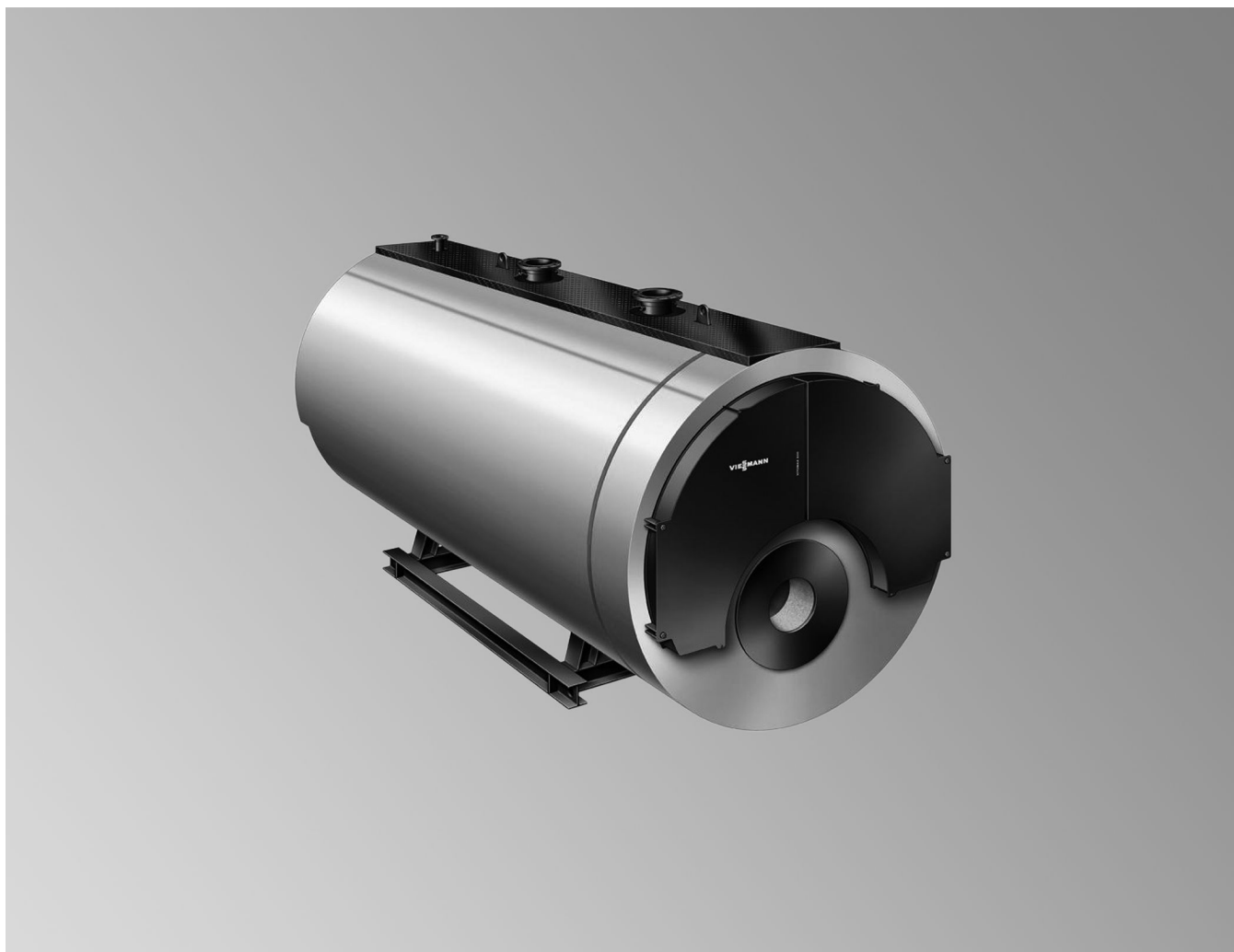


## Datasheet

**VITOMAX HW** Type M72B

High pressure hot water boilers  
Certified in accordance with Pressure Equipment Directive  
Permissible for flow temperatures up to 150 °C  
Suitable for the combustion of gas and fuel oil EL  
Three-pass boiler  
Permissible operating pressure 6, 10 and 16 bar

## Specification for burner selection

### Note

All diagrams in this document are schematic, illustrative examples.

All dimensions are nominal.

