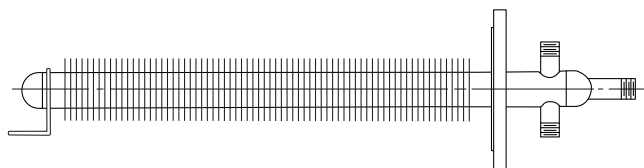
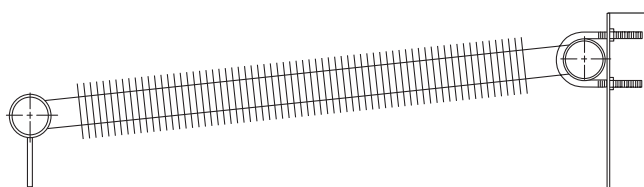
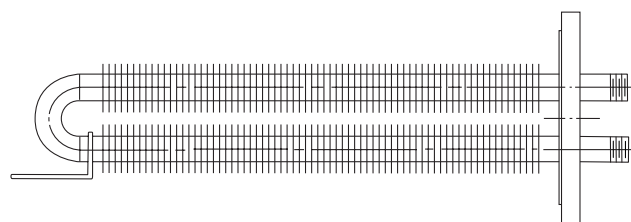
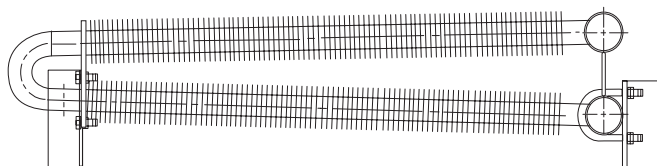


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Tank Heaters

Armstrong




Flange Mounted Bayonet Type FBC and FBS

Base Mounted Direct Type BD

Flange Mounted Hairpin Type FHC and FHS

Base Mounted Hairpin Type BHC and BHS

Application Flexibility

Four types of tank heaters are offered in several materials and sizes to suit your specific requirements. Several heaters are custom built, consult factory.

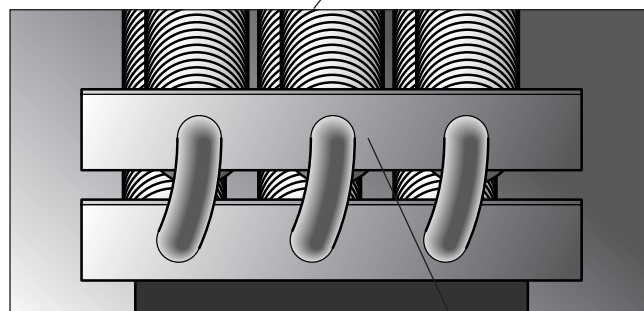
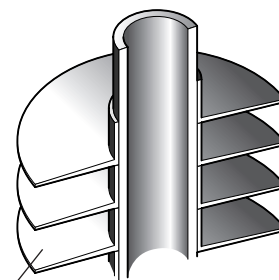
Space Savings

Flange mounted heaters are installed on various standard manhole sizes. You save internal space because only the heating element itself is inside. Steam and condensate connections are outside of the tank.

Heat Transfer Efficiency

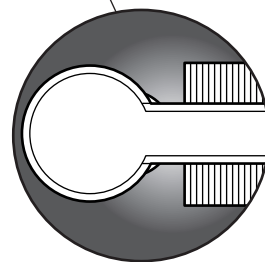
Stiff, helically wound L fin design for an efficient and long-lasting heat transfer surface.

Vertical fin surface provides uniform heating of liquid with a minimum of coking due to hot spots.



Durability Over Long Life

Pipes and headers are of heavy construction (minimum Sch. 40 pipe for steel). Greater thickness means a stronger, more corrosion-resistant design that lasts longer.



