

LINOVECTOR II

LV2-R8 1114
Copper/Aluminum and
Steel Element Ratings

Submittal

Specification

LV2 Slip Jointed Enclosure

ENCLOSURE:

STYLE: Flat Top, Rounded Outlet
OUTLET: Stamped Louvers
Pencil Proof

LENGTHS: 2'0" thru 8'0" in 6" Increments
MAT'L: 16 Ga. CRS (Std)

14 Ga. Aluminum (Opt'l)

HEIGHT: 8"
 11"
 14"

FINISH: Baked Powder (Std)
 Baked Metallic (Opt'l)

ACCESSORIES:

LV Overlapping Type

All accessories return to the wall at the bottom and have pre-punched holes for fastening to the wall.

ELEMENT:

TYPE: Cu/AL (Mechanically Expanded)

LENGTHS: 2'0" thru 12'6" in 1" Increments for 1" & 1-1/4" Cu.
2'0" thru 8'0" in 1" Increments for 3/4" Cu.

One End Flared (Std)

TYPE: IPS Steel (Mechanically Expanded)

LENGTHS: 2'0" thru 12'6" in 1" Increments
 NPT Thread both Ends (Std)
 Beveled Ends for Field Weld (Opt'l)

See Catalog for Working Pressures

BACKPLATE:

TYPE: Partial B/P

LENGTHS: 8'0" Only

MAT'L: 20 Ga. Prepainted (Std)
 18 Ga. Galvannealed (Opt'l)

TYPE: Full Ht. B/P (Opt'l)

LENGTHS: 2'0" thru 8'0" in 6" Increments

MAT'L: 20 Ga. Galvannealed (Opt'l)
 20 Ga. Painted (Opt'l)
 18 Ga. Painted (Opt'l)

AIRSEAL:

1/8" x 3/8" Closed Cell (Opt'l)

BRACKETS:

Water Brkt w/B.B.
 Wall Mtd Hngr for 2nd Tier

DAMPER:

Damper Blades Factory Installed
 Knob Damper (Opt'l)
 Tamper Resistant (Opt'l)

LV2-R8

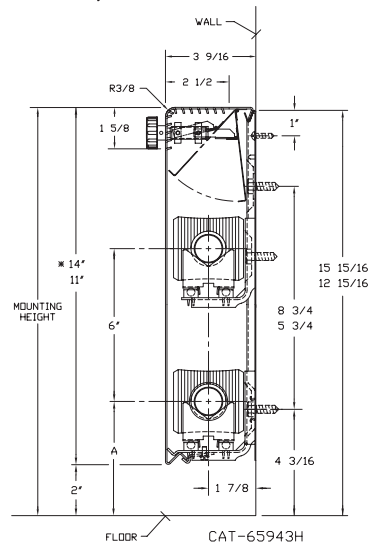
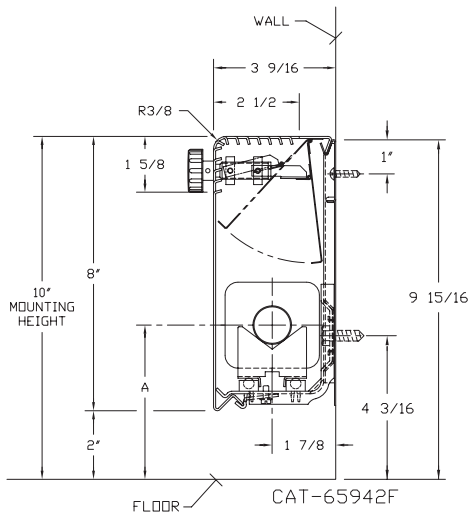
ELEMENT TUBE SIZE	FIN SIZE HEIGHT x WIDTH	CRADLE NUMBER	A
* 3/4 COPPER	2 1/2 x 2 1/4	1	4 5/16
* 3/4 COPPER	2 1/2 x 2 3/4	1	
* 3/4 COPPER	3 3/4 x 2 3/4	2	5"
* 1" COPPER	2 1/2 x 2 3/4	1	4 1/2
* 1" COPPER	3 3/4 x 2 3/4	2	5 3/16
* 1" COPPER	5" x 2 3/4	3A	5 1/2
1 1/4 COPPER	3 3/4 x 2 3/4	2	5 5/16
1 1/4 COPPER	5" x 2 3/4	3A	5 11/16
1" STEEL	3 3/4 x 2 3/4	2	5 5/16
1" STEEL	5" x 2 3/4	3A	5 11/16
1 1/4 STEEL	3 3/4 x 2 3/4	2	5 1/2
1 1/4 STEEL	5" x 2 3/4	3A	5 15/16

* Damper available with these elements only.

