

Technical Data Manual

Model Nos. and pricing: see Price List



Vitodens 100-W

WB1B Series

Wall-Mounted, gas-fired condensing boiler
with optional on demand hot water Combi**PLUS** Kit

Heating input: 37 to 118 MBH
10.8 to 34.5 kW



VITODENS® 100-W



Vitodens 100-W, WB1B
(with pre-installed coaxial vent pipe adaptor)



Combi**PLUS** Kit

Gas-Fired Wall-Mounted Condensing Boiler with modulating stainless steel Matrix cylinder burner, stainless steel Inox-Radial heat exchanger for room air independent operation (using a direct vent system) or room air dependent operation. Optional Combi**PLUS** Kit providing reliable on demand hot water without a DHW tank is available.



Product Information

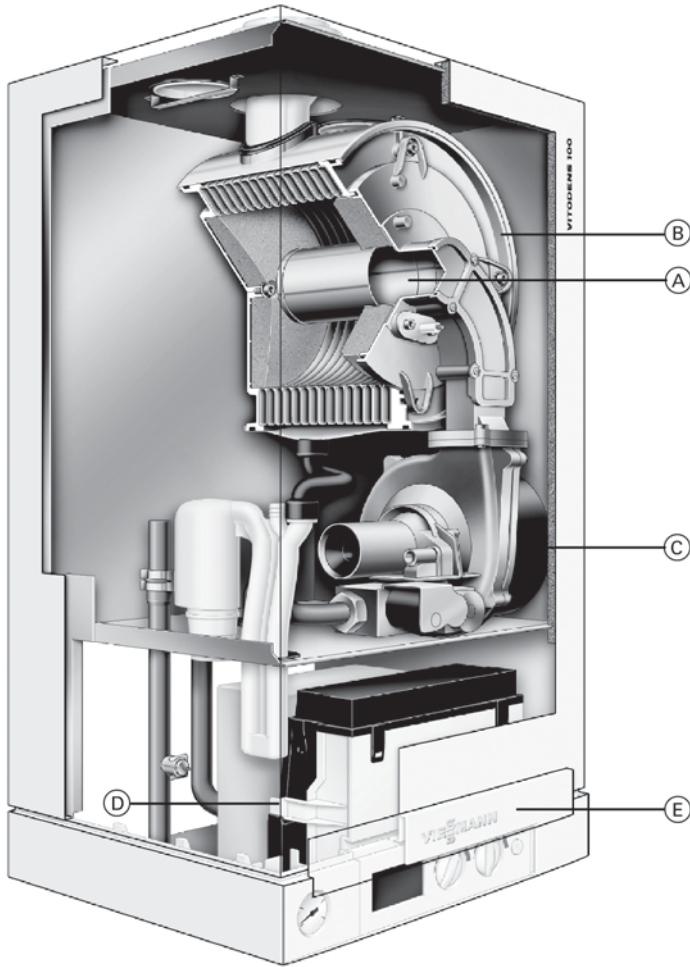
Equipped with a Viessmann stainless steel heat exchanger for lasting performance and reliability and a modulating MatriX cylinder gas burner, the Vitodens 100-W wall-mounted condensing boiler is the perfect combination of value, quality and Viessmann technology.

The benefits at a glance:

- **Outstanding efficiency**
of 94.0 % A.F.U.E. on all models.
- **Lasting performance**
with Viessmann-made SA240 316Ti stainless steel Inox-Radial heat exchanger constructed to ASME Section IV and CSA B51.
- **Low-emission**
with fully-modulating stainless steel MatriX cylinder burner. Factory calibration eliminates adjustments in the field.
< 29 ppm NO_x (at 3% O₂)
< 40 ppm CO (at 3% O₂)
- **Control variety**
Integrated boiler control interfaces with any level of external control - from room thermostat to outdoor reset and more.
- **Compact, lightweight wall mount design**
and zero clearance to combustibles make it a great choice for limited-space installations.
- **Extremely quiet operation**
quieter than most refrigerators.
< 50 dBA [at 3.3 ft. (1 meter)]
- **Easy installation, service and maintenance**
with all pipe connections located at the bottom and serviceable components (including electrical connections) easily accessible from the front.
- **Multiple venting options**
 - Horizontal or vertical sealed combustion coaxial, PP(s) vent system (Viessmann supplied).
 - Horizontal, vertical or hybrid sealed combustion double-pipe CPVC vent system (field supplied).
 - Horizontal or vertical single pipe CPVC vent system (field supplied).
 - Horizontal or vertical single or double pipe PP(s), flexible vent system (Viessmann supplied).
- **Suitable for high altitude levels**
of up to 10,000 ft. (3,000 m) without deration.
- **Built-in automatic frost protection**
allows boiler to be shut off for an extended period of time while protecting it against freeze-up.
- **Reliable on demand hot water**
with an optional CombiPLUS kit (no DHW tank required).
 - Plate type heat exchanger
 - Built-in diverting valve
 - Built-in Grundfos 3-speed pump
 - Built-in pressure bypass valve
 - Built-in water hammer arrester
 - Built-in flow sensor
 - Built-in temperature sensor
 - Supplied with a pressure relief valve rated at 150 psi

Note: Check the boiler rating plate on the Vitodens 100-W, models WB1B-26 or WB1B-35 to ensure it states compatibility with the CombiPLUS kit.
- **Limited lifetime warranty**
in residential applications.
- Certified to CSA Low Lead Content Certification Program; including US Safe Drinking Water Act, NSF/ANSI 372 as well as other applicable US State requirements.

Product Information



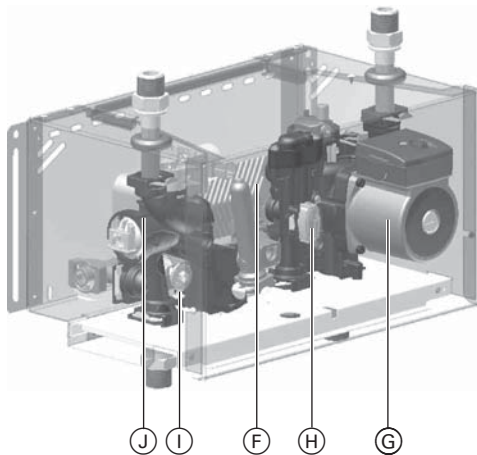
Boiler cross-section

Legend

- (A) Stainless steel Matrix cylinder burner
- (B) Inox-Radial stainless steel heat exchanger
- (C) Burner blower
- (D) Gas and hydronic connections
- (E) Boiler control

Standard Equipment:

Wall-mount boiler and installation fittings c/w 30 psi pressure relief valve, pressure gage, gas shut-off valve, two fill/drain valves, all mounting hardware, outdoor temperature sensor, and LP conversion kit.



CombiPLUS cross-section

Legend

- (F) Plate-type heat exchanger
- (G) Boiler / DHW pump
- (H) Flow sensor
- (I) Pressure by-pass valve
- (J) Diverting valve

Note: Products may not look exactly as illustrated.

Specifications

Standard heating boiler

Boiler Model No.		WB1B 26	WB1B 35
Natural gas and LPG			
CSA input	MBH	37-91	37-118
	kW	10.8-26.7	10.8-34.6
CSA output/DOE ¹	MBH	34-83	34-108
heating capacity	kW	9.9-24.3	9.9-31.6
Net I = B = R rating ²	MBH	72	94
Heat exchanger surface area	ft. ²	10.23	10.23
	m ²	0.95	0.95
Min. gas supply pressure			
Natural gas	"w.c.	4	4
LPG	"w.c.	10	10
Max. gas supply pressure ³			
Natural gas and LPG	"w.c.	14	14
A.F.U.E.	%	94.0	94.0
Weight	lbs	78	78
	kg	34.1	34.1
Shipping weight	lbs	95	95
	kg	43	43
Boiler water content	USG	0.87	0.87
	L	3.3	3.3
Boiler max. flow rate ⁴	GPM	6.2	6.2
	L/hr.	1400	1400
Max. operating pressure (max. allowable working pressure) at 210° F (99° C)	psig	45	45
	bar	3	3
Boiler water temperature			
- Adjustable high limit (AHL) range		86 to 176 (30 to 80)	
- space heating (steady state)	°F (°C)	176 (80)	
- DHW production (set-point)	°F (°C)		
- Fixed high limit (FHL)	°F (°C)	210 (99)	
Boiler connections			
Boiler heating supply and return	NPTM (male) "	¾"	¾"
Pressure relief valve	NPTF (female) "	¾"	¾"
Drain valve	(male thread) "	¾"	¾"
Dimensions			
Overall depth	inches	14 1/8	14 1/8
	mm	360	360
Overall width	inches	15 3/4	15 3/4
	mm	400	400
Overall height	inches	28 1/2	28 1/2
	mm	725	725

¹ Output based on 140° F (60° C), 120° F (49° C) system supply / return temperature.

² Net I = B = R rating based on piping and pick-up allowance of 1.15.

³ If the gas supply pressure exceeds the maximum gas supply pressure value, a separate gas pressure regulator must be installed upstream of the heating system.

⁴ See "System Flow Rates" on pages 20 to 25 in this manual.

Specifications *(continued)*

Standard heating boiler *(continued)*

	Boiler Model No.	WB1B 26	WB1B 35
Gas supply connection	NPTF (female)"	¾	¾
Flue gas 5 Temperature at boiler return temperature of 86° F (30° C)			
- at rated full load	°F (°C)	127 (53)	131 (55)
- at rated partial load	°F (°C)	90 (32)	90 (32)
Temperature at boiler return temperature of 140° F (60° C)	°F (°C)	167 (75)	172 (78)
Flue gas value Mass flow rate (of flue gas)			
- at rated full load	lbs/h	79.2	100.1
	kg/h	36.0	45.5
- at rated partial load	lbs/h	33.0	33.0
	kg/h	15.0	15.0
Available draught	Pa	100	100
	mbar	1.0	1.0
Flue gas temperature sensor limit	°F (°C)	230 (110)	230 (110)
Average condensate flow rate 6 with natural gas			
- Ts/TR = 122 / 86° F (50 / 30° C)	USG/day	1.95-2.3	2.5-2.8
	L/day	8-9	9.4-10.5
Condensate connection 7	hose nozzle Ø in	1	1
Boiler flue gas connection 8	Ø in (mm)	2¾ (60)	2¾ (60)
Combustion air supply connection 8	coaxial outer Ø in (mm) single	4 (100) 2¾ (60)	4 (100) 2¾ (60)
Noise level (at 1 meter)			
- at full load	(dB)	47	49
- at partial load	(dB)	40	42
High altitude (factory set) 9	ft. (m)	0-5,000 (0-1,500)	0-5,000 (0-1,500)

5 Measured flue gas temperature with a combustion air temperature of 68° F (20° C).

6 Based on typical boiler cycles, including partial load conditions.

7 Requires 1"(25) mm tubing. See Vitodens 100-W Installation Instructions for details.

8 For detailed information refer to the Vitodens Venting System Installation Instructions.

9 For 5,000 to 10,000 ft. (1,500 to 3,048 m) operation, a control programming change is required. Refer to the Installation and Service Instructions for details.

► For information regarding other Viessmann System Technology componentry, please reference documentation of respective product.

