

MARINE BOILER

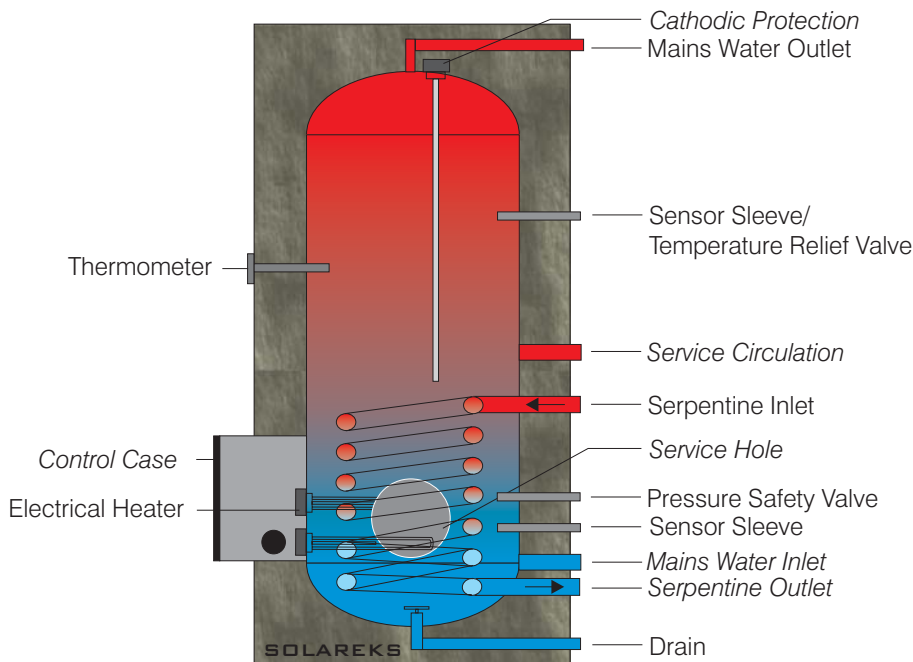
METRIC UNIT CATALOGUE

**BOILER & ELECTRICAL
HEATER FOR SHIP**



SOLAREKS - MARINE BOILER

Boiler is designed to be used in ships, water can be heated by electrical heaters and engine cooling liquid. While the engine is working engine cooling liquid passes through the serpentine in the boiler and heats the water stored in the tank where energy is saved. When the engine is not working the water will be heated by the thermostatically controlled electrical heaters.



Technical Details

1- Boiler and Electrical Heater in one Product

Serpentine and electrical heaters are situated in the boiler. While the engine is working the water will be heated by the engine cooling liquid to save energy, when the engine is not working water can be heated by the electrical heaters

2- Corrosion Protection and Hygiene

Boilers inner tank is produced by high quality stainless steel for a longer useful life. Additional corrosion protection is obtained by magnesium anods. (Cathodic Protection)

3- Insulation

Boiler is insulated with rockwool against heat losses.

4- Digitally Controlled Heaters

Boilers heaters are controlled by digital thermostat, easy to use and safe by its coding system.

5- Aesthetic

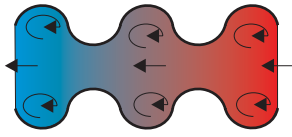
Thus the outer coverage of the boiler is made by brushed stainless steel has an aesthetic view.

6- Long Useful Life

The boilers are produced by stainless steel have a useful long life. Serpentine is designed to work as a compensator against heat tensions.

7- Perfect Heat Transfer

Pipes where the heat transfer fluid passes works like a turbulator, higher heat convection and heat convection coefficients are obtained to have a perfect heat transfer



8- Installation

Boiler can be connected to ground by welding or bolts. Wall hanging equipments lets a secure installation.

9- Material in a High Quality and Production

High quality stainless steel is used for production. Products are shipped after conducting pressure, electrical and packing controls.

10- Safety

Boiler is equipped with a digital thermostat and additional analog thermostat, If digital thermostat is broken down safety thermostat will switch off the electrical heaters at 176 °F. Non return valve is used not to let the electrical heaters work without water. Pressure safety valve is used to protect the tank against high pressures.

