

# Technical Data Manual

Model Nos. and pricing : See Price List

# VIESSMANN®



## VITOCROSSAL 300

Gas-fired Condensing Boiler

2500 to 6000 MBH (733 to 1758 kW)



*Product may not be exactly as illustrated.*

### Vitocrossal 300

#### CA3B Series 2.5, 3.0, 3.5, 4.0, 5.0 and 6.0

High efficiency, gas-fired condensing boiler with pre-mix modulating cylinder burners for natural gas (NG) or liquid propane gas (LPG), with Inox-Lamellar heat exchanger made of high-grade SA 240-316 Ti stainless steel.

For operation without low limit on boiler return water temperature.

For closed loop hot water heating systems with maximum supply water temperatures of 210°F (99°C) for a maximum operating pressure of 160 psig.

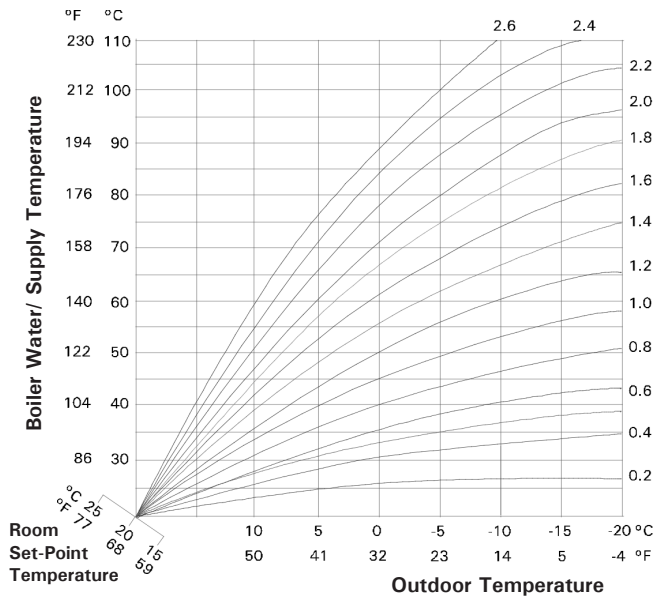
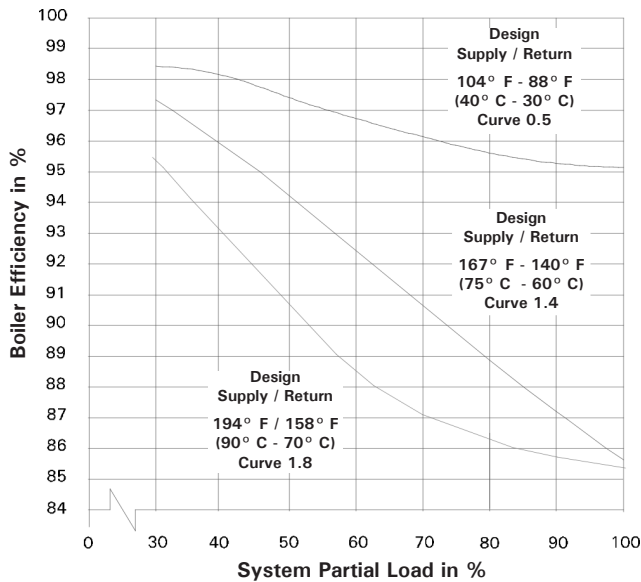
Heating input: 2500 to 6000 MBH  
(733 to 1758 kW)



# Vitocrossal 300

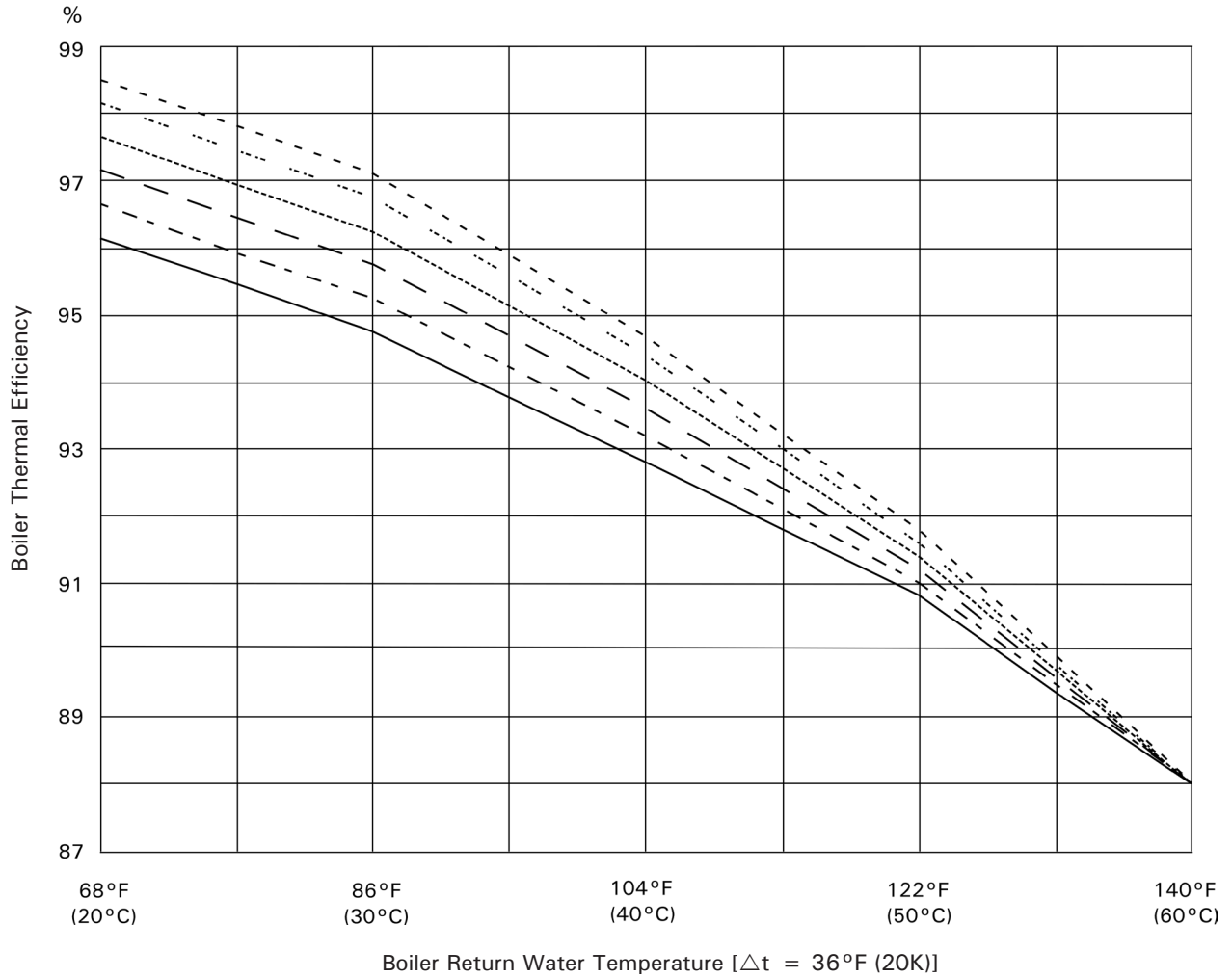
**Benefits at a glance:**

- Low emissions and quiet operation from fully-modulating Viessmann pre-mix cylinder burners (up to 3 per boiler).
- Inox-Lamellar heat exchanger surface made of high-grade SA 240-316 Ti stainless steel for high operational reliability and long service life.
  - Easy dispersal of condensate through vertical gas flues; therefore no concentration of condensate.
  - Increased self-cleaning effect through smooth stainless steel surfaces.
- Easy installation and elimination of wiring mistakes with Viessmann pre-wired plug-in system.
- Pre-mix cylinder burners for environmentally-friendly operation with a modulation range up to 16:1.
- All hydronic connections are fitted from the rear of the boiler.
- Easy handling in boiler rooms through particularly compact size.
- Economical and safe heating system operation through Vitotronic digital control system with communication capability. Tailored to every need, covering all known control strategies and applications. Standard LON BUS for complete integration into building management systems.
- Efficiency up to 98% through intensive condensation. The flue gas temperature is only approximately 9°F-27°F (5°C-15°C) above boiler return temperature.
- Clean combustion - through perfect match of burner and boiler, low combustion chamber loading and straight-through combustion chamber.
- Particularly quiet operation.
- High altitude operation up to 10,000 ft. (3000 m) with a simple electronic adjustment.
- Large water content extends burner run time and reduces cycling.



