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General

DAKON s.r.o. thanks you for your decision to use this product.

For DAKON DOR boilers is issued declaration of conformity under the §13 art.2 No.22/177 Statutes. and § 11, art. 1 government decree No. 163/202 Statutes.

Important Notes

- By proper reading of this handbook you will get important information about construction, safe operation, controlling and service.
- Check the delivery if it is complete immediately after you have unwrapped it.
- Please check, if the type of boiler agrees with asked using.
- Installation can do the specialist with valid authorization only.
- The producer is not responsible for faults and/or damages that have been caused by wrong installation.
- Connection of the boiler must comply with all valid standards, regulations and this handbook.
- In case of faults set the billet back and organize removal of fault.
- Removing of fault is recommended to do by some of contractual service partner named in list, which is an annex this handbook. Repair made by non-expert user can cause damaging of boiler.
- Use only original spare parts for repairing of the boiler.
- For right function, safety as well as long-term operation the regular checking is recommended to be carried out **once per year** by some of our contact service firm. It is herewith protection of your investment.
- In case of the faults that have been caused by wrong installation and/or breaking of standards, regulations and instructions for operation and maintenance mentioned in this handbook, the producer is not responsible for faults and/or damages and the guarantee is not given for faults like those.
- Producer stipulates right for all changes made within technician improving of product.
- When the boiler is out of order for a long time (switched off, breakdown) it is necessary to be very careful when switching on. Pump blocking, leak of water from the system or freezing the water in winter can happen in out of order boiler.

Operation

Steel hot water boiler DOR is suitable for heating flats family houses, plants and similar objects. Heater system can be without pump; using just differences between hot and cold water or with forced heating water circulation and maximum operation overpressure 200kPa.

DOR boiler is for solid fuels. It is necessary to connect with chimney, corresponding to boiler capacity. A proper professional installation, service and a good flue are necessary for good function of boiler.

Engineering examining body in Brno under ČSN EN 303-5 has proved the boiler.

Description of the Boiler

Construction of the boiler

Steel hot water boiler **DOR** is suitable for heating flats and family houses. It is produced in low-end as a boiler for solid fuels. Hot combustion space and dividing combustion air causes high efficiency. A proper professional installation, service and a good flue are necessary for good function of boiler.

The boiler is welded from steel stampings. Inside room of the boiler is divided by **water fins** into a fuel bunker, combustion space and combustion ways. Combustion products flow towards the chimney branch (See the Fig. 1). In the combustion space there are stabilizing fireclay wedges. The swivelling furnace grate system including a front fire grate and a dumping fire grate are placed below the combustion space and the fuel bunker. The swivelling furnace grate system is controlled by control lever. **Primary and secondary air**s are led under the grate by the adjustable air flap placed on the ash door. For better burning is boiler equipped with sustainable **secondary air flow** which is led through the secondary air duct placed on the water fin towards the combustion space and **controllable tertiary air flow**, which is led into the combustion space from the side of the boiler.

The boiler is equipped with an output temperature governor placed on the right side of the boiler. Thermo gauge - composite metering device for gauging water pressure and temperature in boiler - is placed on the front panel in the left side.

Water outlet and inlet is set up by outlets DN 50 (DOR 12,16) or DN 70 (DOR 24-45D) equipped with flanges at the ends. The **chimney branch** is situated in the middle of the boiler at the back. The **reducing flap** is situated in the chimney branch. The key of the flap is controlled by a fire hook and indicates the position. The **whole boiler** is jacketed with sprayed-on removable panels fitted with insulation.

For reducing combust condensation and increasing the service life of the boiler it is recommended to equip the boiler with mechanism securing, the temperature will not go under 65 degrees (water point of combustion) for this purpose, it is possible to use mixing four-way valve DUOMIX.

Fuel

Fuel determination for **DOR 12, 16, 20, 24, 25 MAX and 32** boilers is brown coal – sort 1 nut (20-40 mm) with heating value 16 MJ/kg, which contains up to 28% water. It is possible to use another fuels but it is not necessary to retain all operation conditions and parameters boilers as for the determined fuel.

Fuel determination for **DOR 32 D** and **45 D** boiler is wood with heating value 13 MJ/kg, which contains up to 20% water, maximum length 330 or 530mm and maximum diameter 100 mm. It is possible to use another sorts of solid fuels but it is not necessary to retain all operation conditions and parameters boilers as for the determined fuel.

Placement of parts in boiler

DOR 12

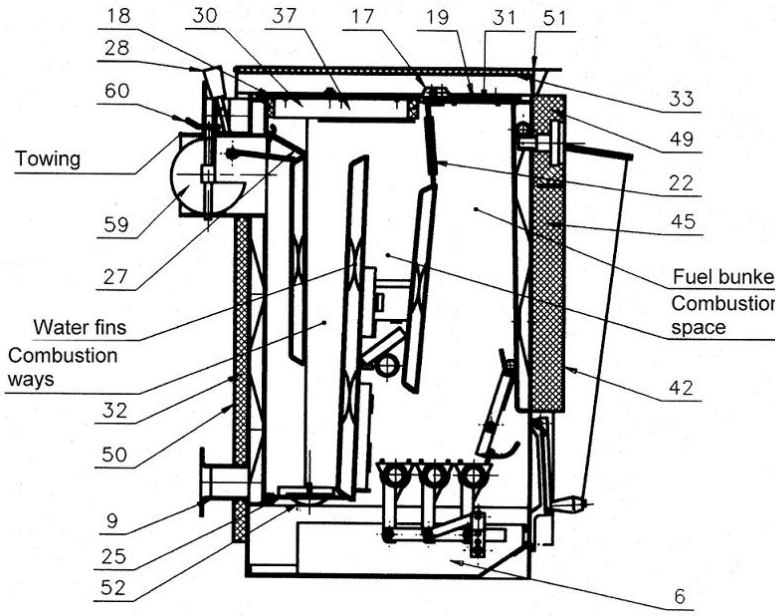


Fig. 1 Placement of parts in boiler

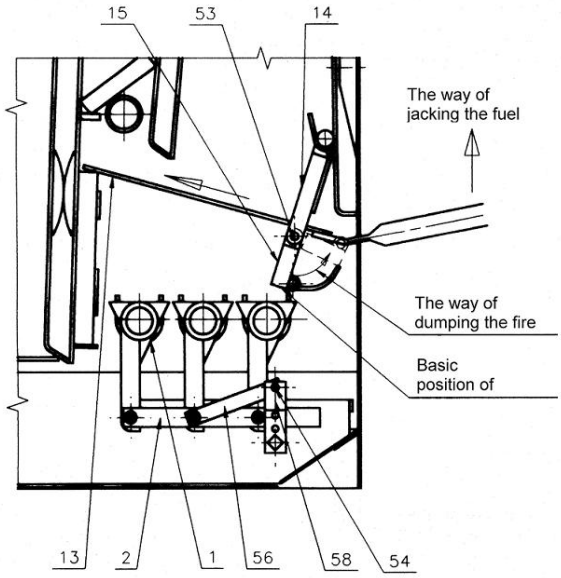


Fig. 2 Swiveling grates and ash cutter

Legend fig. 1, 2, 5, 6, 31

1	swivelling grate	27	short-circuiting flap	50	rear panel
2	draw bar with cogs	28	short-circuiting lever with finger	51	hinged cover
4	ash door	30	plate insulation	52	cleaning lid
6	ash pan	31	stoking door insulation	53	pivot hinge
8	swivelling gate lever	32	rear insulation	54	connecting cog
9	flange	33	upper insulation	55	lower hinge
10	door bound	37	plate insulation carrier	56	coupling draw bar
13	ash cutter	39	tapered brick	57	conic swivelling handle
14	front fire grate	40	side brick	58	complete lever
15	dumping fire grate	41	middle brick	59	reducing flap
16	thermo gauge	42	front panel	60	reducing flap key
17	plate with stoking door	43	right side panel	61	adjusting screw
18	plate	45	front insulation	63	door knob
19	stoking door with lever	46	left side panel		
20	air flap	47	side insulation		
22	baffle plate	48	thermo auger cover		
25	ash chamber bottom	49	cover insulation		

DOR 16

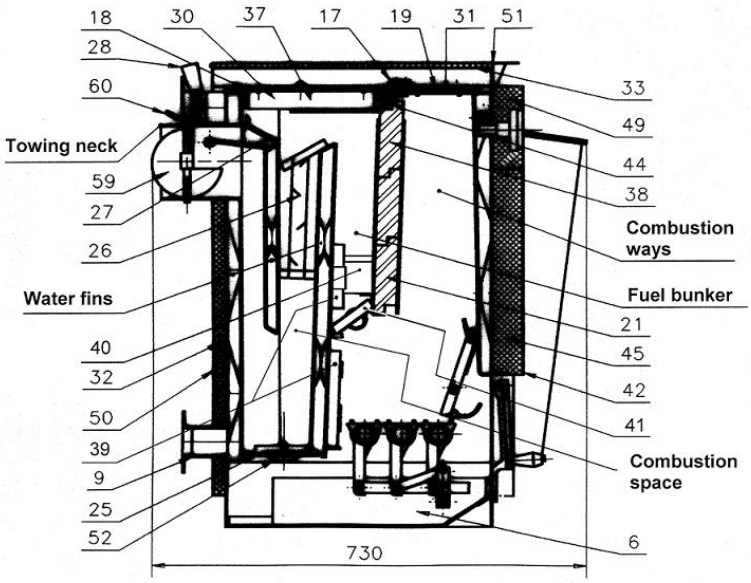


Fig. 3 Placement of parts in boiler

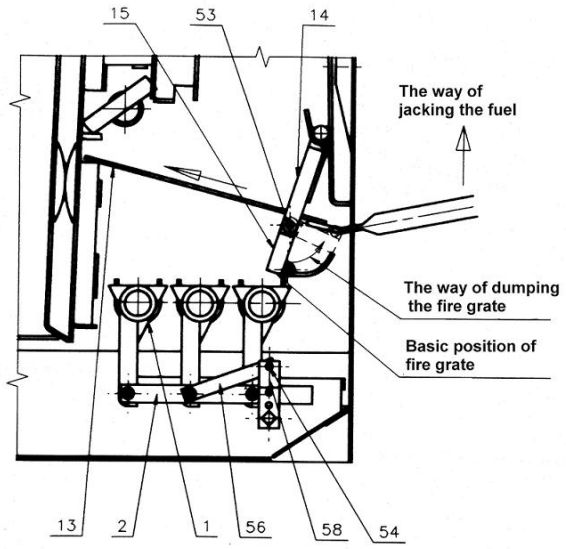


Fig. 4 Swivelling grates and ash cutter

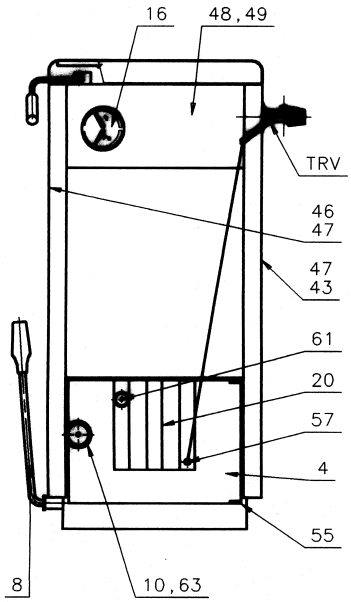


Fig. 5 Placement of parts at the front side of boiler DOR 12,16

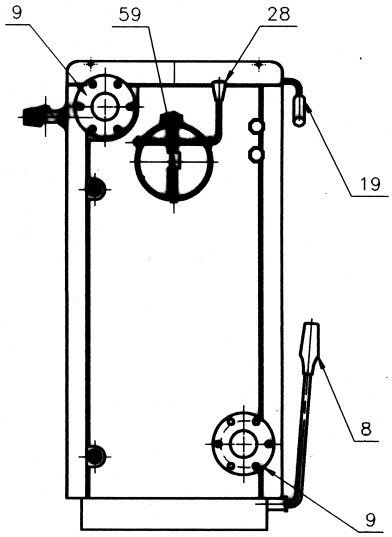


Fig. 6. Placement of parts at backside of boiler

Legend fig. 3, 4, 5, 6, 31

1	swivelling grate	26	economizer	49	cover insulation
2	draw bar with cogs	27	short-circuiting flap	50	rear panel
3	swivelling grates –complete	28	short-circuiting lever with finger	51	hinged cover
4	ash door	30	plate insulation	52	cleaning lid
6	ash pan	31	stoking door insulation	53	pivot hinge
8	swivelling gate lever	32	rear insulation	54	connecting cog
9	flange	33	upper insulation	55	lower hinge
10	door bound	37	plate insulation carrier	56	coupling draw bar
13	ash cutter	38	fire parting brick	57	conic swivelling handle
14	front fire grate	39	tapered brick	58	complete lever
15	dumping fire grate	40	side brick	59	reducing flap
16	thermo gauge	41	middle brick	60	reducing flap key
17	plate with stoking door	42	front panel	61	adjusting screw
18	plate	43	right side panel	63	door knob
19	stoking door with lever	45	front isolation		
20	air flap	46	left side panel		
21	parting brick SICAL	47	side isolation		
25	ash chamber bottom	48	thermo auger cover		

