

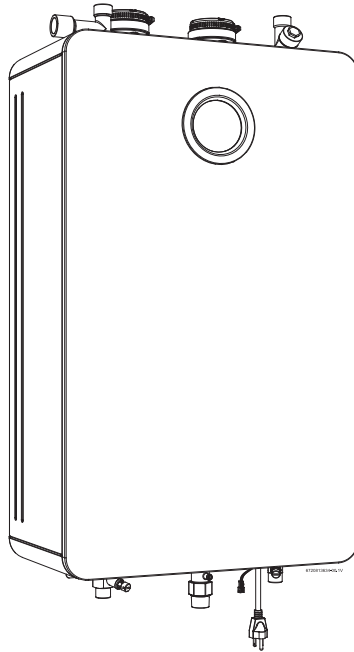
# Bosch Greentherm T9800 SE 160 Gas Tankless Water Heater

Engineering  
Submittal  
Sheet



# BOSCH

## Product Overview & Certifications



## Engineering Specifications

The system shall consist of \_\_\_ gas tankless water heater model Greentherm T9800 SE 160 as manufactured by Bosch Thermotechnology.

Water Heater shall be CSA/ANSI Z21.10.3 listed, and operate with a 100% thermal efficiency. The Greentherm 9800 SE 160 Water Heater shall have an input of 160,000 BTU/Hr with natural or propane fuel. Water Heater shall have Low NOx emissions and be 2016 SCAQMD NOx certified to rule 1146.2.

### CONSTRUCTION

Water Heater shall be gas fired, condensing tank less design with a segmented power burner and modulating gas valve. Burner shall be capable of 18:1 turndown of firing, without loss of combustion efficiency.

Primary heat exchanger/combustion chamber shall incorporate a multi pass copper tube and fin design. Secondary condensing heat exchanger shall incorporate a multi-pass stainless steel heat exchanger with bank tubes for lower water pressure drop. Heat exchangers shall be rated for maximum working pressure not less than 150 psig.

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The Water Heater shall be equipped with an active bypass valve to achieve water temperature stability of less than +/- 2 oF. On the cold water inlet connection the Water Heater shall be equipped with an externally accessible in-line water filter.

The Water Heater's external control panel shall consist of a high resolution LCD display with capacitance touch keys. The internal control board shall be field replaceable.

The combustion safeguard/flame monitoring system shall utilize spark ignition and a rectification type flame sensor.

The control panel hardware shall support wireless remote communications if the wireless module is installed. The controls shall include extensive self-diagnostic capabilities that incorporate a minimum of 38 separate fault codes.

The Water Heater shall come equipped with power cord and shall operate on 120V/1/60Hz electrical service.

Bosch Thermotechnology Corp.  
Londonderry, NH • Ft. Lauderdale, FL

# Bosch Greentherm T9800 SE 160 Gas Tankless Water Heater



## Engineering Specifications

### INSTALLATION

All aspects of installation of Water Heater system shall be in strict accordance with manufacturer's instructions.

Materials shall conform to all manufacturer's recommendations including a manufacturer listed vent system. Venting options shall include 2" and 3" Flex PP, Rigid PP, Concentric PP, Common PP Vent, PVC (sch40), PVC-DWV, CPVC (sch40), and ABS-DWV (sch40).

Venting length will be limited to 60' when using 2" pipe and 280' when using 3" pipe.

Water Heater will include a barometric pressure sensor that will be used to determine the altitude of installation.

Water Heater will have top mounted water connections and bottom mounted flush ports. Water Heater shall include an ASME approved temperature/pressure relief valve with a setting of 150 psig.

Water Heater shall require a minimum gas pressure of 3.5 W.C. of natural gas and 8" W.C. for propane.

### MODE OF OPERATION

Water Heater shall include integral factory wired operating controls to control all operation and energy input.

The outlet water temperature shall be controlled using the integrated digital display with a field adjustment of 100°F to 140°F. Water Heater shall be capable of maintaining the outlet temperature within an accuracy of  $\pm 2^\circ\text{F}^*$ . This shall be accomplished by modulation of firing rate and the use of the active bypass valve.

### MULTI UNIT CASCADES

The Water Heater shall be capable to cascade configurations with up to 24 Water Heaters plumbed in parallel when using the Cascading Kit.

This Cascading Kit accessory shall stage Water Heaters based on demand activating or deactivating other Water Heaters as needed.

