



CUSTOM-LINE DOUBLE-WALL COPPER TUBE TANK HEATERS

Double wall copper tube tank heaters are designed for heating potable water with either potable, non-potable liquids, or gases or vapors.

DESIGN AND CONSTRUCTION FEATURES

Tank heating units are used for heating water and are specifically engineered for installation in A. O. Smith Model "HD" series custom lined storage tanks or in large volume commercial electric water heaters. Models DVE and DHE for dual energy applications.

Heating units are manufactured with a smooth copper tube within a grooved copper tube. Tubing is seamless copper. Outer tube is 3/4" OD. Coil assembly includes ASME approved collar, cast iron head, stainless steel spacer(s), (2) stainless steel tube sheets with atmospheric vent between, (specify non-ferrous tube sheet(s) if desired), (2) gaskets, bolts, nuts, and tube supports as required.

Heating units are designed and constructed in accordance with the ASME code for 125 to 150 PSI working pressure for use in potable water heaters and tanks.

Heating units have a positive visible fail-safe means of leak detection in the event of either tube failure to prevent mixture of heating medium and potable water.

EXPLANATION OF MODEL NUMBERS

Example: DW 6-24
 DW = double wall liquid water
 6 = diameter of tube bundle in inches
 24 = length of tube bundle in inches

SELECTION

For the best performance, tank heating units should extend into the tank as far as possible.

In Table A, minimum flow rates are given for both a 100% water solution and a 50%-50% water glycol solution. These flow rates will assure a liquid turbulent flow in the tubes.

ASME CODE CONSTRUCTION & REGISTRATION

Heat exchangers are constructed in accordance to ASME Section VIII.Div.1 requirements. A Manufacturer's Partial Data Report for Pressure Vessels, Form U-2, is furnished with each Type "DW" unit upon request. These forms are signed by an authorized inspector, holding a National Board Commission, who is employed by an authorized inspection agency, certifying that construction conforms to the latest ASME Code for pressure vessels. In addition, each "DW" unit is registered with the National Board of Boiler and Pressure Vessel Inspectors.

TABLE A - WATER HEATING COIL SELECTION

Model Number	Sq. Ft. Ht. Surf.	Approx. Ship. Wt. (Lbs.)	Minimum Flow Rate GPM Requirements				Maximum GPM		Overall Tube Length
			Water		50/50 Glycol		Do Not Exceed		
			Flow Rate GPM	Press. Drop Ft.	Flow Rate GPM	Press. Drop Ft.	Flow Rate GPM	Press. Drop Ft.	
DW4-24	2.5	41						1.8	23 1/4
DW4-30	3.3	44						2.2	29 1/4
DW4-36	4.1	47						2.7	35 1/4
DW4-42	4.9	49						3.1	41 1/4
DW4-48	5.2	52						3.6	47 1/4
DW4-54	6.5	55	3	1	6	1	23	4.0	58 1/4
DW4-60	7.2	58						4.5	59 1/4
DW4-66	8.0	60						4.9	65 1/4
DW4-72	8.8	63						5.2	71 1/4
DW4-84	10.4	69						6.3	83 1/4
DW4-96	12.0	74						7.2	95 1/4
DW6-24	8.0	84						1.8	21 1/8
DW6-30	10.3	93						2.2	27 1/8
DW6-36	12.7	101						2.7	33 1/8
DW6-42	15.0	110						3.1	39 1/8
DW6-48	17.4	110						3.6	45 1/8
DW6-54	19.7	128	10	1	20	1	71	4.0	51 1/8
DW6-60	22.1	136						4.5	57 1/8
DW6-66	24.2	144						4.9	63 1/8
DW6-72	26.8	154						5.2	69 1/8
DW6-84	31.5	171						6.3	81 1/8
DW6-96	36.2	188						7.2	93 1/8
DW8-24	15.0	147						1.8	22 1/4
DW8-30	19.0	164						2.2	26 1/4
DW8-36	23.0	180						2.7	34 1/4
DW8-42	27.0	197						3.1	40 1/4
DW8-48	32.0	214	18	1	36	1	131	3.6	46 1/4
DW8-54	36.5	231						4.0	52 1/4
DW8-60	41.0	248						4.5	58 1/4
DW8-66	45.0	265						4.9	64 1/4
DW8-72	49.0	281						5.2	70 1/4
DW8-84	58.0	315						6.3	82 1/4
DW8-96	67.0	349						7.2	94 1/4
DW8-108	75.0	366						8.1	106 1/4
DW10-24	27.0	268						1.8	23 3/8
DW10-30	34.5	291						2.2	29 3/8
DW10-36	42.0	314						2.7	35 3/8
DW10-42	49.5	337						3.1	41 3/8
DW10-48	56.0	358						3.6	47 3/8
DW10-54	63.5	381	30	1	60	1	226	4.0	53 3/8
DW10-60	71.0	404						4.5	59 3/8
DW10-66	78.5	427						4.9	65 3/8
DW10-72	86.0	449						5.2	71 3/8
DW10-84	101.0	495						6.3	83 3/8
DW10-96	116.0	591						7.2	95 3/8
DW10-108	131.0	586						8.1	107 3/8
DW12-36	61.0	436						2.3	36 1/4
DW12-42	72.0	477						2.7	42 1/4
DW12-48	83.0	518						3.0	48 1/4
DW12-54	94.0	559						3.4	54 1/4
DW12-60	104.0	600						3.8	60 1/4
DW12-66	115.0	641	44	1	88	1	300	4.2	66 1/2
DW12-72	126.0	682						4.6	72 1/4
DW12-84	147.0	764						5.1	84 1/4
DW12-96	169.0	846						6.1	96 1/4
DW12-108	191.0	929						6.9	108 1/4