Specifications *(continued)*

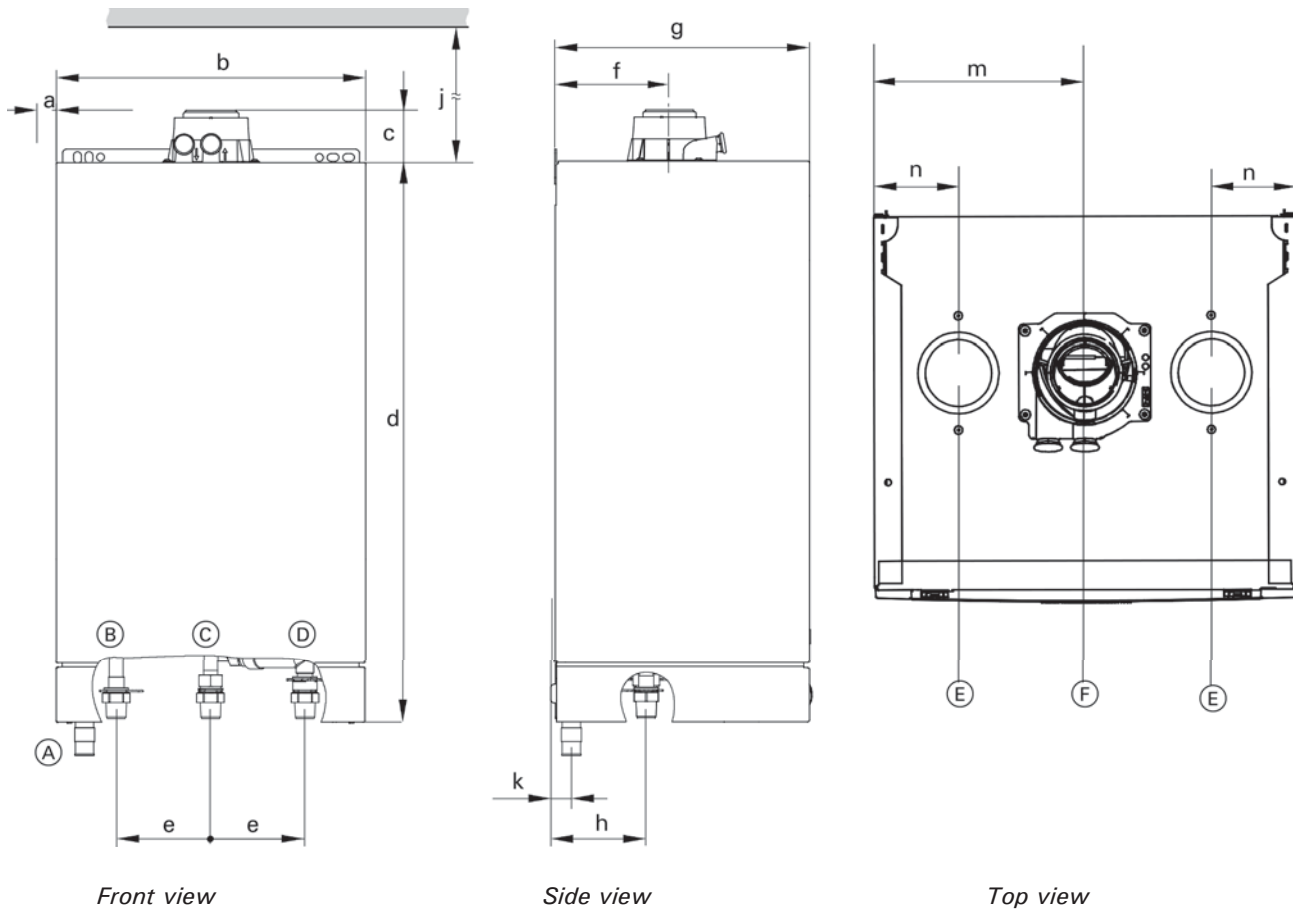
CombiPLUS (Integrated with the Boiler)

Boiler Model No.		WB1B 26	WB1B 35
DHW supply temperature	°F (°C)	140 (60)	140 (60)
Continuous draw rate ¹ with DCW temp. of 56° F (13° C)	USG/h	99	147
	L/h	374	556
Continuous draw rate ² at Δ t= 63° F (35K)	USG/h	156	216
	L/h	589	800
Maximum allowable working pressure (potable water)	psi	150	150
Test pressure	psi	300	300
Connections, DHW and DCW	NPTM (male) "	½"	½"
Connections to boiler supply/return and to heating supply/return	NPTM (male) "	¾"	¾"
Dimensions			
Overall depth	inches	9.8	9.8
	mm	250	250
Overall width	inches	17	17
	mm	432	432
Overall height	inches	8.7	8.7
	mm	223	223
Height with pipe connector	inches	13	13
	mm	331	331
Integrated pump flow rate DHW production @ 23 ft. (9.8 m) Head pressure	USG/min.	5.63	5.63
	L/h	1278	1278
Heating system operation with system side additional drop in pressure of max. 6 ft. of water (1.8 m)	USG/min.	6.2	6.2
	L/h	1408	1408
Weight	lbs	25	25
	kg	11	11

¹ Based on boiler max. output and boiler supply temperature of 176° F (80° C).

² DCW and DHW temperature rise would be proportional. Maximum DHW supply temperature is 140° F (60° C).

Boiler Dimensions Without Bottom Piping Connections



Connections Vitodens 100-W, WB1B 26, 35

Legend

Connections

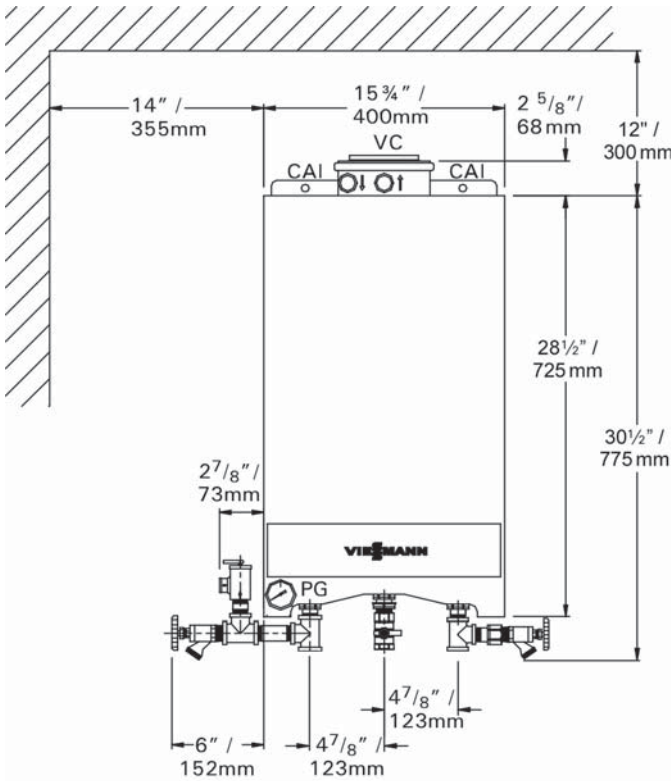
- (A) Condensate drain, plastic hose Ø 0.87" (22 mm)
- (B) Boiler water supply, NPT 3/4" (male thread)
- (C) Gas connection, NPT 3/4" (male thread)
- (D) Boiler water return, NPT 3/4" (male thread)
- (E) Combustion air opening for double pipe system
- (F) Combustion air opening for coaxial system

Note: If using the optional CombiPLUS see page 9.

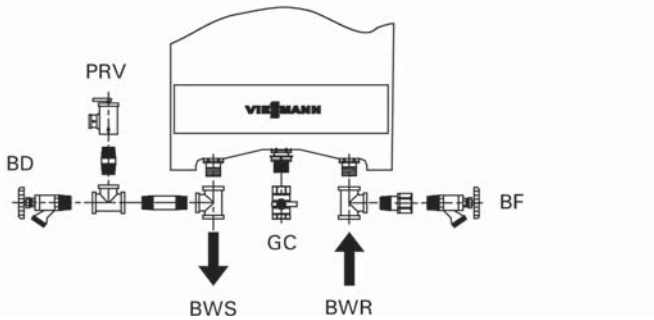
Dimensions

- a See illustration for dimensions
- b 15 3/4" (400 mm)
- c 2 5/8" (68 mm)
- d 28 1/2" (725 mm)
- e 4 7/8" (123 mm)
- f 6 1/8" (156 mm)
- g 14 1/8" (360 mm)
- h 5" (125 mm)
- j 12" (305 mm)
- k 1 1/4" (31 mm)
- m 7 7/8" (200 mm)
- n 3 1/8" (80 mm)

Boiler Dimensions With Piping Connections



Piping connections for Vitodens 100-W, WB1B 26 and 35 (factory supplied)



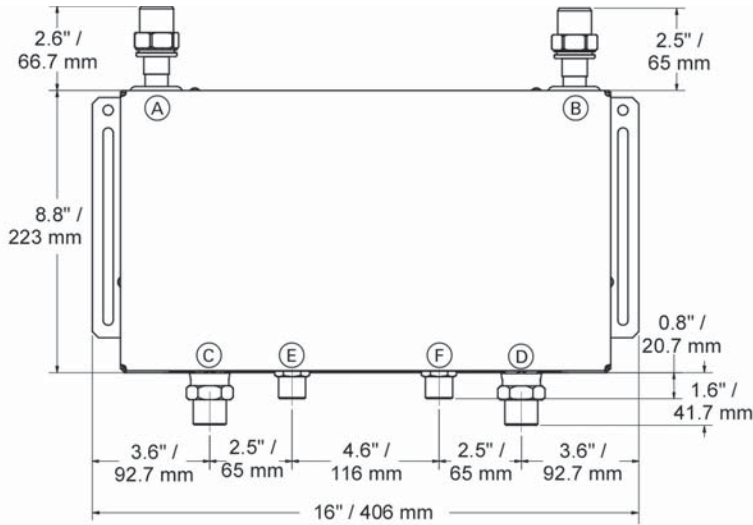
Legend

- BWR Boiler water return, 3/4"
- BWS Boiler water supply, 3/4"
- BD Boiler drain
- BF Boiler fill
- GC Gas connection, 3/4" NPTM (male thread)
- PRV Pressure relief valve
- PG Pressure gage
- VC Venting connection
- CAI Combustion air inlet connection (optional)

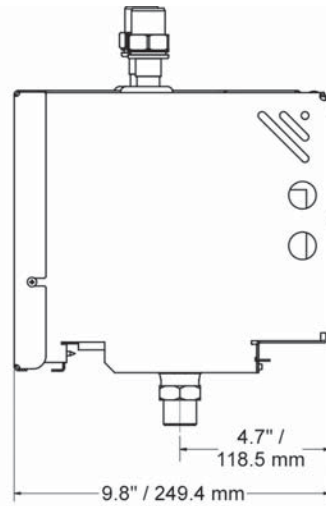
Note: If using the optional CombiPLUS see page 9.