### WARRANTY

The heat exchangers shall carry a 15-year limited warranty against leakage due to defects in materials or workmanship in a residential, non-direct recirculation system, subject to the manufacturer's warranty terms and conditions and water quality requirements.

All other parts and components provided by Bosch shall carry a 5 year limited warranty against defects in materials or workmanship subject to the terms and conditions of the manufacturer's warranty.

The Water Heater shall carry a 1-year limited warranty for Service labor cost against defects in workmanship subject to the terms and conditions of the manufacturer's warranty.

## Performance Data

	Unit	Value
Maximum flow rate at a 35 °F (19.4 °C) rise	GPM (l/min)	9 (34)
Maximum flow rate at a 45 °F (25 °C) rise	GPM (l/min)	7 (26.7)
Maximum flow rate at a 55 °F (30.6 °C) rise	GPM (l/min)	5.8 (21.9)
Maximum flow rate at a 75 °F (41.7 °C) rise	GPM (l/min)	4.2 (15.9)
Maximum flow rate at a 90 °F (50 °C) rise	GPM (l/min)	3.5 (13.2)
Maximum gas input <sup>1</sup>	BTU/hr (kW)	160,000 (46.64)
Minimum input	BTU/hr (kW)	9,000 (2.6)
Maximum output	BTU/hr (kW)	157,608 (46.2)
Thermal efficiency (Efficiency in %)	%	> 99%

<sup>1</sup>) Input rating is based on sea level operation and need not be changed for operation up to 2000 ft (610 m) elevation. For operation at elevations above 2000 ft (610 m), input rating is automatically reduced at the rate of 4 percent (US) or 10 percent (Canada) for each 1000 ft (305 m) above sea level.

# Bosch Greentherm T9800 SE 160 Gas Tankless Water Heater



# BOSCH

Operational Data		
	Unit	Value
<b>Temperature Control<sup>2</sup></b>		
Selection range	°F ( °C)	100 - 120 <sup>3</sup> (38 - 49)
Default temperature	°F ( °C)	120 (49)
Temperature stability <sup>4</sup>	°F ( °C)	± 2 (± 1)
<b>Gas Requirement</b>		
Gas connection	inches	¾"
Max. Inlet gas pressure NG / LP	Inch W.C.	3.5" - 10.5" / 8" - 13"
<b>Water</b>		
Top hot water connection NPT	inches	¾"
Top cold water connection NPT	inches	¾"
Minimum water flow <sup>6</sup>	GPM (l/min)	0.45 (1.7)
Maximum water pressure	PSI (bar)	150 (10.3)
Minimum recommended water pressure	PSI (bar)	18 (1.2)
Minimum well pressure	PSI	30
Water valve material	—	Polymer (PPS) (Polypropylene)
<b>Combustion</b>		
CO level	ppm	≤ 250 (measured)
CO2 level (set from factory)	%	see installation manual
<b>Weight</b>		
Net weight	pounds (kg)	73.2 (33.20)
Gross weight	pounds (kg)	79.37 (36.0)
<b>Electrical</b>		
Voltage	V AC	120
Frequency	Hz	60
Amperage (Idle)	mA	40
Amperage (operation)	A	≤ 2.7
Water protection <sup>7</sup>	IP	X4D
<b>Venting</b>		
Venting category	—	IV
Approved vent or combustion air pipe material - United States	—	PP flexible/concentric/rigid PVC sched. 40, PVC-DWV, CPVC sched. 40, ABS-DWV sched. 40
Approved vent or combustion air pipe material - Canada	—	CSA or ULC certified only (ULCS636)

<sup>2</sup>) With constant flow.

<sup>3</sup>) Can be reprogrammed to achieve 140 °F (60 °C).

