

Packaged Instantaneous Circulation Heater

Full KW Selection In All Voltages, Single or Three Phase

Features

■ Heavy Duty Construction

- ✓ Constructed with high grade materials to ensure long operating life
- ✓ Turn-Key package is simple to specify and operate
- ✓ Factory wired electrical controls provide trouble-free installation and operation

■ Reliability

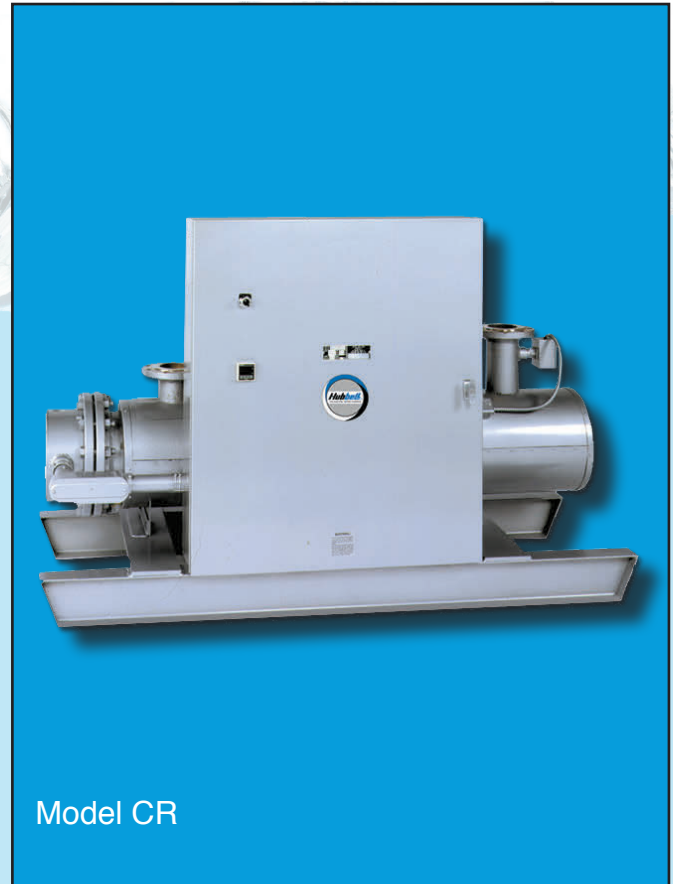
- ✓ Engineered for your specific application to ensure reliable operation
- ✓ Full selection of materials and controls to meet even the most demanding application

■ High Efficiency

- ✓ On demand heating eliminates costly and cumbersome storage tanks
- ✓ Instantaneous design reduces standby heat loss and lowers operating costs

Applications

- | | |
|-----------------------|-------------------------------|
| ■ Process Systems | ■ High Powered Boiler Systems |
| ■ Wash Downs | ■ Freeze Protection |
| ■ Aquariums | ■ Shipboard |
| ■ Heat Pump - Back up | |
| ■ Swimming pools | |



Model CR

Model CR Circulation Heater



An Instantaneous Heater For Industrial Applications

The Hubbell CR model is a highly reliable and easily maintained heater designed for continuous operation in a commercial or industrial application. Each heater is constructed to meet the specific requirements of your system and is available in a full array of operating controls, materials, and design styles. Its compact, highly efficient design takes up minimal floor space, reduces operating costs, and is factory packaged with all operating controls.

Hubbell's vast experience, meticulous engineering, and advanced manufacturing processes ensure that you can rely on the CR model for your heating needs in even the most demanding and critical application. It makes sense to specify and install a Hubbell CR model for your heating requirements, as the owner will be provided with a quality product that is long lasting and trouble-free.

CR Model Standard Equipment

Vessel Construction

1. Designed and built in strict accordance with the ASME Code Section IV and stamped, certified, and registered with the National Board of Boiler and Pressure Vessel Inspectors (units over 58 KW only)
2. All welded carbon Type 304 Stainless Steel pressure vessel
3. Designed for 150 psi working pressure and hydrostatically tested