11- Packing

Woodbox is used to pack the products

12- Warranty

Stainless Steel: 5 years
 Hot Deep Galvanized: 2 years
 Electrical case&Equipments: 2 years
 Electrical Heaters: 2 year warranty against production faults.

Note: Hetaers are not guarantied against crack or explosion of working conditions.

Technical Details

Capacity (US Gallons)	26.4	42.2	52.8	79.2	105.6	132	158.4	
Corrosion Protection	Stainless Steel / Cathodic Protection							
Outer Coverage	Stainless Steel							
Insulation	Rockwool							
Dimensions (Inches)	39.37xØ19.68	51.18xØ21.65	51.18xØ23.62	61.41xØ25.59	59xØ30.70	72.04xØ30.70	66.93xØ33.46	
Weight (Lbs)	88	127.6	160.6	195.8	237.6	279.4	308	
Working Pressure (psi)	87 psi							
Test Pressure (psi)	130 psi							
Thermostat Heater (BTU/hr) 440 V- 3 Phase - 60 Hz	2x15,354 30,700	2x15,354 30,700	2x15,354 30,700	3x15,354 46,063	3x20,472 61,418	3x25,591 76,773	3x25,591 76,773	
Time of the heating by electrical heater (min.) considering heating from 50°F up to 122°F	31	50	62	62	62	62	74	
Serpentine Continous Working Capacity								
Heat Transfer Fluid Temperature	26.4	42.2	52.8	79.2	105.6	132	158.4	
Heating Capacity (US Gallons/Hr) considering heating from 50°F up to 122°F	176°F	129	223	233	335	430	528	464
	158°F	101	175	185	264	338	428	369
	140°F	80	130	138	195	253	311	272

Technical Details

Capacity (US Gallons)	198	264.1	330.1	396.1	462.1	528.2	660.25	
Corrosion Protection	Stainless Steel / Cathodic Protection							
Outer Coverage	Stainless Steel							
Insulation	Rockwool							
Dimensions (Inches)	72.83xØ35.43	82.28xØ38.97	88.58xØ43.3	80.70xØ51.18	82.67xØ52.75	86.22xØ54.72	86.64xØ23.62	
Weight (Lbs)	407	556.6	693	825	1016	1210	1419	
Working Pressure (psi)	87 psi							
Test Pressure (psi)	130 psi							
Thermostat Heater(BTU/hr) 440 V- 3 Phase - 60 Hz	3x34,121 102,390	3x51,195 153,585	3x51,195 153,585	3x68,260 204,780	3x68,260 204,780	3x102,390 307,170	3x102,390 307,170	
Time of the heating by electrical heater (min.) considering heating from 50°F up to 122°F	70	62	77	70	81	62	77	
Serpentine Continous Working Capacity								
Heat Transfer Fluid Temperature	198	264.1	330.1	396.1	462.1	528.2	660.25	
Heating Capacity (US Gallons/Hr) considering heating from 50°F up to 122°F	176°F	581	934	1122	1307	1545	1790	2238
	158°F	462	739	884	1030	1228	1426	1782
	140°F	338	554	660	773	897	1043	1300

Technical Details

Capacity (US Gallons)	792.3	1056.4	1320	
Corrosion Protection	Stainless Steel / Cathodic Protection			
Outer Coverage	Stainless Steel			
Insulation	Rockwool			
Dimensions (Inches)	86.22xØ64.56	86.61xØ74.40	86.61xØ82.28	
Weight (Lbs)	1595	2085	2695	
Working Pressure (psi)	87 psi			
Test Pressure (psi)	130 psi			
Thermostat Heater(BTU/hr) 440 V- 3 Phase - 60 Hz	4x102,390 409,560	5x102,390 511,950	5x102,390 511,950	
Time of the heating by electrical heater (min.) considering heating from 50°F up to 122°F	70	74	93	
Serpentine Continous Working Capacity				
Heat Transfer Fluid Temperature	792.3	1056.4	1320	
Heating Capacity (US Gallons/Hr) considering heating from 50°F up to 122°F	176°F	2131	2825	3459
	158°F	1684	2244	2865
	140°F	1249	1663	2131

