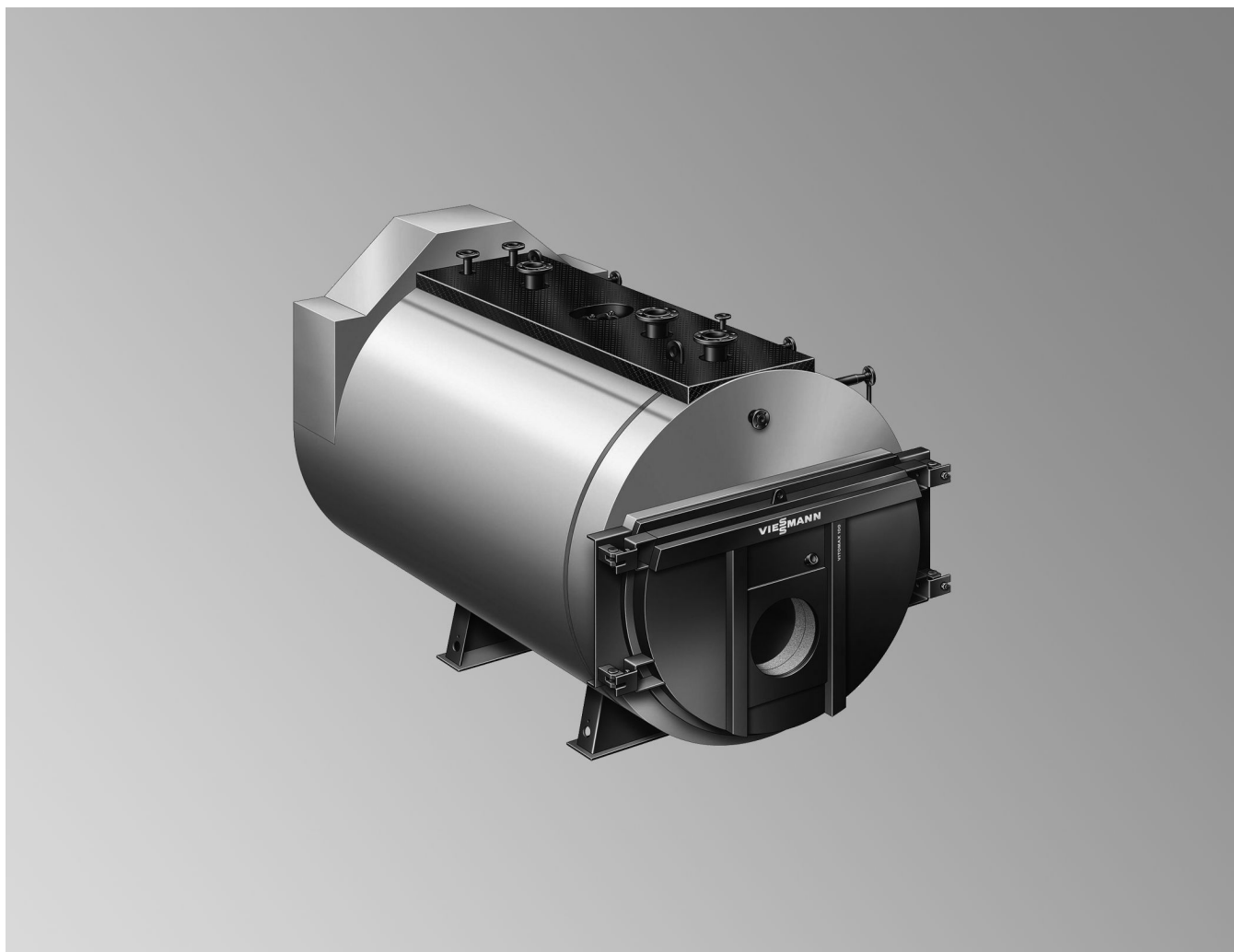


## Datasheet

**VITOMAX 100-HS** Type M33A

High pressure steam boiler

Certified in accordance with Pressure Equipment Directive 97/23/EC

Available with or without economiser

Suitable for the combustion of fuel oil and gas

Permissible operating pressure 6 to 16 bar

## General specification for the selection of a suitable burner

### Note

All diagrams are schematic.

Tab. 1

Boiler size			1	2	3	4	5	6	7	8	9	
Permiss. steam output <sup>*1</sup> at 102 °C feedwater temperature			t/h	1.0	1.3	1.7	2.1	2.7	3.5	4.4	5.4	6.4
<b>Length</b>			<b>Combustion chamber dimensions</b>									
- Flame tube length	a	mm	1500	1680	1860	2090	2250	2450	2650	2900	3300	
<b>Diameter</b>			<b>Burner connections</b>									
- Smooth pipe, internal	d1	∅ mm	670	718	789	837	883	956	1056	1133	1206	
- Corrugated pipe, internal, for 16 bar	d2	∅ mm	-	-	-	-	-	-	-	1075	1150	
Max. flame head diameter	d3	∅ mm	380	380	380	380	380	420	420	530	530	
Minimum flame head length	c	mm	350	350	350	350	400	400	425	475	475	
Axis offset	b	mm	45	50	55	60	65	70	75	80	85	
			<b>Combustion chamber volume</b>									
Flame tube (average value)		m <sup>3</sup>	0.53	0.68	0.91	1.15	1.38	1.76	2.32	2.92	3.77	

