burning of particles deposited inside chimney (flue) channels; the deposits are formed in the course of boiler's operation and were not cleaned by chimney sweeps. In case of soot fire in chimney the following recommendations should be observed:

- Call Fire Brigade at 998 or 112, give information about what is happening and give detailed directions what is happening and hot to get to the given building;
- Quench fire in the boiler;
- Close boiler's door and cleaning holes tightly to cut off air supply (due to lack of air the fire will eventually stop);
- Check the whole chimney channel for any cracks which might result in fire spread to the rooms;
- Prepare fire quenching means, e.g. a fire extinguisher, a fire blanket, a hose connected to the water system, water in a container;
- Make rooms and necessary information available to the Fire Brigade.

Danger!

It is strictly forbidden to pour water into the chimney - risk of blowout.

Danger!

Untight chimney channels can be source of burning sparks or very hot flue gas, including insensible carbon monoxide

Attention!

Chimneysweep should be called after soot fire in the chimney to perform cleaning of ducts and to inspect theirs technical condition

8.6. SWITCHING OFF THE HEATER

After the heating season and in other cases of planned boiler's shutdown, the fuel charged should burn out completely and ash and slag is to be removed from the furnace and ash-pan chambers. The heater is to be cleaned carefully including the furnace chamber, ash-pan and convection draught. To protect the boiler after a heating season, ash and carbon deposit containing the largest amount of sulphur is to be removed and maintenance tasks are to be carried out.

If the heater has been installed in cool and humid rooms, in the summer, the heater is to be protected against humidity by locating some moisture-absorbing material inside such as, e.g. burnt non-hydrated lime, Silica Gel.

9. REMARKS ON HEATER USAGE.

Danger!

The following rules of safe operation of the boiler should be strictly observed and introduced.

Warnings from the manual should be carefully read because they include significant indications on system, operational safety and maintenance of the equipment.

- System should be executed in accordance with the regulations in force for the country, where it will be used, in accordance with the manufacturer recommendations, by qualified personnel from the authorized service point. Errors in the system can cause injuries and damages for which the manufacturer will not be responsible.
- It is forbidden to leave packaging components in the location accessible for children - they can be dangerous.

It is forbidden to block air inlet grids.

Heaters can be used only by adult persons, who have familiarized themselves with this operating manual and have been trained in the scope of usage.

- Flammable liquids must not be used for torching the fuel; only solid fuel (e.g. tourist), resinous wood or paper can be used etc.
- In case of damage or failure user should switch off the heater and do not try to repair it but ask for intervention of technical service.
- Heater should be used only for the purpose for which it is intended. Any other use will be treated as inappropriate and even hazardous.
- Use only solid fuels given in the table for the combustion purposes. Do not insert bigger amounts of fuel to the heater than it is given.
- If flammable gas or fumes get to the installation location of the heater or during works of increased fire or explosion risk are to be carried out (e.g. gluing, lacquering), the heater is to be switched off before commencement of the works.
- It is forbidden to extinguish fire in the furnace by pouring it with water.
- It is forbidden to make any constructional changes in the heater.
- This equipment is not intended for use by the people (including children) with limited physical, sensing of mental abilities, or people without experience or knowledge about the equipment, unless it is under the supervision or in accordance with the operating manual, forwarded by people responsible for its safety.
- It is forbidden for children to be in the neighbourhood of the heater without adult persons.

Flammable materials must not by placed on the heater and in its vicinity.

- Electrical and construction elements of the heater cannot be changed or modified by the user.
- While removing ash from the heater, flammable materials cannot be located closer than 1500 mm from the heater. Ash is to be placed to heat-resistant containers with a lid.
- After a heating season has finished, the heater and smoke channel are to be precisely cleaned. Installation location should always be clean and dry. Remove fuel from the heater, fuel feeder pipe and leave the heater doors and covers slightly open.

10. EXAMPLES OF BREAKDOWNS AND TROUBLESHOOTING

The most frequent problems occurring during operation of the boiler and methods of removal.

