

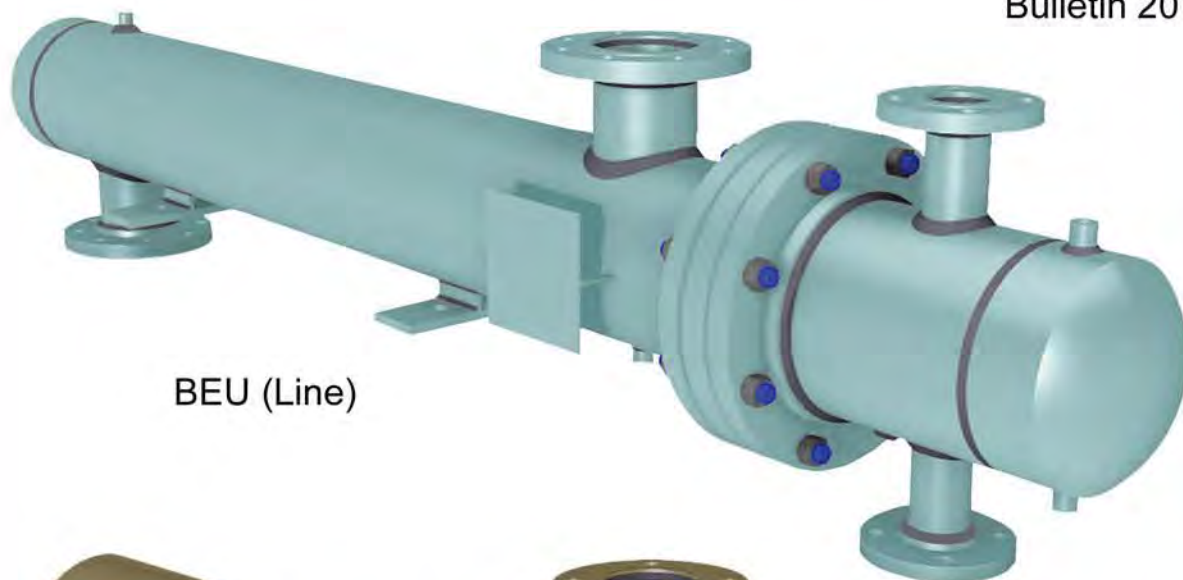
R. W. HOLLAND, INC.

PETROFIN® Hairpin Heat Exchangers

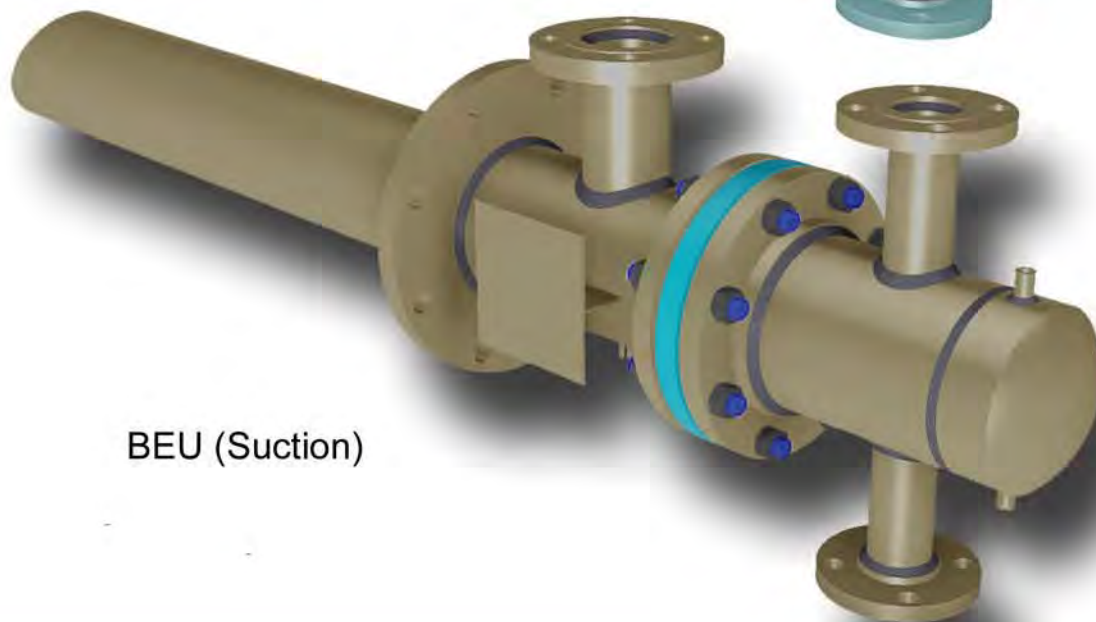
Suction and Line Heaters

Serving the petroleum, petrochemical, chemical and power industries.