Material Specifications

	Material	ASTM (USA)	EN (Europe)	UNS (USA)	BS (Great Britain)	JIS (Japan)	NF (France)	SIS (Sweden)	GOST (Russia)
Inner Tank	Stainless Steel	304 L	1.4306 - X12 CrNi 19-11	S30403	304S11	SUS 304 L	Z 3 CN 18-10	2352	03Ch18N11
Serpentine	Stainless Steel	316 L	1.4432 - X5 CrNiMo 17-12-3	S31603	316S13	SUS 316 L	Z 3 CND 17-12-03	2353	03Ch17N14M3
Electrical Heater	Stainless Steel	316 L	1.4432 - X5 CrNiMo 17-12-3	S31603	316S13	SUS 316 L	Z 3 CND 17-12-03	2353	03Ch17N14M3
Cathodic Protection	Magnesium	ASTM - B843AZ63(H-1)							
Insulation	Rockwool	EN - 13162							
Outer Coverage	Stainless Steel	304 L	1.4306 - X12 CrNi 19- 11	S30403	304S11	SUS 304 L	Z 3 CN 18-10	2352	03Ch18N11
Mounting Parts	Stainless Steel	304 L	1.4306 - X12 CrNi 19- 11	S30403	304S11	SUS 304 L	Z 3 CN 18-10	2352	03Ch18N11



Control Case Specifications

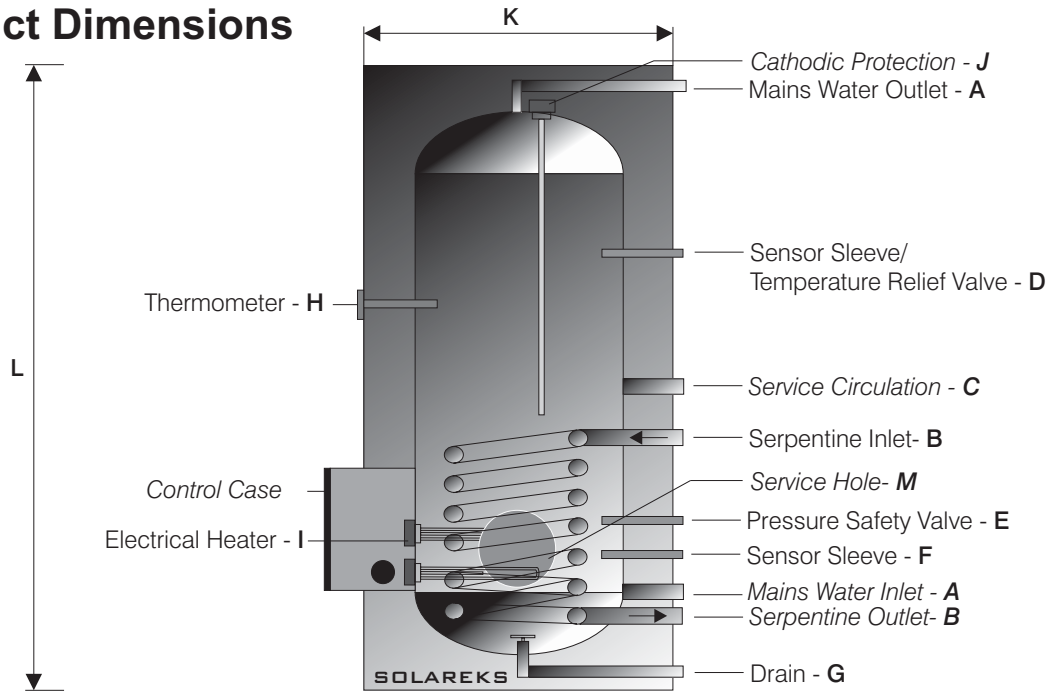
Boiler is shipped with all working equipments ready to use. Below are the main elements of control case;

- Electrical Heater: To have a long useful life in hard working conditions 316 quality stainless steel is used in production, heaters are designed for low energy output per square meter. Electrical heaters can be operated separately. When one of the heater is broke down the others can be operated.
- Emergency Stop Button
- Reset Button: If the system is stopped because of unsafety conditions it should be reset before operating.
- Digital Controller/Thermostat: Easy to adjust temperature. Because of its coding system limit sets can be done only by authorized person.
- Safety Thermostat: Safety thermostat is used as an additional safety when the digital thermostat is out of order. It switches of the heating elements when the water temperature is 176 °F. It is used to prevent boiler producing steam and to prevent users from scalding.
- Dielectric Current Protection Relay: When there is leakage current in system Protection Relay switches off the system.
- Magnetic Contactors are heavy duty resistive load type rated for 100.000 cycles.
- Water proof control case is used.
- Easy&Secure to change heaters: Control case has two gates second is a flat type gate (service gate) which is easy to open and used to change the electrical heaters, open gate cut off switch is used as an additional safety which switches off heaters when the service gate is open.
- 24 Volt AC Control Circuit Voltage.