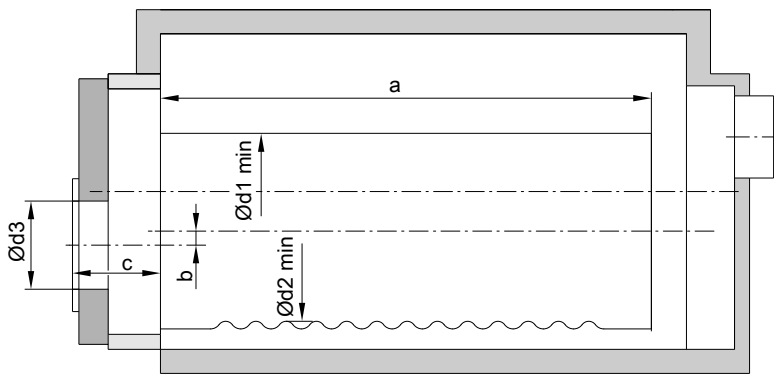


Fig. 1

### Note

The pressure stage applied determines the type of flame tube. Product-dependent tolerances are not taken into consideration.

\*1 The actual steam output may be lower, subject to the emission limits applicable at the site.

## General specification for the selection of a suitable burner (cont.)

### Determining the combustion heating output

Values as an average for all boiler sizes  
 Residual oxygen content in the flue gas 3 %  
 Combustion air temperature 25 °C  
 Feedwater temperature 102 °C

#### Note

According to the Steam Boiler Agreement 003-2011-01, the flame tube diameter limits the permissible combustion heating output for fuel oil EL.

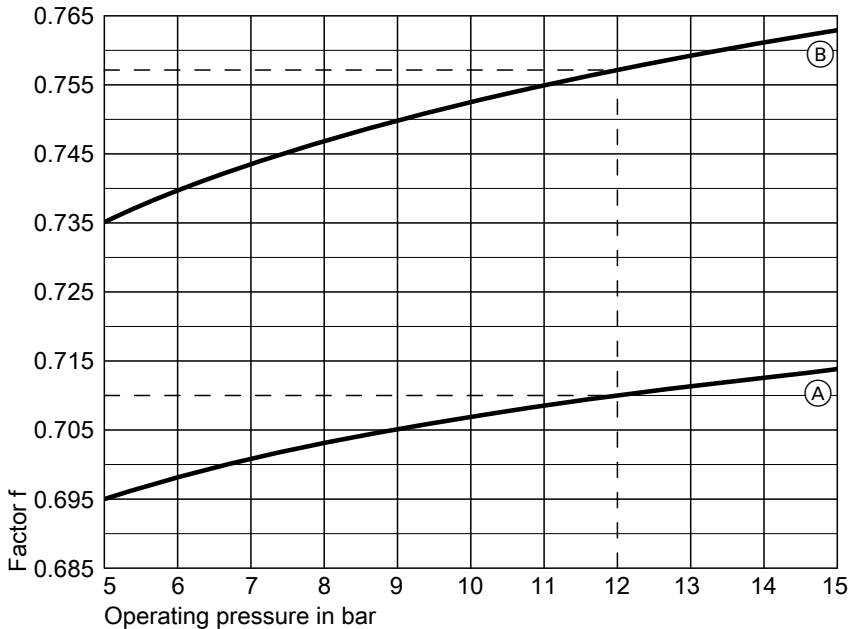


Fig. 1: Determining factor f for operation with an economiser

- Ⓐ With an ECO 100
- Ⓑ Without an economiser

Combustion heating output in kW = Factor f x steam output in kg/h

#### Example:

Steam output: 2100 kg/h  
 Operating pressure: 12 bar

1. Operation without an economiser  
 Factor f = 0.757 results in a combustion heating output = 1590 kW, curve Ⓑ at 12 bar
2. Operation with an ECO 200  
 Factor f = 0.710 results in a combustion heating output = 1491 kW, curve Ⓐ at 12 bar

Tab. 2: Max. pressure drop on the flue gas side

Boiler size		1	2	3	4	5	6	7	8	9
With an ECO 100	- for natural gas mbar	4.5	5.5	6.5	7.0	7.5	6.5	8.0	9.0	10.5
	- for fuel oil EL mbar	4.0	5.0	5.5	6.5	7.0	6.0	7.0	8.0	9.5
Without an economiser	- for natural gas mbar	5.0	6.0	7.0	8.0	8.0	7.0	8.0	10.0	11.0
	- for fuel oil EL mbar	4.5	5.5	6.5	7.5	7.5	6.5	7.0	9.0	10.0