Failure type	possible reason of failure	suggested repair
Fan is not working	• equipment is not connected to the supply	• connect to supply
	• problem with supply voltage	• check voltage on supply socket
	• damaged supply cable	• replace cable
	• fan blocked mechanically	• remove blockade
	• fan damaged	• replace fan
Smoke from bottom doors	• incorrectly closed doors	• adjust lock
	• cord contamination	• clean cord
	• sealing cord damaged	• replace sealing cord
Room is smoky	• untight chimney system	• seal the system
	• incorrect or choked ventilation system of the room	• correct or clear ventilation
	• ash-pan full	• empty ash-pan, clean grate
Water leaks from equipment	• wet fuel	• use dry fuel
Poor fuel combustion	• poor fuel quality	• add fuel of higher calorific value or replace with fuel of required parameters
	• too low amount of air supplied to combustion	• flap on fan outlet blocked - unblock flap, change position of weights
Carbon deposit on the exchanger, creation of carbides	• poor fuel quality	• use fuel recommended by the manufacturer
	• fuel too humid	• use fuel of lower humidity, store fuel in heated room
	• incorrect fuel combustion	• adjust settings of electronic controller

11. HEATER REMOVAL DUE TO WEAR-OUT

Heaters with electric equipment is subject to European Directive 2002/96/EC concerning waste of electrical and electronic equipment, and in connection with it:

• marking in accordance with the above-mentioned directive /crossed bin/ on waste of electronic and electric equipment is located on the rating plate,

• parts connected with screws should be disassembled by uncrewing, welded parts must be cut

• before scrapping of boiler electronic controller with leads should be disconnected. These leads are subject to selective collection of waste electrical and electronic equipment for utilization purposes. These parts cannot be placed with other general wastes. Collection place should be specified by the municipal or commune services. Other elements of a boiler are subject to standard waste disposal, mostly as steel scrap.

•take safety precautions during disassembly of the boiler by using appropriate hand-held and mechanical devices as well as personal protective equipment (gloves, clothes, apron, glasses, etc.).

☞ ***Hint!***
Convection channels and walls of furnace chamber should be exactly cleaned before calling service team. In addition, entrance to the boiler room should be made available in case of possible replacement of boiler.

HEATER SAFE OPERATION CONDITIONS

Primary safety condition for operation of heaters is observation of the following regulations:

1. To carry out any tasks, protective gloves, glasses and headgear are to be worn.
2. Never stand in front of the door while opening. Do not open charging doors during starting the fan.

Danger!
Never stand in front of the boiler door while opening. Burn risk.

3. Make sure the heater area is kept tidy and there are not any objects not connected with heater's service.
4. While carrying out any works connected with the heater, the maximum lighting voltage should not exceed 24V.
5. It is necessary to maintain good condition of the heater as well as doors' and cleaning holes' tightness.
6. All faults are to be removed immediately.
7. It is unacceptable to start-up the heater by means of, e.g. petrol, kerosene and other flammable and explosive materials.
8. Do not approach with open flame to lifted furnace doors during operation of the fan and just after its switching off, because unburnt gas can explode.

Danger!
It is forbidden to use open flame and flammable materials near the heater - it can explode and cause fire.

9. Execution of electric system can be made by authorized electrician.

Danger!
All connections to the electric system can be executed only by the electrician having suitable certifications /of Polish Electricians Association to 1kV./

Attention!
Supervision of heater is required in case when voltage decays.

13. WARRANTY CONDITIONS AND PRODUCT LIABILITY.

Guarantor and manufacturer:

Przedsiębiorstwo Wielobranżowe **DEFRO**
Ruda Strawczyńska 103a
26-067 Strawczyn

tel. 041 303 80 85, 041 303 87 94
fax 041 303 91 31

1. The Guarantor issues a guarantee to the Purchaser on the purchased product on terms and conditions specified herein.
2.The guarantee refers to an air heating type ***NP.*** .....with serial number ..... (subject of agreement - air heater) under the condition that the product has been fully paid for and a copy of a correctly filled in copy of Warranty Card has been sent back to the manufacturer.
3. The Purchaser receives Warranty Terms and Conditions as well as Operating Manual containing conditions for heater's usage, installation guide and parameters regarding the chimney, fuel and boiler water.
4. The Guarantor guarantees that the heater works correctly provided that all conditions specified in the Operating Manual has been met, especially with respect to parameters applying to chimney, flue.
5. Warranty is given for the heater operated in accordance with the operating manual. The warranty period commences on the date of issuance of the subject of the Agreement by the Purchaser and equals:
a) 24 months for heater's body but not longer than 30 months from date of production.
b) 1 year for cast-iron elements and movable elements constituting boiler's equipment;
c) Elements subject to wear-out are not covered by the Warranty; these include especially: screws, nuts, handles, and ceramic and sealing elements.
6. The Warranty is valid in Republic of Poland.
7. During the warranty period, the Guarantor ensures free-of-charge repairs of any physical faults of the subject of the Agreement within the period of:
a) 14 days after the fault report, unless the repair requires replacement of constructions elements of the subject of the Agreement,
b) 30 days after the fault report, if the repair requires replacement of constructions elements of the subject of the Agreement.
8. Registration of any physical fault to be repaired during the warranty period (fault registration) should be made immediately after a fault has been found and no later than after 14 days.
9. Any fault is to be registered with the manufacturer by sending a complaint sheet contained in this operating manual, filled in and stamped by an outlet. The fault registration should contain:
a) type, capacity, serial number, manufacturer number (the information is located at the rating plate),
b) date and place of purchase,
c) brief description of fault,
d) boiler protection system (type of the pressure vessel),
e) detailed address and phone number of a person making complaint.
If the following cases are complained about: incorrect combustion in the heater, tar deposits, smoking through the fuel charging door; the fault registration should be supplemented with a copy of a chimney sweep expertise certifying that the flue meets all requirements specified in the operating manual for a given boiler's capacity.
10. Any repairs shall be carried out immediately if the Guarantor or its representative is ready to remove the fault in a period agreed upon with the Purchaser and the repair is not impossible for reasons for which the Guarantor holds no responsibility (e.g. lack of free access to the heater, lack of energy or water supply).
11. If repair is made impossible by the Purchaser twice despite that the Guarantor is ready to carry it out, it is to be assumed that the Purchaser has resigned from the guarantee claim.
12. If the fault complained about cannot be removed and after three repairs the heater is still faulty but can be used, the Purchaser has the following rights:
a) to obtain discounted price for the boiler, proportionally to the use value of the heater;
b) replacement of faulty heater with the one free of faults.
13. The heater can be replaced if the Guarantor decides it cannot be repaired.
14. The Guarantor does not accept liability for inappropriate choice of boiler with respect to heated area (e.g. boiler of too low or too high power with respect to requirements). It is recommended to choose a boiler with cooperation with a design office or the Guarantor.
15. The guarantor will refuse realization of Purchaser's claims resulting from this document in case when:
a) will state damage or ripping of leaden seals,
b) identification of product will be impossible (that is conformity of presented product with document describing the equipment),
c) damages resulting from incorrect transport carried out or ordered by Purchaser,
d) damages resulting from incorrect installation or repair by an unqualified person, including obedience to standards specified in PN-91/B-02413: Heating Engineering.
e) particular components of the equipment were wilfully replaced with non-genuine, used etc.,
f) damages are mechanical, chemical, thermal,
g) damages concerns wearing parts, especially: screws, nuts, handles, ceramic and sealing elements,
h) damages resulting from heater usage inconsistently with the operating manual, that is especially when:
- Incorrect heater functioning resulting from lack of chimney draught or inappropriate power of the heater,
- damage resulting from electricity cuts,
i) Faults are not significant and do not have impact on the use value of the heater
16. This Warranty does not cover the elements of electric equipment, on which a separate manufacturer's guarantee has been issued.
17. The guarantor can charge the costs connected with warranty claim only in case when claim is not accepted as a result of stating circumstances which are listed in points 15 and 16.

18. Fault registration can be completed if the Purchaser has a purchase confirmation and has filled in the Warranty Card correctly including a complaint sheet.
19. A warranty card without a date, stamp, signatures and with changes and cross-outs made by persons not entitled to do this is invalid.
20. Heater installation can be carried out by a person holding general installation qualifications (an entry and stamp in the Warranty Card is required).
21. Heater's first start-up, any repairs and other activities, which are not supposed to be carried out by the User according to the operating manual, can be carried out only by a certified manufacturer's service. Heater's first start-up is payable by the User.
22. Complaint electric equipment /electronic controller, fan/ should be send to the headquarters of P.W. DEFRO at the cost of the Guarantor. Returning faulty equipment is a condition to accept the claim and replace this equipment free of charge. Not returning the above-mentioned part within 7 working days will be a subject to not accept the claim and to charge its costs to buyer.
23. To all matters not settled in this Warranty Card provisions of the Civil Code Art. 581 - 581 shall apply.

