Greenstar® Gas-Fired Condensing Boilers

A Green Start To Space & Water Heating

Residential space and water heating boiler solutions with up to 98.7% efficiency and 57.2 to 151.6 MBH inputs.

BOSCH
Invented for life

Q 1

LOW NOx EMISSIONS

Do not extend exposed vent pipe outside the building beyond recommended distance. Condensate could freeze and block vent pipe.

Vent should terminate at least 3 feet (915 mm) away from adjacent walls, inside corners and 5 feet (1525 mm) below roof overhang (→ fig. 26 [X_2], [X_4], page 46).

It is not recommended to terminate vent above any door or window, condensate can freeze causing ice formations.

Do not use chimney as a raceway if another boiler or fireplace is vented into or through chimney.

All non-steel vent pipes must be glued, except for the flue gas adapter-pipe connection.

The exhaust pipe must be properly supported and pitched a minimum of ¼ inch (6.35 mm) per foot back to the boiler. This allows the condensate to properly drain.

NOTICE: Damage of 2 inch PVC pipes.

- For ZBR42-3A and ZWB42-3A use 2 inch CPVC-pipes or 3 inch pipes.

All non-steel combustion air and vent pipe materials and fittings must comply with the following and must be UL approved venting material:

Material	Item	United states	Canada	ZBR16-3A	ZBR28-3A	ZBR35-3A	ZBR42-3A	ZWB28-3A	ZWB42-3A
PVC schedule 40, 80	2" (50 mm) Vent or air pipe and fitting	ANSI/ASTM D1785	BH Gas venting systems, ULC S636 [1]	X	X	X		X	
PVC-DWV		ANSI/ASTM D2665		X	X	X		X	
CPVC schedule 40, 80		ANSI/ASTM F441		X	X	X	X	X	X
PVC schedule 40, 80	3" (76 mm) Vent or air pipe and fitting	ANSI/ASTM D1785		X	X	X	X	X	X
PVC-DWV		ANSI/ASTM D2665		X	X	X	X	X	X
CPVC schedule 40, 80		ANSI/ASTM F441		X	X	X	X	X	X
PVC	Pipe cement/ primer	ANSI/ASTM D2564		X	X	X	X	X	X
CPVC		ANSI/ASTM F493		X	X	X	X	X	X

Tab. 18 Materials for pipe

1) Components of the certified vent systems must not be interchanged with other vent systems or unlisted pipe fittings. Plastic components, and specified primers and glues of the certified vent system must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts.

Roof terminals	Material	Supplier	Part number
Ø 3" / Ø 6" (Ø 76/150 mm)	concentric PVC	IPEX	196016

Tab. 19 Roof terminals

Wall terminals	Flue System / Materials	Supplier	Part number
Ø 3" (Ø 76 mm)	parallel stainless steel	Flex-L	46546901
90°-elbow with inlet screen	PVC (elbow) stainless steel (screen)	IPEX (elbow) Langly Wire (screen)	UL-S636 approval (elbow) L2594 (screen)

Tab. 20 Wall terminals

5.8.3 Vent and combustion air pipe lengths

3" (76 mm) Vent and combustion air pipe

For all installation situations and for all appliances the maximum vent and combustion air pipe length is 100 feet each, with no more than 8 elbows each.

2" (50 mm) Vent and combustion air pipe

The maximum combined vent and combustion air pipe length (→ tab. 21, 22 and 23) depend on the installation situation, the appliance type and the number of elbows used.

Installations → Fig. 27, 28, 29, 31, 32 and 34 Separate terminations		
2" PIPE	Maximum combined pipe length including elbows in feet (m) for	
Number of elbows	ZBR16-3A ZBR28-3A ZWB28-3A	ZBR35-3A ZBR42-3A ZWB42-3A
1	81 ft (24.6 m)	65 ft (19.8 m)
2	76 ft (23.1 m)	57 ft (17.3 m)
3	71 ft (21.6 m)	48 ft (14.6 m)
4	66 ft (20.1 m)	40 ft (12.2 m)
5	61 ft (18.6 m)	32 ft (9.8 m)
6	56 ft (17.1 m)	23 ft (7.0 m)

Tab. 21 Vent and combustion air pipe lengths with 2" diameter and separate terminations

