

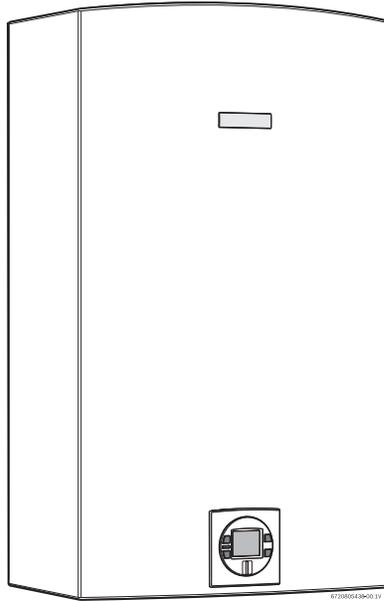
C1210ES Tankless Water Heater

Engineering
Submittal
Sheet



BOSCH

Overview and Certifications



Massachusetts
Plumbing Board
Approved

Engineering Specifications

Water heater shall be a Model Therm C 1210 ES. Plant shall consist of __ Model Therm C 1210 ES NG/LP tankless water heaters as manufactured by Bosch Thermotechnology Corp. Heater shall be CSA/ANSI Z21.10.3 listed. Heater shall have an input of 225 MBH with a gross output of 211 MBH when fired with natural gas. Unit shall operate with a minimum of 94% ANSI Z-21 efficiency. Tankless water heater shall have a recovery of 329 gallons per hour at a 77°F temperature rise. Tankless water heater shall have Low NOx emissions and is 2012 SCAQMD NOx certified to rule 1146.2.

CONSTRUCTION

Water heater shall be gas fired, condensing tankless design with a modulating power burner and negative pressure gas valve. Burner shall be capable of 9:1 turndown of firing, without loss of combustion efficiency. Primary heat exchanger/combustion chamber shall incorporate a multi pass copper tube and fin design with internal turbulators. Secondary condensing heat exchanger shall incorporate a multi-pass aluminum heat exchanger of fin tube design with copper water path to prevent

galvanic corrosion. Heat exchangers shall be rated for maximum working pressure not less than 150 psig. Exhaust outlet connector shall be of corrosion resistant metal, with a 3" diameter flue connection.

The water heater control system shall be a single printed circuit board in water-resistant plastic enclosure. The entire system shall be Underwriters Laboratories approved.

The control system shall contain: embedded control board incorporating LCD display to read temperature, and tactile buttons for output power, temperature, and programming control; CPU board which houses all control functions; power transformer; ignition spark module; and unique connections for each sensor or component. The 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

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that incorporate a minimum of 18 separate fault codes and 8 programmable system categories. The water heater comes equipped with power cord and shall operate on 120V/1/60Hz electrical service.

INSTALLATION

All aspects of installation of Water Heater Plant shall be in strict accordance with manufacturer's instructions. Materials shall conform to all manufacturer's recommendations including a manufacturer listed vent system.

Water heater plant piping shall be field constructed of materials as specified. Water heater shall be installed with individually isolating shutoff valves for service and maintenance, and a hot water hose connection for field testing. Unit shall have 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. (Natural Gas) at 1,000 scfh (full load rated capacity).

MODE OF OPERATION

Heater shall include integral factory wired operating controls to control all operation and energy input. Control of discharge water temperature shall be set through an internal setpoint with a field adjustment of 100°F to 140°F. 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 from 100% to 11% of rated input. Unit shall operate with an Inverse Efficiency Curve, with maximum efficiency achieved at minimum firing input.

CONTROLS INTEROPERABILITY

The control board may be linked to other Bosch tankless water heaters through the use of a cascading kit. This accessory shall cause the unit to perform as described above while activating or deactivating other units in the system. Additional Bosch tankless water heaters shall be plumbed in parallel and located near the main unit.