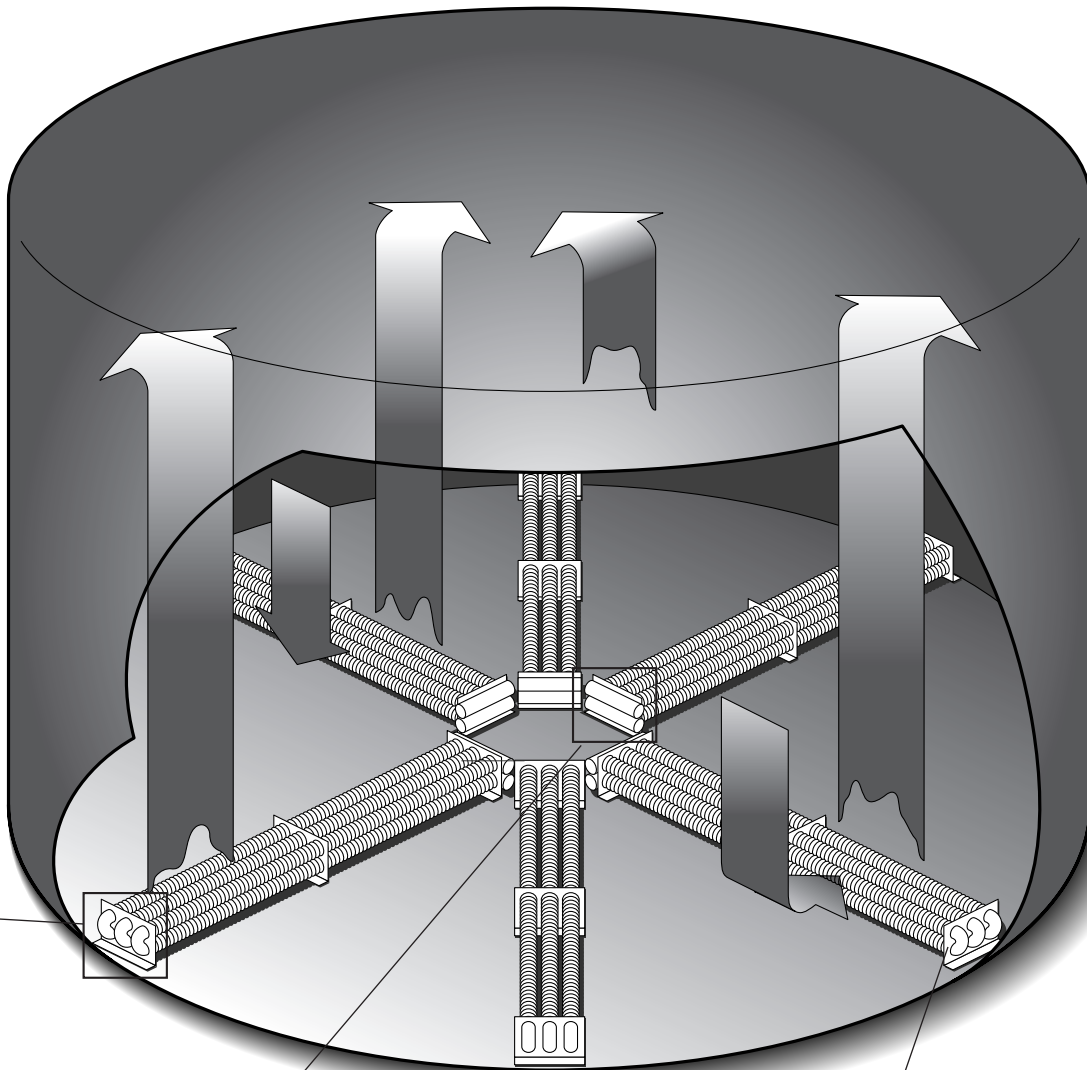
Corrosion Resistance

Pipes, headers and connections are welded together for a tough, single material joint. Eliminating dissimilar materials precludes galvanic corrosion, thereby lengthening service life.

Several heaters are custom built - consult factory.

Typical Tank Heater Arrangement

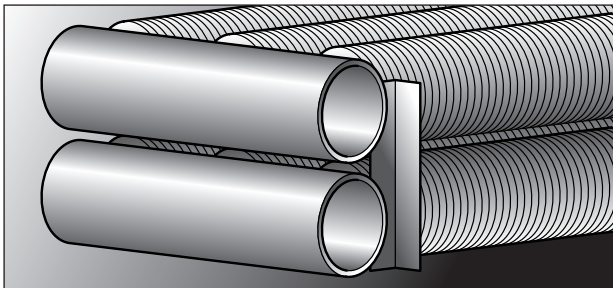
Base Mounted
Hairpin Types
BHC and BHS
Shown



Heating and Cooling Coils

Fast, Direct Connection

Heaters are ready for connection to the steam and condensate systems as supplied. Numerous types of connections are available.



Base mounted heaters come with supports to allow for a proper distance between the tank bottom and the heating surface. This also helps to minimize the need for internal welding. Longer units are provided with mid-support members to further minimize inside welding and ensure rigid footing.

Minimum Installation Welding

Armstrong base-mounted tank heaters are installed and removed easily through manholes, eliminating the need for time-consuming welding inside the tank.

Armstrong tank heaters are built to withstand the rigorous demands encountered in industrial installations. The heavy-duty features of our units were developed in response to a need for tank heaters that could provide efficient heat transfer without sacrificing structural integrity. These features include heavy-wall pipes and headers, thick L footed fins and all welded construction. In addition, the mono-metallic construction of our units precludes galvanic corrosion, and the finned surface is rigid enough to withstand high-pressure cleaning.

Experience gained over 80 years backs every Armstrong tank heater. As a steam system specialist, your Armstrong Representative can provide assistance with everything from the boiler to the condensate return system.

Quality products from Armstrong, plus the practical knowledge to integrate them into your total steam system, ensure an efficient and trouble-free installation.