TABLE B TANK COIL RECOVERY DATA (Various Temperature Rises)

HOW TO SIZE TABLE B

1. Locate temperature rise desired in left-hand column.
2. Move to the right, to the column labeled with the appropriate boiler water inlet temperature (at 10° to 20° drop). This figure represents the recovery capacity of 1 sq. ft. of heating surface.
3. Divide the total GPH requirement of the installation by the recovery of 1 sq. ft. to determine the number of sq. ft. required.
4. Select the coil with adequate sq. ft. of heating surface from table A. In most cases, more than one coil will meet the system requirements. Maximum efficiency for hot water coils will normally be obtained when the coil extends into the tank as far as possible (minimum of halfway required).
5. Boiler water flow rate must be greater than the minimum required for the coil, however must not exceed the maximum shown in table A.

To determine the boiler water flow rate, multiply the total GPH requirement by the temperature rise. Divide this quantity by 60 times the appropriate boiler water temperature drop of 10° or 20° (600 or 1200).

Example: 150 GPH required @ 140° outlet with inlet of 40°F (temperature rise equal to 100). Boiler water temperature of 200°F with a 20° drop (180°F outlet). Table B indicates 14 GPH/sq. ft., therefore, divide 150 GPH by 14 GPH/sq. ft. which gives you 10.7 sq. ft. of heating surface required. To determine the flow rate of the boiler water, multiply 150 GPH x 100° rise and divide by 60 x 20° drop = 12.5 GPM. This will allow you to select a DW 4-96 w/12.0 sq. ft. or DW 6-36 w/12.7 sq. ft.

Vertical tank: Maximum coil length determined by tank diameter.

Horizontal tank: Maximum coil length determined by tank length.

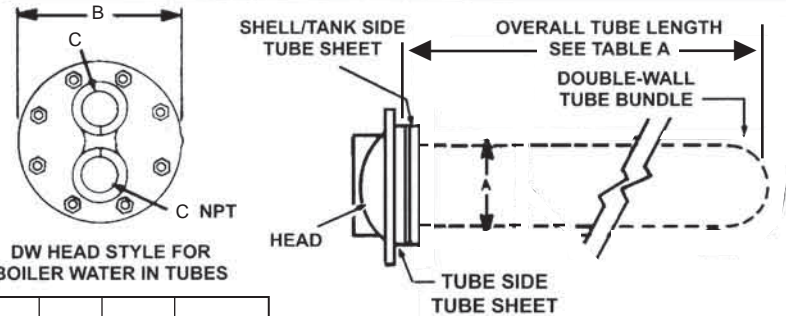
NOTE: The heat transfer rate can be drastically reduced with age and build-up of scale. Thus, consideration should be given to fouling factors and the square footage increased accordingly, in hard water areas. The recovery capacity (GPH/sq. ft.) already includes a .001 fouling factor for average water conditions.