CombiPLUS Dimensions and Piping Connections

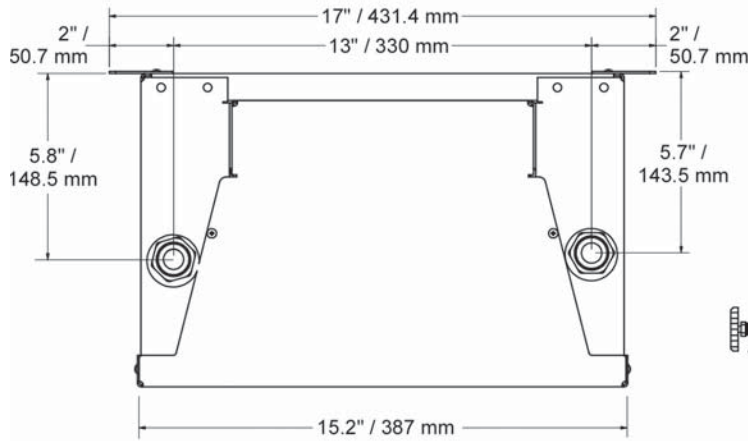
CombiPLUS Connections



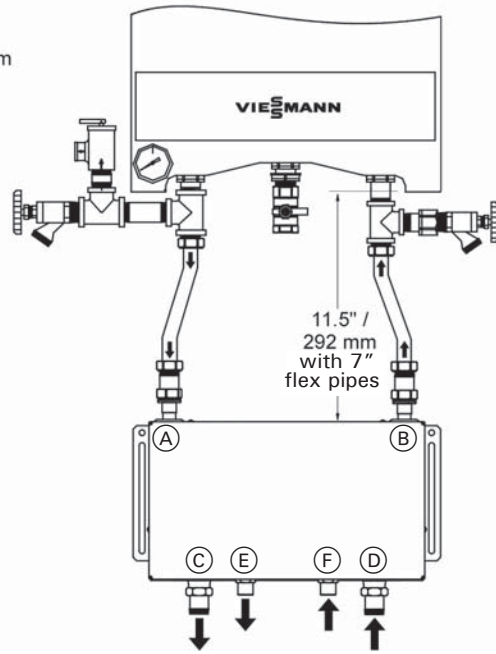
Front view



Side view



Top view



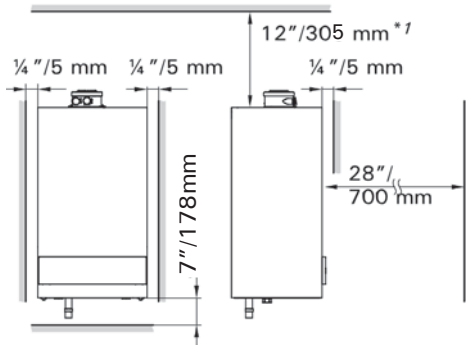
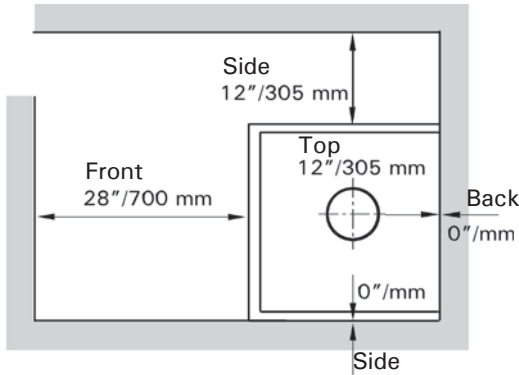
Front view

Legend

- (A) Boiler water supply, NPTM 3/4" (male thread)
- (B) Boiler water return, NPTM 3/4" (male thread)
- (C) System water supply, NPTM 3/4" (male thread)
- (D) System water return, NPTM 3/4" (male thread)
- (E) DHW, NPTM 1/2" (male thread)
- (F) DCW, NPTM 1/2" (male thread)

Boiler Minimum Clearances

Recommended minimum boiler service clearances



Recommended minimum boiler and CombiPLUS Kit clearances to combustibles

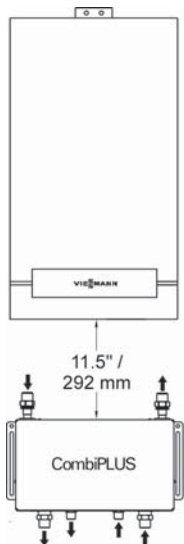
Top	Front	Rear	Left	Right	Vent pipe *1
0	0 AL, CL	0	0	0	0

AL = Alcove
CL = Closet

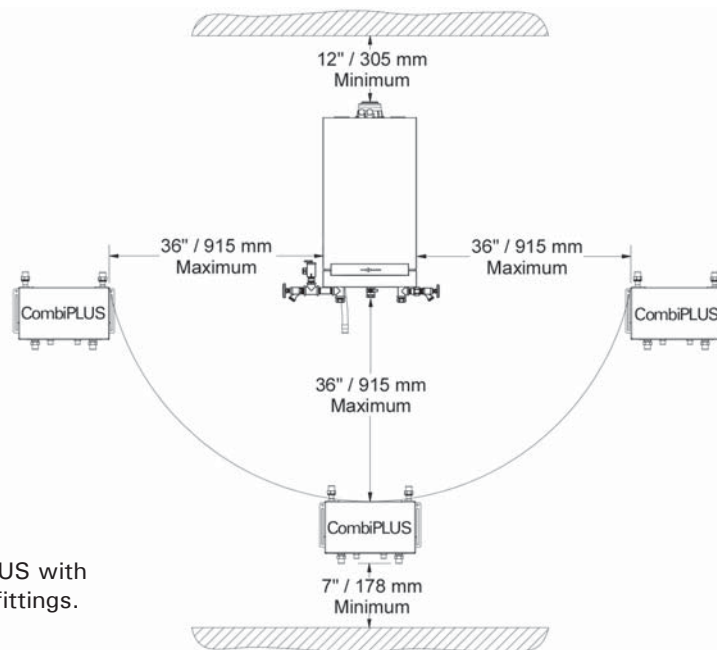
*1 Refer to the Installation Instructions of the Vitodens Venting System for details.

Note: The Vitodens 100-W boiler has passed the zero inches vent clearance to combustibles testing requirements dictated by the boiler latest Harmonized Standard ANSI Z21.13, CSA 4.9.2007 and therefore is listed for zero clearance to combustibles when vented with a single-wall special venting system (AL-29-4C material) or UL/ULC-listed CPVC/PP(s) gas vent material. The zero inches vent clearance to combustibles for the Vitodens 100-W boiler supercedes the clearance to combustibles listing that appears on the special venting system label.

CombiPLUS installation options



Min. distance between the boiler and CombiPLUS with Viessmann supplied 7" flex piping connection fittings.



Shown is the maximum distance between the boiler and CombiPLUS using field supplied fittings and pipes.

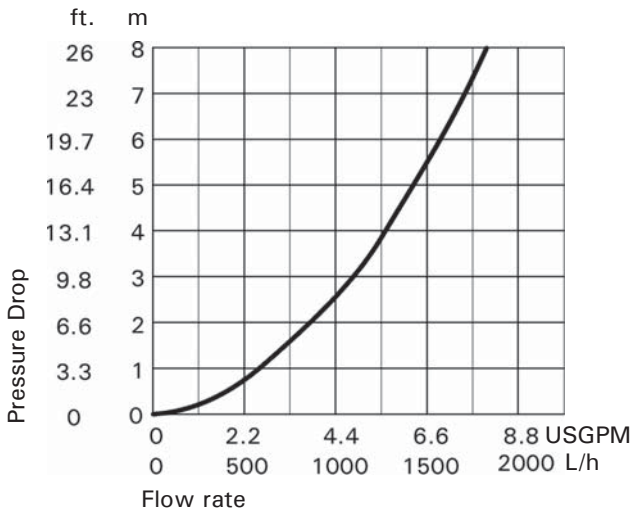
Note: The maximum distance between the boiler and the CombiPLUS is restricted by the communication cable to 36" (915 mm).

Heating Circuit Pumps

Waterside Flow (boiler circuit)

The Vitodens 100-W is designed only for closed loop, forced circulation hot water heating systems.

Pressure drop (primary circuit) of Vitodens 100-W



A low-loss header **must** be used when the **system** flow rate exceeds the maximum (or minimum) flow rate of the Vitodens 100-W boiler. An alternative method may be used, such as primary secondary piping using closely spaced tees.

A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees. Please see page 18 for details.

Use standard friction loss method for pipe sizing. Observe boiler maximum and minimum flow rate limitations. If system flow rate exceeds boiler maximum flow rate (as stated on page 18) or if system flow rate is unknown, Viessmann strongly recommends the installation of a low-loss header. See page 18 for low-loss header information or refer to the Vitodens Venting System Installation Instructions.

Heating circuit pumps (field supplied)

Recommended heating pumps with Vitodens 100-W, WB1B 26, 35 (without an optional CombiPLUS).

- Grundfos 15-58 (3-speed)
- Taco 00R or equivalent

Refer to the graph for the proper waterside boiler friction loss calculations.

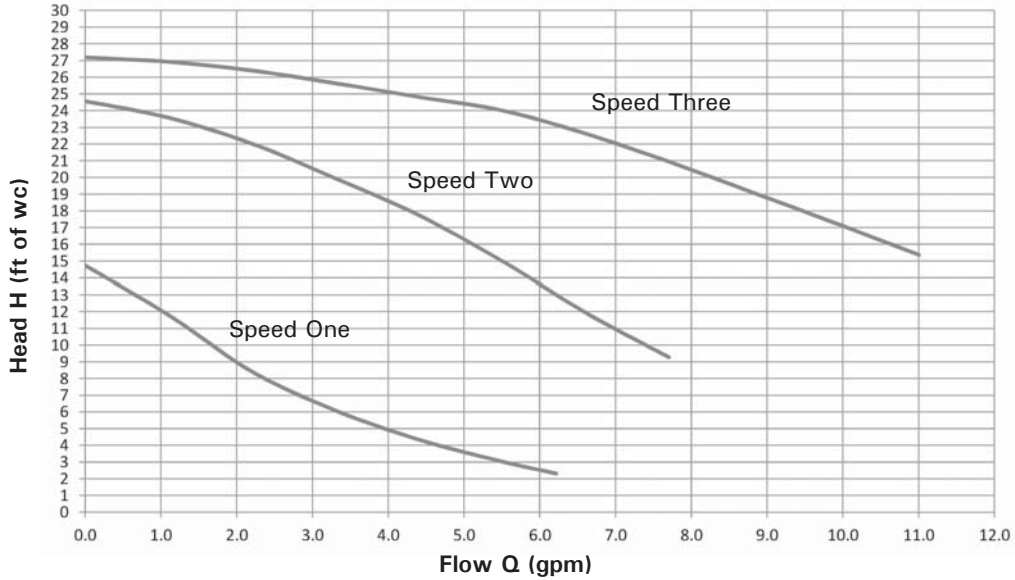
IMPORTANT

Pump selection must be based on accurate system flow and pressure drop calculations (including DHW sizing).

Heating Circuit Pumps *(continued)*

CombiPLUS built-in pump

Grundfos UPS15-78 three speed heating circuit/DHW production pump for Vitodens 100 WB1B 26, 35 boilers (in the factory setting, the pump speed is preset to 'speed three')



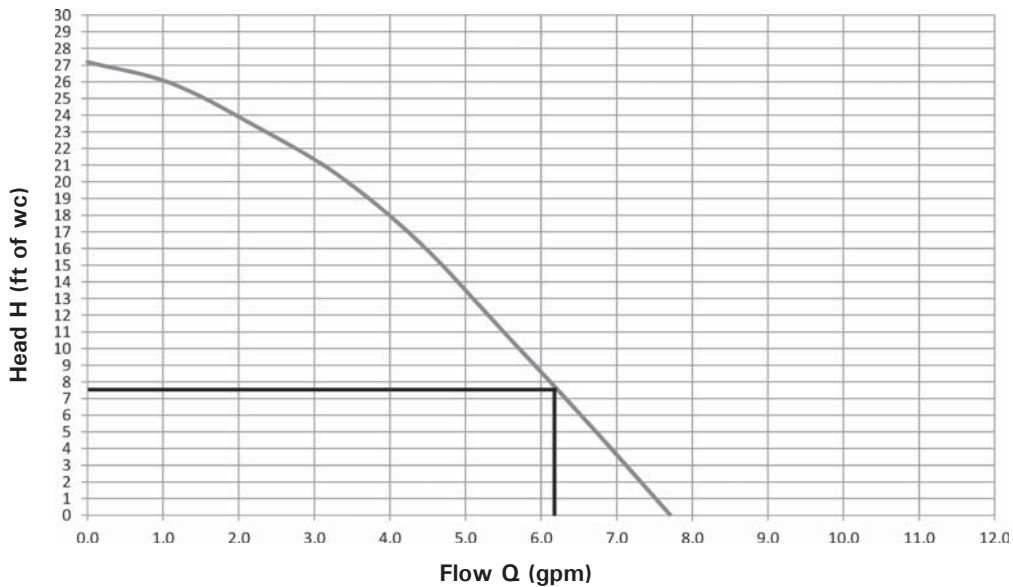
Performance chart courtesy of Grundfos

Pump Model Grundfos UPS15-78

Rated voltage	VAC	115
Rated current	A max.	1.15
	A min.	0.8
Capacitor	μ F	8
Power consumption	W max.	130
	W min.	80

CombiPLUS built-in pump, Grundfos UPS15-78 residual head pressure

Residual head of built-in three speed pump used with Vitodens 100 WB1B 26, 35



Heating Circuit Pumps *(continued)*

DHW Production Planning

With the CombiPLUS for instantaneous DHW heating or with DHW connections for DHW production via a stand-alone DHW storage tank, the Vitodens 100 boiler series offers the right solution for every need.