DOR 20

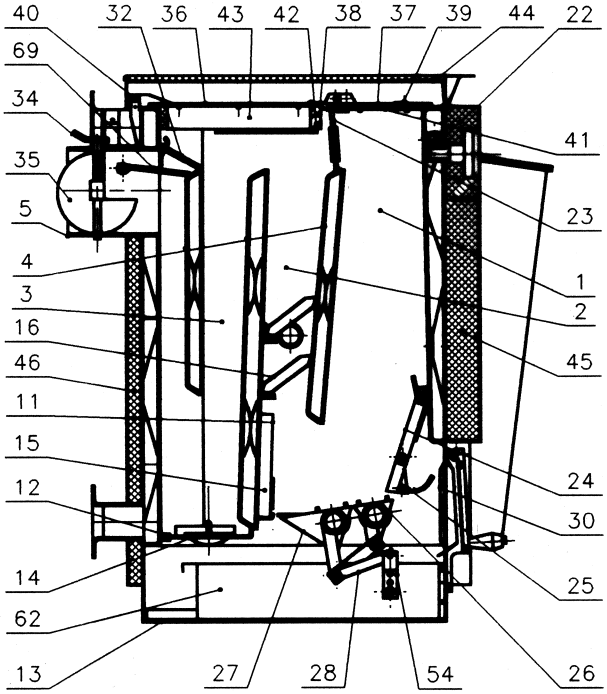


Fig. 7 Placement of parts in boiler

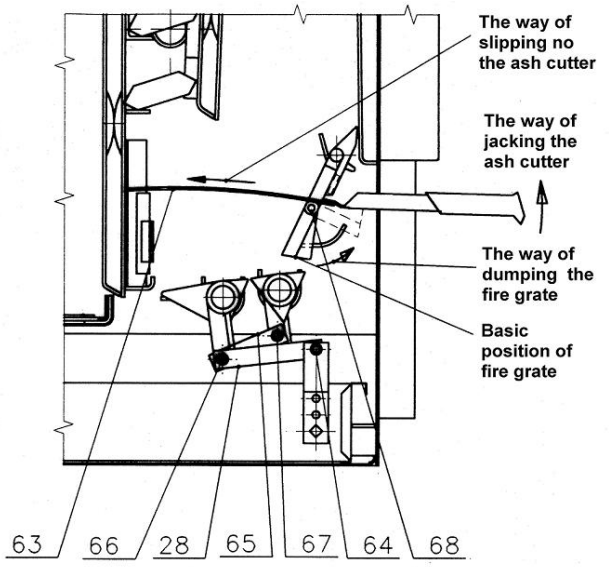


Fig. 8 Swivelling grates and ash cutter

DOR 24

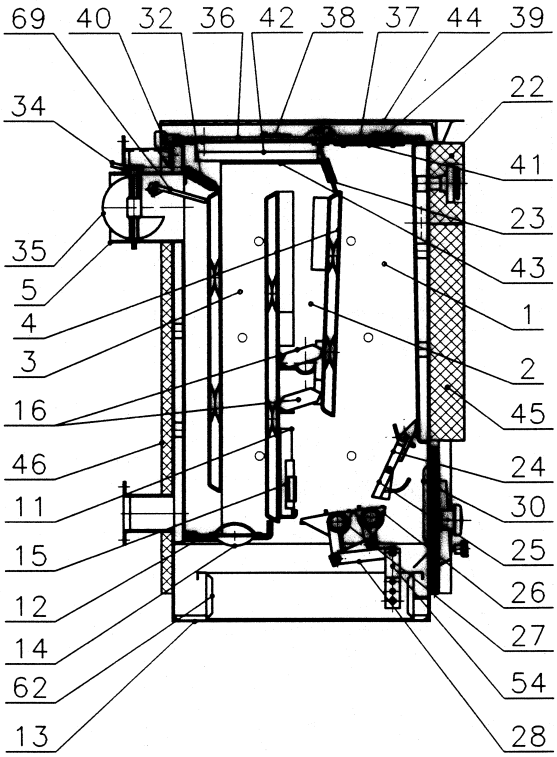


Fig. 9 Placements of parts in boiler

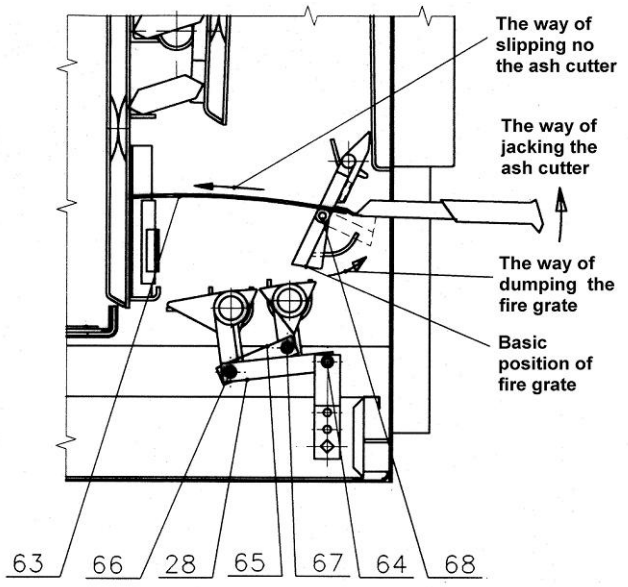
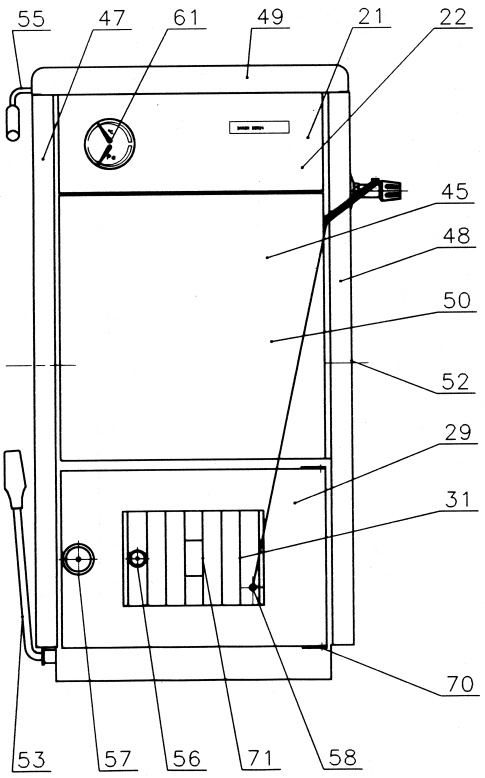


Fig. 10 Swivelling grates and ash cutter



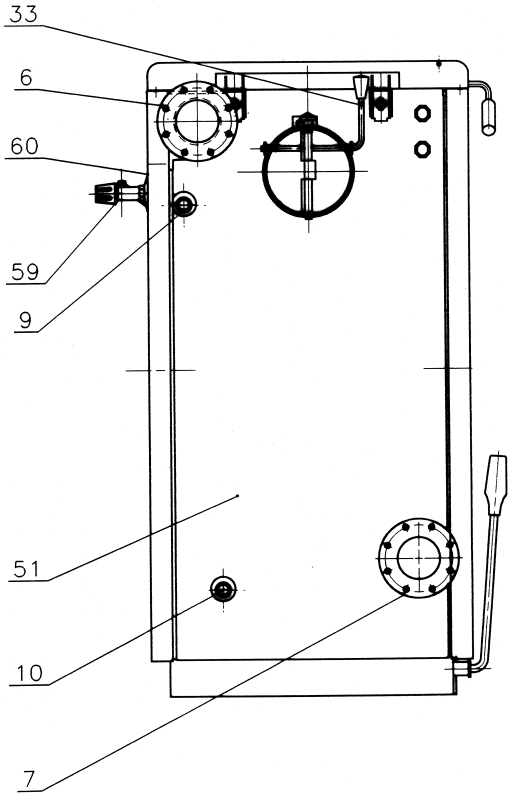


Fig. 11 Placement of parts at the front side of the boiler

Fig. 12 Placement of parts at back side of boiler

Legend fig. 7, 8, 9, 10, 11, 12, 32

1	fuel bunker	28	connecting link	50	front panel
2	combustion space	29	ash door	51	rear panel
3	combustion ways	30	protective sheet	52.	tertiary air cap
4	water fins	31	air flap	53	grate lever
5	chimney branch	32	short-circuiting flap	54	lever
6	output neck flange	33	short-circuiting flap lever	55	stoking door lever
7	input neck flange	34	reducing flap key	56	adjusting screw
9	socket G1/2	35	reducing flap	57	door knob
10	filling plug-valve sock G1/2	36	plate	58	conic swivelling handle
11	secondary channel	37	stoking door	59	output temperature governor
12	ash chamber bottom	38	flame sight hole	60	covering rosette
13	boiler bottom	39	vacuum hole	61	thermo gauge
14	cleaning lid	40	plate hinge	62	ash pan
15	furnace brick (3 pcs)	41	stoking door cover	63	ash cutter
16	fireclay wedge – stabilization fireclay wedges	42	plate isolation	64	coupling cog
21	thermo auger cover	43	plate isolation career	65	grate draw bar
22	thermo gauge isolation	44	upper isolation	66	coupling draw bar cog
23	baffle plate	45	front isolation	67	grate draw bar cog
24	front fire grate	46	rear isolation	68	pivot hinge
25	dumping fire grate	47	left side panel	69	flap finger
26	swivelling grate	48	right side panel	70	lower hinge
27	rear swivelling grate	49	cover	71	sight glass

DOR 25 MAX

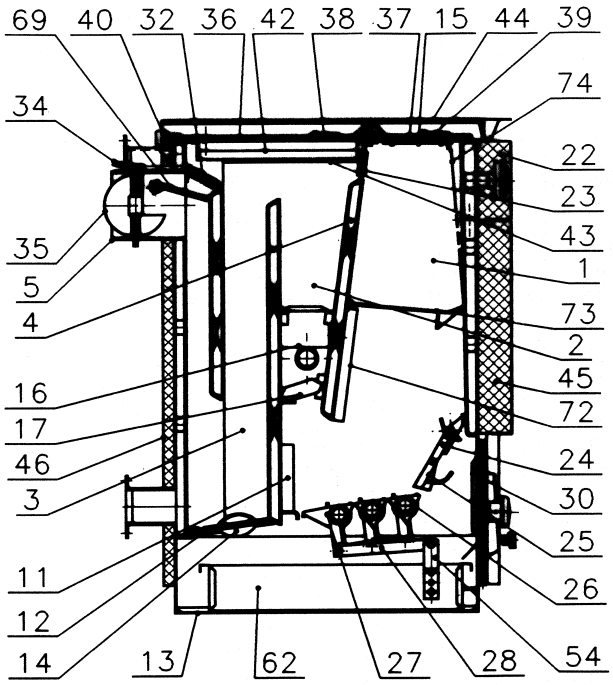


Fig. 13 Placement of parts in boiler

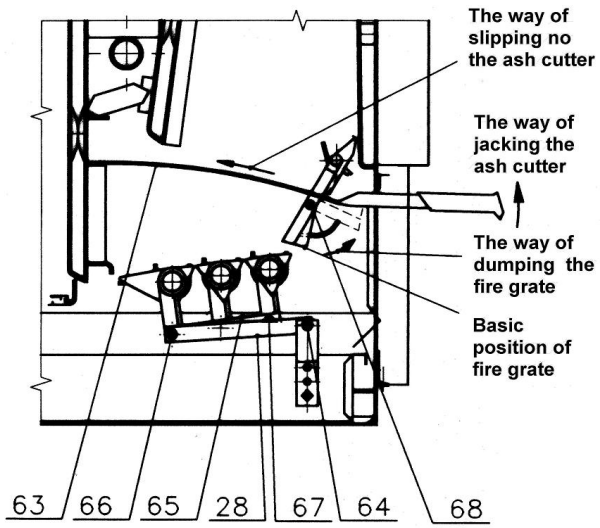


Fig. 14 Swivelling grates and ash cutter

DOR 32

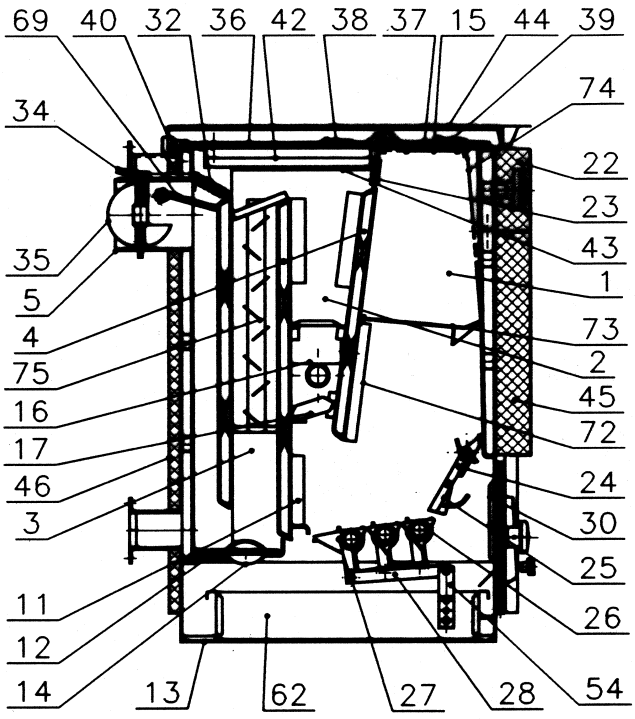


Fig. 15 Placements of parts in boiler

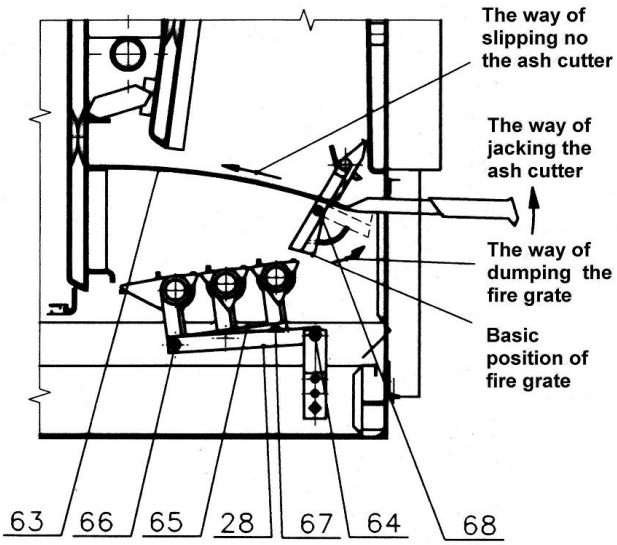
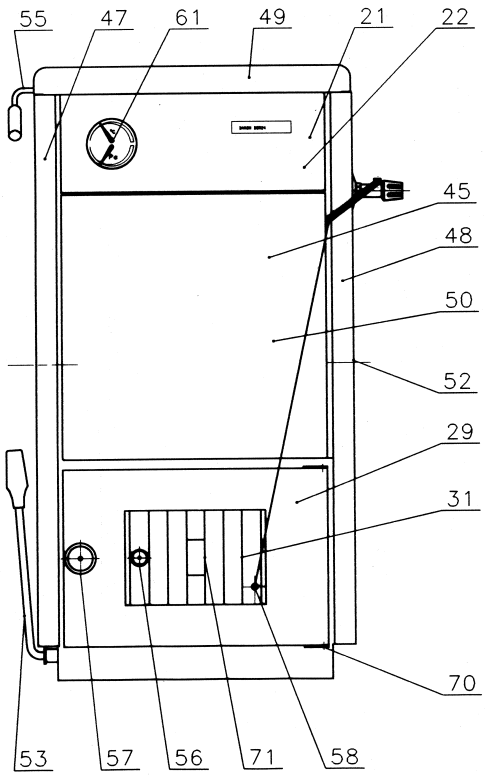


Fig. 16 Swivelling grates and ash cutter



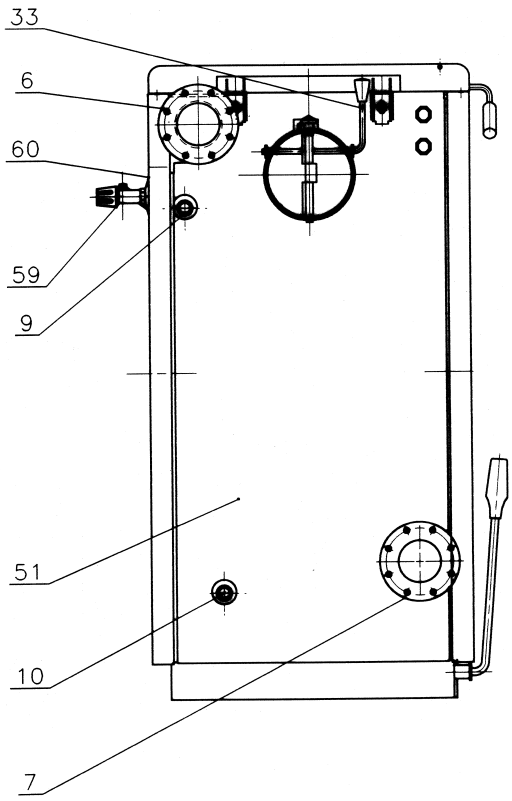


Fig. 17 Placement of parts at the front side of the boiler

Fig. 18 Placement of parts at back side of boiler

Legend fig. 7, 8, 9, 10, 11, 12, 32

1	fuel bunker	28	connecting link	52.	tertiary air cap
2	combustion space	29	ash door	53	grate lever
3	combustion ways	30	protective sheet	54	lever
4	water fins	31	air flap	55	stoking door lever
5	chimney branch	32	short-circuiting flap	56	adjusting screw
6	output neck flange	33	short-circuiting flap lever	57	door knob
7	input neck flange	34	reducing flap key	58	conic swivelling handle
9	socket G1/2	35	reducing flap	59	output temperature governor
10	filling plug-valve sock G1/2	36	plate	60	covering rosette
11	secondary channel	37	stoking door	61	thermo gauge
12	ash chamber bottom	38	flame sight hole	62	ash pan
13	boiler bottom	39	vacuum hole	63	ash cutter
14	cleaning lid	40	plate hinge	64	coupling cog
15	stoking door cover	42	plate isolation career	65	grate draw bar
16	lining brick	43	plate isolation	66	coupling draw bar cog
17	fireclay wedge	44	upper isolation	67	grate draw bar cog
21	thermo auger cover	45	front isolation	68	pivot hinge
22	thermo gauge isolation	46	rear isolation	69	flap finger
23	baffle plate	47	left side panel	70	lower hinge
24	front fire grate	48	right side panel	71	sight glass
25	dumping fire grate	49	cover	72	vacuum channel
26	swivelling grate	50	front panel	73	explosion flap
27	rear swivelling grate	51	rear panel	74	chain with cogs
				75	economizer