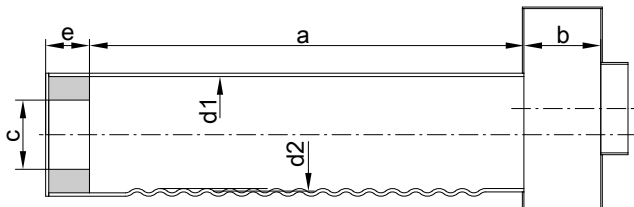
### Test conditions

The information and values in the tables relate to the following test conditions:

- O<sub>2</sub> content in the dry flue gas
  - For natural gas: 2.1 by vol. %
  - For EL fuel oil: 2.7 by vol. %
- Flow/return temperature: 120/80 °C

- 100 % load
- Installation altitude: < 500 m above sea level
- Combustion air temperature: 25 °C

Boiler size				1	2	3	4	5	6	7	8	9	A	B	C		
<b>Rated heating output</b>																	
– For natural gas				MW	2.30	2.60	2.90	3.20	3.60	4.00	4.50	5.20	6.00	6.75	8.00	8.80	
– For fuel oil EL				MW	2.30	2.60	2.90	3.20	3.60	4.00	4.50	5.20	6.00	6.75	8.00	8.55	
<b>Permissible combustion heating output</b>																	
– For natural gas				MW	2.53	2.86	3.19	3.52	3.96	4.40	4.95	5.72	6.60	7.42	8.79	9.67	
– For fuel oil EL				MW	2.53	2.86	3.19	3.52	3.96	4.40	4.95	5.71	6.59	7.42	8.79	9.24	
<b>Flame tube dimensions</b>																	
Diameter																	
– Smooth pipe, min. internal $\varnothing$																	
6 bar				d1	mm	803	803	853	853	901	901	974	974	1064	1064	1143	1143
10 bar				d1	mm	797	797	845	845	893	893	968	968	1064	1064	1135	1135
16 bar				d1	mm	785	785	835	835	885	885	-	-	-	-	-	-
– Corrugated pipe, min. internal $\varnothing$																	
16 bar				d1	mm	-	-	-	-	-	-	950	950	1050	1050	1125	1125
– Corrugated pipe, average $\varnothing$																	
16 bar				d2	mm	-	-	-	-	-	-	1000	1000	1100	1100	1175	1175
Flame tube length				a	mm	2630	2630	2900	2900	3240	3240	3660	3660	4220	4220	4830	4830
Reversing chamber depth				b	mm	500											
<b>Burner connections</b>																	
– Max. flame head $\varnothing$				c	mm	420	420	420	420	520	520	520	520	590	590	710	710
– Minimum flame head length				e	mm	360											
<b>Combustion chamber volume (average value)</b>																	
– Flame tube				m <sup>3</sup>	1.33	1.33	1.65	1.65	2.07	2.07	2.70	2.70	3.79	3.79	4.97	4.97	
– Relative to flame tube length a and reversing chamber depth b				m <sup>3</sup>	1.58	1.58	1.93	1.93	2.38	2.38	3.07	3.07	4.24	4.24	5.49	5.49	
<b>Max. pressure drop on the flue gas side</b>																	
– For natural gas				mbar	8.9	9.4	10.1	10.9	13.2	13.3	14.1	15.8	17.3	18.2	13.8	12.8	
– For fuel oil EL				mbar	8.5	8.9	9.7	10.4	12.7	12.8	13.5	15.2	16.6	17.4	13.1	11.1	



Flame tube dimensions

### Note

Dimensions apply to all types of burner entry point.

The pressure stage used determines the type of flame tube. Tolerances related to production factors are not taken into consideration.

## Engineering information for burner selection

### Burner selection

#### Criteria for burner selection:

- Select burner in accordance with the combustion heating output and the pressure drop on the flue gas side.
- The boiler and burner combination must be in line with country-specific regulations (statutes, standards, guidelines, ordinances, etc.).
- Burner head must be suitable for operating temperatures of at least 500 °C.
- The minimum flame head length must be guaranteed.

#### Recommendation

*Certain types of burner, such as rotary atomisers for example, can obstruct the opening of the cleaning doors. Check with the factory prior to delivery.*

Burner type	Requirements
Pressure-jet gas burner	Test and identification to EN 676
Pressure-jet oil burner	Test and identification to EN 267



#### Burner specification

Manufacturer's datasheets

### Burner connection

If the burner plate is to be prepared at the factory, specify burner make when ordering.

Otherwise, make the flame tube aperture and fixing holes on site in the blank plate supplied. Then fit the burner to the boiler.

### Burner adjustment

Adjust the oil or gas throughput of the burner to the stated combustion heating output of the boiler.