Bulletin 20



BEU (Line)



BEU (Suction)

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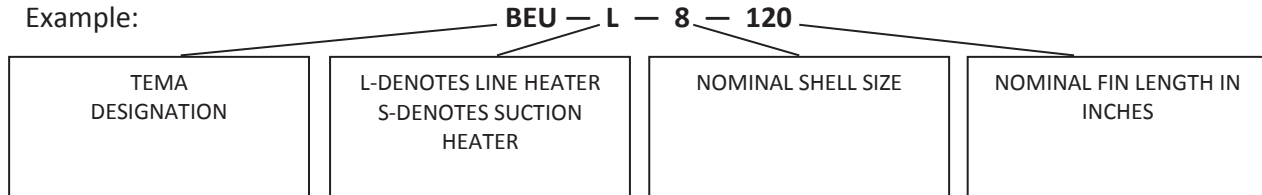
R.W. Holland, INC.

BEU LINE & SECTION HEATERS

NOMENTCLATURE

The R.W. Holland nomenclature follows TEMA standards where practical. This is shown below.

Example:



APPLICATIONS

R.W. Holland line and suction heaters are used in heating heavy viscous fluids (e.g. #6 fuel oil, heavy crude, asphalt etc.). Suction heaters heat the fluids directly from the tank to temperatures suitable for pumping. Line heaters, mounted in line, heat the fluids to processing or burner temperatures. Steam is generally the heating medium however hot water, hot oils, or heat transfer fluids can also be used.

HIGH EFFICIENCY

These heaters obtain high efficiency as they utilize the R.W. Holland Petrofin fintube. This is a longitudinal fintube with the fins resistance welded to the tube. Several different tube and fin configurations are utilized to obtain the most economical selection for a specific application. These are detailed in the tables on pages 2 and 3. The use of fintubes keep the metal temperature lower, resulting in less fouling; therefore, extending the period between shut downs for cleaning.

CONSTRUCTION

R.W. Holland line and suction heaters are fabricated in accordance with the ASME unfired pressure vessel code and TEMA standards. Tubesheets are fully studded allowing the removal of the channel for tube inspection without disturbing the shellside closure. This eliminates the need to drain tanks, in the case of suction heaters or piping, in the case of line heaters. Materials of construction are of the highest quality available. Dimensions for standard units are given in the tables on pages 2 and 3.

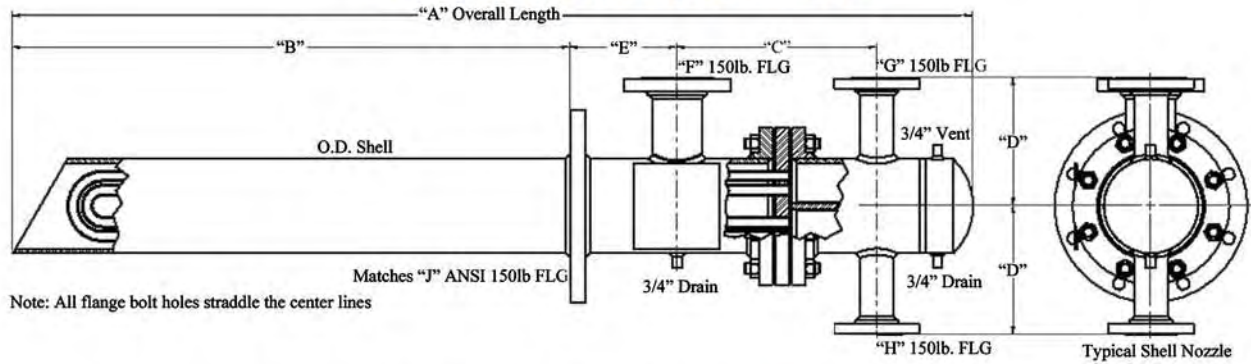
PRESSURE – TEMPERATURE RATING

Standard ratings are 150 psig at 500°F for both the shell and tubeside of line heaters and tubeside of suction heaters. The shellside of the suction heater is not pressure rated. Since there is no pressure in the storage tank, pressure rating is not required. Normally, the inlet end of suction heaters is not flanged, preventing the hydrostatic testing of the shellside. Both line and suction heaters can be designed for higher pressure to meet specific applications.