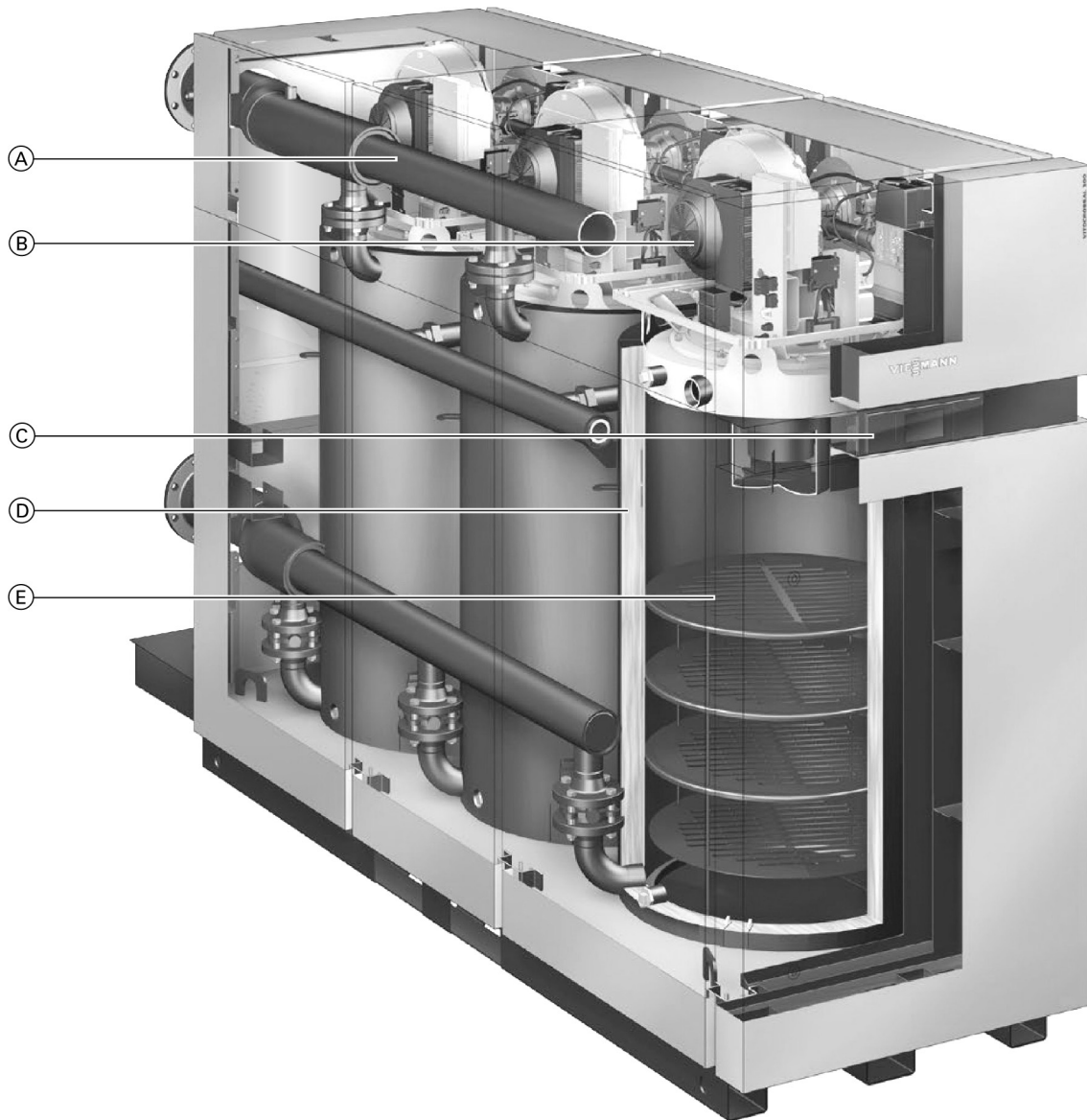
Vitocrossal 300 CA3B boiler efficiency dependent on system heating water return temperatures and load conditions

**Vitocrossal 300** *(continued)*



- - - - - 7% Modulation Rate
- - - - - 20% Modulation Rate
- ..... 40% Modulation Rate
- . - . - 60% Modulation Rate
- - - - - 80% Modulation Rate
- 100% Modulation Rate

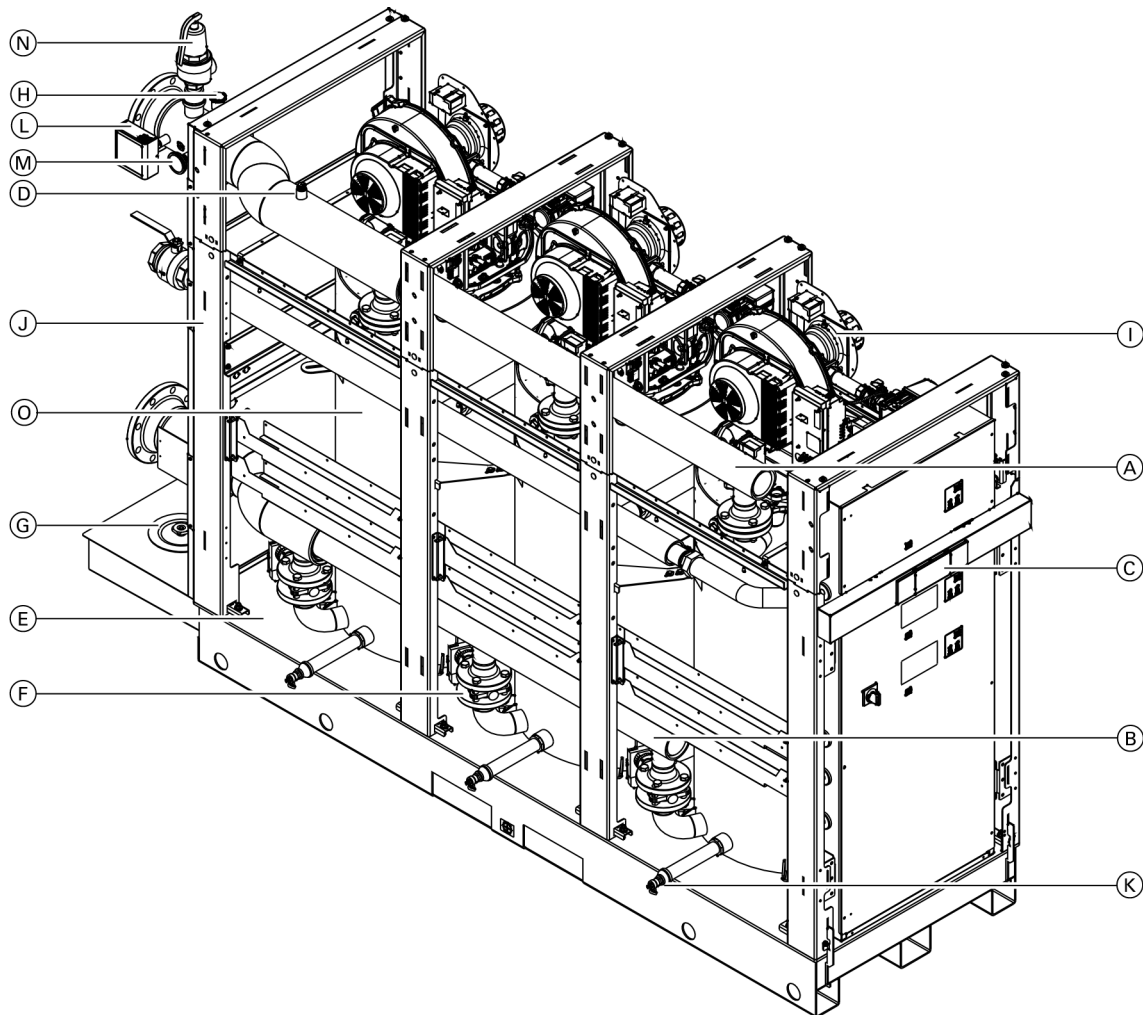
**Cutaway Section**



**Legend**

- (A) Wide water passageways with low pressure drop
- (B) Fully-modulating pre-mix cylinder burners
- (C) Vitotronic 300, GW6C boiler and heating system control
- (D) Highly effective thermal insulation
- (E) Inox-Lamellar heat exchanger surfaces

# Overview of Components



**Legend**

- (A) Supply header
- (B) Return header
- (C) Vitotronic 300 GW6C
- (D) Common supply water temperature limit switch 210°F (99°C)
- (E) Common flue gas temperature limit switch
- (F) Boiler section isolation valves
- (G) Flue gas collector cleanout and inspection port
- (H) Air vent
- (I) Viessmann cylinder burner (1 per section)
- (J) 160 psi maximum operating pressure
- (K) Boiler drains
- (L) Low water cutoff
- (M) Pressure and temperature gauge
- (N) Pressure relief valve
- (O) Boiler heat exchanger