LV2-R11 14

ELEMENT TUBE SIZE	FIN SIZE HEIGHT x WIDTH	CRADLE NUMBER	A
* 3/4 COPPER	2 1/2 x 2 1/4	1	4 5/16
* 3/4 COPPER	2 1/2 x 2 3/4	1	
* 3/4 COPPER	3 3/4 x 2 3/4	2	5"
* 1" COPPER	2 1/2 x 2 3/4	1	4 1/2
* 1" COPPER	3 3/4 x 2 3/4	2	5 3/16
* 1" COPPER	5" x 2 3/4	3A	5 1/2
1 1/4 COPPER	3 3/4 x 2 3/4	2	5 5/16
1 1/4 COPPER	5" x 2 3/4	3A	5 11/16
1" STEEL	3 3/4 x 2 3/4	2	5 5/16
1" STEEL	5" x 2 3/4	3A	5 11/16
1 1/4 STEEL	3 3/4 x 2 3/4	2	5 1/2
1 1/4 STEEL	5" x 2 3/4	3A	5 15/16

* 2 tier with damper available in 14" height with these elements only.



Not recommended for steam applications, consult factory.

Vulcan

RADIATOR

260 North Elm St., Westfield, MA 01085
(413) 568-9571 Fax: (413) 564-5661
www.vulcanrad.com

PROJECT: _____ DATE: _____
LOCATION: _____
ARCHITECT: _____
ENGINEER: _____
CONTRACTOR: _____
PO NUMBER: _____

STYLE "LV2-R8 11 14" LINOVECTOR II

COPPER/ALUMINUM ELEMENTS

ALL RATINGS ARE IN BTU/HR/LIN FT AND BASED ON 3 FPS VELOCITY, 65° EAT

TUBE SIZE	CATALOG DESIGNATION	FIN SIZE HEIGHT X WIDTH	FINS PER FT.	FIN THICKNESS IN INCHES	ENCL HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MOUNTING HEIGHT IN INCHES	STEAM 215° FACTOR	HOT WATER (AVG.)								
									200°	190°	180°	170°	160°	150°	140°	130°	120°
									CORRECTION FACTORS FOR AVERAGE WATER TEMPERATURES								
3/4"	VR01	2-1/2" x 2-1/4"	50	.011	8*	1	10	830	710	650	570	510	440	370	330	270	220
					11	1	13	890	770	690	610	540	470	400	360	290	230
					14	1	16	960	830	750	660	590	510	430	380	320	250
					14*	2-5 CL	16	1360	1170	1060	940	830	720	610	540	450	350
3/4"	VR02	2-1/2" x 2-3/4"	60	.010	8*	1	10	990	850	770	680	600	520	450	400	330	260
					11	1	13	1060	910	830	730	650	560	480	420	350	280
					14	1	16	1230	1060	960	850	750	650	550	490	410	320
					14*	2-5 CL	16	1730	1490	1350	1190	1060	920	780	690	570	450
1"	VR03	2-1/2" x 2-3/4"	55	.011	8*	1	10	970	830	760	670	590	510	440	390	320	250
					11	1	13	1030	890	800	710	630	550	460	410	340	270
					14	1	16	1100	950	860	760	670	580	500	440	360	290
					14*	2-5 CL	16	1580	1360	1230	1090	960	840	710	630	520	410
3/4"	VR04	3-3/4" x 2-3/4"	50	.014	8*	1	10	1190	1020	930	820	730	630	540	480	390	310
					11	1	13	1250	1080	980	860	760	660	560	500	410	330
					14	1	16	1320	1140	1030	910	810	700	590	530	440	340
					14*	2-5 CL	16	1750	1510	1370	1210	1070	930	790	700	580	460
1"	VR05	3-3/4" x 2-3/4"	50	.011	8*	1	10	1180	1010	920	810	720	630	530	470	390	310
					11	1	13	1240	1070	970	860	760	660	560	500	410	320
					14	1	16	1310	1130	1020	900	800	690	590	520	430	340
					14*	2-5 CL	16	1740	1500	1360	1200	1060	920	780	700	570	450
1-1/4"	VR08	3-3/4" x 2-3/4"	50	.020	8*	1	10	1120	960	870	770	680	590	500	450	370	290
					11	1	13	1190	1020	930	820	730	630	540	480	390	310
					14	1	16	1310	1130	1020	900	800	690	590	520	430	340
					14*	2-5 CL	16	1760	1510	1370	1210	1070	930	790	700	580	460
1"	VR07	5" x 2-3/4"	50	.020	8*	1	10	1330	1140	1040	920	810	700	600	530	440	350
					11	1	13	1400	1200	1090	970	850	740	630	560	460	360
					14	1	16	1450	1250	1130	1000	880	770	650	580	480	380
					14*	2-5 CL	16	1820	1570	1420	1260	1110	960	820	730	600	470
1-1/4"	VR10	5" x 2-3/4"	50	.020	8*	1	10	1300	1120	1010	900	790	690	590	520	430	340
					11	1	13	1360	1170	1060	940	830	720	610	540	450	350
					14	1	16	1420	1220	1110	980	870	750	640	570	470	370
					14*	2-5 CL	16	1770	1520	1380	1220	1080	940	800	710	580	460

