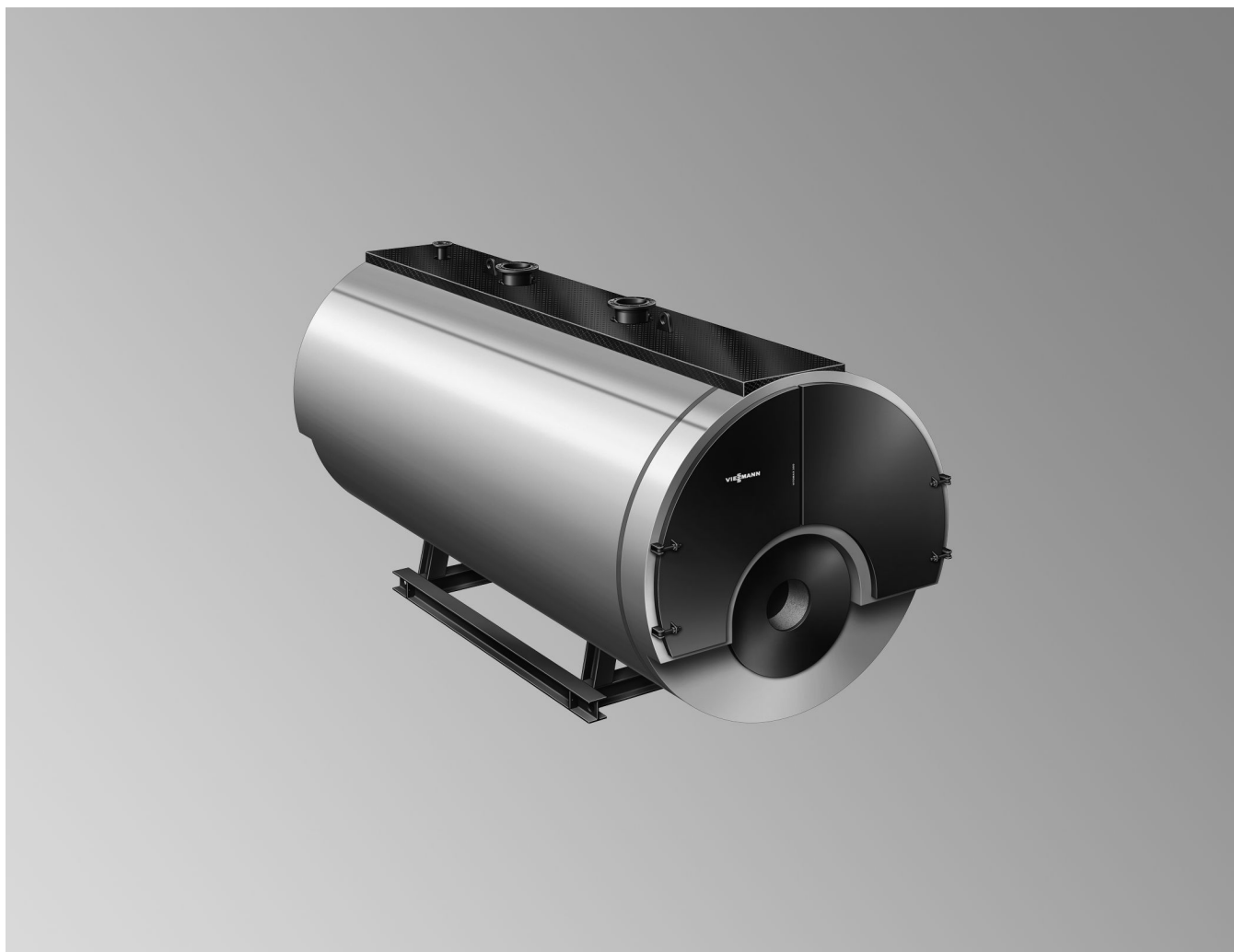


Datasheet

**VITOMAX LW** Type M84

Low pressure hot water boilers

Low NO_x 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 for burner selection