**Technical Data**

Boiler Model	CA3B	2.5	3.0	3.5	4.0	5.0	6.0	
Input	MBH	2500	3000	3500	4000	5000	6000	
	(kW)	(733)	(879)	(1026)	(1172)	(1465)	(1758)	
Minimum Input NG	MBH	250	300	300	400	300	400	
	(kW)	(73)	(88)	(88)	(117)	(88)	(117)	
Minimum Input LPG	MBH	495	495	495	660	495	660	
	(kW)	(145)	(145)	(145)	(193)	(145)	(193)	
Output (thermal efficiency)	MBH	2402	2883	3363	3844	4805	5766	
	(kW)	(703)	(844)	(985)	(1126)	(1408)	(1689)	
Output (combustion efficiency)	MBH	2352	2823	3294	3764	4705	5646	
	(kW)	(689)	(827)	(965)	(1103)	(1379)	(1655)	
Net AHRI Rating	MBH	2089	2506	2924	3342	4178	5013	
	(kW)	(611)	(734)	(856)	(979)	(1224)	(1469)	
Combustion efficiency *1	%	94.1	94.1	94.1	94.1	94.1	94.1	
Thermal efficiency *1	%	96.1	96.1	96.1	96.1	96.1	96.1	
NG Supply Pressure	"w.c. (max.)	14	14	14	14	14	14	
	"w.c. (min.)	4	4	4	4	4	4	
LPG Supply Pressure	"w.c. (max.)	14	14	14	14	14	14	
	"w.c. (min.)	10	10	10	10	10	10	
Power Supply	Voltage	120	120	120	120	208*2	208*2	
	Phase	1	1	1	1	3	3	
	Hz	60	60	60	60	60	60	
	Amp.	20	20	20	20	20	20	
Overall Boiler Length (including insulation and jacketing)	in.	88¾	88¾	99½	99½	136	136	
	(mm)	(2251)	(2251)	(2526)	(2526)	(3449)	(3449)	
Overall Boiler Width (including insulation and jacketing)	in.	34	34	39½	39½	39½	39½	
	(mm)	(860)	(860)	(1000)	(1000)	(1000)	(1000)	
Overall Boiler Height *4 (including insulation and jacketing)	in.	78¾	78¾	84	84	84	84	
	(mm)	(2000)	(2000)	(2131)	(2131)	(2131)	(2131)	
Concrete boiler base *3	Length	in.	74 ¾	74 ¾	82¾	82¾	114¼	114¼
		(mm)	(1900)	(1900)	(2100)	(2100)	(2900)	(2900)
	Width	in.	34	34	39½	39½	39½	39½
Thickness	(mm)	(860)	(860)	(1000)	(1000)	(1000)	(1000)	
	in.	4	4	4	4	4	4	
(mm)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	
Weight	Complete with the burners, control, thermal insulation and jacketing	lb.	4233	4233	4696	4806	6261	6894
		(Kg)	(1920)	(1920)	(2130)	(2180)	(2840)	(3127)

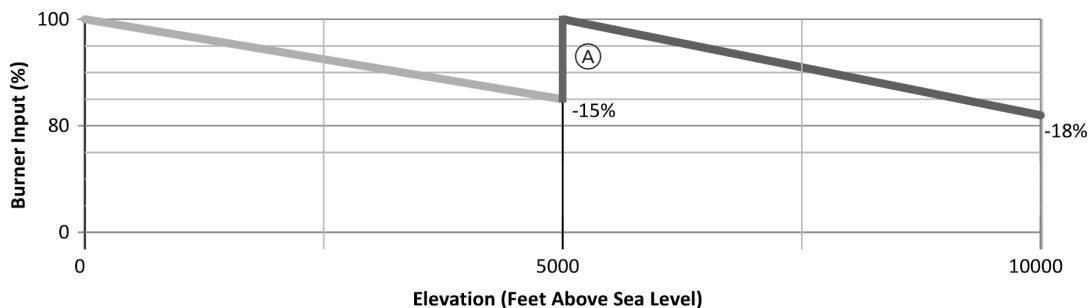
\*1 Tested to ANSI/AHRI standard 1500 Performance Rating of Commercial Space Heating Boilers / DOE Test Procedure 81 FR 89276 / U.S. Standards ANSI Z21.13/CSA 4.9 / AHRI, BTS-2000 Testing Standard Method to determine the efficiency of Commercial Heating Boilers.

\*2 Requires 208Y/120VAC - 3 phase- 60 Hz - 4 wire (L1, L2, L3, N, G) power supply.

\*3 Concrete boiler pad is required for all installations (refer to page 10 for additional information).

\*4 Does not include the concrete boiler pad or seismic brackets.

**Note:** For altitude operation up to 4,999 feet, derate the input capacity by 3%/1000 ft. For operation from 5,000 to 10,000 feet, with the electronic altitude adjustment made, derate the input capacity by an additional 0.6%/1000 ft. for a total derate of 18%.



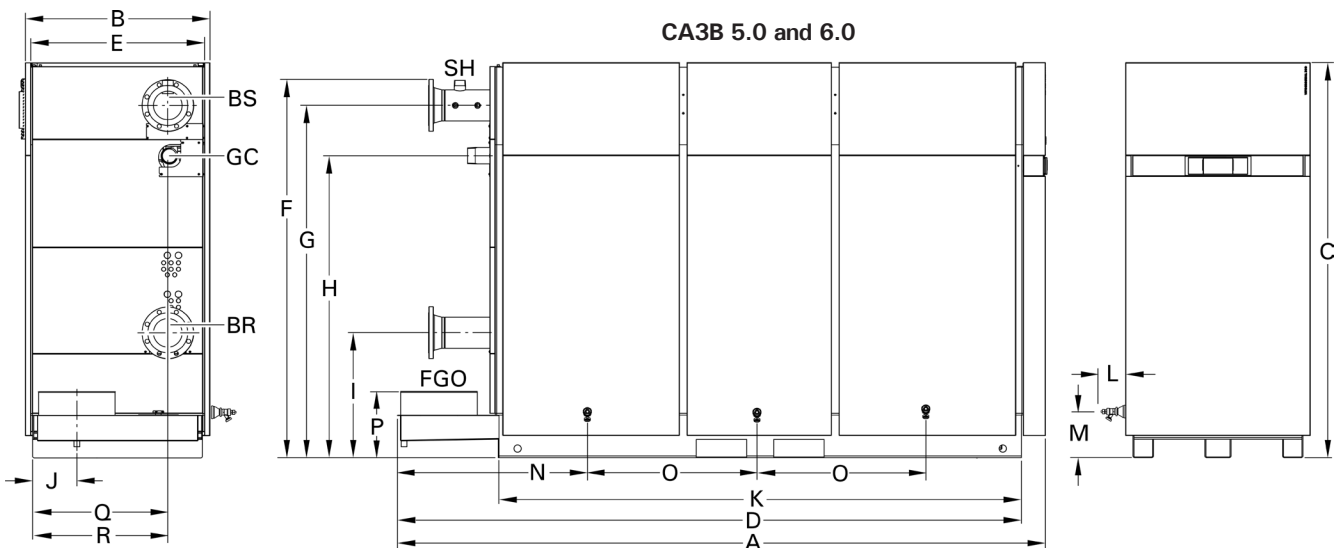
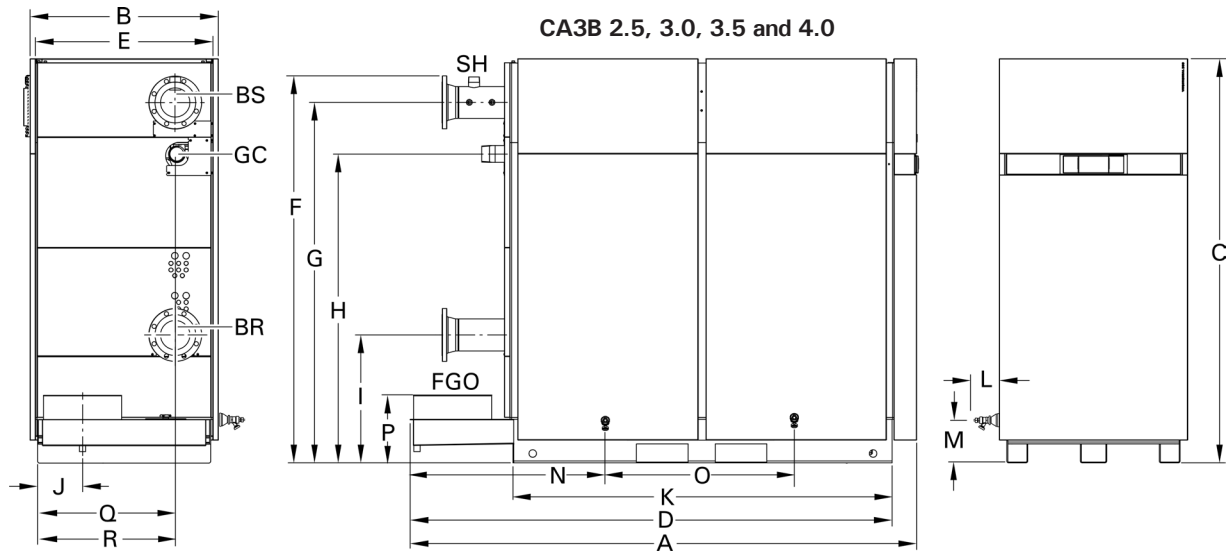
(A) Input capacity after electronic altitude adjustment is made.