### Fuels

#### Gas

- Natural gas, town gas and LPG to DVGW Code of Practice G 260/I and II or local regulations

#### Oil

- Fuel oil EL to DIN 51603 Part 1

#### Note

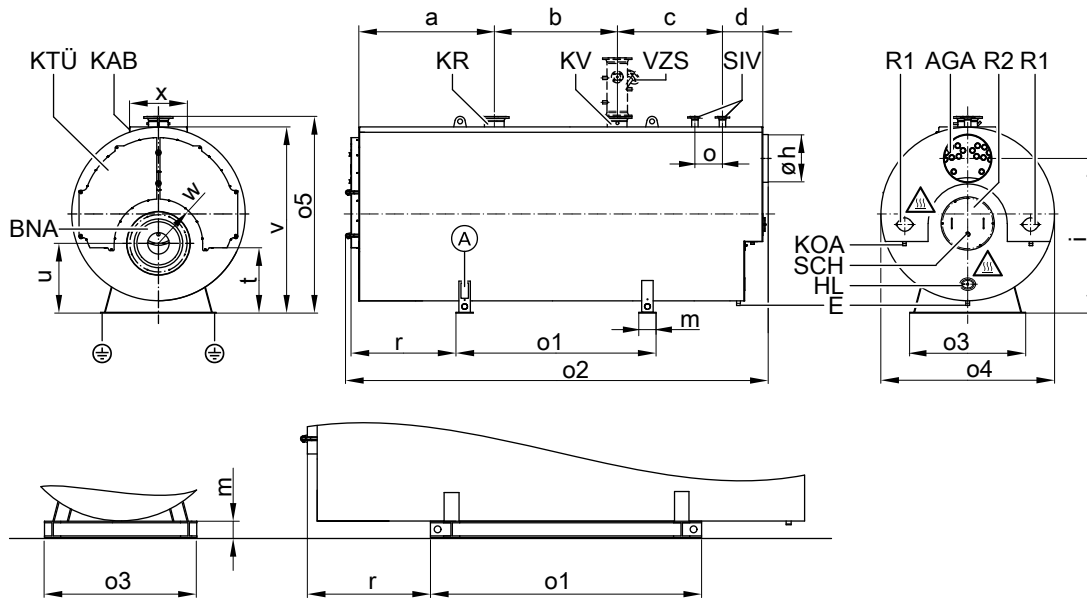
*Vitomax LW, type M72B is approved for operation with fuel oil S (heavy fuel oil). Conversion required (option incurs additional charge, see pricelist).*

#### Biodiesel

- To DIN EN 51603-6, EN 14213, EN 14214 (or equivalent)

Alternative fuels on request

## Boiler geometry



Boiler base with longitudinal I-beams: standard for boiler sizes B + C, option subject to additional charge for boiler sizes 1 to A

- Caution - hot surfaces in non-insulated areas of the boiler.
- Type plate
- AGA Flue outlet
- BNA Burner connection
- E DN40 PN40 drain
- HL Hand hole 100 x 150 mm
- KAB Boiler cover (optional)
- KOA Condensate drain connector R 1½
- KR Boiler return
- KTÜ Boiler door
- KV Boiler flow
- R1 Cleaning aperture, flue gas collector
- R2 Cleaning aperture, flame tube
- SCH Sight glass
- SIV Safety valve connector
- VZS Intermediate flow pieces as accessories (required for  $\geq 120^\circ\text{C}$ )
- Equipotential bonding

Boiler size		1	2	3	4	5	6	7	8	9	A	B	C
a	mm	1235	1235	1440	1440	1535	1535	1670	1670	1875	1875	2085	2085
b	mm	1100	1100	1150	1150	1350	1350	1500	1500	1700	1700	1900	1900
c	mm	1057	1057	1072	1072	1137	1137	1272	1272	1457	1457	982	982
d	mm	510	510	510	510	510	510	560	560	560	560	1285	1285
h (internal $\varnothing$ ) <sup>*1</sup>	mm	392	392	440	440	490	490	550	550	620	620	700	700
i	mm	1785	1785	1865	1865	1990	1990	2055	2055	2170	2170	2400	2400
m	mm	200	200	200	200	200	200	240	240	240	240	-	-
m - I-beam	mm	120	120	120	120	120	120	160	160	160	160	160	160
o	mm	300	300	300	300	400	400	400	400	400	400	500	500
o1	mm	1935	1935	2070	2070	2240	2240	2490	2490	2770	2770	3315	3315
o2	mm	4110	4110	4370	4370	4730	4730	5200	5200	5790	5790	6508	6508
o3	mm	1260	1260	1310	1310	1390	1390	1510	1510	1580	1580	1730	1730
o4	mm	1925	1925	2010	2010	2150	2150	2280	2280	2400	2400	2670	2670
o5	mm	2275	2275	2360	2360	2500	2500	2630	2630	2750	2750	3090	3090
r	mm	1009	1009	1077	1077	1182	1182	1267	1267	1437	1437	-	-
r - I-beam	mm	929	929	997	997	1102	1102	1147	1147	1317	1317	1469	1469
t	mm	812	812	842	842	907	907	945	945	995	995	1052	1052
u	mm	800	800	820	820	890	890	900	900	930	930	915	915
v	mm	2130	2130	2215	2215	2355	2355	2485	2485	2605	2605	2895	2895
w	mm	435	435	460	460	510	510	550	550	600	600	625	625
x	mm	900	900	900	900	900	900	900	900	1000	1000	1000	1000