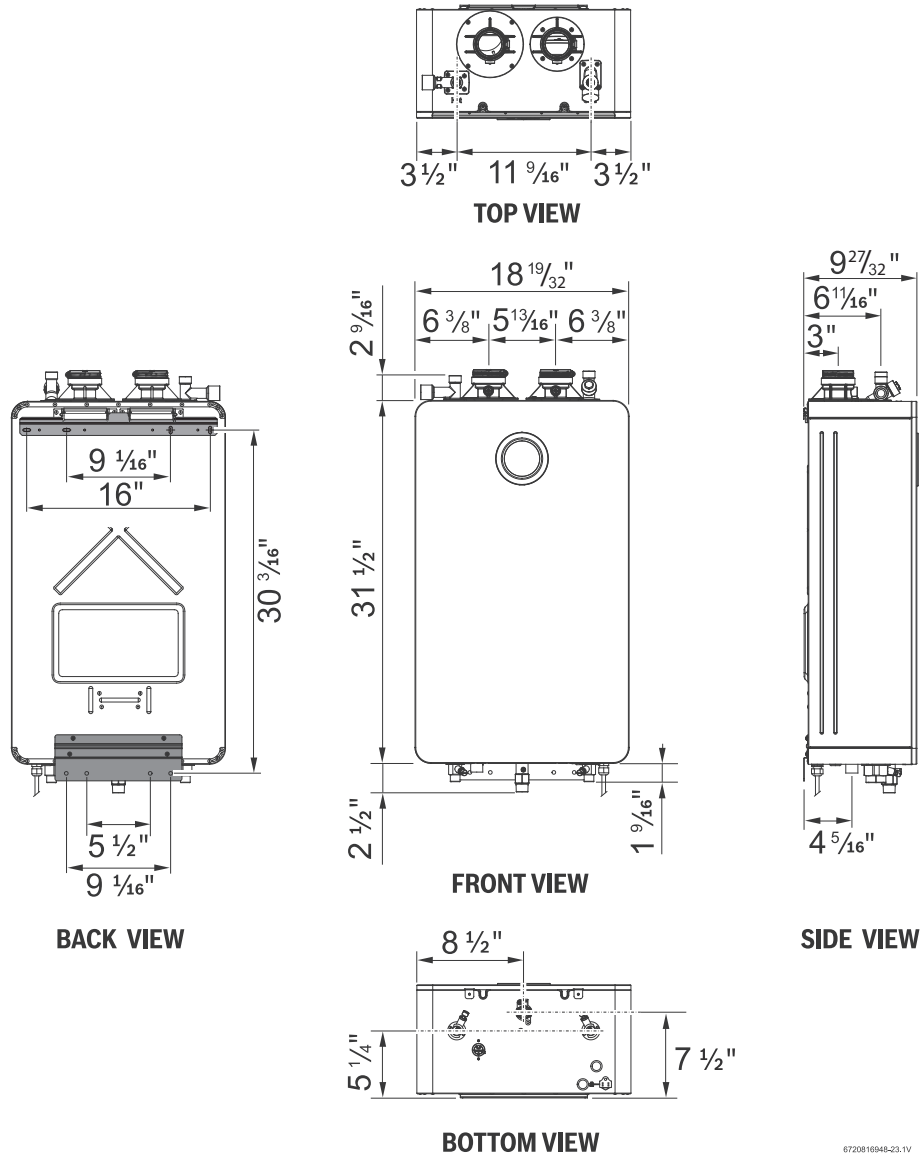
<sup>4</sup>) Requirements: Steady flows, single unit installations, up to 140 °F (60 °C).

<sup>5</sup>) To measure Gas Pressure, see Measuring Gas Pressure, chapter 4.13, page 36.

<sup>6</sup>) Activation varies with inlet water temperatures.