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

General conditions

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

- O₂ 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

Boiler size				3	4	5	6	7	8	9		
Rated heating output												
– For natural gas				MW	10.00	12.00	14.00	16.00	18.00	20.00	21.50	
– For EL fuel oil				MW	10.00	12.00	13.04	13.09	16.21	16.90	16.90	
Permissible combustion heating output*1												
– With natural gas for smooth pipe				MW	10.87	13.04	15.22	17.39	19.57*2	–	–	
– With natural gas for corrugated pipe				MW	10.87	13.04	15.22	17.39	19.57*2	21.74*2	23.37*2	
– With EL fuel oil for smooth pipe				MW	10.87	13.04	14.00	14.00	16.75*2	–	–	
– With EL fuel oil for corrugated pipe				MW	10.87	13.04	14.00	14.00	17.33*2	18.00*2	18.00*2	
Flame tube dimensions												
Diameter												
– Smooth pipe, internal Ø												
	6 bar	d1	mm	1414	1512	1585	1656	1706	–	–		
	10 bar		mm	–	–	–	–	–	–	–		
– Corrugated pipe, internal Ø												
	6 bar	d1	mm	–	–	–	–	–	1775	1800		
	10 bar		mm	1400	1500	1575	1650	1700	1775	1800		
	16 bar		mm	1400	1500	1575	1650	1700	1775	1800		
Flame tube length				a	mm	5325	5825	6225	6625	7050	7450	
Reversing chamber depth				b	mm	500						
Burner connections												
– Max. flame head Ø (optional wear-resistant burner entry point)				c	mm	910	910	1010	1110	1110	1210	1210
– Max. flame head Ø (standard version)				c		Can be adjusted subject to burner				–	–	
– Flame head length				e	mm	360						
Combustion chamber volume (min. values)												
– Flame tube					m ³	8.20	10.29	12.13	14.17	16.00	18.43	19.59
– Flame tube and reversing chamber depth					m ³	8.97	11.18	13.10	15.24	17.14	19.67	20.87
Max. pressure drop on the flue gas side												
– For natural gas					mbar	11.9	14.2	13.3	13.9	15.7	17.4	18.0
– For EL fuel oil					mbar	10.4	12.5	11.7	10.4	10.8	10.4	9.0

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^{2,1}

Example:

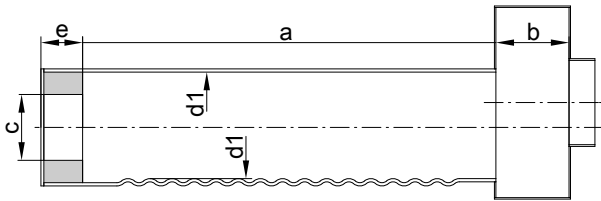
100 % load: 14.2 mbar

60 % load: 14.2 mbar x 0.6^{2,1} = 4.9 mbar

*1 In accordance with EN 12953, the internal diameter of the flame tube limits the maximum combustion heating output for oil operation.

*2 With reference to EN 12953, flame tube temperature monitoring is recommended for a combustion heating output above 14 MW for oil combustion and above 18.2 MW for gas combustion.

Specification for burner selection (cont.)



Flame tube dimensions

Note

Dimensions *c* and *e* 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.

Flame tube temperature monitoring (FTM)

In line with the requirements of EN 12953-3, flame tube temperature monitoring (FTM) is necessary under the following conditions:

- Internal flame tube diameter for smooth pipes or average flame tube diameter for corrugated pipes > 1800 mm
- Combustion heating output for fuel oil > 14 MW or for natural gas > 18.2 MW

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 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 burner 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 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