Installations → Fig. 30 Stainless steel wall termination		
2" PIPE	Maximum combined pipe length including elbows in feet (m) for	
Number of elbows	ZBR16-3A ZBR28-3A ZWB28-3A	ZBR35-3A ZBR42-3A ZWB42-3A
1	76 ft (23.1 m)	60 ft (18.3 m)
2	71 ft (21.6 m)	52 ft (15.9 m)
3	66 ft (20.1 m)	43 ft (13.1 m)
4	61 ft (18.6 m)	35 ft (10.7 m)
5	56 ft (17.1 m)	27 ft (8.2 m)
6	51 ft (15.6 m)	18 ft (5.5 m)

Tab. 22 Vent and combustion air pipe lengths with 2" diameter and the stainless steel wall termination

Installations → Fig. 33 Concentric termination		
2" PIPE	Maximum combined pipe length including elbows in feet (m) for	
Number of elbows	ZBR16-3A ZBR28-3A ZWB28-3A	ZBR35-3A ZBR42-3A ZWB42-3A
1	66 ft (20.1 m)	47 ft (14.3 m)
2	61 ft (18.6 m)	38 ft (11.6 m)
3	56 ft (17.1 m)	30 ft (9.1 m)
4	51 ft (15.6 m)	22 ft (6.7 m)
5	46 ft (14.1 m)	13 ft (4.0 m)
6	41 ft (12.5 m)	5 ft (1.5 m)

Tab. 23 Vent and combustion air pipe lengths with 2" diameter and the concentric termination

5.8.1 Installation of the exhaust and air intake system

NOTICE:

- Vent connectors serving appliances vented by natural draft shall not be connected to any portion of mechanical draft systems operating under positive pressure.

NOTICE: Burner damage!

- Avoid drawing in combustion air excessively loaded with dust or airborne particles.

DANGER:

- Ensure that the flue pipes and seals are not damaged.
- Use only sealing compounds (primer and glue) approved with the vent material.
- Never install a barometric nor a thermally controlled vent damper with this boiler.
- Connect only one boiler to each flue system or chimney flue.
- The flue system piping must not feed into or through another air extraction duct.
- Do not route the flue system piping through or inside another duct that is used for exhausting air or other flue gases.
- The condensate trap must be primed at all times. Failure to do so may allow combustion gases to escape into boiler room.

Consult local and state codes pertaining to special building code and fire department requirements. Adhere to national code requirements.

Observe the listed maximum lengths of vent system, which are boiler model dependent (→ chapter 5.8.3).

Optional vent kits are:

- Concentric termination for horizontal/vertical (Part-#196006)
- Stainless steel parallel wall terminal (Part-#46546901)

Direct vent installations (sealed combustion)

For direct vent applications all applicable items below must be met.

The termination shall be at least 4 feet (1220 mm) for the U.S. and 6 feet (1830 mm) for Canada away from a gas utility meter, service regulator or the like (for room air applications only).

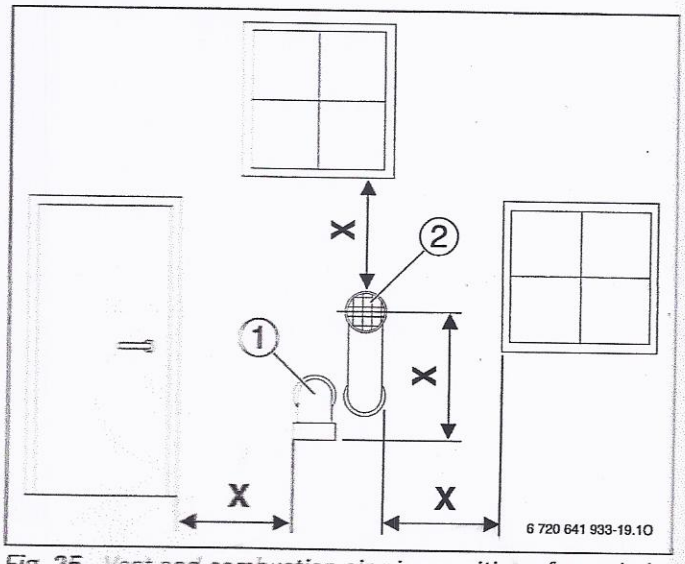

Fig. 25 Vent and combustion air pipe position of a sealed combustion system

1 Intake
2 Exhaust
X At least 1 foot (305 mm)

The termination shall terminate at least 1 foot (305 mm) below, 1 foot (305 mm) horizontally from or 1 foot (305 mm) above any door, window or gravity air inlet into any building (→ fig. 26 [2], [X_1], [X_3], page 46).