WARRANTY

The heat exchangers shall carry a 15-year limited warranty against leakage due to defects in materials or workmanship or corrosion in a residential, non-direct recirculation system, subject to the manufacturer's water quality requirements. All other parts and components shall carry a 5 year limited warranty against defects in materials or workmanship.

OR

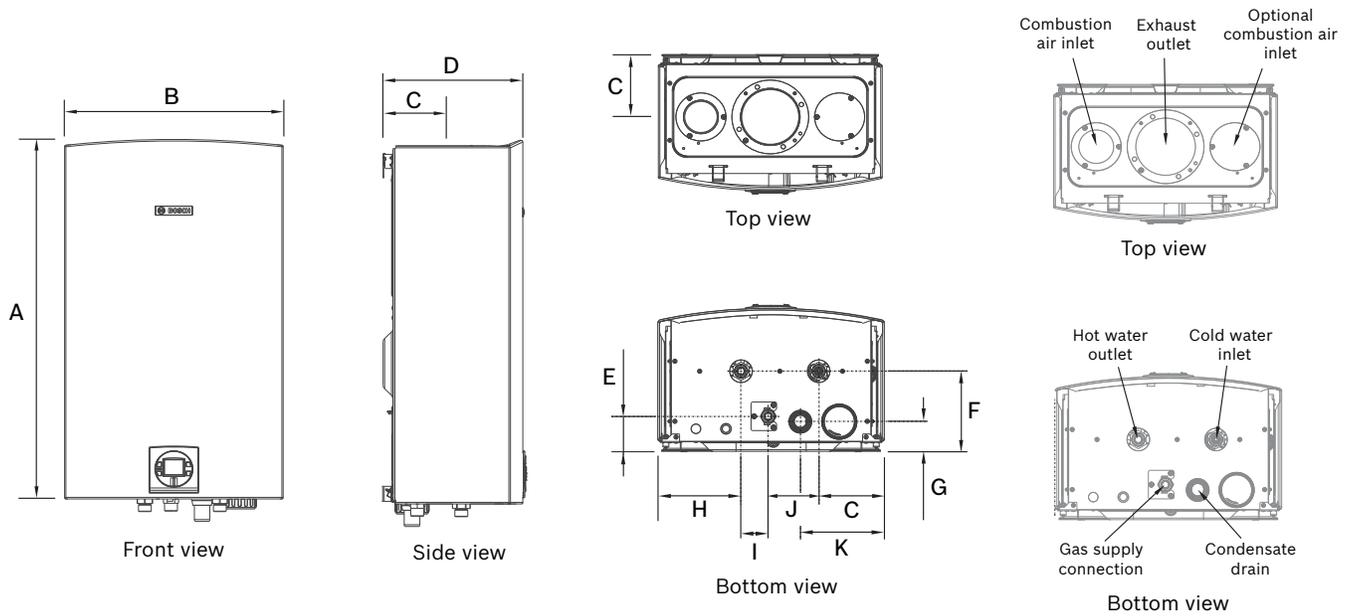
The heat exchangers shall carry a 5-year limited warranty against leakage due to defects in materials or workmanship or corrosion in a commercial installation, subject to the manufacturer's water quality requirements. All other parts and components shall carry a 5 year limited warranty against defects in materials or workmanship.

* based on static stability test

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Dimensions and Connections



Dimensions

| | Unit | A | B | C | D | E | F | G | H | I | J | K |
|--------------|--------|-----|-----|----|-----|----|----|----|----|----|----|----|
| Value | Inches | 30½ | 17⅞ | 5¼ | 11¼ | 2¾ | 6⅝ | 2⅝ | 6½ | 2¼ | 4¼ | 6⅝ |

Performance Data

| | Unit | Value |
|--------------------|------|---------|
| Maximum gas input | BTU | 225,000 |
| Minimum input | BTU | 25,000 |
| Maximum output | BTU | 210,000 |
| Minimum output | BTU | 23,000 |
| Thermal efficiency | % | 94 |

