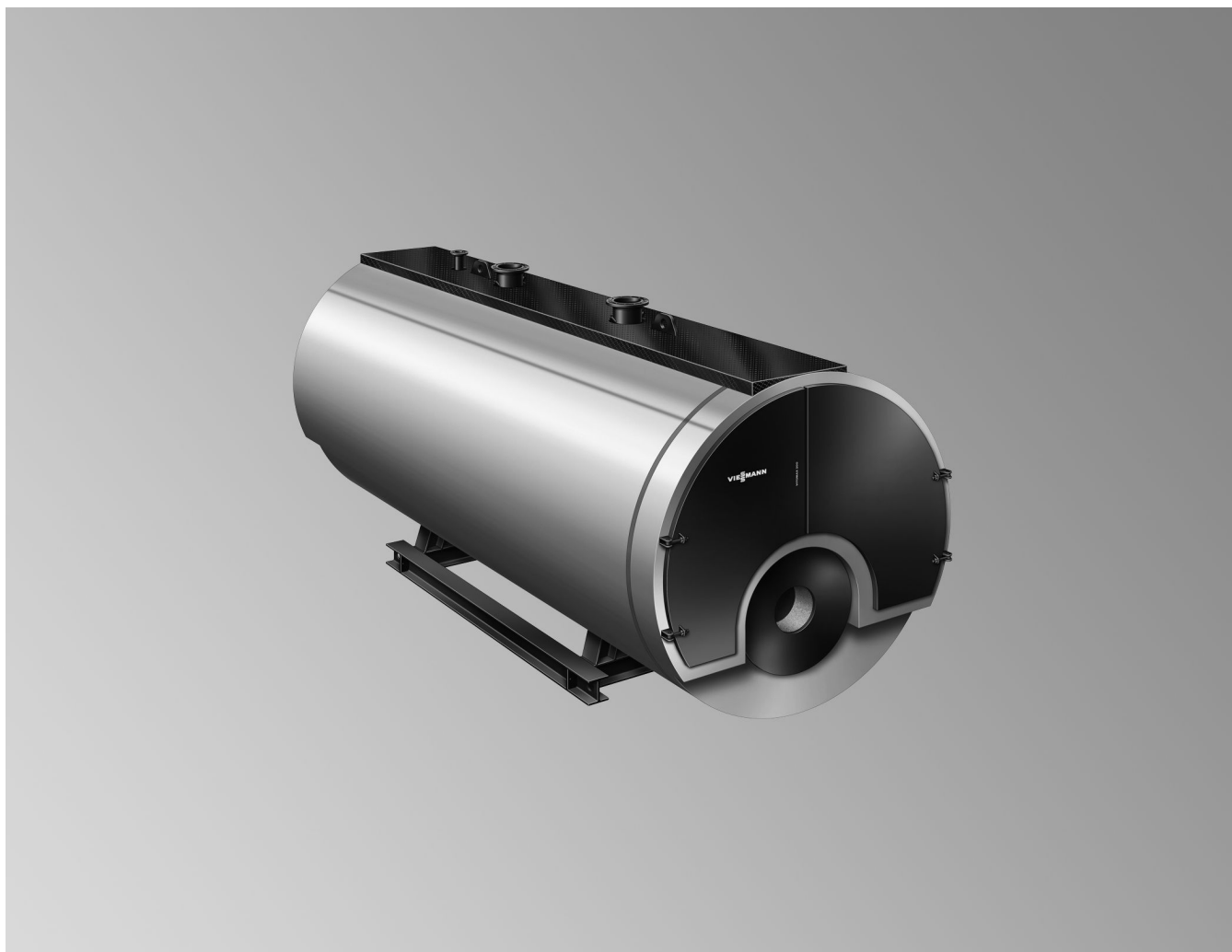


## Datasheet

**VITOMAX LW** Type M84

Low pressure hot water boilers

Low NO<sub>x</sub> version

Permissible for flow temperatures up to 110 °C

Suitable for the combustion of gas, EL fuel oil  
and S fuel oil

Three-pass boiler

Permissible operating pressure 6 to 16 bar

## Specification

### Note

All diagrams in this document are schematic, illustrative examples.