**Technical Data** *(continued)*

<b>Boiler Model</b>	<b>CA3B</b>	<b>2.5</b>	<b>3.0</b>	<b>3.5</b>	<b>4.0</b>	<b>5.0</b>	<b>6.0</b>
<b>Boiler Water Content</b>	USG (L)	108 (410)	108 (410)	151 (570)	143 (540)	227 (860)	218 (825)
<b>Heat Exchanger Surface</b>	ft. <sup>2</sup> (m <sup>2</sup> )	142.7 (13.3)	142.7 (13.3)	170.2 (15.8)	192.5 (17.9)	244.1 (22.7)	288.8 (26.8)
<b>Maximum Operating Temperature</b>	°F (°C)	210 (99)	210 (99)	210 (99)	210 (99)	210 (99)	210 (99)
<b>Maximum Adjustable High Limit</b>	°F (°C)	203 (95)	203 (95)	203 (95)	203 (95)	203 (95)	203 (95)
<b>Maximum Operating Pressure</b>	psig (bar)	160 (11)	160 (11)	160 (11)	160 (11)	160 (11)	160 (11)
<b>Min. Pressure Relief Valve Capacity</b>	lbs/h	2205	2646	3086	3527	4409	5280
<b>Boiler Connections</b>							
<b>Boiler supply and return</b> (BS), (BR) (ANSI flanges)	in. (mm)	4 (100)	4 (100)	4 (100)	4 (100)	4 (100)	6 (150)
<b>Safety supply</b>	in.	2	2	2	2	2	2
<b>Boiler drain</b>	in.	2@1½	2@1½	2@1½	2@1½	3@1½	3@1½
<b>Condensate drain</b> (barbed fitting)	in.	¾	¾	¾	¾	¾	¾
<b>Gas connection</b>	in.	2½	2½	2½	2½	3	3
<b>Boiler flue collar</b>							
Internal diameter	in. (mm)	10 (254)	10 (254)	12 (306.8)	12 (306.8)	16 (408.4)	16 (408.4)
<b>Combustion Air</b>							
Internal diameter (for direct vent sealed combustion using the combustion air intake kit optional accessory)	in. (mm)	10 (254)	10 (254)	12 (306.8)	12 (306.8)	16 (408.4)	16 (408.4)
<b>Flue Gas Values</b>							
Temperature (at a return temperature of 86°F (30°C) <b>at rated input</b>	°F (°C)	113 (45)	113 (45)	117 (47)	117 (47)	122 (50)	122 (50)
<b>at partial load</b>	°F (°C)	91 (33)	91 (33)	91 (33)	91 (33)	91 (33)	91 (33)
Temperature (at a return temperature of 140°F (60°C) <b>at rated input</b>	°F (°C)	167 (75)	167 (75)	162 (72)	162 (72)	167 (75)	167 (75)
Mass flow rate (of flue gas) <b>at rated input</b>	lbs/h (kg/h)	2216 (1007)	2656 (1205)	3109 (1410)	3549 (1610)	4442 (2015)	5324 (2415)
<b>at partial load</b>	lbs/h (kg/h)	267 (121)	320 (145)	320 (145)	425.5 (193)	320 (145)	425.5 (193)
<b>Max. Condensate Flow Rate</b> for NG and LPG	USG/h (L/h)	24 (91)	29 (109)	34 (129)	38 (144)	48 (182)	58 (220)
<b>Pressure</b>							
at boiler flue outlet	pa (max.)	100	100	100	100	100	100
at rated input	"w.c. (max.)	0.4	0.4	0.4	0.4	0.4	0.4
<b>Standby Loss</b>							
At boiler water temperature 158°F (70°C) [room temperature 68°F (20°C)]	BTU/h (W) %	6227 (1825) 0.25	7469 (2197) 0.25	8750 (2564) 0.25	10000 (2931) 0.25	12500 (3663) 0.25	15000 (4396) 0.25
NOx @3% O <sub>2</sub> *5		< 20 ppm					

\*5 For operation with natural gas, field setup and adjustment is required to achieve the stated value. Adjustment may cause a boiler derate of up to 20%.

**Boiler Dimensions**



**Dimensions**

Boiler Model	2.5 and 3.0	3.5 and 4.0	5.0 and 6.0
A	in. (mm) 88¾ (2251)	99½ (2526)	136 (3449)
B	in. (mm) 34 (860)	39½ (1000)	39½ (1000)
C*1	in. (mm) 78¾ (2000)	84 (2131)	84 (2131)
D	in. (mm) 85½ (2168)	96½ (2453)	133 (3376)
E	in. (mm) 31½ (800)	37 (936)	37 (936)
F*1	in. (mm) 73¾ (1874)	79 (2006)	5.0 - 79¼ (2011) 6.0 - 79¾ (2027)
G*1	in. (mm) 69¼ (1760)	74½ (1892)	5.0 - 74¾ (1897) 6.0 - 74¼ (1887)
H*1	in. (mm) 53½ (1360)	55½ (1413)	55½ (1413)
I*1	in. (mm) 26¼ (666)	26¼ (665)	26¼ (665)
J	in. (mm) 12¾ (325)	9¾ (248)	9¾ (248)
K	in. (mm) 71½ (1813)	79¼ (2013)	111¼ (2823)

**Dimensions**

Boiler Model	2.5 and 3.0	3.5 and 4.0	5.0 and 6.0
L	in. (mm) 6 (152)	6 (152)	6 (152)
M*1	in. (mm) 11¾ (299)	11¾ (299)	11¾ (299)
N	in. (mm) 35 (889)	40 (1015)	44 (1118)
O	in. (mm) 28½ (720)	32¼ (820)	32¼ (820)
P*1	in. (mm) 14 (357)	14 (357)	14 (357)
Q*2	in. (mm) 27¼ (693)	32¼ (818)	5.0 - 32¼ (818) 6.0 - 28¾ (728)
R*3	in. (mm) 26¾ (682)	32 (811)	32 (811)

**Note:** dimensional tolerance of ± ¼ in. (± 5 mm)

**Legend**

- SH Safety Header
- BS Boiler Supply
- GC Gas Connection
- BR Boiler Return
- FGO Flue Gas Outlet (vent pipe connection)

\*1 Heights do not include the concrete pad or seismic brackets. Seismic brackets will add 2¾ inches (60 mm) (refer to page 10).

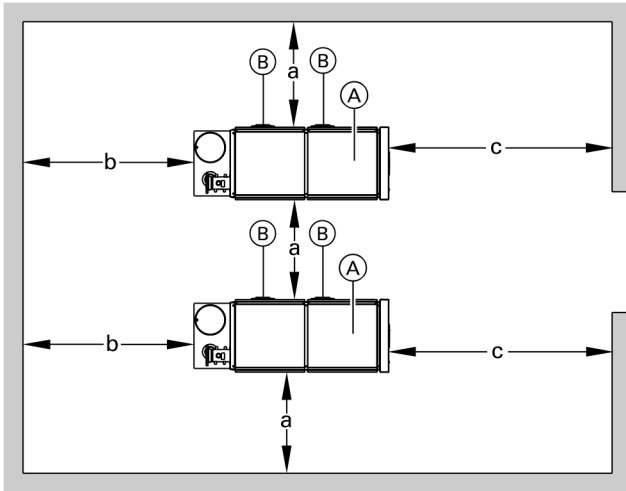
\*2 Applies to BR and BS

\*3 Applies to GC

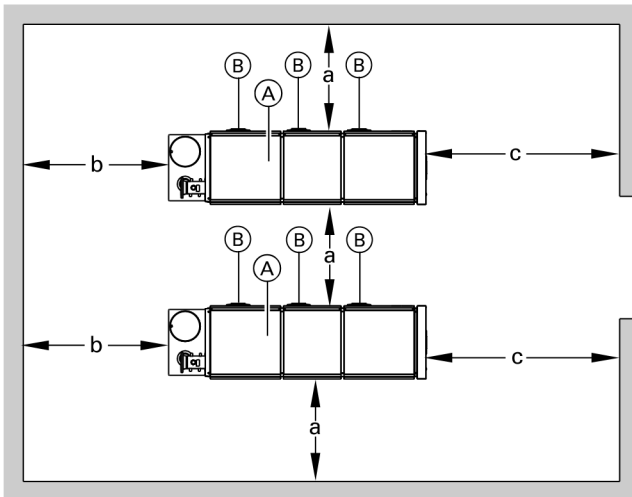


## Recommended Minimum Service Clearances

CA3B 2.5, 3.0, 3.5 and 4.0



CA3B 5.0 and 6.0



**Legend**

- (A) Boiler
- \*1 Clearance for vent pipe installation.
- (B) Combustion air intake vent

To enable convenient installation and maintenance, observe the stated clearance dimensions. Maintain the minimum clearances where space is tight.

CA3B Model	2.5	3.0	3.5	4.0	5.0	6.0
a in. (mm)	31½ (800)	31½ (800)	31½ (800)	31½ (800)	31½ (800)	31½ (800)
b*1 in. (mm)	31½ (800)	31½ (800)	31½ (800)	31½ (800)	31½ (800)	31½ (800)
c in. (mm)	29½ (750)	29½ (750)	29½ (750)	29½ (750)	29½ (750)	29½ (750)
Top clearance	31½ (800)	31½ (800)	31½ (800)	31½ (800)	31½ (800)	31½ (800)

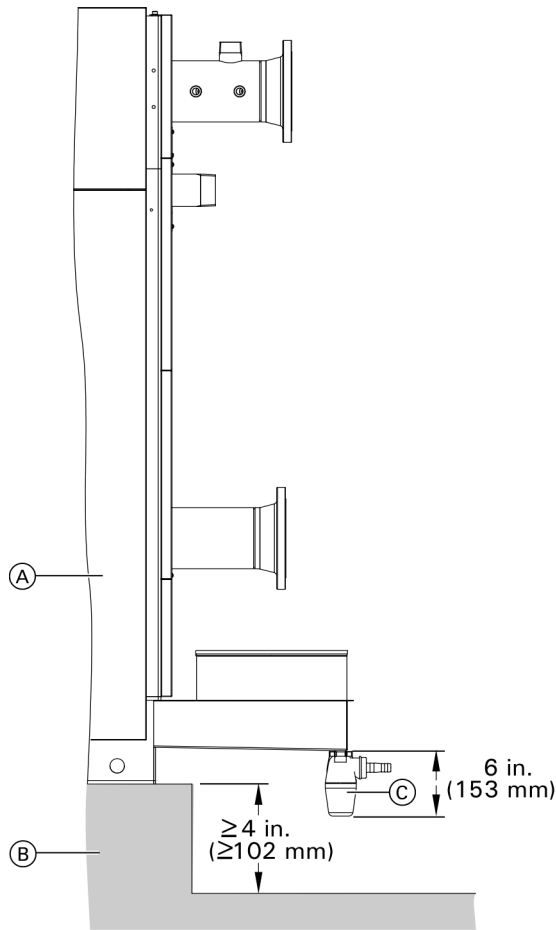
**Mechanical room**

- Avoid air contamination by halogenated hydrocarbons (e.g. as in sprays, paints, solvents and cleaning agents)
- Avoid very dusty conditions
- Avoid high levels of humidity
- Protect against frost and ensure good ventilation, otherwise the system may suffer faults and damage. In rooms where air contamination from halogenated hydrocarbons is to be expected, operate the boiler using only direct vent (sealed combustion) operation only.