## Specification for boilers with an ECO 100

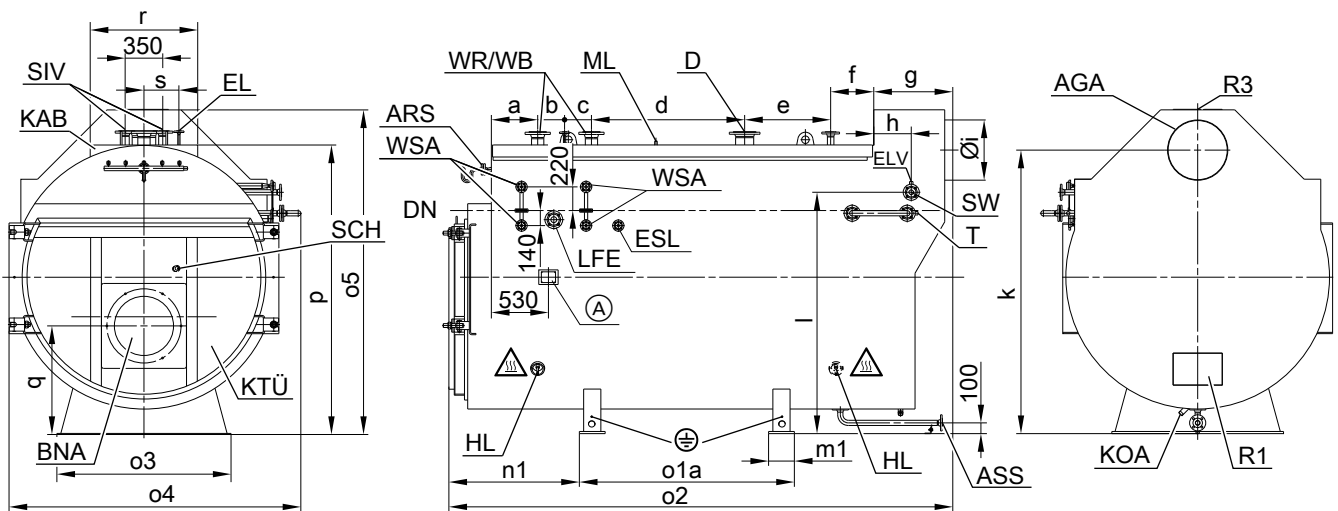



Fig. 2:  Caution – hot surface!

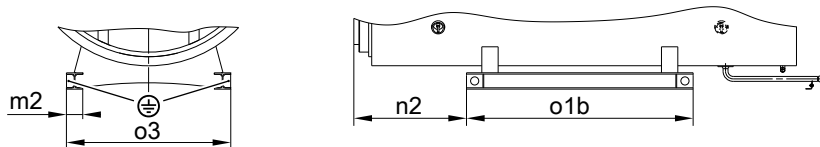


Fig. 3: Alternative boiler support version as an option

Ⓐ	Type plate	KTÜ	Boiler door
AGA	Flue outlet	LFE	Connector for conductivity electrode DN 50 PN 40
ARS	Connector for fitting assembly DN 20 PN 40	ML	Manhole 320 x 420 mm
ASS	Blow-down valve connector, up to size 6: DN 25 PN 40, from size 7: DN 40 PN 40	DN	Low water level (LWL)
BNA	Burner connection	R1	Cleaning aperture, flue gas collector
D	Steam connector	R3	Cleaning aperture, economiser
EL	Air vent valve connector DN 15 PN 40	SCH	Inspection port
ELV	Female connection for air vent valve R ½	SIV	Connector for safety valve with 1 x blank flange
ESL	Connector for TDS line DN 20 PN 40	SW	Feedwater connector
HL	Handhole 100 x 150 mm	T	Female connection G ½ for thermometer
KAB	Boiler cover	WR/WB	Connector for water level controller/limiter DN 100 PN 40
KOA	Condensate drain outlet R 1 ¼	WSA	Connector for water level indicator, 1 x blank flange DN 20 PN 40

Tab. 3: Nominal dimensions for boilers with an ECO 100\*2

Boiler size		1	2	3	4	5	6	7	8	9
a	mm	280	280	280	280	280	330	330	430	430
b	mm	150	175	225	225	225	250	250	250	250
c	mm	150	175	225	225	225	250	250	250	250
d	mm	800	900	900	1050	1100	1100	1250	1250	1425
e	mm	275	305	335	415	450	525	575	675	800
f	mm	100	100	150	150	225	250	250	300	400
g	mm	435	435	510	510	585	660	660	735	735
h	mm	161	161	161	161	161	161	161	349	349
i*3	∅ mm	216	272	306	346	392	440	490	550	550
k	mm	1803	1887	1984	2048	2160	2290	2455	2570	2655
l	mm	1583	1640	1720	1778	1848	1965	2103	2180	2263
m1	mm	180	180	180	200	200	200	200	240	240
m2	mm	100	100	100	120	120	120	120	160	160
n1	mm	707	702	747	816	896	946	1026	1116	1216
n2	mm	647	642	687	736	816	866	946	996	1096
o1a	mm	935	1125	1215	1345	1425	1525	1625	1795	1995
o1b	mm	1055	1245	1335	1505	1585	1685	1785	2035	2235
o2	mm	2447	2677	2882	3112	3406	3681	3911	4286	4686
o3	mm	1070	1120	1170	1240	1290	1380	1470	1580	1620
o4	mm	1926	2172	2074	2249	2299	2413	2613	2597	2734

\*2 Subject to technical modifications.

\*3 Internal diameter, for external diameter up to size 5: +8 mm, from size 6: +10 mm.

