

# VIADRUS

## **VIADRUS U 22 C/D** MANUAL FOR BOILER OPERATION AND INSTALLATION



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**Dear customer,**  
**thank you for buying the general – purpose VIADRUS HERCULES U 22 furnace and thus showing belief in the company ŽDB GROUP, a.s., VIADRUS division.**

**At first read this operating manual (especially Chapter Nr.7 – User's furnace service and Chapter Nr. 8 – Important notice) to get used to a proper usage with your new product from the very beginning. We request to maintain the further mentioned information and particularly to perform the prescribed annual checks by an authorized specialized company by which a long – time failure – free operation of your furnace - to your and our satisfaction - is secured.**

The furnace VIADRUS U 22 is a general – purpose cast iron sectional low – pressure furnace intended for burning of:

- solid fuels      coke, anthracite, wood      commercial marking VIADRUS U 22 C
- wood (optionally coke and anthracite)      commercial marking VIADRUS U 22 D

**Burning of other materials such as plastic is unallowable.**

## **1. Usage and advantages of the furnace**

Two and three – sectional size of the furnace VIADRUS U 22 is appropriate for heat source reconstruction in self – contained flats, for smaller residential and recreational facilities. Bigger sizes of the furnace meet the requirements of heating the family houses, shops, schools, etc.

The furnace is produced as hot – water with natural and forced circulation of heat water and operational overpressure to 800 kPa.

The VIADRUS U 22 D furnace is different from the VIADRUS U 22 C furnace version by its enlargement of the stoke hole so that it is possible to burn even bigger clogs up to the average of 220 mm. By burning wooden logs the heat work difficulty is considerably reduced and the service quality is increased. The amount of ash is also substantially smaller and it is possible to further use it as fertilizer.

### **Advantages of the furnace:**

1. High operating life of cast iron exchanger and all other parts with respect to the quality of used materials.
2. Design approved in the long term.
3. Elaborate production technology on automatic forming lines with consistent and approved quality of the production process (ISO 9001, ISO 14 001).
4. Efficiency of coke and anthracite burning – 75 – 80 %, efficiency of wood burning – 75 %.
5. Simple service and maintenance.
6. Low demandingness for chimney draught
7. Power gradation according to the sections
8. Possibility of furnace transformation of burning of solid fuels to gas or liquid fuels or vice versa.

## **2. Technical data of the furnace VIADRUS U 22**

**Chart Nr.1 Dimensions, technical parameters of the furnace VIADRUS U 22 C**

Chart Nr.1 - Dimensions, technical parameters of the furnace VIADUC 5-12 C										
Section number	pieces	2	3	4	5	6	7	8	9	10
Weight	kg	198	218	252	282	312	347	377	417	448
Water space volume	l	26,1	31,5	36,2	40,9	45,6	50,3	55,0	59,7	64,4
Firing chamber volume	l	21	34	47	60	73	86	99	112	125
Firing chamber depth	mm	149	244	339	434	529	624	719	814	909
Diameter of smoke socket	mm	156							176	
Furnace dimensions: - height x width (version with the box)	mm	1007,5 x 545								
Furnace dimensions: - height x width (version without the box)	mm	989,5 x 545								
- depth	mm	592,8	688,8	784,8	880,8	976,8	1072,8	1168,8	1264,8	1360,8
Water operating overpressure	kPa	400								
Testing water overpressure	kPa	800								
Hydraulic loss	-	See picture Nr.1								
Recommended heat water operating temperature	°C	60-90								
Noise level	dB	Not exceeding the level of 65 dB (A)								
Minimum chimney draught	Pa	12	14	16	18	20	22	24	26	28
Furnace connections - heat water		DN 50								
- returnable water		DN 50								

**Chart Nr.2 Dimensions, technical parameters of the furnace VIADRUS U 22 D**

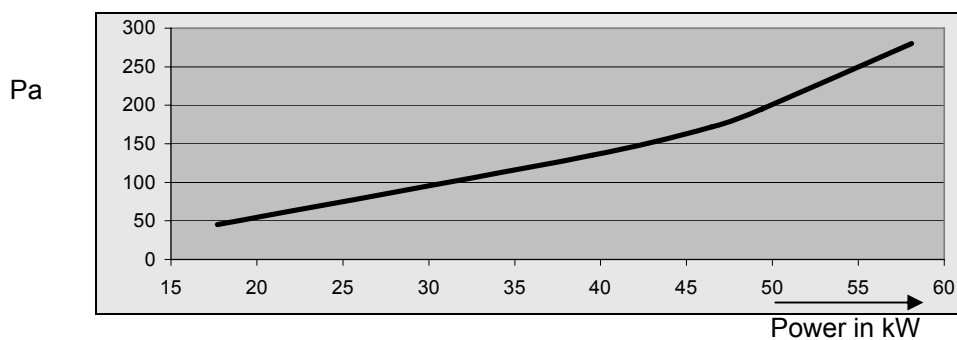
Section number	pieces	4	5	6	7	8	9	10
Weight	kg	252	282	312	347	377	417	448
Water space volume	l	36,2	40,9	45,6	50,3	55,0	59,7	64,4
Firing chamber volume	l	47	60	73	86	99	112	125
Firing chamber depth	mm	339	434	529	624	719	814	909
Lightness of the stove - pipe	mm	156					176	
Furnace dimensions: - height x width (version with the box)	mm	1007,5 x 545						
Furnace dimensions: - height x width (version without the box)	mm	989,5 x 545						
- depth	mm	750	845	940	1035	1130	1225	1320
Water operating overpressure	kPa	400						
Testing water overpressure	kPa	800						
Hydraulic loss	-	See picture Nr.1						
Recommended heat water operating temperature	°C	60-90						
Noise level	dB	Not exceeding the level of 65 dB (A)						
Minimum chimney draught	Pa	16	18	20	22	24	26	28
Furnace connections - heat water		DN 50						
- returnable water		DN 50						

**Chart Nr. 3 Heat - technical parameters of the furnace at COKE and ANTHRACITE burning**  
granularity 30 – 60 mm heating value: 26 - 30 MJ. kg<sup>-1</sup>

Section number		2	3	4	5	6	7	8	9	10
Rated power	kW	11,7	17,7	23,3	29,1	34,9	40,7	46,5	52,3	58,1
Efficiency	%	75 - 80								
Orientation fuel consumption – coke	kg.h <sup>-1</sup>	1,89	2,87	3,77	4,71	5,65	6,59	7,53	8,47	9,41
Heating value – coke	MJ. kg <sup>-1</sup>	27,8								
Orientation fuel consumption – anthracite	kg.h <sup>-1</sup>	1,98	3,0	3,95	4,93	5,92	6,9	7,88	8,87	9,85
Heating value – anthracite	MJ. kg <sup>-1</sup>	28,31								
Product of consumption temperature	°C	max. 280								

**Chart Nr. 4 Heat technical parameters of the furnace at WOOD burning**humidity 15 - 25 % heating value: 12 - 15 MJ. kg<sup>-1</sup>

Section number		4	5	6	7	8	9	10
Rated power	kW	20	25	30	35	40	45	49
Efficiency	%	75						
Orientation fuel consumption	kg.h <sup>-1</sup>	6,4	8,0	9,59	11,19	12,79	14,39	15,67
Heating value	MJ. kg <sup>-1</sup>	15,01						
Product of consumption temperature	°C	max. 320						

**Fig. Nr. 1 Hydraulic loss of the boiler drum**

### **3. Description**

#### **3.1 Construction of the furnace**

The main part of the furnace is the cast iron section boiler drum made of grey cast iron according to:  
ČSN 42 2415 Grey iron 42 2415 with luminated graphite, or  
ČSN 42 2420 Grey iron 42 2420 with luminated graphite

Pressure parts of the furnace correspond to the demands on solidity according to:  
ČSN 07 0240 Warm-water and low-pressure steam boilers  
ČSN 07 0245 Warm-water and low-pressure steam boilers. Warm-water boilers up to 50 kW output.

The boiler drum consists of sections with the help of pressured boiler nipples and is secured with boiler screws. The sections create burning and ash space, water space and a convective part. Heat water input and output are situated at the back part of the furnace.

The back section of the furnace has a smoky chimney – pot and a heat water flange in the upper part, and a returnable water flange with a socket for impregnating and clearing plug. Stoker and ash door and a firebox door under them are fixed to the front section.

The whole boiler drum is isolated with a stifling, mineral isolation that reduces losses by sharing heat into the surroundings. The steel jacket is fitted in colour with a quality comaxite paint.

At seven to ten – sectional size of the VIADRUS U 22 C furnace two tapes of medium sections are used: at the front part of the furnace the sections are without a molding and in the back part with a molding. The molding closes the burning space and carries back the flame and product of consumption from the back space to the front part of the furnace, i.e. by the back path in smoky draughts it is perfectly taken advantage of the product of consumption heat.

Number of sections without and with a molding is mentioned in the following chart:

**Chart Nr.5 Medium sections of the VIADRUS U 22 C furnace**

<b>Size of the furnace in sections</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Medium section with a molding	-	1	2	3	4	4	5	5	6
Medium section without a molding	-	-	-	-	-	1	1	2	2

At the VIADRUS U 22 D furnace three types of medium sections are used: in the front part of the furnace (except the four – section size) there is a section with a recess for easier fuel inserting to the average up to 220 mm, then sections without a molding, in the back part with a molding. The molding closes the burning space and carries back the flame and product of consumption from the back space to the front part of the furnace, i.e. by the back path in smoky draughts it is perfectly taken advantage of the product of consumption heat.

**Chart Nr. 6 Medium sections of the VIADRUS U 22 D furnace**

<b>Size of the furnace in sections</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Medium section with a recess	-	1	1	1	1	1	1
Medium section with a molding	2	2	3	4	5	5	6
Medium section without a molding	-	-	-	-	-	1	1

#### **3.2 Regulating and security elements**

The smoky flap of the smoky chimney – pot regulates the climb of the product of consumption from the furnace to the chimney. It is regulated with the handle with a rod in the upper left part of the furnace next to the stoker hole.

Stifling of the ash door regulates the inflow of the combustion air under the grate of the furnace. It is regulated by the draught governor or manually with an adjusting screw of the stifling.

The air rose of the stoker door serves for carrying the secondary air to the burning space. To control the rose it is necessary with respect to the higher surface temperature of the stoker door to use an instrument that is part of the delivered tools.

The cleaning cover of the smoky chimney – pot located in its bottom part serves for cleaning the embedded waste product caused by burning.