## Transport information

Boiler size		1	2	3	4	5	6	7	8	9	A	B	C
<b>Shipping dimensions incl. packaging</b>													
- Total length	m	4.20	4.20	4.50	4.50	4.85	4.85	5.30	5.30	5.90	5.90	6.60	6.60
- Total width	m	1.95	1.95	2.04	2.04	2.18	2.18	2.31	2.31	2.43	2.43	2.70	2.70
- Total height	m	2.24	2.24	2.33	2.33	2.47	2.47	2.63	2.63	2.75	2.75	3.10	3.10

\*1 External  $\varnothing$  = internal  $\varnothing$  + 8 mm, for size 3 - C internal  $\varnothing$  + 10 mm

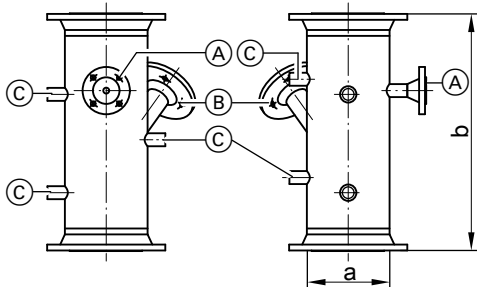
## Boiler geometry (cont.)

Boiler size			1	2	3	4	5	6	7	8	9	A	B	C	
Dry weight* <sup>2</sup> Boiler incl. thermal insulation															
For perm. operating pressure	6 bar	t	4.30	4.44	5.02	5.14	5.86	6.05	7.34	7.58	8.63	9.00	13.50	14.20	
	10 bar	t	5.00	5.14	5.82	5.94	6.86	7.05	8.54	8.78	10.40	10.80	15.30	16.10	
	16 bar	t	6.10	6.24	7.02	7.14	8.36	8.55	10.30	10.60	12.80	13.20	18.10	18.90	

## Boiler connections

Boiler size			1	2	3	4	5	6	7	8	9	A	B	C
<b>Connectors, boiler flow and return</b>														
Temperature spread														
For perm. operating pressure 6 and 10 bar														
	40 K	PN16 DN	100	100	100	125	125	125	150	150	150	200	200	200
	30 K	PN16 DN	125	125	125	125	150	150	150	200	200	200	200	250
	20 K	PN16 DN	150	150	150	150	200	200	200	200	250	250	250	250
For perm. operating pressure 16 bar														
	40 K	PN25 DN	-	-	-	-	-	-	-	-	-	200	200	200
		PN40 DN	100	100	100	125	125	125	150	150	150	-	-	-
	30 K	PN25 DN	-	-	-	-	-	-	-	200	200	200	200	250
		PN40 DN	125	125	125	125	150	150	150	-	-	-	-	-
	20 K	PN25 DN	-	-	-	-	200	200	200	200	250	250	250	250
		PN40 DN	150	150	150	150	-	-	-	-	-	-	-	-
<b>Safety valve connector</b>														
For perm. operating pressure 6 bar														
	6 bar	PN40 DN	50	50	50	65* <sup>3</sup>	65* <sup>3</sup>	65* <sup>3</sup>	65* <sup>3</sup>	80	80	80	100	100
	10 bar	PN40 DN	40	40	40	50	50	50	50	65* <sup>3</sup>	65* <sup>3</sup>	65* <sup>3</sup>	65* <sup>3</sup>	80
	16 bar	PN40 DN	32	32	32	40	40	40	40	50	50	50	65* <sup>3</sup>	65* <sup>3</sup>