TEMP. RISE	GALLONS PER HOURS/SQ. FT. OF HEATING SURFACE FORCED BOILER WATER - INLET TEMPERATURE												
	BASED ON 10°F DROP						BASED ON 20°F DROP						
	Inlet	Outlet	150°F	160°F	170°F	180°F	190°F	200°F	210°F	170°F	180°F	190°F	200°F
40	80	31	36	39	42	47	50	54	38	41	45	49	53
	100	18	21	23	26	28	30	33	22	25	27	30	32
	120	11	13	15	17	19	21	23	20	16	18	20	22
	140	6	8	10	11	13	14	16	9	11	13	14	16
	160	--	--	6	7	9	11	12	--	7	8	10	11
180	--	--	--	--	5	7	8	--	--	--	7	8	
50	80	40	45	50	55	60	65	70	47	53	57	63	68
	100	20	23	27	30	33	36	39	25	29	32	35	37
	120	12	14	16	19	21	23	25	15	19	20	22	24
	140	6	8	10	12	14	16	17	10	11	13	15	17
	160	--	--	6	8	9	11	12	--	7	9	10	12
180	--	--	--	--	5	7	9	--	--	--	7	8	
60	80	56	64	71	79	86	93	101	68	75	83	90	98
	100	24	28	32	36	39	43	47	30	34	38	41	45
	120	13	15	18	21	23	26	28	17	19	22	25	27
	140	6	9	11	13	15	17	19	10	12	14	16	18
	160	--	--	6	8	10	11	13	--	8	10	11	13
180	--	--	--	--	6	7	9	--	--	--	7	9	
70	100	30	35	40	45	50	55	60	38	42	47	53	57
	120	14	17	20	23	27	29	33	19	22	25	29	31
	140	7	9	12	14	16	19	21	11	13	15	18	20
	160	--	--	6	9	10	12	14	--	8	10	11	13
	180	--	--	--	--	6	8	9	--	--	--	7	9
80	100	41	49	56	64	71	79	86	53	60	68	75	83
	120	16	20	24	28	32	36	39	22	26	30	34	38
	140	7	10	13	15	18	21	23	12	14	17	20	22
	160	--	--	6	9	11	13	15	--	--	10	12	14
	180	--	--	--	--	6	8	10	--	--	--	7	9
90	120	20	25	30	34	39	45	50	27	32	38	42	47
	140	8	11	14	17	20	23	27	12	16	19	22	26
	160	--	--	7	9	12	14	16	--	9	11	13	15
	180	--	--	--	--	6	8	10	--	--	--	8	10
	100	120	26	34	41	49	56	64	71	38	45	53	60
140		8	12	16	20	24	28	32	15	18	22	26	30
160		--	--	7	10	13	15	18	--	9	12	14	17
180		--	--	--	--	6	9	11	--	--	--	8	10

TABLE C DIMENSIONS

Dia.	Design Press. Tubes PSI 2 Pass	Test Press Tubes in PSI	Standard Unit		Tubes Inner Outer	Tube Supports	Nuts & Bolts	Max. Oper. Temp °F	A	B	C
			Head	Tube Shts.							
4"	150	300		1	2			300	4 1/2	9	1 1/4
6"	150	300						300	6 5/8	11	2
8"	150	300						300	8 5/8	13 1/2	3
10"	125*	250 (2P) 300 (4P)	Cast Iron Bonnet		Copper Copper	Stainless Steel	Carbon Steel	300	10 3/4	16	3
12"	125*	250 (2&4P) 300 (6P)	Welded					300	12 3/4	19	4" Flange

* 150 lb. cast iron heads available on special order.



1. Tankside tube sheet is Stainless Steel. Tube Side tube sheet is Carbon Steel.
2. Both inner and outer tubes are copper.

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