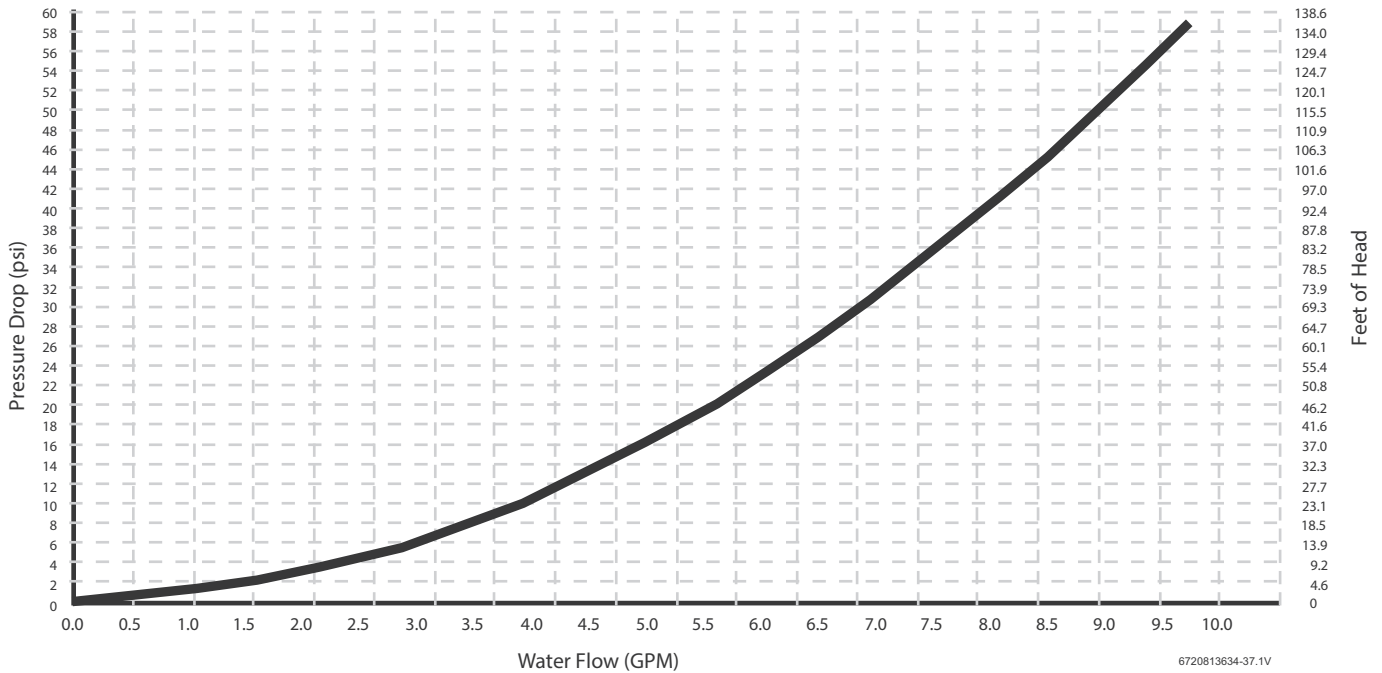
<sup>7</sup>) Protection against water drops.

Dimensions and Connections

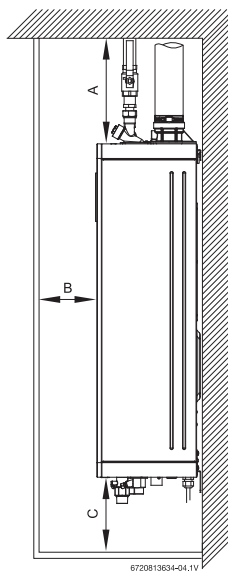


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**Water Heater Pressure Drop Curve**



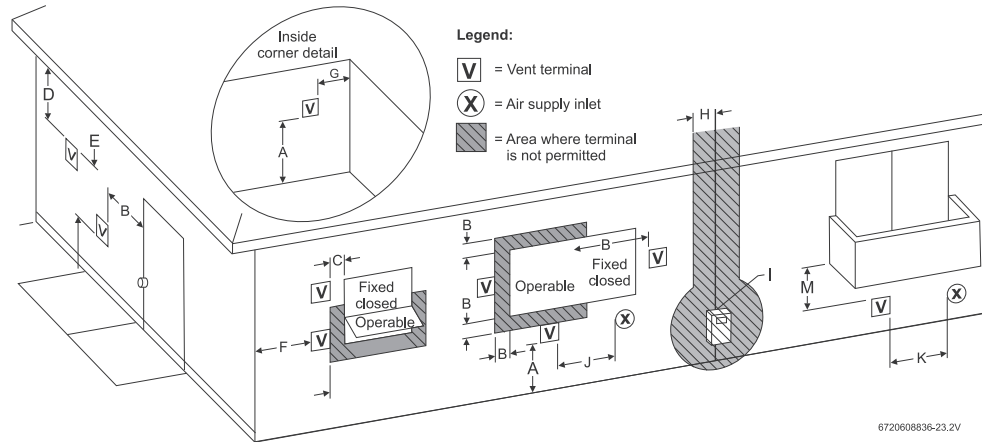
**Clearances**



Description	Unit	Recommended Minimum clearance*
TOP (A)	Inch	12
FRONT (B)	Inch	1
BACK	Inch	0
SIDES	Inch	1
FLOOR (C)	Inch	12

\* For servicing access, a 2ft clearance is recommended to the front cover.