## Specification for boilers with an ECO 100 (cont.)

Boiler size		1	2	3	4	5	6	7	8	9
o5	mm	2020	2127	2237	2318	2465	2619	2808	2947	3030
p	mm	1850	1925	2025	2100	2200	2345	2510	2615	2700
q	mm	700	720	758	783	808	850	945	978	1010
r	mm	700	700	900	900	900	900	1000	1000	1000
s	mm	250	250	250	275	275	300	300	325	325

**Tab. 4: Boilers with an ECO 100**

Boiler size		1	2	3	4	5	6	7	8	9
<b>Permiss. steam output</b> <sup>*1</sup> at 102 °C feedwater temperature	t/h	1.0	1.3	1.7	2.1	2.7	3.5	4.4	5.4	6.4
<b>Max. combustion heating output</b> <sup>*4</sup>		See diagram 1 on page 3								
<b>CE designation</b>		See "Tested quality" on page 11								
<b>Shipping dimensions</b> incl. packaging										
- Total length	m	2.65	2.83	3.08	3.31	3.61	3.88	4.11	4.49	4.89
- Total width	m	1.95	2.20	2.10	2.28	2.32	2.44	2.64	2.62	2.76
- Total height	m	2.05	2.15	2.26	2.34	2.49	2.64	2.83	2.97	3.06
<b>Dry weight</b> <sup>*5</sup> Boiler with thermal insulation										
- for permissible operating pressure	6 bar t	1.81	2.22	2.75	3.25	3.92	4.88	5.67	6.83	8.06
	8 bar t	1.96	2.36	2.92	3.60	4.34	5.37	6.33	7.39	9.05
	10 bar t	2.08	2.62	3.22	3.85	4.74	5.73	6.94	8.14	9.80
	13 bar t	2.32	2.90	3.54	4.33	5.22	6.43	7.75	9.17	10.76
	16 bar t	2.53	3.16	4.01	4.77	5.84	7.01	8.57	10.12	12.08
<b>Boiler water content</b>										
- total	m <sup>3</sup>	1.81	2.21	2.68	3.24	3.88	4.82	5.65	6.68	7.94
- average operating range <sup>*6</sup>	m <sup>3</sup>	1.55	1.87	2.26	2.70	3.20	3.93	4.54	5.31	6.34
- steam chamber volume <sup>*6</sup>	m <sup>3</sup>	0.26	0.33	0.42	0.53	0.68	0.89	1.11	1.38	1.60
- steam level surface area <sup>*6</sup>	m <sup>2</sup>	1.70	2.01	2.36	2.78	3.21	3.79	4.36	5.04	5.85
<b>Connections for boiler with/without an economiser</b>										
- for permissible operating pressure	6 bar PN 16 DN	80	100	100	125	125	150	200	200	200
	8 bar PN 16 DN	65	80	100	100	125	125	150	150	200
	10 bar PN 16 DN	65	65	80	100	100	125	125	150	150
	13 bar PN 40 DN	50	65	65	80	100	100	125	125	125
	16 bar PN 40 DN	50	50	65	65	80	100	100	125	125
		<b>Safety valve connector</b>								
- for permissible operating pressure	6 bar PN 40 DN	25	32	32	40	40	50	50	65	65
	8 bar PN 40 DN	25	25	32	32	40	40	50	50	65
	10 bar PN 40 DN	20	25	25	32	32	40	40	50	50
	13 bar PN 40 DN	20	20	25	25	32	32	40	40	50
	16 bar PN 40 DN	20	20	20	25	25	32	32	40	40
		<b>Feedwater connector</b>								
	PN 40 DN	25	25	25	25	25	32	32	40	40
<b>Flue outlet</b> - DN external to DIN24 154-T2	mm	224	280	315	355	400	450	500	560	560
<b>Flue gas parameters</b>		See diagrams 2 and 3 on page 6								
<b>Flue gas mass flow rate</b> - for natural gas	t/h	1.5225 x combustion output in MW								
- for fuel oil EL	t/h	1.5 x combustion output in MW								
<b>Flue gas volume</b>	m <sup>3</sup>	1.1	1.4	1.8	2.1	2.6	3.4	4.5	5.5	7.0

\*1 The actual steam output may be lower, subject to the emission limits applicable at the site.

\*4 The maximum combustion heating output varies as a result of statutory emission values and the fuel used. Agree with the burner manufacturer.

\*5 Boiler dry weight varies by up to +10 % subject to manufacture.

\*6 Average water level between pump "ON" and pump "OFF".

## Specification for boilers with an ECO 100 (cont.)

### Operating pressure, efficiency and flue gas temperature with an ECO 100

Values as an average for all boiler sizes

Residual oxygen content in the flue gas 3 %

Feedwater temperature 102 °C

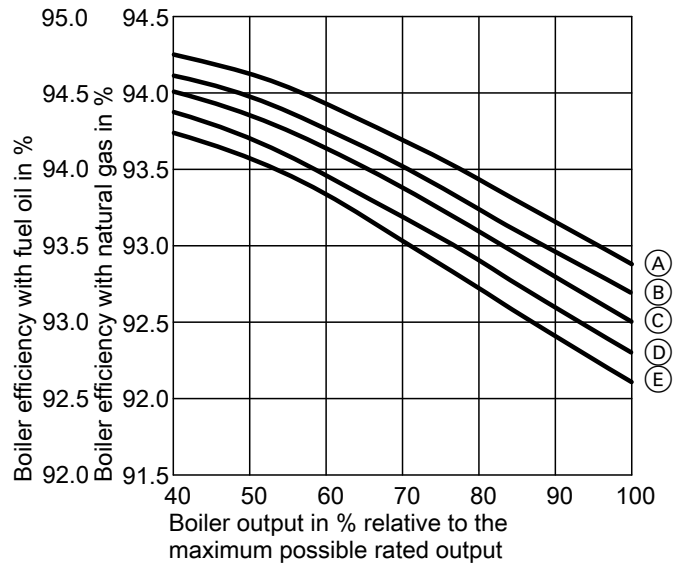


Fig. 2: Influence of the operating pressure on boiler efficiency when operating with an ECO 100