Electrical Operating Controls

1. All electrical operating controls are factory sized, selected, wired, tested, and mounted in a NEMA 1 enclosure to ensure safe and reliable operation
2. A power distribution block is supplied for single point electrical installation
3. Fast acting power fuses rated at a maximum of 60 Amps protect each heating element branch circuit per NEC and UL requirements. Each branch circuit has a maximum rating of 48 Amps
4. Heavy duty resistive load type magnetic contactors with integrally mounted power fuse block assembly
5. Heavy duty low watt density 150# flange type copper sheathed immersion heating element provides long service life
6. Factory installed flow switch prevents the element from energizing in low/no flow conditions
7. Fully adjustable temperature controller maintains accurate water temperature and is sized by the factory to control the appropriate number of heating element circuits
8. A high quality generously sized transformer provides fused 120V to the control circuit
9. A fully adjustable (100-240°F) safety hi-limit device with manual reset interrupts power to the control circuit in the event of over-temperature water
10. Safety door interlock mechanism interrupts power to the control circuit upon opening the electrical control panel

General

1. Heavy duty 2" thick fiberglass type blanket insulation for maximum operating efficiency and minimal standby heat loss
2. Heavy gauge galvanized steel protective jacket keeps insulation in place to ensure high efficiency during operation
3. Horizontal configuration supported on heavy duty integrally welded steel I beam supports for sturdy floor mounting
4. Full five (5) year Non Pro-Rated vessel warranty and one (1) year electrical component warranty
5. Bronze ASME rated combination temperature and pressure safety relief valve set at the vessel working pressure and 210°F

CR Model Optional Equipment

NOTE: Other optional features are available, please consult factory if required.

Vessel

- ☐ 1. Alternate material construction: Stainless Steel Type 304 or 316L, 90/10 Copper-Nickel, Copper-Silicon, Carbon Steel, Galvanized Steel, other
- ☐ 2. Pressure vessel designed, constructed and stamped according to section VIII of the ASME Code

