Hubbell™
Marine Products Division

Model MSE

Shipboard Electric Water Heater

6-119 Gallon Capacity, Three Phase Voltages Up To 58 KW, Single Phase Voltages Over 6 KW

Heavy Duty Construction
- Hydrastone cement lining provides longer tank life
- Copper-silicon alloy tappings cannot rust or corrode
- High impact composite jacket cannot rust or corrode and eliminates damage during installation and transit

Marine Approvals
- United States Coast Guard (USCG) conformance and American Bureau of Shipping (ABS) Type Approved
- USCG conformance and ABS Type Approval eliminates costly delays and uncertainties during ship inspection

Wide Selection
- Built to meet your exact needs
- Numerous options available for specialized applications

Mounting Systems
- Heavy-duty legs secure the tank to deck
- Removable side-sway bulkhead attachment points provide added mounting integrity
- The entire mounting system is integrally welded to tank for maximum stability and safety

High Efficiency
- 2" thick polyurethane foam insulation reduces heat loss
- Built-in heat trap lowers operating costs

Reliable
- Full five (5) year Non Pro-rated tank warranty is standard
- Full ten (10) year Non Pro-rated tank warranty can be specified for extended protection

A Long Lasting, Trouble-Free Water Heater

The Hubbell Model MSE water heater is specifically designed for marine use and is in USCG conformance and is ABS Type Approved. By utilizing deck and removable bulkhead mounting supports, the water heater is securely fastened to the ship structure, thus providing a secure and reliable water heater installation. To ensure tank longevity, the high quality tank is constructed of steel and internally lined with specially formulated hydrastone cement. The hydrastone cement lining, along with solid copper-silicon threaded tank openings and a built-in heat trap device, all ensure a longer lasting, energy efficient water heater that is resistant to the highly corrosive effects of hot water.

When you specify and install a Hubbell model MSE, knowing that it is in conformance with USCG regulations and ABS Type Approved, you will have confidence that the ship owner will be provided with a long lasting, trouble-free source for hot water.

ABS TYPE APPROVED PRODUCT

c UL us LISTED

CERTIFIED ISO 9001 ANAB ACCREDITED MANAGEMENT SYSTEMS CERTIFICATION BODY

USCG As Used By The US Coast Guard

Hubbell™ *The Electric Heater Company*
P.O. Box 288 ▪ Stratford, CT 06615-0288
Phone: 203-378-2659 ▪ FAX: 203-378-3593
E-mail: info@hubbellheaters.com ▪ ***www.hubbellheaters.com***

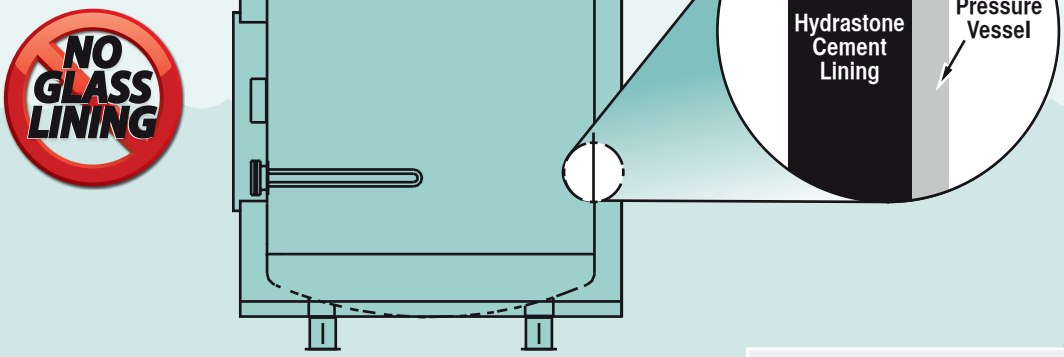
Cement Lined Tanks Provide Longer Service Life

Hubbell™

Q: What is the most common reason why a water heater fails?

A: Failure of a tank's protective lining allows water to come into direct contact with the steel tank causing it to corrode and leak.