Efficient Heat Transfer

Finned pipe tank heaters are easier than bare pipe units to install, remove and repair. They are also more compact and provide superior efficiency in product heating. Finned pipe tank heaters provide up to 10 times as much heat transfer as an equivalent length of bare pipe, resulting in lower film or "skin" temperatures. This reduces coking of the product on the heat transfer surface and discoloration of heat-sensitive products. This buildup of deposits on the heater requires that more frequent cleanings be carried out to maintain maximum efficiency and original heat transfer design conditions.

This helically wound finned pipe is best suited for horizontal units, with the fins being in the vertical plane. This increases the natural convection currents, which increases heat transfer and continuously wipes the coil surface to maintain cleanliness.

Options to Match Your Applications

Armstrong tank heaters are available in four standard configurations:

- Flange Mounted Hairpin—Types FHC and FHS
- Flange Mounted Bayonet—Types FBC and FBS
- Base Mounted Hairpin—Types BHC and BHS
- Base Mounted Direct—Type BD

These four configurations offer a range of choices to suit most area coverage and thermal performance requirements. Each type includes a number of length, width and fin pitch options. All units are available in seamless carbon steel pipe construction. The hairpin and bayonet types are available in stainless steel. **Liquid heated units and custom designs are also available.**

Critical to the heating and maintenance of temperatures for a broad variety of products, Armstrong tank heaters are widely used in breweries, chemical and food processing plants, oil refineries, paper mills, tank storage farms, and in shipping and other industries.



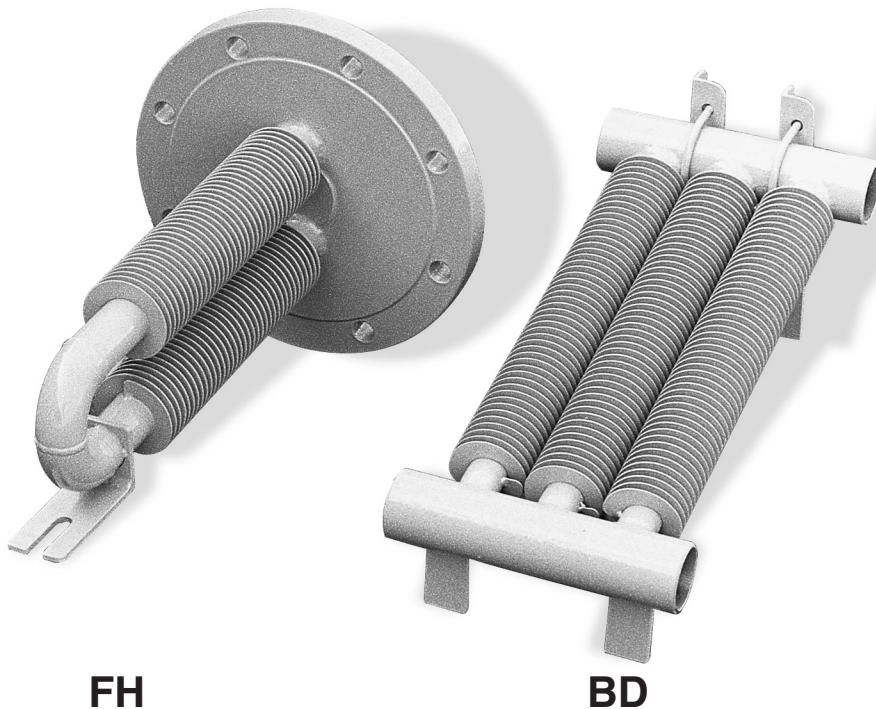
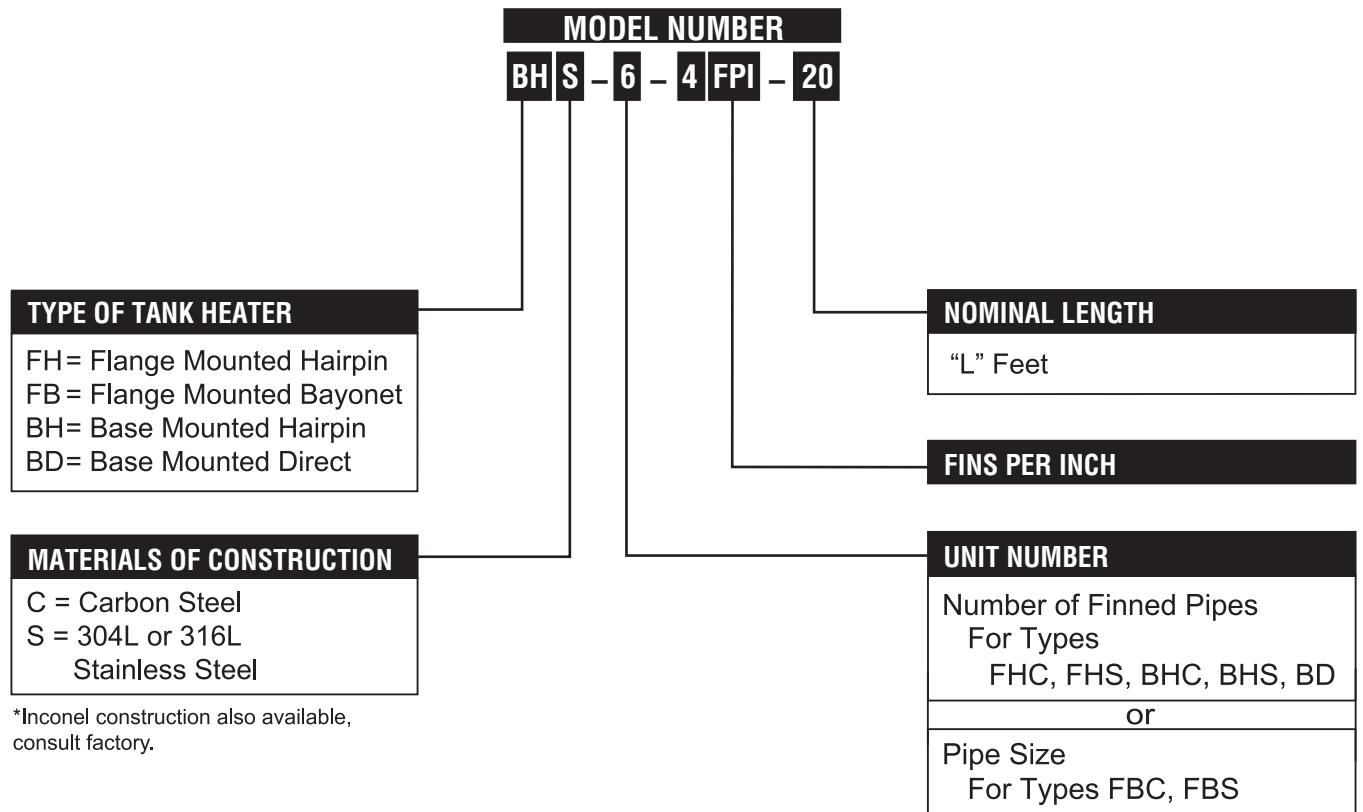
BH