13.1. WARRANTY CONDITIONS "48H SERVICE".

1. The "48h Service" program covers heaters manufactured by P.W. DEFRO Robert Dziubeła.
2. Any complaints are to be made at a retail or wholesale outlet or directly at the Company on fax. no. 041 303 80 85, e-mail: serwis@defro.pl, or by a letter to company's address.
3. Fault registration can be completed if the Purchaser has a purchase confirmation and has filled in the Warranty Card correctly including a complaint sheet.
4. "48h Service" warrants that P.W. DEFRO does its best to remove any faults which make it impossible/difficult for the heater to operate within the period of two business days from the day of fault registration.

13.2. POST-WARRANTY SERVICES.

Apart from standard warranty services, we offer the following paid post-warranty services:

1. Checking room ventilation.
2. Checking tightness / application of silicon or replacement of cord - payable according to price list/.
3. Checking correctness of hydraulic connections.
4. Checking correctness of connection to the flue.
5. Check electrical connections in the electronic controller.
6. Checking tightness of fuel container door.
7. Checking for damage of electrical wires of the fan, gear-motor and sensors.
8. Checking for any changes to the boiler /description in comments/.
9. Checking indicators and location of all sensors.
10. Cleaning exchanger /removal of deposit/
11. Cleaning exchanger /removal of deposit/

For paid and post-warranty repairs, the cost of man-hour and cost of service travel from the service's seat is counted according to the current price list available on www.defro.pl.

We kindly inform that possible replacement of boiler component, with the working one, claimed by the user is not unambiguous with admission of boiler user's warranty claims and does not end the complaint processing procedure. PW DEFRO reserves the right to charge the boiler's user with component replacement/repair costs, which after expertise/repair was stated as damaged by the factors independent of the boiler's manufacturer (e.g. short-circuit in electric system, overvoltage, flooding, mechanical damages not visible to the naked eye etc.) and which damages were not able to stated during repairing in location of boiler operation by the service, within 60 days from date of carrying out the repair. PW DEFRO will issue appropriate invoice for replacement/repair of the subject component with enclosed expertise protocol. At the same time we inform, that lack of payment for the invoice including the above-mentioned costs within 14 days from its issuance results in irrevocable loss of warranty for the used boiler and this information will be entered to our computer supervision system for boilers within the warranty period. The date when the due amount is credited to the bank account given in the mentioned invoice is treated as payment date.

REPORT

OF TECHNICAL CONDITION AND FIRST START-UP OF HEATER

User name and surname: .....

Detailed adress: .....tel.:.....

Boiler type .....Heater serial number.....Heater power .....kW

I. BOILER ROOM		**Remarks**
ventilation		
pressure ventilation in accordance with PN-B/02411:1987		
exhaust ventilation in accordance with PN-B/02411:1987		
chimney dimensions		
height [m]		
cross-section [cm^2]		
other items		
tightness of boiler connection to the flue		
lighting allowing for boiler maintenance/repair		
location of boiler in boiler room		
distance from gear-motor to wall on the side of container		

The following activities can be carried out after checking correctness of installation of the heater in the system

II. CONNECTION OF ELEMENTS TO ELECTRICAL SYSTEM					**Comments**
forced-draught fan	*was connected*		*I have connected*		
electronic controller	*was connected*		*I have connected*		
III. FITTINGS TEST					**Comments**
checking of sensors location					
compatibility of sensors readouts with the reality					
checking direction of fan rotation					
IV. HEATER START-UP					**Comments**
starting up boiler according to the point 9.3. of operating manual					
initial adjustment of boiler operation settings					
instructing the user on using the controller					
instructing the user on using the boiler					
V. OPERATING PARAMETERS OF THE HEATER					
fuel type					
VI. CONFIRMATION OF USER'S TRAINING					**signature of heater user**
User confirms with own sign that he/she was trained within the scope of the following					
operation of heater controller and adjustment of combustion process					
heater maintenance					
required fuel quality					
safe operation of the heater					
action in emergency and complaint procedure					

IIN THE REPORT, MARK AS FOLLOWS IN SECOND COLUMN: ☑ if condition is fulfilled | if not applicable 12 enter correct value if required

.....

date, stamp and sign of authorized DEFRO service

.....

sign of heater user

Attention!