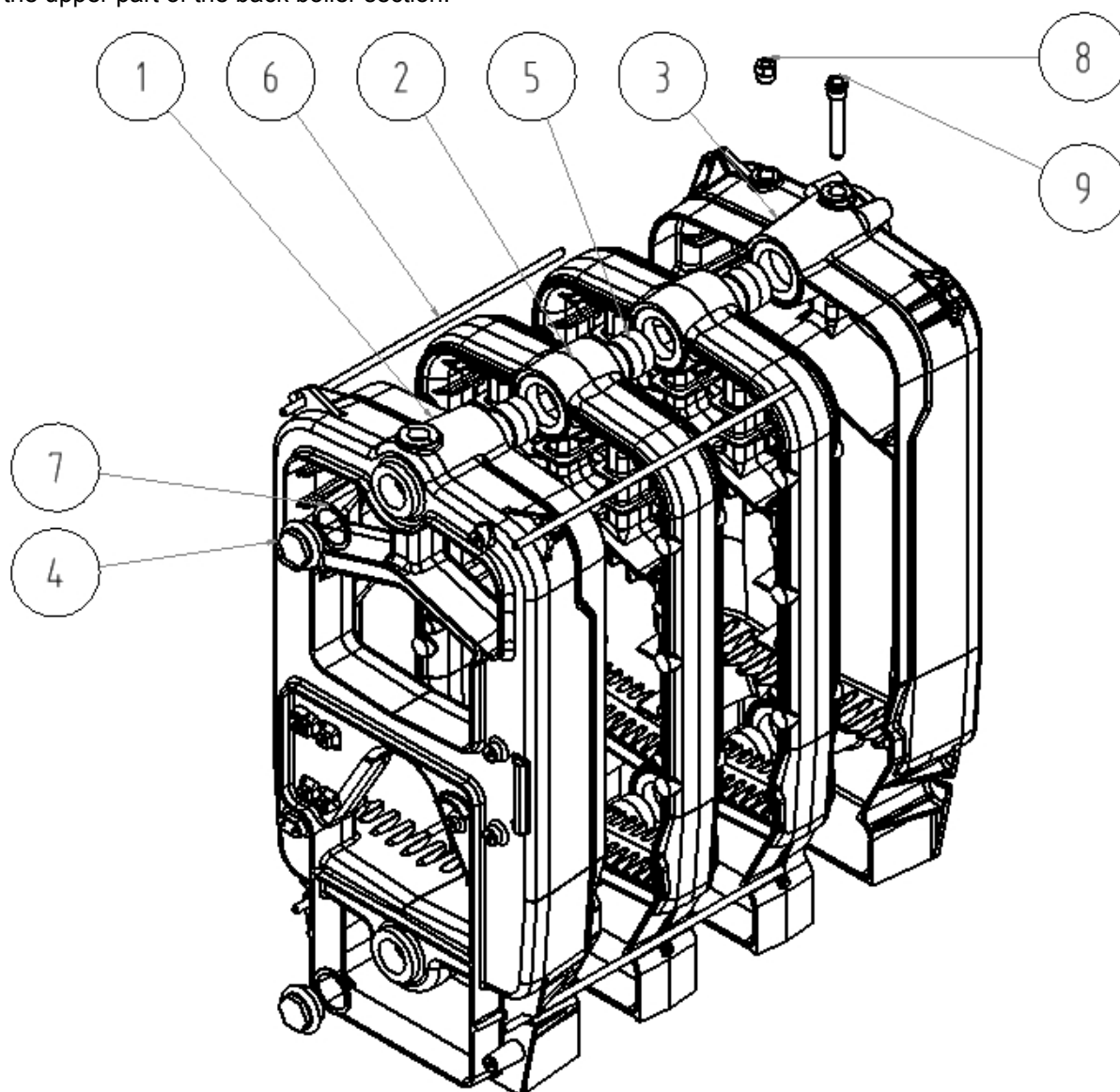
There are barriers of the smoky channel between the front and medium sections above the stoker hole of the furnace VIADRUS U 22 C. It serves for reducing the draw – away cross - section and for a better

utilization of the product of consumption at the furnaces of smaller power (2 – 5 sectional). They are used with a various cross – section width according to the sizes of the furnaces in conformity with this chart:

**Chart Nr.7 Barriers of the smoky channel of the VIADRUS U 22 C furnace**

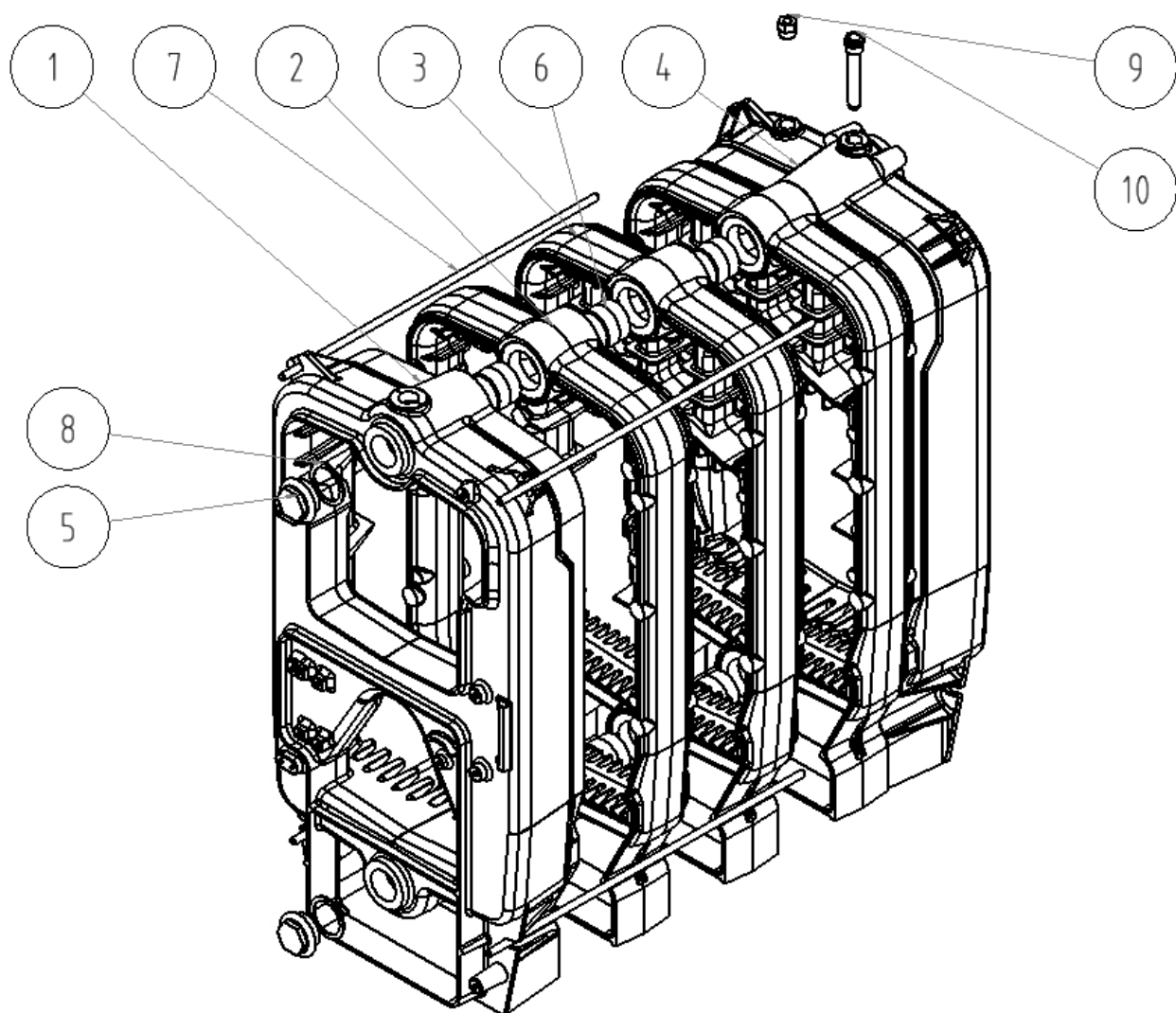
Furnace section number (pieces)	Cross – section of the smoky channel width (mm)	Barrier number (pieces)
2	12	2
3	24	2
4	36	2
5	48	2

A thermomanometer in the control box serves as an associated device for measuring the temperature of the heat water and water pressure in the heat system. The sump of the thermomanometer sensor is located in the upper part of the back boiler section.



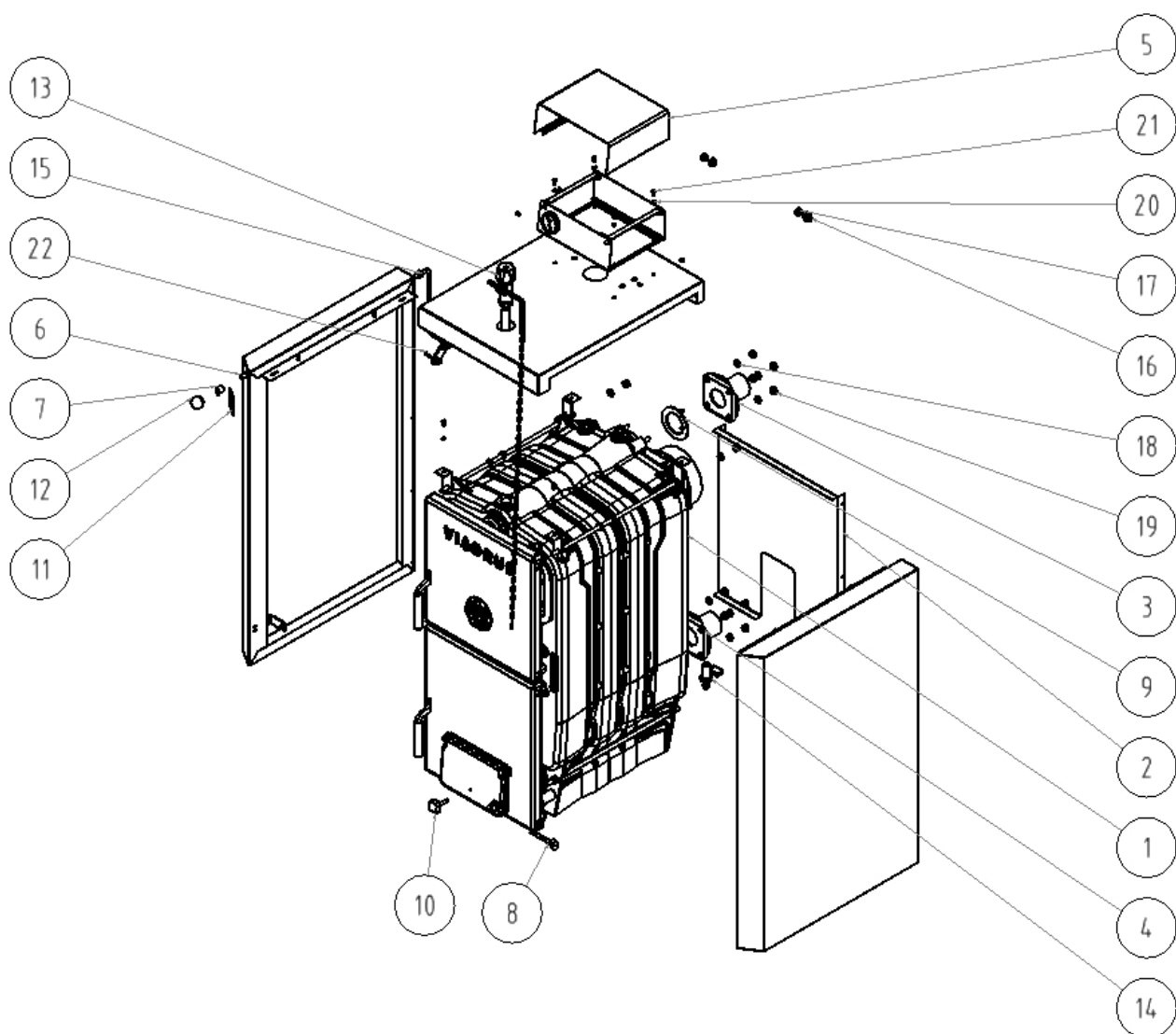
1. Front section U 22C
2. Middle section with a strip
3. Rear section
4. Plug
5. Insert
6. Anchor bolt
7. Sealing
8. Clack valve of the thermomanometer
9. Thermostat well