## Intermediate flow piece (order separately)



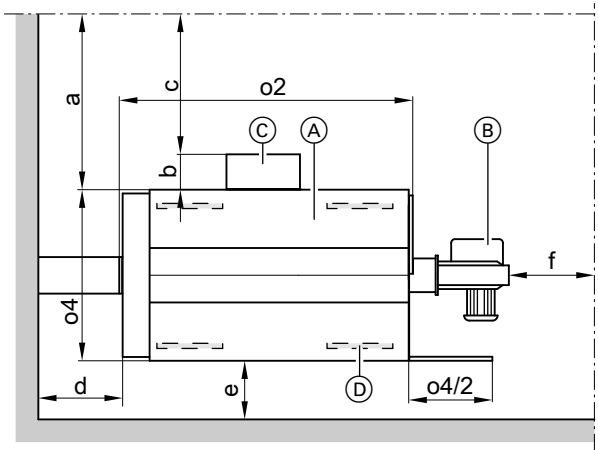
a	DN	100	125	150	200	250	300	350	400
b	mm	500	500	500	500	550	550	600	600

Intermediate flow piece (VZS) for boilers with permissible flow temperature > 110 °C

- (A) Connector for fitting assembly (pressure regulator, pressure limiter and pressure gauge) - DN20 PN40
- (B) Connector for water level limiter with electrodes - DN50 PN40
- (C) Female connections for thermometer, sampling valve and other control equipment 5 x R 1/2

## Boiler geometry (cont.)

### Recommended minimum clearances



- (A) Boiler
- (B) Burner

- (C) Regulating and control system
- (D) Anti-vibration boiler supports
- a Control system not fitted
- b Control system depth
- c Control system fitted
- d,e,f Miscellaneous clearances
- o2, o4 See dimension tables: Max. length, max. width

a/b/c	mm	≥1000/≥500/≥800
d/e/f	mm	≥500/≥300/≥500

#### Recommendation for dimension f

Leave one boiler length (o2) of space in front of the boiler door to extract the turbulators (if fitted) and for cleaning.

Observe the specified clearances to ensure easy installation and maintenance.

Observe the clearances with regard to the regulations applicable at the installation site. Allow for equipment and accessories.

Supporting surfaces must be level. The boiler must be levelled horizontally.

### Siting conditions

- Prevent air contamination from halogenated hydrocarbons. Halogenated hydrocarbons can be found in sprays, paints, solvents and cleaning agents.
- Provide an adequate supply of uncontaminated combustion air if there is a risk of air contamination from halogenated hydrocarbons where the boiler is sited.

- Avoid high levels of dust.
- Avoid high levels of humidity.
- Prevent frost and ensure good ventilation.
- Site on a level surface.

Failure to observe these instructions can cause system faults and damage.

### Reducing noise

Place sound-absorbing supports (accessory) under the boiler body. Position supports centrally under the base rails, distributed evenly along the length.