DOR 32 D

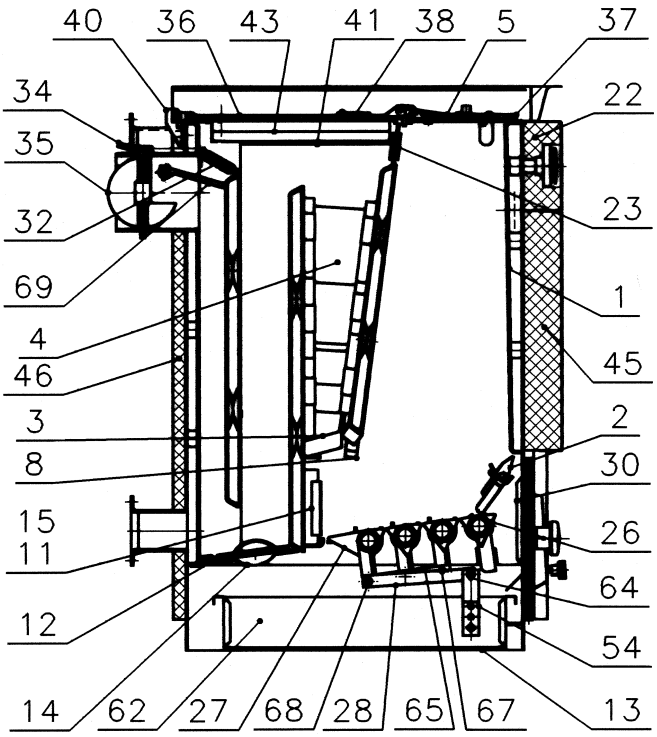


Fig. 19 Placement of parts in boiler

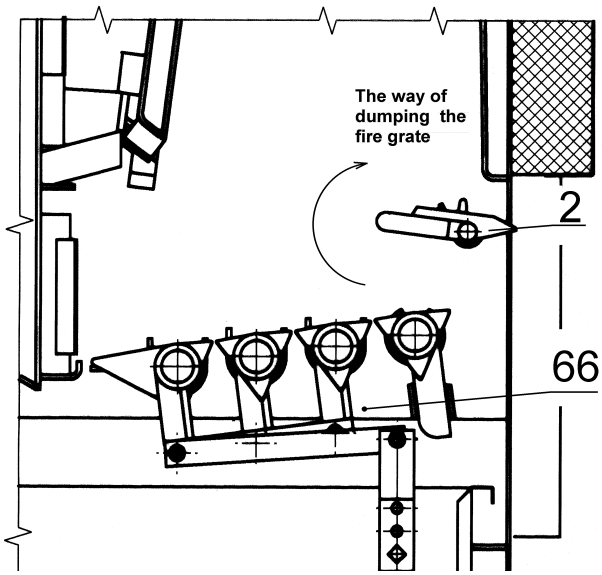


Fig. 20 Swivelling grates and ash cutter

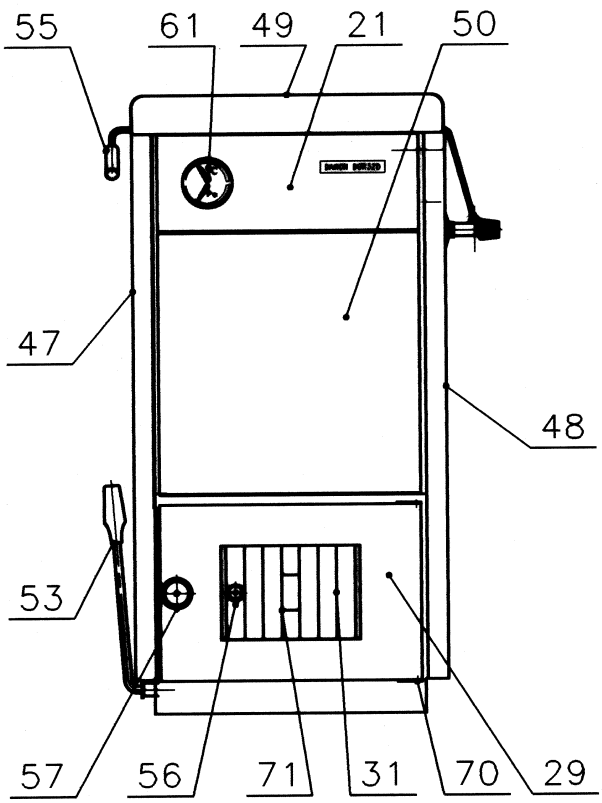


Fig. 21 Placement of parts at the front side of the boiler

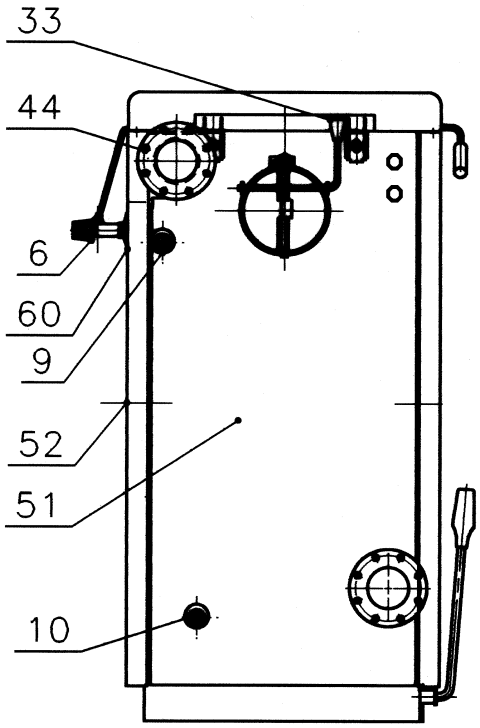


Fig. 22 Placement of parts at back side of boiler

Legend fig. 19, 20, 21, 22, 30

1	boiler body	29	ash door	51	rear panel
2	front fire grate	30	protective sheet	52	tertiary air cap
3	segment rest	31	air flap	53	grate lever
4	brick layout	32	short-circuiting flap	54	lever
5	upper air flap	33	short-circuiting flap lever	55	stoking door lever
6	output temperature governor	34	reducing flap key	56	adjusting screw
8	segment	35	reducing flap	57	door knob
9	socket G1/2	36	plate	60	covering rosette
10	filling plug-valve sock G1/2	37	stoking door	61	thermo gauge
11	secondary channel	38	flame sight hole	62	ash pan
12	ash chamber bottom	40	plate hinge	64	coupling cog
13	boiler bottom	41	plate isolation career	65	grate draw bar
14	cleaning lid	43	plate isolation	66	swivelling grates with bars
15	furnace brick	44	upper isolation	67	pivot hinge
21	thermo auger cover	45	front isolation	68	pivot hinge
22	thermo gauge insulation	46	rear isolation	69	flap finger
23	baffle plate	47	left side panel	70	lower hinge
26	swivelling grate	48	right side panel	71	sight glass
27	rear swivelling grate	49	cover		
28	connecting draw bar	50	front panel		

DOR 45 D

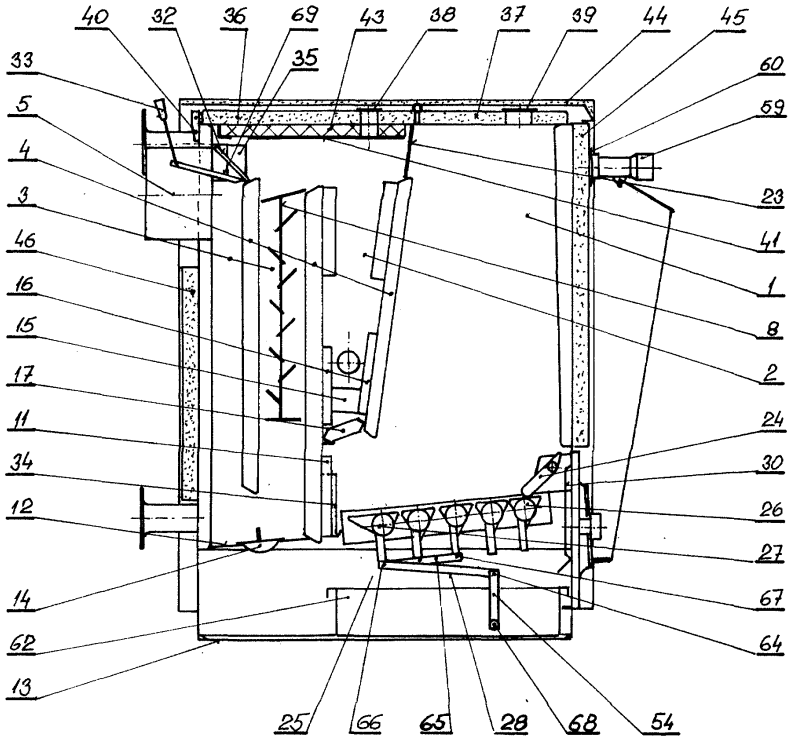


Fig. 23 Placement of parts in boiler

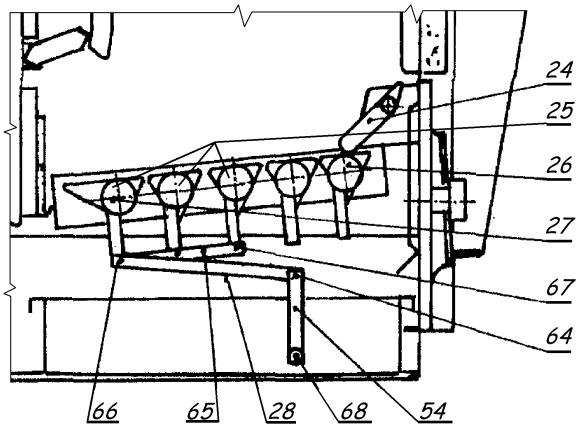
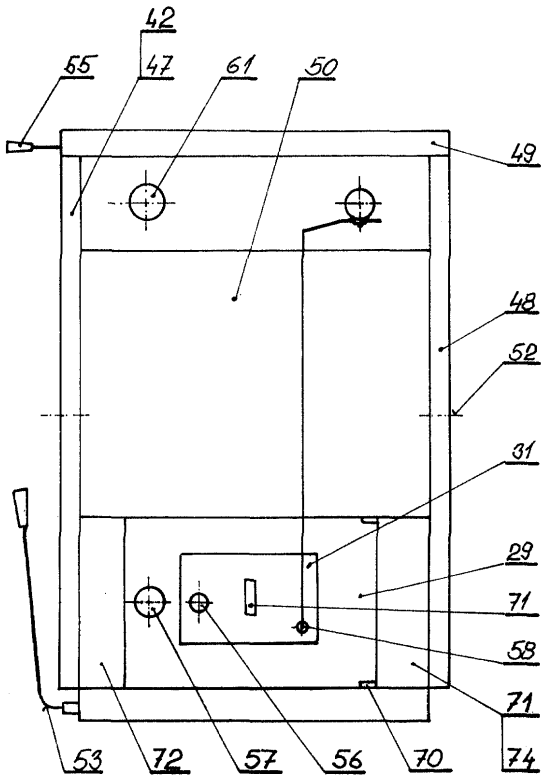


Fig. 24 Swivelling grates and ash cutter



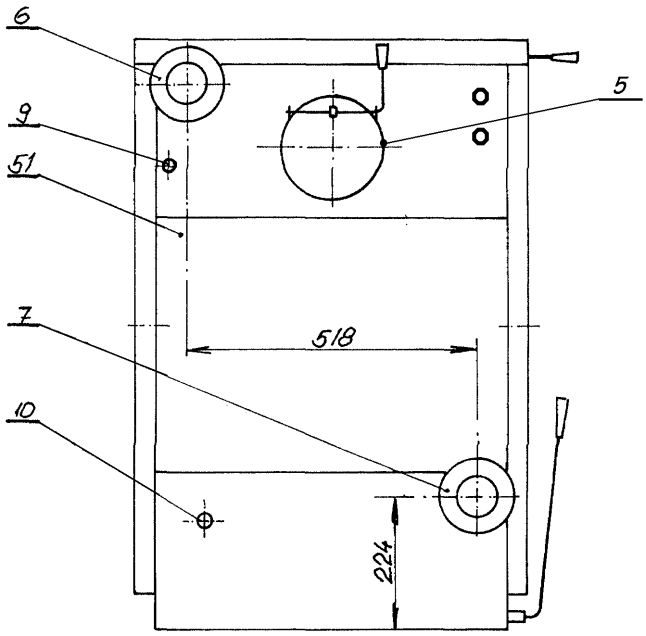


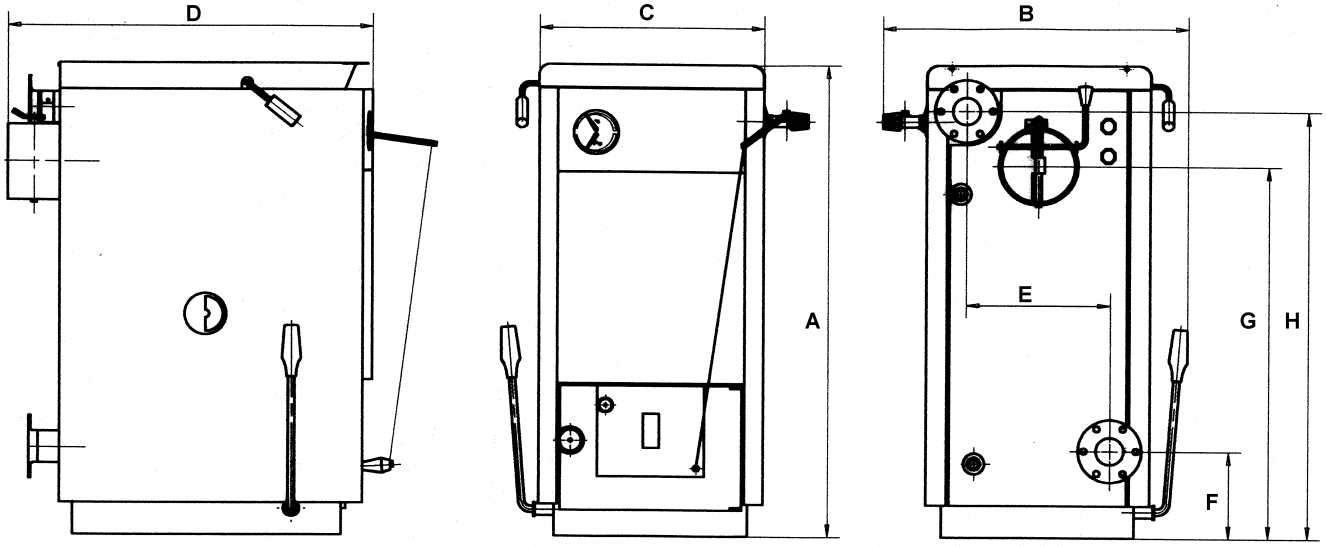
Fig. 25 Placement of parts at the front side of the boiler **Fig. 26 Placement of parts at back side of boiler**

Legend fig. 23, 24, 25, 26

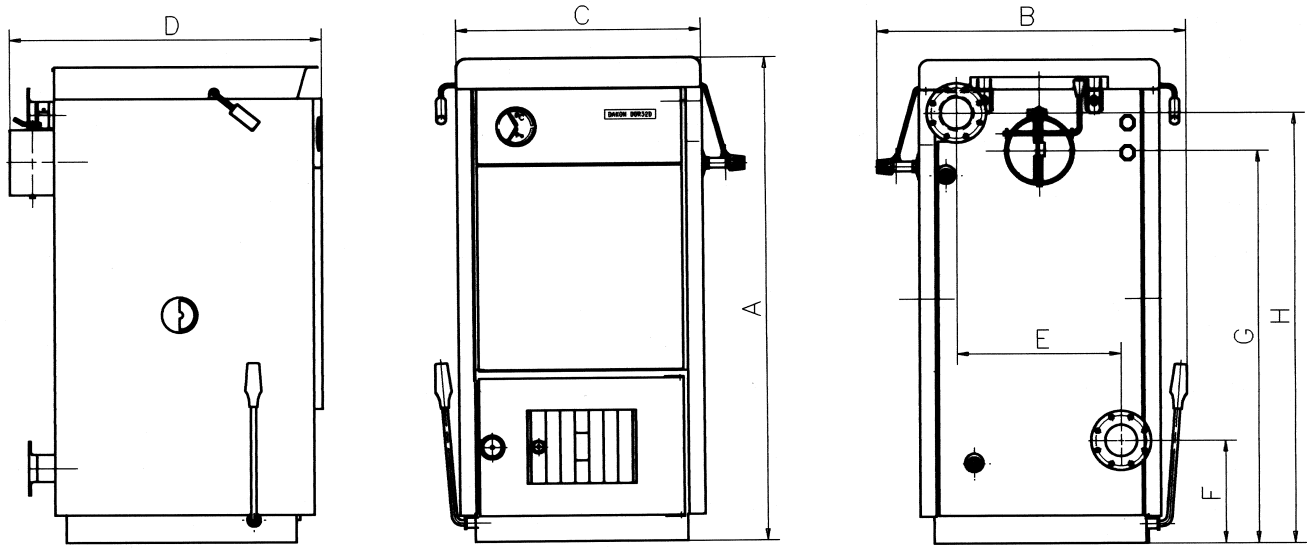
1	fuel bunker	29	ash door	52	tertiary air cap
2	combustion space	30	protective sheet	53	grate lever
3	combustion ways	31	air flap	54	lever
4	water fins	32	short-circuiting flap	55	stoking door lever
5	chimney branch	33	short-circuiting flap lever	56	adjusting screw
6	output neck flange	34	furnace brick	57	door knob
7	input neck flange	35	flap baffle plate, right, left	58	conic swivelling handle
8	economizer	36	plate	59	output temperature governor
9	socket G1/2	37	stoking door	60	covering rosette
10	filling plug-valve sock G1/2	38	flame sight hole	61	thermo gauge
11	secondary channel	39	vacuum hole	62	ash pan
12	ash chamber bottom	40	plate hinge	64	coupling cog
13	boiler bottom	41	plate isolation career	65	grate draw bar
14	cleaning lid	42	side isolation	66	pivot hinge
15	fireclay wedge, lower	43	plate isolation	67	pivot hinge
16	front brick	44	upper isolation	68	lever tube
17	fireclay wedge, short	45	front isolation	69	flap finger
23	baffle plate	46	rear isolation	70	lower hinge
24	front fire grate	47	left side panel	71	sight glass
25	swivelling grate complete	48	right side panel	72	left sideboard
26	swivelling grate	49	cover	73	right sideboard
27	rear swivelling grate	50	front panel	74	sideboard isolation
28	connecting draw bar	51	rear panel		