**Fig. no. 2 Diagram of VIADRUS HERCULES U 22 C boiler drum**



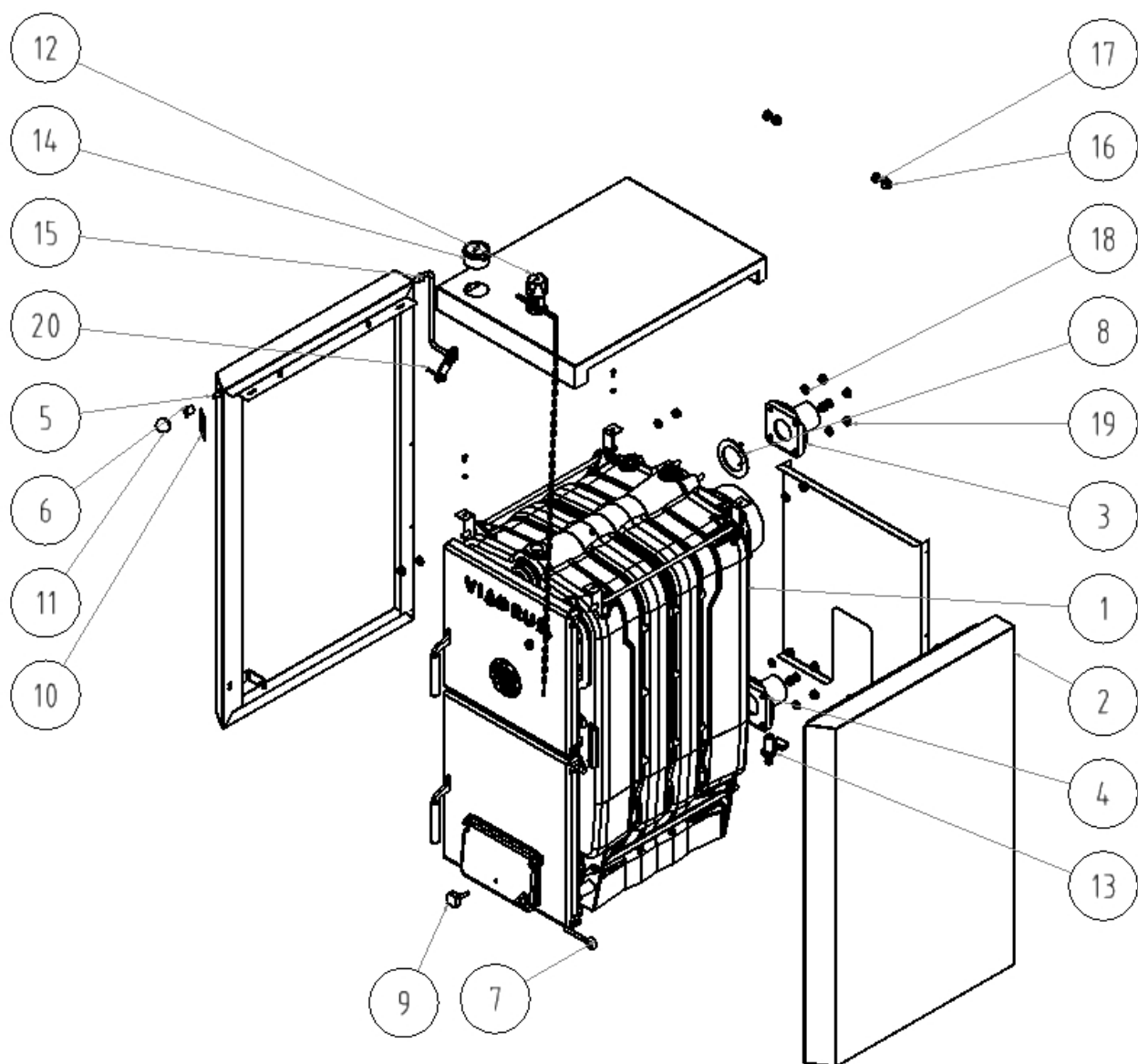
1. Front section U 22D
2. Middle section with a cutout
3. Middle section with a strip
4. Rest section
5. Plug
6. Insert
7. Anchor bolt
8. Sealing
9. Clack valve of the thermomanometer
10. Thermostat well

**Fig. no. 3 Diagram of VIADRUS HERCULES U 22 D boiler drum**



1. Boiler drum complete with valves
2. Complete boiler jacket according to the given size
3. Heating water flange
4. Return water flange
5. Control box with s thermomanometer
6. Tow bar
7. Slant bushing
8. Suspension pin
9. Sealing Ø 90 x 60 x 3
10. Choker screw
11. Label of smoke flap control
12. Plastic ball M10
13. Front draught controller
14. Filling and draining cock
15. Bushing HEYCO
16. Blind flange 19
17. Blind flange 15,9
18. Washer 10,5
19. Nut M10
20. Washer 5,3
21. Screw M5 x 12
22. Lock 2,5 x 20

**Fig. no. 4 Assembly of VIADRUS HERCULES U 22 boiler with the box**



1. Boiler drum complete with valves
2. Complete boiler jacket according to the given size
3. Heating water flange
4. Return water flange
5. Draw bar
6. Slant bushing
7. Suspension pin
8. Sealing  $\varnothing 90 \times 60 \times 3$
9. Choker screw
10. Label of smoke flap control
11. Plastic ball M10
12. Front draught controller
13. Filling and draining cock
14. Thermomanometer
15. Bushing HEYCO
16. Blind flange 19
17. Blind flange 15,9
18. Washer 10,5
19. Nut M10
20. Lock 2,5 x 20

**Fig. no. 5 Assembly of VIADRUS HERCULES U 22 boiler without the box**

## 4. Placing and installation

### 4.1 Regulations and instructions

The furnace for solid fuels can be installed by a company with a valid authorization to perform its installation and maintenance. For installation a project in accordance with valid regulations must be executed.

The heating system must be filled with water, that meets the ČSN 07 7401 requirements, especially its harness must not exceed the required parameters.

Recommended values		
Hardness	mmol/l	1
Ca <sup>2+</sup>	mmol/l	0,3
Concentration of total Fe + Mn	mg/l	(0,3)*

\*) recommended value

**WARNING!!! The use of anti-freeze mixture is not recommended by the manufacturer.**

#### a) to the heating system

- ČSN 06 0310 Heating systems in buildings – Designing and installation
- ČSN 06 0830 Heating systems in buildings – protecting device
- ČSN 07 0240 Warm-water and low-pressure steam boilers
- ČSN 07 0245 Warm-water and low-pressure steam boilers. Warm-water boilers up to 50 kW output.
- ČSN 07 7401 Water and steam for thermal energy equipments with working pressure up to 8 MPa.

#### b) to the chimney

- ČSN 73 4201 Chimneys and flue gas ducting– designing, implementation and connection of fuel consumers.

#### c) regarding the fire regulations

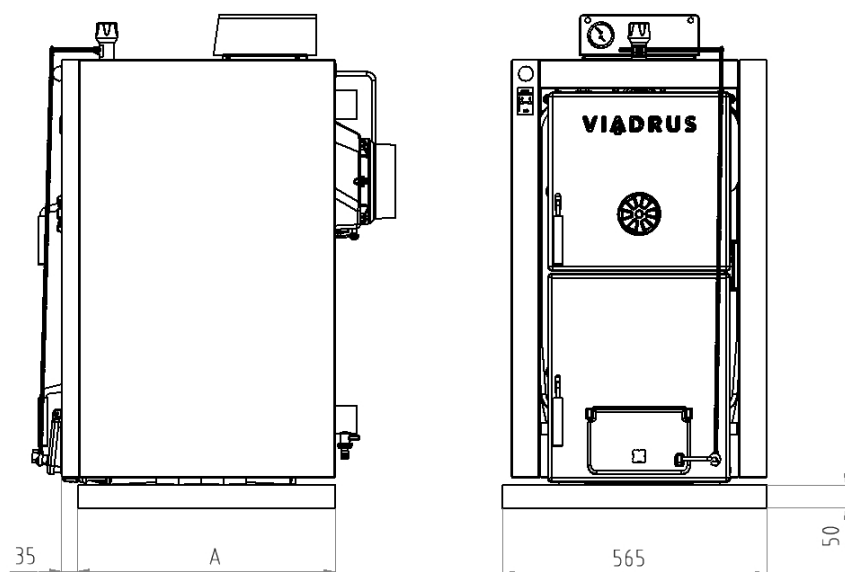
- ČSN 06 1008 Fire safety of heat installations.
- EN 13501-1 Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests

#### d) to the system of HWS heating

- ČSN 06 0320 Heating systems in buildings – Hot water preparation – Designing and planning
- ČSN 06 0830 Heating systems in buildings – Safety devices.
- ČSN 73 6660 House water plumbing

### 4.2 Placing possibilities

The VIADRUS U 22 furnace is approved for installation in non – residential spaces (for example – cellar, corridor, etc.)



Section number	2	3	4	5	6	7	8	9	10
A [mm]	360	455	550	645	740	835	930	835	930

Fig. Nr. 6 Bedding dimensions

### ***Furnace placing with regard to fire regulations:***

1. Placing on floor of flame resistant material (Pic.6)
  - furnace to be put on a flame resistant backing exceeding the furnace platform over 20 mm at sides and only on the boiler drum depth.
  - if the furnace is situated in a cellar we recommend to place it on a bedding of minimum 50 mm height.
2. Safety distance from the flammable materials
  - at installation and even service of the furnace it is necessary to keep a safety distance of 200 mm from the flammable materials of flammability levels of B, C1 and C2 (according to ČSN 06 1008)
  - for easy flammable materials of flammability level of C3 that quickly burn and burn themselves even after removing the embrazing source (such as paper board, cardboard, asphalt and tar boards, wood and wood – fibre boards, plastic materials, floor coverings) the safety distance is doubled to, i.e. for 400 mm
  - the safety distance is necessary to be doubled even in case when the flammability level of the building material is not proved

**Chart Nr. 8 Flammability levels of building materials and products**

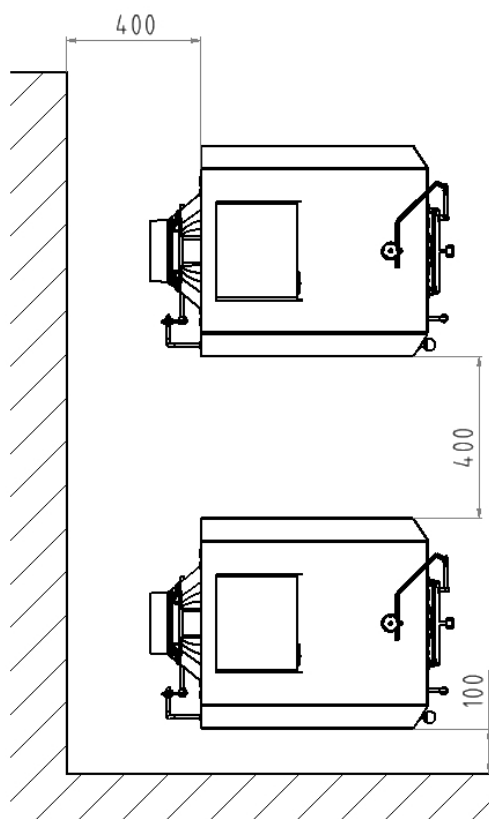
Flammability level of building materials and products	Building materials and products included in flammability level (selection from EN 13 501-1)
<b>A</b> – fire - resistant	granite, sandstone, concrete, bricks, ceramic tiles, mortars, fire plasters, ...
<b>B</b> – hard - flammable	acumin, isumin, cement – bonded board, lignos, boards and basalt felts, boards out of fibreglass, ...
<b>C<sub>1</sub></b> – heavily - flammable	beech wood, oak, hobrex boards, plywoods, wersalite, formica, sirkolit, ...
<b>C<sub>2</sub></b> – medium - flammable	pine wood, larch, spruce, wood chip and cork boards, rubber floor coverings, ...
<b>C<sub>3</sub></b> – easily - flammable	asphalt board, wood–fibre boards, wood–pulp materials, polyurethane, polystyrene, polyethylene, PVC, ...