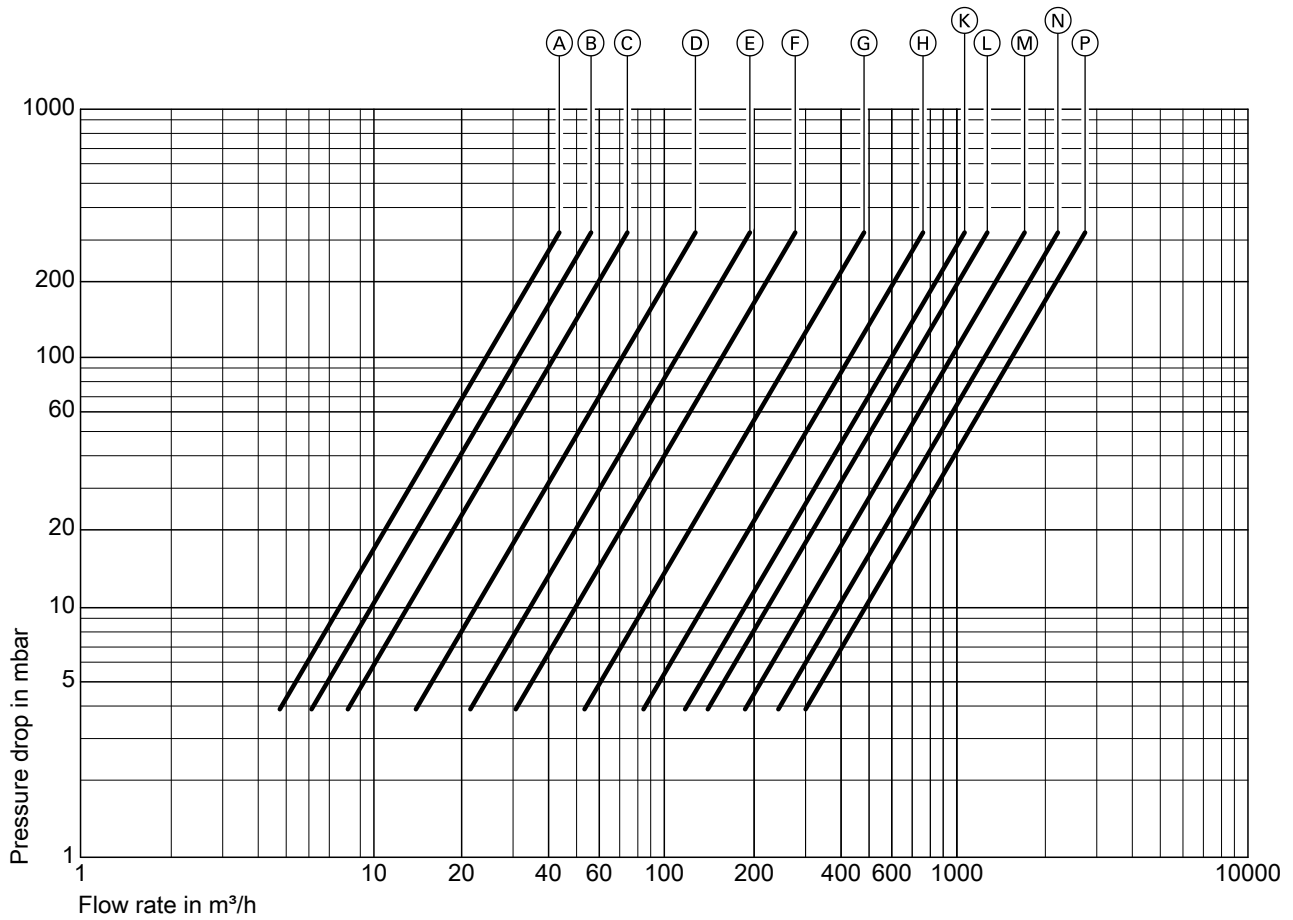
## Boiler performance data

Boiler size		1	2	3	4	5	6	7	8	9	A	B	C
Boiler water content	m <sup>3</sup>	5.01	4.90	5.69	5.60	7.17	7.00	8.93	8.70	10.83	10.50	16.03	15.43
Boiler size		1	2	3	4	5	6	7	8	9	A	B	C
Flue gas mass flow rate* <sup>4</sup> damp	t/h	1.5225 x combustion heating output in MW											
– For natural gas	t/h	1.5 x combustion heating output in MW											
– For fuel oil EL	t/h												
Heating surface		1	2	3	4	5	6	7	8	9	A	B	C
– Gas side	m <sup>2</sup>	57.6	63.5	72.3	77.0	82.8	91.1	107.9	118.9	135.9	151.9	198.6	227.3
– Water side	m <sup>2</sup>	61.7	68.1	77.9	83.1	89.0	98.0	116.1	128.0	146.2	163.6	216.5	247.8
Flue gas volume	m <sup>3</sup>	2.89	2.98	3.57	3.64	4.42	4.56	5.92	6.10	7.74	8.01	10.60	11.10

\*<sup>4</sup> Calculation of values for sizing the flue system to EN 13384 with the following CO<sub>2</sub> contents: 13 % for EL fuel oil, 10 % for natural gas. The significant factor for sizing the flue system is the flue gas temperature at 80 °C boiler water temperature. It is used to determine the application range of flue pipes with maximum permissible operating temperatures.