All dimensions are nominal.

### Designation of boiler types

With the boiler type, the respective stage of development is indicated in capital letters.

Example M84B: Boiler type M84 version B

### Reference values

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

- O<sub>2</sub> content in dry flue gas
  - For natural gas: 3.0 % by vol.
  - For EL fuel oil: 3.0 % by vol.
- Flow/return temperature: 80/60 °C

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

## Engineering information for burner selection

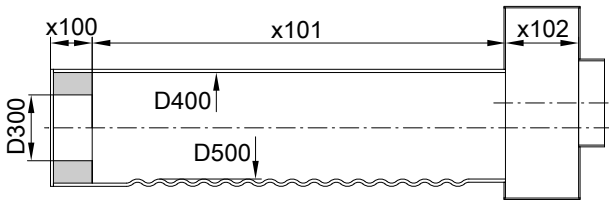
Boiler size				3	4	5	6	7	8	9	
<b>Rated heating output</b>											
– With natural gas for smooth pipe/corrugated pipe	MW			10.00	12.00	14.00	16.00	18.00	20.00	21.50	
– With EL fuel oil for smooth pipe	MW			10.00	12.00	13.04	–	–	–	–	
– With EL fuel oil for corrugated pipe	MW			10.00	12.00	14.00	15.46	16.21	16.90	16.90	
<b>Combustion heating output</b>											
– With natural gas for smooth pipe	MW			10.87	13.04	15.22	–	–	–	–	
– With natural gas for corrugated pipe	MW			10.87	13.04	15.22	17.39	19.57 <sup>*1</sup>	21.74 <sup>*1</sup>	23.37 <sup>*1</sup>	
– With EL fuel oil for smooth pipe	MW			10.87	13.04	14.00	–	–	–	–	
– With EL fuel oil for corrugated pipe	MW			10.87	13.04	15.08	16.67	17.33 <sup>*1</sup>	18.00 <sup>*1</sup>	18.00 <sup>*1</sup>	
<b>Flame tube dimensions</b>											
Diameter											
– Smooth pipe internal											
∅	6 bar	D400	mm	1412	1508	1581	–	–	–	–	
	8 bar	D400	mm	1408	–	–	–	–	–	–	
	10 bar	D400	mm	–	–	–	–	–	–	–	
	13 bar	D400	mm	–	–	–	–	–	–	–	
	16 bar	D400	mm	–	–	–	–	–	–	–	
– Corrugated pipe internal											
∅	6 bar	D500	mm	–	–	–	1650 <sup>*2</sup>	1700 <sup>*2</sup>	1775 <sup>*2</sup>	1800 <sup>*2</sup>	
	8 bar	D500	mm	–	1500	1575 <sup>*2</sup>	1650 <sup>*2</sup>	1700 <sup>*2</sup>	1775 <sup>*2</sup>	1800 <sup>*2</sup>	
	10 bar	D500	mm	1400	1500	1575 <sup>*2</sup>	1650 <sup>*2</sup>	1700 <sup>*2</sup>	1775 <sup>*2</sup>	1800 <sup>*2</sup>	
	13 bar	D500	mm	1400	1500	1575	1650	1700	1775	1800	
	16 bar	D500	mm	1400	1500	1575	1650	1700	1775	1800	
Flame tube length	x101		mm	5325	5825	6225	6625	7050	7450	7700	
Reversing chamber depth	x102		mm	500							
<b>Burner connections</b>											
– Max. flame head ∅ (optional wear-resistant burner entry point)											
	D300		mm	910	910	1010	1110	1110	1210	1210	
– Max. flame head ∅ (standard version)											
	D300			Can be adjusted subject to burner.							
– Minimum flame head length											
	x100		mm	360							
<b>Combustion chamber volume (average values)</b>											
– Flame tube											
			m <sup>3</sup>	8.20	10.29	12.13	14.17	16.00	18.43	19.59	
– Flame tube length and reversing chamber depth											
			m <sup>3</sup>	8.97	11.18	13.10	15.24	17.14	19.67	20.87	
<b>Pressure drop on flue gas side</b>											

<sup>\*1</sup> With reference to EN 12953, flame tube temperature monitoring from 13 bar is applied for a combustion heating output above 14 MW for oil combustion and above 18.2 MW for gas combustion.