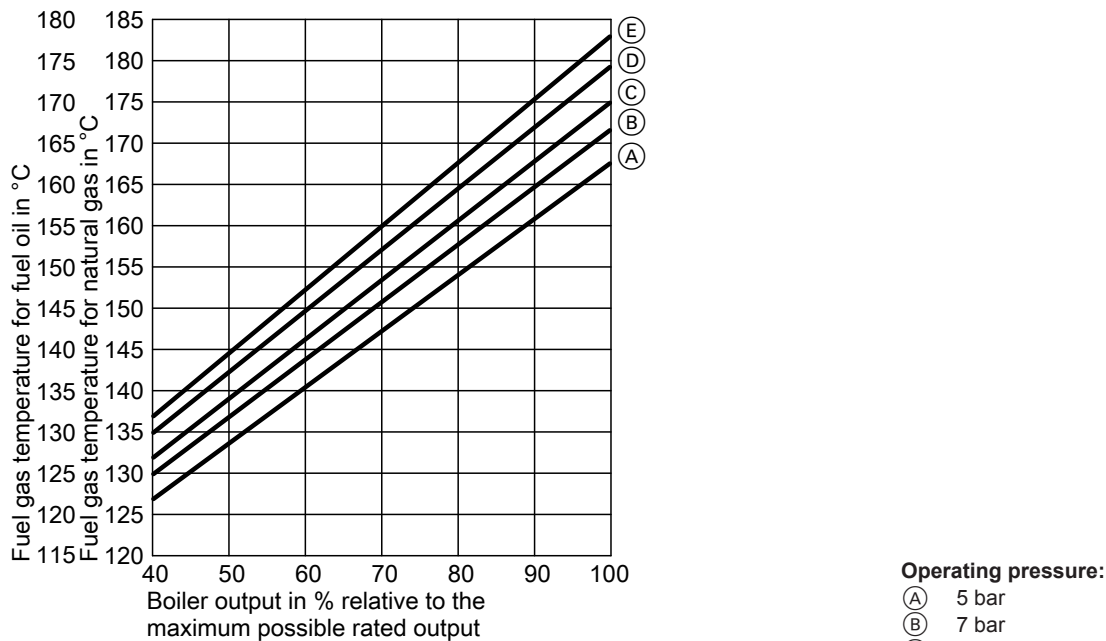


Fig. 3: Influence of the operating pressure on the flue gas temperature when operating with an ECO 100

- Operating pressure:**
- Ⓐ 5 bar
  - Ⓑ 7 bar
  - Ⓒ 9 bar
  - Ⓓ 12 bar
  - Ⓔ 15 bar

## Specification - boilers without an economiser

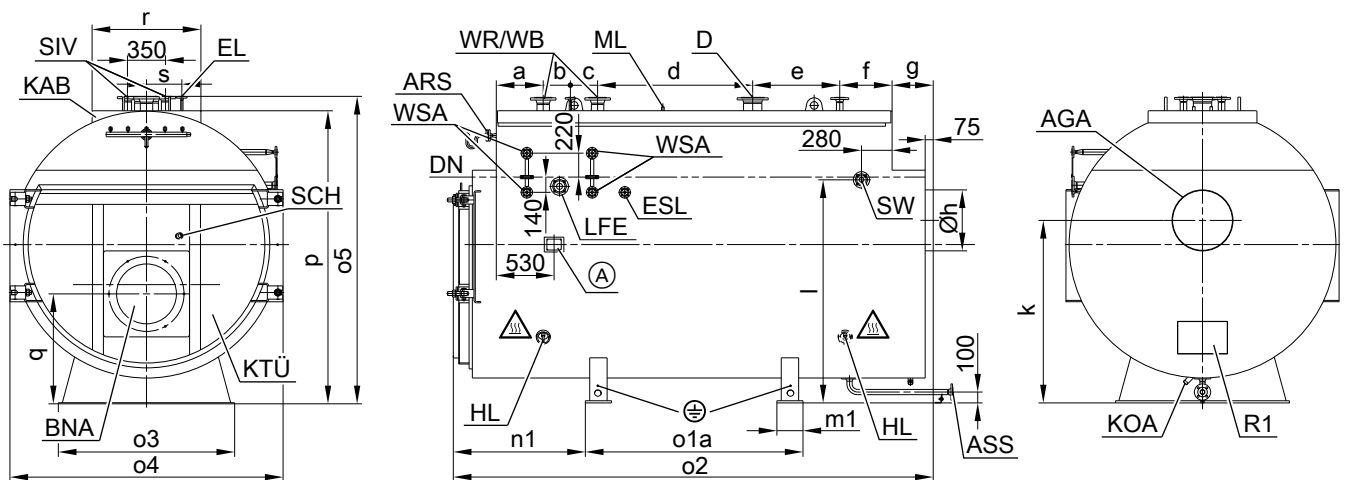


Fig. 4:  Caution – hot surface!