Safety Specifications

- Adjustable Safety Valve: Protects boiler against high mains water pressure. Can be adjusted between 43.5 psi to 174 psi.
- Non-Return Valve: Prevents electrical heaters against dry fired.
- Boiler is equipped with a digital thermostat and additional analog thermostat, If digital thermostat is broken down safety thermostat will switch off the electrical heaters at 176 °K.
- Temperature Relief Valve: Protects users against high temperature&scalding (Optional).
- Thermostatic Mixing Valve: Mixes hot water with cold water to deliver tempered water at a controlled temperature (Optional)
- Boiler Mounting Equipments: Special hanging apparatus are use against boiler falling over.
- Emergency Lamp: Lamp is turned on in water temperature which exceeds the adjusted value, or when leakage current occurs (Optional).
- Low Water cutout device to prevent dry firing of heating elements (Optional).

Product Dimensions



Capacity (US Gallons)	26.4	42.2	52.8	79.2	105.6	132	158.4	198	264.1	330.1
A- Mains Water Inlet/Outlet	3/4"	3/4"	3/4"	1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"
B- Serpentine Inlet/Outlet	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
C- Service Circulation	3/4"	3/4"	3/4"	1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"
D- Sensor Sleeve/Temperature Relief Valve	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
E- Pressure Safety Valve	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
F- Sensor Sleeve	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
G- Drain	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"
H- Thermometer	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
I- Electrical Heater- 440 V - 60 Hz - 3 phase (BTU/Hr)	2x15,354 30,700	2x15,354 30,700	2x15,354 30,700	3x15,354 46,063	3x20,472 61,418	3x25,591 76,773	3x25,591 76,773	3x34,121 102,390	3x51,195 153,585	3x51,195 153,585
J- Cathodic Protection - Ø 1 (inches)	27.56	27.56	27.56	27.56	27.56	27.56	27.56	55.11	55.11	55.11
K- Diameter (inches)	19.68	21.65	23.62	25.59	30.70	30.70	33.46	35.43	38.97	43.3
L- Height (inches)	39.37	51.18	51.18	61.41	59	72.04	66.93	72.83	82.28	88.58
M- Service Hole	4"	4"	4"	4"	4"	4"	4"	4"	4"	4"
N- Weight (Lbs)	18	26	33	40	49	57	63	83	114	142

Capacity (US Gallons)	396.1	462.1	528.2	660.25	792.3	1056.4	1320
A- Mains Water Inlet/Outlet	1 1/2"	1 1/2"	1 1/2"	1 1/2"	2"	2"	2"
B- Serpentine Inlet/Outlet	1"	1"	1"	1"	1"	1"	1"
C- Service Circulation	1 1/2"	1 1/2"	1 1/2"	1 1/2"	2"	2"	2"
D- Sensor Sleeve/Temperature Relief Valve	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
E- Pressure Safety Valve	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
F- Sensor Sleeve	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
G- Drain	1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"
H- Thermometer	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
I- Electrical Heater- 440 V - 60 Hz - 3 phase (BTU/Hr)	3x68,260 204,780	3x68,260 204,780	3x102,390 307,170	3x102,390 307,170	4x102,390 409,560	5x102,390 511,950	5x102,390 511,950
J- Cathodic Protection - Ø 1 (inches)	55.11	82.67	82.67	82.67	82.67	82.67	82.67
K- Diameter (inches)	51.18	52.75	54.72	23.62	64.56	74.40	82.28
L- Height (inches)	80.70	82.67	86.22	86.64	86.22	86.61	86.61
M- Service Hole	4"	4"	4"	4"	4"	4"	4"
N- Weight (Lbs)	169	208	248	290	326	426	551

SOLAREKS STANDART SPECIFICATIONS

Products are shipped at the specifications which are written below, if needed options should be note down.