**Minimum clearances to combustibles**

CA3B Model	2.5	3.0	3.5	4.0	5.0	6.0
Top	0					
Sides	0					
Flue	per vent manufacturer's specifications					
Front	0					
Floor	combustible					

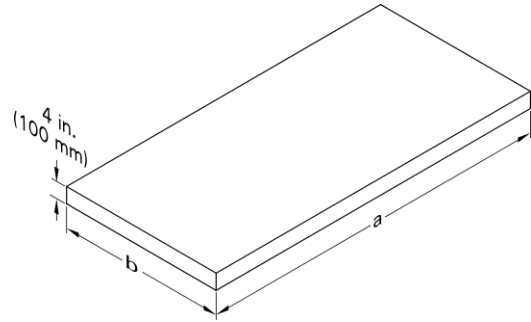
**Recommended Minimum Service Clearances** *(continued)*



**Legend**

- Ⓐ Boiler
- Ⓑ Concrete pad
- Ⓒ Condensate siphon

**Concrete pad**



**Without seismic feet**

CA3B Model	2.5	3.0	3.5	4.0	5.0	6.0
a in. (mm)	74 <sup>3</sup> / <sub>4</sub> (1900)	74 <sup>3</sup> / <sub>4</sub> (1900)	82 <sup>3</sup> / <sub>4</sub> (2100)	82 <sup>3</sup> / <sub>4</sub> (2100)	114 <sup>1</sup> / <sub>4</sub> (2900)	114 <sup>1</sup> / <sub>4</sub> (2900)
b in. (mm)	34 (860)	34 (860)	39 <sup>1</sup> / <sub>2</sub> (1000)	39 <sup>1</sup> / <sub>2</sub> (1000)	39 <sup>1</sup> / <sub>2</sub> (1000)	39 <sup>1</sup> / <sub>2</sub> (1000)

**With seismic feet**

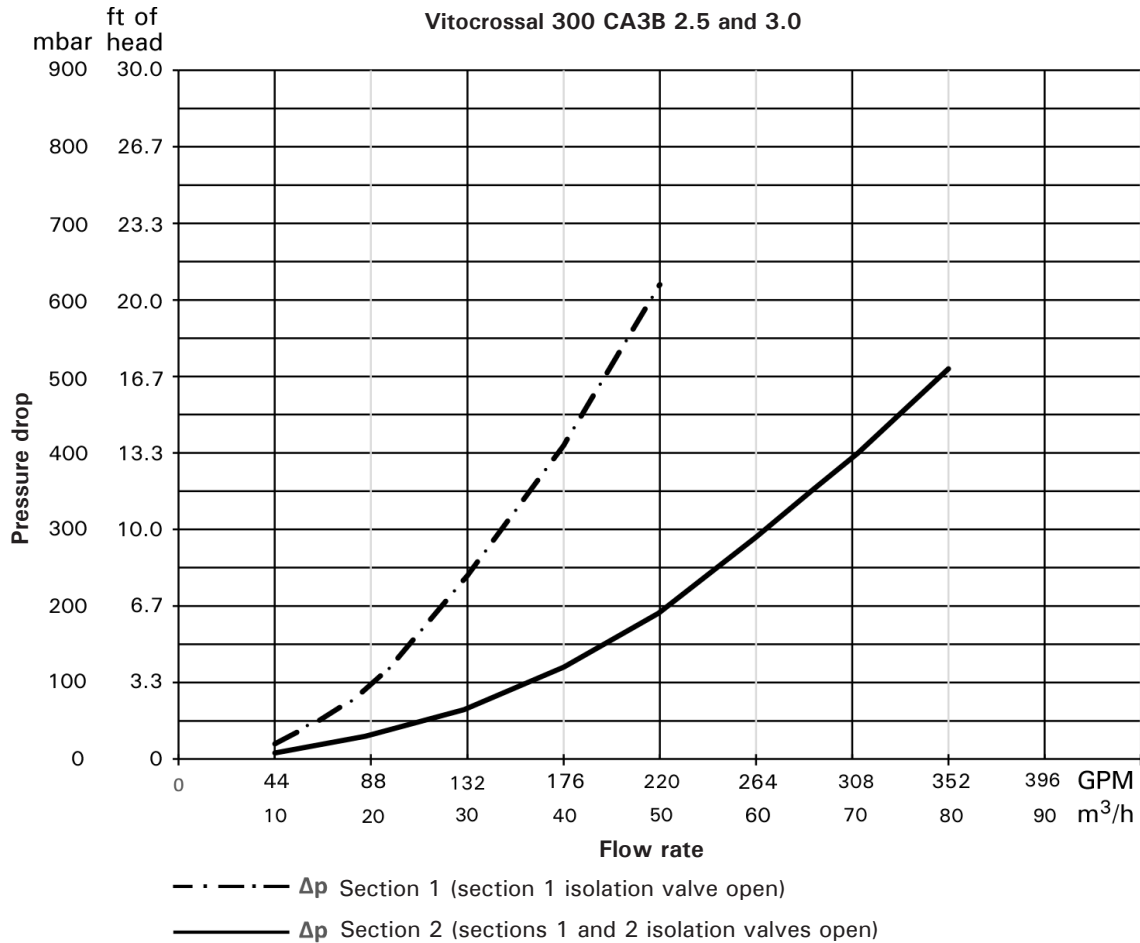
CA3B Model	2.5	3.0	3.5	4.0	5.0	6.0
a in. (mm)	85 <sup>1</sup> / <sub>4</sub> (2165)	85 <sup>1</sup> / <sub>4</sub> (2165)	94 (2388)	94 (2388)	125 (3175)	125 (3175)
b in. (mm)	48 <sup>1</sup> / <sub>4</sub> (1225)	48 <sup>1</sup> / <sub>4</sub> (1225)	53 (1346)	53 (1346)	53 (1346)	53 (1346)

**Note:** The boiler must be installed on a concrete pad to allow accessibility for the condensate siphon connection.

## Flow Rate

### Pressure drop (primary circuit)

The Vitocrossal 300, CA3B is only suitable for fully pumped hot water heating systems.



### Flow Rates CA3B

CA3B model		2.5	3.0
16°F $\Delta t$	GPM	300	360
20°F $\Delta t$	GPM	240	288
40°F $\Delta t$	GPM	120	144
100°F $\Delta t$	GPM	48	58
9°C $\Delta t$	m <sup>3</sup> /h	68.1	81.8
11°C $\Delta t$	m <sup>3</sup> /h	54.5	65.4
22°C $\Delta t$	m <sup>3</sup> /h	27.3	32.7
56°C $\Delta t$	m <sup>3</sup> /h	10.9	13.2

**Note:** The graph line for section 2 shows the maximum flow-pressure drop used for flow calculation or equipment such as pump selection. The other graph line is provided for reference only.

$\Delta t$  = temperature difference

This boiler does not require a flow switch.