SPECIAL DESIGNS

R.W. Holland can incorporate special requirements to meet a customer's specific needs. Nozzle and orientation can be changed to match customer piping requirements. Suction heaters can be provided with a flanged inlet connection to match a customer supplied valve, which can be operated via an extension from the tank roof. This allows the tube bundle to be removed without draining the tank. Flapper valves can also be fabricated on the heater itself and accomplish the same purpose.

SUCTION HEATERS



PHYSICAL DIMENSIONS

TYPE	NOMINAL									
	SHELL	A*	B*	C	D	E	F	G	H	J
BEU-S-5	5"	2'1"	2"	12 1/2"	6 3/4"	6"	2"	1 1/2"	1 1/2"	8"
BEU-S-6	6"	2'7"	3 1/2"	13 1/2"	7 3/4"	7 1/2"	3"	1 1/2"	1 1/2"	8"
BEU-S-8	8"	3'3"	4 1/2"	18 3/8"	8 7/8"	9"	4"	2"	1 1/2"	10"
BEU-S-10	10"	3'9"	4 1/2"	20 1/2"	10 3/4"	11"	6"	3"	1 1/2"	12"
BEU-S-12	12"	3'11"	4 1/2"	21 5/8"	11 3/8"	11"	6"	3"	1 1/2"	14"
BEU-S-14	14"	4'4"	6 5/8"	24"	13"	11"	6"	4"	2"	16"
BEU-S-16	16"	4'8"	8 5/8"	24 1/2"	14 1/2"	11"	6"	4"	2"	18"
BEU-S-18	18"	5'3"	11"	2'-3 1/8"	15"	13 1/2"	8"	4"	2"	20"
BEU-S-20	20"	5'4"	11"	2'-3 3/4"	16"	13 1/2"	8"	6"	3"	24"
BEU-S-24	24"	6'3"	12 3/4"	2'-8 3/4"	18"	13 1/2"	8"	6"	3"	26"
BEU-S-30	30"	7'5"	14 3/4"	3'-4 1/8"	21 1/2"	18"	12"	8"	3"	32"
BEU-S-36	36"	8'3"	16"	3'-6 3/4"	2'-2"	22"	16"	10"	4"	38"

*Add Nominal Fin Length to Length Shown

Dimensions based on 150 psi design through 24" size and 75 PSI design from 26" through 36"

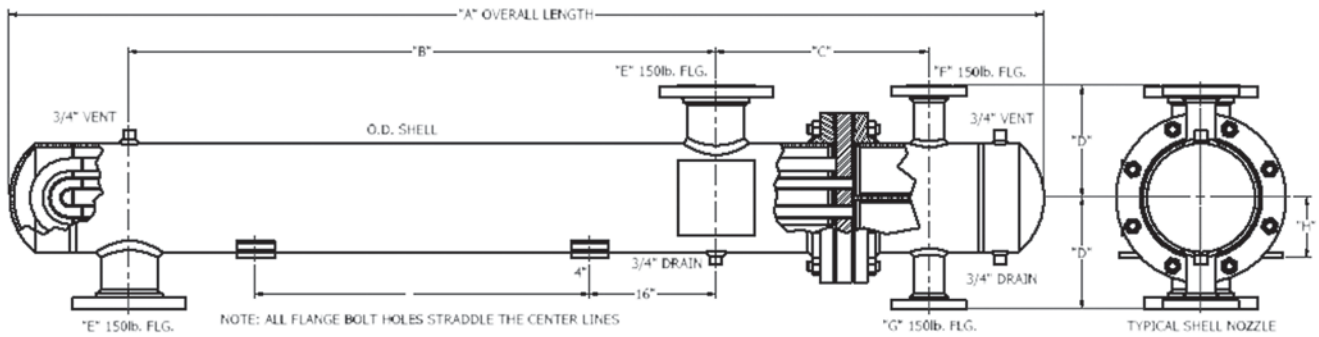
SUCTION & LINE HEATERS FIN TUBE DATA

3/4" O.D. Tubes - 14 BWG Wall Thickness - Fins 0.035" Tk.