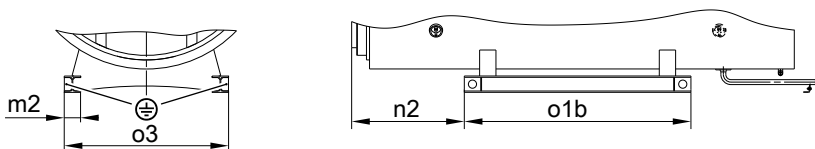


Fig. 5: Alternative boiler support version as an option

(A)	Type plate	KTÜ	Boiler door
AGA	Flue outlet	LFE	Connector for conductivity electrode DN 50 PN 40
ARS	Connector for fitting assembly DN 20 PN 40	ML	Manhole 320 x 420 mm
ASS	Blow-down valve connector, up to size 6: DN 25 PN 40, from size 7: DN 40 PN 40	DN	Minimum water level (LWL)
BNA	Burner connection	R 1	Cleaning aperture, flue gas collector
D	Steam connector	SCH	Inspection port
EL	Air vent valve connector DN 15 PN 40	SIV	Connector for safety valve with 1 x blank flange
ESL	Connector for TDS line DN 20 PN 40	SW	Feedwater connector
HL	Handhole 100 x 150 mm	WR/WB	Connector for water level controller/limiter DN 100 PN 40
KAB	Boiler cover	WSA	Connector for water level indicator, 1 x blank flange DN 20 PN 40
KOA	Condensate drain outlet R 1 ¼		

Tab. 5: Specification - boilers without an economiser\*2

Boiler size		1	2	3	4	5	6	7	8	9
a	mm	280	280	280	280	280	330	330	430	430
b	mm	150	175	225	225	225	250	250	250	250
c	mm	150	175	225	225	225	250	250	250	250
d	mm	800	900	900	1050	1100	1100	1250	1250	1425
e	mm	275	305	335	415	450	525	575	675	800
f	mm	180	180	230	230	305	330	330	380	480
g	mm	279	279	279	279	279	279	329	329	379
h*3	Ø mm	216	272	306	346	392	440	490	550	550
k	mm	1180	1210	1270	1310	1355	1445	1555	1600	1685
l	mm	1388	1445	1525	1583	1653	1770	1908	1985	2068
m1	mm	180	180	180	200	200	200	200	240	240
m2	mm	100	100	100	120	120	120	120	160	160
n1	mm	707	702	747	816	896	946	1026	1116	1216
n2	mm	647	642	687	736	816	866	946	996	1096
o1a	mm	935	1125	1215	1345	1425	1525	1625	1795	1995
o1b	mm	1055	1245	1335	1505	1585	1685	1785	2035	2235
o2	mm	2371	2551	2731	2980	3180	3380	3660	3960	4410
o3	mm	1070	1120	1170	1240	1290	1380	1470	1580	1620
o4	mm	1755	1830	1910	1985	2085	2230	2330	2435	2510
o5	mm	1975	2050	2150	2225	2325	2470	2635	2740	2825
p	mm	1850	1925	2025	2100	2200	2345	2510	2615	2700
q	mm	700	720	758	783	808	850	945	978	1010

\*2 Subject to technical modifications.

\*3 Internal diameter, for external diameter up to size 5: +8 mm, from size 6: +10 mm.

## Specification - boilers without an economiser (cont.)

Boiler size		1	2	3	4	5	6	7	8	9
r	mm	700	700	900	900	900	900	1000	1000	1000
s	mm	250	250	250	275	275	300	300	325	325