**Required direct vent terminal clearances (twin pipe / concentric penetration)**



**Clearance Data**

Item	Description	Canadian installations <sup>1)</sup>	U.S. installations <sup>2)</sup>
A	Clearance above grade, veranda, porch, deck or balcony	12 in. (30cm)	12 in. (30cm)
B	Clearance to window or door that may be opened	36 in. (91cm)	12 in. (30cm) below or to side of opening; 12 in. (30cm) above opening.
C	Clearance to permanently closed window	*	*
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 ft (61cm) from the center line of the terminal.	*	*
E	Clearance to unventilated soffit	*	*
F	Clearance to outside corner	*	*
G	Clearance to inside corner	*	*
H	Clearance to each side of center line extended above meter/regulator assembly	36 in. (91cm) within a height 15 ft (4.6m) above the meter/regulator assembly	*
I	Clearance to service regulator vent outlet	36 in. (91cm)	*
J	Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance.	36 in. (91cm)	12 in. (30cm)
K	Clearance to a mechanical air supply inlet	6 feet (1.83m)	36 in. (91cm) above if within 10 ft (3m) horizontally
L	Clearance above paved sidewalk or paved driveway located on public property	7 ft (2.13m) <sup>3)</sup>	*
M	Clearance under veranda, porch deck or balcony	12 in. (30cm) <sup>4)</sup>	*

1) In accordance with the current CSA B149.1 Natural Gas and Propane Installation Code

2) In accordance with the current ANSI Z223.1 / NFPA 54 National Fuel Gas Code

3) A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

4) Permitted only if veranda, porch, deck or balcony is fully open on a minimum of two sides beneath the floor.

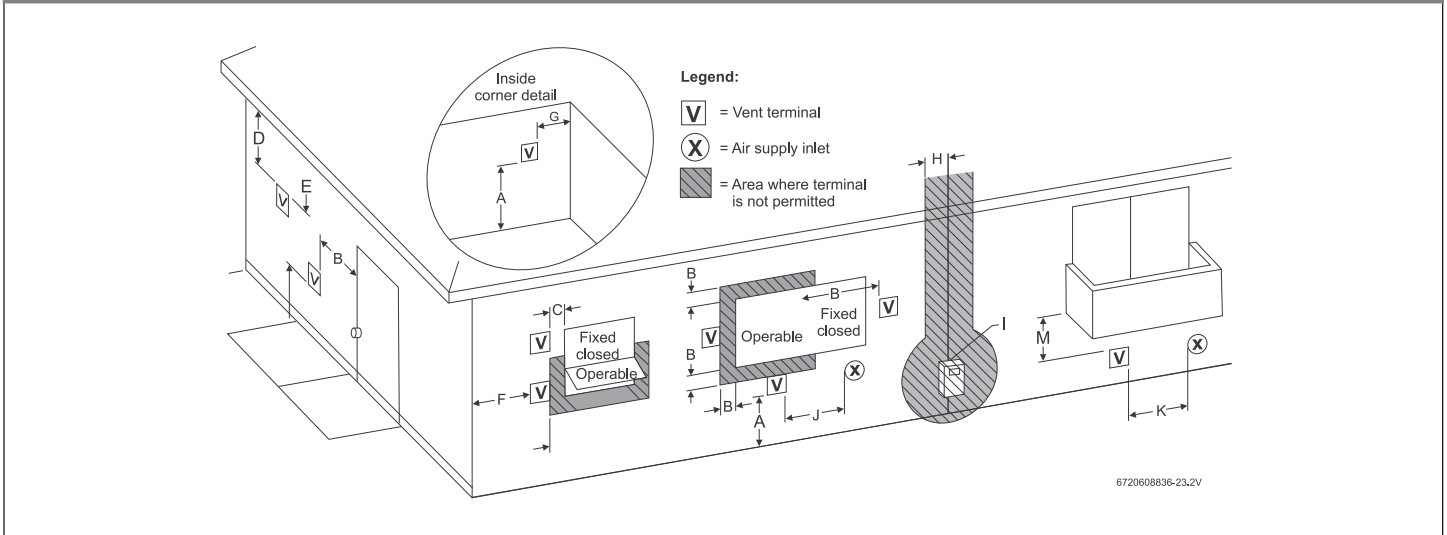
\* For clearances not specified in ANSI Z223.1 / NFPA 54 or CSA-B149.1, one of the following shall be indicated:

a) A minimum clearance value determined by testing in accordance with section 2.20, or;

b) A reference to the following footnote:

"Clearance in accordance with local installation codes and the requirements of the gas supplier."