Fuels

Gas

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

Oil

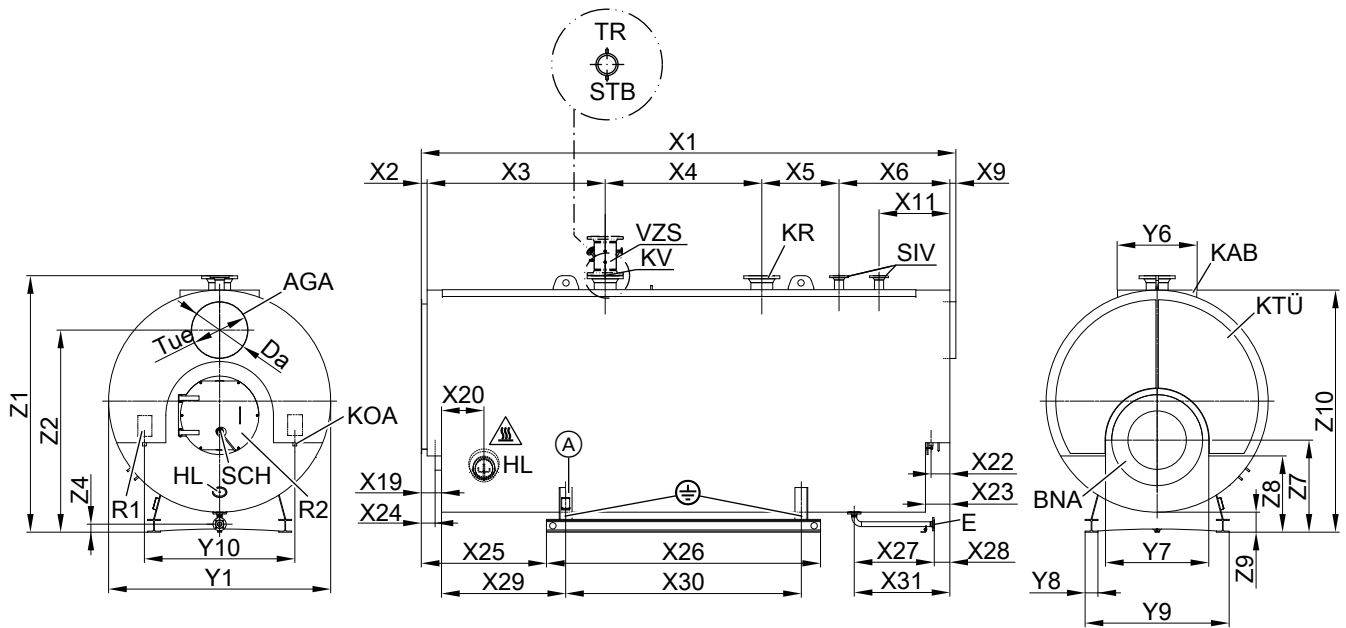
- EL fuel oil to DIN 51603 Part 1
 - S fuel oil to DIN 51603 Part 3
- If using S fuel oil, different output data for the rated heating output, flue gas temperature and efficiency may result.
Never use heat exchangers if using S fuel oil.

Biodiesel



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

Alternative fuels on request

Boiler geometry



Boiler sizes 1 - 2 cross plate design with I-beams; boiler size 3 I-beam design with longitudinal I-beam supports

-  Caution – hot surface. No thermal insulation fitted.
-  Type plate
- AGA Flue outlet
- BNA Burner connection
- E Drain connector DN 50 PN 40
- HL Handhole 100 x 150 mm
- KAB Boiler cover (optional)
- KOA Condensate drain connector R 1½
- KR Boiler return connector
- KTÜ Boiler door
- KV Boiler flow connector
- R1 Flue gas collector inspection port
- R2 Flame tube inspection port
- SCH Sight tube
- SIV Safety valve connector (2nd safety valve optional up to boiler size 7)
- STB High limit safety cut-out – female connection R ½
- TR Temperature controller – female connection R ½
- VZS Intermediate flow piece as accessory
- ⊕ Equipotential bonding connection

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
x9	mm	75	75	75	75	75	75	75
x11	mm	885	935	985	1035	1035	1035	1085
x19	mm	293	293	333	373	393	433	433
x20	mm	480	480	480	480	480	480	480
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
x28	mm	195	245	295	345	345	345	395
x29	mm	1611	1736	1846	1946	1971	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

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Boiler geometry (cont.)