**Tab. 6: Boiler without an economiser**

Boiler size		1	2	3	4	5	6	7	8	9
Permiss. steam output* <sup>1</sup> at 102 °C feedwater temperature	t/h	1.0	1.3	1.7	2.1	2.7	3.5	4.4	5.4	6.4
Max. combustion heating output* <sup>4</sup>		See diagram 1 on page 3								
CE designation		See "Tested quality" on page 11								
Shipping dimensions incl. packaging										
- Total length	m	2.57	2.75	2.93	3.16	3.38	3.58	3.86	4.16	4.71
- Total width	m	1.80	1.87	1.95	2.02	2.11	2.25	2.35	2.45	2.55
- Total height	m	1.99	2.06	2.16	2.24	2.34	2.48	2.65	2.75	2.84
Dry weight* <sup>5</sup> boiler incl. thermal insulation										
- for permissible operating pressure	6 bar t	1.6	2.0	2.5	2.9	3.5	4.4	5.1	6.1	7.3
	8 bar t	1.7	2.1	2.6	3.3	3.9	4.9	5.7	6.7	8.3
	10 bar t	1.9	2.4	2.9	3.5	4.3	5.2	6.4	7.5	9.0
	13 bar t	2.1	2.7	3.2	4.0	4.8	5.9	7.2	8.5	10.0
	16 bar t	2.3	2.9	3.7	4.4	5.4	6.5	8.0	9.4	11.3
Boiler water content										
- total	m <sup>3</sup>	1.80	2.19	2.67	3.22	3.86	4.80	5.62	6.64	7.90
- average operating range* <sup>6</sup>	m <sup>3</sup>	1.54	1.86	2.24	2.69	3.18	3.91	4.51	5.27	6.30
- steam chamber volume* <sup>6</sup>	m <sup>3</sup>	0.26	0.33	0.42	0.53	0.68	0.89	1.11	1.38	1.60
- steam level surface area* <sup>6</sup>	m <sup>2</sup>	1.70	2.01	2.36	2.78	3.21	3.79	4.36	5.04	5.85
Connections for boiler with/without an economiser										
		<b>Steam connector</b>								
- for permissible operating pressure	6 bar PN 16 DN	80	100	100	125	125	150	200	200	200
	8 bar PN 16 DN	65	80	100	100	125	125	150	150	200
	10 bar PN 16 DN	65	65	80	100	100	125	125	150	150
	13 bar PN 40 DN	50	65	65	80	100	100	125	125	125
	16 bar PN 40 DN	50	50	65	65	80	100	100	125	125
		<b>Safety valve connector</b>								
- for permissible operating pressure	6 bar PN 40 DN	25	32	32	40	40	50	50	65	65
	8 bar PN 40 DN	25	25	32	32	40	40	50	50	65
	10 bar PN 40 DN	20	25	25	32	32	40	40	50	50
	13 bar PN 40 DN	20	20	25	25	32	32	40	40	50
	16 bar PN 40 DN	20	20	20	25	25	32	32	40	40
		<b>Feedwater connector</b>								
	PN 40 DN	25	25	25	25	25	32	32	40	40
Flue outlet- DN external to DIN24 154-T2	mm	224	280	315	355	400	450	500	560	560
Flue gas parameters		See diagrams 4 and 5 on page 9								
Flue gas mass flow rate	- for natural gas t/h - for fuel oil EL t/h	1.5225 x combustion output in MW 1.5 x combustion output in MW								
Flue gas volume	m <sup>3</sup>	1.0	1.3	1.6	1.9	2.3	3.0	4.1	4.9	6.3

\*<sup>1</sup> The actual steam output may be lower, subject to the emission limits applicable at the site.

\*<sup>4</sup> The maximum combustion heating output varies as a result of statutory emission values and the fuel used. Agree with the burner manufacturer.

\*<sup>5</sup> Boiler dry weight varies by up to +10 % subject to manufacture.

\*<sup>6</sup> Average water level between pump "ON" and pump "OFF".



## Specification - boilers without an economiser (cont.)

### Operating pressure, efficiency and flue gas temperature without an economiser

Values as an average for all boiler sizes

Residual oxygen content in the flue gas 3 %

Feedwater temperature 102 °C

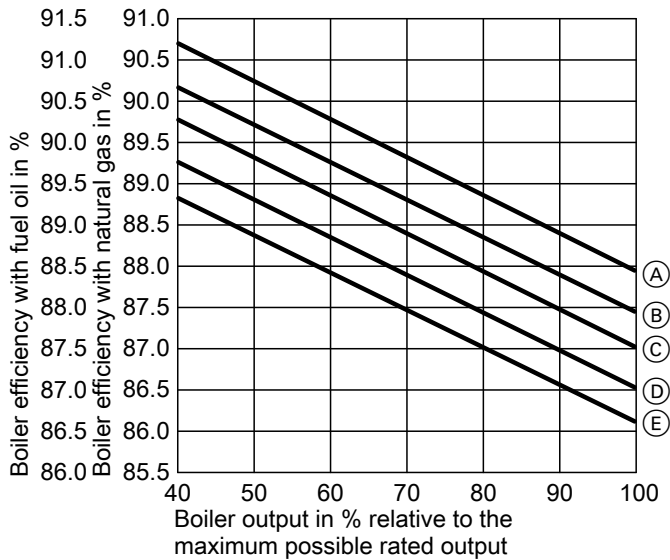


Fig. 4: Influence of the operating pressure on boiler efficiency when operating without an economiser