FB

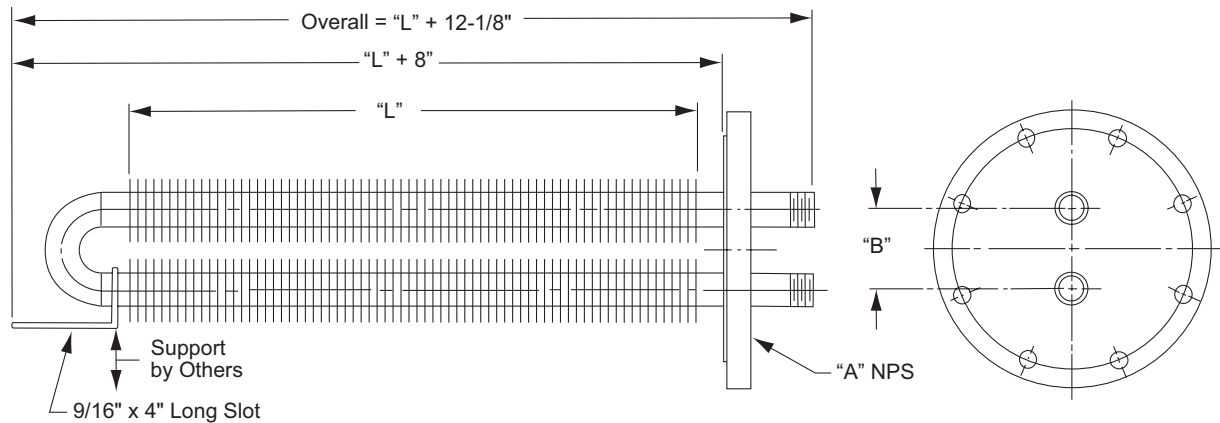
From left to right, Base Mounted Hairpin, Flange Mounted Bayonet, Flange Mounted Hairpin and Base Mounted Direct.

Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com for up-to-date information.