Boiler size		3	4	5	6	7	8	9
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

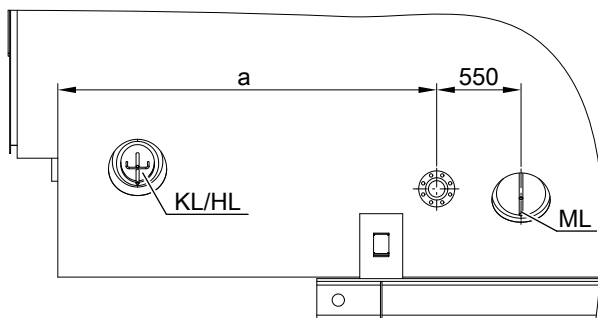
Transport information

Boiler size		3	4	5	6	7	8	9
Shipping dimensions								
– 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
Dry weight^{*3} Boiler incl. thermal insulation								
For perm. operating pressure		t						
6 bar	t	21.5	25.1	28.9	35.0	38.7	40.2	43.2
10 bar	t	22.1	25.8	29.7	35.7	40.2	45.1	48.8
16 bar	t	28.3	33.3	38.8	44.5	49.4	55.2	59.2

Boiler connections

Boiler size		3	4	5	6	7	8	9
Boiler flow and return								
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
Safety valve connector								
For perm. operating pressure								
6 bar	PN 16 DN	100	125	125	150	150	2 x 100	2 x 125
10 bar	PN 16 DN	80	100	100	100	125	125	150
16 bar	PN 40 DN	65	80	80	100	100	100	100

Flame tube temperature monitoring (FTM)



Detailed drawing – flame tube temperature monitoring (FTM) for boiler sizes 7 - 9

HL Handhole
 KL Headhole
 ML Manhole

Boiler size		3	4	5	6	7	8	9
a	mm	–	–	–	–	2060	2740	2830

Note

Dimension a is approximate.

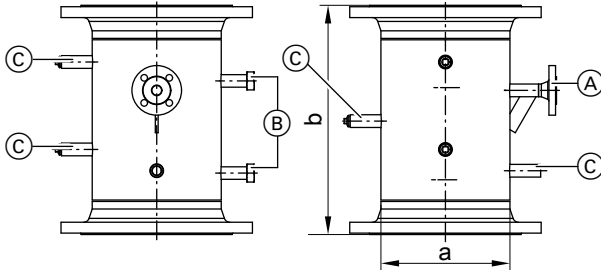
^{*3} Deviations of ±10 % are possible, subject to order.

Boiler geometry (cont.)



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

Intermediate flow piece

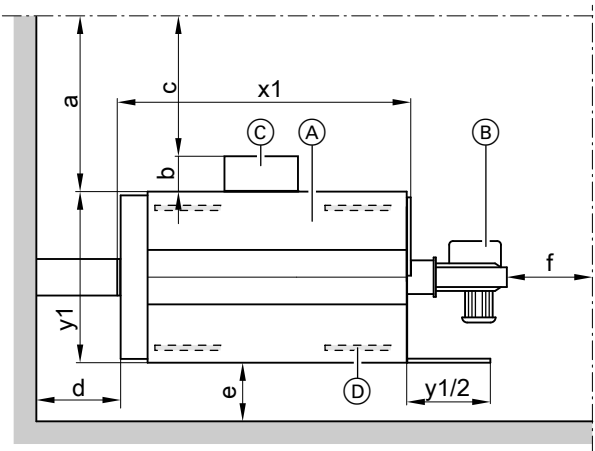


Intermediate flow piece (VZS)

- (A) Fitting assembly connector DN 20 PN 40
- (B) Female connections for water level limiter float
- (C) Thermometer, sampling valve and other control equipment, female connections 4 x R 1/2

a	DN	80	100	125	150	200	250	300	350	400	450
b	mm	470	470	470	470	475	485	490	515	515	515

Recommended minimum clearances



a	mm	≥1000
b	mm	Subject to the selected control panel
c	mm	≥800
d	mm	≥500
e	mm	≥300
f	mm	≥500

Recommendation for dimension f

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.