<sup>\*2</sup> FTM not applicable for corrugated pipe with 6, 8, 10 bar

## Engineering information for burner selection (cont.)

Boiler size		3	4	5	6	7	8	9
– With natural gas	mbar	11.9	14.2	13.3	13.9	15.7	17.4	18.0
– With EL fuel oil	mbar	10.4	12.5	11.7	10.4	10.8	10.4	9.0



Flame tube dimensions

### Note

Dimensions D300 and x100 apply to all versions of the burner entry point.

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

### Calculation of pressure drop on the flue gas side with reference to deviating heating output

Pressure drop on the flue gas side = resistance value in table x load<sup>2.1</sup>

### Example:

100 % load: 14.2 mbar

60 % load: 14.2 mbar x 0.6<sup>2.1</sup> = 4.9 mbar

## Burner selection

### Criteria for burner selection:

- The choice of burner depends on the combustion heating output and the pressure drop on the flue gas side.
- The burner must meet the requirements of EN 12953-7.
- The boiler/burner combination must comply with country-specific regulations (statutes, standards, guidelines, ordinances, etc.).
- The flame head must be suitable for operating temperatures of at least 500 °C.
- The flame head length must be guaranteed.

### Recommendation

Certain types of burner can hinder the opening of the boiler doors. Check with the factory prior to ordering.

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

## Fuels

### Gas

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

### Oil

- EL fuel oil to DIN 51603 Part 1
- Fuel oil S to DIN 51603 Part 3  
If using fuel oil S, different performance data for the rated heating output, flue gas temperature and efficiency may result.  
If using fuel oil S, only use on-site economisers that are suitable for this purpose.

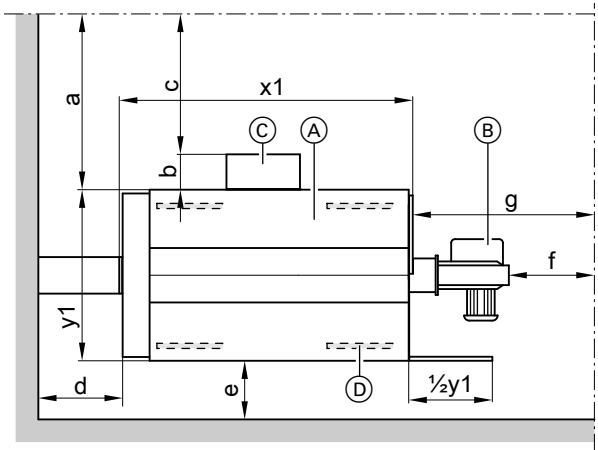
### Biodiesel

- In accordance with EN 51603-6, EN 14213, EN 14214 (or equivalent)

Alternative fuels on request

## Design information for siting

### Recommended minimum clearances



- Ⓐ Boiler
- Ⓑ Burner
- Ⓒ Control system and switchgear
- Ⓓ Anti-vibration boiler supports
- a Switchgear not fitted
- b Switchgear depth
- c Switchgear fitted
- d, e, f, g Other clearances
- x1, y1 See tables of dimensions: Max. length, max. width

#### Note

The schematic diagram only shows the boiler and the switchgear. Space required for additional equipment or further cables/pipework must be added to the minimum clearances.

a	mm	≥1000
b	mm	Subject to the selected switchgear
c	mm	≥800
d	mm	≥500
e	mm	≥300
f	mm	≥500
g	mm	See recommendation: Approx. x1

#### Recommendation for dimension g

Leave one boiler length (x1) of space in front of the boiler door to extract the turbulators (if fitted) and for cleaning.

Observe the stated dimensions to ensure straightforward installation and maintenance.

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

The installation surface must be level. Level the boiler horizontally.

### Siting conditions

- Contamination of the combustion air from halogenated hydrocarbons is not permissible. Halogenated hydrocarbons can be found in sprays, paints, solvents and cleaning agents, for example.
- 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 incidence of dust exposure.

- Avoid high levels of humidity.

- Prevent frost and ensure good ventilation.