Various factors must be taken into account when designing the DHW system, and when deciding between the DHW production with integrated CombiPLUS and the standard heating boiler with DHW production via a stand-alone DHW storage tank.

Such factors are:

- DHW requirement, level of comfort and convenience
- Number of draw points
- Distance of draw points from the boiler/DHW storage tank
- System retrofit
- Space requirements

Options

		Gas-fired boiler with instantaneous CombiPLUS production	Gas-fired standard heating boiler with stand-alone DHW storage tank
DHW requirement, level of comfort and convenience	DHW requirement for an apartment	+	+
	DHW requirement for a single-family house	0	+
	Central DHW requirement for a multi-family house	-	+
	Decentralized DHW requirement for a multi-family house	+	+
Number of draw points	One draw point	+	0
	Several draw points, non-simultaneous use	+	0
	Several draw points, simultaneous use	-	+
Distance of draw points from the boiler/DHW storage tank	Up to 23 ft. (7 m) (without DHW recirculation line)	+	-
	With DHW recirculation line	-	+
System retrofit	DHW storage tank already installed	-	+
	Replacement of existing Combi boiler	+	-
Space requirements	Minimal space available (installation in alcove)	+	0
	Adequate space available (boiler room)	+	+

+ (recommended)
 0 (recommended in certain cases)
 - (not recommended)

Heating Circuit Pumps *(continued)*

Domestic Hot Water Production via Instantaneous DHW Plate Heat Exchanger (CombiPLUS)

The CombiPLUS is equipped with an electronically controlled instantaneous DHW plate heat exchanger. The comfort control function (if selected) ensures that the instantaneous DHW plate heat exchanger is kept warm. This translates into immediate availability of domestic hot water at any required temperature level.

Technical Data DHW Plate Heat Exchanger

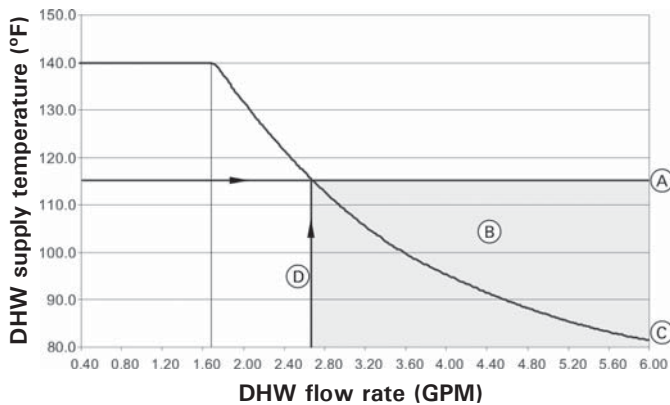
See page 5 in this manual for technical data.

CombiPLUS heat exchanger performance

Legend

- (A) DHW output temperature
- (B) DHW/DCW mixing zone
- (C) DHW output temperature at the tap
- (D) Max. flow (restriction by flow limiter)

DHW supply temperature for WB1B 26 (with mixed water)



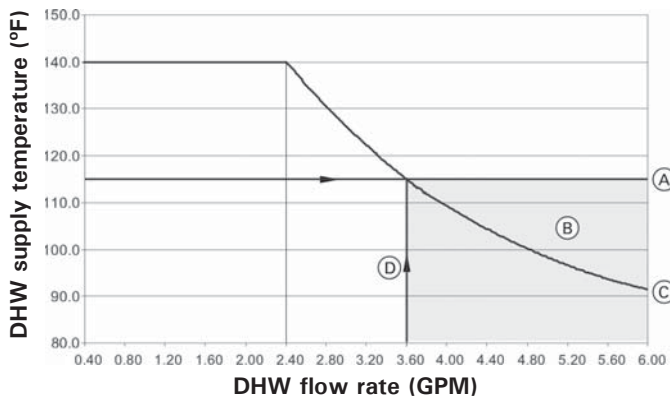
This chart illustrates the changes in the outlet temperature, subject to the flow rate at the tap.

If greater volume (max. flow rate through heat exchanger = 2.6 GPM) of water is required, cold water needs to be mixed which reduces the outlet temperature.

Curve is only applicable for a *DCW inlet temperature of 56° F* and a boiler input of 91,000 MBH (Vitodens 100-W, WB1B 26).

Max. recovery rate @ DHW temperature of 140° F = 1.7 GPM
Min. flow through the heat exchanger for boiler start = 0.4 GPM

DHW supply temperature for WB1B 35 (with mixed water)



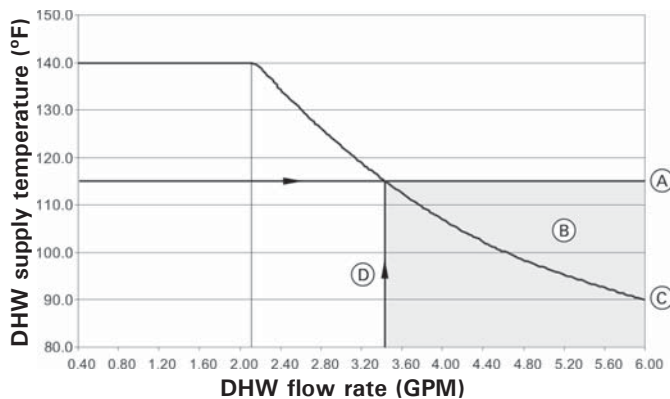
This chart illustrates the changes in the outlet temperature, subject to the flow rate at the tap.

If greater volume (max. flow rate through heat exchanger = 3.6 GPM) of water is required, cold water needs to be mixed which reduces the outlet temperature.

Curve is only applicable for a *DCW inlet temperature of 56° F* and a boiler input of 118,000 MBH (Vitodens 100-W, WB1B 35).

Max. recovery rate @ DHW temperature of 140° F = 2.4 GPM
Min. flow through the heat exchanger for boiler start = 0.4 GPM

DHW supply temperature for WB1B 35 (with mixed water)



This chart illustrates the changes in the outlet temperature, subject to the flow rate at the tap.

If greater volume (max. flow rate through heat exchanger = 3.4 GPM) of water is required, cold water needs to be mixed which reduces the outlet temperature.

Curve is only applicable for a *DCW inlet temperature of 40° F* and a boiler input of 118,000 MBH (Vitodens 100-W, WB1B 35).

Max. recovery rate @ DHW temperature of 140° F = 2.14 GPM
Min. flow through the heat exchanger for boiler start = 0.4 GPM

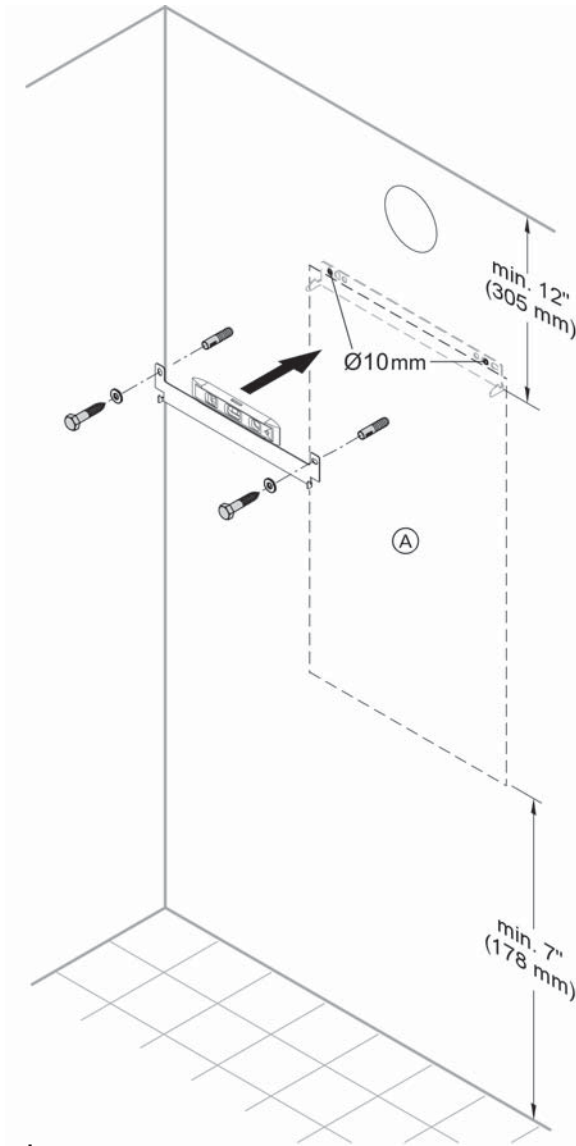
Mounting

Domestic Hot Water Production via DHW Storage Tank

Vitodens 100-W boilers can be used in conjunction with the stand-alone DHW storage tanks offered by Viessmann (a separate DHW controller should be field supplied). All Viessmann DHW storage tanks sold in North America are available in "Vitosilver" finish only.

Size and select the DHW storage tank based on the forecast DHW consumption of the building in question. For further technical information on DHW storage tanks, see the Vitocell-V Technical Data Manuals.

Mounting Vitodens 100-W boiler



Legend

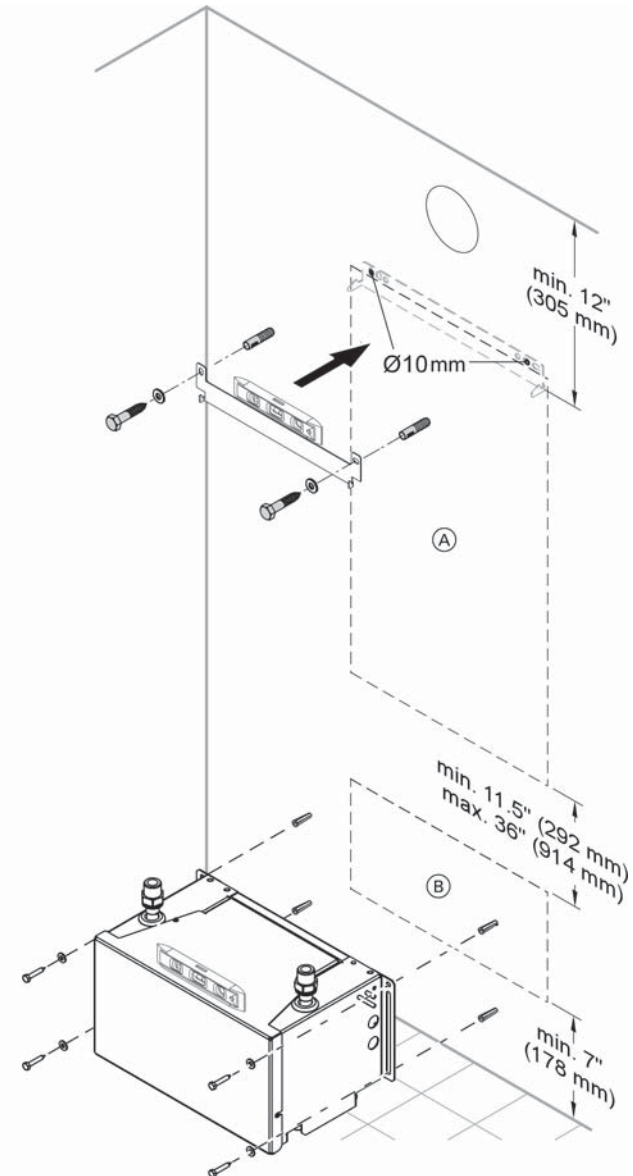
Ⓐ Boiler mounting template

Wall Mounting Information

The Vitodens 100-W (model WB1B 26 and 35) comes with a template, which allows you to easily mark the location of the screws for the mounting bracket and the location of the flue gas pipe on the wall (Viessmann coaxial PPS vent system only).

The connection to the heating circuits must be made on site (installation fittings are supplied in the Installation Fittings package supplied with the boiler).