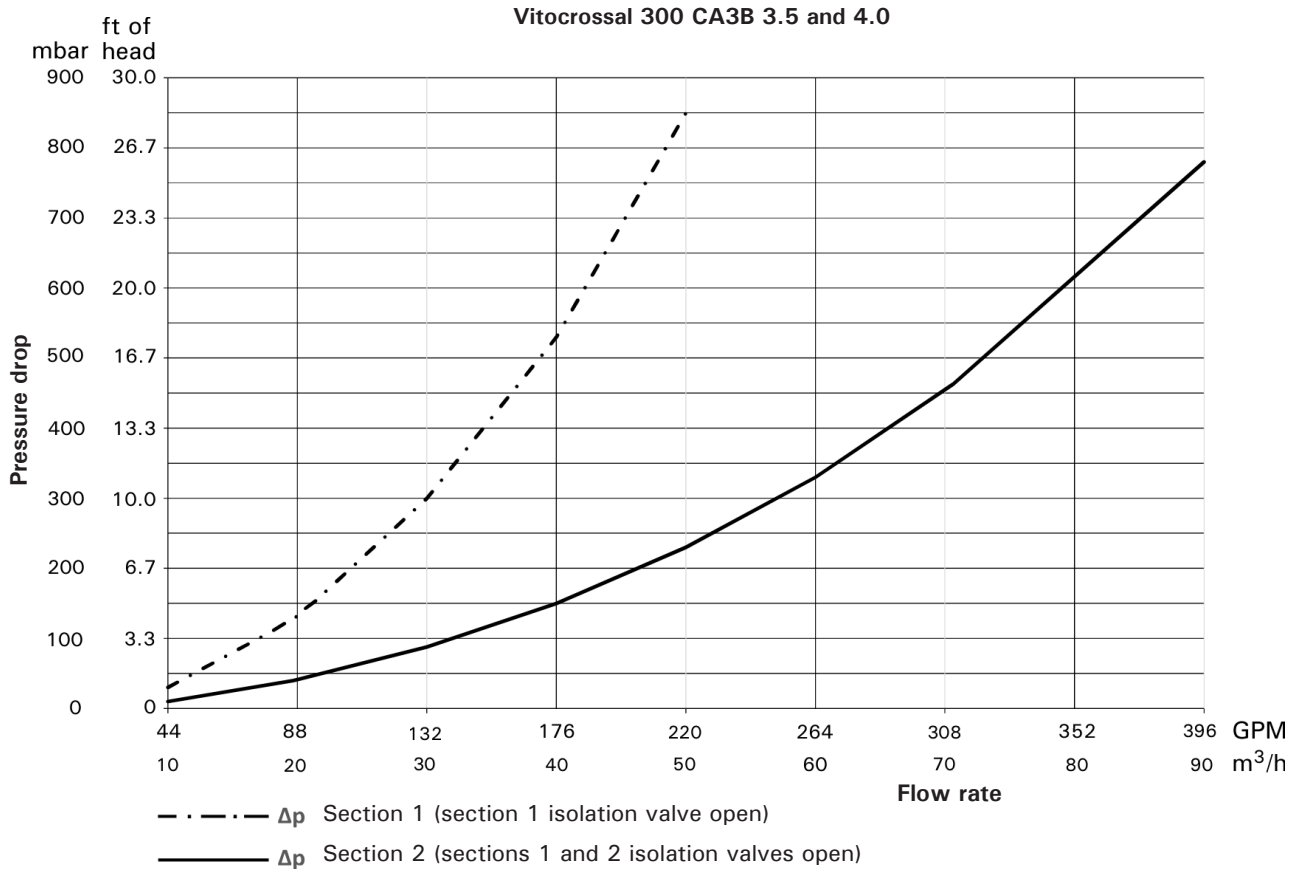
Minimum required flow rate based on: 100°F  $\Delta t$  (56°C  $\Delta t$ )

Maximum flow rate based on: 16°F  $\Delta t$  (9°C  $\Delta t$ )

**Flow Rate**

**Pressure drop (primary circuit)**

The Vitocrossal 300, CA3B is only suitable for fully pumped hot water heating systems.



**Flow Rates CA3B**

CA3B model		3.5	4.0
16°F Δt	GPM	420	480
20°F Δt	GPM	336	384
40°F Δt	GPM	168	192
100°F Δt	GPM	67	77
9°C Δt	m³/h	95.4	109.2
11°C Δt	m³/h	76.3	87.2
22°C Δt	m³/h	38.2	43.6
56°C Δt	m³/h	15.3	17.5

**Note:** The graph line for section 2 shows the maximum flow-pressure drop used for flow calculation or equipment such as pump selection. The other graph line is provided for reference only.

Δt = temperature difference

This boiler does not require a flow switch.

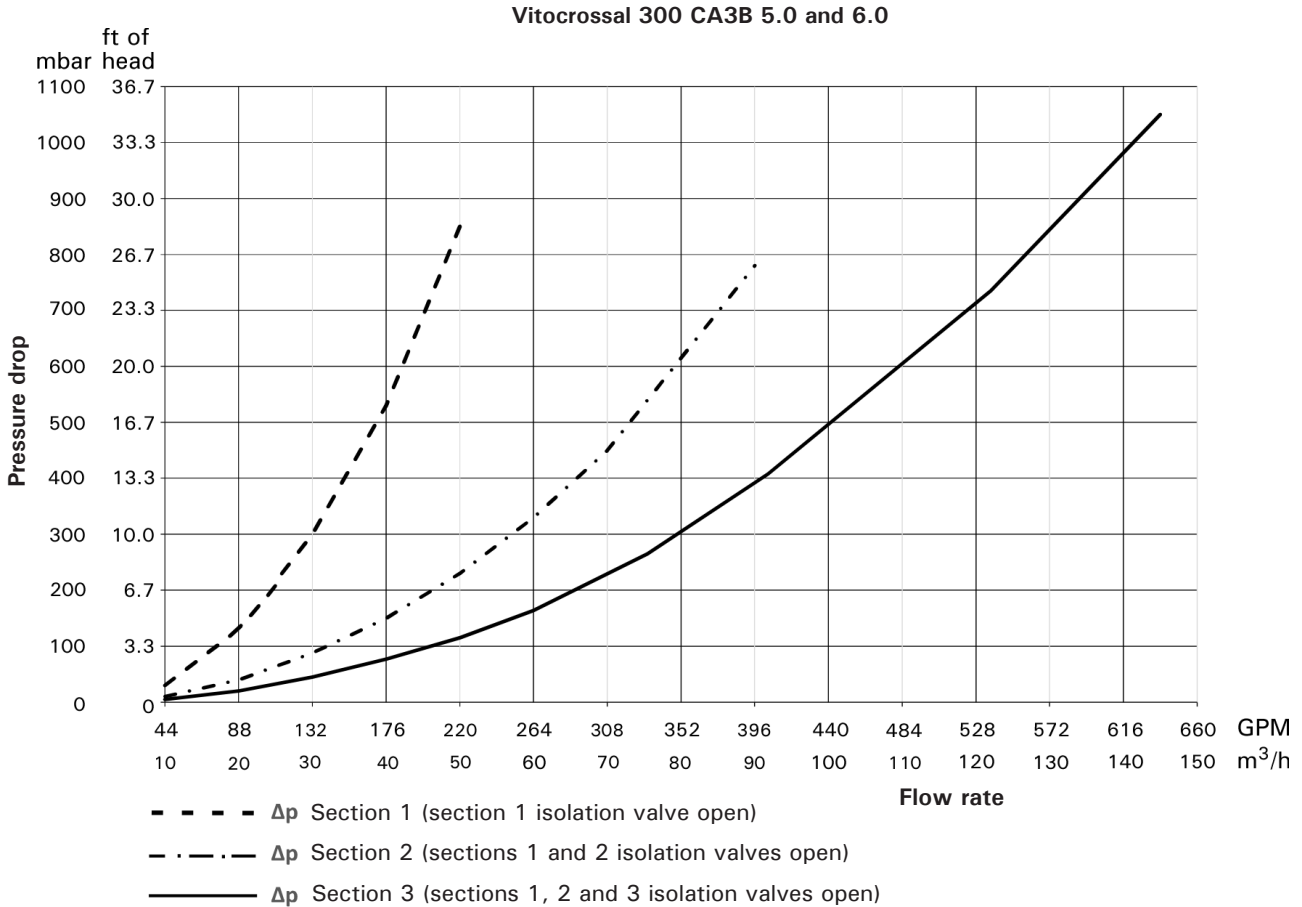
Minimum required flow rate based on: 100°F Δt (56°C Δt)

Maximum flow rate based on: 16°F Δt (9°C Δt)

**Flow Rate** *(continued)*

**Pressure drop (primary circuit)**

The Vitocrossal 300, CA3B is only suitable for fully pumped hot water heating systems.



**Flow Rates CA3B**

CA3B model		5.0	6.0
16°F Δt	GPM	600	720
20°F Δt	GPM	481	577
40°F Δt	GPM	240	287
100°F Δt	GPM	96	115
9°C Δt	m <sup>3</sup> /h	136.3	163.5
11°C Δt	m <sup>3</sup> /h	109.2	131.1
22°C Δt	m <sup>3</sup> /h	54.5	65.4
56°C Δt	m <sup>3</sup> /h	21.8	26.2

**Note:** The graph line for section 3 shows the maximum flow-pressure drop used for flow calculation or equipment such as pump selection. The other graph lines are provided for reference only.