If multiple boilers are installed in a row, allow at least 1 foot (305 mm) clearance between the vent termination of one and the combustion air intake of the other.

Vent termination must be at least 1 foot (305 mm) above grade, anticipated snow line or roof surface (Canada 1-1/2 feet (457 mm) minimum) (→ fig. 26 [Y_A], page 46).

Vent termination must be at least 7 feet (2135 mm) above a public walkway (→ fig. 26 [X_5], page 46). Ensure that condensate spilling from the termination does not create a hazard or a nuisance.

Vent termination must be 3 feet (915 mm) above any forced air intake within 10 feet (3050 mm) (→ fig. 26 [1], [Y_B], page 46).

3.16 Technical data combi boiler ZWB42-3A...

	Unit	NG	LPG (propane)
Output at elevation 0 - 2000 feet (0 - 610 m)			
Maximum nominal output (P_{max}) 104/86 °F (40/30 °C)	BTU/hr (kW)	137,500 (40.3)	137,500 (40.3)
Maximum nominal output (P_{max}) 122/86 °F (50/30 °C)	BTU/hr (kW)	137,500 (40.3)	137,500 (40.3)
Maximum nominal output (P_{max}) 176/140 °F (80/60 °C)	BTU/hr (kW)	134,400 (39.4)	134,400 (39.4)
Max. nominal thermal load (Q_{max}) heating (H_i) 180/79 °F (82/26 °C)	BTU/hr (kW)	136,500 (40.0)	136,500 (40.0)
Max. nominal thermal load (Q_{max}) heating (H_s) 180/79 °F (82/26 °C)	BTU/hr (kW)	151,600 (44.4)	148,300 (43.5)
Min. nominal output (P_{min}) 104/86 °F (40/30 °C)	BTU/hr (kW)	35,500 (10.4)	46,400 (13.6)
Min. nominal output (P_{min}) 122/86 °F (50/30 °C)	BTU/hr (kW)	35,100 (10.3)	46,100 (13.5)
Min. nominal output (P_{min}) 176/140 °F (80/60 °C)	BTU/hr (kW)	31,700 (9.3)	42,000 (12.3)
Min. nominal thermal load (Q_{min}) heating (H_i) 180/79 °F (82/26 °C)	BTU/hr (kW)	32,400 (9.5)	42,700 (12.5)
Min. nominal thermal load (Q_{min}) heating (H_s) 180/79 °F (82/26 °C)	BTU/hr (kW)	36,000 (10.5)	46,400 (13.6)
Max. nominal output (P_{max}) DHW (H_i) 113 °F (45 °C)	BTU/hr (kW)	137,500 (40.3)	137,500 (40.3)
Max. nominal output (P_{max}) DHW (H_s) 140 °F (60 °C)	BTU/hr (kW)	135,800 (39.8)	135,800 (39.8)
Max. nominal thermal load (Q_{max}) DHW (H_i)	BTU/hr (kW)	136,500 (40.0)	136,500 (40.0)
Max. nominal thermal load (Q_{max}) DHW (H_s)	BTU/hr (kW)	151,600 (44.4)	148,300 (43.5)
Min. nominal thermal load (Q_{min}) DHW (H_i)	BTU/hr (kW)	32,400 (9.5)	42,700 (12.5)
Min. nominal thermal load (Q_{min}) DHW (H_s)	BTU/hr (kW)	36,000 (10.5)	46,400 (13.6)
Output at elevation 2000 - 4500 feet (611 - 1372 m) above sea level			
Maximum nominal output (P_{max}) 104/86 °F (40/30 °C)	BTU/hr (kW)	123,750 (36.3)	129,250 (37.9)
Maximum nominal output (P_{max}) 122/86 °F (50/30 °C)	BTU/hr (kW)	123,750 (36.3)	129,250 (37.9)