Mounting Vitodens 100-W boiler and the CombiPLUS



Legend

Ⓐ Boiler mounting template

Ⓑ CombiPLUS mounting template

Condensate

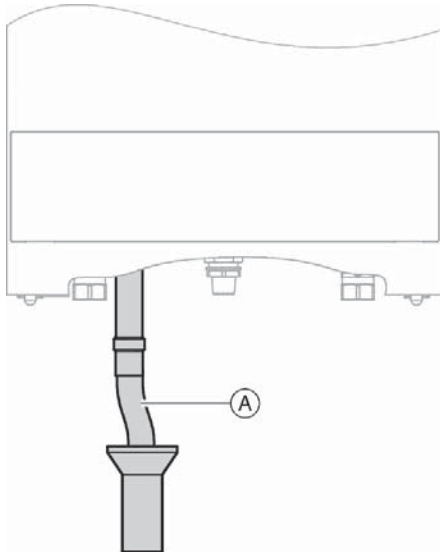
Condensate Connection

Install the condensate drain pipe (Ø 7/8" / 22 mm) with a suitable gradient (min. 2.5%).

Discharge condensate from the boiler into the drainage system, either directly or (if required) via a neutralization unit (accessory).

Condensate connection for Vitodens 100-W

- model WB1B 26, 35



Ⓐ Discharge tubing

The condensate drain of the Vitodens 100-W boiler is equipped with a built-in siphon trap in order to keep flue gases from being discharged via the condensate drain.

IMPORTANT

Pipe ventilation must take place between the siphon trap and the neutralization unit (if applicable).

Condensate Drainage and Condensate Neutralization

The condensate formed both in the condensing boiler and in the flue gas pipe must be discharged into the public sewage system in accordance with all applicable local regulations. The condensate produced by a gas-fired heating system has a pH value between 3 and 4.

Some local codes may require the use of a separate neutralization unit to treat the aggressive and corrosive condensate.

With a neutralization unit installed, all condensate from the boiler and the flue gas pipe enters into the neutralization unit where it is treated and released into the public sewage system with a safe pH value of above 6.5.

The use of neutralization granulate (performing the neutralizing process) is dependent on the operation of the heating system. To determine the required refill amount, check granulate level several times during the first year of operation. In some cases one granulate fill may last an entire year.

Contact Viessmann to order a neutralization unit for the Vitodens 100-W boiler.

See Viessmann Price List for order information.

The condensate discharge outlet to the drainage system connection must be clearly visible. It must be installed with a suitable gradient and provided with a stench trap.

If the condensate outlet of the Vitodens 100-W boiler is lower than the drain, a condensate pump must be used.

Only corrosion-resistant materials may be used for condensate drainage purposes (e.g. braided hose). Do not use galvanized materials or materials containing copper for piping, couplings etc. The condensate drain must have a trap.

Please note that other requirements may apply depending on local regulations and/or project-specific details.

It is advisable to contact your local waterworks office (authority responsible for waste water regulations) well before commencing with the installation of the neutralization unit in order to establish details of local regulations that apply.

The following table shows the concentration of (effluent) substances (e.g. heavy metals) contained in the waste water from the Vitodens 100-W condensing boiler.

Condensate (effluent) substances	Values measured in mg/L Vitodens 100
Lead	< 0.01
Cadmium	< 0.005
Chromium	< 0.01
Copper	< 0.01
Nickel	< 0.01
Zinc	< 0.05
Tin	< 0.05

Venting Options / Electrical Connections

Vitodens 100-W Venting Options

For detailed information refer to the Vitodens Venting System Installation Instructions.

Electrical Connection

All electrical connections are made to the boiler's integrated power pump module (120 VAC/60 Hz). Use disconnect means and power service switch as per local code requirements.

Control Unit

Function and construction:

The control is integrated into the Vitodens 100-W boiler.

- Integrated diagnostic system
- For room temperature-dependent operation, an external control or a room temperature thermostat may be connected
- To control DHW temperature, a separate DHW controller may be connected
- External heat demand
- 0-10 V (with open therm only)
- Viessmann outdoor temperature sensor (field wiring)
- Open Therm (field wiring)
- CombiPLUS instantaneous DHW control

The control unit consists of:

- LCD Display
- Selector dial for boiler water temperature adjustment
- Selector dial for service setting
- Temperature adjustable high limit
- Boiler temperature sensor
- Burner fault display
- Burner fault reset
- Pressure gage
- Fuse

Boiler temperature sensor

The boiler temperature sensor is connected to the control unit and built into the boiler.

Frost protection

Frost protection is continuously active. The burner is switched ON when the boiler water temperature reaches 41° F (5° C) and is switched OFF again when the boiler water temperature reaches at least 59° F (15° C) [but not more than 68° F (20° C)].

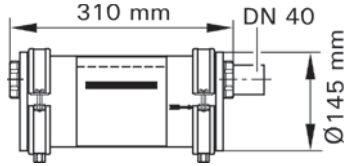


For details on the control, refer to the Vitodens 100-W Operating Instructions.

Accessories

Accessories for the Vitodens 100-W

Neutralization Unit for Single-Boiler Applications with neutralizing granulate for Vitodens 100-W, WB1B 26, 35 Part No. 7134 231



Low-Loss Header

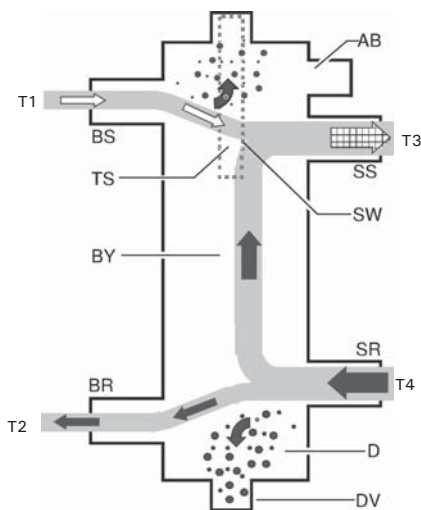
- Type 80/60 [max. flow rate 19.5 GPM (4.4 m3/h)]
- Type 120/80 [max. flow rate 35.2 GPM (8 m3/h)]

A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees. When used in conjunction with the Vitodens 100-W boiler, the low-loss header acts as hydraulic break, decoupling boiler and system circuits from each other (no sensor required). It is recommended to use the low-loss header in applications in which the total system flow rate exceeds the maximum or falls below the minimum flow rate of the Vitodens 100-W boiler.

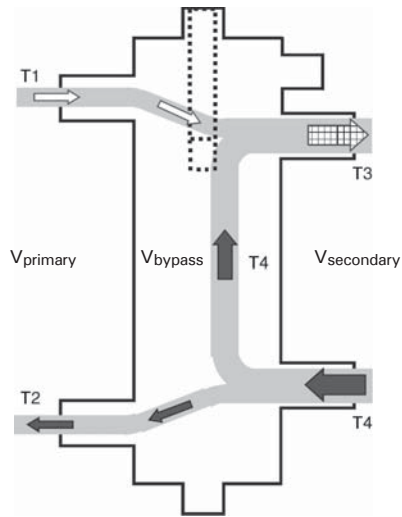
For maximum boiler flow rates, see the table on page 11 in this manual.

Viessmann strongly recommends the use of a low-loss header in cases where the system head and flow rates are unknown.

In addition, the low-loss header helps eliminate air and debris [D] from the heating system. See illustrations for Low-loss header design and the principle of operation. Product may not look exactly as illustrated.



Low-loss header design



Principal of operation

The low-loss header is available in the following sizes. Select the size based on the maximum system flow rate of your application.

Model No.	Max. system flow rate
Type 80/60	19.5 GPM (4.4 m3/h)
Type 120/80	35.2 GPM (8 m3/h)

Legend

AB	Air Bleed	DV	Drain Valve
BR	Boiler Return	SR	System Return
BS	Boiler Supply	SS	System Supply
BY	Bypass (with laminar flow)	TS	Viessmann Temp. Sensor (not used)
D	Debris and/or air	SW	Sensor Well
T1	Boiler supply temp.	T3	System supply temp.
T2	Boiler return temp.	T4	System return temp.

- $V_{primary}$ Boiler circuit flow rate
- $V_{secondary}$ Heating circuit flow rate
- V_{bypass} Bypass flow rate
- $Q_{primary}$ Heat supplied by boiler
- $Q_{secondary}$ Heat consumed by system

$V_{primary} < V_{secondary}$
 $T1 > T3$
 $T2 = T4$
 $Q_{primary} = Q_{secondary}$
 $T1 \ 176^{\circ} \text{ F } (80^{\circ} \text{ C})$
 $V_{secondary} = V_{primary} + V_{bypass}$

IMPORTANT

When installing a low-loss header, system mixed supply temperature (T3) must be calculated as follows

$$T3 = \frac{T1 \times V_{primary} + T4 \times V_{bypass}}{V_{secondary}}$$

Product may not look exactly as illustrated.

Standard Equipment

Standard Equipment

The Vitodens 100-W gas-fired condensing boiler with Inox-Radial heat exchanger surfaces, modulating stainless steel MatriX cylinder gas burner c/w:

- installation fittings with 30 psig pressure relief valve, air vent and pressure gauge
- two fill/drain valves
- all mounting hardware

The boiler comes fully piped and pre-wired.

Venting material (coaxial) or single pipe PP(s) is to be supplied by Viessmann only. Side wall vent installations must include Viessmann protective screen!

Wall mounting componentry

The following wall mounting components are supplied with the Vitodens 100-W boiler:

- Mounting bracket
- Mounting bolts
- Installation fittings
- Screws for mounting bracket on
 - wood studs (2" x 4")
 - metal studs
 - brick/concrete wall

How the Vitodens 100-W boiler operates...

The Vitodens 100-W boiler uses a premix combustion system, which is designed to deliver a certain air-gas mixture to the burner for complete combustion. The gas is injected upstream of the blower. The burner and heat exchanger are part of a forced-draft design. The benefits of forced-draft systems are lower component temperatures, direct air-fuel connection (premix) for improved mixing, and longer service life of the boiler due to mild to moderate ambient conditions.

The MatriX cylinder burner, blower and the combination gas valve are factory calibrated and pre-adjusted. A pneumatic link between combustion air and gas flows guarantees optimal boiler performance at all firing rates. Blower speed is automatically increased or decreased based on heat demand, thereby regulating the amount of combustion air drawn. The pneumatic link between air and gas introduces the required amount of gas for optimal combustion to meet the current heat demand, based on a linear relationship between ΔP air and ΔP gas.

Installation Examples

IMPORTANT

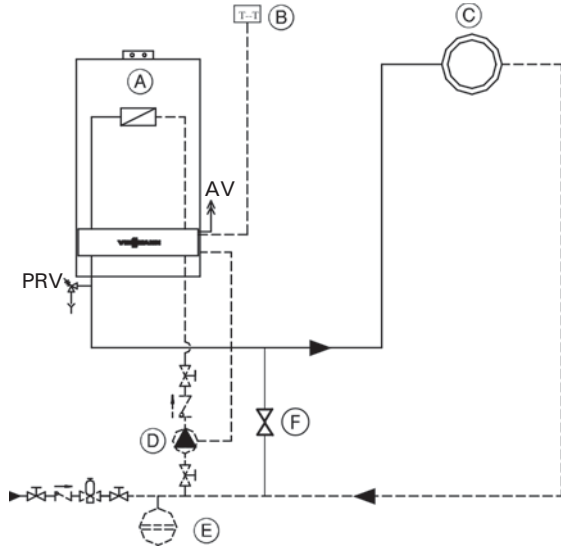
The examples on the following pages depict possible piping layouts of the Vitodens 100-W boiler.

Please note that the following examples are simplified conceptual drawings only!