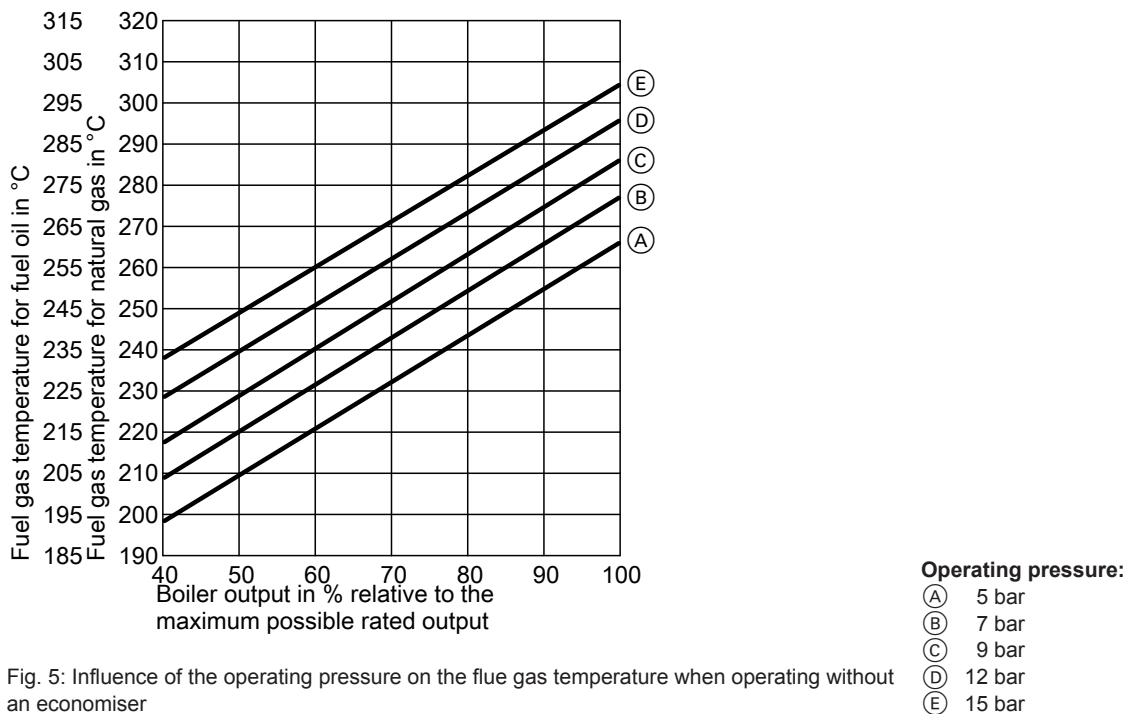


Fig. 5: Influence of the operating pressure on the flue gas temperature when operating without an economiser

## General specification

### Minimum clearances

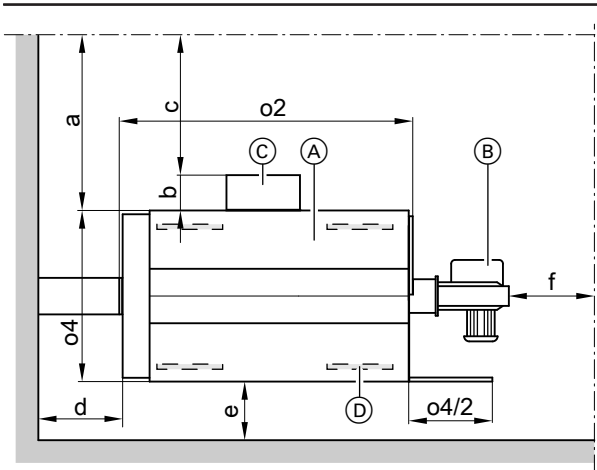


Fig. 6

- Ⓐ Boiler
- Ⓑ Burner

- Ⓒ Regulating and control system
- Ⓓ Optional: Anti-vibration boiler supports
- a Control panel, not fitted
- b Control panel depth
- c Control panel, fitted
- d,e,f Miscellaneous clearances
- o<sub>2</sub>, o<sub>4</sub> See dimensions: Max. length, max. width

Tab. 7

a/b/c	mm	≥1000/≥500/≥800
d/e/f*7	mm	≥500/≥300/≥500

Observe the specified dimensions to ensure easy installation and maintenance. **Always maintain at least the minimum clearances.** Check clearances against requirements applicable on site. Include equipment and accessories in your considerations.

### Installation conditions

- Prevent air contamination through halogenated hydrocarbons. These may be found, for example, in sprays, paints, solvents and cleaning agents.
- Avoid very dusty conditions.
- Avoid high levels of humidity.
- Install the boiler in an area free from the risk of frost that is adequately ventilated.
- Install the boiler on a level surface.

Failure to observe the above conditions can result in faulty operation and damage to the system.

If air contamination through **halogenated hydrocarbons** cannot be reliably prevented on site, ensure an adequate supply of uncontaminated combustion air.

### Delivered condition

#### Boilers are delivered with the following:

- Thermal insulation
- Fitting assembly
- Blank flanges for connectors that are not required
- Sight glass
- Burner plate (supplied separately)
- Insulation material for sealing the flame head
- Installation protection and possibly shipping packaging

#### Boilers with an economiser are additionally supplied with the following:

- Feedwater line with thermal insulation
- Flue gas hood with thermal insulation

### Design information

#### Burner selection and mounting

##### Note

See chapter "**General technical details on the selection of a suitable burner**" and burner specification.

The following are critical for selecting a suitable burner:

- The burner must be suitable for the intended rated heating output and the pressure drop on the hot gas side of the boiler.
- The burner head must be suitable for operating temperatures of at least 500 °C.

##### Note

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

#### The following are required for pressure-jet oil burners:

- Testing and identification to EN 267

#### The following are required for pressure-jet gas burners:

- Testing to EN 676
- CE designation to Directive 2009/142/EC

\*7 **Information on the trouble-free extraction of the turbulators, if fitted and cleaning:** Leave one boiler length of space clear in front of the boiler door.

## Design information (cont.)

### Burner connection

#### Note

*The burner plate can be prepared at the factory. If that is required and the burner is not being supplied by Viessmann: Specify the burner make and boiler type when ordering.*

Alternatively, make the burner tube aperture and fixing holes in the blank burner plate on site. Then mount the burner on the boiler.

### Burner adjustment

Adjust the maximum oil or gas throughput of the burner to suit the rated boiler heating output.

---

## Fuels

### Oil

- Fuel oil EL to DIN 51603 part 1.

Alternative fuels on request.

### Gas

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

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## Tested quality

 The CE designation is compliant with current EC Directives.

Subject to technical modifications.

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