### ***The furnace placing with respect to the necessary handling space:***

- basic surroundings of AA5/AB5 according to ČSN 33 2000-3
- handling space of minimum 1000 mm in front of the furnace must be maintained
- a minimum distance of 400 mm between the back part of the furnace and the wall
- to maintain space for access to the back part of the furnace of minimum 400 mm at least from one lateral face
- a minimum distance of 100 mm from the side wall

### ***Fuel placing:***

- it is disallowed to store fuel behind the furnace or to unload it beside the furnace in the distance smaller than 400 mm
- it is disallowed to store fuel between two furnaces in a boiler room
- the producer recommends to keep distance of minimum 1000 mm between the furnace and fuel or to place the fuel to a another room than that where the furnace is installed



**Fig. Nr. 7 Furnace placing in a boiler room**

## **5. Order, delivery and assembly**

### **5.1 Order**

**In the order the following is needed to be specified:**

- 1) Furnace design - VIADRUS U 22 C furnace  
- VIADRUS U 22 D furnace
- 2) Furnace size.
- 3) Demands on optional accessories.

### **5.2 Delivery and accessories**

The VIADRUS U 22 furnace is delivered according to the order in a manner that a complete boiler drum is located on the palette and a covered boiler jacket is fixed on the side. The accessories are stored inside the boiler drum and is available after opening the stoker hole. The furnace is covered in the transfer packing and must not be turned over during the transit, only a declination into sides for taking down of the boiler drum packing is allowed.

#### ***Standard accessories for the VIADRUS U 22 furnace:***

• cleaning tools (hook, brush with shaft, point, hanger)	
• control box	1 piece
• thermomanometer	1 piece
• impregnating and clearing plug Js 1/2"	1 piece
• draught regulator complete	1 piece
• closure Js 6/4"	2 pieces
• rod with a control handle of the smoky flap	1 piece
• control label of the smoky flap	1 piece
• stifling screw	1 piece
• connecting pin of the jacket	4 pieces
• fan-shaped washer 5	4 pieces
• nut M5	4 pieces
• washer 10,5	8 pieces
• nut M10	8 pieces
• flexible pins 3 x 26	1 piece
• split pin 2,5 x 32	1 piece
• washer 10,5	3 pieces
• bushings HEYCO	2 pieces
• blind flanges	6 pieces
• screws into metal C 4,8 x 13	4 pieces
• flange of heat water DN 70	1 piece
• flange of returnable water DN 70 with a socket Js 1/2" for impregnating and clearing plug	1 piece
• sealing $\phi$ 90 x 60 x 3	2 pieces
• operating key	1 piece
• hook	2 pieces
• socket 8 mm	2 pieces
• boiler operation and installation manual	

### 5.3 Assembly techniques

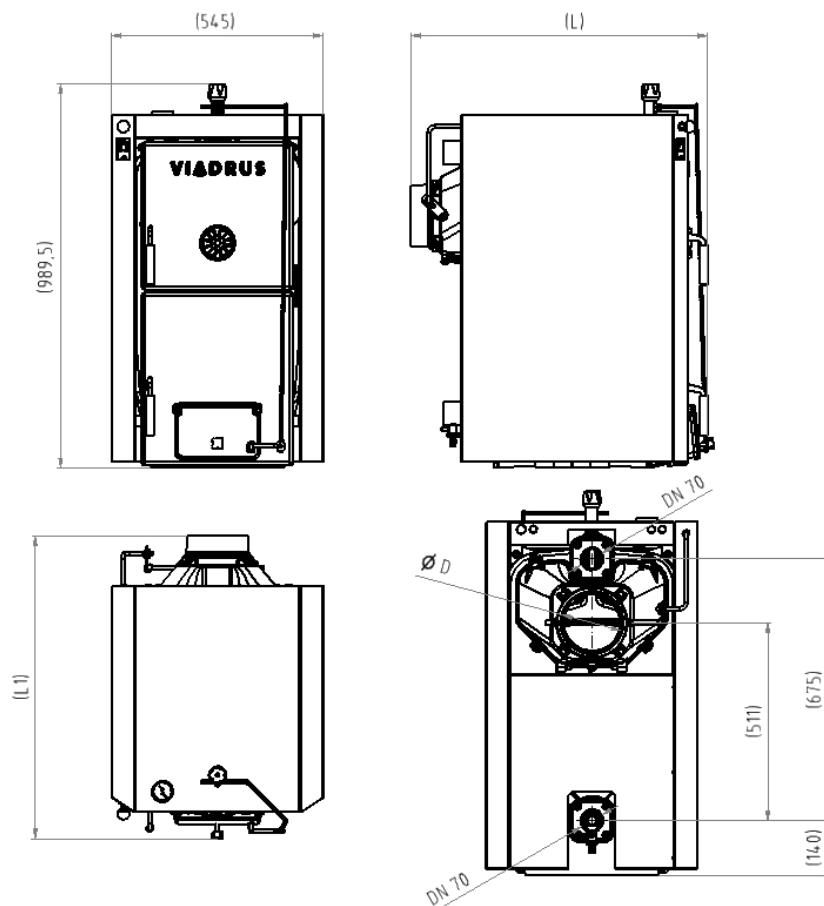


Fig.no. 8 Connecting dimensions of VIADRUS HERCULES U 22 boiler without the control box

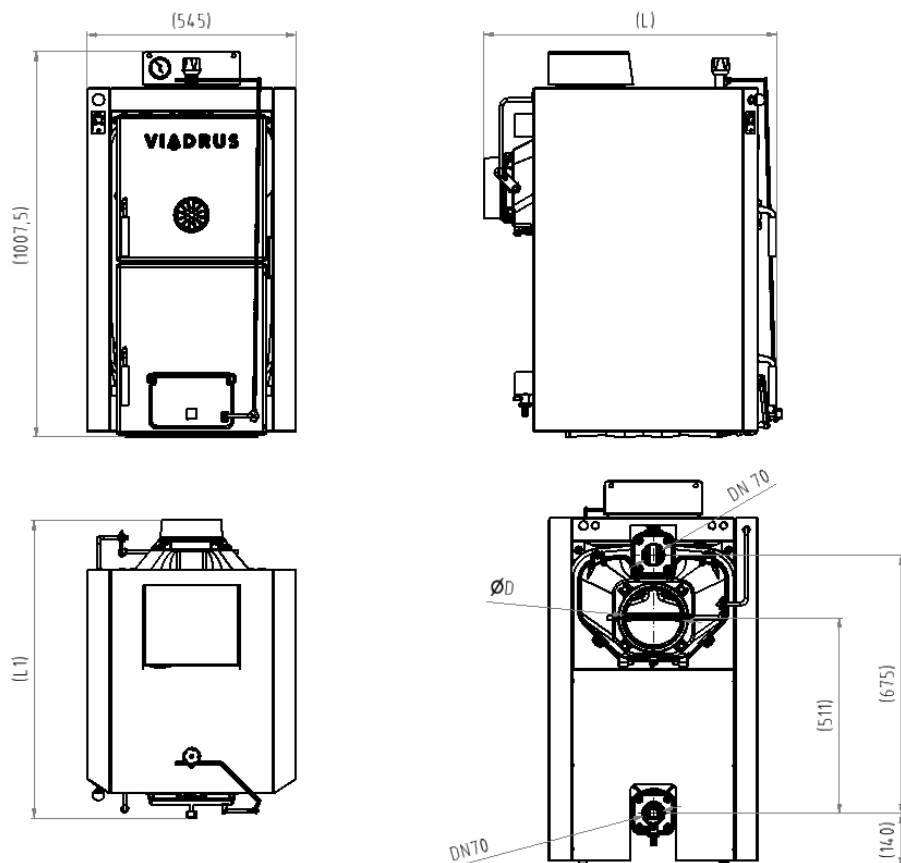
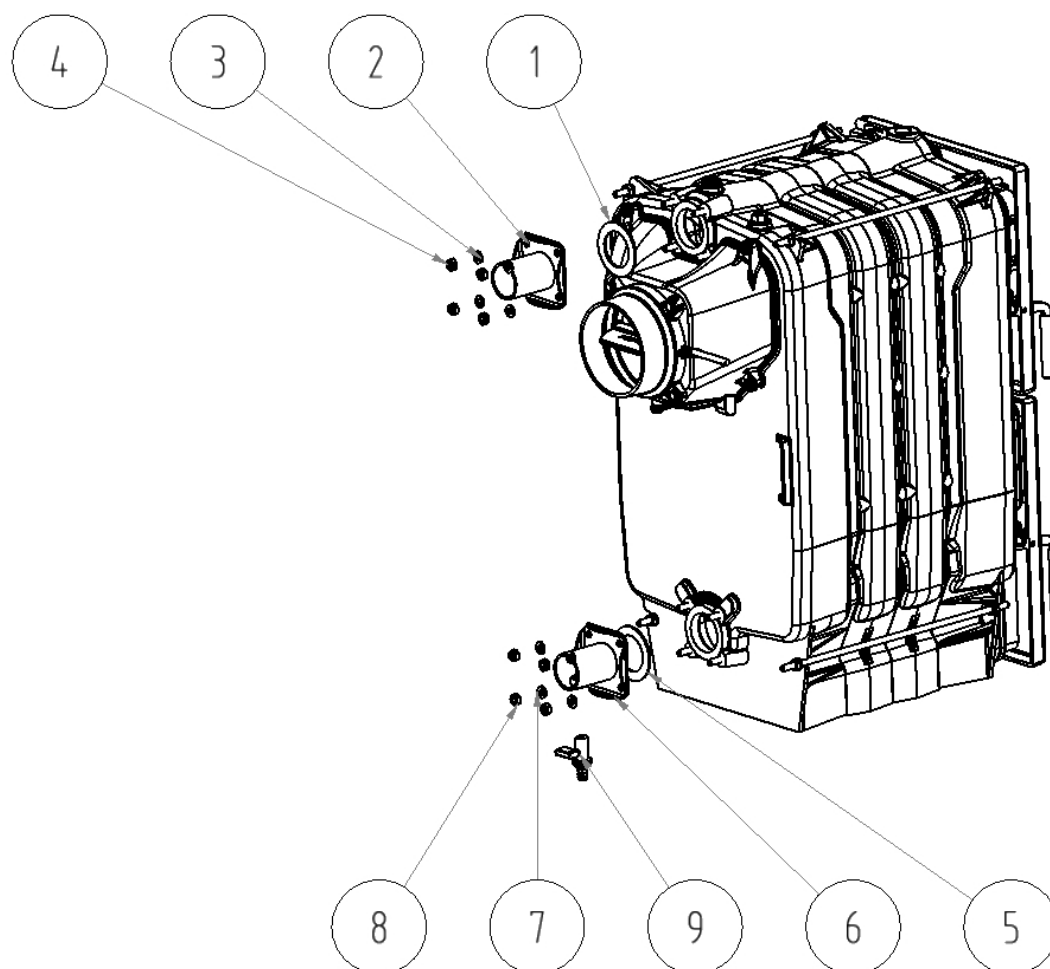