Parameters of boilers

DOR 12, 16, 20, 24, 25 MAX, 32



DOR 32 D



DOR 45 D

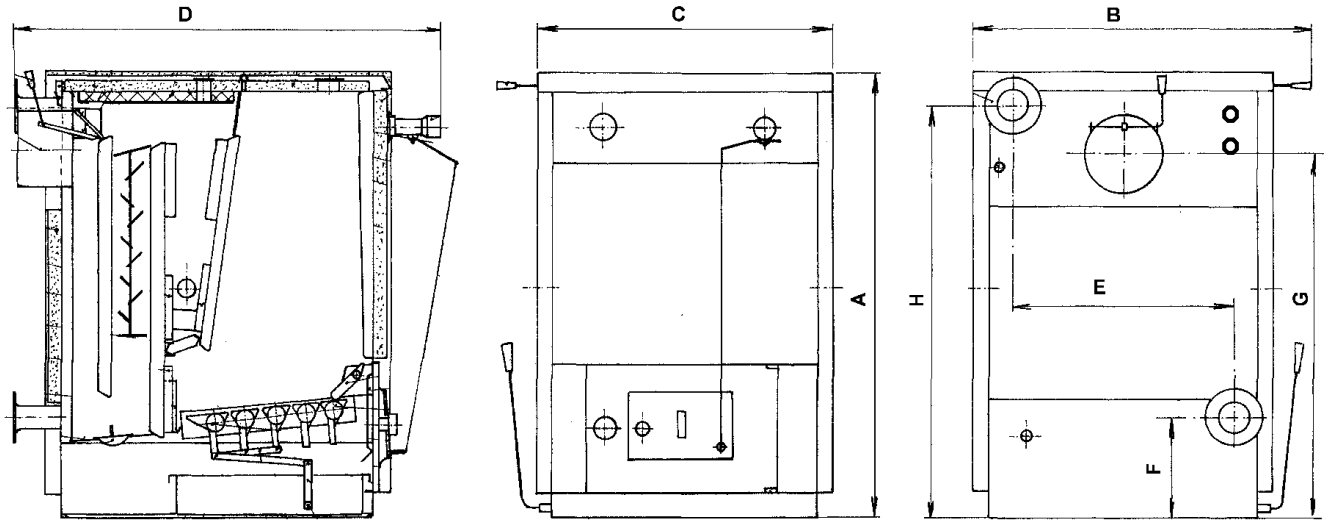


Fig. 27 Parameters of boilers (see the schedule of technician parameters)

Technical parameters

Technical data		DOR 12	DOR 16	DOR 20	DOR 24	DOR 25MAX	DOR 32	DOR 32 D	DOR 45
Data specification	**MJ**								
Output (minimum/nominal)	kW	7-13,5	6-16	6-20	7-24	8-25	10-32	9-28	18-45
Nominal Output for Determined Fuel	%	78-84	74-78					75-82	76-82
Output for Substitute Fuel	%	74-86	72-83					73-82	
Boiler class according EN 303-5	-	2							
Determined Fuel	-	Brown coal (sort 1,nut)						wood	
Consumption of Determined Fuel	kg/hour	3,2	4,7	6,0	7,6	7,9	8,9	8,4	14,0
Substitute fuel	-	A, B,C,D,E,F[1]						B,C,D,E,F	
Height A	mm	920		1040				1060	1045
Width C / total B	mm	424/600		526/700					688/770
Depth/ total D	mm	691/730		730/770		830/870			864/980
Flange distance E	mm	272		356		356			518
Inlet flange height F	mm	181		224		224			224
Outlet flange height H	mm	831		941		941			941
Smoke neck axel G	mm	725		858		858			840
Towing neck diameter I	mm	145		145		145			180
Filling cock dimension	mm	206x135	260x125	358x150		358x175			550x276
Fuel bunker capacity	l	26		46		61		63	115
Boiler weight without water	kg	158	166	200	215	232	240		320
Water capacity of boiler	l	46	46	56	57	63	64	64	73
Heating water attachment	Js	DN 50	DN 70						
Coolant loop attachment	Js	G ½ external thread							
Heating water temperature range	°C	65-95							
Combustion gases temperature output(nominal/minimum)	°C	250/100							
Maximum heating water overpressure	MPa	0,2							
Experimental heating ware overpressure	MPa	0,4							
Flue attachment	mm	145							180
Operating Draught for determined fuel	Pa	12	18	20	26	26	26	20	26
Heating Surface of the Boiler	m^2	1,1	1,1	1,7	1,8	1,9	2	2	3
Weight gas combustion flow - nominel output - minimal output	g/sec	15,2 7,8	17,8 6,6	22,3 6,7	26,5 7,8	30,4 8,6	36,1 11,3	19,6 6,2	31,5 12,2

[1] **A-wood, B-brown coal-nut 2, C-brown coal-cubes, D-pressed fuel, E-black coal, F-coke**

Diagram of hydraulic losses of boilers DOR, DOR D

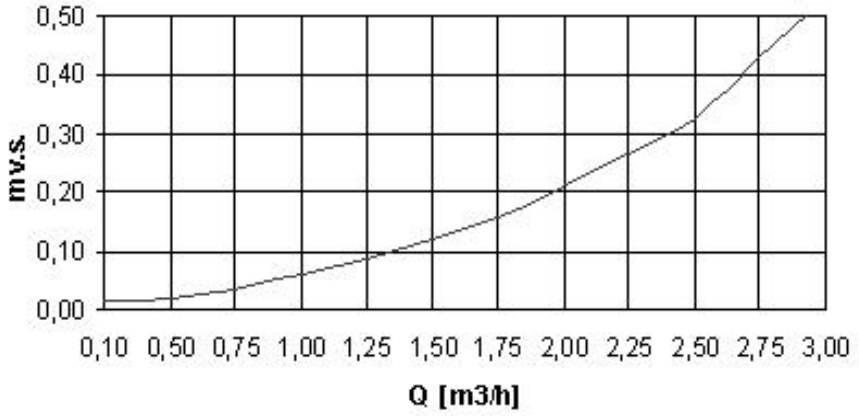


Fig. 28 Diagram of hydraulic losses of boilers DOR, DOR D

Coolant loop connection

The boiler has to be equipped under the government direction No. 182/1999 statutes and direction ČSN EN 303-5 with equipment enabling safe exhaust of the spare heat without any additional energy, to be kept the water temperature maximum 110°C (equipment protection against overheating). For this purpose is boiler equipped with coolant loop put into boiler body. By boiler assembling the coolant loop has to be completed with thermostatic valve type TS 130-3/4ZD (Honeywell) or STS 20(WATTS) which is possible to order as an independent boiler accessory. Valve connection is necessary to carry out strictly according Fig. 29. Loop is equipped by the external thread type G1/2 at the outlet and inlet as well.

The maximum overpressure of coolant eater is 2 bar. There has to be put a filter before the coolant water enters into the valve. By the boiler DOR 20, 24, 25MAX, 32, 32D is necessary to install valve pit cells type TS 130-3/4 ZD to the boiler with lengthening ½”x40mm. By the DOR 45 boiler is asked to use type TS 130-3/4 ZD into the boiler with lengthening 1/2x50mm.

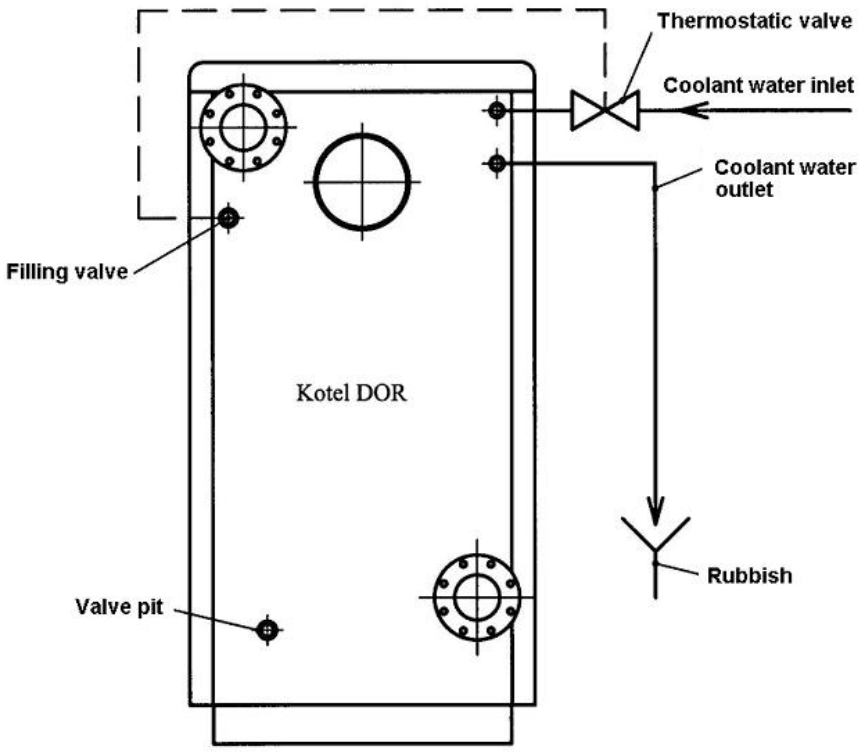


Fig. 29 coolant loop connection

Accessories

Basic accessories

Handbook	1 pc	flange, jointing material, seal	2 pcs
Guarantee card	1 pc	covering rosette	1 pc
List of service firms	1 pc	fire hook	1 pc
Discharging cock	1 pc	stoking door lever	1 pc
Grate lever	1 pc	air flap handle	1 pc
Adjusting screw	1 pc	cleaning scrapper	1 pc
Ash cutter (not DOR D)	1 pc	scrapper for secondary cleaning (not DOR D)	1 pc
Plug G1/2	1 pc	output temperature governor + handbook	1 pc
Thermo gauge	1 pc	ash pan	1 pc

Special accessories

The thermostatic (safety) valve for coolant loop TS 130-3/4" ZD DAKON (Honeywell) or STS 20 (WATTS)
Air escape valve G 3/8"

The parts are delivered only if there is a purchase order.

Boiler installation

It is allowed to install the boiler only by special service firm with valid certificate.

There has to be project for installation under the directions ČSN EN303-5.

When installing keep ČSN 06 1008 directions.

Installation has to correspond to all directions, valid rules and handbook. Producer is not responsible for faults caused by wrong installation.

The right size of boiler

Choice of right size of boiler, it means its output is a very important condition for economical operation and right boiler function. It is necessary to choose such boiler, which output corresponds heat losses of heated object.

Nominal boiler output is under ČSN 06 0210 for out temperatures –12°C, -15°C and –18°C. if you choose the boiler with too gig nominal output, it cause the higher tarring. It is not recommended to use boilers with bigger output, than heat losses of heated objects.

Boiler placement

It is allowed to install boiler in basic background AA5/AB 5 under ČSN 33-2000-3:1995.

The smallest distance of boiler and flue from hard and mean combustible materials (see the annexes-ignitability of building materials) is **100** mm.

The smallest distance of boiler and flue from easy combustible materials is **200** mm.

The distance of 200mm has to be kept in case, when the ignitability is not sure. For more details see ČSN 73 0823.

Safety distance is necessary to keep also when storing investment objects, burning material and fuel in room, where is the boiler.

It is necessary to place the boiler on incombustible floor or base overlapping the boiler basic. In the front side at least 300mm, the other sides about 100 mm. It is recommended to fix the corner with a water outlet higher by 5 mm for better cleaning.

There has to be constant air flow for combustion in the room where the boiler is. Its consumption by nominal output is about 19m^3 (DOR 12), 25 m^3 (DOR16), 32 m^3 (DOR20), 38 m^3 (DOR24), 40 m^3 (DOR 25 MAX), 50 m^3 (DOR32, 32D), 70 m^3 (DOR45D).

Heating system attachment

DOR boiler is bound to systems with gravitational or forcible circulation.

For lower combustion gases condensation and for lengthening of operational life, we recommend to equip the boiler with equipment ensuring, that a heating water temperature is not lower than 65°C (combustion dew point). For this purpose is possible to use a four-way valve DUOMIX. As a heating medium we recommend to use clear safe water-the best is filtered rain water, or other liquids determinate for this purpose.

As a **passive protection**, we recommended to use a liquid with a low freezing point and anticorrosive effect – FRITERM.

The maximum water level in expansion tank is **20 m** from the boiler bottom.

Attachment of chimney to the flue pipe

Rivet on the flue pipes on the chimney branch with a rivet of diameter 5 mm using the ready hole of diameter 6 mm. the flue pipe is recommended to be as short as possible with upper pitch ob the boiler.

Flue pipe fixed only in flue and put on the chimney branch neck has to be assembled very well not to detach spontaneously. When the pipes are longer than 2 m, it has to be well fixed. All parts of flue pipe have to be from incombustible materials.

For solid fuels the tubes has to be assembled in the way of combustion flue.

Chimney attaching

The chimney attaching has to be carry out under ČSN **73 4201:02** with agreement Chimneysweep Company .

The boilers, which are used for central heating, must be attached to a separate chimney flue.

A chimney with good draught is a basic premise for good functioning of the boiler. It affects the output and efficiency. The chimney can be attached only to such a chimney flue, which has proper draught- see the schedule of technical data.

Recommended minimum heights of a chimney for DOR 12boiler

Min. 5m diameter of air duct 150x150mm
Min. 5m diameter of air duct 150mm

Recommended minimum heights of a chimney for DOR 16 boiler

Min. 6m diameter of air duct 200x200mm
Min. 7m diameter of air duct 2000mm
Min. 12m diameter of air duct 150mm
Min. 10m diameter of air duct 150x150mm

Recommended minimum heights of a chimney for DOR 20 boiler

Min. 6m diameter of air duct 200mm
Min. 12m diameter of air duct 150mm
Min. 10m diameter of air duct 150x150mm

Recommended minimum heights of a chimney for DOR 24 boiler

Min. 6m diameter of air duct 200mm
Min. 12m diameter of air duct 150mm
Min. 10m diameter of air duct 150x150mm

Recommended minimum heights of a chimney for DOR 25 MAX boiler

Min. 18m diameter of air duct 150mm
Min. 8m diameter of air duct 200mm
Min. 12m diameter of air duct 150x150mm
Min. 6m diameter of air duct 200x200mm

Recommended minimum heights of a chimney for DOR 32 boiler

Min. 20m diameter of air duct 150mm
Min. 12m diameter of air duct 200mm
Min. 18m diameter of air duct 150x150mm
Min. 10m diameter of air duct 200x200mm

Recommended minimum heights of a chimney for DOR 32 D boiler

Min. 9m diameter of air duct 200mm
Min. 12m diameter of air duct 150x150mm
Min. 8m diameter of air duct 200x200mm

Recommended minimum heights of a chimney for DOR 45 D boiler

Min. 14m diameter of air duct 200mm
Min. 12m diameter of air duct 200x200mm

These data are only informative. The draught depends on section, height, surface roughness of the chimney and thermal difference between combustion products and outside air. It is best to use chimneys with a liner.