Model Number Selection



Flange Mounted Hairpin Type FHC and FHS



Standard Sizes

FHC Carbon Steel Units									
Type	A Flange Size (in)	B (in)	Nominal Length L (ft)	Surface Area (sq ft)			Weight (lb)		
				3 FPI	4 FPI	5 FPI	3 FPI	4 FPI	5 FPI
FHC-2	8	3-3/4	2	11.6	14.9	18.1	71	74	77
			3	17.4	22.3	27.2	81	86	90
			4	23.2	29.8	36.3	91	97	103
			5	29.0	37.2	45.4	102	109	116
			6	34.8	44.6	54.4	112	120	129
			7	40.6	52.1	63.5	122	132	142
			8	46.4	59.5	72.6	132	144	155
			9	52.3	67.0	81.6	142	155	168
			10	58.1	74.4	90.7	153	167	181
			10	58.1	74.4	90.7	153	167	181
FHC-4	10	5-5/16	2	21.8	27.9	34.0	124	130	135
			3	33.4	42.8	52.2	144	153	161
			4	45.0	57.7	70.3	165	176	187
			5	56.6	72.5	88.5	185	200	213
			6	68.2	87.4	106.6	206	223	239
			7	79.8	102.3	124.7	226	246	265
			8	91.4	117.2	142.9	246	269	291
			9	103.1	132.1	161.0	267	292	317
			10	114.7	146.9	179.2	287	316	343
			10	114.7	146.9	179.2	287	316	343

Materials of Construction

Pipes: 1-1/4" NPS Sch. 80 Seamless Steel (1.66" OD x 0.191" Wall)

Fins: 0.036" Thick Helically Wound Steel "L" Foot

Return Bends: A-234 Long Radius Forged Steel Sch. 80

Mounting Flange: A-105 Forged Steel, 150 lb Raised Face

Mechanical Design: 450 psig, 650°F, Standard Testing Pressure 675 psi

FHS Stainless Steel Units									
Type	A Flange Size (in)	B (in)	Nominal Length L (ft)	Surface Area (sq ft)			Weight (lb)		
				3 FPI	4 FPI	5 FPI	3 FPI	4 FPI	5 FPI
FHS-2	8	3-3/4	2	8.8	11.1	13.4	60	61	62
			3	13.1	16.6	20.1	65	67	69
			4	17.5	22.2	26.9	71	73	75
			5	21.9	27.7	33.6	76	79	82
			6	26.3	33.3	40.3	82	85	88
			7	30.6	38.8	47.0	87	91	95
			8	35.0	44.4	53.7	92	97	101
			9	39.4	49.9	60.4	98	103	108
			10	43.8	55.5	67.2	103	109	114
			10	43.8	55.5	67.2	103	109	114
FHS-4	10	5-5/16	2	17.5	22.2	26.9	100	102	105
			3	26.3	33.3	40.3	111	114	118
			4	35.0	44.4	53.7	122	126	131
			5	43.8	55.5	67.2	132	138	144
			6	52.5	66.6	80.6	143	150	157
			7	61.3	77.7	94.0	154	162	170
			8	70.0	88.8	107.5	165	174	183
			9	78.8	99.9	120.9	176	186	196
			10	87.6	111.0	134.3	186	198	209
			10	87.6	111.0	134.3	186	198	209

Materials of Construction

Pipes: 1-1/4" NPS Sch. 10, 304L SS (1.66" OD x 0.109" Wall)

Fins: 0.020" Thick Helically Wound 304 SS "L" Foot

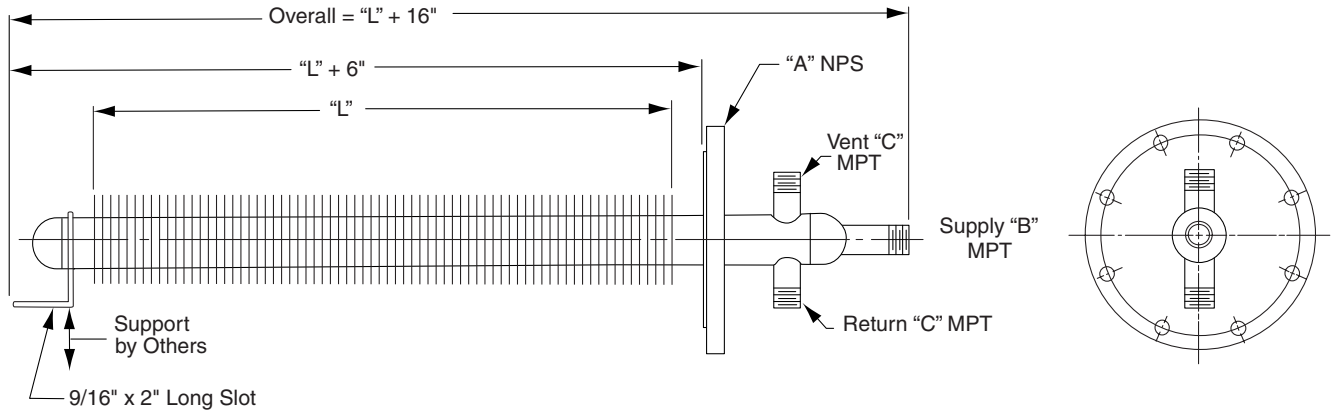
Return Bends: A-403 Long Radius 304L SS Sch. 10

Mounting Flange: A-182 304L SS, 150 lb Raised Face

Mechanical Design: 450 psig, 650°F, Standard Testing Pressure 675 psi

NOTE: Type 316L SS Construction is available.