Fig.no. 9 Connecting dimensions of VIADRUS HERCULES U 22 boiler with the control box

### **5.3.1 Boiler drum installation**

1. Put the boiler drum on an embedding.
2. Put a sealing  $\phi 90 \times 60 \times 3$  on the upper flange part of the back section and fix the flange of the heat water. The flange to be welded to the distribution of the heat water in advance.
3. Put a sealing  $\phi 90 \times 60 \times 3$  on the bottom flange part of the back section and fix the flange of the returnable water with a socket for impregnating and clearing plug. The flange to be welded to the distribution of the returnable water in advance.
4. An elbow with an impregnating and clearing plug to be screwed to the flange socket of the returnable water after connection of the furnace to the heat system
5. To put the stove – pipe to the smoky chimney - pot and penetrate it into the chimney hole
6. To screw the draught controller to the hole in the upper part of the front section
7. Two holes with a Js 6/4" thread in the front section to blind with Js 6/4" closures



1. Sealing  $\phi 90 \times 60 \times 3$
2. Heating water flange
3. Washer 10,5
4. Nut M10
5. Sealing  $\phi 90 \times 60 \times 3$
6. Return water flange
7. Washer 10,5
8. Nut M10
9. Filling and draining cock

**Fig. Nr. 10 Boiler drum installation**

### 5.3.2 Jacket assembly

#### Mounting of the side part of the jacket and the rear part of the jacket

1. Remove the jackets from the cardboard cover.
2. Put the consoles 1 (1) and 2 (4) on the thread of the right upper anchor screw and screw them by means of two nuts M10 (6) and two washers 10,5 (5) - (see Fig. no. 11).
3. Put the consoles 1 (1) and 2 (4) on the thread of the left upper anchor screw and screw them by means of two nuts M10 (6) and two washers 10,5 (5) - (see Fig. no. 11).

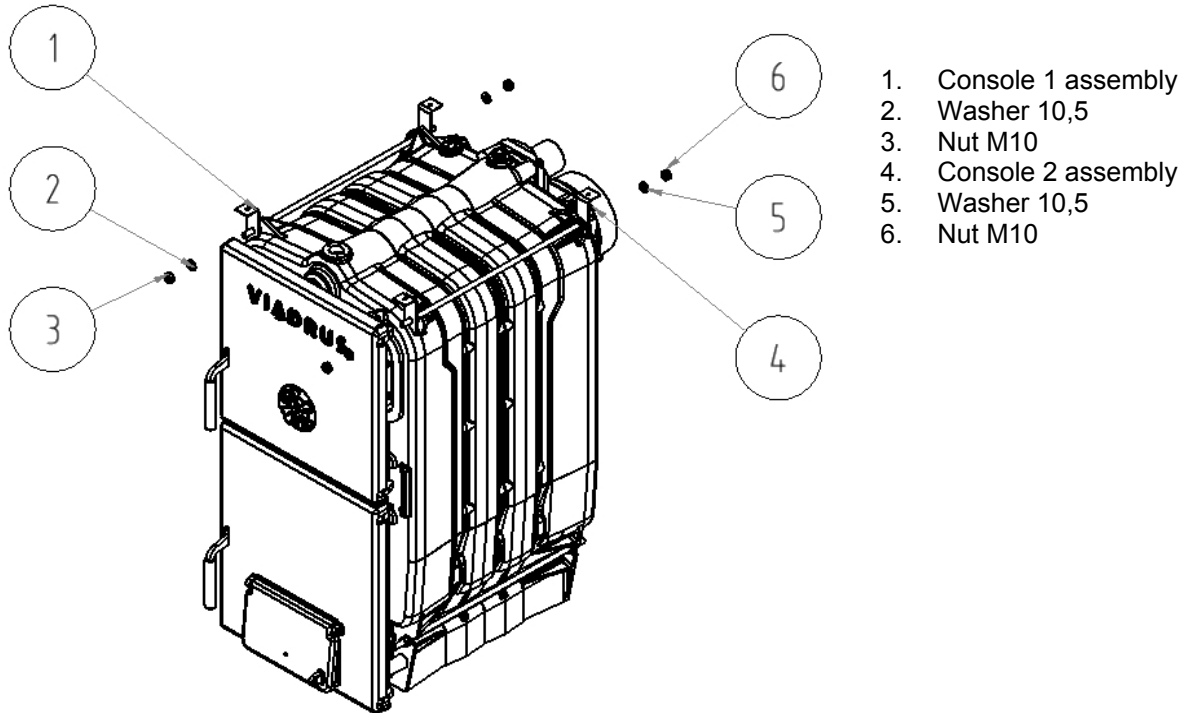


Fig. No. 11 Assembly of jacket consoles

4. Mount two connecting plugs (2) on the right side part of the jacket (1) and then insert the insulation. Put the jacket on the lower anchor bolts and connect upper part with consoles 1 and 2 by means of two screws M5 x12 plus two washers ,3 – see Fig. no. 12.

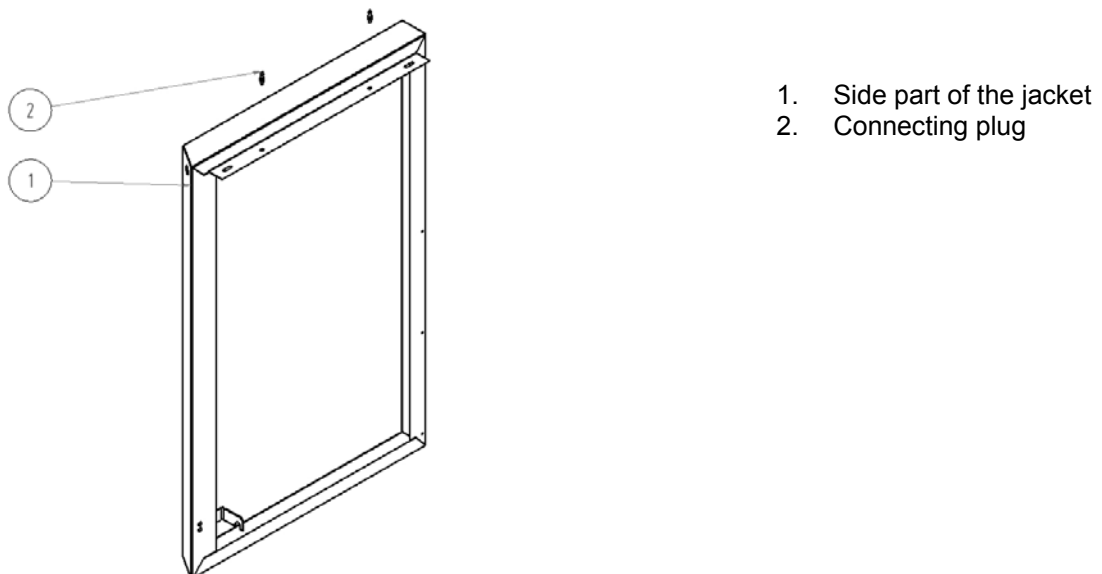
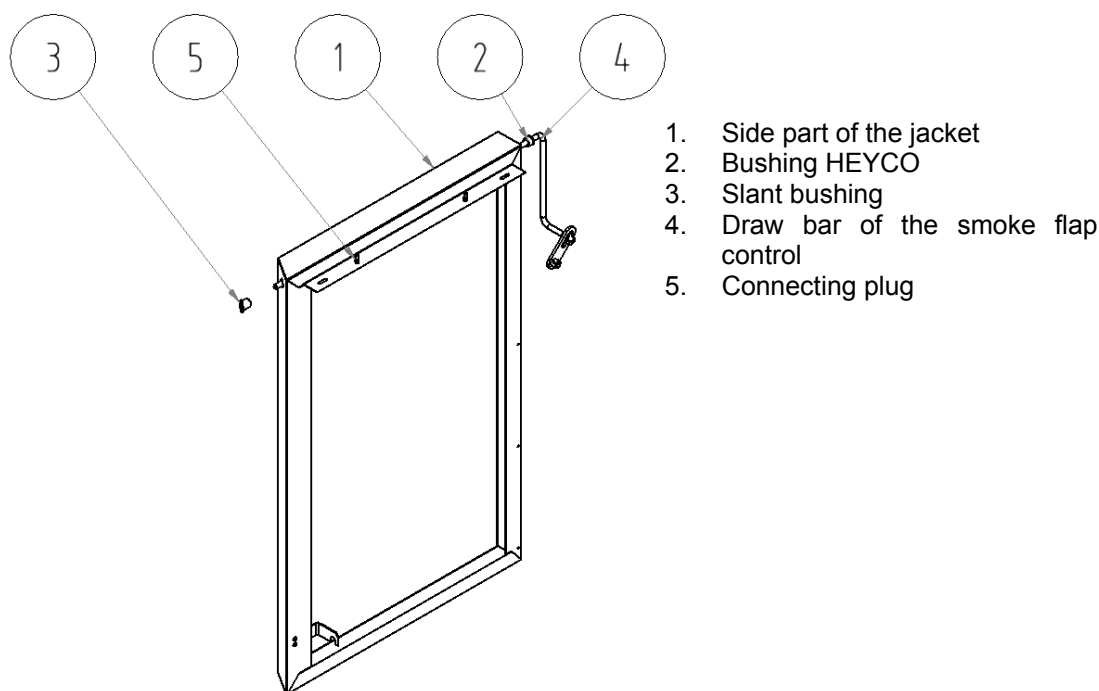


Fig. No. 12 Right side part of the jacket

5. Mount two connecting plugs (5), into the left side part of the jacket (1), insert the bushings (2, 3), then insert the draw bar of the smoke flap control (4) and the insulation. Put the jacket on the lower anchor bolts and connect the upper part with consoles 1 and 2 by means of two screws M5 x12 and two washers 5,3 – see Fig. no. 13.