UNDER NO CIRCUMSTANCES, THE HEATER CANNOT BE STARTED in case when abnormalities or connection inconsistent with the mandatory regulations are stated. If the heater is started up despite the contraindications, its guarantee becomes invalid, and the person starting up the heater accepts responsibility for the boiler and becomes guarantor for the heater, as well as loses technical permission issued by PW DEFRO.

copy to send back

REPORT

OF TECHNICAL CONDITION AND FIRST START-UP OF HEATER

User name and surname: .....

Detailed adress: .....tel.:.....

Boiler type .....Heater serial number.....Heater power .....kW

I. BOILER ROOM		**Remarks**
ventilation		
pressure ventilation in accordance with PN-B/02411:1987		
exhaust ventilation in accordance with PN-B/02411:1987		
chimney dimensions		
height [m]		
cross-section [cm^2]		
other items		
tightness of boiler connection to the flue		
lighting allowing for boiler maintenance/repair		
location of boiler in boiler room		
distance from gear-motor to wall on the side of container		

The following activities can be carried out after checking correctness of installation of the heater in the system

II. CONNECTION OF ELEMENTS TO ELECTRICAL SYSTEM					**Comments**
forced-draught fan	*was connected*		*I have connected*		
electronic controller	*was connected*		*I have connected*		
III. FITTINGS TEST					**Comments**
checking of sensors location					
compatibility of sensors readouts with the reality					
checking direction of fan rotation					
IV. HEATER START-UP					**Comments**
starting up boiler according to the point 9.3. of operating manual					
initial adjustment of boiler operation settings					
instructing the user on using the controller					
instructing the user on using the boiler					
V. OPERATING PARAMETERS OF THE HEATER					
fuel type					
VI. CONFIRMATION OF USER'S TRAINING					**signature of heater user**
User confirms with own sign that he/she was trained within the scope of the following					
operation of heater controller and adjustment of combustion process					
heater maintenance					
required fuel quality					
safe operation of the heater					
action in emergency and complaint procedure					

.....
date, stamp and sign of authorized DEFRO service

.....
sign of heater user

Attention!

UNDER NO CIRCUMSTANCES, THE HEATER CANNOT BE STARTED in case when abnormalities or connection inconsistent with the mandatory regulations are stated. If the heater is started up despite the contraindications, its guarantee becomes invalid, and the person starting up the heater accepts responsibility for the boiler and becomes guarantor for the heater, as well as loses technical permission issued by PW DEFRO.

IIN THE REPORT, MARK AS FOLLOWS IN SECOND COLUMN: ☑ if condition is fulfilled | if not applicable 12 enter correct value if required

WARRANTY CARD

Heater quality and completeness receipt

In accordance with the conditions stated herein, warranty for the heaters of the following type has been issued:

NP.....kW*

operated in accordance with the operating manual.

Heater manufacturing number*.....

Heater power*.....kW

User /name and surname/**.....

Address /street, city, postal code/**.....

.....

tel./fax**..... e-mail**.....

This is to confirm that the above-mentioned heater has passed the technical test.

Attention!
Heaters type NP installed in accordance with the recommendations of this operating manual are not subject to commissioning by the Office of Technical Inspection.

Date of purchase ....

Installation date .....

(stamp and signature of salesperson)

(stamp and signature of fitter)

Start-up date .....

(stamp and signature of company starting up the boiler)

Measurement type	Value measured at 100% power	Value measured at 30% power
Chimney draught [Pa]		
Flue gas temperature [°C]		

The user confirms that:
- the heater has been delivered as complete;
- the boiler showed no failure during the first start-up carried out by a service company;
- has received the Operating Manual and boiler's installation manual with this Warranty Card filled in;
- has been familiarised with boiler's operation and maintenance.

..... location and date

..... signature of boiler user

** filled by the manufacturer*
*** filled by the user*
The Customer and the installation and service company confirm by their own signature that their personal data can be processed for service register purposes according to the Data Protection Act of 29 August 1997, Journal of Laws No. 133 item 883.

18. CARRIED OUT WARRANTY REPAIRS AND MAINTENANCE

No.	date	fault description, repaired elements, description of repairs	comments	Stamp and signature of Service
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

WARRANTY CARD

Heater quality and completeness receipt

In accordance with the conditions stated herein, warranty for the heaters of the following type has been issued:

NP.....kW*

operated in accordance with the operating manual.