Flange Mounted Bayonet Type FBC and FBS



Standard Sizes

FBC Carbon Steel Units										
Type	A Flange Size (in)	B (in)	C (in)	Nominal Length L (ft)	Surface Area (sq ft)			Weight (lb)		
					3 FPI	4 FPI	5 FPI	3 FPI	4 FPI	5 FPI
FBC-125	4	3/4	3/4	2	5.8	7.4	9.1	33	34	35
				3	8.7	11.2	13.6	39	41	42
				4	11.6	14.9	18.1	45	47	50
				5	14.5	18.6	22.7	51	54	57
				6	17.4	22.3	27.2	57	60	64
				7	20.3	26.0	31.8	63	67	72
				8	23.2	29.8	36.3	69	74	79
				9	26.1	33.5	40.8	75	80	86
				10	29.0	37.2	45.4	81	87	93
				FBC-200	6	1	1	2	7.9	10.1
3	11.8	15.1	18.4					59	62	65
4	15.7	20.2	24.6					67	71	75
5	19.7	25.2	30.7					76	81	86
6	23.6	30.2	36.9					85	91	96
7	27.6	35.3	43.0					94	101	107
8	31.5	40.3	49.2					102	110	118
9	35.4	45.4	55.3					111	120	128
10	39.4	50.4	61.5					120	130	139
FBC-250	6	1-1/4	1					2	9.2	11.8
				3	13.8	17.7	21.5	72	75	79
				4	18.4	23.5	28.7	84	89	94
				5	23.0	29.4	35.8	97	102	108
				6	27.6	35.3	43.0	109	115	123
				7	32.2	41.2	50.2	121	129	137
				8	36.8	47.1	57.4	133	142	151
				9	41.4	53.0	64.5	145	155	166
				10	46.0	58.9	71.7	158	168	180

Materials of Construction

FBC-125 Pipes: 1-1/4" NPS Sch. 40 Seamless Steel (1.66" OD x 0.140" Wall)

FBC-200 Pipes: 2" NPS Sch. 40 Seamless Steel (2.375" OD x 0.154" Wall)

FBC-250 Pipes: 2-1/2" NPS Sch. 40 Seamless Steel (2.875" OD x 0.203" Wall)

Fins: 0.036" Thick Helically Wound Steel "L" Foot

Inner Distributing Pipe: Sch. 80A-53F Steel

End Caps: A-234 Forged Steel Sch. 40

Mounting Flange: A-105 Forged Steel, 150 lb Raised Face

Mechanical Design: 450 psig, 650°F, Standard Testing Pressure 675 psi

NOTE: Sch. 80 Construction is available.

FBS Stainless Steel Units										
Type	A Flange Size (in)	B (in)	C (in)	Nominal Length L (ft)	Surface Area (sq ft)			Weight (lb)		
					3 FPI	4 FPI	5 FPI	3 FPI	4 PFI	5 FPI
FBS-125	4	3/4	3/4	2	4.4	5.5	6.7	27	28	29
				3	6.6	8.3	10.1	31	32	33
				4	8.8	11.1	13.4	34	36	37
				5	10.9	13.9	16.8	38	39	41
				6	13.1	16.6	20.1	41	43	45
				7	15.3	19.4	23.5	45	47	50
				8	17.5	22.2	26.9	48	51	54
				9	19.7	25.0	30.2	52	55	58
				10	21.9	27.7	33.6	55	58	62
				FBS-200	6	1	1	2	6.0	7.5
3	8.9	11.3	13.6					46	48	49
4	11.9	15.0	18.2					51	53	55
5	14.9	18.8	22.7					57	59	61
6	17.9	22.6	27.3					62	64	67
7	20.8	26.3	31.8					67	70	73
8	23.8	30.1	36.4					72	76	79
9	26.8	33.8	40.9					77	81	85
10	29.8	37.6	45.5					83	87	91
FBS-250	6	1-1/4	1					2	6.9	8.7
				3	10.4	13.0	15.7	53	54	56
				4	13.8	17.4	21.0	59	61	63
				5	17.3	21.7	26.2	66	69	71
				6	20.7	26.1	31.5	73	76	78
				7	24.2	30.4	36.7	80	83	86
				8	27.6	34.8	42.0	86	90	94
				9	31.1	39.1	47.2	93	97	101
				10	34.5	43.5	52.5	100	105	109

Materials of Construction

FBS-125 Pipes: 1-1/4" NPS Sch. 10, 304L SS (1.66" OD x 0.109" Wall)

FBS-200 Pipes: 2" NPS Sch. 10, 304L SS (2.375" OD x 0.109" Wall)

FBS-250 Pipes: 2-1/2" NPS Sch. 10, 304L SS (2.875" OD x 0.120" Wall)