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| Operational Data | | |
|---|-----------|---|
| | Unit | Value |
| C 1210 ES NG / Natural Gas - part number | - | 7703311073 |
| C 1210 ES LP / Liquid Propane - part number | - | 7703411071 |
| Weight | LBS | 74 |
| Electrical voltage mains | VAC / Hz | 120 / 60 |
| Power consumption max load | A | ≤ 2.5 |
| Power consumption idle | mA | 40 |
| Min. Inlet gas pressure NG / LP | Inch W.C. | 3.5 / 8 |
| Max. Inlet gas pressure NG / LP | Inch W.C. | 10.5 / 13 |
| C1210ES Maximum Output Temperature | °F | 140 |
| Max. Working pressure | PSI | 150 |
| Min. Working pressure | PSI | 30 |
| Min. Activation rate | GPM | 0.5 |
| Relief valve pressure rating | PSI | 150 |
| Venting category | - | IV |
| Approved vent or combustion air pipe material - United States | - | PVC schedule 40, PVC-DWV, CPVC schedule 40, ABS-DWV sched. 40 |
| Approved vent or combustion air pipe material - Canada | - | CSA or ULC certified only (ULCS636) |

Clearances

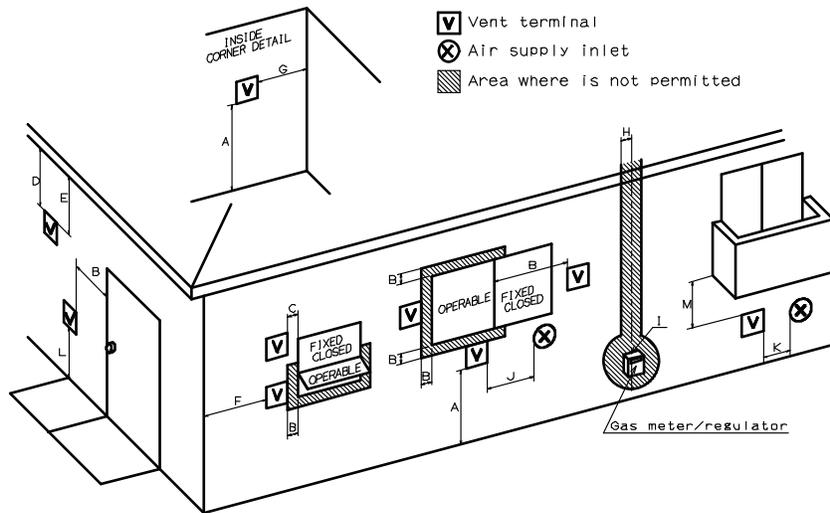
Top View

Front View

| Description | Unit | Minimum clearance |
|---------------------|------|-------------------|
| Side clearance W1 | Inch | 1 |
| Front clearance W2* | Inch | 1 |
| Top clearance W3 | Inch | 12 |
| Floor clearance W4 | Inch | 12 |
| Rear clearance W5 | Inch | 0 |

* 24 inches recommended for servicing.

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



Clearance Data

| Item | Description | Value | Canadian installations ¹⁾ | U.S. installations ²⁾ |
|------|--|-------|--|---|
| A | Clearance above grade, veranda, porch, deck or balcony | Inch | 12 | 12 |
| B | Clearance to window or door that may be opened | Inch | 36 | 12 |
| C | Clearance to permanently closed window | Inch | * | * |
| D | Vertical clearance to ventilated soffit located above the vent terminator within a horizontal distance of 2 feet (61cm) from the center line of the terminator | Inch | * | * |
| E | Clearance to unventilated soffit | Inch | * | * |
| F | Clearance to outside corner | Inch | * | * |
| G | Clearance to inside corner | Inch | * | * |
| H | Clearance to each side of center line extended above meter/regulator assembly | - | 36 in. within a height 15 feet above meter/ regulator assembly | * |
| I | Clearance to service regulator vent outlet | Inch | 36 | * |
| J | Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other application | Inch | 36 | * |
| K | Clearance to mechanical air supply inlet | Inch | 72 | 36 in. above if within 10 feet horizontally |
| L | Clearance above paved sidewalk or paved driveway located on public property | Inch | 84 ³⁾ | * |
| M | Clearance under veranda, porch deck or balcony | Inch | 12 ⁴⁾ | * |

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.