Heater manufacturing number*.....

Heater power*.....kW

User /name and surname/**.....

Address /street, city, postal code/**.....

.....

tel./fax**..... e-mail**.....

This is to confirm that the above-mentioned heater has passed the technical test.

Attention!
Heaters type NP installed in accordance with the recommendations of this operating manual are not subject to commissioning by the Office of Technical Inspection.

Date of purchase	Installation date	Start-up date
....	.....	.....
(stamp and signature of salesperson)	(stamp and signature of fitter)	(stamp and signature of company starting up the boiler)

Measurement type	Value measured at 100% power	Value measured at 30% power
Chimney draught [Pa]		
Flue gas temperature [°C]		

The user confirms that:
- the heater has been delivered as complete;
- the boiler showed no failure during the first start-up carried out by a service company;
- has received the Operating Manual and boiler's installation manual with this Warranty Card filled in;
- has been familiarised with boiler's operation and maintenance.

..... location and date

..... signature of boiler user

** filled by the manufacturer*
*** filled by the user*
The Customer and the installation and service company confirm by their own signature that their personal data can be processed for service register purposes according to the Data Protection Act of 29 August 1997, Journal of Laws No. 133 item 883.

COMPLAINT FORM

made on _____ **in connection with complaint no.** _____

SUBJECT OF COMPLAINT

BOILER TYPE: _____ Date of boiler prduction: _____

Boiler serial number: _____ Date of boiler purchase: _____

CLAIMANT

Name and surname _____

Detailed address _____

_____

Phone number: _____

DETAILED DESCRIPTION OF QUALITY FAULTS OR FAULTS RESULTING FROM THE MANUFACTURER'S FAULT

_____

_____

_____

_____

_____

OTHER FAULTS _____

_____

CLAIMANT LODGES WARRANTY CLAIM FOR (SELECT APPROPRIATE):

Warranty repair ☐ Paid repair ☐ Post-warranty paid repair ☐

CLAIMANT REQUESTS _____

_____

In case of unjustified calling the service, the CLAIMANT agrees to cover the costs incurred by the manufacturer's service.

_____ _____ _____

(place, date) (sign of person claimant) (sign of service technician)

REMOVAL OF HEATER'S FAULT - to be filled by service

Date of informing the service technician about fault _____ hour _____

Name and surname of service technician _____

Way of fault removal _____

_____

_____

Advice (DESCRIPTION) _____

_____

END OF COMPLAINT

Name and surname of service technician _____ Fault removal date _____

Justness of compleint _____ Duration of repair _____

Fault (defect) has been removed, the boiler operates correctly. I hereby confirm removal of the fault. I declare that I have familiarised myself with conditions of warranty on the basis of which I wish to register my complaint and I agree for processing my personal data for complaint register purposes according to the Data Protection Act of 29 August 1997 (Journal of Laws No. 133 item 833)

_____ _____ _____

(place, date) (sign of claimant) (sign of person registering complaint)

ATTENTION! In case of unjustified calling of the "DEFRO" service the CLAIMANT covers the labour costs and travel expenses*

*cost per man-hour and travelling expenses are calculated according to the current price list available at www.defro.pl.

COMPLAINT FORM

made on _____ **in connection with complaint no.** _____

SUBJECT OF COMPLAINT

BOILER TYPE: _____ Date of boiler prduction: _____

Boiler serial number: _____ Date of boiler purchase: _____

CLAIMANT

Name and surname _____

Detailed address _____

_____

Phone number: _____

DETAILED DESCRIPTION OF QUALITY FAULTS OR FAULTS RESULTING FROM THE MANUFACTURER'S FAULT

_____

_____

_____

_____

_____

OTHER FAULTS _____

_____

CLAIMANT LODGES WARRANTY CLAIM FOR (SELECT APPROPRIATE):

Warranty repair ☐ Paid repair ☐ Post-warranty paid repair ☐

CLAIMANT REQUESTS _____

_____

In case of unjustified calling the service, the CLAIMANT agrees to cover the costs incurred by the manufacturer's service.