Fins: 0.020" Thick Helically Wound 304 SS "L" Foot

Inner Distributing Pipe: Sch. 10, 304L SS

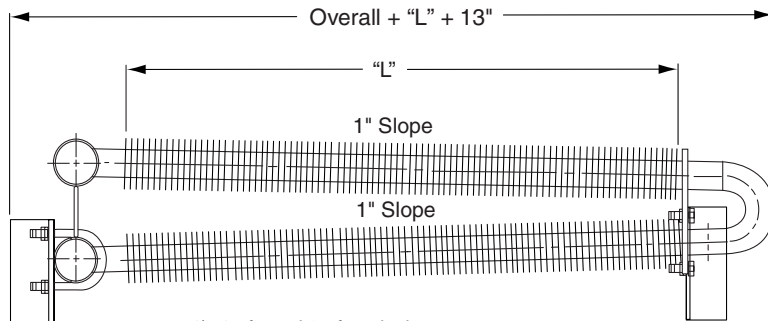
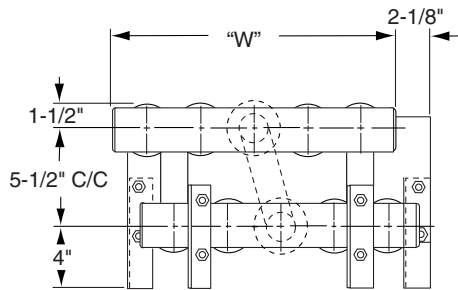
End Caps: A-403, 304L SS, Sch. 10

Mounting Flange: A-182, 304L SS, 150 lb Raised Face

Mechanical Design: 450 psig, 650°F, Standard Testing Pressure 675 psi

NOTE: Type 316L SS Construction is available.

Base Mounted Hairpin Type BHC and BHS



- 1) 15 ft. and 20 ft. units have center supports.
- 2) Header ends are beveled for on-site butt welding.

Standard Sizes

BHC Carbon Steel Units									
Type	Minimum Manhole Size (in)	W (in)	Nominal Length L (ft)	Surface Area (sq ft)			Weight (lb)		
				3 FPI	4 FPI	5 FPI	3 FPI	4 FPI	5 FPI
BHC-4	16	7-1/8	5	59	76	93	108	123	138
			10	118	152	186	198	228	258
			15	178	228	278	293	338	383
			20	237	304	371	384	444	503
BHC-6	18	10-1/4	5	89	114	139	158	180	203
			10	178	228	278	294	339	383
			15	266	342	418	435	502	569
			20	355	456	557	570	660	749
BHC-8	22	13-3/8	5	118	152	186	208	238	268
			10	237	304	371	389	449	508
			15	355	456	557	576	666	755
			20	473	608	742	757	877	995
BHC-10	24	16-1/2	5	148	190	232	258	295	332
			10	296	380	464	484	559	633
			15	444	570	696	717	830	941
			20	592	760	928	943	1,093	1,241

BHS Stainless Steel Units									
Type	Minimum Manhole Size (in)	W (in)	Nominal Length L (ft)	Surface Area (sq ft)			Weight (lb)		
				3 FPI	4 FPI	5 FPI	3 FPI	4 FPI	5 FPI
BHS-4	16	7-1/8	5	44	55	67	70	76	81
			10	88	111	134	124	135	147
			15	131	166	201	182	199	217
			20	175	222	269	236	256	282
BHS-6	18	10-1/4	5	66	83	101	101	110	119
			10	131	166	201	182	199	217
			15	197	250	302	268	294	320
			20	263	333	403	349	384	418
BHS-10	24	16-1/2	5	88	111	134	133	144	156
			10	175	222	269	240	264	287
			15	263	333	403	354	389	424
			20	350	444	537	462	508	555
BHS-8	22	13-3/8	5	109	139	168	164	179	193
			10	219	277	336	299	328	357
			15	328	416	504	440	484	527
			20	438	555	672	575	633	691

Materials of Construction

Pipes: 1-1/4" NPS Sch. 40 Seamless Steel (1.66" OD x 0.140" Wall)

Fins: 0.036" Thick Helically Wound Steel "L" Foot

Headers: 2" NPS Sch. 40 Seamless Steel (2.375" OD x 0.154" Wall)

Return Bends: A-234 Long Radius Forged Steel Sch. 40

Mechanical Design: 450 psig, 650°F, Standard Testing Pressure 675 psi

NOTE: Sch. 80 Construction is available.