Installation of basic accessories

The parts of basic accessories are delivered together with the boiler, packed and put into the ash pan.

Grate lever installation

Slip the grate lever **8** (fig. 5) or **53** (fig. 11, 17, 21, 25) on the bearing at the left side of the boiler. On its four square end put he grate system lever **58** (fig. 2, 4) or **54** (fig. 8, 10, 14, 16, 20) and anchor it by pin.

Output temperature governor installation

By boilers **DOR 12, 16, 20, 24, 25MAX, 32 and 45 D** carry out under the handbook delivered with output temperature governor.

By the boiler **DOR 32D** carry out as follows:

1. Before start installation tight properly the governor body in the six square in pit.
2. Put enough packing material in the screw and put on the covering rosette. Screw the governor with a spanner No. 32 to put the governor to the right position-see fig. 7. When installing in horizontal position, the carrier has to be up after slipping the governor lever on.
3. Into the holes in governor body and arm career put the arm **4** (fig. 7) and screwing of screw M5 in arm career fix the arm to stop moving.
4. Put the lifting bar **1** on the arm with inner ring **3** and outer ring **2**. plug under the follower of upper air flap the upper bent part of lifting bar.
5. Set the position of lifting bar under the picture, tip over the cover and check, if the bar fits in the gap in the cover and modify position of the lifting bar. Lift the cover.
6. Detach the screw on the external ring and tighten the screw on the inner ring to the arm six square spot.
7. Always carry out the governing by the heating water temperature lower than 30°C.
8. Adjusting make the following way: set the minimum temperature 30°C by white numbers on the governing button, rest the lifting bar on the boiler body when air flap is closed, bearing screw push the way to the boiler and adjust the screw of external ring. When turning the governing knob, the upper air flap has to open.

Heat he boiler always to the temperature about 5°C higher than asked when setting the temperature of heating water. Set the governor to close the air flap.

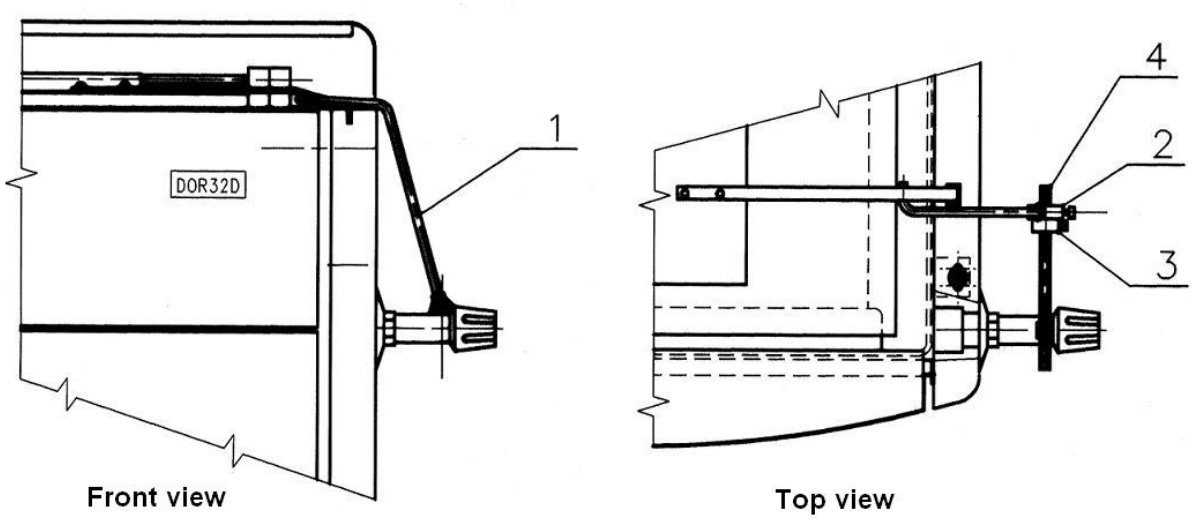


Fig. 30 Placement of output temperature governor

Adjusting screw and conical swivelling handle installation

Carry out the assembling of the adjusting screw **61** (fig. 5) or **56** (fig. 11,17) of **DOR 12, 16, 20, 24, 25MAX, 32** boilers by screwing it into a thread M6 in the air flap. Conical swiveling handle **57** or **58** fix with a screw M4. Both chain eyes at the ends open to get the chain easily out, take the hanger off and modify smaller chain eye into original shape. Slide beneath the head of the screw M4 a chain eye, a washer of diameter 4.3 mm, and the swiveling handle. Screw in the swiveling handle by a screw using the thread in the air flap. Put the end of the chain on the bigger hanger eye. Leave it opened foe possible air flap manipulation and repairs of chain length when manipulating.

Adjusting screw installation **56** (fig. 21) of boiler **DOR 32D** carry out by its screwing in the air flap.

Carry out the assembling of the adjusting screw **56** (fig. 25) of **DOR 45 D** boilers by screwing it into a thread in the air flap screw in the second adjusting screw on the right side of stoking door. . Conical swiveling handle **58** fix with a screw M4. Both chain eyes at the ends open to get the chain easily out, take the hanger off and modify smaller chain eye into original shape. Slide beneath the head of the screw M4 a chain eye, a washer of diameter 4.3 mm, and the swiveling handle. Screw in the swiveling handle by a screw using the thread in the air flap. Put the end of the chain on the bigger hanger eye. Leave it opened foe possible air flap manipulation and repairs of chain length when manipulating output temperature governor.

Stoking Door Lever installation

The stoking door lever serves for opening the stoking door. Slide a lever **19** (fig. 6) or **55** (fig. 11, 17, 21, 25) pivot into the hole on the side of the stoking door and secure it by a spring pin of diameter 4 mm, length 20 mm.

Furnace Grate System

DOR boiler is equipped with installed furnace grate system.

DOR 12, 16

The furnace grate system (fig. 2,4) consists of 3 swiveling grates **1**,front fire grate **14** and dumping fire grate **15**. The swiveling grates are put in bearings. On the left side (i.e. on the side of the swiveling grate lever) the bearings are encased and on the right side they are opened. The front fire grate and the dumping fire grate are free to rotate connected by pins.

Carry out disassembling of those grates by slipping out from their bearings towards high up and lift them through the fuel bunker.

Disassemble the split pin from the pivot hinge **54** which connects the swivelling grate system with lever **58**, in ash space and remove the pivot hinge .You can remove the swivelling grates through the ash door when releasing them from the open bearings on the right side and drawing out from the closed bearings on the left side. The swiveling grates are connected with the grate draw bar **2** and riveted on pins. To exchange a swiveling grate it is necessary to file away the pins. Assemble a new swiveling grate with a new pin and rivet it on.

Assembling of the swiveling grate system into the boiler to be done in the other way round.

DOR 20, 24, 25MAX, 32

The furnace grate system (fig. 8, 10, 14, 16) consists of 3 swiveling rare fire grate **27**,swiveling grate **26** ,front fire grate **24** and dumping fire grate **25**. The swiveling grates are put in bearings. On the left side (i.e. on the side of the swiveling grate lever) the bearings are encased and on the right side they are opened The front fire grate and the dumping fire grate are free to rotate connected by pins.

Carry out disassembling of those grates by slipping out from their bearings towards high up and lift them through the fuel bunker.

Disassemble the split pin from the pivot hinge **64** which connects the swiveling grate system with lever **54**, in ash space and remove the pivot hinge. You can remove the swiveling grates through the ash door when releasing them from the open bearings on the right side and drawing out from the closed bearings on the left side. The swiveling grates are connected with the grate draw bar **2** and riveted on pins. To exchange a swiveling grate it is necessary to file away the pins. Assemble a new swiveling grate with a new pin and rivet it on.

Assembling of the swiveling grate system into the boiler to be done in the other way round.

DOR 32D

The furnace grate system (fig. 20) consists of swiveling rare fire grate **27** and 2 swiveling grates **26** ,it is completed with one independent swiveling grate **26** and front fire grate **2**. The swiveling grates are put in bearings. On the left side (i.e. on the side of the swiveling grate lever) the bearings are encased and on the right side they are opened The front fire grate and the dumping fire grate are free to rotate connected by pins.

Carry out disassembling of those grates by slipping out from their bearings towards high up and lift them through the fuel bunker.

Disassemble the split pin from the pivot hinge **64** which connects the swiveling grate system with lever **54**, in ash space and remove the pivot hinge before drawing out the swiveling grates. You can remove the swiveling grates through the ash door when releasing them from the open bearings on the right side and drawing out from the closed bearings on the left side. The swiveling grates are connected with the grate draw bar **2** and riveted on pins. To exchange a swiveling grate it is necessary to file away the pins. Assemble a new swiveling grate with a new pin and rivet it on.

Assembling of the swiveling grate system into the boiler to be done in the other way round.

DOR 45D

The furnace grate system (fig. 24) consists of swiveling rare fire grate **27** and 2 swiveling grates **26** and 2 independent swiveling grates **26**.It is completed with one independent front fire grate **24** .The swiveling grates are put in bearings. On the left side (i.e. on the side of the swiveling grate lever) the bearings are encased and on the right side they are opened The front fire grate and the dumping fire grate are free to rotate connected by pins.

Carry out disassembling of those grates by slipping out from their bearings towards high up and lift them through the fuel bunker.

Disassemble the split pin from the pivot hinge **64** which connects the swiveling grate system with lever **54**, in ash space and remove the pivot hinge before drawing out the swiveling grates. You can remove the swiveling grates through the ash door when releasing them from the open bearings on the right side and drawing out from the closed bearings on the left side. The swiveling grates are connected with the grate draw bar **2** and riveted on pins. To exchange a swiveling grate it is necessary to file away the pins. Assemble a new swiveling grate with a new pin and rivet it on.

Assembling of the swiveling grate system into the boiler to be done in the other way round.

Explosion flap installation

For boilers DOR 25MAX and DOR 32 only

The boilers **DOR 25 MAX and DOR 32** are equipped with explosion flap**,** which protects the boiler when burning finishing and stoops possible exploding of smoke gases in fuel bunker..

It is hanged in the middle of fuel bunker in bearings welded on the water fin. It is connected to stoking door with the chain and opens together with it. If you need to put he plate away and clean the boiler, it is necessary to take the hanger at the chain end out off pin eye.

When using brown coal cubes or wood, take the flap away and take the hang at the end of the chain away and flap will be pulled out form the bunker the way up.

Stabilizing Fireclay Wedges installation

DOR 12, 16

Because of possibility loosing the middle brick **41** and side bricks **40** during transformation, these bricks are delivered in ash pan.

The placement of these bricks do such way, the middle brick is at the side of water fin on the **clue** and leans on the front fin at the other side. Place the brick into the combustion space. Clue is for moving the middle brick when cleaning secondary air channel. By operation, the brick ahs to be at the **end of dog**.

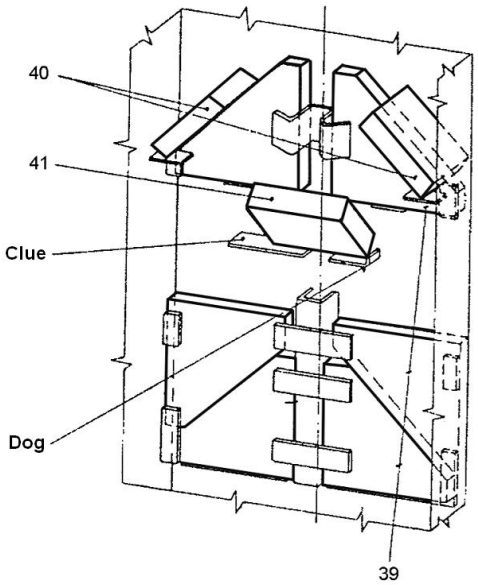


Fig. 31 Placement of brick layout parts in boiler

Codes for brick spare parts

Position	Title	Code
39	Tapered brick	2116 0668
40	Side brick	2116 0669
41	Middle brick	7184 0670

DOR 20, 24

Take out from the boiler front fire grate and dumping fire grate (disassembly see chap. Poking the fire). Place the middle wedges 16 (fig. 33) into the combustion space on the rests, weld on middle and front plate.

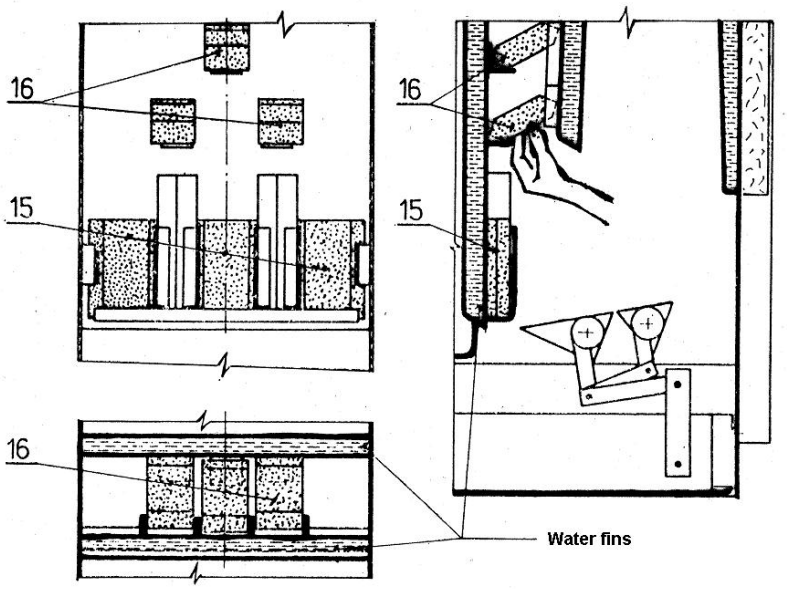


Fig. 32 Placement of brick layout parts in boiler

Codes for brick spare parts

Position	Title	Code
15	Furnace brick 818/102	7221 0729
16	Short wedge 815/94	7222 0730

DOR 25 MAX, 32

Placement of brick layout see below

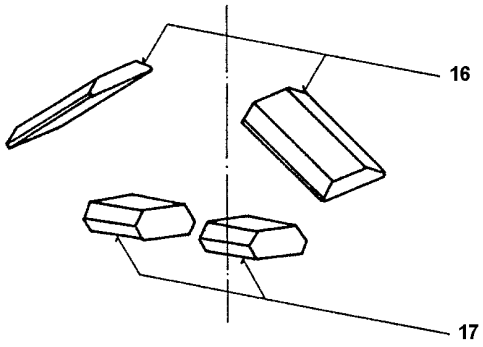


Fig. 33 Placement of brick layout parts in boiler

Codes for brick spare parts

Position	Title	Code
16	Lateral brick layout	7235 0751
17	Short wedge 815/94	7222 0730

DOR 32 D

Placement of brick layout see below

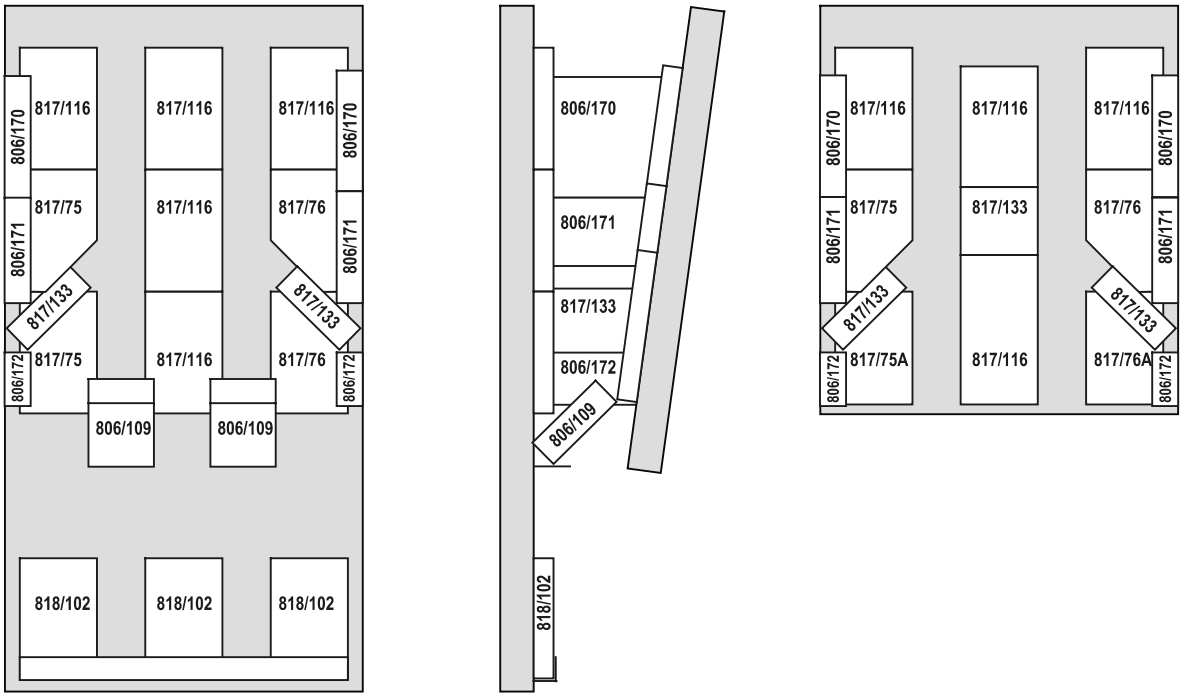


Fig. 34 Placement of brick layout parts in boiler

Codes for brick spare parts

Title	Code
Chamfer brick layout I, 817/75	7374 4153
Chamfer brick layout IA, 817/75A	2232 0757
Chamfer brick layout II, 817/76	7373 4152
Chamfer brick layout IIA, 817/76A	2232 0758
Brick layout 817/116	7372 4072
Lateral brick layout 817/133	7235 0751
Upper wedge 806/170	2232 0759
Middle wedge 806/171	2232 0760
Lower wedge 806/172	2245 0601
Segment rest 806/109	2232 0761
Furnace brick 818/102	7221 0729

Boiler function, service and operation

A proper professional installation, service and a good flue is necessary for good function of boiler (See the schedule of technician dates).