Therefore, the type of protective lining is the single most important feature when determining the quality of any water heater. The ability of a lining to protect the steel tank is primarily based upon its thickness and complete coverage of all steel surfaces.



Threaded tapping material is critical for tank longevity.

Glass lined tanks are constructed with regular steel tappings which are continuously attacked by corrosive hot water due to the lack of glass lining on the internal threads. The Hubbell Model MSE water heater tank is constructed with solid non-ferrous copper-silicon tank tappings which are impervious to the corrosive effects of hot water.

The Hubbell Model MSE is a longer lasting marine water heater based upon the construction features found in the Hydrastone cement lined storage tank. The result is that when you specify and install a Hubbell Model MSE, you will have confidence in knowing that the owner will be provided with a trouble-free and long lasting marine water heater.

Thickness
Each Hubbell Model MSE storage tank is lined with a minimum of 1/2" thick Hydrastone cement to ensure protection of the steel tank.

Coverage
The Hydrastone cement lining covers a guaranteed 100% of all interior tank surfaces and is free from imperfections. Full coverage is achieved by injecting the precise amount of Hydrastone cement into each tank and then centrifugally spinning it at 250 RPM to ensure complete and uniform coverage of the lining on all interior surfaces.

Corrosion Resistance
Hydrastone cement is a specially formulated high density lining designed to provide maximum protection from the corrosive effects of hot water.

Reduced Operating Costs
The Hubbell Model MSE marine water heater significantly reduces the total ownership cost of a water heater due to the longer life and maintenance-free benefits derived from a Hydrastone cement lined tank. Longer tank life is directly attributable to the unmatched tank protection provided by the Hydrastone cement lining and copper-silicon tappings. Additionally, the Model MSE reduces operating expenses by eliminating the periodic inspection and replacement costs associated with maintaining a sacrificial anode in a glass lined tank.

Two common internal tank linings are Glass & Cement

Glass Lining
is approximately 5 mils (.005") thick & **does not cover** all internal surfaces. To compensate, all glass lined tanks require a sacrificial anode rod which must be periodically inspected and replaced.

Hydrastone Cement Lining
is a minimum of 1/2" thick (100 times thicker than glass lining) and is guaranteed to uniformly cover 100% of all internal tank surfaces. The result is a significantly longer lasting tank which does not require a sacrificial anode.

Shipboard Electric Water Heater

Model MSE Water Heater Specifications

Tank:	Hydrastone Cement Lined Steel
Capacities:	6 thru 119 Gallons
Orientation:	Vertical
Voltages:	120 thru 600 Volt
Phase:	1 or 3Φ
Inlet Size:	
Below 45 KW:	3/4" Female NPT
45 KW and over:	1 1/2" Male NPT
Outlet Size:	
Below 45 KW:	3/4" Male NPT
45 KW and over:	1 1/2" Male NPT
Drain Size:	3/4" GHT Hose Connection
Relief Valve Size:	3/4" Female NPT
Relief Valve Type:	T&P, 210 °F, 100 psi
Thermostat Range	
Surface:	110-170 °F
Immersion:	100-190 °F
Hi-Limit:	190 °F
Design WP:	100 psi
Design TP:	300 psi
Elements:	Incoloy Sheathed
Insulation:	2" Polyurethane Foam
Tank Warranty	
Standard:	5 Year Non Pro-Rated
Optional:	10 Year Non Pro-Rated
Electrical Warranty:	1 Year
Jacket:	High Impact Colorized Composite
Color:	White and Black
Marine Classifications:	ABS Type Approved