*Not recommended for steam applications, consult factory.
Note: Copper tube furnished flared one end standard.

STEEL ELEMENTS

ALL RATINGS ARE IN BTU/HR/LIN FT AND BASED ON 3 FPS VELOCITY, 65° EAT

TUBE SIZE	CATALOG DESIGNATION	FIN SIZE HEIGHT X WIDTH	FINS PER FT.	FIN THICKNESS IN INCHES	ENCL HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MOUNTING HEIGHT IN INCHES	STEAM 215° FACTOR	HOT WATER (AVG.)								
									200°	190°	180°	170°	160°	150°	140°	130°	120°
									CORRECTION FACTORS FOR AVERAGE WATER TEMPERATURES								
1"	VR11	3-3/4" x 2-3/4"	40	.024	8*	1	10	920	790	720	630	560	490	410	370	300	240
					11	1	13	980	840	760	680	600	520	440	390	320	250
					14	1	16	1050	900	820	720	640	560	470	420	350	270
					14*	2-5 CL	16	1500	1290	1170	1040	920	800	680	600	500	390
1"	VR15	5" x 2-3/4"	50	.024	8*	1	10	990	850	770	680	600	520	450	400	330	260
					11	1	13	1040	890	810	720	630	550	470	420	340	270
					14	1	16	1120	960	870	770	680	590	500	450	370	290
					14*	2-5 CL	16	1410	1210	1100	970	860	750	630	560	470	370
1-1/4"	VR16	5" x 2-3/4"	50	.024	8*	1	10	1010	870	790	700	620	540	450	400	330	260
					11	1	13	1070	920	830	740	650	570	480	430	350	280
					14	1	16	1140	980	890	790	700	600	510	460	380	300
					14*	2-5 CL	16	1590	1370	1240	1100	970	840	720	640	520	410

*Not recommended for steam applications, consult factory.
Notes: 1) Steel fin furnished as .024 thick. Painted black.
2) NPT threads furnished on steel elements. Please use domestic fittings for proper installation.
3) The ends can be provided chamfered for field welded fittings when specified.

Design Data

COMMERCIAL FINNED TUBE CHARTS FOR RATING CORRECTIONS

For assistance with ratings and selection, please use our online Specifier.