Putting into operation

Putting into operation, service and possible repairs is allowed to do such service technician only, which has valid certificate from producer. When making fire for the first time check whether the heating system is filled by heating medium and vented.

Obligations while putting into operation

- Check and compare the installation with project and revision.
- Check whether the heating system is filled by heating medium and vented.
- Carry out he leakiness test of heating circle.
- Check the flue gas installation.
- Check the heating regulation.
- Familiarize the user with boiler operation and service .
- Write down the putting into operation into the guarantee card.

Operation

Making fire and operation with determinated fuel

Making fire and combustion air adjusting

Boilers DOR 12, 16, 20, 24, 25 MAX, 32

Before making fire check whether the cleaning outlet, which is situated on the ash chamber bottom **25** (fig. 1, 3) or **12** (fig. 7, 9, 13, 15, 19, 23) is closed by the cleaning lid **52** or **14**. Through the cleaning outlet the ash from combustion ways is discharged when the boiler is cleaned. Shut the tertiary air lids on side panels.

In order to reduce draught resistance of the boiler, we recommend to open the short-circuiting flap by pushing the circuiting flap lever entirely backwards. Put paper and wood on the furnace grate and fill the fuel bunker with coal. Also it is possible to make fire without coal in the fuel bunker and to fill the fuel bunker with coal after the fire is blown up.

Carry out inflammation with a piece of paper from below through the furnace grate or through the dumping fire grate after swinging the grate away. Shut the circuiting flap lever immediately after blowing up and after warming-up the furnace open the tertiary air lids. Perfection of burning depends on right quantity of tertiary air in the combustion space. The quantity is controlled by opening and shutting the lids according to used fuel and capacity of the boiler. Set up the tertiary air only when the flame there is in the combustion chamber. Take care to this regulation a lot. The right quantity of the tertiary air is set up when flames are yellow or clearly red. If there is not enough the tertiary air the flames are dark red with black tail. If the flames are short, white or violet it means there is excess of tertiary air.

For checking flames use the checking hole placed on the plate **18** or **38**.

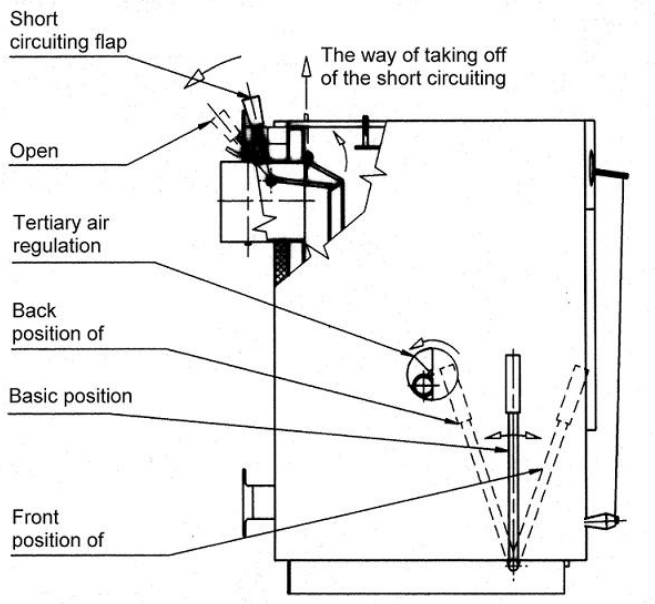


Fig. 35 control element position- boilers DOR 12, 16, 20, 24, 25MAX, 32

The longer time of burning after ash releasing the less quantity of tertiary air is needy. When making fire for the first time we recommend to check good burning by watching smoke going away from the chimney besides checking the right color of the flame in the boiler. The smoke is to be thin and light colored.
Thick and dark smoke means lack of the tertiary air in the combustion space (during full operation) and efficiency of the boiler is lower.

Primary air regulation is carried out either by the adjusting screw **61** or automatically on the ash door air flap by the output temperature governor according to temperature of the water in the boiler.

The minimum operation temperature is recommended to be **higher than 65°C,** by the lower temperature can water vapour condensation appear. This has negative consequences for proper boiler operation and its operational life.

Boilers DOR 32D, 45D

When making fire for the first time check whether the heating system is filled by heating medium and vented.

Before making fire check whether the cleaning outlet which is situated on the ash chamber bottom **12** is closed by the cleaning lid **14**.

In order to reduce draught resistance of the boiler we recommend to open the short-circuiting flap **32** by pushing the circuiting flap lever **33** entirely backwards. Put paper and wood on the furnace grate. Carry out inflammation with a piece of paper from below under the rare furnace grate. Shut the ash door, leave the fuel burn properly, shut the short circuiting flap and set the temperature on the output temperature governor.

It is possible to use soft wood or hard wood maximum length 330 mm and diameter 100 mm. If somebody uses mixed fuel, it is possible to use 500 mm long logs and put them from upside to down. The logs of bigger diameter are necessary to cut into pieces. It is possible to burn also wooden rubbish, by such a rubbish is not necessary to reach asked output. The wood can be also partly wet, maximum 20%. If you keep this number, damp will influence neither output nor combustion quality. When the dump is higher, the output and efficiency is lower.

Place the wood not to stuck it in boiler. If you cut it in smaller pieces, the output will be higher. When bigger pieces, the output will be lower.

The minimum operation temperature is recommended to be **higher than 65°C,** by the lower temperature can water vapour condensation appear. This has negative consequences for proper boiler operation and its operational life.

Instructions for the boiler DOR 45 D only

By operation at ultimate capacity is primary air led under the grates by the air flap **31** and into the combustion space by stoking door **37** with opening them or with opening the cover of vacuum hole **39** in stoking door The regulation the air led under the grates is carried out either by the adjusting screw **56** on the ash door air flap or by the output temperature governor. The air led to the combustion space **2** is carried out by the adjusting screw **56** placed on the stoking door side.

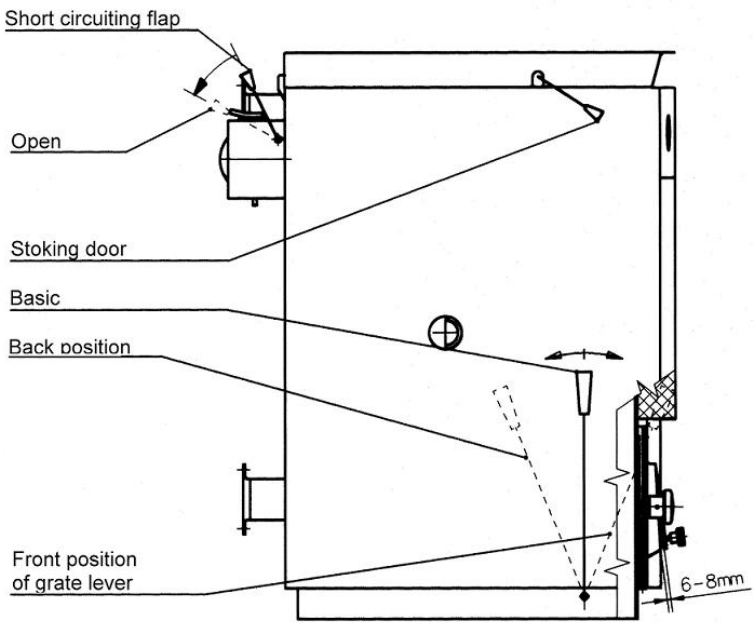


Fig. 36 control element position boiler DOR 32D, 45D

Stoking

Shut the air flap **21** or **31** before stoking next fuel into the fuel bunker. Let draw off the combustion products towards the chimney by slightly opening either the stoking door **37** or the air hole **39** and only after it open the stoking door and fully complete the fuel bunker. Maximum filling height for fuel in fuel bunker is restricted by upper side of baffle plate.

Every time after stoking clean bearing surfaces round the fuel bunker and set up tertiary air according to the color of the flame in the combustion space.

Using economizer

For Boilers DOR 16, 32 Only

At he beginning of the heating period and in transition period we recommend to take the economizer out from the boiler. When the out temperature is lower than –t 1 C and corresponding heating water temperature 77°C and output about 75%, it is necessary to put the economizer back into the boiler.

For the lowest out temperature –15°C within proper ¨sizing of heating elements and boiler water temperature corresponds these out temperatures:

Out temperature:	**+10**	**+5**	**0**	**-5**	**-7**	-10	-15	°C
Heating water temperature:	**47**	**56**	**65**	**73**	**77**	81	90	°C
Operation:	**without economizer**					with economizer		

These informations are meant to be guide only and they depend on operating conditions.

Heat Constant Operation (keeping fire overnight)

Poke the fire, fully complete the fuel bunker, entirely shut the air flap in ash door **20** or **31**, tertiary air lids, reducing flap **59** or **35** and open the short circuiting flap **27** or **32**. It minimizes fouling the combustion ways with low-temperature tar and soot. When handling with flap use the gloves.

During heat constant operation the output is reduced and heating water temperature is lower than 65°C. To set up normal operation open the air flap and the reducing flap, complete the fuel bunker, poke the fire and after short blowing up of the fire shut the short circuiting flap. Adjust the air flap and quantity of the tertiary air.

Another way how to get ready the heat constant operation there is to do the same steps but without shutting the reducing flap as well as opening the short circuiting flap.

Poking the Fire

Output of the boiler is reduced after the grate is filled with ash and it necessary to poke the fire. The poking is carried out by short swinging with the swivelling grate lever connected with the swivelling furnace grate system the basic position of grate lever is vertical (fig. 35, 36).

Swing with the swivelling grate lever until live coal drops. Use the sight glass to check the dropping. If done, leave the lever in the basic position. Use the whole range only if it is necessary to crush clinker or release all the ash.

When using wood it is necessary to poke very carefully, wooden ash drops very easily.

If you are not able to swivel with the grate because of blocking by stone or clinker do not swing the lever by force but carry out following steps:

As much as possible of ash keep to be above the grate, open ash door **4** or **29,** slide the ash cutter into the gap between the front fire grate **14** or **24** and the dumping fire grate **15** or **25** as far as possible towards the rear wall **13** or **63** (fig. 2, 4, 6, 8, 10, 14, 16), moving with cutter handle press off the front grate and by means of the poker pull the dumping fire grate - through the gap you can rake out stone(s) or clinker lift the cutter again and release the dumping fire grate and set up it to its original position, remove the ash cutter, shut the ash door and adjust the boiler.

When poking very strongly it is possible flames will stop to burn because of excessive combustion products generation. In the case like this it is necessary to adjust tertiary air intake or fully shut the lids. Adjust the tertiary air after the flame in the combustion space burns again. If smoke collects in the bunker due to low chimney draught and only a little fuel in the tank, keep the air hole open (caused by low fuel in fuel bunker, low flue).

Ash Removing from the Boiler

To remove ashes and clinker use the ash pan **6** or **62**. The ash pan is placed in the middle of the ash bunker and in front it leans against the reinforcement of the boiler's front wall. It is necessary to make empty the ash pan before it is overfilled. To grasp and remove it use handles situated on sides of the ash pan. After the ash pan is removed from the boiler, empty the ashes into the container you arranged for taking away. When the ash in the ash pan is still hot, be very carefully and use working gloves to avoid burn.

Boiler shutdown

To make the shutdown leave burn the rest of the fuel in the fuel bunker on the grate. It is not recommended to speed up the process.

Short boiler shutdown

For short shutdown carry out the grating, empty the ash pan, clean bearing surfaces of stoking door and ash space and close ash and stoking door.

Long time boiler setting back

For long time shutdown (e.g. the end of heating period) clean the boiler properly to avoid corrosion cause by dump in black and flue ash.

Operation

The boiler can operate only the adult persons, which are made familiar with instructions and operation the boiler. It is allowed to put the boiler into operation, set the temperature on the output temperature governor, put the boiler out of the operation and check the operation only. Acquainting with function and servicing the boiler is obliged to do service technician after putting into operation. Leaving children alone near working boiler is prohibited.

Operate the boiler with maximum temperature **95°C** and check the boiler occasionally.

It is prohibited to use liquids for making the fire and increase the output of boiler. Do not leave any combustible objects near the ash hole. The ash put into the incombustible container with cover.

When danger of explosion, fire, combustion gases or vapours (e.g. linoleum or PVC sticking) the boiler has to put out off the operation or stopped.

Condensation and tarring

Before the soot settles down on the inside walls of the boiler, some condensate appears on the walls. This condensation can look as the boiler is leaking. The condensate runs down towards the ash space. The boiler stops condensing after the fire was made from two up to four times. It is recommended to take the economizer away for first making fire out from the combustion way. Also at low output heating the condensate is formed.

The dew point of combustion products is 65° C and therefore the temperature of combustion product on the walls must not be lower than 65° C i.e. the temperature of the water in the boiler must not be lower than 65° C.

If there is condensation in the fuel bunker it means the fuel contains too much free water (wet fuel). In case like this the condensate can appear at temperature of the water in the boiler higher than 65° C.

Tarring appears at similar conditions (low output, low temperature) and in addition at not right adjusted burning - little tertiary air. The tar settled on the bottom of the combustion way makes pulling out the cleaning lid difficult and then it is necessary to knock-out the lid with a hammer from the ash space. In case of very thick tar layer make a fire in ash pan and heat the tar from under to make it soft.

It is possible to scrape off the tar only while it is warm i.e. at temperature of the water about 90°C. You can reach the temperature by quick putting radiators out of the operation. The most suitable fuel for that purpose is soft wood, which is able to burn quickly.

The safety of boiler operation

- Keep all safety rules and directions while boiler operation, especially ČSN 06 1008 Fire safety of local hest appliances and generators.
- DOR boiler cannot be use for the other purpose than in this handbook.
- Clean the boiler surface only incombustible detergents.
- Do not put any combustible objects on the boiler and do not leave any combustible objects near the boiler (less than safety distance).
- Do not store any combustible material in room, where the boiler is. (E.g. wood, paper, petroleum, oil)
- The smallest admissible distance of the boiler's outside and flue from the hard and mean combustible materials (which after starting a fire die away by themselves without supplying next thermal energy - ignitability B, C_1 and C_2) must be minimum **100 mm**.
- The smallest distance from easy combustible materials (which after starting a fire burn and are burnt by themselves - ignitability C3) must be minimum 200 mm. The distance of 200 mm must be kept also in that case when the ignitability of material is unknown. Details concerning combustibility of building materials are mentioned in ČSN 73 0823.
- When danger of explosion, fire, combustion gases or vapours (e.g. linoleum or PVC sticking) the boiler has to put out off the operation or stopped.