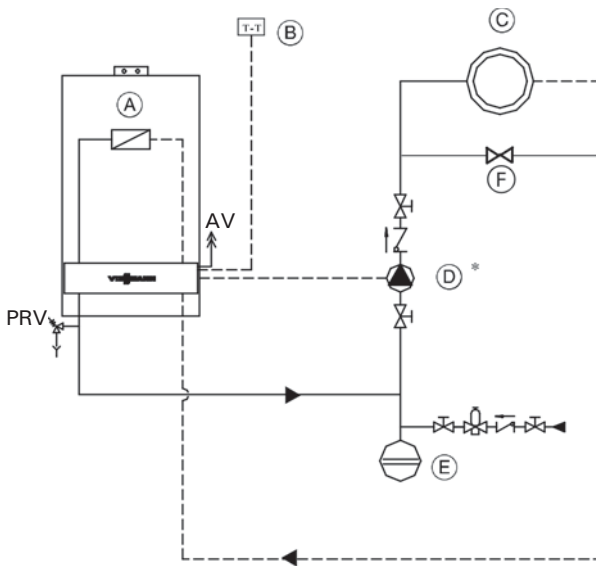
Piping and necessary componentry must be field verified. A low water cut-off (LWCO) must be installed where required by local codes. Proper installation and functionality in the field is the responsibility of the heating contractor.

System Layout 1

Vitodens 100-W, WB1B 26, 35 with one heating circuit (without optional CombiPLUS)



System Layout 1 (alternate option)



Legend

- AV Air vent
- PRV Pressure relief valve
- (A) Vitodens 100-W
- (B) Room thermostat
- (C) Heating circuit
- (D) Heating circuit pump (field supplied)
- (E) Expansion tank
- (F) Pressure Activated By-Pass

Maximum Flow Rates

Model WB1B	26	35
Δt		
Output Btu/h	83,000	108,000
30° F rise (GPM)	5.5	---
35° F rise (GPM)	4.7	6.2
40° F rise (GPM)	4.2	5.4

Note: The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h). The low-loss header is available as accessory part.

Note: Heating circuit C in the examples should be designed to 30° F to 40° F (16.7° C to 22.2° C). For lesser delta T design, system layout designer must use one of the examples (3 or 4) on the following pages.

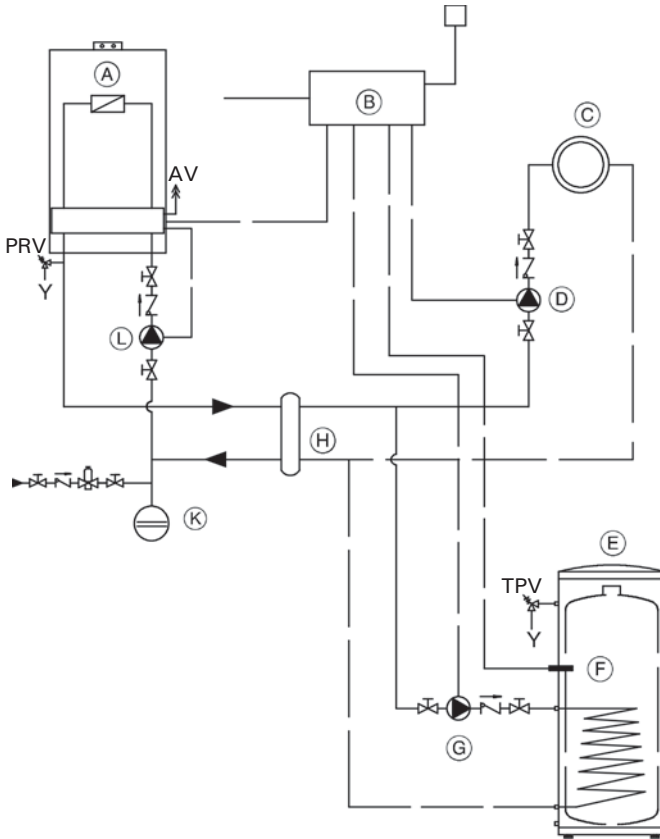
IMPORTANT

Ensure that a pressure activated by-pass is installed if there are system component(s) in (C) that may isolate the flow to the pump (D).

System Layout 2

Vitodens 100-W, WB1B 10-26, 10-35 with...

- DHW storage tank
- low-loss header
- one heating circuit



Legend

- AV Air vent
- PRV Pressure relief valve
- TPV Temperature and pressure relief valve
- (A) Vitodens 100-W gas-fired condensing boiler
- (B) External boiler/DHW controller (field supplied)
- (C) Heating circuit
- (D) Heating circuit pump (field supplied)
- (E) DHW storage tank
- (F) DHW tank temperature aquastat or sensor
- (G) DHW circulating pump (field supplied)
- (H) Low-loss header
- (K) Expansion tank
- (L) Primary pump (boiler circuit, field supplied) with low-loss header only

IMPORTANT

Primary pump must pump into the boiler (as illustrated).

Note: The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as accessory part.

Maximum Flow Rates

Model WB1B	26	35
Δt		
Output Btu/h	83,000	108,000
30° F rise (GPM)	5.5	---
35° F rise (GPM)	4.7	6.2
40° F rise (GPM)	4.2	5.4

IMPORTANT

DHW supply and return piping between boiler DHW connections and the Viessmann DHW tank connections, shall be a minimum of 1" nominal pipe diameter (irrespective of the 3/4" DHW connection outlet sizes provided on the boiler and the DHW tank).

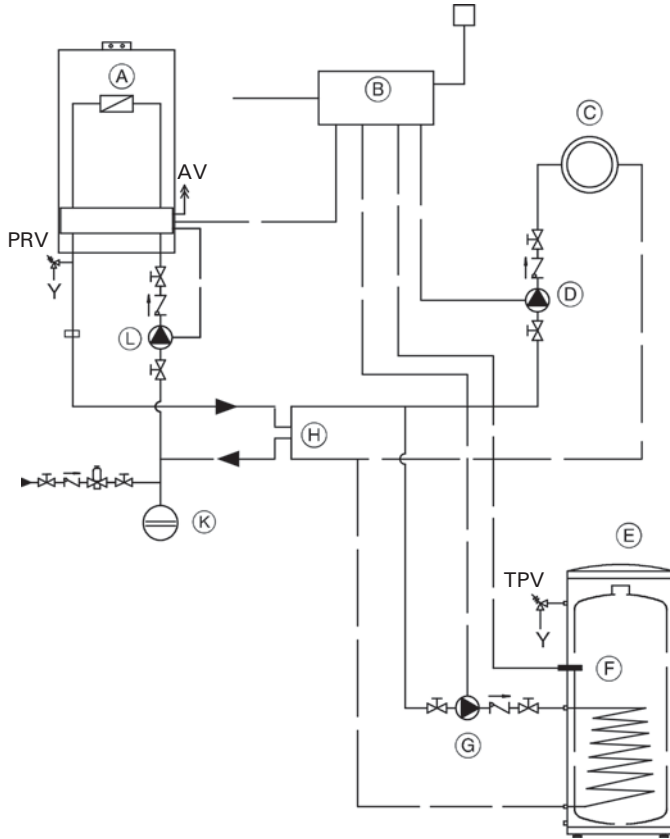
This ensures that the head of the pump is fully utilized to overcome the resistance of the DHW heat exchanger coil and to provide sufficient water flow to the boiler heat exchanger.

In non-Viessmann DHW tank applications, perform, in addition to the above, accurate calculations for DHW tank coil pressure drop versus boiler pump head to ensure sufficient water flow to the boiler heat exchanger.

Failure to heed the above instructions may cause boiler short-cycling and inadequate DHW supply.

System Layout 3

Vitodens 100-W, WB1B 10-26, 10-35 with DHW storage tank and one heating circuit



Legend

- AV Air vent
- PRV Pressure relief valve
- TPV Temperature and pressure relief valve
- (A) Vitodens 100-W gas-fired condensing boiler
- (B) External boiler/DHW controller (field supplied)
- (C) Heating circuit
- (D) Heating circuit pump (field supplied)
- (E) DHW storage tank
- (F) DHW tank temperature aquastat or sensor
- (G) DHW circulating pump (field supplied)
- (H) Closely spaced tees, 4x pipe Ø or 12" (305 mm)*
- (K) Expansion tank
- (L) Primary pump (boiler circuit, field supplied) with low-loss header only

* A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees.

See page 18 for details.

IMPORTANT

Primary pump must pump into the boiler (as illustrated).

Note: The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).

The low-loss header is available as an accessory part.

Maximum Flow Rates

Model WB1B	26	35
Δt		
Output Btu/h	83,000	108,000
30° F rise (GPM)	5.5	---
35° F rise (GPM)	4.7	6.2
40° F rise (GPM)	4.2	5.4

IMPORTANT

DHW supply and return piping between boiler DHW connections and the Viessmann DHW tank connections, shall be a minimum of 1" nominal pipe diameter (irrespective of the 3/4" DHW connection outlet sizes provided on the boiler and the DHW tank).

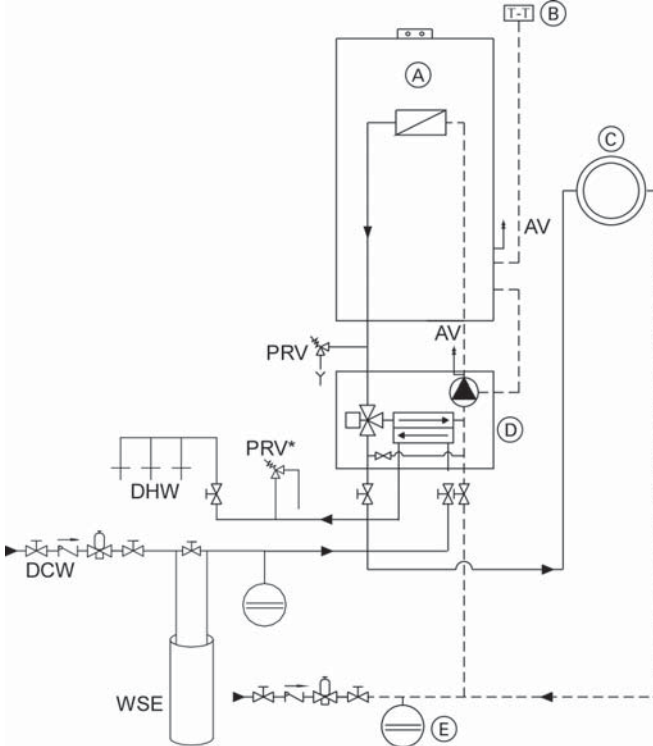
This ensures that the head of the pump is fully utilized to overcome the resistance of the DHW heat exchanger coil and to provide sufficient water flow to the boiler heat exchanger.

In non-Viessmann DHW tank applications, perform, in addition to the above, accurate calculations for DHW tank coil pressure drop versus boiler pump head to ensure sufficient water flow to the boiler heat exchanger.

Failure to heed the above instructions may cause boiler short-cycling and inadequate DHW supply.

System Layout 4

Vitodens 100-W, WB1B 26, 35 with one heating circuit and the CombiPLUS



Maximum Flow Rates

Model WB1B	26	35
Δt		
Output Btu/h	83,000	108,000
30° F rise (GPM)	5.5	---
35° F rise (GPM)	4.7	6.2
40° F rise (GPM)	4.2	5.4

Note: The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h). The low-loss header is available as accessory part.

Built-in pump residual head for the heating system side is 7.5 ft. of water column at the boiler maximum flow rate of 6.2 GPM.

Note: Heating circuit C in the examples should be designed to 30° F to 40° F (16.7° C to 22.2° C). For lesser delta T design, system layout designer must use one of the examples (5 or 6) on the following pages.