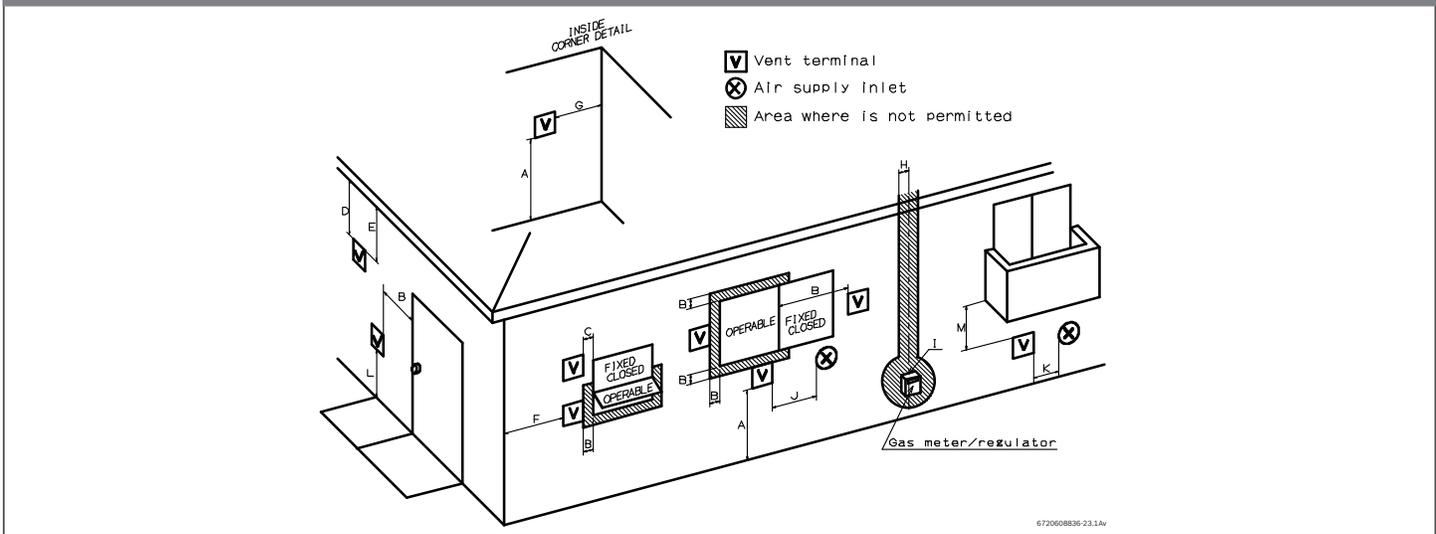
* For clearances not specified in ANSI Z223.1 / NFPA 54 or CSA-B149.1, one of the following shall be indicated:

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)