Material Specifications

	Material	ASTM (USA)	EN (Europe)	UNS (USA)	BS (Great Britain)	JIS (Japan)	NF (France)	SIS (Sweden)	GOST (Russia)
Inner Tank	Stainless Steel	304 L	1.4306 - X12 CrNi 19-11	S30403	304S11	SUS 304 L	Z 3 CN 18-10	2352	03Ch18N11
Serpentine	Stainless Steel	316 L	1.4432 - X5 CrNiMo 17-12-3	S31603	316S13	SUS 316 L	Z 3 CND 17-12-03	2353	03Ch17N14M3
Electrical Heater	Stainless Steel	316 L	1.4432 - X5 CrNiMo 17-12-3	S31603	316S13	SUS 316 L	Z 3 CND 17-12-03	2353	03Ch17N14M3
Cathodic Protection	Magnesium	ASTM - B843AZ63(H-1)							
Insulation	Rockwool	EN - 13162							
Outer Coverage	Stainless Steel	304 L	1.4306 - X12 CrNi 19- 11	S30403	304S11	SUS 304 L	Z 3 CN 18-10	2352	03Ch18N11
Mounting Parts	Stainless Steel	304 L	1.4306 - X12 CrNi 19- 11	S30403	304S11	SUS 304 L	Z 3 CN 18-10	2352	03Ch18N11

Control Case Specs. Electrical Heater Capacities 440 V - 60 Hz - 3 Phase

Phase Signal Lamp
Main Circuit Breaker
Emergency Stop Button
Heaters Can be Operated Separately
Digital Controller/Thermostat (Coding System)
Safety Thermostat
Analog Temperature Gauge
Dielectric Current Relay
Flap Type Gate
Reset Button

Capacity (US Gallon)	Heater Capacity (BTU/Hr)	Total Heater Capacity (BTU/Hr)	Heating Time* (minute)
26.4	2x15,354	30,700	31
42.2	2x15,354	30,700	50
52.8	2x15,354	30,700	62
79.2	3x15,354	46,063	62
105.6	3x20,472	61,418	62
132	3x25,591	76,773	62
158.4	3x25,591	76,773	74
198	3x34,121	102,390	70
264.1	3x51,195	153,585	62

Capacity	Heater Capacity (BTU/Hr)	Total Heater Capacity (BTU/Hr)	Heating Time* (minute)
330.1	3x51,195	153,585	77
396.1	3x68,260	204,780	70
462.1	3x68,260	204,780	81
528.2	3x102,390	307,170	62
660.25	3x102,390	307,170	77
792.3	4x102,390	409,560	70
1056.4	5x102,390	511,950	74
1320	5x102,390	511,950	93

* Considering heating from 50°F up to 122°F

Standart Accessories

Adjustable Pressure Safety Valve
Non Return Valve
Electrical Heater Wrench

Material Options

	Optional Feature	Optional Code	Explanation
Inner Tank	Stainless Steel	316 L	More durable in acidic water conditions than 304 L Stainless steel.
Inner Tank	Hot Deep Galvanized	GD	Has cost advantage compared to stainless steel. 2 years guaranteed.
Electrical Heater	Stainless Steel	316 Ti	Is more durable than 316 L quality stainless steel.
Outer Coverage	Stainless Steel	430	Corrosion durability is less than 304 Stainless Steel, has cost advantage.
Outer Coverage	Hot Deep Galvanized Paited Steel	BS	Hot deep galvanized steel is painted by hot deep painting method. Has the nearly same durability with 430 quality steel which as cost advantage.

Control Case Options

Optional Feature	Optional Code	Explanation
Cooling Fan	PF	Cools the electrical equipments in control case.
Low Water Cutout Device	SS	Is used to prevent dry firing of heating elements.
Open door cut off switch	AA	Switches off the electricity when the service door is opened while changing the electrical heater against getting an electric shock.
Operation Lamp	SL	Three coloured lamp indicates that system is on/off or broken down.
Circulation Pump/Valve Automation	SP	Serpentine circuit pump or Automatic Valve can be controlled by control case.
Additional Option	XX	Customized features, please consult factory.