Legend

- AV Air vent
- PRV Pressure relief valve (boiler)
- PRV* Pressure relief valve (DHW 150 psi)
- WSE Water softner equipment
- (A) Vitodens 100-W
- (B) Room thermostat
- (C) Heating circuit
- (D) CombiPLUS
- (E) Expansion tank

System Layout 5

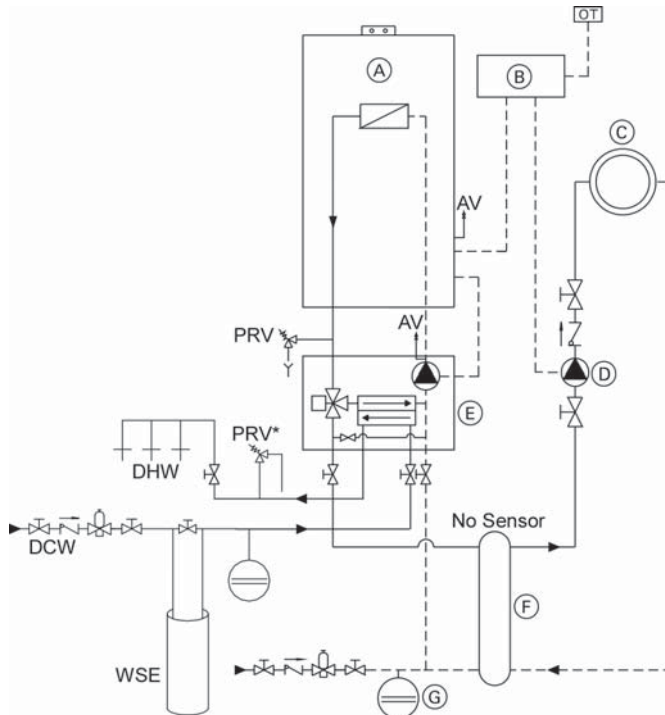
Vitodens 100-W, WB1B 10-26, 10-35 with...

- CombiPLUS Kit
- low-loss header
- one heating circuit

Note: The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as accessory part.

Maximum Flow Rates

Model WB1B	26	35
Δt		
Output Btu/h	83,000	108,000
30° F rise (GPM)	5.5	---
35° F rise (GPM)	4.7	6.2
40° F rise (GPM)	4.2	5.4



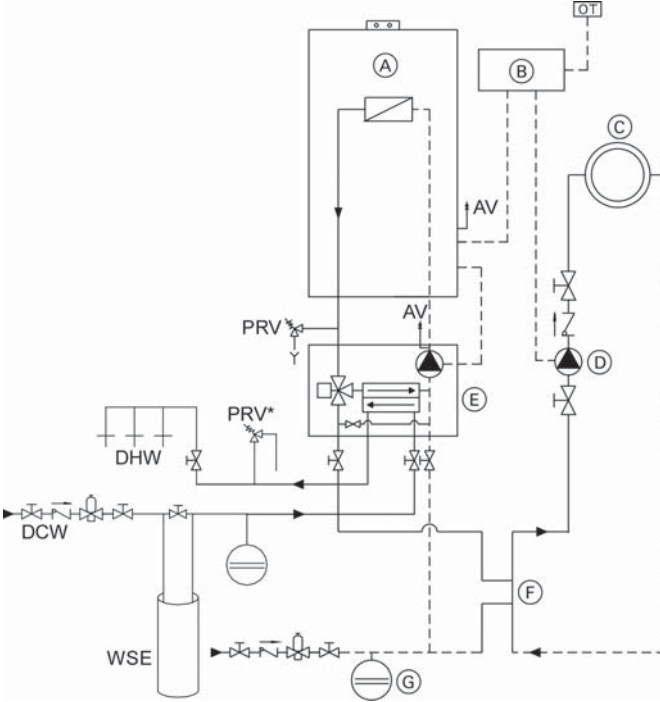
Legend

- AV Air vent
- PRV Pressure relief valve (boiler)
- PRV* Pressure relief valve (DHW 150 psi)
- WSE Water softener equipment
- (A) Vitodens 100-W gas-fired condensing boiler
- (B) External boiler / system controller (field supplied)
- (C) Heating circuit
- (D) Heating circuit pump (field supplied)
- (E) CombiPLUS
- (F) LLH
- (G) Expansion tank

System Layout 6

Vitodens 100-W, WB1B 10-26, 10-35 with CombiPLUS and one heating circuit without LLH

Note: The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as an accessory part.



Maximum Flow Rates

Model WB1B	26	35
Δt		
Output Btu/h	83,000	108,000
30° F rise (GPM)	5.5	---
35° F rise (GPM)	4.7	6.2
40° F rise (GPM)	4.2	5.4

Legend

- AV Air vent
- PRV Pressure relief valve (boiler)
- PRV* Pressure relief valve (DHW 150 psi)
- WSE Water softener equipment
- (A) Vitodens 100-W gas-fired condensing boiler
- (B) External system controller (field supplied)
- (C) Heating circuit
- (D) Heating circuit pump (field supplied)
- (E) CombiPLUS
- (F) Closely spaced tees, 4x pipe Ø or 12" (305 mm)*
- (G) Expansion tank

* A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees.

See page 18 for details.

System Design Considerations

IN THE COMMONWEALTH OF MASSACHUSETTS...

- this product shall be installed by a licensed plumber or gas fitter.
- the flexible connector (if used) may not exceed 36".
- any level type shutoff used must be of tee handle type.

Boiler location

As a direct vent appliance, the Vitodens 100-W may be installed for room air independent operation (sealed combustion) regardless of size and ventilation method of the room in which it is located.

The Vitodens 100-W may be installed, for example, in the main living area of a house, in non-ventilated utility rooms, cupboards, closets and alcoves with no clearance required from combustible materials, as well as in attics with a direct outlet for the flue gas/fresh air system. Follow all local and national codes.

Flue gas system

Viessmann coaxial PPS (Polypropylene - flame retardant) concentric flue gas/fresh air systems and two-pipe stainless steel/CPVC systems for room air independent operation (sealed combustion) and side wall venting are tested to ANSI Z21.13 - CSA 4.9 - 2007 standards and are certified together with the Vitodens 100-W boiler as a constructional unit. The Vitodens 100-W boiler may also be vented vertically or horizontally, using a metallic AL29-4C® special stainless steel, or non-metallic CPVC single-wall, room air dependent venting system (UL/ULC listed for category IV).

For a more detailed description of the direct vent and single-wall vent system, please refer to the Vitodens Venting System Installation Instructions.

Flue gas temperature protection

Viessmann coaxial PPS (Polypropylene - flame retardant) flue pipes used for the Vitodens 100-W are rated for max. flue gas temperatures of up to 230° F (110° C).

Flue gas temperature protection is also included although the maximum permissible flue gas temperature will not be exceeded in any operating condition or in the event of malfunctioning.

Low water cut-off

A low water cut-off may be required by local codes. If the boiler is installed above the radiation level, a low water cut-off device of approved type must be installed in all instances. An approved low water cut-off device that meets government and local regulations must be provided by the heating contractor.

Do not install an isolation valve between the boiler and the low water cut-off. The Vitodens 100-W boiler has a built-in flow switch, which may be accepted by local codes in lieu of a low water cut-off.

System layout

- The max. boiler water temperature for ...
 - space heating is 176° F (80° C).
 - DHW production is 176° F (80° C).

To minimize distribution losses, Viessmann recommends that the heating and domestic hot water systems be based on a maximum boiler supply temperature of 158° F (70° C).

- Due to the low return temperatures required for gas condensing, avoid the use of mixing valves in the heating circuit whenever possible.

If mixing valves are required, e.g. for multi-circuit systems or underfloor heating systems, only 3-way mixing valves may be used.

Do not use 4-way mixing valves in a system with condensing boilers.

Water connections

Vitodens 100-W boilers can be used in any fully pumped hot water heating system.

Minimum system pressure is 0.8 bar (12 psig).

Chemical corrosion protection products

Corrosion does not typically occur in sealed heating systems which have been correctly installed and are correctly operated.

Many manufacturers of plastic pipes recommend the use of chemical additives. In this case, only commercially available corrosion protection products that have been approved for boilers with domestic hot water heating via single-wall heat exchangers (instantaneous plate heat exchangers or DHW tanks) may be used.

Underfloor heating systems

For underfloor heating systems Viessmann recommends the use of plastic tubing with an oxygen diffusion barrier in order to prevent the diffusion of oxygen through tubing.

If plastic tubing without an oxygen diffusion barrier is used in underfloor heating systems, Viessmann recommends that such systems be separated from the boiler with a heat exchanger.

Water Conditions for DHW CombiPLUS

Media: pH value 6.5 to 12, glycol max. 30%

DHW (max. hardness): Chloride up to 250 mg/L

Hardness up to 358 ppm
(= max. 0.278 kg/m³ lime deposit)

System Design Considerations *(continued)*

Oxygen diffusion barrier underfloor tubing

The boiler warranty does not cover leaks resulting from corrosion caused by the use of underfloor plastic tubing without an oxygen diffusion barrier. Such systems must have the non-oxygen diffusion barrier tubing separated from the boiler with a heat exchanger.

Viessmann recommends the use of underfloor plastic tubing with an oxygen diffusion barrier.

Water quality

Treatment for boiler feed water should be considered in areas of known problems, such as where a high mineral content and hardness exist. In areas where freezing might occur, an antifreeze may be added to the system water to protect the system. 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 backflow preventer within the automatic water feed and influence components such as diaphragm expansion tanks, radiation, etc. Maximum antifreeze content is 50% for the Vitodens 100-W boiler (when used with DHW CombiPLUS max. content is 30%). Do not use antifreeze other than specifically made for hot water heating systems.

The system may also contain components which might be negatively affected by antifreeze.

Check total system frequently when filled with antifreeze. Advise system operator/ultimate owner that system is filled with a glycol mix.

The heating contractor must provide a MSDS (Material Safety Data Sheet) for the antifreeze used to the system operator/ultimate owner.

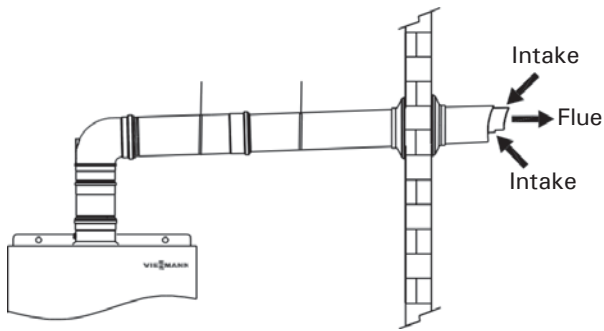
Warranty

Our warranty does not cover damages resulting from the following:

- installation or service by unqualified and unlicensed personnel.
- attempting to perform any repair work on the boiler other than that mentioned in the boiler literature.
- tampering with or attempting to readjust the factory settings of the combination gas valve
- leaks resulting from corrosion caused by the use of underfloor plastic tubing without an oxygen diffusion barrier.

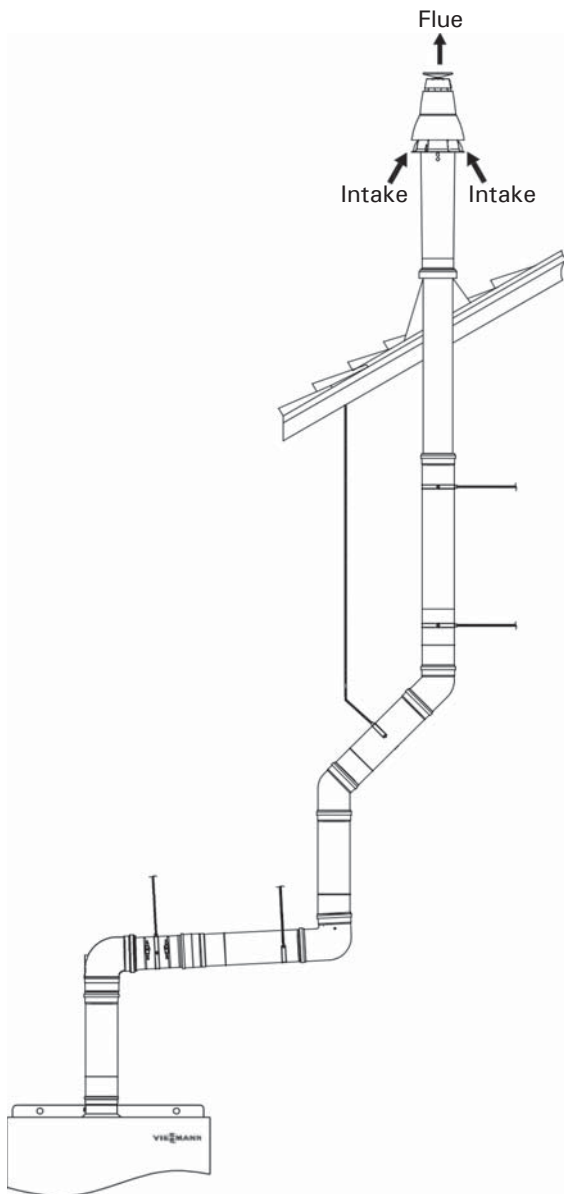
For detailed warranty information, please read warranty sheet supplied with product.