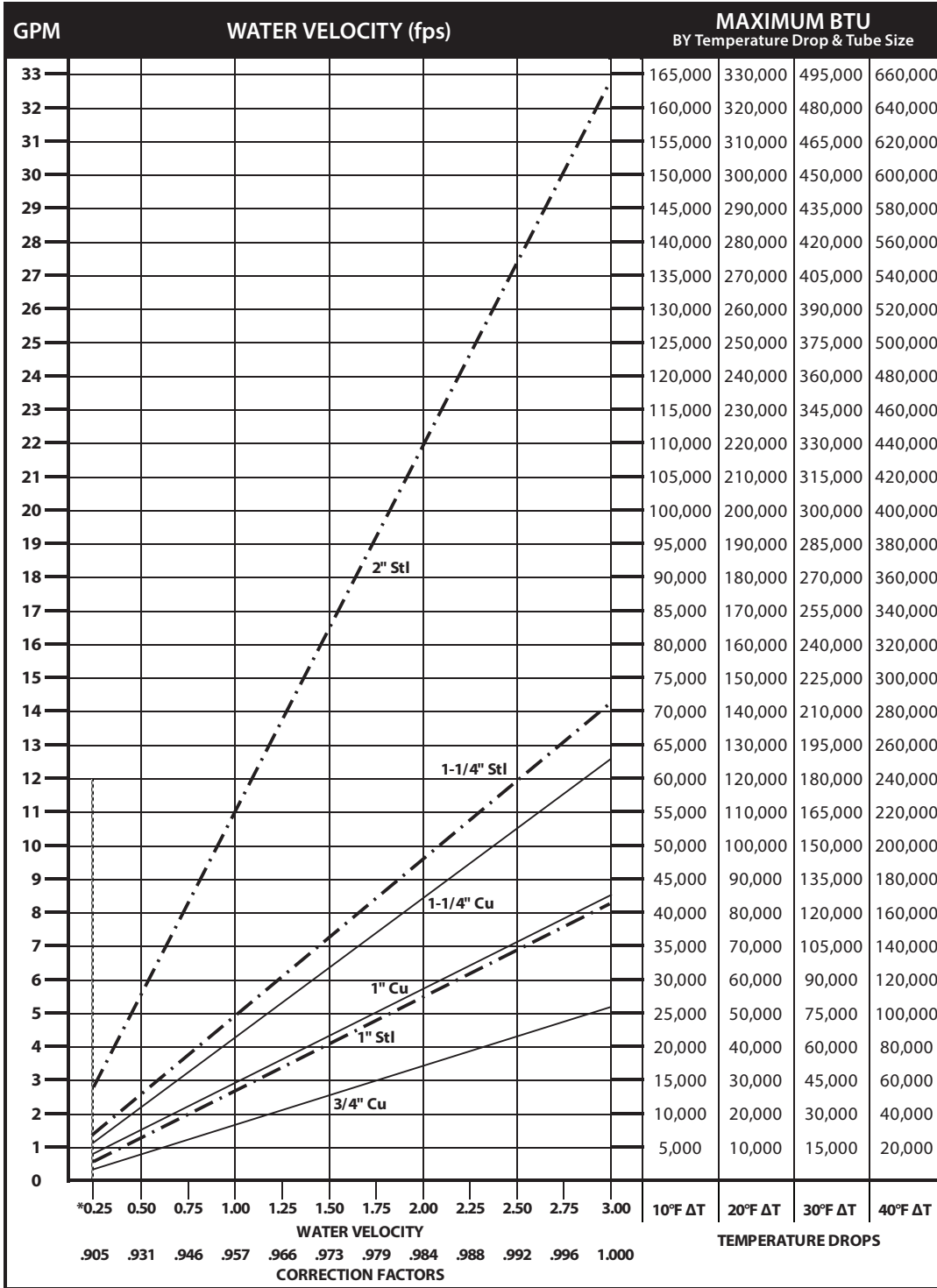
CORRECTION FACTORS FOR WATER TEMPERATURES AND AIR TEMPERATURES OTHER THAN STANDARD															
AVERAGE WATER TEMP. °F	ENTERING AIR TEMPERATURE °F														
	45	55	STD 65	70	75	80	85	90	95	100	110	120	130	140	150
90	.19	.13	.11	.06											
100	.25	.19	.15	.11	.08	.06									
110	.31	.25	.20	.16	.13	.11	.08	.06							
120	.38	.31	.26	.21	.19	.16	.13	.11	.08	.06					
130	.45	.38	.33	.28	.25	.21	.19	.16	.13	.11	.06				
140	.53	.45	.40	.34	.31	.28	.25	.21	.19	.16	.11	.06			
150	.61	.53	.45	.41	.38	.34	.31	.28	.25	.21	.16	.11	.06		
160	.69	.61	.53	.49	.45	.41	.38	.34	.31	.28	.21	.16	.11	.06	
170	.77	.69	.61	.57	.53	.49	.45	.41	.38	.34	.28	.21	.16	.11	.06
180	.86	.77	.69	.65	.61	.57	.53	.49	.45	.41	.34	.28	.21	.16	.11
190	.95	.86	.78	.73	.69	.65	.61	.57	.53	.49	.41	.34	.28	.21	.16
200	1.05	.95	.86	.82	.77	.73	.69	.65	.61	.57	.49	.41	.34	.28	.21
210	1.14	1.05	.95	.91	.86	.82	.77	.73	.69	.65	.57	.49	.41	.34	.28
▶ 215 (STD.)	1.19	1.09	1.00	.95	.91	.86	.82	.77	.73	.69	.61	.53	.45	.38	.31
220	1.24	1.14	1.05	1.00	.95	.91	.86	.82	.77	.73	.65	.57	.49	.41	.34
230	1.34	1.24	1.14	1.09	1.05	1.00	.95	.91	.86	.82	.73	.65	.57	.49	.41
240	1.44	1.34	1.25	1.19	1.14	1.09	1.05	1.00	.95	.91	.82	.73	.65	.57	.49
250	1.55	1.44	1.34	1.29	1.24	1.19	1.14	1.09	1.05	1.00	.91	.82	.73	.65	.57
260	1.66	1.55	1.44	1.39	1.34	1.29	1.24	1.19	1.14	1.09	1.00	.91	.82	.73	.65
270	1.76	1.66	1.55	1.50	1.44	1.39	1.34	1.29	1.24	1.19	1.09	1.00	.91	.82	.73
280	1.87	1.76	1.66	1.60	1.55	1.50	1.44	1.39	1.34	1.29	1.19	1.09	1.00	.91	.82
290	1.99	1.87	1.76	1.71	1.66	1.60	1.55	1.50	1.44	1.39	1.29	1.19	1.09	1.00	.91
300	2.10	1.99	1.87	1.82	1.76	1.71	1.66	1.60	1.55	1.50	1.39	1.29	1.19	1.09	1.00