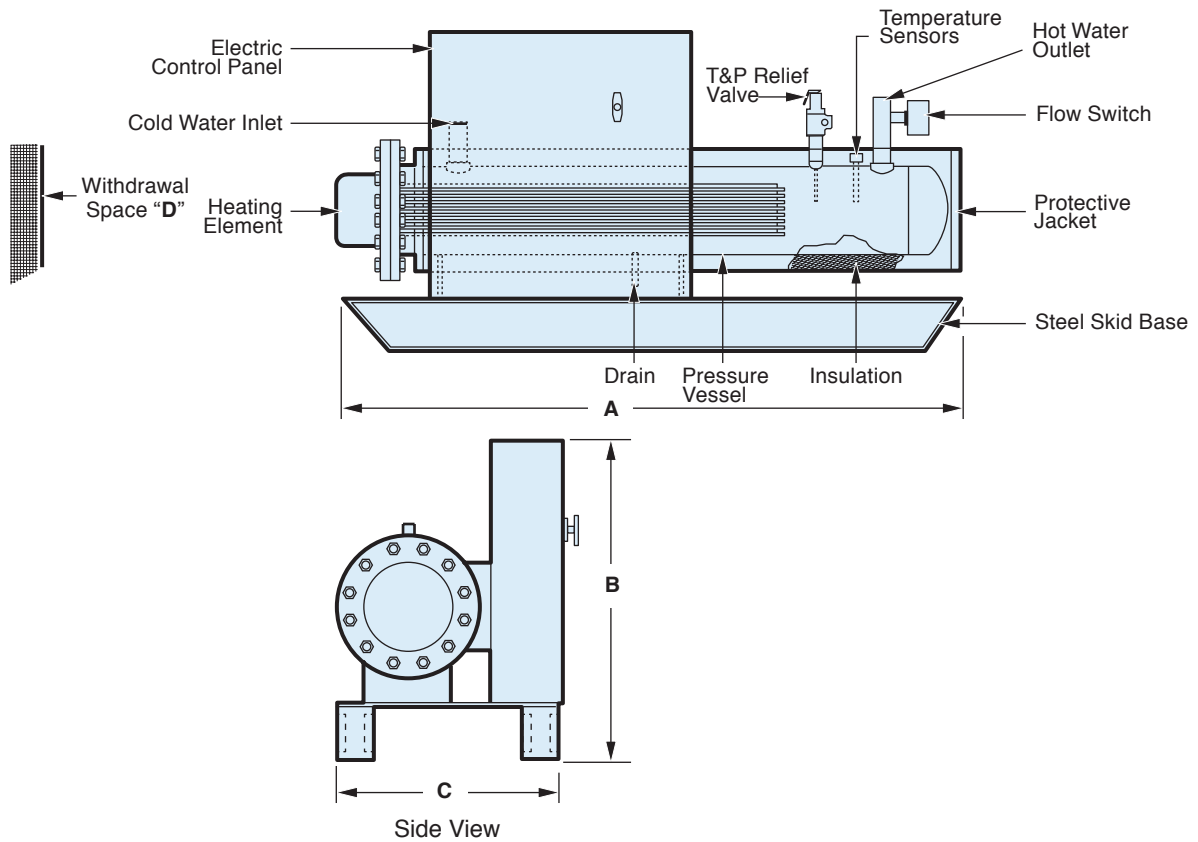
Electrical

- ☐ 3. NEMA 4 watertight enclosure for outdoor/wet locations
- ☐ 4. Explosion resistant construction for hazardous locations
- ☐ 5. Built-in circuit breaker (with or without shunt trip) or a built-in non-fused On/Off disconnect switch
- ☐ 6. Alternate element sheath material: Incoloy, Stainless Steel, Inconel, Monel, Steel, Teflon, Titanium, other
- ☐ 7. Integrated PLC Control Package
- ☐ 8. Factory installed low water cut out device prevents the element from energizing if there is no water in the unit

General

- ☐ 9. Vertical configuration with heavy duty support base
- ☐ 10. Wall hung construction for (horizontal, vertical) off the floor installation
- ☐ 11. Stainless steel outer protective jacket
- ☐ 12. 316L Stainless Steel Temperature and Pressure relief valve
- ☐ 13. Specialized heating element construction including: Special watt density rating, passivation, electropolishing, baffles, or any other feature required to meet the needs of your application
- ☐ 14. Digital display electronic temperature controller
- ☐ 15. SCR power control package for full proportional control of the heating element
- ☐ 16. Dial thermometer and pressure gauge.
- ☐ 17. Status indicating lamp(s)
- ☐ 18. Audible alarm system.
- ☐ 19. RS485 communication port for remote operation of the temperature controller.