General Specifications

- 1/2" thick Hydrastone cement lining.
- Removable bulkhead attachment points.
- Heavy-duty integrally welded leg supports for deck mounting.
- Non-ferrous solid copper-silicon threaded openings for maximum corrosion resistance.
- Magnetic contactor(s) are heavy duty resistive load type rated for 200,000 cycles.
- Low voltage control circuit (fused) transformer (units over 240 volt).
- Power circuit fuse protection (units over 48 amp).
- Incoloy sheathed immersion heating elements.
- Built-in heat trap to improve operating efficiency. (3/4" only)
- Surface thermostat 110-170 °F range.
- Immersion thermostat (100-190 °F) furnished as standard when required due to high recovery versus storage ratio. See below for details.*
  * On 6-30 gallon heaters over 5 KW.
  On 40 and 50 gallon heaters over 8 KW.
  On 65 gallon heaters over 12 KW.
  On 80-120 gallon heaters over 15 KW.
- Surface safety hi-limit cut out with manual reset button (190 °F).
- Immersion safety hi-limit cut out with manual reset button (Standard on heaters 45 KW and above).
- ASME rated temperature and pressure relief valve set at 100 psi, 210 °F.
- 2" thick polyurethane foam insulation.
- High impact non-corroding colorized composite protective jacket.
- Cold water inlet diffuser with drain valve.

Optional Equipment

- ☐ **1.** Full 10 Year Non Pro-Rated tank warranty.
- ☐ **2.** Control circuit (fused) transformer. (Standard on units over 240V).
- ☐ **3.** Electronic low water cut off.
- ☐ **4.** Power circuit fuse protection.
- ☐ **5.** Immersion thermostat (specify 100-190 °F or 30-110 °F Range).
- ☐ **6.** Immersion adjustable (100-240 °F) safety hi-limit cut out with manual reset.
- ☐ **7.** Solid Type 316L stainless steel tank, 90/10 copper nickel alloy tank.
- ☐ **8.** 1 1/2" Male NPT brass inlet and outlet water connections (heat trap not available).
- ☐ **9.** 2" Male NPT brass inlet and outlet water connections (heat trap not available).
- ☐ **10.** Special connection size/type: _____
- ☐ **11.** Combination temperature and pressure gauge; 2 1/2" dial, **30-**240 °F, 0-200 psi — factory installed in tank.
- ☐ **12.** Built-in circuit breaker, specify with or without shunt trip protection.
- ☐ **13.** Built-in non-fused On/Off disconnect switch.
- ☐ **14.** Electro-mechanical 7-day time clock with battery back-up.
- ☐ **15.** Horizontal construction.
- ☐ **16.** NEMA 4 weather resistant construction for installation in outdoor/wet areas.
- ☐ **17.** Explosion resistant enclosures for hazardous locations. Please specify class, division and group.
- ☐ **18.** Secondary heating capability provided by a tank inserted heat exchanger constructed from single wall (Optional: double wall) copper fin tube.
- ☐ **19.** Additional ground connections
- ☐ **20.** Alternate working pressure available *(Please Specify)*

Please note: *optional equipment may impact overall dimensions and weight. Please request submittal drawing from factory.*

Hubbell™

KW Selection Chart With Recovery Rating & Amperage

KW	BTU/HR	Gallons Per Hour Heated At Various Temperature Rises			Amperage Ratings At Various Voltages								
					Single Phase			Three Phase					
		60 °F Δ	80 °F Δ	100 °F Δ	208V	240V	480V	208V	240V	380V	415V	440V	480V
3	10,236	21	15	12	14	13	6	8	7	5	4	4	4
4	13,648	27	21	16	19	17	8	11	10	6	6	5	5
6	20,472	41	31	25	29	25	13	17	15	9	8	8	7
8	27,296	55	41	33	39	33	17	22	19	12	11	11	10
10	34,120	68	51	41	48	42	21	28	24	15	14	13	12
12	40,944	82	62	49	58	50	25	33	29	18	17	16	15
15	51,180	103	77	62	72	63	31	42	36	23	21	20	18
18	61,416	123	92	74	87	75	38	50	43	27	25	24	22
20	68,240	137	103	82	96	83	42	56	48	30	28	26	24
24	81,888	164	123	98	115	100	50	67	58	37	33	32	29
30	102,360	205	154	123	144	125	63	83	72	46	42	39	36
36	122,832	246	185	148	173	150	75	100	87	55	50	47	43
40	136,480	273	205	164	192	167	83	111	96	61	56	53	48
45	153,540	308	231	185	216	188	94	125	108	69	63	59	54
50	170,600	342	256	205	240	208	104	139	120	76	70	66	60
54	184,248	369	277	221	260	225	113	150	130	82	75	71	65
58	197,896	396	297	238	279	242	121	161	140	88	81	76	70