Optional Accessories

Optional Feature	Optional Code	Explanation
Temperature Relief Valve	SEV	Protects users against high scalding.
Mixing Valve	KV	Mixes hot water with cold water to deliver tempered water at a controlled temperature.
Additional Anod	KK	Cathodic Protection Element which should be changed every two years
Additional Heating Element	T	-
Flange Connections	F	Flanged inlet and outlet connections (Please specify size).
Additional Option	XX	Customized features, please consult factory.

HEATING TIMES for DIFFERENT CAPACITIES OF HEATING ELEMENTS 440 V - 3 Phase - 60 Hz

Electrical Heater Capacities (BTU/Hr)

Capacity (USGall.)	2 x 15,354 30,700	2 x 20,47 40,94	3 x 15,35 46,06	2 x 25,59 51,195	3 x 20,47 61,41	3 x 25,59 76,77	4 x 20,47 81,89	3 x 34,12 102,390	3 x 51,195 153,585	3 x 68,260 204,780	4 x 68,260 273,040
26.4	31										
42.2	50	37									
52.8	62	46	41								
79.2	93	70	62	56	46						
105.6	124	93	83	74	62	50	46				
132		116	103	93	77	62	58	46			
158.4		139	124	111	93	74	70	56			
198			155	139	116	93	87	70	46		
264.1						124	116	93	62	46	
330.1						155	145	116	77	58	44
396.1								139	93	70	52
462.1								163	108	81	61
528.2									124	93	70
660.25									155	116	87
792.3										139	105
1056.4											139
1320											174

Heating Time *(minute)

Electrical Heater Capacities (BTU/Hr)

Capacity (USGall.)	3 x 102,390 307,170	4 x 102,390 409,560	5 x 102,390 511,950
396.1			
462.1			
528.2	62		
660.25	77	58	
792.3	93	70	56
1056.4	124	93	74
1320	155	116	93

Heating Time *(minute)

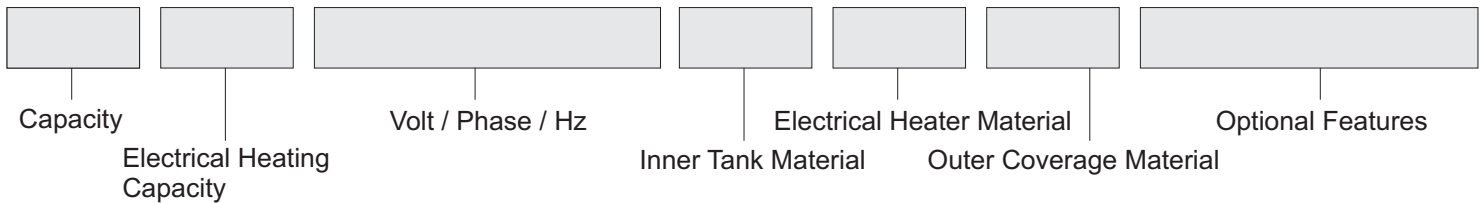
* Considering heating from 50°F up to 122°F

OPTIONAL FEATURE

Optional Feature	Optional Code
Temperature Relief Valve	SEV
Mixing Valve	KV
Additional Anod	KK
Additional Heating Element	T
Cooling Fan	PF
Low Water Cutout Device	SS
Open door cut off switch	AA
Operation Lamp	SL
Circulation Pump/Valve Automation	SP
Flange Connections	F
Additional Option	XX
316 L Quality Stainless Steel Inner Tank	316 L
Hot Deep Galvanized Inner Tank	GD
316 Ti Quality Stainless Steel Electrical Heater	316 Ti
430 quality Stainless Steel Outer Coverage	430
Hot Deep Galvanized Painted Steel Outer Coverage	BS

Electrical Heater (Volt - Phase - Hz)	Code
440 - 3 - 60	440 - 3 - 60
120 - 1 - 60	120 - 1 - 60
208 - 1 - 60	208 - 1 - 60
208 - 3 - 60	208 - 3 - 60
240 - 1 - 60	240 - 1 - 60
277 - 1 - 60	277 - 1 - 60
240 - 3 - 60	240 - 3 - 60
380 - 3 - 50/60	380 - 3 - 50/60
415 - 3 - 50/60	415 - 3 - 50/60
480 - 3 - 60	480 - 3 - 60
575 - 3 - 60	575 - 3 - 60

HOW to ORDER PRODUCT



Example: 132 / 3 x 25,59 BTU/Hr / 440 - 3 - 60 / 304 L / 316 L / 304 / T x 3 - SEV - KK

A 132 US Gallons tank with three piece of 25,59 BTU/Hr electrical heater is ordered. Inner tank material is 304 L quality stainless steel, electrical heater material is 316 L quality stainless steel, outer coverage is 304 quality stainless steel. 3 piece of additional electrical heater, temperature relief valve, additional anod is ordered as option.