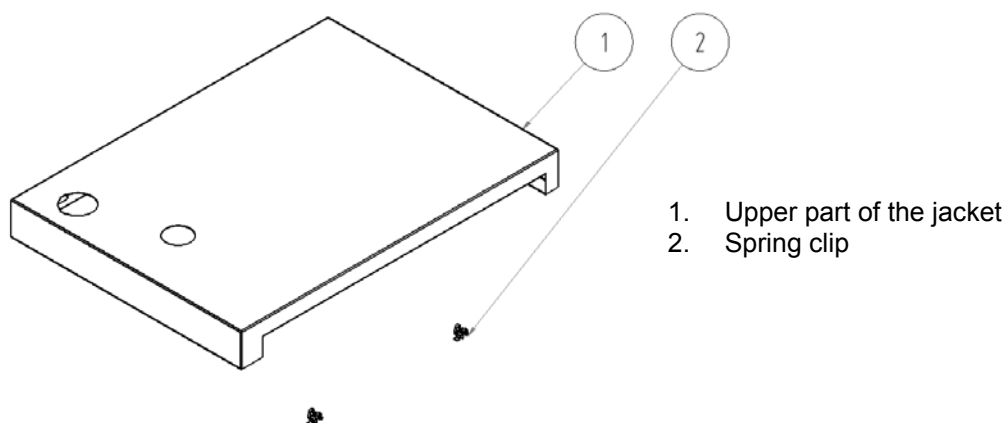


**Fig. No. 13 Left side part of the jacket**

6. Mount the insulation of the rear part of the jacket (9 – Fig.no.15; 14 – Fig.no.18) and screw to the side parts of the jacket by means of screws ST 4,2 x 9,5 (10 – Fig.no.15; 15 – Fig.no.18).

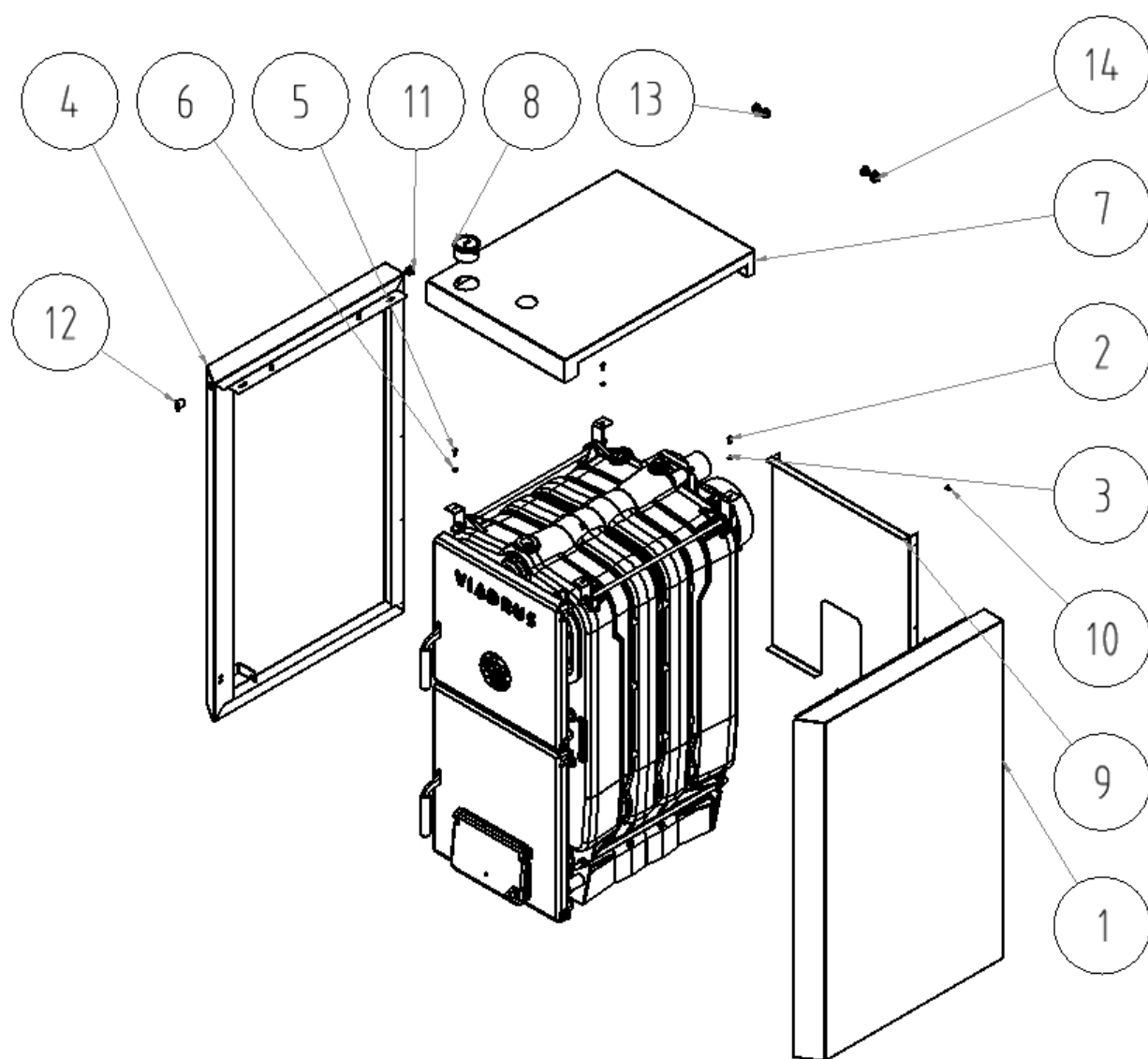
**Mounting of the upper part of the jacket in case of boiler without the control box (see Fig.no.14):**

1. Mount four spring clips (2) on the upper part of the jacket (1) and insert the thermomanometer (8 – Fig.no.15).



**Fig.no.14 Upper part of the jacket in case of boiler without the control box**

2. Insert the thermometer sensors into thermometer well and screw the manometer sensor into the manometr well. .
3. Insert the insulation into the upper part of the jacket and put the whole assembly on the boiler. .

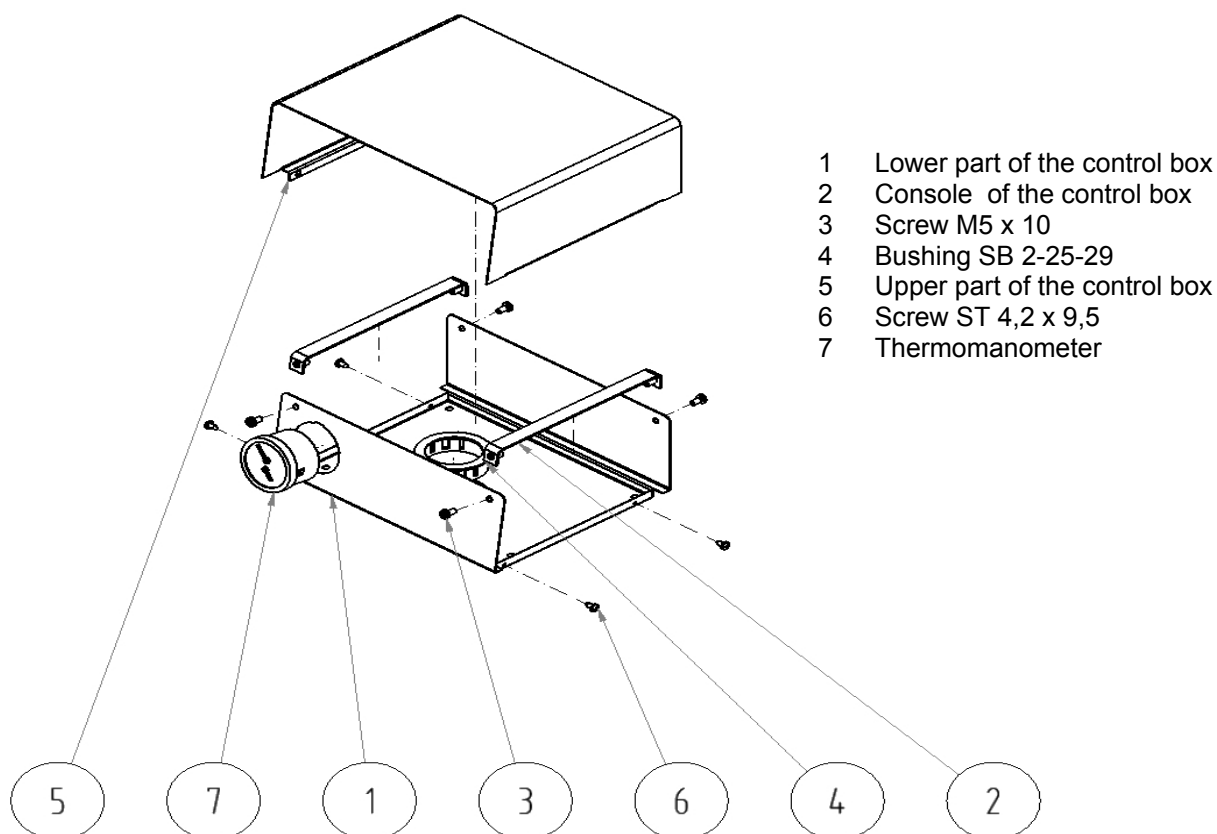


- |                                  |                              |
|----------------------------------|------------------------------|
| 1. Right side part of the jacket | 8. Thermomanometer           |
| 2. Screw M5 x 12                 | 9. Rear part of the jacket   |
| 3. Washer 5,3                    | 10. Screw ST 4,2 x 9,5       |
| 4. Left side part of the jacket  | 11. Bushing HEYCO            |
| 5. Screw M5 x 12                 | 12. Slant bushing            |
| 6. Washer 5,3                    | 13. Blind flange 15,9 (3 ks) |
| 7. Upper part of the jacket      | 14. Blind flange 19 (1 ks)   |

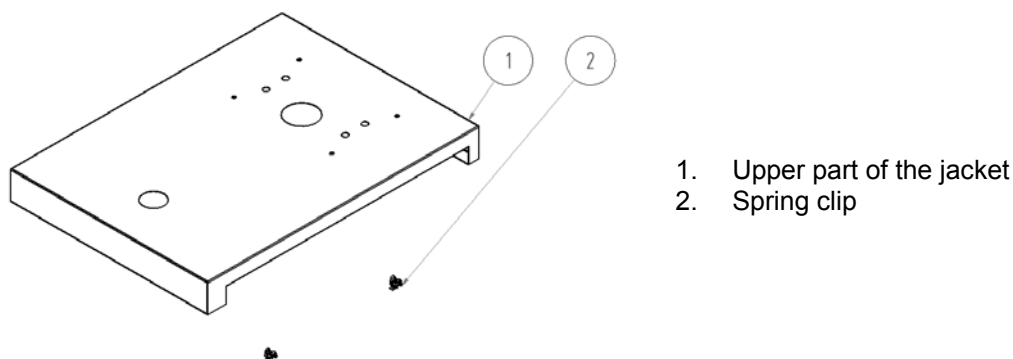
**Fig. no. 15 Jacket assembly of the boiler without the box**