Shell Size sch 40	16 Fins - 1/4" High				16 Fins - 3/8" High				16 Fins - 1/2" High			
	No. U Tubes	Surf ft ²	Wt. lbs.	Surf per ft	No. U Tubes	Surf ft ²	Wt. lbs.	Surf per ft	No. U Tubes	Surf ft ²	Wt. lbs.	Surf per ft
6"	7	121	500	12.1								
8"	13	224	854	22.4	9	215	820	21.5	7	214	792	21.5
10"	22	380	1264	38.0	15	359	1200	35.9	10	306	1100	30.6
12"	33	569	1710	56.9	22	526	1600	52.6	15	459	1464	45.9
14"	40	690	2127	69.0	26	622	1975	62.2	20	612	1887	61.2
16"	55	949	2746	94.9	38	909	2600	90.9	26	795	2368	79.5
18"	73	1260	3678	126.0	51	1220	3500	122.0	36	1100	3224	110.0
20"	92	1581	4488	158.8	62	1483	4200	148.3	43	1315	3840	131.5
24"	137	2364	6382	236.4	94	2248	6000	224.8	67	2048	5512	204.8
30"	214	3693	8292	369.3	147	1758	7700	175.8	110	3364	7104	336.4
36"	326	5627	12900	562.7	224	5358	12000	535.8	165	5045	11008	504.5

- NOTES:**
- (1) Other sizes are available upon application
 - (2) These exchangers are designed for all type of pressure & temperature rating to the maximum allowable by ASME Code per given material
 - (3) The weight and surfaces shown are based on 10 ft nominal length
 - (4) Dimension "E" is a minimum dimension and can be increased if shell projects into tank further than desired

LINE HEATERS



PHYSICAL DIMENSIONS

TYPE	NOMINAL SHELL O.D.								
	A*	B*	C	D	E	F	G	H	
BEU-L-5	5"	2'4"	2 3/8"	12 1/2"	6 3/4"	2"	1 1/2"	1 1/2"	3 5/8"
BEU-L-6	6"	2'6"	3 1/2"	13 1/2"	7 3/4"	3"	1 1/2"	1 1/2"	4 1/8"
BEU-L-8	8"	3'2"	4 1/2"	18 3/8"	8 7/8"	4"	2"	1 1/2"	5 1/8"
BEU-L-10	10"	3'6"	4 1/2"	20 1/2"	10 3/4"	4"	2"	1 1/2"	6 1/8"
BEU-L-12	12"	4'	6 5/8"	21 5/8"	11 3/8"	6"	3"	1 1/2"	7 1/8"
BEU-L-14	14"	4'7"	8 5/8"	24"	13"	8"	4"	2"	7 3/4"
BEU-L-16	16"	4'10"	8 5/8"	24 1/2"	14 1/2"	8"	4"	2"	8 3/4"
BEU-L-18	18"	5'4"	10 3/4"	2'-3 1/8"	15"	10"	6"	2"	9 3/4"
BEU-L-20	20"	5'6"	10 3/4"	2'-3 3/4"	16"	10"	6"	3"	11"
BEU-L-24	24"	6'8"	12 3/4"	2'-8 3/4"	18"	12"	6"	3"	13"
BEU-L-30	30"	7'5"	14"	3'-4 1/8"	21 1/2"	14"	8"	3"	16"
BEU-L-36	36"	8'3"	16"	3'-6 3/4"	2'-2"	16"	10"	4"	19"

*Add Nominal Fin Length to Length Shown

Dimensions based on 150 psi design through 24" size and 75 PSI design from 26" through 36"

SUCTION & LINE HEATERS FIN TUBE DATA

1" O.D. Tubes - 12 BWG Wall Thickness - Fins 0.035" Tk.