- Site on a level surface.

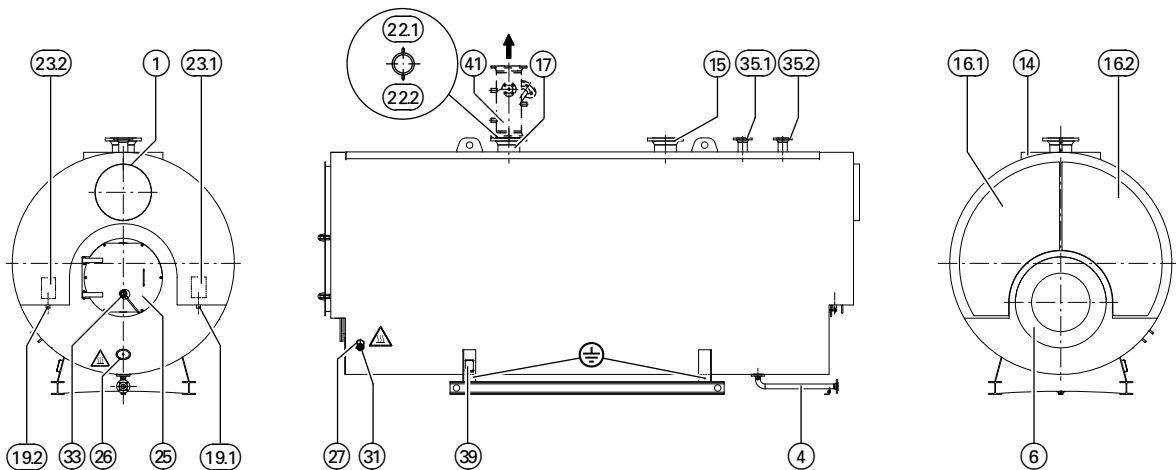
- Align the boiler horizontally.

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

### Reducing noise

We recommend positioning anti-vibration supports (accessories) underneath the boiler support.

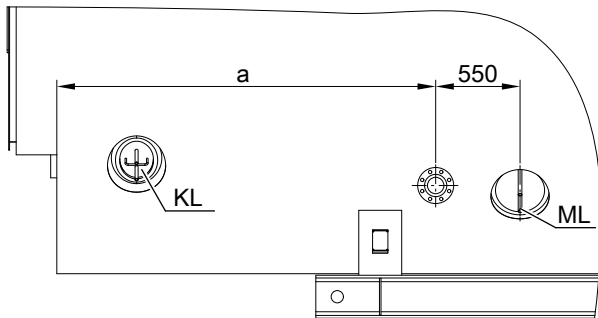
## Boiler geometry



Rear view – side view – front view

- Caution – hot surface.
- No thermal insulation fitted!
- Equipotential bonding connection
- 1 Flue outlet
- 4 Drain connector DN 50 PN 40 (can be pivoted)
- 6 Burner connection
- 14 Boiler cover (optional)
- 15 Boiler return connector
- 16.1 Boiler door
- 16.2 Boiler door
- 17 Boiler flow connector
- 19.1 Condensate drain nipple R 1½
- 19.2 Condensate drain nipple R 1½
- 22.1 Measurement/control equipment sleeve – R ½
- 22.2 Measurement/control equipment sleeve – R ½
- 23.1 Inspection port, flue gas collector
- 23.2 Inspection port, flue gas collector
- 25 Flame tube inspection port
- 26 Inspection port, back of boiler floor
- 27 Inspection port, boiler jacket (front, right-hand side)  
Handhole 100 x 150 mm
- 31 Inspection port, boiler jacket (front, left-hand side)  
Headhole 220 x 320 mm
- 33 Sight tube
- 35.1 Safety valve connector
- 35.2 Safety valve connector, optional
- 39 Type plate
- 41 Intermediate flow piece as accessory

### Flame tube temperature monitoring (FTM)



Detailed drawing – flame tube temperature monitoring (FTM) for boiler sizes 7 - 9 with PS 13 bar or higher

- KL Headhole
- ML Manhole

Boiler size		1	2	3	4	5	6	7	8	9
a	mm	–	–	–	–	–	–	2055	2740	2825

#### Note

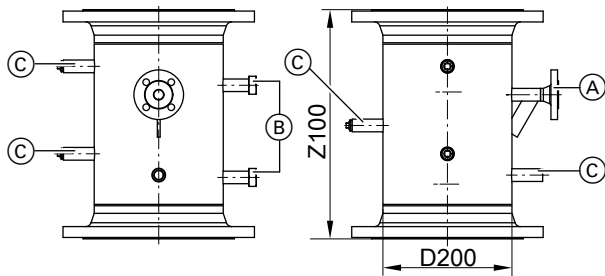
Dimension a is approximate.