Outline Dimensions



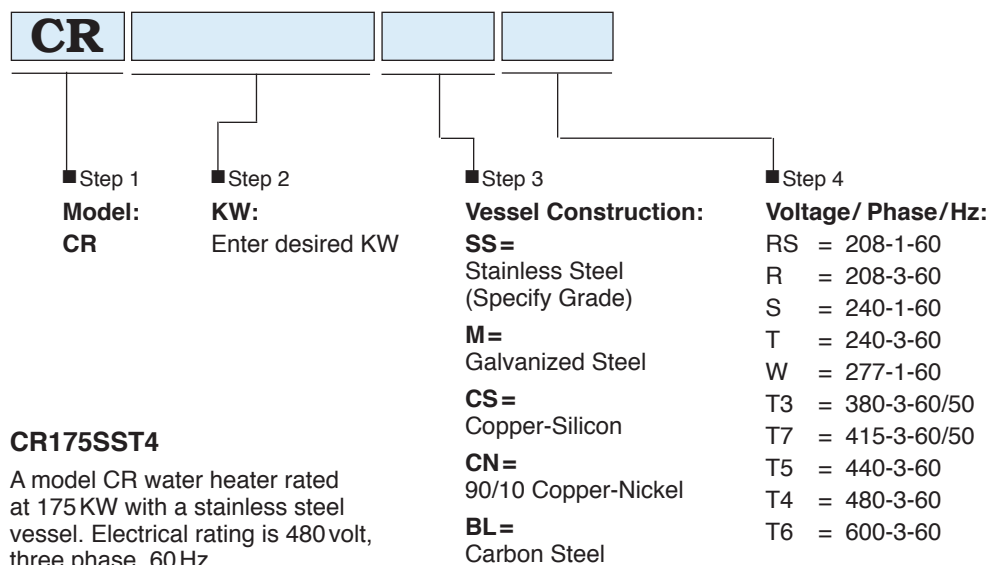
General Specifications

KW	Recovery Rate In GPM At °F Temperature Rise								Approx. Dimensional Data (Inches)				Inlet/Outlet (Inches)	Amperage Rating At Three Phase Power				
	10°	20°	40°	60°	80°	100°	120°	140°	A	B	C	D		208V	240V	380V	415V	480V
25	17.0	8.5	4.3	2.8	2.1	1.7	1.4	1.2	36	32	19	34	3/4 MNPT	70	60	38	35	30
45	30.7	15.4	7.7	5.1	3.8	3.0	2.6	2.2	48	32	19	40	3/4 MNPT	125	108	68	63	54
58	39.6	19.8	9.9	6.6	4.9	3.9	3.3	2.8	48	36	19	40	1.5 MNPT	161	140	89	82	71
72	49.2	24.6	12.3	8.2	6.1	4.9	4.1	3.5	54	40	24	44	1.5 MNPT	200	173	109	100	86
90	61.5	30.7	15.4	10.2	7.7	6.1	5.1	4.4	60	40	24	50	1.5 MNPT	250	217	137	126	109
120	82.9	41.0	20.5	13.7	10.2	8.2	6.8	5.9	60	48	24	50	2 MNPT	334	290	184	169	146
150	102	51.2	25.6	17.1	12.8	10.2	8.5	7.3	60	48	24	50	2 MNPT	417	362	229	211	182
175	120	59.7	30.0	19.9	14.9	11.9	10.0	8.5	60	48	24	50	2 MNPT	487	422	267	246	213
200	136	68	34	22	17	13.6	11.9	10.2	72	54	30	62	2 MNPT	555	481	304	278	240
225	153	76	38	25	19	15.3	13.7	11.7	72	54	30	62	3 FLG	625	541	342	313	270
250	170	85	42	28	21	17.0	15.9	13.7	72	54	30	62	3 FLG	694	602	380	348	301
300	205	102	51.2	34.1	25.6	20.4	17.1	14.6	72	66	36	62	4 FLG	835	724	459	419	362
350	239	120	59.7	39.8	29.9	23.8	20.0	17.1	72	66	36	62	4 FLG	974	844	535	489	423
400	273	137	68.3	45.5	34.1	27.2	22.7	19.5	84	66	36	70	5 FLG	1113	965	611	558	482
500	342	171	85.3	56.9	42.7	34.0	28.4	24.4	84	66	36	70	5 FLG	1391	1206	764	698	603
600	410	205	102	68.3	51.2	40.8	34.1	29.3	96	72	48	84	5 FLG	1669	1447	916	837	723
700	478	239	119	79.6	59.7	47.6	39.8	34.1	96	72	48	84	6 FLG	1947	1688	1069	976	843
850	581	290	145	96.7	72.5	57.8	48.4	41.4	108	72	54	96	6 FLG	—	—	1296	1184	1023
1000	683	341	171	114	85.3	68.0	56.9	48.8	108	76	60	96	6 FLG	—	—	1521	1389	1200
1200	820	409	205	137	102	81.6	68.3	58.5	108	76	60	96	6 FLG	—	—	1825	1667	1440
1400	956	478	239	159	119	95.2	79.6	68.3	108	76	60	96	6 FLG	—	—	—	1945	1681
1600	1093	546	273	182	137	108	91.0	78.0	108	76	60	96	6 FLG	—	—	—	—	1925

Notes:

1. Consult factory for vertical and wall mounted dimensions.
2. The KW selections above are shown for convenience. A full selection of KW ratings up to 1600 KW is available by simply entering the desired KW into the model number.