CORRECTION FACTORS FOR STEAM PRESSURES AND AIR TEMPERATURES OTHER THAN STANDARD																
STEAM		ENTERING AIR TEMPERATURE °F														
PRESSURE		TEMP. °F	45	55	STD 65	70	75	80	85	90	100	110	120	130	140	150
GAUGE	ABS. PSI															
(VAC) 15" HG	7.32	178.9	0.90	0.80	0.70	0.65	0.60	0.56	0.51	0.45	0.39	0.32	0.25	0.18	0.13	0.08
(VAC) 10"	9.78	192.2	1.02	0.91	0.81	0.76	0.71	0.66	0.62	0.55	0.48	0.40	0.33	0.26	0.20	0.14
(VAC) 5"	12.25	202.9	1.11	1.00	0.90	0.85	0.79	0.75	0.70	0.63	0.56	0.48	0.40	0.33	0.27	0.20
▶ 0 PSI	14.696	212.0	1.19	1.09	0.97	0.92	0.87	0.82	0.77	0.70	0.63	0.54	0.46	0.38	0.31	0.25
.899	15.595	215.0	1.22	1.11	1.00	0.95	0.90	0.84	0.80	0.75	0.65	0.57	0.48	0.40	0.33	0.26
5	19.70	227.1	1.34	1.22	1.11	1.05	1.00	0.95	0.90	0.81	0.75	0.66	0.57	0.49	0.41	0.34
10	24.70	239.4	1.45	1.33	1.22	1.17	1.11	1.05	1.00	0.91	0.85	0.75	0.66	0.58	0.50	0.42
15	29.70	249.8	1.55	1.43	1.31	1.26	1.20	1.14	1.09	1.00	0.94	0.84	0.75	0.66	0.57	0.49
20	34.70	258.5	1.63	1.52	1.40	1.33	1.28	1.23	1.17	1.07	1.02	0.92	0.82	0.73	0.64	0.55
25	39.70	266.8	1.71	1.59	1.47	1.41	1.36	1.30	1.25	1.15	1.09	0.98	0.89	0.80	0.71	0.62
30	44.70	274.0	1.78	1.66	1.54	1.48	1.42	1.37	1.31	1.21	1.15	1.05	0.95	0.85	0.76	0.68
40	54.70	286.7	1.91	1.79	1.66	1.61	1.54	1.49	1.43	1.32	1.27	1.16	1.06	0.97	0.87	0.78
50	64.70	297.7	2.02	1.90	1.77	1.71	1.65	1.60	1.54	1.42	1.37	1.26	1.16	1.06	0.96	0.87
60	74.70	307.3	2.10	2.00	1.87	1.81	1.75	1.69	1.63	1.51	1.47	1.35	1.25	1.15	1.05	0.95
70	84.70	316.0	2.20	2.09	1.95	1.89	1.83	1.77	1.71	1.59	1.55	1.44	1.33	1.23	1.12	1.03
80	94.70	323.9	2.27	2.17	2.03	1.97	1.91	1.85	1.80	1.69	1.63	1.52	1.41	1.31	1.20	1.10
90	104.70	331.2	2.36	2.24	2.11	2.05	1.98	1.93	1.87	1.74	1.70	1.59	1.48	1.38	1.28	1.17
100	114.70	337.9	2.43	2.31	2.18	2.11	2.05	2.00	1.94	1.81	1.77	1.65	1.54	1.44	1.33	1.23
125	139.70	352.9	2.59	2.47	2.33	2.27	2.21	2.16	2.10	1.96	1.92	1.80	1.69	1.59	1.48	1.38
150	164.70	365.9	2.73	2.62	2.47	2.43	2.35	2.29	2.23	2.08	2.05	1.94	1.82	1.72	1.61	1.51
175	189.70	377.4	2.86	2.74	2.60	2.54	2.47	2.41	2.35	2.21	2.17	2.05	1.95	1.85	1.73	1.63
200	214.70	387.8	2.95	2.85	2.71	2.63	2.58	2.52	2.47	2.31	2.29	2.17	2.06	1.96	1.84	1.75