Installation and service instructions for flame tube temperature monitoring (FTM)

## Boiler geometry (cont.)

### Intermediate flow piece (option)

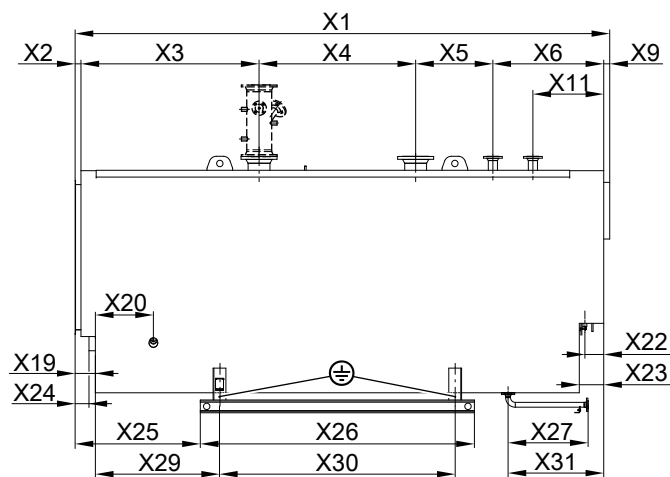


Intermediate flow piece for boilers with permissible flow temperatures up to 110 °C

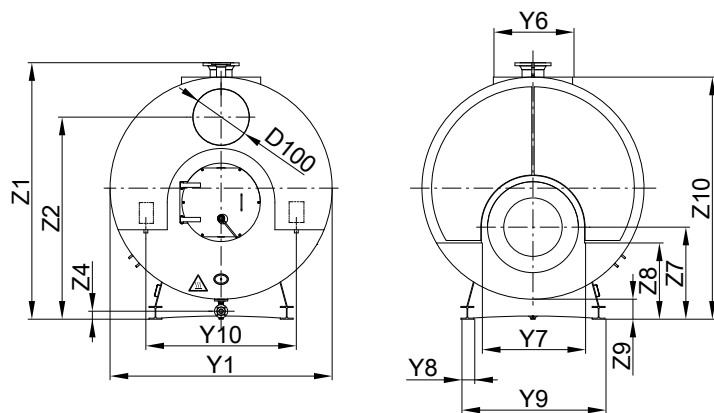
- (A) Fitting assembly connector DN 20 PN 40
- (B) Water level limiter float – sleeves 2 x G 1
- (C) High limit safety cut-out, thermometer, sampling valve and other control equipment – sleeves 4 x R ½

D200	PN16	DN	80	100	125	150	200	250	300	350	400	450
Z100		mm	470	470	470	470	475	485	490	515	515	515

### Dimensions



I-beam design with longitudinal I-beams



Boiler size		3	4	5	6	7	8	9
x1	mm	6995	7545	8035	8525	8970	9410	9710
x2	mm	73	73	73	73	73	73	73
x3	mm	2355	2525	2695	2870	3030	2990	2990
x4	mm	2052	2212	2352	2482	2627	3187	3437
x5	mm	1055	1225	1355	1490	1630	1550	1550
x6	mm	1385	1435	1485	1535	1535	1535	1585