Coaxial System



Coaxial, horizontally vented, PP(s) (Viessmann supplied)

Vent system diameter (mm)	60/100	80/125	100/150
Maximum equivalent length ft. (m)	82 (25)	98 (30)	118 (36)

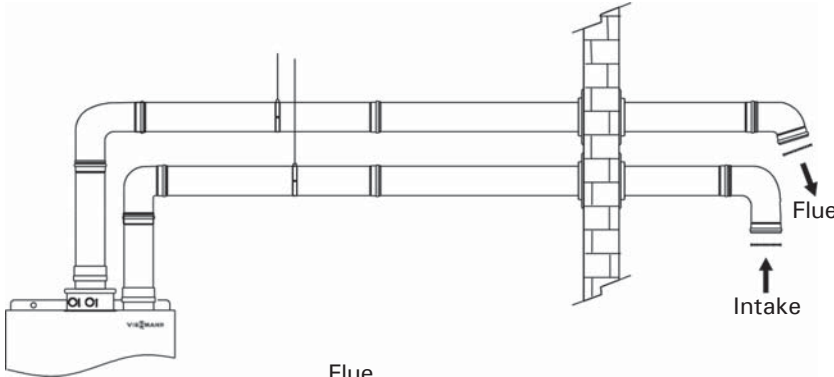


Coaxial, vertically vented, PP(s) (Viessmann supplied)

Vent system diameter (mm)	60/100	80/125	100/150
Maximum equivalent length ft. (m)	82 (25)	98 (30)	118 (36)

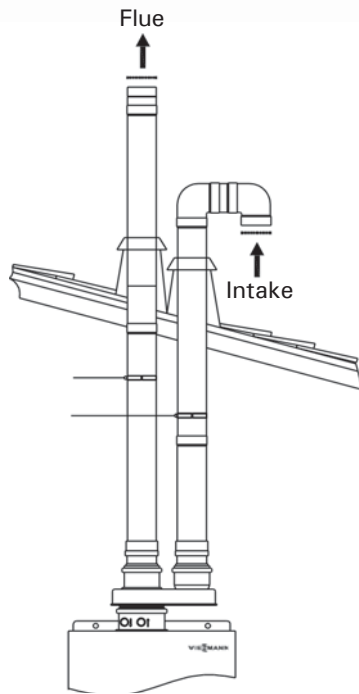
Two Pipe System

Two pipe system (room air independent) horizontally vented



Vent system diameter (in)	2*	3	4
Maximum equivalent length ft. (m)	86 (20)	164 (50)	200 (61)

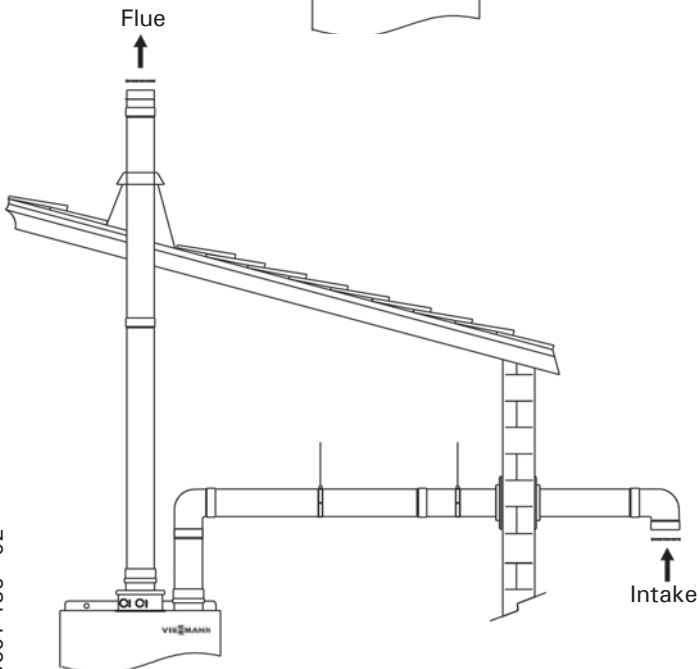
*stainless steel is not available in 2"
Combustion air: CPVC, PVC, ABS and stainless steel (field supplied)
Flue gas: CPVC and stainless steel (field supplied)
PP(s): (Viessmann supplied)



Two pipe system (room air independent) vertically vented

Vent system diameter (in)	2*	3	4
Maximum equivalent length ft. (m)	86 (20)	164 (50)	200 (61)

*stainless steel is not available in 2"
Combustion air: CPVC, PVC, ABS and stainless steel (field supplied)
Flue gas: CPVC and stainless steel (field supplied)
PP(s): (Viessmann supplied)

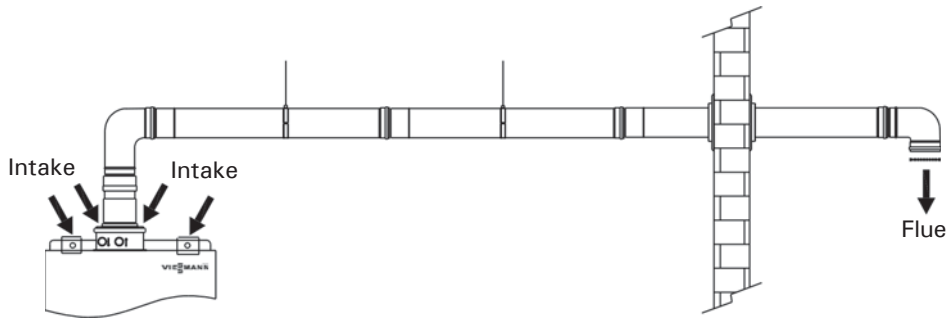


Two pipe system (room air independent) hybrid

Vent system diameter (in)	2*	3	4
Maximum equivalent length ft. (m)	86 (20)	164 (50)	200 (61)

*stainless steel is not available in 2"
Combustion air: CPVC, PVC, ABS and stainless steel (field supplied)
Flue gas: CPVC and stainless steel (field supplied)
PP(s): (Viessmann supplied)

Single Pipe System

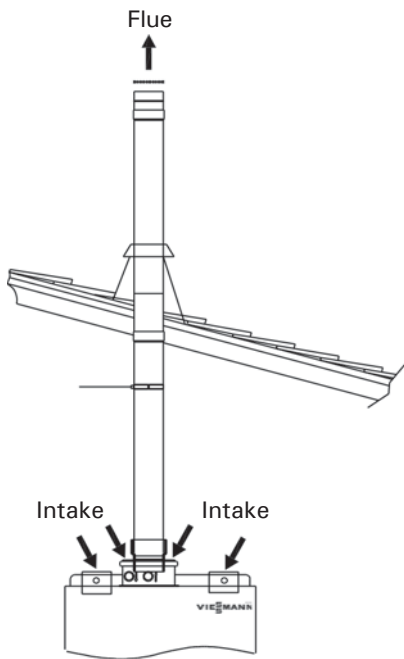


Single pipe system (room air dependant) horizontally vented

Vent system diameter (in)	2*	3	4
Maximum equivalent length ft. (m)	86 (20)	164 (50)	200 (61)

*stainless steel is not available in 2"

CPVC and stainless steel (field supplied)
PP(s) (Viessmann supplied)



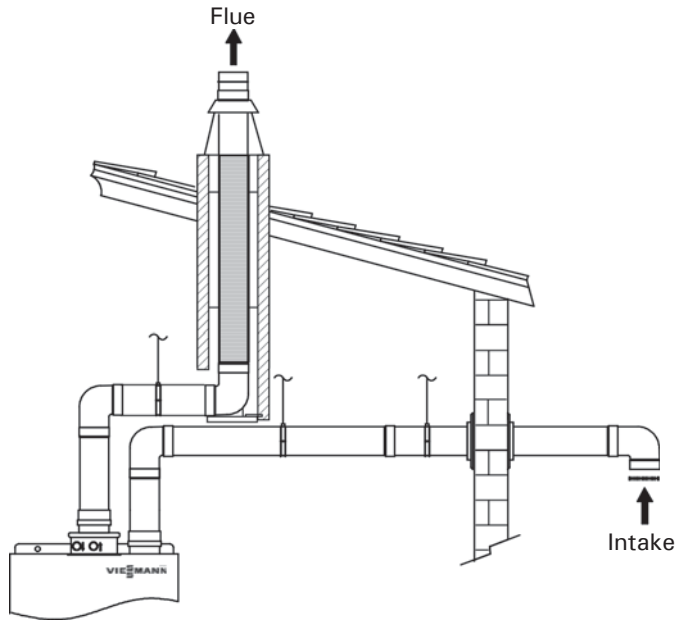
Single pipe system (room air dependant) vertically vented

Vent system diameter (in)	2*	3	4
Maximum equivalent length ft. (m)	86 (20)	164 (50)	200 (61)

*stainless steel is not available in 2"

CPVC and stainless steel (field supplied)
PP(s) (Viessmann supplied)

Flexible System

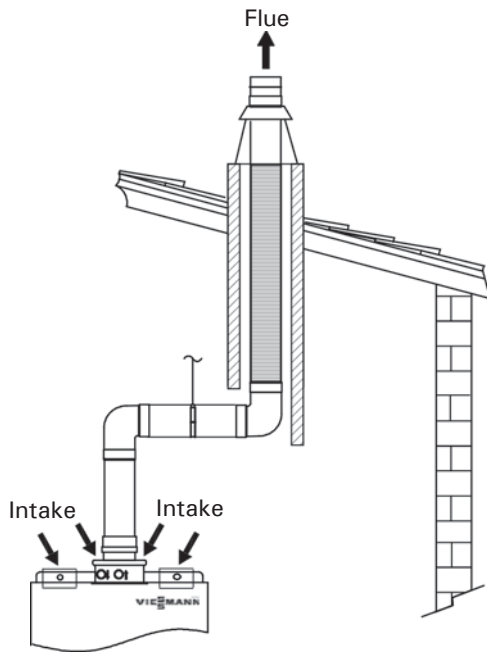


Flexible two pipe system (room air independent)

Vent system diameter (in)	80 flex 2" comb.	80	100
Maximum equivalent length ft. (m)	65 (20)	123 (37)	150 (46)

Combustion air: CPVC, PVC, ABS and stainless steel (field supplied)

Flue gas: PP(s) (Viessmann supplied)



Flexible single pipe system (room air dependant)

Vent system diameter (in)	80	100
Maximum equivalent length ft. (m)	123 (37)	150 (46)

PP(s) (Viessmann supplied)

Quick Reference

°C	°F
-40	-40
-35	-31
-25	-13
-20	-4
-18	0
-16	+3
-14	+7
-12	+10
-10	+14
-9	+16
-8	+18
-7	+19
-6	+21
-5	+23
-4	+25
-3	+27
-2	+28
-1	+30
0	+32
+1	+34
+2	+36
+3	+37
+4	+39
+5	+41
+6	+43
+7	+45
+8	+46
+9	+48
+10	+50
+12	+54
+14	+57
+16	+61
+18	+64
+20	+68
+25	+77
+30	+86
+35	+95
+40	+104
+50	+122
+60	+140
+70	+158
+80	+176
+90	+194
+100	+212
+110	+230

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