Notes: 1. The KW selections above are shown for convenience. A full selection of KW ratings from 1 to 58 KW is available by simply entering the desired KW into the model number.
2. Units 45 KW and over are supplied with 1 1/2" Male NPT inlet/outlet connections and immersion hi-limit.
3. Alternate voltages including 220, 230, 460, 575 and 600 volt are available, please consult factory for details.

Formulas To Solve For:

Recovery

GPH x _____ °F ΔT x 0.00244 = KW

KW x 410 ÷ GPH = _____ °F ΔT

KW x 410 ÷ _____ °F ΔT = GPH

***Note:** 1 KW will heat 4.1 GPH at a 100°F ΔT*

Electrical

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

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

Metric Conversion

Liters x 0.2641 = Gallons

Gallons x 3.79 = Liters

Gallons x 0.003785 = m^3

m^3 x 264.2 = Gallons

1°C ΔT = 1.8°F ΔT

°F = (°C x 1.8) + 32

°C = (°F - 32) x 0.556

Watts/Sq.Cm. x 6.4 = Watts/Sq.In.

Watts/Sq.In. x 0.155 = Watts/Sq.Cm.

psi x 0.06896 = Bar

Bar x 14.5 = psi

psi x 6.86 = kPa

kPa x 0.1456 = psi