- (A) Boiler
- (B) Burner
- (C) Control system and control panel
- (D) Anti-vibration boiler supports

a Control panel not fitted

b Control panel depth

c Control panel fitted

d, e, f Other clearances

$x1, y1$ See tables of dimensions: Max. length, max. width

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.

Boiler geometry (cont.)

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 performance data

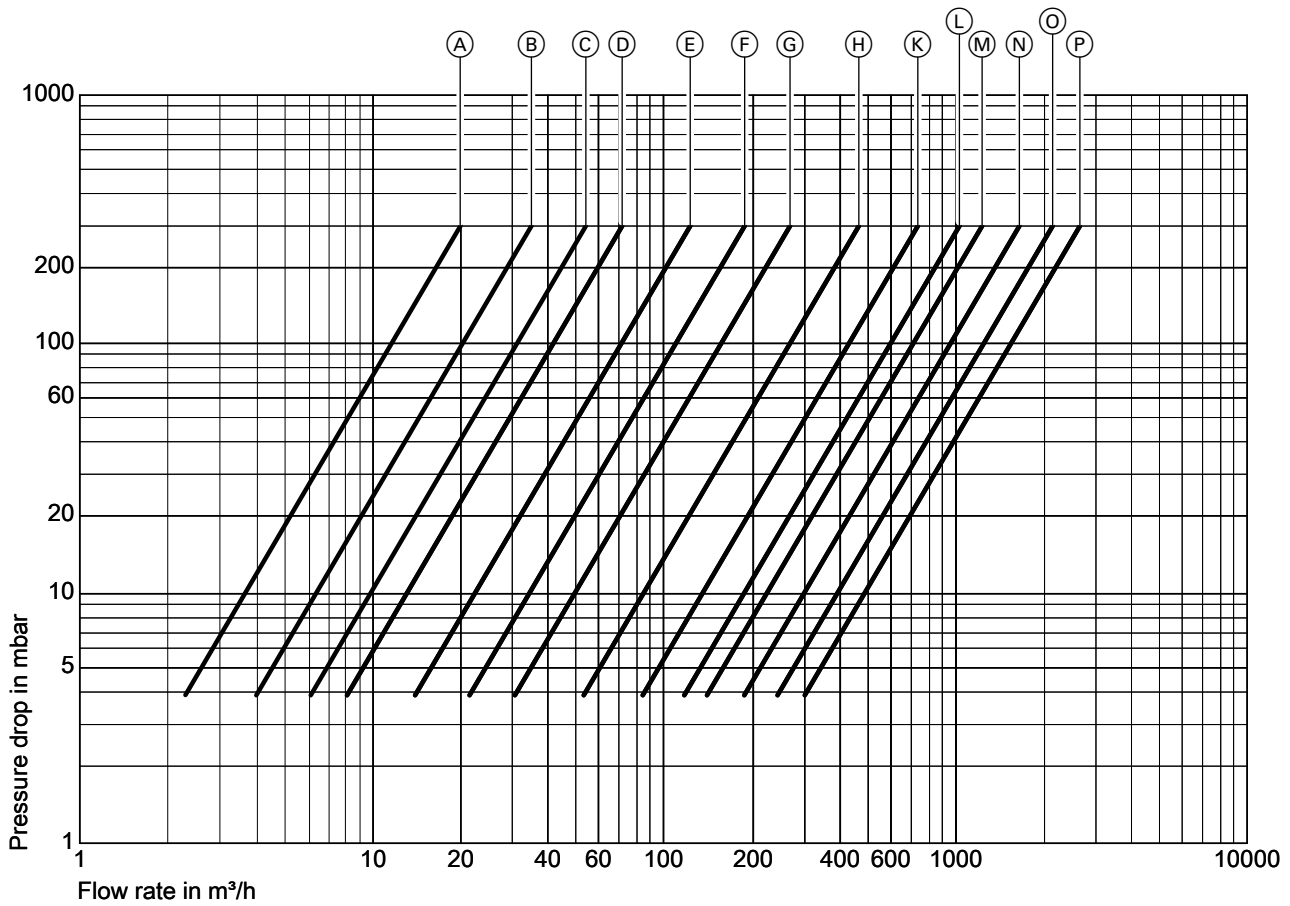
Boiler size		3	4	5	6	7	8	9
Boiler water capacity	m ³	20.5	24.3	27.3	31.1	34.2	37.7	39.8