Model Number Designation

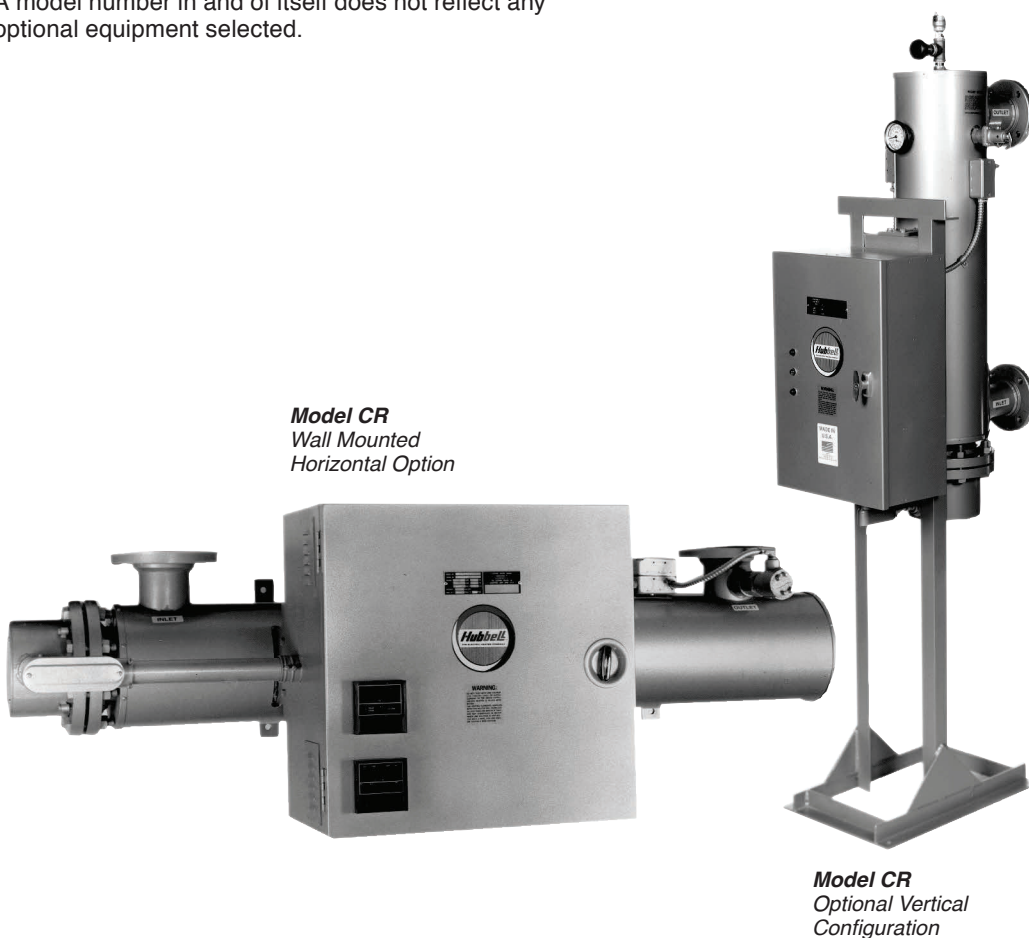


Example: CR175SST4

A model CR water heater rated at 175 KW with a stainless steel vessel. Electrical rating is 480 volt, three phase, 60 Hz.

Option Note

Any and all optional equipment for a CR model heater must be called out in the written specifications. A model number in and of itself does not reflect any optional equipment selected.



Model CR Sizing Information

Step 1

Solve for the unknown using the formulas stated below.

Variables To Solve For:

1. KW Requirement:

$$\text{_____ GPM} \times \text{_____ } ^\circ\text{F}\Delta\text{T} \times 0.1465 = \text{_____ KW}$$

2. Temperature Rise:

$$\text{_____ KW} \times 6.824 \div \text{_____ GPM} = \text{_____ } ^\circ\text{F}\Delta\text{T}$$

3. Flow Rate:

$$\text{_____ KW} \times 6.824 \div \text{_____ } ^\circ\text{F}\Delta\text{T} = \text{_____ GPM}$$

Step 2

Choose the CR model with the KW rating which meets the peak demand (GPM) of your system.

Step 3

Choose the voltage and phase power supply available. Note the total amperage draw of the unit and verify availability.

Electrical

$$\frac{\text{KW} \times 1000}{\text{Volts}} \div 1.73 = \text{Amps } 3\Phi$$

$$\frac{\text{KW} \times 1000}{\text{Volts}} = \text{Amps } 1\Phi$$

Note:

Each branch circuit in the CR Model is typically rated at a maximum of 48 Amps and each circuit is typically operated as an independent temperature step.

Example:

Model **CR225SST4** is 225 KW at 480 V 3 Φ .