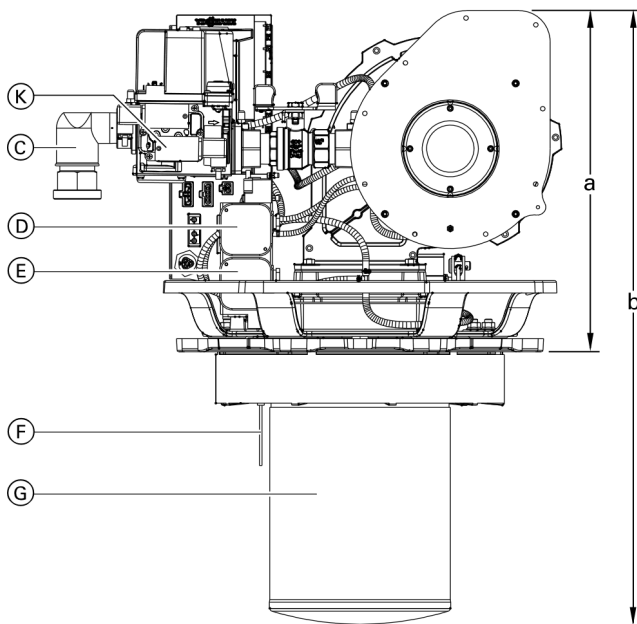
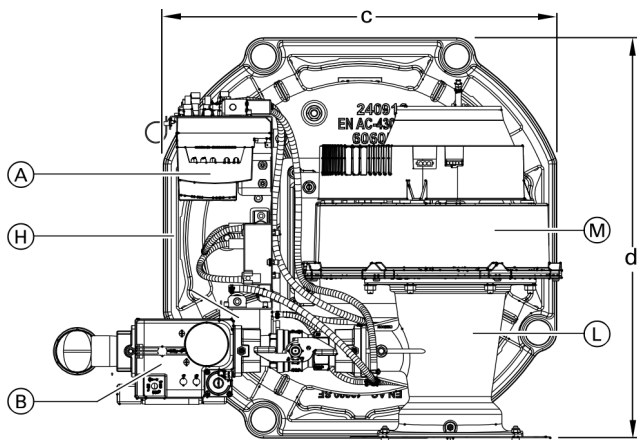
Δt = temperature difference

This boiler does not require a flow switch.

Minimum required flow rate based on: 100°F Δt (56°C Δt)

Maximum flow rate based on: 16°F Δt (9°C Δt)

**Compact Cylinder Radiant Burner (CA3B models 2.5 to 3.0)**



**Legend**

- (A) Burner control unit
- (B) Gas train
- (C) Gas supply pipe
- (D) Air pressure switch 1
- (E) Air pressure switch 2
- (F) Ignition electrodes
- (G) Burner gauze assembly
- (H) Burner frame
- (K) Gas pressure switch
- (L) Venturi mixing pipe
- (M) Burner fan

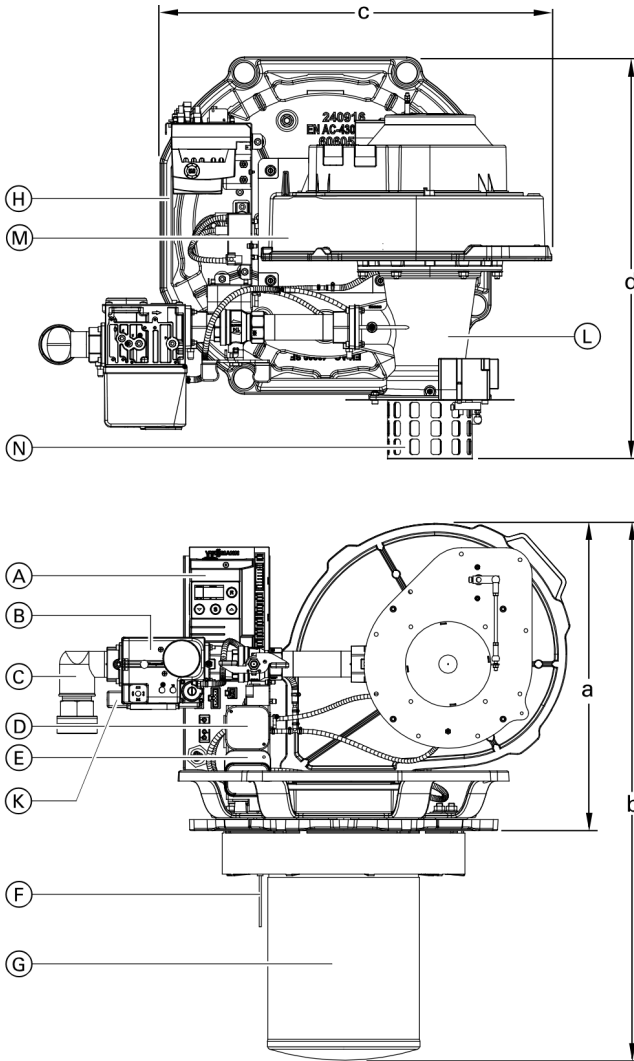
**Dimensions**

CA3B Burner model		1250	1500
a	in. (mm)	17¾ (452)	17¾ (452)
b	in. (mm)	33½ (845)	33½ (845)
c	in. (mm)	21½ (541)	21½ (541)
d	in. (mm)	21¾ (550)	21¾ (550)

**Burner Combinations**

CA3B Boiler	Burner Input MBH		
	Section 1 (lead)	Section 2 (lag 1)	Section 3 (lag 2)
2.5	1250	1250	--
3.0	1500	1500	--

**Cylinder Radiant Burner (CA3B models 3.5 to 6.0)**



**Dimensions**

CA3B Burner model		1500	2000
a	in. (mm)	17¾ (451)	19 (485)
b	in. (mm)	33¾ (843)	34½ (878)
c	in. (mm)	21½ (547)	25¼ (641)
d	in. (mm)	25½ (647)	25¾ (657)

**Burner Combinations**

CA3B Boiler	Burner Input MBH		
	Section 1 (lead)	Section 2 (lag 1)	Section 3 (lag 2)
3.5	1500	2000	--
4.0	2000	2000	--
5.0	1500	1500	2000
6.0	2000	2000	2000

**Legend**

- (A) Burner control unit
- (B) Gas train
- (C) Gas supply pipe
- (D) Air pressure switch 1
- (E) Air pressure switch 2
- (F) Ignition electrodes
- (G) Burner gauze assembly
- (H) Burner frame
- (K) Gas pressure switch
- (L) Venturi mixing pipe
- (M) Burner fan
- (N) Rotary damper with servomotor

## Standard Equipment

Boiler body with fitted mating ANSI flanges and gaskets to all connectors and fitted protective crate, plus flue gas collector collar.

CA3B Boiler model	2.5	3.0	3.5	4.0	5.0	6.0
Thermal insulation	2	2	2	2	3	3
Cylinder burners	2	2	2	2	3	3
Boiler control unit (see boiler control alternatives below)	1	1	1	1	1	1
Boiler coding card	2	2	2	2	3	3
Burner coding card	2	2	2	2	3	3
Technical documentation	1	1	1	1	1	1
NG to LPG burner conversion kits	2	2	2	2	3	3

Installation fittings for standard equipment includes:

- low water cut-off
- gas shut off valve
- safety header (c/w 75 psig pressure relief valve, air vent and temperature/pressure gauge)
- drain valves
- product documentation

### Permissible Ambient Conditions

#### During Operation:

For installation in living spaces or boiler rooms (standard ambient conditions)

Temperature Range 32 to 104°F (0 to +40°C)

Relative humidity of less than 95%, non condensing

#### During Storage:

Stored indoors (no exposure to outside elements)

Temperature range of -4 to 149°F (-20 to +65°C)

Relative humidity of less than 95%, non condensing

## Boiler Control Alternatives

### For single boiler systems

Vitotronic 300 (type GW6C) single boiler operating mode Outdoor reset control for stand alone operation, for modulating water temperature and mixing valve control for a maximum of 2 heating circuits with mixing valve. The addition of a Vitotronic 200-H, type HK1B can provide control for an additional 1 or 3 heating circuits with mixing valve.

### For single boiler or multiple boiler installations

Custom control panels for residential or commercial applications are designed and manufactured by Viessmann to suit any customer's specific requirements. Custom control panels can integrate features such as pool heating, hot tub heating, snow melting, telephone tie-in, integration with Building Management Systems, as well as other functions. Please inquire.

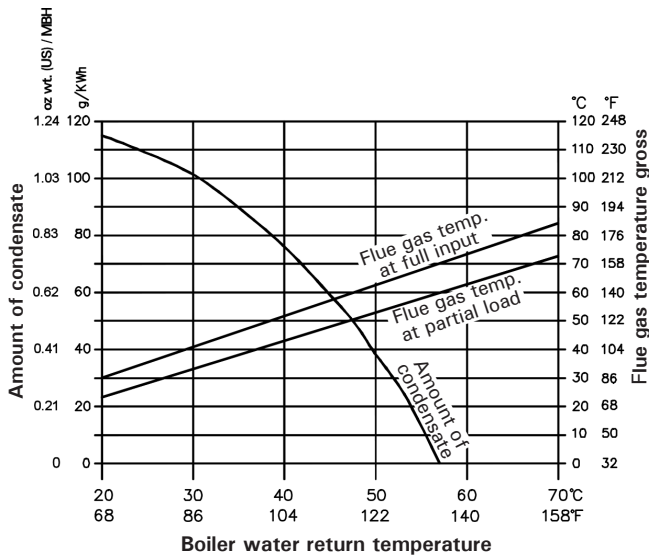
### For multiple boiler installations

The Vitotronic 300 (type GW6C) can cascade up to 8 boiler sections. The Vitocrossal 300 CA3B 2.5, 3.0, 3.5 and 4.0 have 2 sections for each boiler. The Vitocrossal 300 CA3B 5.0 and 6.0 have 3 sections for each boiler.

Outdoor reset control for cascade operation with mixing valve control for a maximum of 2 heating circuits (with mixing valve). Vitotronic 200-H type HK1B for 1 to 3 additional heating circuits with mixing valve.