Boiler size		3	4	5	6	7	8	9
Flue gas mass flow rate ^{*4} damp		1.5225 x combustion heating output in MW						
– For natural gas	t/h	1.5 x combustion heating output in MW						
– For EL fuel oil	t/h							
Heating surface								
– Flue gas side	m ²	286	340	395	453	507	562	579
– Water side	m ²	308	367	424	488	545	605	625
Flue gas volume	m ³	16.7	20.2	24.5	29.2	34.6	39.0	41.8

^{*4} Calculation of values for sizing the flue system to EN 13384 with the following CO₂ 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

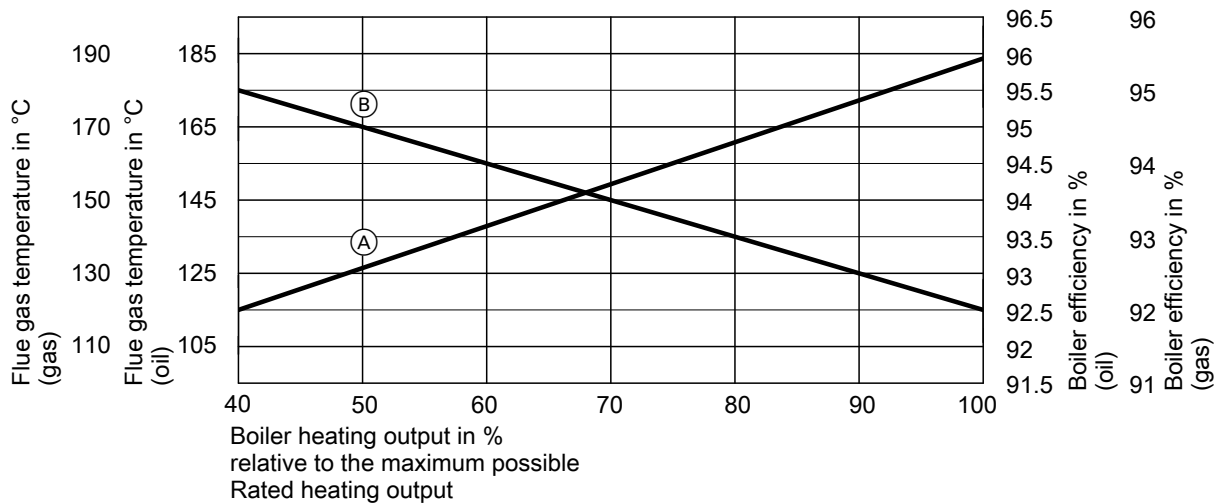


Nominal diameter of boiler flow and return connectors

- (A) DN 40
- (B) DN 50
- (C) DN 65
- (D) DN 80
- (E) DN 100
- (F) DN 125
- (G) DN 150
- (H) DN 200
- (K) DN 250
- (L) DN 300
- (M) DN 350
- (N) DN 400
- (O) DN 450
- (P) DN 500

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

- 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. Boiler return temperature (minimum value)	
– Gas operation	55 °C
– Oil operation	50 °C
3. Lower boiler water temperature	70 °C
4. Max. temperature spread	
For gas and oil operation	50 K
5. Multi stage burner operation	None
6. Modulating burner operation	None
7. Reduced mode	
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

Note

The achievable flow temperature is approx. 15 K below the permissible flow temperature (= safety temperature).

Note

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



See chapter "Requirements and standard values for water quality" in the technical guide

Operating conditions (cont.)

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 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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