Materials of Construction

Pipes: 1-1/4" NPS Sch. 10, 304L SS (1.66" OD x 0.109" Wall)

Fins: 0.020" Thick Helically Wound 304 SS "L" Foot

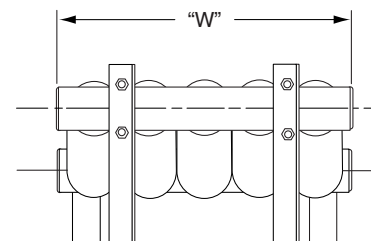
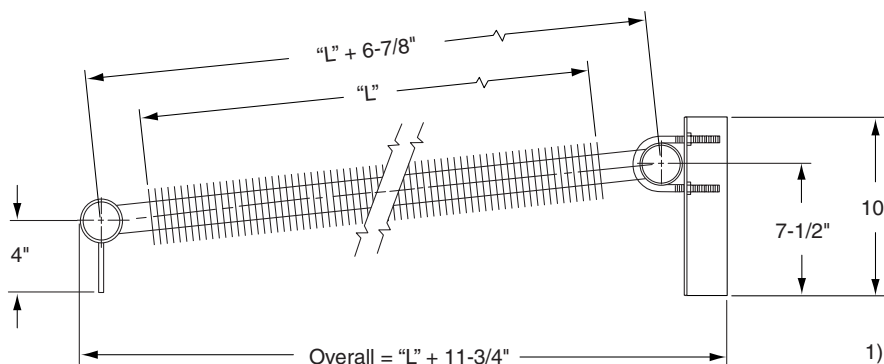
Headers: 2" NPS Sch. 40, 304L SS (2.375" OD x 0.154" Wall)

Return Bends: A-403 Long Radius 304L SS Sch. 10

Mechanical Design: 450 psig, 650°F, Standard Testing Pressure 675 psi

NOTE: Type 316L SS Construction is available.

Base Mounted Direct Type BD



- 1) 15 ft and 20 ft units have center supports.
- 2) Header ends are beveled for on-site butt welding.

Standard Sizes

BD Carbon Steel Units									
Type	Minimum Manhole Size (in)	W (in)	Nominal Length L (ft)	Surface Area (sq ft)			Weight (lb)		
				3 FPI	4 FPI	5 FPI	3 FPI	4 FPI	5 FPI
BD-2	14	7-1/8	5	30	38	47	60	68	75
			10	59	76	93	104	121	135
			15	89	114	140	156	179	201
			20	118	152	186	201	231	261
BD-3	16	10-1/4	5	45	57	70	86	97	109
			10	89	114	139	154	177	199
			15	134	171	209	227	261	294
			20	178	228	278	295	340	384
BD-4	20	13-3/8	5	59	76	93	112	127	142
			10	118	152	186	203	233	262
			15	177	228	279	298	343	388
			20	237	304	371	389	449	508
BD-5	22	16-1/2	5	74	95	116	138	157	175
			10	148	190	232	251	288	325
			15	222	285	348	369	425	481
			20	296	380	464	482	557	631

Materials of Construction

Pipes: 1-1/4" NPS Sch. 40 Seamless Steel (1.66" OD x 0.140" Wall)

Fins: 0.036" Thick Helically Wound Steel "L" Foot

Headers: 2" NPS Sch. 40 Seamless Steel (2.375" OD x 0.154" Wall)

Mechanical Design: 450 psig, 650°F, Standard Testing Pressure 675 psi

NOTE: Sch. 80 Construction is available.

These units are available only in Carbon Steel.



Tank Heater Selection Work Sheet

Tank Information

Tank Reference Number _____
Tank Type _____
Tank Material _____
Dimensions _____ feet
Insulated? _____ If yes, how thick? _____ inches
Open Top? _____
Tank Level (% full) or Fluid Volume _____
Design Ambient Air Temperature _____ °F
Design Wind Velocity (if outside and not insulated) _____ mph

Steam Information

Steam Pressure _____ psig
Saturated? _____ If not, what temperature? _____ °F

Fluid Information

Type of Fluid _____
Properties (not required for water) _____
1. Specific Gravity _____ at _____ °F
or Density _____ lb/cu ft at _____ °F
or Density _____ lb/US gal at _____ °F
2. Specific Heat _____ Btu/lb/°F at _____ °F
3. Viscosity (at least one value required, preferably two)
units _____
_____ at _____ °F
_____ at _____ °F

Heating Requirements

A. Through Load _____ USGPM at _____ °F _____ not applicable
B. Heat-Up Load from _____ °F to _____ °F in _____ hours _____ not applicable
C. Maintenance Load to Hold _____ °F
D. Total Heat Load (if known) _____ Btu/hr

Tank Heater Requirements

1. Materials of Construction
A. Carbon Steel _____
B. Type 304L Stainless Steel _____
C. Type 316L Stainless Steel _____
2. Type of Unit
A. Flange Mounted _____ (preference? Hairpin _____ Bayonet _____)
B. Base Mounted _____ (preference? Hairpin _____ Direct _____)
If flange mounted, is std. flange size OK? _____ If not, specify size _____
3. Maximum tank opening to insert heater into the tank: _____ inches.

Other Information



Notes

Lined area for notes, consisting of multiple horizontal lines.

Heating and Cooling Coils