## Boiler performance data (cont.)

### Pressure drop on the heating water side

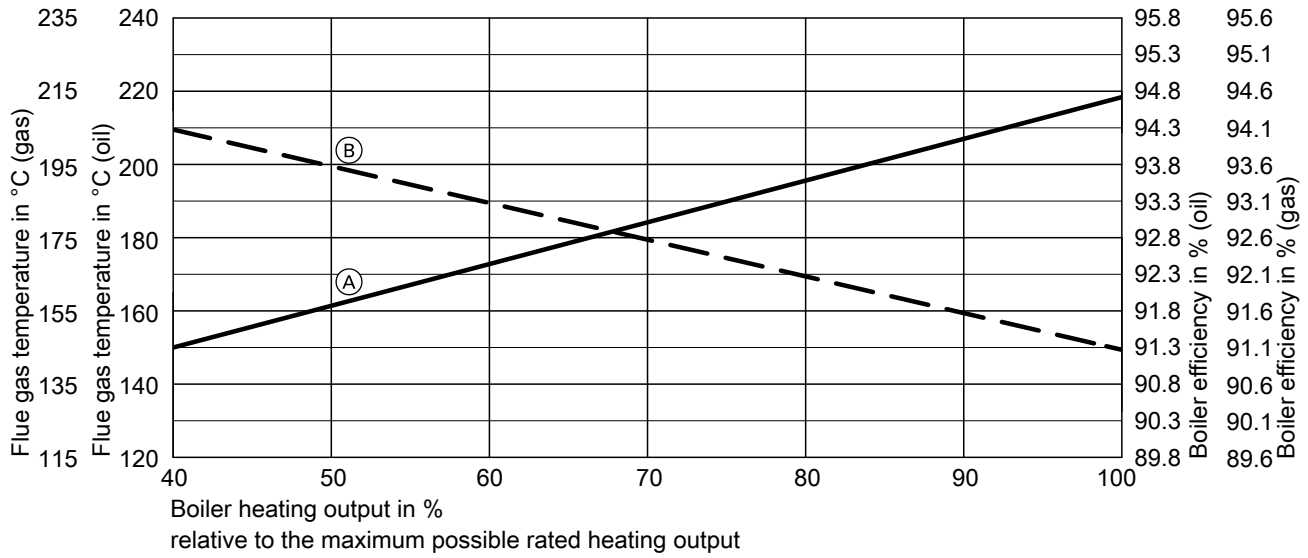


Nominal diameter of boiler flow and return connectors

- |         |         |
|---------|---------|
| Ⓐ DN40  | Ⓗ DN250 |
| Ⓑ DN65  | Ⓚ DN300 |
| Ⓒ DN80  | Ⓛ DN350 |
| Ⓓ DN100 | Ⓜ DN400 |
| Ⓔ DN125 | Ⓝ DN450 |
| Ⓕ DN150 | Ⓟ DN500 |
| Ⓖ DN200 |         |

## Boiler performance data (cont.)

### Flue gas temperature and boiler efficiency



- (A) Flue gas temperature in °C
- (B) Boiler efficiency in %

#### Note

Offset of the boiler efficiency shown

- At 30 K temperature spread: - 0,2 %
- At 20 K temperature spread: - 0,4 %

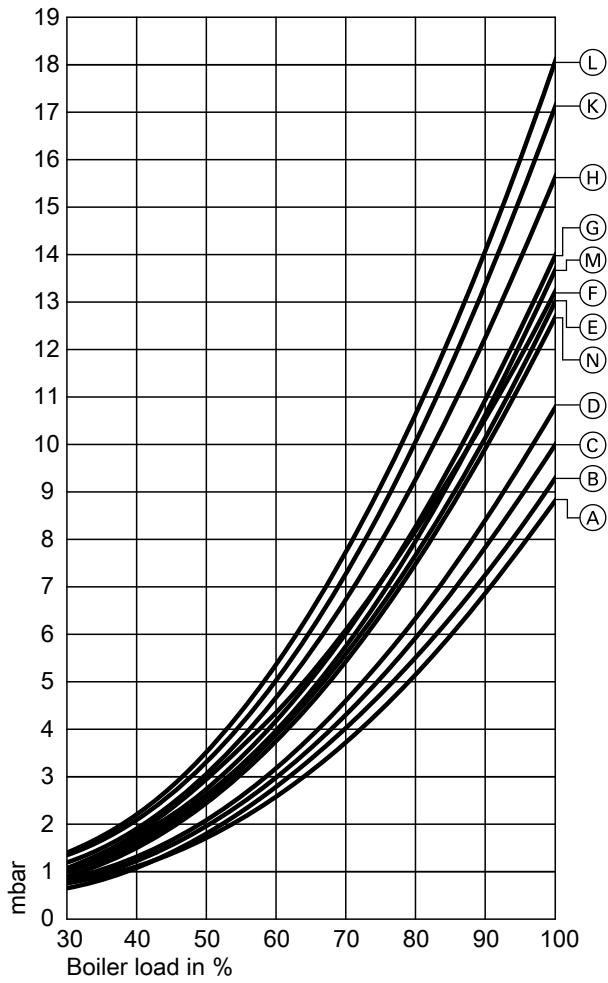
#### Boiler efficiency calculation

The boiler efficiencies provided are composed as follows: Boiler efficiency = 100 % - flue gas loss [%] - radiation loss [%]. Radiation losses are calculated according to EN 12953 Part 11.