**Required other than direct vent terminal clearances (single pipe penetration)**



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**Clearance Data**

Item	Description	Canadian installations <sup>1)</sup>	U.S. installations <sup>2)</sup>
A	Clearance above grade, veranda, porch, deck or balcony.	12 in. (30cm)	12 in. (30cm)
B	Clearance to window or door that may be opened.	36 in. (91cm)	48 in. (1.2 m) below or to side of opening; 12 in. (30cm) above opening)
C	Clearance to permanently closed window	*	*
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61cm) from the center line of the terminal	*	*
E	Clearance to unventilated soffit	*	*
F	Clearance to outside corner	*	*
G	Clearance to inside corner	*	*
H	Clearance to each side of center line extended above meter/regulator assembly	36 in. (91cm) within a height 15 ft (4.6m) above the meter/regulator assembly	*
I	Clearance to service regulator vent outlet	36 in. (91cm)	*
J	Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	36 in. (91cm)	48 in. (1.2m) below or to side of opening; 1 ft (300mm) above opening
K	Clearance to mechanical air supply inlet	6 ft (1.83 m)	36 in. (91cm) above if within 10 ft (3m) horizontally
L	Clearance above paved sidewalk or paved driveway located on public property	7 ft (2.13m) <sup>3)</sup>	*
M	Clearance under veranda, porch deck or balcony	12 in (30cm) <sup>4)</sup>	*

1) In accordance with the current CSA B149.1 Natural Gas and Propane Installation Code

2) In accordance with the current ANSI Z223.1 / NFPA 54 National Fuel Gas Code

3) A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

4) Permitted only if veranda, porch, deck or balcony is fully open on a minimum of two sides beneath the floor.

\* For clearances not specified in ANSI Z223.1 / NFPA 54 or CSA-B149.1, one of the following shall be indicated:

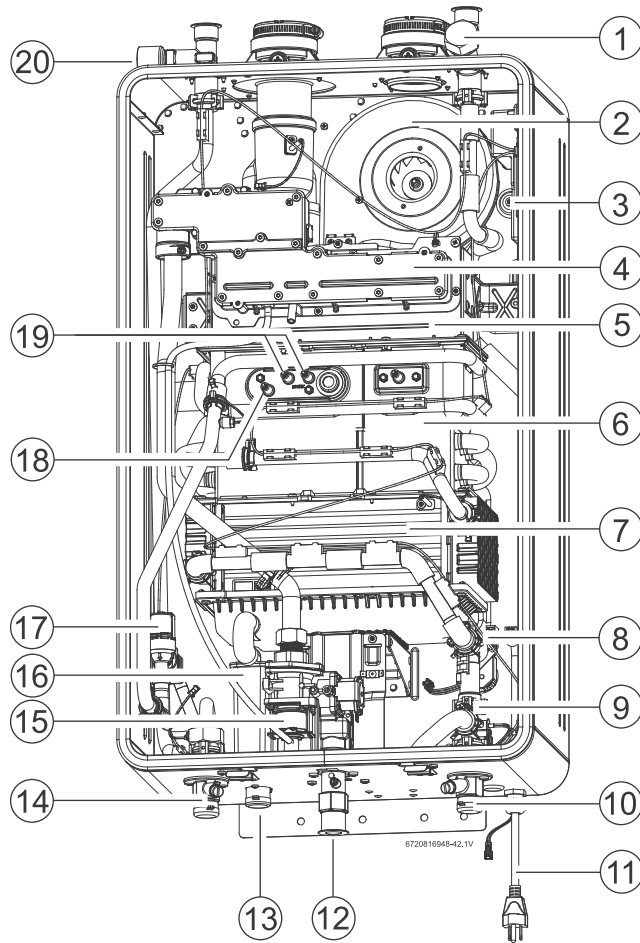
a) A minimum clearance value determined by testing in accordance with section 2.20, or;

b) A reference to the following footnote:

"Clearance in accordance with local installation codes and the requirements of the gas supplier."



Tankless Components



T9800 SE 160 Components

- |                        |                          |
|------------------------|--------------------------|
| [1] Inlet water filter | [13] Condensate drain    |
| [2] Air fan            | [14] HE drain            |
| [3] Control unit       | [15] Gas valve           |
| [4] Gas manifold       | [16] Condensate trap     |
| [5] Burner             | [17] By-pass water valve |
| [6] Heat exchanger     | [18] Ionization sensor   |
| [7] Condensing unit    | [19] Ignition electrodes |
| [8] Main water valve   | [20] PRV connection      |
| [9] By-pass pipe       |                          |
| [10] HE drain          |                          |
| [11] Power cord        |                          |
| [12] Gas connection    |                          |

**DISCLAIMER**

Specifications subject to change without notice. All dimensions shown on these engineering submittal sheets are for reference only and should not be used for field installation purposes. Please refer to current product installation manuals for detailed installation instructions and dimensions.