Maximum nominal output (P_{max}) 176/140 °F (80/60 °C)	BTU/hr (kW)	120,960 (35.5)	126,336 (37.0)
Max. nominal thermal load (Q_{max}) heating (H_i) 180/79 °F (82/26 °C)	BTU/hr (kW)	122,850 (36.0)	128,310 (37.6)
Max. nominal thermal load (Q_{max}) heating (H_s) 180/79 °F (82/26 °C)	BTU/hr (kW)	136,440 (40.0)	139,402 (40.9)
Max. nominal output (P_{max}) DHW (H_i) 113 °F (45 °C)	BTU/hr (kW)	123,750 (36.3)	129,250 (37.9)
Max. nominal output (P_{max}) DHW (H_s) 140 °F (60 °C)	BTU/hr (kW)	122,220 (35.8)	127,652 (37.4)
Max. nominal thermal load (Q_{max}) DHW (H_i)	BTU/hr (kW)	122,850 (36.0)	128,310 (37.6)
Max. nominal thermal load (Q_{max}) DHW (H_s)	BTU/hr (kW)	136,440 (40.0)	139,402 (40.9)
Output at elevation 4500 - 7000 feet (1373 - 2134 m) above sea level			
Maximum nominal output (P_{max}) 104/86 °F (40/30 °C)	BTU/hr (kW)	114,125 (33.5)	119,625 (35.1)
Maximum nominal output (P_{max}) 122/86 °F (50/30 °C)	BTU/hr (kW)	114,125 (33.5)	119,625 (35.1)
Maximum nominal output (P_{max}) 176/140 °F (80/60 °C)	BTU/hr (kW)	111,552 (32.7)	116,928 (34.3)
Max. nominal thermal load (Q_{max}) heating (H_i) 180/79 °F (82/26 °C)	BTU/hr (kW)	113,295 (33.2)	118,755 (34.8)
Max. nominal thermal load (Q_{max}) heating (H_s) 180/79 °F (82/26 °C)	BTU/hr (kW)	125,828 (36.9)	129,021 (37.8)
Max. nominal output (P_{max}) DHW (H_i) 113 °F (45 °C)	BTU/hr (kW)	114,125 (33.5)	119,625 (35.1)
Max. nominal output (P_{max}) DHW (H_s) 140 °F (60 °C)	BTU/hr (kW)	112,714 (33.0)	118,146 (34.6)
Max. nominal thermal load (Q_{max}) DHW (H_i)	BTU/hr (kW)	113,295 (33.2)	118,755 (34.8)
Max. nominal thermal load (Q_{max}) DHW (H_s)	BTU/hr (kW)	125,828 (36.9)	129,021 (37.8)
Gas connection value			
Natural Gas – H_s = 1,010 BTU/ft^3 (37.3MJ/m^3)	ft^3/hr (m^3/h)	149 (4.2)	–
Liquid Propane Gas – H_{D-S} = 2,500 BTU/ft^3 (93.1MJ/m^3)	ft^3/hr (m^3/h)	–	59 (1.7)
Permissible inlet gas pressure			
NG	in. W.C. (mbar)	3.5-10.5" (8.7-26.1)	–
LPG (propane)	in. W.C. (mbar)	–	8-13" (19.9-32.3)
Expansion vessel			
Pre-charge pressure	psi (bar)	10.9 (0.75)	10.9 (0.75)
Total contents	Gal (L)	3.17 (12)	3.17 (12)
DHW			
Max. DHW flow rate	gpm (l/min)	3.963 (15)	3.963 (15)
Nominal DHW quantity (at 140 °F (60 °C) outlet temperature)	gpm (l/min)	3.61 (11.4)	3.61 (11.4)
Outlet temperature	°F (°C)	104 - 140 (40 - 60)	104 - 140 (40 - 60)
Max. cold water inlet temperature	°F (°C)	140 (60)	140 (60)
Max. approved DHW pressure	psi (bar)	150 (10.3)	150 (10.3)
Minimum water pressure	psi (bar)	4.35 (0.3)	4.35 (0.3)

Tab. 9 Technical data combi boiler ZWB42-3A...