Repairs

The user is allowed to carry out only those repairs consisting in simple exchange of assembling parts grates, lining bricks, and packing cord.

The other possible fault can remove service firm named in list only, which is delivered as an annex of handbook. Use only original spate parts.

Faults and remedy

Fault	Cause	Remedy
1. The output is insufficient	• badly seated the cleaning lid (14)	• seat the cleaning lid (14) properly on the hole at the bottom of the ash chamber
	• the plate (36) and the stoking door do not seal properly	• checking and rearranging packing cords or exchanging
	• released seal mastic from bottom or chamber circumference	• new mastic
	• insufficient draught	
	• insufficient fuel heating value	• adaptation of the chimney
		• if low outside temperature, use fuel of higher heating value
2. Impossible to regulate, impossible to keep fire overnight	• released mastic from bottom or chamber circumference	• new seal mastic
	• the ash door does not seal	• checking and rearranging packing cords or exchanging
	• too high draught	• reduce the draught by means of the reducing flap, adaptation of the chimney
3. High temperature of water in the boiler and at the same time low temperature in radiators	• too big hydraulic resistance, especially at self-circulation systems	• overcome the hydraulic resistance for instance by means of a circulation pump
	• too high draught, too high fuel heating value	• reduce the draught by means of the reducing flap

Maintenance

Soot and ash settling on walls of water fins reduces heat passage. Settling or tarring depends on the used fuel, chimney draught and operation. It is recommended to carry out cleaning approximately one time per week. Do not clean walls of the combustion space.

After demoting two nits M6 on the plate **18**,remove the stoking door **19** and the plate and strip the short-circuiting flap **27** (see Fig. 8.) this enables access to combustion ways and sidewalls of boiler.

By means of a poker remove the cleaning lid through the combustion way **52**. Clean the walls with a steel scraper. All the released soot and ashes collect into the ash pan**.** Put on the cleaning lid after the cleaning is finished.

Twice during the heating period clean the secondary air channel by scraper from the basic accessories. First remove the middle brick **41** (see Fig. 7) in the way from the mid point of the boiler on the guideline, to have an access to a permanent secondary air channel. After cleaning put the brick back to the guideline stopper.

Put on the short-circuiting flap - if it is completely plain, turn it by 180° to avoid deformation and if it is mildly deflected it should touch the rear water fin with its middle part.

It is recommended to do once per year boiler inspection and check boiler parameters – e.g. combustion temperature.

Service

As a part of a handbook, delivered with boiler, there is a list of service firms, which have under the agreement authorization to do service of gas boilers DAKON.

Disposal of packaging

Wooden and paper parts of packaging are recommended to use by heating. The other parts of packaging put into junk buyout or use refuse storage area, managing by local authority.

Disposal of product after service life finishing

The old boiler put into junk buyout or use refuse storage area, managing by local authority.

Standards and regulations

There are these standards and regulations concerning projecting, assembly and service of boilers:

ČSN EN 303-5	Central heating boilers-Part 5: boilers for solid fuels used for central heating with manual or automatic supply with output up to 300 kW-terminology, examinations, requirements and marking.
ČSN 06 0310	Central heating - designing, mounting.
ČSN 73 0823	Ignitability of building materials.
ČSN 07 7401	Water and steam for heating power equipment with working pressure up to 8 MPa.
ČSN 06 0830	Safety devices for central heating and preparation of DHW.
ČSN 73 4201	Designing of chimneys and flues.
ČSN 06 1610	Parts of flues and house appliances .
ČSN 73 4201:02	Mounting of chimneys and flues, connecting of consumers of fuel.
ČSN 06 1008	Fire safety of local consumers and heat sources.
ČSN 73 0831-50	Fire safety of buildings.

Guarantee

The guarantee period and guarantee conditions are named in list, delivered together with boiler. Producer stipulates right for all changes made within technician improving of product.

Producer's address for possible making complaints:

DAKON s.r.o.

Ve Vrbině 588/3

794 01 Krnov-Pod Cvilínem

554 694 122 complaints, 554 694 111 switchboard operator, 554 694 333 fax

e-mail : dakon@dakon.cz

Regular annual inspections of coolant loop.

Proving the function of coolant loop.

The coolant loop ensures safe boiler operation in case of breakdown of heating system, when the system is not able to lead the heat out from the boiler. This breakdown can appear e.g. by freezing heating system, water circulation breakdown and so on. Enough pressure, and coolant water is necessary for good function of boiler. It is necessary to ensure pressure at least 2 bar and water flow 20 l/min.

The coolant lap function examination is the best to do by overheating the boiler at minimum temperature 97 degrees. If this examination not possible, the alternative examination is necessary:

- Screw out the sensing head of thermostatic valve from the coffer.
- Dive the sensing head into the water in electric kettle and let the water boil. Thermostatic valve has to open the coolant water outlet flow. Check in the flow at the water outlet.
- After water is chilling out, the valve has to close the coolant water flow.
- After a successful examination, install the sensing head back to the coffer.
- Clean the filter before the coolant water enters the valve.

When the examination is not successful - the valve will not open the coolant water flow or the valve does not calk enough, it is necessary to change the valve.

Caution! Possibility of injuring by hot water!

No changes of setting valve or repairing it!

General guarantee conditions

These guarantee conditions concern all products, sold by Dakon company and are meant as general conditions for guarantee for these goods. The guarantee period is given in guarantee card delivered together with products. DAKON guarantees that all features and properties named in handbook and certificate will be the same for all the guarantee period, assuming that the product will be used the way, settled by producer in handbook.

Assembly of product has to be made according all valid rules and standards and producer's directions. While operation keep the conditions given in handbook.

In case, when putting into operation is asked to do by service firm or annual inspection and repair asked to do by service firm, it is possible to do such activity only by service technician from any of service firm named in list delivered together with product.

Service technician is obliged to show his certificate for certain type of product issued by producer before making such repair or boiler inspection. While putting into operation and making maintenance is technician obliged to do all activities according valid standards and rules concerning such product and all activities given in handbook such as proving the product, especially control its operating and security elements. He is also obliged to acquaint user with maintenance the product.

The customer makes a complain at seller, at the nearest service firm named in list delivered together with boiler or at DAKON company. Each complain has to be make immediately after finding the fault.

When complaining the product, which is asked to put into operate by some of service firms, the customer is asked to show confirmation about putting into operation by service firm of Dakon company. In case when annual service is asked to do by some of service firm, the customer is obliged to show paper about such service, including service of coolant loop ant thermostatic valve as long as 12 months including date of putting into operation and as long as 12 moths including last service date.

By transportation and storage of product keep instructions on packaging. Use only original spare parts for repairs.

Dakon company stipulates the decision, whether will be the broken part repaired or changed, within free repair. Parts changed during guarantee period become a means of Dakon company.

The claim for free repair passes:

- By breaching the guarantee conditions.
- By not presenting all papers when making complain.
- When a serial number of product or data code is missing or impossible to read.
- When not keeping all instructions in handbook.
- When wearing caused by ordinary using of product.
- When the faulty caused by not keeping instructions, rules and standards in handbook.
- When the faulty caused by interference with product in conflict with handbook.
- When faults of exchanger, pump, three-way valve and the other parts of hydraulic circuit, gas fitting, burners etc, caused by fouling up from heating system, water pipeline, gas pipeline or combustion in the air.
- When fault of boiler body caused by corrosion as a result of inconvenienced operation mode, when the temperature of back coming water is lower than combustion vapour point.
- In case of boiler body breakdown (deformation, cracking, running) caused by operation without coolant loop. Coolant loop installation and proving has to be confirmed in guarantee card by service technician when putting into operation. Coolant loop has to be installed according the handbook and it has to be functional.
- In case of damage caused by transportation.
- In case of damage caused by natural disaster or unpredictable effect.

All of these general guarantee conditions cancel the other entire establishment concerning guarantee conditions set in handbook, which would be in conflict with these conditions.

Ignitability

Of building materials

(extract from ČSN 73 0823)

A ... incombustible	asbestos, bricks, blocks, ceramic wall tiles, fireclay, mortar, plaster (without any organic additions)
B ... not easy combustible	cardboard plaster plates, basalt felt plates, fiberglass, plates AKUMIN, IZOMIN, RAJOLIT, LIGNOS , VELOX and HERAKLIT
$\mathbf{C_1}$ ... hard combustible	beech and oak wood, laminated wood boards, felt, plattes HOBREX, VERZALIT, UMAKART
$\mathbf{C_2}$ ... mean combustible	pine, larch and spruce wood, laminated wood boards according to ČSN 49 2614
$\mathbf{C_3}$ ... easy combustible	asphalt cardboard, cellulose materials, tar paper, wood-fiber boards, cork, polyurethane, polystyrene, polypropylene, polyethylene, floor fabric

Installation and operation of Pressure Expansion Vessels for steel boilers up to 50kW

The main advantage of using the pressure expansion vessel there is the possibility to avoid the air to come into the heating system.

Any complaint of guarantee will be recognized only if the principles mentioned below are kept.

1) Inlet piping leading towards the expansion vessel must be as short as possible, without any closing elements and with possibility of dilatation. The expansion vessel must not be under heat radiation.

2) Each heating system must be equipped at least with one reliable safety valve located on the outlet piping of the boiler and must be equipped by a manometer. Location, assembling and inner diameter of the safety valve must comply with ČSN 06 0830 and ON 13 4309.

3) Opening pressure of the safety valve must be checked by overpressure of 180 kPa.

4) Only a licensed company is allowed to carry out installation and adjusting of the safety valve, pressure testing, and adaptation of the pressure in the pressure expansion vessel. It is necessary to check the gas pressure in the pressure expansion vessel if it is higher than hydrostatic height in the heating system.

5) The boiler must be equipped with safety facility under ČSN 060830 the boilers for solid fuels up to 50kw also with draught governor. The maximum operating temperature is 95°C.

6) The pressure expansion vessel must be protected against freezing.

7) It is possible to adapt the gas pressure in the pressure expansion vessel by reducing to the value of the heating system while the water is cold. Reducing is carried out with a valve and the overpressure is measured with a tire gauge. Complete water into the heating system up to pressure maximum higher by 10 kPa than the hydrostatic height of the heating system.

8) For filling up the heating system make marks on the manometer for adapted hydrostatic height and for maximum pressure in the system at 90° C.

9) If the pressure difference is changed during operation against the marks (getting over the minimum or maximum pressure), it is necessary to check the system, desecrate, to complete water and if need be to increase the gas pressure in the pressure expansion vessel according to the manufacturer’s directions.

10) It is allowed the hydrostatic height to be maximum 12 m in the boilers under ČSN 07 0245.

11) Every pressure expansion vessel must be checked minimum once per year including filling pressure.

12) A project must be worked out for each heating system.

13) If the pressure expansion vessel is well chosen, the pressure difference must not change more than 60 kPa at changes of the heating water from 10 up to 90° C. This pressure difference can be tested at heating test when the temperature of the water is warmed up from the cold state. If the pressure difference changes more than 60 kPa it means the pressure expansion vessel is not chosen well and there is a risk to damage the boiler.

Proposal of the Pressure Expansion Vessel's Capacity Calculation

(Under the amendment ČSN 06 0830, art. 122)
Capacity of the Pressure Expansion Vessel

$$C = 1.3 * V * \frac{P1 + B}{B} \quad [dm^3]$$

B ... pressure difference, for steel boilers designated for **50 kPa**
P1 ... absolute hydrostatic pressure (kPa)
1.3 ... coefficient of safety
V ... increased volume of water in the heating system:

$$V = G * \Delta v \quad [dm^3]$$

G ... weight of water in the heating system (kg)
Δv ... change of water volume at certain thermal difference:

Δt	°C	60	80	90
Δv	dm^3/kg	0.0224	0.0355	0.0431

The real pressure difference can be higher against the calculated maximum by 10 kPa in case of limiting values of calculation and due to increasing pressure of gas in the expansion vessel according to item **7)**.

Sample:
weight of water in the heating system ... G = 180 kg
hydrostatic height of the heating system ... 9.5 m then P1=195 kPa
thermal difference in the heating system ... t = 80° C
change of water volume for t = 80° C ... 0,0355 dm^3/kg
safety valve adjusted for ... 180 kPa
pressure difference D = 50 kPa

increasing of the water in the whole heating system: $V = G * \Delta v = 18 * 0.0355 = 6.39\ dm^3$
The minimum needy capacity:

$$C = 1.3 * V * \frac{P1 + D}{D} = 1.3 * 6.39 * \frac{195 + 50}{50} = 40.7\ dm^3$$

According to manufactured sizes we can choose the vessel to be: **50 dm^3**

Notice

If the pressure expansion vessel is to prolong the service life of the boiler, it is necessary to avoid low-temperature corrosion by keeping the temperature in the boiler above dew point (about 65°C) for example by means of mixing device. If the temperature is under the dew point, the boiler will corrode on its combustion products surfaces and the service life of the boiler will be shorter because of pressure and dynamic stress to the boiler's walls.

Under the Decree No. 18/79 Statutes or No. 23/79 Statutes §4 a licensed company with a valid certification is allowed to mount the pressure expansion vessel only.

Spare

DOR 12

Description	Position (fig. 1, 2, 5, 6, 31)	Code
swivelling grate	1	2116 0632
bar with cogs	2	2116 0633
swivelling grate complete	3	2116 0634
ash door	4	2116 0635
ash door with air flap	5	2116 0636
ash pan	6	2116 0637
packing cord set for ash door	7	2116 0638
grate lever	8	7178 0639
outlet/inlet flange	9	7082 0340
door bar gate	10	2116 0641
ash cutter	13	2116 0642
front fire grate	14	2116 0643
dumping fire grate	15	2116 0644
thermo gauge	16	2116 0645
front and dumping fire grate assembled	-	2116 0647
plate with stoking door	17	2116 0779
plate	18	2116 0780
stoking door with lever	19	2116 0650
air flap	20	2116 0651
baffle plate	22	2116 0781
ash chamber bottom	25	2116 0655
short-circuiting flap	27	7180 0657
circuiting flap lever with finger	28	7181 0658
plate insulation	30	2116 0782
stoking door insulation	31	2116 0661
rear insulation	32	2116 0783
upper insulation	33	2116 0784
fire hook	34	2116 0664
scraper	35	2116 0665
channel scraper	36	2116 0666
plate insulation holder	37	2116 0785
tapered brick	39	2116 0668
side brick	40	2116 0669
middle brick	41	7184 0670
front panel	42	2116 0786
right side panel	43	2116 0787
front insulation	45	2116 0788
left-side panel	46	2116 0789
side insulation	47	2116 0790
thermo gauge cover	48	2116 0791
cover insulation	49	2116 0792
side insulation	50	2116 0793
cover complete	51	2116 0794
cleaning lid	52	7192 0680
pivot hinge	53	7193 0681
pivot hinge connecting	54	7194 0682
lower hinge	55	7195 0683
coupling draw bar	56	2116 0684
conical swivelling handle	57	7196 0685
coupling draw bar	58	2116 0686
reducing flap	59	7197 0687
reducing flap key	60	7198 0688
adjusting screw	61	7199 0689
door knob	63	7200 0690
output temperature governor	-	9200 4250
filling cock	-	7177 0631

DOR 16

Description	Position (fig. 3, 4, 5, 6, 31)	Code
swivelling grate	1	2116 0632
bar with cogs	2	2116 0633
swivelling grate complete	3	2116 0634
ash door	4	2116 0635
ash door with air flap	5	2116 0636
ash pan	6	2116 0637
packing cord set for ash door	7	2116 0638
grate lever	8	7178 0639
outlet/inlet flange	9	7082 0340
door bar gate	10	2116 0641
ash cutter	13	2116 0642
front fire grate	14	2116 0643
dumping fire grate	15	2116 0644
thermo gauge	16	2116 0645
front and dumping fire grate assembled	-	2116 0647
plate with stoking door	17	2116 0779
plate	18	2116 0780
stoking door with lever	19	2116 0650
air flap	20	2116 0651
parting brick SICAL	21	2116 0652
baffle plate	22	2116 0781
ash chamber bottom	25	2116 0655
economizer	26	2116 0656
short-circuiting flap	27	7180 0657
circuiting flap lever with finger	28	7181 0658
plate insulation	30	2116 0782
stoking door insulation	31	2116 0661
rear insulation	32	2116 0783
upper insulation	33	2116 0784
fire hook	34	2116 0664
scraper	35	2116 0665
channel scraper	36	2116 0666
plate insulation holder	37	2116 0785
fireclay parting brick	38	7183 0667
tapered brick	39	2116 0668
side brick	40	2116 0669
middle brick	41	7184 0670
front panel	42	2116 0786
right side panel	43	2116 0787
brick packing	44	2116 0673
front insulation	45	2116 0788
left-side panel	46	2116 0789
side insulation	47	2116 0790
thermo gauge cover	48	2116 0791
cover insulation	49	2116 0792
side insulation	50	2116 0793
cover complete	51	2116 0794
cleaning lid	52	7192 0680
pivot hinge	53	7193 0681
pivot hinge connecting	54	7194 0682
lower hinge	55	7195 0683
coupling draw bar	56	2116 0684
conical swivelling handle	57	7196 0685
coupling draw bar	58	2116 0686
reducing flap	59	7197 0687
reducing flap key	60	7198 0688
adjusting screw	61	7199 0689
door knob	63	7200 0690
output temperature governor	-	9200 4250
filling cock	-	7177 0631