_____ (place, date) _____ (sign of person claimant) _____ (sign of service technician)

REMOVAL OF HEATER'S FAULT - to be filled by service

Date of informing the service technician about fault _____ hour _____

Name and surname of service technician _____

Way of fault removal _____

_____

_____

Advice (DESCRIPTION) _____

_____

END OF COMPLAINT

Name and surname of service technician _____ Fault removal date _____

Justness of compleint _____ Duration of repair _____

Fault (defect) has been removed, the boiler operates correctly. I hereby confirm removal of the fault. I declare that I have familiarised myself with conditions of warranty on the basis of which I wish to register my complaint and I agree for processing my personal data for complaint register purposes according to the Data Protection Act of 29 August 1997 (Journal of Laws No. 133 item 833)

_____ (place, date) _____ (sign of claimant) _____ (sign of person registering complaint)

ATTENTION! In case of unjustified calling of the "DEFRO" service the CLAIMANT covers the labour costs and travel expenses*

*cost per man-hour and travelling expenses are calculated according to the current price list available at www.defro.pl.

COMPLAINT FORM

made on _____ **in connection with complaint no.** _____

SUBJECT OF COMPLAINT

BOILER TYPE: _____ Date of boiler prduction: _____

Boiler serial number: _____ Date of boiler purchase: _____

CLAIMANT

Name and surname _____

Detailed address _____

_____

Phone number: _____

DETAILED DESCRIPTION OF QUALITY FAULTS OR FAULTS RESULTING FROM THE MANUFACTURER'S FAULT

_____

_____

_____

_____

_____

OTHER FAULTS _____

_____

CLAIMANT LODGES WARRANTY CLAIM FOR (SELECT APPROPRIATE):

Warranty repair ☐ Paid repair ☐ Post-warranty paid repair ☐

CLAIMANT REQUESTS _____

_____

In case of unjustified calling the service, the CLAIMANT agrees to cover the costs incurred by the manufacturer's service.

_____ _____ _____

(place, date) (sign of person claimant) (sign of service technician)

REMOVAL OF HEATER'S FAULT - to be filled by service

Date of informing the service technician about fault _____ hour _____

Name and surname of service technician _____

Way of fault removal _____

_____

_____

Advice (DESCRIPTION) _____

_____

END OF COMPLAINT

Name and surname of service technician _____ Fault removal date _____

Justness of compleint _____ Duration of repair _____

Fault (defect) has been removed, the boiler operates correctly. I hereby confirm removal of the fault. I declare that I have familiarised myself with conditions of warranty on the basis of which I wish to register my complaint and I agree for processing my personal data for complaint register purposes according to the Data Protection Act of 29 August 1997 (Journal of Laws No. 133 item 833)

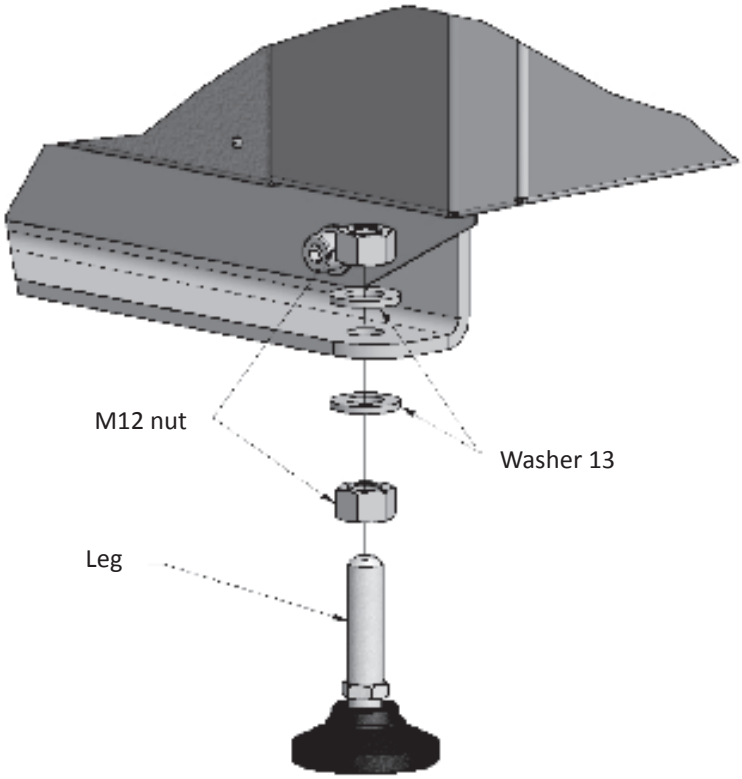
_____ _____ _____

(place, date) (sign of claimant) (sign of person registering complaint)

ATTENTION! In case of unjustified calling of the "DEFRO" service the CLAIMANT covers the labour costs and travel expenses*

*cost per man-hour and travelling expenses are calculated according to the current price list available at www.defro.pl.