6720658836-23.1A

Clearance Data

| Item | Description | Value | Canadian installations ¹⁾ | U.S. installations ²⁾ |
|------|--|-------|---|--|
| A | Clearance above grade, veranda, porch, deck or balcony | Inch | 12 | 12 |
| B | Clearance to window or door that may be opened | Inch | 36 | 4 feet below or to side of opening; 1 foot above opening |
| C | Clearance to permanently closed window | Inch | * | * |
| D | Vertical clearance to ventilated soffit located above the vent terminator within a horizontal distance of 2 feet (61cm) from the center line of the terminator | Inch | * | * |
| E | Clearance to unventilated soffit | Inch | * | * |
| F | Clearance to outside corner | Inch | * | * |
| G | Clearance to inside corner | Inch | * | * |
| H | Clearance to each side of center line extended above meter/regulator assembly | - | 36 in. within a height 15 feet above meter/regulator assembly | * |
| I | Clearance to service regulator vent outlet | Inch | 36 | * |
| J | Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other application | Inch | 36 | 4 feet below or to side of opening; 1 foot above opening |
| K | Clearance to mechanical air supply inlet | Inch | 72 | 36 in. above if within 10 feet horizontally |
| L | Clearance above paved sidewalk or paved driveway located on public property | Inch | 84 ³⁾ | 84 |
| M | Clearance under veranda, porch deck or balcony | Inch | 12 ⁴⁾ | * |

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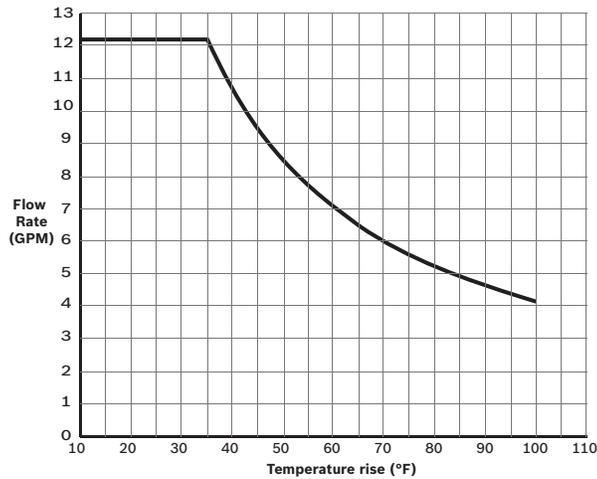
"Clearance in accordance with local installation codes and the requirements of the gas supplier."

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

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Water Heating Capacity Curve

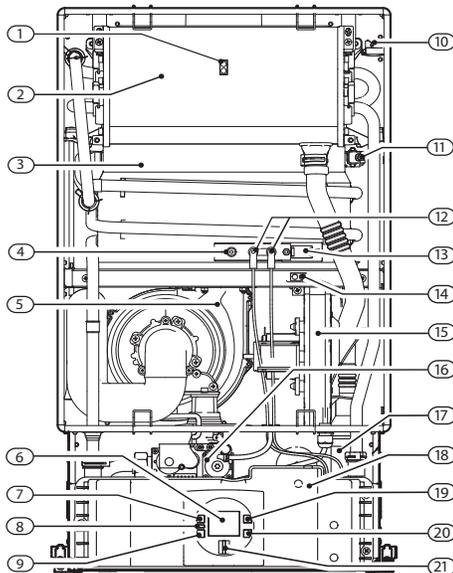


Water Heating Capacity Data

| Temperature Rise (°F) | Flow Rate (GPM) |
|-----------------------|-----------------|
| 35 | 12.1 |
| 45 | 9.4 |
| 55 | 7.7 |
| 65 | 6.5 |
| 75 | 5.6 |
| 90 | 4.7 |
| 100 | 4.2 |

* 35°F capacity is based on installation with a mixing valve to overcome typical pressure loss through the water heater and system.

Tankless Components



Components Legend

- 1 Exhaust temperature sensor
- 2 Condensing heat exchanger
- 3 Heat exchanger
- 4 Ionization sensor
- 5 Primary fan (Mixer)
- 6 LCD display
- 7 On/Off button
- 8 Reset button
- 9 Program button
- 10 Flue gas limiter
- 11 Heat exchanger overheat sensor (ECO)
- 12 Ignition electrodes
- 13 Observation window
- 14 Backflow temperature sensor
- 15 Secondary air fan
- 16 Gas valve
- 17 Condensate trap
- 18 Control unit
- 19 Up button
- 20 Down button
- 21 LED