**Mounting of the upper part of the jacket in case of the boiler with the control box(see Fig.no.16):**

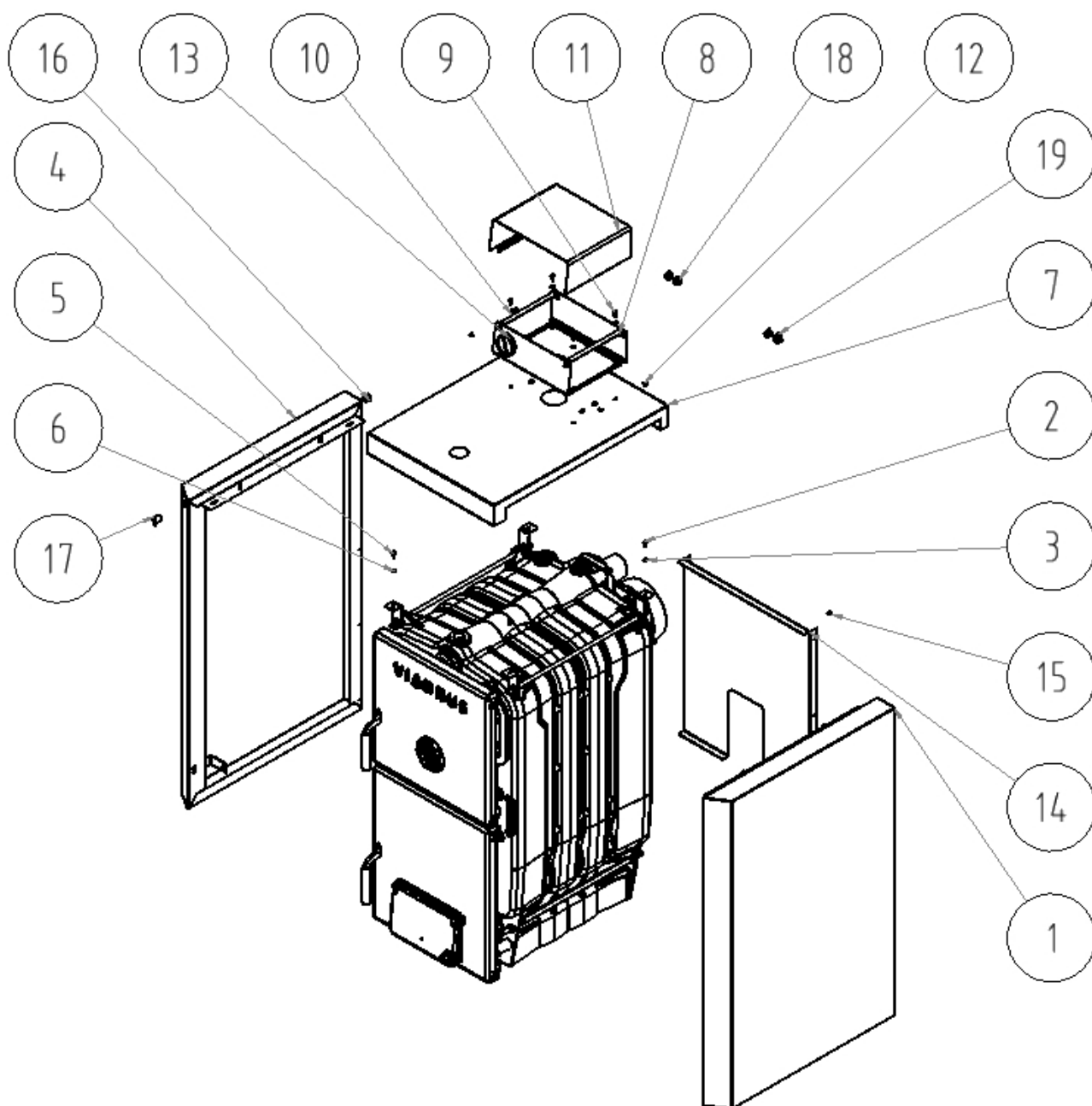
1. Connect the front and rear part of the lower part of the control box by means of two consoles (2) and four screws M5 x 10 (3).
2. By means of four screws M5 x 12 screw the lower part of the control box to the upper part of the jacket (1 – Fig. No. 17).
3. Insert the thermomanometer and slip the capillaries through the hole in the lower part of the control box. Insert the thermometer sensors into the thermometer well and screw the manometer sensor into the manometer well..
4. Insert the insulation into the upper part of the jacket and put the whole assembly on the boiler.
5. Put and screw the upper part of the control box (5) by means of four screws ST 4,2 x 9,5.
6. Complete the smoke flap control according to Fig. No.. 19



**Fig. no. 16 Mounting of the control box**



**Fig. no. 17 Upper part of the jacket in case of the boiler with the control box**



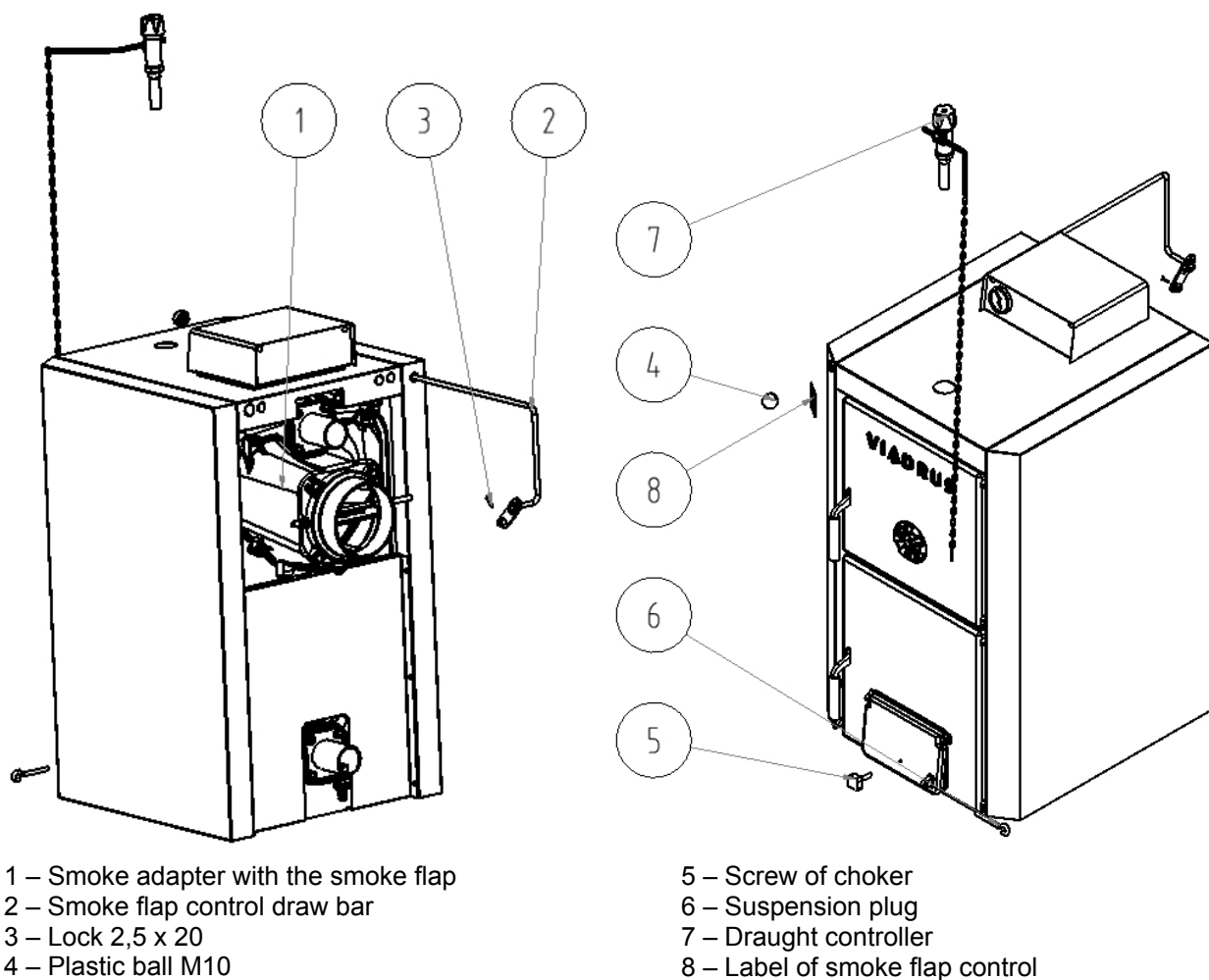
1. Right side part of the jacket
2. Screw M5 x 12
3. Washer 5,3
4. Left side part of the jacket
5. Screw M5 x 12
6. Washer 5,3
7. Upper part of the jacket
8. Košer part of the control box
9. Screw M5 x 12
10. Washer 5,3

11. Upper part of the control box
12. Screw M 5 x 12
13. Thermomanometer
14. Rear part of the jacket
15. Screw ST 4,2 x 9,5
16. Bushing HEYCO
17. Slant bushing
18. Blind flange 15,9 (3 ks)
19. Blind flange 19 (1 ks)

**Fig. no. 18 Jacket assembly of the boiler with the box**

#### **Mounting of the draw bar of smoke flap control**

1. Complete the smoke flap control according to Fig.no.19.
2. Fasten the smoke flap control draw bar (2) to the smoke flap (1) by means of lock 2,5 x 20 (3).
3. Screw the plastic ball M10 (4) to the front part of the draw bar
4. Stick the label of smoke flap control.



**Fig. no. 19 Smoke flap control**

### **Draught controller**

The instructions for the draught controller setting are given in the manual attached to the particular controller.

### **Filling of the heat system with water:**

Water for filling of the furnace and the heat system must be pure and colourless, without suspended substances, oil and chemically aggressive substances. Its hardness must correspond to ČSN 07 7401 and in case it does not correspond it is necessary the water to be adjusted. Even multiplying heating of the water with higher hardness does not prevent from excluding of soils on the boiler drum walls. The precipitation of 1 mm of limestone reduces in the given place the heat transfer from metal to water by 10 %.

Heat systems with an open expansive tank allow direct contact of the heat water with atmosphere. In the heat period the expansive water in the tank absorbs oxygen that increases the rust effects and at the same time a considerable vaporization of water occurs. Only water adjusted to values according to ČSN 07 7401 can be used for fill – up. The heat system is needed to be rinsed so as all impurities have been washed out.

During heat period it is necessary to keep consistent water volume in the heat system. While filling – up of the heat system with water it is necessary to prevent the air from leeching onto the system. The water from furnace and heat system must never be impregnated or taken out for use except for cases necessarily needed such as repairs, etc. By draining the water and filling with new one the risk of rust and scale creation is increased. **If it is needed to fill water into the heat system we fill it only to a cooled down furnace to prevent section cracking.** After filling of the furnace and heat system checking of tightness of all joints is needed.

**The finishing of assembly and the heat test performance must be recorded in the warranty card.**

## **6. Putting into operation – instructions for a contractual service organization**

Putting the furnace into operation can be performed only by a contractual service organization authorized for performing of this operation.

### **6.1 Control operation before starting**

*Before starting the furnace it is needed to check:*

- a) filling the heat system with water (thermomanometer check) and system tightness.
- b) connection to chimney – **this connection can be performed only with consent of a relevant chimney company according to ČSN 73 4201.**

### **6.2 Putting the furnace into operation**

1. Performance of fire in the furnace.
2. Setting the furnace on the necessary operating temperature. The recommended temperature of the output water is 80 °C.
3. Adjustment of the draught controller chainlet length (according to the enclosed draught controller instruction).
4. Operating of the furnace in the operating condition according to the competent standards.
5. Repeatedly check the furnace tightness.
6. Introduction of the user with servicing.
7. Making a record into the Warranty card.