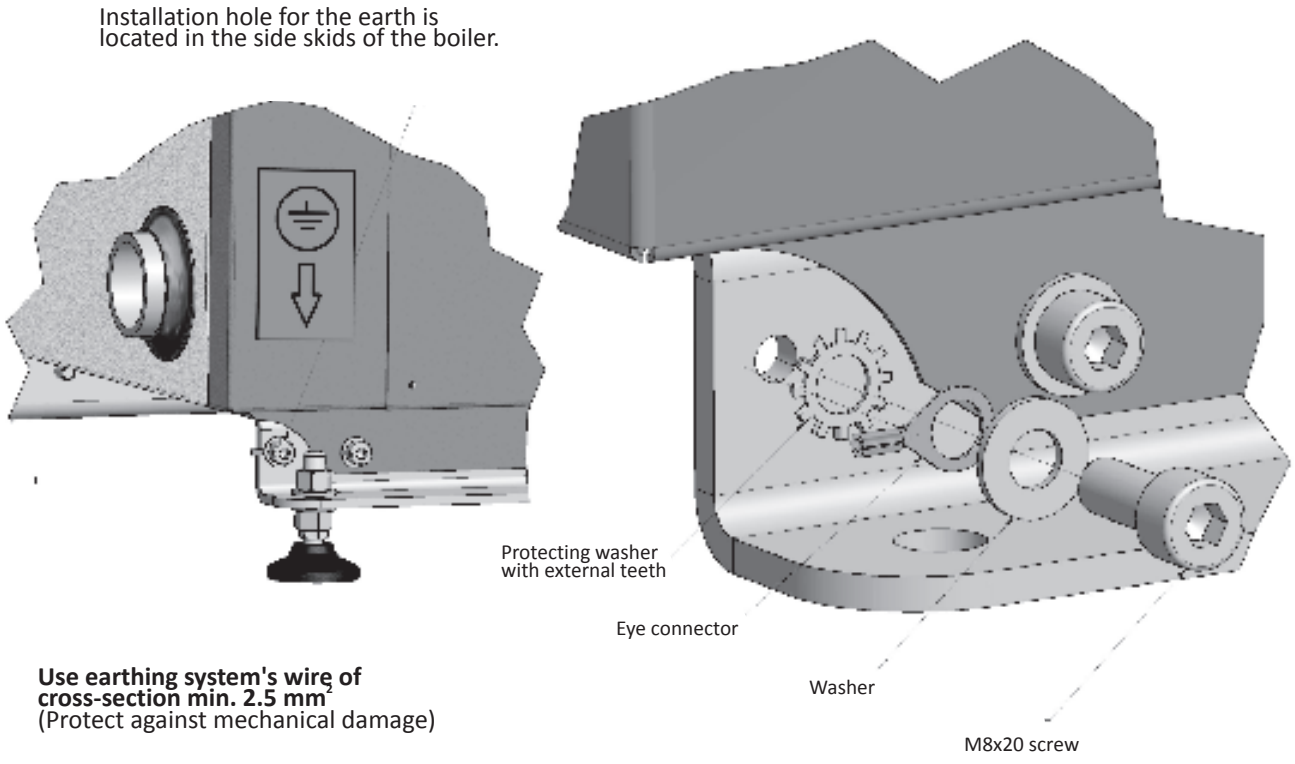
Installation of boiler levelling legs.



Additional levelling legs allowing unequivocal setting against the floor are included as equipment of the boiler.

Picture 6. Installation of boiler levelling legs.

Diagram of earth installation of boiler's body.



Picture 7. Diagram of earth installation of boiler's body.

ATTENTION! The manufacturer reserves the right to introduce constructional modifications and changes in documentation of boiler connected with is modernization and improvement.

DEFRO®
technika grzewcza

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Problem with a controller?
Call us:

665 011 151

Any other problem with the boiler?
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509 577 900