$$\frac{225 \times 1000}{480} \div 1.73 = 271 \text{ Amps Total}$$

$$271 \div 48 \text{ Amps max circuit rating} = 5.6$$

Round up to 6 for the number of heating load temperature steps

Metric Conversions

$$\text{Liters} \times 0.2641 = \text{Gallons}$$

$$\text{Gallons} \times 3.79 = \text{Liters}$$

$$\text{Gallons} \times 0.003785 = \text{m}^3$$

$$\text{m}^3 \times 264.2 = \text{Gallons}$$

$$1^\circ\text{C } \Delta\text{T} = 1.8^\circ\text{F } \Delta\text{T}$$

$$^\circ\text{F} = (^\circ\text{C} \times 1.8) + 32$$

$$^\circ\text{C} = (^\circ\text{F} - 32) \times 0.556$$

$$\text{psi} \times 0.06896 = \text{Bar}$$

$$\text{Bar} \times 14.5 = \text{psi}$$

$$\text{psi} \times 6.86 = \text{kPa}$$

$$\text{kPa} \times 0.1456 = \text{psi}$$

$$\text{Lbs} \times 0.4536 = \text{Kg}$$

$$\text{Kg} \times 2.2 = \text{Lbs}$$

$$\text{Watts/Sq.Cm.} \times 6.4 = \text{Watts/Sq.In.}$$

$$\text{Watts/Sq.In.} \times 0.155 = \text{Watts/Sq.Cm.}$$

Master Specification: Model CR

JOB NAME

ENGINEER

REPRESENTATIVE

CONTRACTOR

GENERAL

Provide a quantity of _____ packaged type instantaneous electric circulation heater(s) Model No. _____ as manufactured by HUBBELL Electric Heater Co., Stratford, CT. The pressure vessel section, including the electrical control panel, shall be mounted on structural supports and be suitably insulated, jacketed, painted, and provided with proper lifting lugs. The entire unit is to be packaged ready for plumbing and electrical service connections and shall bear the UL listing mark certifying the entire unit.

PRESSURE VESSEL

The pressure vessel shall be all welded Type 304 Stainless Steel. (☐ **Optional Specifications:** Carbon steel, galvanized steel, Type 316L Stainless Steel, 90/10 Copper-nickel, Copper-silicon) and rated for a maximum allowable working pressure of 150 psi. Units rated over 58KW shall be ASME Code Section IV stamped and approved. The pressure vessel is to be completely covered with 2" thick "E" type energy conservation fiberglass blanket insulation and enclosed in a heavy gauge galvanized steel metal jacket finished in gray hammertone enamel. The vessel shall be protected by a factory installed ASME rated combination temperature and pressure relief valve set at 150 psi and 210°F.

RECOVERY

The recovery section shall be rated at _____ KW which will heat _____ GPM of water at _____ °F rise (_____ ° to _____ °F).

ELECTRICAL

The heater shall be designed to operate at _____ volts, _____ phase, _____ Hz, with a fused low voltage transformer providing 120 volt to all operating controls. The immersion heating element shall be low watt density, high quality copper sheathed (☐ **Optional Specifications:** Incoloy, Type 304 or 316 Stainless Steel, Steel, Monel, Inconel, Teflon, Titanium) and sized to obtain the rated recovery. Each element circuit is to be independently operated through a definite purpose magnetic contactor having a resistive load rating equal to or exceeding the ampere rating of that particular circuit and shall be protected by individual fuses rated at approximately 125% of the ampacity of the circuit. Multiple circuit elements shall be provided with a master terminal block for connecting of the incoming power feeds (☐ **Optional Specification:** Built-in non-fused On/Off disconnect switch, Built-in circuit breaker with On/Off handle). A safety door interlock switch shall interrupt power to the control circuit when the control panel door is opened. The operating thermostat shall be immersion type and shall be consistent with the recovery rate of the heating element as to the number of steps required. A Hi-Limit control with a manual reset button shall be factory installed to disconnect all ungrounded conductors to the heating element in the event of an over-temperature condition. A paddle-type flow switch shall be factory installed to disengage the control circuitry when there is insufficient flow through the heater.

In addition, the circulation heater shall be supplied with the following optional features:

☐ **Option** _____

☐ **Option** _____

☐ **Option** _____

WARRANTY

Hubbell shall warranty all electrical components against defects in workmanship and material for a period of one (1) year from date of start-up, and the pressure vessel for a full five (5) years Non Pro-Rated from date of start-up, provided that the unit is started within three (3) months of date of shipment and installed and operated within the scope of the vessel design and operating capability. Each heater shall be shipped with a complete set of installation and operating instructions including spare parts list and approved drawings.

NOTES

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Hubbell is a leader in the design, engineering and manufacturing of water heaters for use in demanding Commercial, Industrial, Marine/Offshore and Naval markets. Hubbell products are engineered and manufactured in the U.S., and built with only the highest quality materials and technologies including Hydrastone cement, stainless steel, and digital controls. Hubbell is ISO 9001 meeting all the current standards including: cULus, ASME, ASHRAE, ANSI/NSF5, USCG, ABS, DNV, ASME, NR13 and MIL. With dependability, long life, and trouble-free service design, Hubbell water heaters are trusted all over the world adding value to every installation.



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