### **6.3 Furnace transformation from „solid fuels“ to „gas and liquid fuels“ and retroactively**

In case the user decides according to the situation to perform a transformation of its furnace from solid fuels to gas or liquid fuels, such transformation can be required only at contractual service company – organization approved for performing the operation that provides him with performance of such transformation with an appropriate operating test. Parts for transformation are delivered by the producer.

## **7. User's furnace service**

### **COKE, ANTHRACITE**

The optimal fuel is coke with granularity of 40 – 60 mm but it is possible to burn even coke and anthracite with granularity of 20 – 40 mm (nut 2). In case of sufficient chimney draught (15 to 25 Pa) it is possible to burn even non – caking anthracite with granularity of 30 – 50 mm (nut 1) and 50 – 80 mm (cobble)

### **WOOD**

To reach the rated power of the furnace it is necessary to keep a maximum humidity at wood of 20 %. Cleaning of the grate is performed so as the hot fuel would not get through to the ashtray. The fuel needs to be stored in dry conditions.

**Chart Nr. 9 Recommended dimensions of wooden logs**

Section number	4	5	6	7	8	9	10
Log average [mm]	φ 40 to 100						
Log length [mm]	270	360	450	540	630	720	810

Other sorts of wood such as wood clips, wood shavings, sawdust, granules or coal – cakes can be used as additional fuel. In case of heating with smaller clogs (wood clips, wood shavings, sawdust, granules) it is necessary to put logs in the bottom part of the burning chamber so as the fuel would not get through to the ashtray. It is possible to reach smoother burning by further interlaying of the fuel.

These sorts of fuel must have heating power in the range of 12 to 15 MJ.kg<sup>-1</sup> and humidity to 20 % to prevent from reducing of the mentioned furnace power.

### **Heating up**

1. Check the water volume in the heat system on the thermomanometer.
2. Open the closing armatures between the furnace and the heat system.
3. Clean out the grate, ashtray, smoky channels and furnace walls.
4. Spread out the kindling through the ash door with the stoker – hole on a cleaned grate along its entire depth.
5. Set the smoky flap in the chimney – pot to position – open and close the stoker door.
6. Set the kindling afire through open ash door and stoker door.
7. Close the stoker hole and ash door and fully open the stifling
8. Thinner layout of the basic fuel to be put up on the burning wood.
9. After its good burning up more fuel to be put up to the bottom part of the stoker hole, the fuel to be stacked to a uniform layout along its entire furnace depth.
10. As soon as the fuel grades to a dark red flame the air rose of the secondary air input on the stoker hole to be opened with an instrument.
11. After flames become yellow the air rose of the secondary air input to be closed.

### **Operation**

1. After reaching the heat water temperature the burning air input to be adjusted. The furnace power in rough limits is regulated with a chimney draught change with a help of the smoky flap in the chimney – pot. Smooth power regulation is performed by a stifling by which the air output under the grate is regulated, either manually or with a help of draught controller. The draught controller to be adjusted so as the stifling in the ash door is almost closed at the time when the heat water required temperature is reached.
2. According to heat needs and burning intensity the furnace is needed to be supplied with fuel during the operation. Feeding the fire so as the fuel layout was equally high along the entire furnace depth.
3. When using the anthracite it is necessary the air rose of the secondary air input in the stoker hole to be partly opened for the whole time of the build – up of gases and flames out of freshly fed fuel (the air rose of the secondary air input with regard to the surface temperature is necessary to be controlled with an instrument).
4. At change over to night still operation the grate to be cleaned out, the freshly fuel to be let well burnt up and then the furnace power to be suppressed by throttling of the chimney draught with chimney flap in the chimney – pot and by turning down the air rose of the secondary air input. The smoky flap and air rose opening level is necessary to be tried out, it is always necessary to make sure that the product of consumption did not get away to the boiler room. In this case the draught controller to be disconnected.
5. The morning furnace operation reconditioning to be performed by opening of the smoky flap and air rose and with grate raking after opening the ash door.
6. The ash door must be during the operation permanently closed.
7. The ashtray to be emptied according to needs (gloves need to be used).

## **8. IMPORTANT NOTICE**

1. **The boiler only can be used for the purpose that it is destined for.**
2. **The furnace must be operated only by adults who are introduced to these operating instructions. It is unallowable to let children at the furnace unattended of adults. Interventions into the furnace design that could threaten the health of the operating staff, eventually the inmates, are disallowed.**
3. **The boiler is not destined for the use by persons (incl. children) whose physical, sensual or mental disability or lack of experience and knowledge prevent them from a safe use of the appliance unless they are supervised or if they were not instructed on the use of appliance by a person responsible for their safety.**

4. Children should be supervised in order to ensure that they do not play with the appliance.
5. If there is a risk of rise and getting away of flammable steams or gas into the boiler room or at operations by which there is an intermediate risk of fire or blast (sticking of floor coverings, paintings with flammable colours), the furnace must be disabled from operation before the beginning of operations.
6. Using of flammable liquids is **DISALLOWED** for firing the VIADRUS U 22 C furnace.
7. It is **DISALLOWED** to overheat the furnace during its operation.
8. Objects of flammable materials must not be put on the furnace and to a distance smaller than that of a safety distance from it
9. Flammable materials must not be in the minimal distance of 1500 mm from the furnace when emptying the ash at the VIADRUS U 22 C furnace.
10. The space at the point of choking valve rotation of the ashtray door must be cleaned in case of clogging with fuel, ashes or other impurities in order to avoid its rubbing thus wrong functioning.
11. When the furnace operates at a lower temperature than of 60 °C the retting, or the so called low – temperature rust, of the boiler drum may occur that reduces the operating life of the boiler drum. Therefore we recommend to operate the furnace at a temperature of 60 °C or higher.
12. After finishing of the heating period it is necessary to properly clean the furnace, smoke stack and chimney – pot. The fulcrum pin, smoky flap mechanism and other movable parts to be covered with graphite grease. And the boiler room to be kept clean and dry.

## **9. Maintenance**

1. The ash from the ashtray to be emptied during the operation of the furnace even several times per day according to the sort of used fuel because a full ashtray hampers the right distribution of the burning air under the fuel and causes unequal burning process of fuel on the grate. All remains in the firebox especially the clinker are removed before each new burning up and at morning furnace operation reconditioning. The ash is needed to be put away into the fire – resistant tanks with a cover. **It is necessary to use protective facilitations and to pay attention to personal safety while operating.**
2. The boiler walls inside the firebox, smoky furnace draughts and smoky chimney – pot to be cleaned 1x per month if heating with coke. The cleaning to be performed 1x per week when heating with anthracite.
3. If there is a settlement of tar silt on the walls of the burning space while using fuels with higher gas build – up it can be removed with a scraper or by burning out with a help of dry wood (eventually coke) when setting the furnace to the maximum operating temperature.

## **10. Instructions for product liquidation after its operating life**

**ŽDB GROUP a.s., is contractual partner of firm EKO – KOM a.s. with client number EK – F00060715.**  
The packages comply with EN 13427.

With respect to the fact that the product is designed out of common metal materials the individual parts are recommended to be liquidated in the following manner:

- exchanger (grey cast iron), by a company engaged in salvage and liquidation of waste
- tube distributions, jacketing, by a company engaged in salvage and liquidation of waste
- other metal parts, by a company engaged in salvage and liquidation of waste
- ROTAFLEX and IZOBREX sealing materials in common waste

We recommend to dispose the packages in the following way:

- plastic foil, cardboard cover, use a salvage point
- metal strapping tape, use a salvage point
- wooden base, is designated for a single usage and no longer can be used as a product. Its disposal is subject to Act. 477/ 2001 Sb. a 185/2001 Coll.as amended.

**In case that the product has lost its manufacture qualities there can be taken the advantage of product taking back (if this is established), in case that the originator has declared that this is a waste and it must be handled according to the valid legislation of the relevant country.**

## **11. Warranty and defect liability**

### **ŽDB GROUP, a. s., VIADRUS division grants a warranty:**

- For boilers 24 months after the boiler putting into operation, but maximum 30 months after the date it was dispatched from the manufacturing factory.
- For boiler drum 5 years after the date its dispatch from the manufacturing factory.

The user is obliged to leave the furnace installation to an assembly company, putting into operation and defect removing only to a professional contractual service accredited by the furnace producer ŽDB GROUP a.s., VIADRUS division otherwise the warranty for proper furnace operation is not valid.

If the furnace is operated according to the instructions mentioned in the "Instructions for the furnace operation and installation", the furnace does not require any special professional service interventions.

"Certification of the quality and completeness of the VIADRUS U 22 furnace" serves for filling in by a contractual service organization as the "Warranty card".

For an eventual jacket reclamation is the customer obliged to submit a packing label of the boiler jacket. It is placed on the cardboard in which the jacket is expedited.

**The user is obliged to perform a regular control of the furnace – see Chapter 9.**

**Failing to keep the mentioned instructions the warrants provided by the producer are not granted.**

**Each notice of defect must be made immediately after its finding always in written form and by a phone agreement.**

**The grant does not apply for:**

- **Faults caused by improper assembly and improper attendance of the product and faults caused by improper maintenance see chap. 9**
- **Faults and damage caused by failure to observe water quality in heating system see chap. no. 4.1 and 5.3 or by using the anti-freeze mixture**
- **Faults caused by failure to observe instructions stated in this manual**
- **Defects caused by a wrong assembly or incorrect operation of the product**
- **Damage of the product during transfer or other mechanical damage**
- **Defects caused by improper storage**

**The producer grants the right for changes performed within the frame of product innovation that may not be included in this instruction.**

## Information for customer

Packaging identification	Assessment reference
PE Plastic sacks, folie, corrugated board, iron and plastic fix line	

Identification of principal materials used. Paper, Polyethylene, iron, wood
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### Part 1: Summary of assessment

Standard/Report	Assessment requirement	Claim	Note
1.1 Prevention by source reduction		YES	
1.2 Heavy metals and	ensure below maximum permitted levels for components (CR 13695-1:2000)	YES	
1.3 Other noxious/hazardous substances	ensure in compliance with (CR 13695-2:2002, EN 13428:2000)	YES	
2 Reuse	ensure reusability in all terms of the standard for the functional packaging unit (EN 13429:2000)	NO	
3.1 Recovery by material recycling	ensure recyclability in all term sof the standard for the functional packaging unit (EN 13430:2000)	YES	
3.2 Recovery in the form of energy	ensure that calorific gain is achievable for the functional packaging unit (EN 13431:2000)	YES	Iron - NO
3.3 Recovery by composting	ensure compost ability in all terms of the standard for the functional packaging unit (EN 13432:2000)	NO	

NOTE Conformity with EN 13427 requires affirmative responses to sections 1.1; 1.2; 1.3 and to at least one of 3.1; 3.2; 3.3. In addition, where a claim of reuse is made section 2 should also record affirmative responses.
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### Part 2: Statement of conformity

In the light of the assessment results recorded in part I above, this packaging is claimed to comply with the requirements of EN 13427:2000.
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