## Boiler geometry (cont.)

Boiler size		3	4	5	6	7	8	9
x9	mm	75	75	75	75	75	75	75
x11	mm	885	935	985	1035	1035	1035	1085
x19	mm	253	253	293	333	353	393	393
x20	mm	520	520/570	520/570	520/570	520/570	520/570	560/570
x22	mm	235	260	285	310	310	310	335
x23	mm	305	355	405	455	455	455	505
x24	mm	213	213	253	293	313	353	353
x25	mm	1604	1729	1819	1959	2017	2157	2232
x26	mm	3700	3950	4250	4450	4800	5000	5100
x27	mm	1000	1000	1000	1000	1200	1200	1200
x29	mm	1611	1736	1846	1946	2011	2144	2214
x30	mm	3100	3350	3530	3730	3960	4160	4260
x31	mm	1195	1245	1295	1345	1545	1545	1595
y1	mm	3025	3175	3300	3450	3525	3625	3675
y6	mm	1100	1100	1100	1200	1200	1200	1200
y7	mm	1610	1710	1785	1860	1910	1985	2010
y8	mm	200	200	240	240	280	280	280
y9	mm	2300	2350	2550	2600	2750	2800	2850
y10	mm	2080	2190	2280	2390	2440	2520	2550
z1	mm	3455	3605	3730	3880	3995	4095	4145
z2	mm	2750	2880	2985	3120	3220	3305	3345
z4	mm	100	100	100	100	100	100	100
z7	mm	1285	1340	1378	1420	1485	1523	1535
z8	mm	1098	1103	1100	1110	1163	1173	1173
z9	mm	250	250	250	250	290	290	290
z10	mm	3280	3430	3555	3705	3820	3920	3970
∅ Di – internal diameter	mm	790	790	890	990	990	1110	1110
∅ Da – external diameter	mm	800	800	900	1000	1000	1120	1120

## Transport information

Boiler size		3	4	5	6	7	8	9
<b>Shipping dimensions</b> <sup>*3</sup> incl. packaging								
– Total length	m	7.15	7.70	8.19	8.68	9.12	9.56	9.86
– Total width	m	3.05	3.20	3.33	3.48	3.55	3.65	3.70
– Total height	m	3.48	3.63	3.76	3.91	4.02	4.12	4.17
<b>Dry weight</b> <sup>*3</sup> Boiler incl. thermal insulation								
For perm. operating pressure								
6 bar	t	21.6	25.5	29.3	32.1	36.2	39.6	42.7
8 bar	t	22.2	24.1	27.5	32.3	36.5	40.5	40.8
10 bar	t	22.5	25.9	30.7	36.2	41.2	45.3	48.9
13 bar	t	24.5	29.3	34.5	38.7	43.8	48.4	52.9
16 bar	t	28.4	33.0	36.8	42.1	47.2	52.6	57.0