## Boiler performance data (cont.)

### Pressure drop on the flue gas side, natural gas



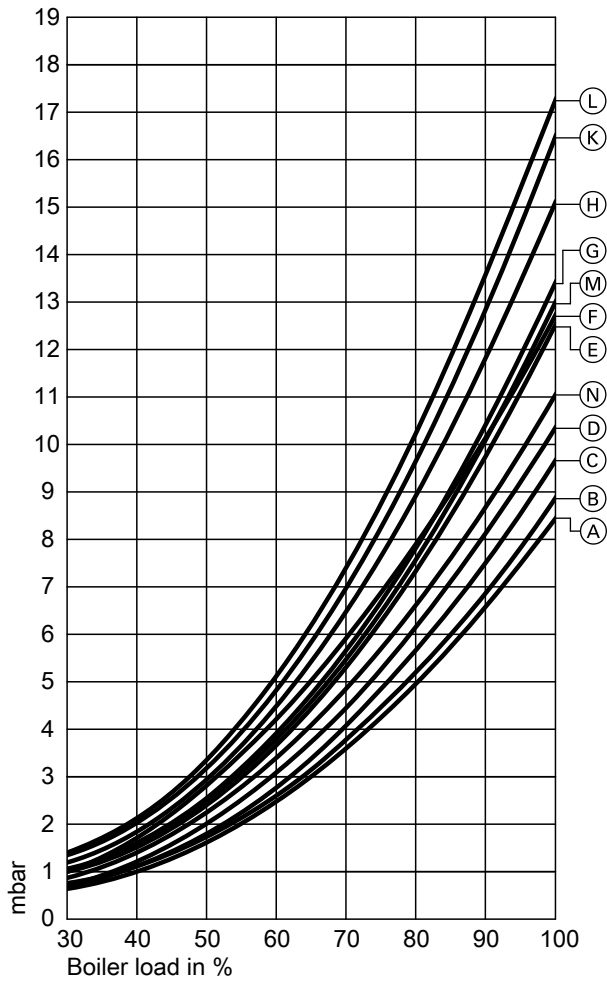
- Ⓒ M72B003
- Ⓓ M72B004
- Ⓔ M72B005
- Ⓕ M72B006
- Ⓖ M72B007
- Ⓗ M72B008
- Ⓚ M72B009
- Ⓛ M72B00A
- Ⓜ M72B00B
- Ⓝ M72B00C

### Pressure drop on the flue gas side 30 % to 100 % boiler load

- Ⓐ M72B001
- Ⓑ M72B002

## Boiler performance data (cont.)

### Pressure drop on the flue gas side, fuel oil EL



- Ⓒ M72B003
- Ⓓ M72B004
- Ⓔ M72B005
- Ⓕ M72B006
- Ⓖ M72B007
- Ⓗ M72B008
- Ⓚ M72B009
- Ⓛ M72B00A
- Ⓜ M72B00B
- Ⓝ M72B00C

Pressure drop on the flue gas side 30 % to 100 % boiler load

- Ⓐ M72B001
- Ⓑ M72B002

## Operating conditions

Operating conditions		Requirements/notes
1.	Heating water flow rate	No minimum heating water flow rate required
2.	<b>Boiler return temperature</b> (minimum value) – Oil operation: – Gas operation:	65 °C 65 °C
3.	Lower boiler water temperature	70 °C
4.	<b>Max. spread</b> <sup>*5</sup>	50 K
5.	Stepped burner operation	None
6.	Modulating burner operation	None
7.	<b>Reduced mode</b> Single boiler system	Operation with lower boiler water temperature
	Multi boiler system – Lead boiler – Lag boiler	Operation with lower boiler water temperature Lag boilers can be shut down
	Weekend setback	See reduced mode

\*5 For oil and gas operation

## Operating conditions (cont.)

### Note

During the combustion of fuel oil S according to DIN 51603-5 an average boiler water temperature of at least 90 °C is required.

## Permissible flow temperatures

Hot water boiler for permissible flow temperatures (= safety temperatures)

- **Up to 150 °C**
  - Designation: compliant with the Pressure Equipment Directive



### For water quality requirements


"Requirements and standard values for water quality"



### For further information on design/engineering

see the technical guide to this boiler

## Tested quality

 CE designation according to the Pressure Equipment Directive.

## Delivered condition

### Boiler

- Boiler shell with burner connection flange and burner plate supplied
- Fitted boiler doors
- Bolted down cleaning cover

### Boiler accessories

- Intermediate flow piece (required for  $\geq 120$  °C)
- Safety equipment
- Burner
- Valves/fittings
- Boiler cover, platform module-ready
- Boiler control platform

- Sight glass
- Fitted thermal insulation and thermally insulated flue gas collector
- Turbulators (if installed)
- Turbulator extractor (if turbulators are installed)
- Packaging

- Regulating and control systems
- Flue gas components
- Pressure maintaining facility
- Anti-vibration supports

### Note

For further accessories, see pricelist

Subject to technical modifications.

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