DOR 20

Description	Position (fig. 7, 8, 11, 12, 32)	Code
thermo gauge cover	21	7243 0795
thermo gauge insulation	22	7244 0796
front fire grate 818/94	24	2122 0692
dumping fire grate	25	7201 0693
front and dumping fire grate	24+25	2122 0694
pivot hinge	68	7193 0681
swivelling grates with bars – complete	26+27+28+65	2122 0695
swivelling grate 818/96	26	2122 0696
rear swivelling grate 818/97	27	7202 0697
pivot hinge	67	7203 0698
pivot hinge	66	7204 0699
pivot hinge	64	7194 0682
grate draw bar	65	2122 0700
plate with stoking door and door lever	36+37+55	2122 0701
plate	36	2122 0702
stoking door	37	7205 0703
plate hinge	40	7206 0704
stoking door lever	55	7207 0705
ash door with air flap	29+31+58+56+57	7175 0605
ash door	29	7208 0707
air flap	31	7209 0708
protective sheet	30	7210 0709
conical swivelling handle	58	7196 0685
adjusting screw	56	7199 0689
door knob	57	7200 0690
plate insulation holder	43	7212 0711
plate insulation – complete	42	2122 0712
stoking door protective sheet	41	7213 0713
ash chamber bottom	12	2122 0714
cleaning lid	14	7192 0680
short-circuiting flap 801/46 III.	32	7215 0716
circuiting flap lever	33	7181 0658
reducing flap 815/34	35	7197 0687
reducing flap key 815/37 I.	34	7198 0688
ash pan	62	7216 0717
right side pane	48	2122 0797
left-side panel	47	2122 0798
front panel	50	7245 0799
rear panel	51	7246 0800
hinged cover	49	2122 0801
side insulation	-	2122 0802
front insulation	45	7247 0803
rear insulation	46	7248 0804
upper insulation	44	2122 0805
packing cord set for plate and stoking door	-	2122 0727
packing cord set for ash door	-	2122 0728
furnace brick 818/102	15	7221 0729
fireclay wedge 2DA	16	7222 0730
baffle plate	23	2122 0731
swivelling grate lever	53	7178 0639
flange packing	-	7223 0733
boiler bottom	13	2122 0734
outlet/inlet flange 2 1/2 inch	6	7224 0735
coupling draw bar	54	7241 0775
lower hinge	70	7195 0683
sight glass	71	7225 0736
coupling draw bar	28	2122 0706
fire hook	-	7214 0715
scraper	-	7179 0640
ash cutter	-	2122 0732
covering rosette	60	7176 0626
thermo gauge	61	2116 0645
output temperature governor	59	9200 4250
filling cock	-	7177 0631

DOR 24

Description	Position (fig. 9, 10, 11, 12, 32)	Code
front fire grate 818/94	24	2122 0692
dumping fire grate	25	7201 0693
front and dumping fire grate	24+25	2122 0694
pivot hinge	68	7193 0681
swivelling grates with bars – complete	26+27+28+65	2122 0695
swivelling grate 818/96	26	2122 0696
rear swivelling grate 818/97	27	7202 0697
pivot hinge	67	7203 0698
pivot hinge	66	7204 0699
pivot hinge	64	7194 0682
grate draw bar	65	2122 0700
plate with stoking door and door lever	36+37+55	2122 0701
plate	36	2122 0702
stoking door	37	7205 0703
plate hinge	40	7206 0704
stoking door lever	55	7207 0705
ash door with air flap	29+31+58+56+57	7175 0605
ash door	29	7208 0707
air flap	31	7209 0708
protective sheet	30	7210 0709
conical swivelling handle	58	7196 0685
adjusting screw	56	7199 0689
door knob	57	7200 0690
plate insulation holder	43	7212 0711
plate insulation – complete	42	2122 0712
stoking door protective sheet	41	7213 0713
ash chamber bottom	12	2122 0714
cleaning lid	14	7192 0680
short-circuiting flap	32	7215 0716
circuiting flap lever	33	7181 0658
reducing flap 815/34	35	7197 0687
reducing flap key 815/37 I.	34	7198 0688
ash pan	62	7216 0717
right side pane	48	2122 0797
left-side panel	47	2122 0798
front panel	50	7245 0799
rear panel	51	7246 0800
hinged cover	49	2122 0801
side insulation	-	2122 0802
front insulation	45	7247 0803
rear insulation	46	7248 0804
upper insulation	44	2122 0805
packing cord set for plate and stoking door	-	2122 0727
packing cord set for ash door	-	2122 0728
furnace brick 818/102	15	7221 0729
fireclay wedge 2DA	16	7222 0730
baffle plate	23	2122 0731
swivelling grate lever	53	7178 0639
fire hook	-	7214 0715
scraper	-	7179 0640
ash cutter	-	2122 0732
flange packing	-	7223 0733
boiler bottom	13	2122 0734
outlet/inlet flange 2 1/2 inch	6	7224 0735
coupling draw bar	54	7241 0775
lower hinge	70	7195 0683
sight glass	71	7225 0736
coupling draw bar	28	2122 0706
thermo gauge cover	21	7243 0795
thermo gauge isolation	22	7244 0796
filling cock	-	7177 0631
covering rosette	60	7176 0626
thermo gauge	61	2116 0645
output temperature governor	59	9200 4250

DOR 25 MAX

Description	Position (fig. 13, 14, 17, 18, 33)	Code
thermo gauge cover	21	7243 0795
thermo gauge isolation	22	7244 0796
front fire grate 819/94	24	2122 0692
dumping fire grate 818/95	25	7201 0693
front and dumping fire grate	24+25	2122 0694
pivot hinge	68	7193 0681
swivelling grates with bars – complete	26+27+28+65	2122 0695
swivelling grate 819/96	26	2122 0696
rear swivelling grate 818/97	27	7202 0697
pivot hinge	67	7203 0698
pivot hinge	66	7204 0699
pivot hinge	64	7194 0682
grate draw bar	65	7227 0740
coupling draw bar	28	7228 0741
plate with stoking door and door lever	36+37+55	2132 0742
plate	36	7229 0743
stoking door	37	7205 0703
plate hinge	40	7206 0704
stoking door lever	55	7207 0705
ash door with air flap	29+31+58+56+57	7175 0605
ash door	29	7208 0707
air flap	31	7209 0708
protective sheet	30	7210 0710
conical swivelling handle	58	7196 0685
adjusting screw	56	7199 0689
door knob	57	7200 0690
plate insulation holder	41	7212 0711
plate insulation – complete	43	7211 0710
stoking door protective sheet	15	7213 0713
ash chamber bottom	12	7230 0744
cleaning lid	14	7192 0680
short-circuiting flap 801/46-III	32	7215 0716
circuiting flap lever	33+69	7181 0658
reducing flap 815/34	35	7197 0687
reducing flap key 815/37-I	34	7198 0688
ash pan	62	7216 0717
right side pane l	48	2132 0806
left-side panel	47	7249 0807
front panel	50	7245 0799
rear panel	51	7246 0800
hinged cover	49	2132 0808
side insulation	-	7250 0809
front insulation	45	7247 0803
rear insulation	46	7248 0804
upper insulation	44	2132 0810
packing cord set	-	7234 0750
laterally lining brick 817/133	16	7235 0751
fireclay wedge II DA	17	7222 0730
explosion set flap	73	2132 0752
baffle plate	23	7236 0754
chain with hangers	74	2132 0753
swivelling grate lever	53	7178 0639
fire hook	-	7214 0715
scraper	-	7179 0640
secondary channel scraper	-	2132 0755
ash cutter	-	2132 0756
flange packing	-	7223 0733
boiler bottom	13	7238 0758
outlet/inlet flange 2 1/2 inch	6	7224 0735
coupling draw bar	54	7241 0775
lower hinge	70	7195 0683
sight glass	71	7225 0736
filling cock	-	7177 0631
covering rosette	60	7176 0626
thermo gauge	61	2116 0645
output temperature governor	59	9200 4250

DOR 32

Description	Position (fig. 15, 16, 17, 18, 33)	Code
front fire grate	24	2132 0737
dumping fire grate	25	7201 0693
front and dumping fire grate	24+25	2132 0739
pivot hinge	68	7193 0681
swivelling grates with bars – complete	26+27+28+65	7226 0738
swivelling grate 819/96	26	7242 0776
rear swivelling grate 818/97	27	7202 0697
pivot hinge	67	7203 0698
connecting pivot hinge	66	7204 0699
connecting cog	64	7194 0682
grate draw bar	65	7227 0740
coupling draw bar	28	7228 0741
plate with stoking door and door lever complete	36+37+55	2132 0742
plate	36	7229 0743
stoking door	37	7205 0703
plate hinge	40	7206 0704
stoking door lever	55	7207 0705
ash door with air flap	29+31+58+56+57	7175 0605
ash door	29	7208 0707
air flap	31	7209 0708
protective sheet	30	7210 0710
conical swivelling handle	58	7196 0685
adjusting screw	56	7199 0689
door knob	57	7200 0690
plate insulation holder	41	7212 0711
plate insulation – complete	43	7211 0710
stoking door protective sheet	15	7213 0713
ash chamber bottom	12	7230 0744
cleaning lid	14	7192 0680
short-circuiting flap	32	7215 0716
circuiting flap lever	33+69	7181 0658
reducing flap 815/34	35	7197 0687
reducing flap key 815/37-I	34	7198 0688
ash pan	62	7216 0717
hinged cover	49	2132 0808
upper insulation	44	7250 0809
packing cord set	-	7234 0750
lateral lining brick	16	7235 0751
fireclay wedge II DA	17	7222 0730
explosion set flap	73	2132 0752
baffle plate	23	7236 0754
chain with hangers	74	2132 0753
swivelling grate lever	53	7178 0639
flange packing	-	7223 0733
boiler bottom	13	7238 0758
outlet/inlet flange 2 1/2 inch	6	7224 0735
coupling draw bar	54	7241 0775
lower hinge	70	7195 0683
sight glass	71	7225 0736
economizer	75	2132 0759
covering rosette	60	7176 0626
thermo gauge cover	21	2116 0645
thermo gauge	61	2113 0645
filling cock	-	7177 0631
output temperature governor	59	9200 4250
thermo gauge insulation	22	7244 0796
side insulation	-	7250 0809
front insulation	45	7247 0803
rear insulation	46	7248 0804
fire hook	-	7214 0715
scraper	-	7179 0640
secondary channel scraper	-	2132 0755
ash cutter	-	2132 0756
right side panel	48	2132 0806
left-side panel	47	7249 0807
front panel	50	7245 0799
rear panel	51	7246 0800

DOR 32 D

Description	Position (fig. 19, 20, 21, 22, 30, 34)	Code
front fire grate 818/94	2	7239 0760
segment rest	3	2232 0761
lining	4	2232 0762
upper air flap	5	2232 0811
output temperature governor	6	2232 0764
segment	8	2232 0766
furnace brick	15	7221 0729
thermo gauge cover	21	7243 0795
thermo gauge insulation	22	7244 0796
connecting pivot hinge	68	7204 0699
swivelling grates with bars – complete	26+27+28+65	7226 0738
swivelling grate with hole 819/96	26	7242 0776
swivelling grate without hole 819/96	26	7240 0768
rear swivelling grate 818/97	27	7202 0697
pivot hinge	67	7203 0698
connecting cog	64	7194 0682
grate draw bar	65	7227 0740
coupling draw bar	28	7228 0741
plate with stoking door and door lever complete	36+37+55	2232 0769
plate	36	7229 0743
stoking door	37	2232 0770
plate hinge	40	7206 0704
stoking door lever	55	7207 0705
ash door with air flap	29+31+56+57	2232 0771
ash door	29	7208 0707
air flap	31	7209 0708
protective sheet	30	7210 0710
adjusting screw	56	7199 0689
door knob	57	7200 0690
plate insulation holder	41	7212 0711
plate insulation – complete	43	7211 0710
ash chamber bottom	12	7230 0744
cleaning lid	14	7192 0680
short-circuiting flap 801/46-III	32	7215 0716
circuiting flap lever complete	33+69	7181 0658
reducing flap 815/34	35	7197 0687
reducing flap key 815/37-I	34	7198 0688
ash pan	62	7216 0717
right side panel	48	2232 0812
left-side panel	47	7249 0807
front panel	50	7245 0799
rear panel	51	7246 0800
hinged cover	49	2232 0813
side insulation	-	7250 0809
front insulation	45	7247 0803
rear insulation	46	7248 0804
neck flange	44	7224 0735
ash door and plate packing cord set	-	7234 0750
ash door packing cord set	-	7234 0750
baffle plate	23	7236 0754
swivelling grate lever	53	7178 0639
fire hook	-	7214 0715
scraper	-	7179 0640
flange packing	-	7223 0733
boiler bottom	13	7238 0758
coupling draw bar	54	7241 0775
lower hinge	70	7195 0683
sight glass	71	7225 0736
covering rosette	60	7176 0626

DOR 45 D

Description	Position (fig. 23, 24, 25, 26)	Code
flange DN70	6	7224 0735
flange packing	-	7223 0733
economizer	8	2245 0772
ash chamber bottom	12	2245 0773
boiler bottom	13	2245 0600
cleaning lid	14	7192 0680
lower fireclay wedge 806/172	15	2245 0601
front brick	16	7174 0602
fireclay wedge 815/94	17	7222 0730
baffle plate	23	2245 0603
front fire grate 818/94	24	7239 0760
swivelling grates set	26+27+28+65	7226 0738
swivelling grate 819/96	26	7242 0768
rear swivelling grate 818/97	27	7202 0697
coupling draw bar	28	7228 0741
ash door	29	7208 0707
protective sheet	30	2246 0604
air flap	31	7209 0708
ash door with air flap	29+31	7175 0605
short-circuiting flap	32	7215 0716
circuiting flap lever complete	33+69	2245 0606
furnace brick 818/102	34	7221 0729
right, left flap baffle plate	35	2245 0607
plate 810/90	36	2245 0608
stoking door	37	2245 0609
plate with stoking door and door lever complete	36+37+55	2245 0610
plate hinge	40	7206 0704
side insulation	45	2245 0611
plate insulation – complete	43	2245 0612
upper insulation	44	2245 0613
front insulation	45	2245 0614
rear insulation	46	2245 0615
stoking door insulation	-	2245 0616
plate insulation	-	2245 0617
packing cord set	-	2245 0618
left-side panel	47	2245 0619
right side panel	48	2245 0620
hinged cover	49	2245 0621
front panel	50	2245 0622
rear panel	51	2245 0623
swivelling grate lever	53	2245 0674
coupling draw bar	54	7241 0775
stoking door lever	55	2245 0625
adjusting screw	56	7199 0689
door knob	57	7200 0690
conical swivelling handle	58	7196 0685
covering rosette	60	7176 0626
thermo nanometer	61	7136 0402
backwater valve G1/2	-	7137 0403
ash pan	62	7216 0717
connecting cog	64	7194 0682
grate draw bar	65	7227 0740
connecting draw bar cog	66	7204 0699
pivot hinge	67	7203 0698
lever tube	68	2245 0627
lower hinge	70	7195 0683
sight glass	71	7225 0736
left side board	72	2245 0629
right side board	73	2245 0628
side board insulation	74	2245 0630
filling cock	-	7177 0631
fire hook	-	7214 0715
scraper	-	7179 0640

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