Kg/cm2 x 14.28 = psi

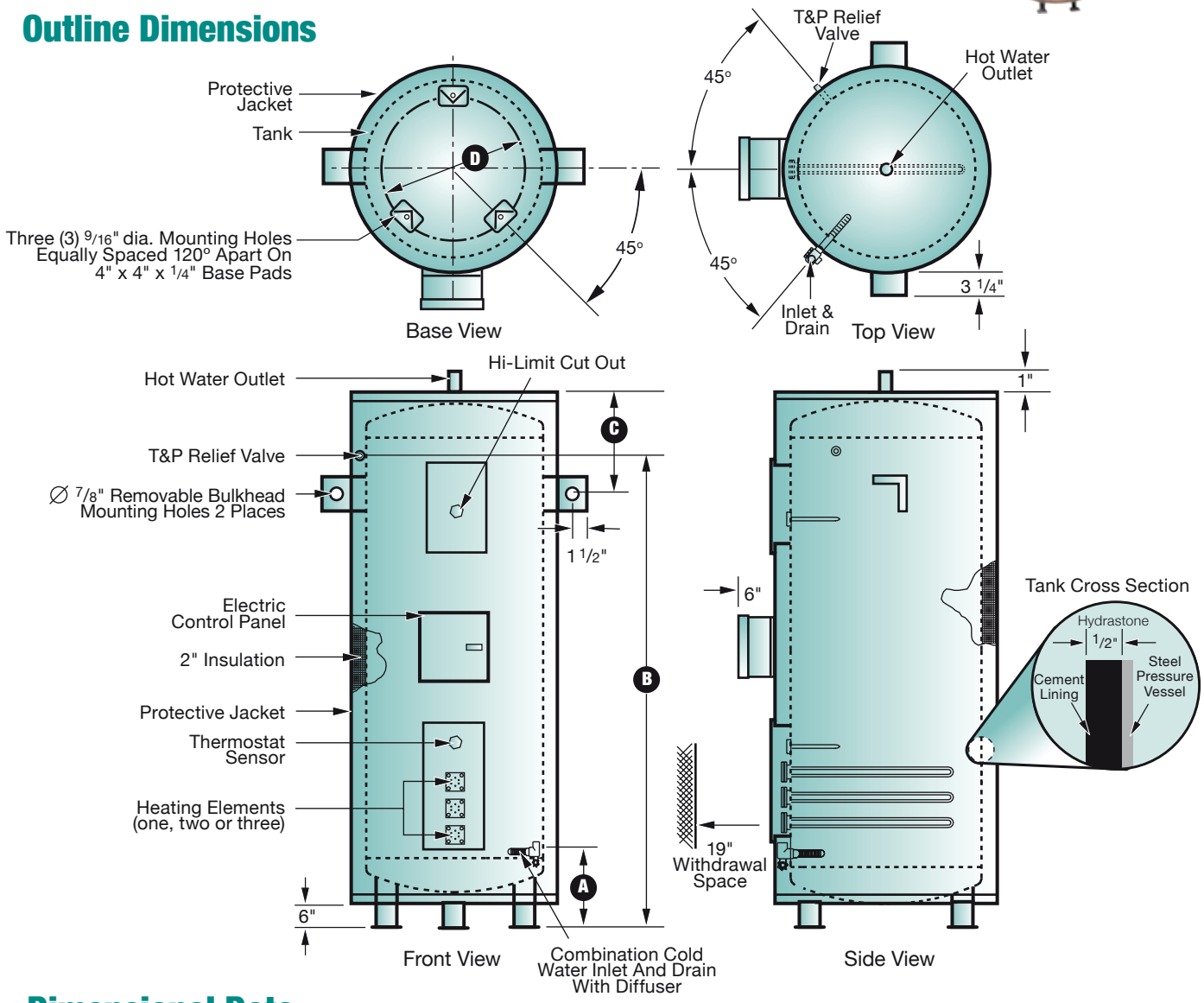
psi x 0.07 = Kg/cm2

Lbs x 0.4536 = Kg

Kg x 2.2 = Lbs

Shipboard Electric Water Heater

Outline Dimensions



Dimensional Data

Storage Capacity (Gallons)	Base Model Number	Maximum KW Input	Dimensions (Inches)						Shipping Weight (lbs.)
			Overall Diameter	Overall Height	Deck to Inlet (A)	Deck to T&P (B)	Bulkhead Mounting Dimension (C)	Bolt Circle (D)	
6	**MSE06**	3	15	17.5	5	12.5	None	None	120
10	**MSE10**	10	20	27	13	21	None	13	155
19	**MSE20**	10	20	39	13	33	None	13	195
30	**MSE30**	15	20	47.5	13	40	12	13	225
40	**MSE40**	15	20	64.75	13	57	12	13	315
50	**MSE50**	58	22.75	57	13	49	12	15	330
65	**MSE65**	58	26	54	14	46	12	18	395
80	**MSE80**	58	26	64	14	57	12	18	430
100	**MSE100**	58	26	75.5	14	68	12	18	460
119	**MSE120**	58	28	75.25	14	68	12	20	510
40	**MSEU40**	58	26	39	13	30	None	18	320

Hubbell™

Marine Products Division

The Electric Heater Company
Stratford, CT

Model No:

Vessel Name:

Location:

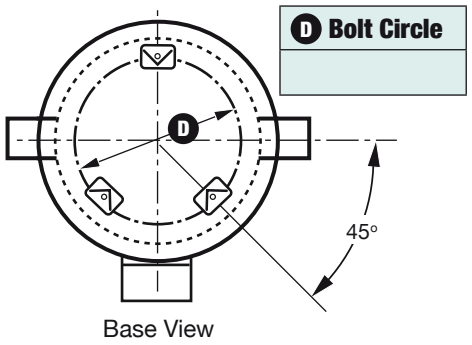
QTY:

Date:

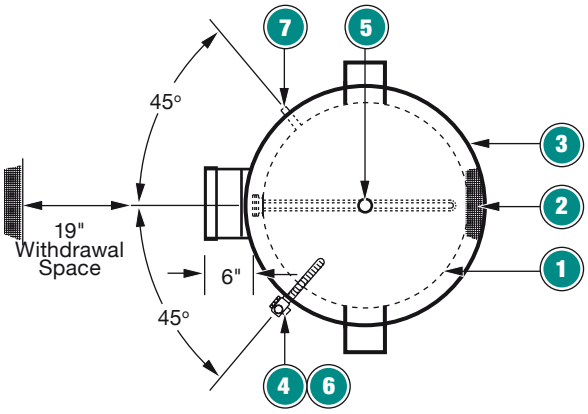
PC Number	Description
1	Hydrastone cement Lined Tank
2	2" Polyurethane Foam Insulation
3	Corrosion Resistant Jacket
4	Cold Water Inlet
5	Hot Water Outlet
6	Drain Connection
7	Relief Valve Connection
8	Heating Element(s)
9	Electric Control Panel
10	Hi-Limit / Upper Panel
11	Bulkhead Attachment Points (removable)
12	Heavy Duty Legs

General Characteristics	
	Gallon Storage Capacity
	Total KW Rating
	Volts
	Phase
	Hertz
	Full Load Amperage
	Inlet / Outlet Size
	Dry Weight (Lbs.)
	Wet Weight (Lbs.)

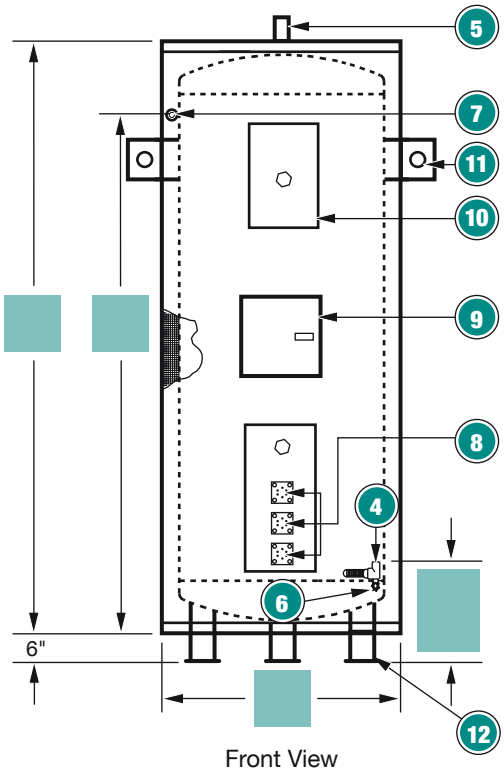
Recovery Rating
____ GPH @ ____ °F ΔT (____°F - ____°F)



Base View



Top View



Front View

Notes:

1. Storage tank rated for 100 psi WP
2. ASME rated T&P relief valve shipped loose
3. Built-in heat trap supplied in hot water outlet (3/4" size only)
4. All electrical controls are factory wired and tested
5. Unit is in conformance to USCG regulations and ABS Type Approved for shipboard installation.

Model Number Designation

MSE		–	0	–			
Step 1	Step 2		Step 3		Step 4	Step 5	Step 6

Model:
MSE

Storage Capacity:
6-119 U.S. Gallons

Upper KW:
Element bank
0 - 58 KW
(typically 0) Not available in 6, 10, 20 Gallon capacity heaters

Lower KW:
Element bank
1 - 58 KW

Tank:

SL = Hydrastone Cement lined tank

SS = Solid stainless steel tank

CN = Solid 90/10 copper-nickel tank

Voltage / Phase / Hz:

RS = 208-1-60
R = 208-3-60
S = 240-1-60
T = 240-3-60
W = 277-1-60
T3 = 380-3-50/60
T7 = 415-3-50/60
T5 = 440-3-60
T4 = 480-3-60
T4S = 480-1-60
T6 = 600-3-60

Example: **MSE120 - 0 - 45SLT4**

Hubbell model MSE marine water heater with a storage capacity of 119 Gallons with 45 KW in the lower element bank. Storage tank is lined with Hydrastone cement and the electrical controls operate at 480 V, 3 phase, 60 Hz power.