# System Design Considerations



**Note:** The 'amount of condensate' and the 'flue gas temperature gross' graphs are independent of each other.

### Condensate and its disposal

During the operation of the boiler, the amount of condensate to be expected can be read from the above diagram.

The values given are approximate amounts occurring under practical conditions. Not included in the diagram is the amount of condensate occurring in the vent pipe and chimney system. The condensate from the chimney system can be collected together with the condensate from the heating boiler and be disposed of into a floor drain. The condensate will be between 3 and 4 on the pH scale. If local building requirements demand neutralizing the condensate before disposal, contact Viessmann Manufacturing Company Inc. for a correctly sized neutralization tank. The treated condensate will show pH values of between 6.5 and 9 and can then be disposed of into the waste water system.

### Design notes regarding draining condensate

The condensate drain to the sewer connection must be able to be inspected. Route it with a gradient and equip the pipe with a P-trap; also provide suitable facilities for taking samples. The bottom drain should be located below the anti-flooding level of the flue gas collector box.

Condensate drains must only be made from corrosion resistant materials (e.g. fibre reinforced hoses). Never use any galvanized materials or those containing copper or black iron for pipes, connectors, etc. Install a P-trap in the condensate drain to prevent flue gases from escaping.

Ensure that the domestic drainage systems are made from materials which are resistant to acidic condensate such as:

- Stoneware pipes
- Hard PVC pipes
- PVC pipes
- PE-HD pipes
- PP(s) pipes
- ABS/ASA pipes
- Stainless steel pipes
- Borosilicate pipes

### Burner adjustment

Matrix cylinder burners are tested at operating temperature and adjusted at the factory.

**System Design Considerations** *(continued)*

**Venting options**

PP(s) (Polypropylene) flue gas/fresh air system for room air independent operation (sealed combustion), and PP(s) flue gas for room air dependent operation are tested to ANSI Z21.13 - CSA 4.9 (most recent edition) standards and are certified together with the Vitocrossal 300 CA3B boiler as a constructional unit.

The Vitocrossal 300 CA3B boiler may also be vented using an special stainless steel, single-wall, (UL listed for category IV).

The boiler may be vented horizontally through the side wall or vertically through the roof.

For a more detailed description of the direct vent and single-wall vent system, please refer to the Vitocrossal 300 CA3B Installation Instructions venting section.

Use ULC S-636 / UL 1738 certified venting systems for category IV boilers. The following vent system suppliers may be contacted for assistance in designing the appropriate stainless steel venting system for Vitocrossal 300 CA3B boilers.

<b>M&amp;G / Duravent</b> www.duravent.com	<b>ICC - Industrial Chimney Co.</b> www.icc-rsf.com
<b>Selkirk Canada Corporation</b> www.selkirkchimney.com	<b>Novaflex</b> www.flexmaster.com
<b>Security Chimneys International Ltd.</b> www.securitychimneys.com	<b>Energex Inc. (formerly Exhausto)</b> www.energex.com
<b>Jeremias Inc.</b> www.jeremiasinc.com	<b>Van-Packer Co. Inc.</b> www.vpstack.com
<b>METAL-FAB, INC.</b> www.mtlfab.com	

**Vent System Suppliers**

Use special venting system (UL/ULC listed for Category IV) for exhaust vent material of the Vitocrossal boilers. Contact one of the following suppliers to order parts.

Both suppliers deliver PP(s) rigid and flexible vents in a variety of sizes.

<b>M&amp;G / Duravent</b> www.duravent.com	<b>Centrotherm InnoFlue</b> www.centrotherm.us.com
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**System layout**

The boiler max. water temperature limit is factory set to 203°F (95°C).

To minimize piping losses of the system, however, Viessmann recommends that the radiation and domestic hot water production in the system be designed for a 158°F (70°C) boiler supply water temperature.

**Oxygen diffusion barrier under floor tubing**

The boiler warranty does not cover pressure vessel failure resulting from corrosion caused by the use of underfloor plastic tubing without an oxygen diffusion barrier. Such systems without oxygen diffusion barrier must have the tubing separated from the boiler with a heat exchanger. Viessmann always recommends the use of underfloor plastic tubing with an oxygen diffusion barrier.

**Boiler/burner start-up**

Vitocrossal 300, CA3B boilers with Viessmann cylinder burners does not require start-up by Viessmann.

**Combustion air supply**

The boiler must not be located in areas or rooms where chemicals containing chlorine, bromine, fluorine, or other corrosive chemicals are stored. Examples include bleach, refrigerants, paint, paint thinner, hair spray, cleaning solvents, water softener salt, etc. The combustion air must not be contaminated with any amount of the above mentioned chemicals.

Boiler should never be installed in areas where excessive dust, high humidity, or risk of frost exist. Ensure adequate ventilation and supply of fresh combustion air.

**System Design Considerations** *(continued)*

**Boiler operation in marine environments (damp, salty coastal areas):**

The service life of the boiler’s exposed metallic surfaces, such as the casing and fan housing, is directly influenced by proximity to damp and salty marine environments. In such areas, higher concentration levels of chlorides from sea spray, coupled with relative humidity, can lead to degradation of the exposed metallic surfaces mentioned above. Therefore, it is imperative that boilers installed in such environments not be installed using direct vent systems which draw outdoor air for combustion. Such boilers must be installed using room air dependent vent systems; i.e. using room air for combustion. The indoor air will have a much lower relative humidity and, hence, the corrosion will be minimized.

Consult your local Viessmann sales representative with uncertainties in regard to a suitable boiler installation location.

This boiler/burner unit needs clean fresh air for safe operation. Provisions for combustion and ventilation air must be made at time of installation. For gas or propane installations, use the “Natural Gas Installation Code CAN/CSA-B149.1 or B149.2” (Canada), or “National Fuel Gas Code ANSI Z223.1” (USA), and/or provisions of local codes.

The sizing methods outlined in the aforementioned codes should be used when installing a round duct to supply combustion air from the outside.

**Warranty**

Our warranty does not cover damages resulting from the following:

- Operation with contaminated fill and supplementary feed water
- Operation with contaminated combustion air
- Exposing the boiler to pressures and temperatures higher than its certified rating

See warranty sheet for details.

**Water quality**

Treatment for boiler feed water should be considered in areas with known problems, such as where a high mineral content and hardness exist. In areas where freezing might occur, it recommended that an antifreeze be added to the system water for protection against freezing. Please adhere to the specifications given by the antifreeze manufacturer. Do not use automotive silicate-based antifreeze. Please observe that an antifreeze/water mixture may require a back flow preventer within the automatic water feed and influence components such as diaphragm expansion tanks, radiation, etc. A 40% antifreeze content will provide freeze-up protection to -10°F (-23°C). Do not exceed 50% antifreeze mix ratio and do not use antifreeze other than specifically made for hot water heating systems.

Total output (MBH)	Total Hardness (ppm as CaCO <sub>3</sub> )
> 2050	< 150

The pH value of the heating water should be between 8.2 and 9.5

The standard values assume the following:

- The total volume of fill and top-up water during its service life will not exceed three times the water content of the heating system.

Soften the fill and top-up water in heating systems operating under the following conditions:

- The total of alkaline earths in the fill and top-up water exceeds the standard value.
- Higher fill and top-up water volumes are expected.

Only fill the boiler with water that conforms with water quality guidelines of VDI 2035-1.

**System Design Considerations** *(continued)***Sound attenuation**

Please consult a professional engineer who is specialized in noise attenuation for advice.

The burner/boiler systems, circulation pumps and other auxiliary equipment used in heating systems generate noise.

This noise is transferred from the boiler room via floorboards, ceiling and walls to neighboring rooms and via the flue gas system as well as the ventilation air and exhaust air apertures into other rooms and into the open, where they may cause a nuisance.

To avoid this from happening, additional protective measures may be required which should be considered at the design stage.

Subsequent measures to reduce noise nuisance frequently require extensive effort and expenditure.

**Airborne noise attenuation**

Frequently, modern boilers are equipped with silencer hoods or sound insulated ventilation air inlet housings.

For larger systems, it may be necessary to route the ventilation air through a sound-insulated channel, in order to avoid a noise nuisance outside the building.

Flue gas silencers are generally only required where higher noise protection measures are called for. Whether or not a flue gas silencer is required can be predicted only with some difficulties, because of the complexity of the creation and propagation of flame noise, the interaction between the burners, boilers and the flue gas system as well as the operating mode (flue gas system operating with positive or negative pressure).

It is advisable, therefore, to assess the noise emission into the neighborhood and to consider the sound pressure level measured at the flue gas system outlet. It should be considered at the planning stage whether silencers might become necessary later.

In planning for its possible use, it is important that sufficient space for the flue gas silencer is available behind the boiler. Good engineering practice mandates that the exhaust pressure drop of the silencer be included in the vent size calculation.

**Anti-vibration measures**

Anti-vibration supports can be field supplied as an economical and effective solution to combat noise generated.

When sizing such supports, take the entire operating weight of the boiler system and, when using longitudinal anti-vibration brackets, the condition of the supporting surface into consideration.

Effective anti-vibration measures are particularly important when installing boilers into an attic. Flexible couplings may be used to physically separate the combustion equipment from the building.

These should be installed into the boiler flow, return and safety pipe and as near as possible to the boiler. Also insulate any braces or hanging arrangements, if installed, against sound/vibration transmission to the building.

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