Note: If not written the features of the boilers will be as Solareks standart production as written in catalogue. If different electrical heater capacity will be ordered the values in page 8 can be used to determine the heating capacities.

Although we will make every effort to give notice, Specifications subject to change without notice.

SI-METRIC Conversions

Liters x 0,2641 = US Gallons

kg x 2,2 = Lbs

Liters x 0,219975 = Great Britain Gallons

m³ x 264,2 = Gallons

Watt x 3,41214 = BTU/hr

m x 39,37 = Inch

°F = (°C x 1,8) + 32

m x 3,28084 = Foot

Bar x 14,5 = psi

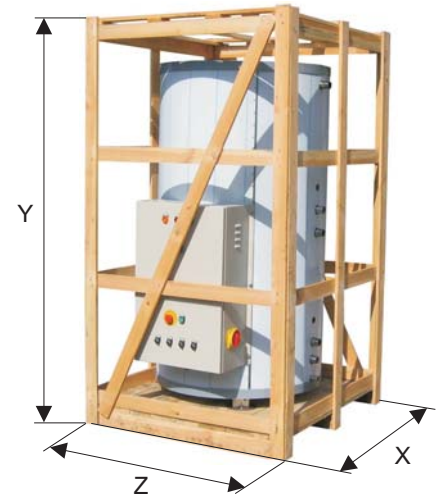
PACKING&SHIPPING DETAILS

Packing Method

Capacity	Packing
26.4 - 1320 US Gallons	Nylon + Wood Box

Packed Product Dimensions

Capacity (US Gall.)	Volume (ft ³)	Weight (Lbs)	X x Y x Z (inches)
26.4	23.3	21	33.07 x 46.85 x 25.98
42.2	33.2	30	35.03 x 58.66 x 27.95
52.8	37.4	38	37 x 58.66 x 29.92
79.2	49.4	46	38.97 x 68.89 x 31.89
105.6	62.8	53	44.1 x 66.53 x 37
132	74.8	63	44.1 x 79.52 x 37
158.4	80.1	69	46.85 x 74.40 x 39.76
198	94.6	90	48.81 x 80.31 x 41.73
264.1	122.8	126	52.36 x 89.76 x 45.27
330.1	156	155	56.69 x 96.06 x 49.60
396.1	189.6	183	64.56 x 88.18 x 57.48
462.1	203.7	220	66.14 x 90.15 x 59.05
528.2	225.3	267	68.11 x 93.7 x 61.02
660.25	282	308	76.37 x 92.12 x 69.29
792.3	300	342	77.95 x 93.70 x 70.86
1056.4	385	448	87.79 x 94.09 x 80.70
1320	461	579	95.67 x 94.10 x 88.58



Container&Truck Dimensions

	Height x Width x Length (Foot)	Volume (ft ³)
20" Container	7'10" x 7'8" x 19'4"	1,172
40" Container	7'10" x 7'8" x 39'5"	2,390
40" High Cube Container	8'10" x 7'8" x 39'5"	2,694
Truck (Euro Norm)	8'2" x 8'1" x 40'11"	2,898

SOLAREKS Contact Details

Adress: İmes Sanayi Sitesi A Blok 106. Sokak No: 48 Yukarı Dudullu / İstanbul TÜRKİYE
Post Code: 81260

Ph: (0090) 216 314 85 80
Fax: (0090) 216 364 10 29
For English: (0090) 532 685 96 30

www.solareks.com.tr
info@solareks.com.tr

www.solareks.com
info@solareks.com

www.solareksboiler.com
www.marine-boiler.com

All Rights Reserved. No part of this technical catalog may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Copyright owner. For information regarding permission, write to: info@solareks.com

Although we will make every effort to give notice, Specifications subject to change without notice.

© Solareks Güneş Enerjisi Sistemleri Alper Uysal 2005