Option Note

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

(Manufacturer reserves the right to change specifications without notice.)

Model MSE

Master Specification

SHIP NAME _____ ENGINEER / NAVAL ARCHITECT _____

SHIPYARD _____ CONTRACTOR / SHIP CHANDLER _____

General

Provide a quantity of _____ heavy-duty marine electric water heater(s) Model No. _____ as manufactured by HUBBELL Electric Heater Co., Stratford CT. The water heater shall be constructed specifically for shipboard installation utilizing deck and bulkhead mounting supports that are integrally welded to the pressure vessel. The entire water heater shall meet USCG regulations per 46 CFR 53.01-10 and be ABS Type Approved for marine use and shall be complete with all operating controls requiring only plumbing and electrical service connections. The tank shall be all welded steel commercial construction designed for 100 psi working pressure and contain _____ gallons of storage. The tank shall be lined with seamless Hydrastone cement to a minimum thickness of 1/2" on 100% of all interior tank surfaces. (☐ **Optional Specification:** *Tank to be fabricated from solid 90/10 copper- nickel tank or type 316L stainless steel. For this option no internal lining is required due to the non-ferrous materials used in construction of the pressure vessel.)* The tank shall not require any type of anodic protection. The tank shall be designed and fabricated with non-ferrous copper-silicon threaded tappings and non-ferrous inlet and outlet piping for maximum corrosion resistance. Steel tank tappings will not be acceptable. The entire tank shall be insulated with a minimum of 2" thick polyurethane foam insulation and exceed the latest ASHRAE standard for stand-by heat loss. The complete heater shall be supplied with a high impact colorized composite protective jacket which cannot rust or corrode and does not require painting. The unit shall bear the ABS Type Approved mark certifying the entire water heater.

The heater shall be supplied with separate cold water and hot water connections. Water entering the cold water inlet shall be deflected by means of a baffle within the tank. Dip tubes shall not be accepted. The hot water outlet shall include a built-in heat trap to prevent hot water from radiating out from the heater during standby periods. A separate 3/4" FNPT connection shall be provided for mounting a combination safety temperature and pressure relief valve. A 3/4" GHT connection is supplied for draining. An ASME rated automatic reseating combination temperature and pressure safety valve set at 100 psi and 210°F shall be factory supplied.

Recovery

The heating element(s) shall be high quality incoloy sheathed immersion type and rated at a total of _____ KW that will heat _____ GPH of water at _____ °F rise (_____ to _____ °F).

Electric

The heater shall be designed to operate at _____ volts _____ phase _____ Hz (balanced) with all necessary operating controls factory mounted, wired and tested. Each circuit shall be independently operated through a definite purpose magnetic contactor rated for 200,000 cycles. Water temperature shall be controlled through an adjustable thermostat. An over-temperature manual reset hi-limit shall be factory installed to disconnect all conductors to the heating element(s) in the event of an over temperature condition in the pressure vessel.

In addition, the water heater shall be supplied with the following options:

☐ **Option** _____

☐ **Option** _____

☐ **Option** _____

The water heater manufacturer 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 (☐ **Optional Specification:** *Full ten (10) years Non Pro-Rated Tank Warranty)* 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 tank design and operating capability. Each water heater shall be shipped with a complete set of installation and operating instructions including spare parts list and approved drawings.

Hubbell™

Committed to continuous improvements

Continuing research results in product improvement; therefore these specifications are subject to change without notice. For the most updated information, consult the factory.

MADE IN THE USA

ISO 9001 ANAB

Marine Products Division

The Electric Heater Company ■ P.O. Box 288 ■ Stratford, CT 06615-0288

Phone: 203-378-2659 ■ FAX: 203-378-3593 ■ info@hubbellheaters.com ■ **www.hubbellheaters.com**