Shell Size sch 40	16 Fins - 1/4" High				20 Fins - 3/8" High				24 Fins - 1/2" High			
	No. U Tubes	Surf ft ²	Wt. lbs.	Surf per ft	No. U Tubes	Surf ft ²	Wt. lbs.	Surf per ft	No. U Tubes	Surf ft ²	Wt. lbs.	Surf per ft
5"	2	64	390	6.4	2	77	400	7.7	2	91	410	9.1
6"	3	96	555	9.6	3	114	570	11.4	3	136	585	13.6
8"	5	160	865	16.0	5	193	890	19.3	5	226	915	22.6
10"	7	223	1058	22.3	7	270	1086	27.0	7	316	1114	31.6
12"	11	350	1394	35.0	11	424	1438	42.4	11	497	1482	49.7
14"	15	478	1835	47.8	15	578	1895	57.8	15	678	1955	67.8
16"	20	637	2337	63.7	20	771	2450	77.1	20	904	2491	90.4
18"	25	797	2880	79.7	25	964	2980	96.4	25	1131	3080	113.1
20"	33	1050	3561	105.0	33	1272	3919	127.2	33	1492	3985	149.2
24"	53	1690	5456	169.0	53	2043	5774	204.3	53	2397	5880	239.7
30"	80	2550	6650	255.0	80	3084	7130	308.4	80	3619	7290	361.9
36"	121	3860	9602	386.0	121	4665	10328	466.5	121	5474	10570	547.4

- NOTES:**
- (1) Other sizes are available upon application
 - (2) These exchangers are designed for all type of pressure & temperature rating to the maximum allowable by ASME Code per given material
 - (3) The weight and surfaces shown are based on 10 ft nominal length

PETROFIN® TUBE DATA

PETROFIN RESISTANCE WELDED LONGITUDINAL FINNED TUBES ARE MANUFACTURED IN A WIDE VARIETY OF MATERIALS, FIN HEIGHTS, AND FIN CONFIGUARTIONS. THE TABLE BELOW LISTS OUR STANDARD FINNED TUBE DATA; OTHER COMBINATIONS ARE AVAILABLE ON REQUEST.



SIZE AND SURFACE AREA OF PETROFIN RESISTANCE WELDED FINNED TUBES										
PIPE OR TUBE SIZE	SURFACE AREA BARE	MINIMUM WALL THK. AVAILABLE	NUMBER OF FINN	TOTAL AREA OF FINNED TUBES (SQ. FT/FT OF LINEAL LENGTH)						
				HEIGHT OF LONGITUDINAL FIN						
				1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
3/4" O.D.	0.1963	0.109	16	0.863	1.03	1.196	1.53	1.863	2.196	2.863
3/4" I.P.S.	0.2748	0.083	16	0.863	1.03	1.196	1.53	1.863	2.196	2.863
			20	1.03	1.238	1.446	1.863	2.28	2.696	3.53
7/8" O.D.	0.2291	0.083	16	0.896	1.062	1.229	1.562	1.896	2.229	2.896
			20	1.062	1.271	1.479	1.896	2.312	2.729	3.562
1" O.D.	0.262	0.083"	16	0.928	1.095	1.262	1.595	1.928	2.262	2.928
			20	1.095	1.303	1.512	1.928	2.345	2.762	3.595
1" I.P.S.	0.344	0.133"	16	1.011	1.178	1.047	1.380	1.713	2.047	2.713
			24	1.344	1.594	1.844	2.344	2.844	3.344	4.344
1-1/2" I.P.S.	0.497	0.145"	24	1.357	1.747	1.997	2.497	2.997	3.497	4.497
			32	1.831	2.164	2.497	3.164	3.831	4.497	5.831
			36	2.164	2.581	2.997	3.831	4.664	5.497	7.164
2" I.P.S.	0.622	0.154"	24	1.622	1.872	2.122	2.622	3.122	3.622	4.622
			32	1.955	2.288	2.622	3.288	3.955	4.622	5.955
			40	2.288	2.705	3.122	3.955	4.788	5.622	7.288
2-1/2" I.P.S.	0.753	0.203"	24	1.753	2.003	2.253	2.753	3.253	3.753	
			32	2.086	2.419	2.753	3.419	4.086	4.753	
			40	2.419	2.836	3.253	4.086	4.919	5.753	
			48	2.753	3.253	3.753	4.753	5.753	6.753	
3" I.P.S.	0.916	0.216"	24	1.916	2.166	2.416	2.916			
			48	2.916	3.416	3.916	4.916			
			56	3.250	3.833	4.416	5.583			

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