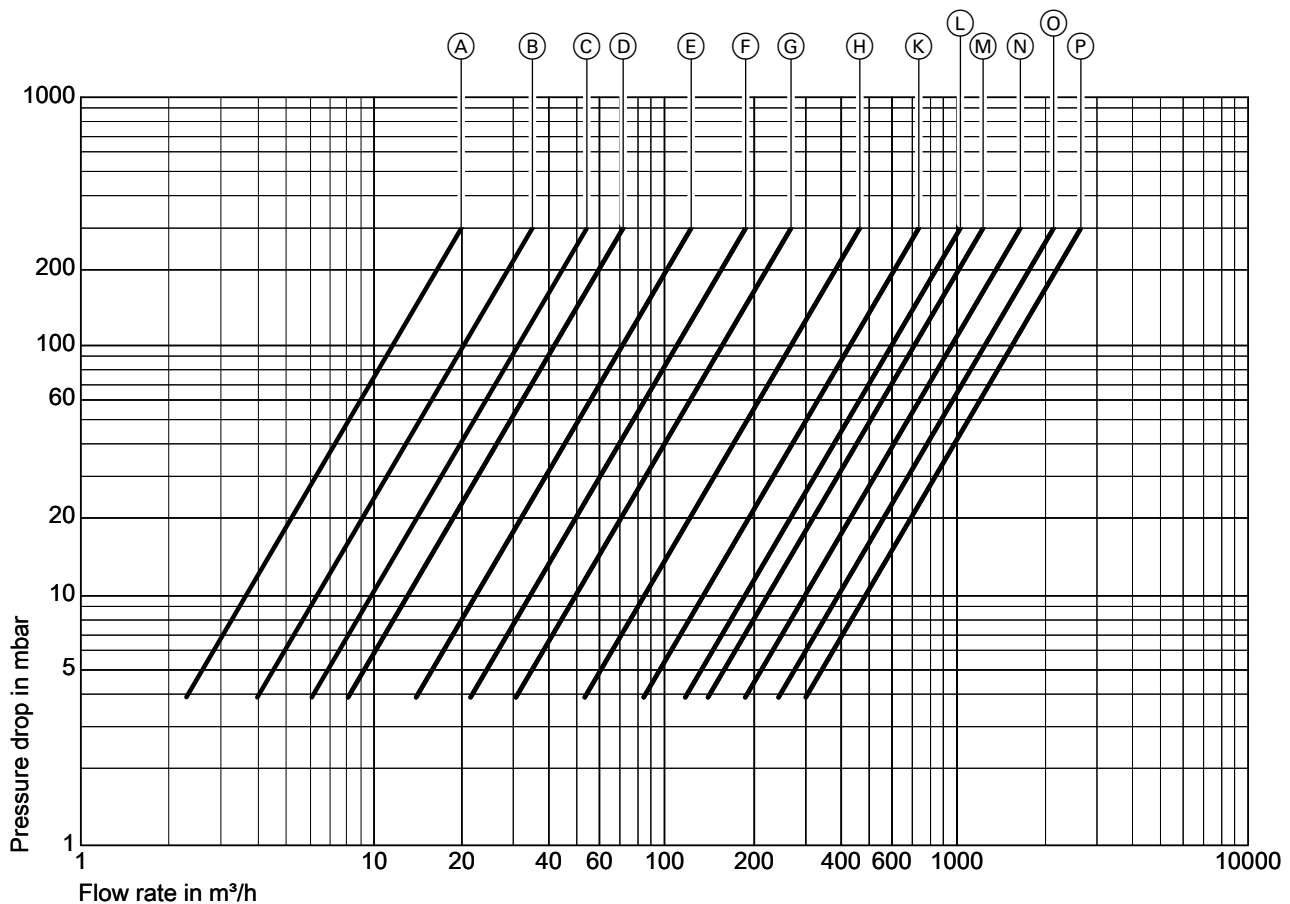
## Boiler connections

Boiler size		3	4	5	6	7	8	9
<b>Boiler flow and return connectors</b>								
For perm. operating pressure 6, 10 bar								
Temperature spread								
40 K	PN 16 DN	200	250	250	250	300	300	300
30 K	PN 16 DN	250	250	300	300	350	350	350
20 K	PN 16 DN	300	300	350	400	400	400	450
For perm. operating pressure 16 bar								
Temperature spread								
40 K	PN 25 DN	200	250	250	250	300	300	300
30 K	PN 25 DN	250	250	300	300	350	350	350
20 K	PN 25 DN	300	350	350	400	400	400	450
<b>Safety valve connector</b>								
For perm. operating pressure								
6 bar	PN 16 DN	100	125	125	150	150	2 x 100	2 x 125
8 bar	PN 16 DN	100	100	125	125	150	150	150
10 bar	PN 16 DN	80	100	100	100	125	125	150
13 bar	PN 16 DN	80	80	100	100	100	100	125
16 bar	PN 40 DN	65	80	80	100	100	100	100

## Boiler performance data

Boiler size		3	4	5	6	7	8	9
Boiler water capacity	m <sup>3</sup>	20.5	24.3	27.3	31.1	34.2	37.7	39.8
Boiler size		3	4	5	6	7	8	9
Flue gas mass flow rate* <sup>4</sup> damp	t/h	1.5225 x combustion heating output in MW						
	t/h	1.5 x combustion heating output in MW						
Heating surface								
- Flue gas side	m <sup>2</sup>	286	340	395	453	507	562	579
- Water side	m <sup>2</sup>	308	367	424	488	545	605	625
Flue gas volume	m <sup>3</sup>	16.7	20.2	24.5	29.2	34.6	39.0	41.8

### Pressure drop on the heating water side



Nominal diameter of boiler flow and return connectors

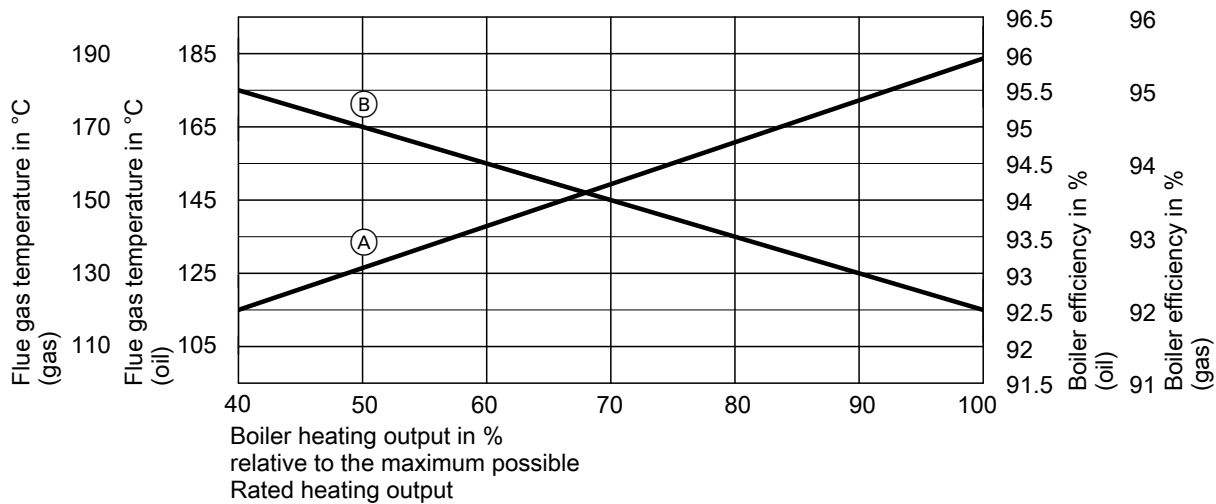
Ⓐ DN40	Ⓗ DN200
Ⓑ DN50	Ⓚ DN250
Ⓒ DN65	Ⓛ DN300
Ⓓ DN80	Ⓜ DN350
Ⓔ DN100	Ⓝ DN400
Ⓕ DN125	Ⓞ DN450
Ⓖ DN150	Ⓟ DN500

\*<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.)

### Flue gas temperature and boiler efficiency



Lower limits averaged across all boiler sizes

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

#### Boiler efficiency calculation

The boiler efficiency levels given are calculated as follows: Boiler efficiency = 100 % - flue gas loss (%) - radiation loss (%)  
The radiation losses are calculated according to EN 12953-11.

#### Efficiency increase

Relative to the O<sub>2</sub> content

- Gas: With a residual O<sub>2</sub> content of 2.1 %, the efficiency increases by 0.7 %.
- EL fuel oil: With a residual O<sub>2</sub> content of 2.7 %, the efficiency increases by 0.2 %.
- Data for other fuels can only be determined on the basis of a fuel analysis.

Relative to the temperature spread

- With 40 K spread while maintaining the flow temperature and 100 % load: + 0.4 %
- With 30 K spread while maintaining the flow temperature and 100 % load: + 0.2 %

## 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)	
	– Gas operation	55 °C
	– Oil operation	50 °C
3.	Minimum flow temperature	70 °C
4.	<b>Max. temperature spread</b>	
	For gas and oil operation	50 K
5.	Multi stage 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	Operation with lower boiler water temperature
	– Lag boiler	Lag boilers can be shut down
	Weekend setback	See reduced mode

## Operating conditions (cont.)

### Note

For combustion of heavy fuel oil S to DIN 51603-5, the average boiler water temperature must be at least 90 °C.



Chapter "Standard values for water quality" in operating and service instructions

## Permissible flow temperatures

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

### ■ Up to 110 °C

– Designation: According to Gas Appliances Regulation (EU)



### Further information on design/engineering

See the technical guide to this boiler

## Tested quality



CE designation according to current EU Directives and EU Regulations.

## Standard delivery

Standard delivery in accordance with order confirmation.

For further information on this product type, speak to your Viessmann contact.

Subject to technical modifications.

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