From Keenan and Keyes — Linear Interpolation. NOTE: Gauge pressure should be corrected for altitude.

Rate of pitch for steam ½" drop over 20-foot run.

Design Data



DYNAMIC FORMULAS

$$BTU = GPM \times 500 \times TD$$

$$GPM = \left(\frac{BTU}{500} \right) \div TD$$

$$TD = \left(\frac{BTU}{500} \right) \div GPM$$

*Do not design below .25 fps.

Pressure Drop at Given Water Velocities (Feet of Water per 100 ft. of pipe) based on Hazen - Williams calculation

Nominal Pipe Size	Water Velocity (ft/sec)											
	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
3/4" Copper	0.06	0.20	0.42	0.72	1.09	1.53	2.04	2.61	3.25	3.95	4.71	5.53
1" Copper	0.04	0.15	0.32	0.54	0.81	1.14	1.52	1.94	2.42	2.94	3.50	4.11
1 1/4" Copper	0.03	0.12	0.25	0.43	0.64	0.90	1.20	1.54	1.92	2.33	2.78	3.26
1" Steel	0.04	0.15	0.32	0.54	0.81	1.14	1.52	1.95	2.42	2.94	3.51	4.12
1 1/4" Steel	0.03	0.11	0.23	0.40	0.60	0.84	1.12	1.44	1.79	2.17	2.59	3.05
2" Steel	0.02	0.07	0.14	0.25	0.37	0.52	0.69	0.89	1.10	1.34	1.60	1.88

Design Data

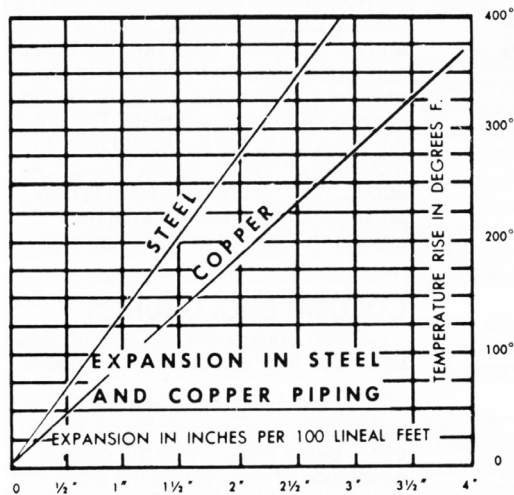
GUARANTEED WORKING PRESSURES

- 1" IPS — 780 at Temperatures up to 650°F.
- 1-1/4" IPS — 660 at Temperatures up to 650°F.
- 2" IPS — 405 at Temperatures up to 650°F.
- 1-1/4" CU — 194 at Temperatures up to 300°F.
- 1" CU 204 at Temperatures up to 300°F.
- 3/4" CU 218 PSI at Temperatures up to 300°F.

MAXIMUM PRESSURES AT OTHER TEMPERATURES ARE AVAILABLE UPON REQUEST.

Pipe Water Capacities and Quantities Circulated at Velocity of 3 Feet Per Second

Nominal Pipe Size	Pipe I.D. (inches)	Gals Per Lin. Ft.	GPM @ 3' per sec Velocity
3/4" Copper	0.835	0.028	5.12
1" Copper	1.077	0.047	8.52
1 1/4" Copper	1.315	0.071	12.70
1" Steel	1.075	0.047	8.49
1 1/4" Steel	1.395	0.079	14.29
2" Steel	2.115	0.183	32.85



Glycol Correction Factors

Fluid Temperature 200°F

% Solution	Ethylene Glycol	Propylene Glycol
20	.952	.988
30	.921	.968
40	.888	.943
50	.852	.912

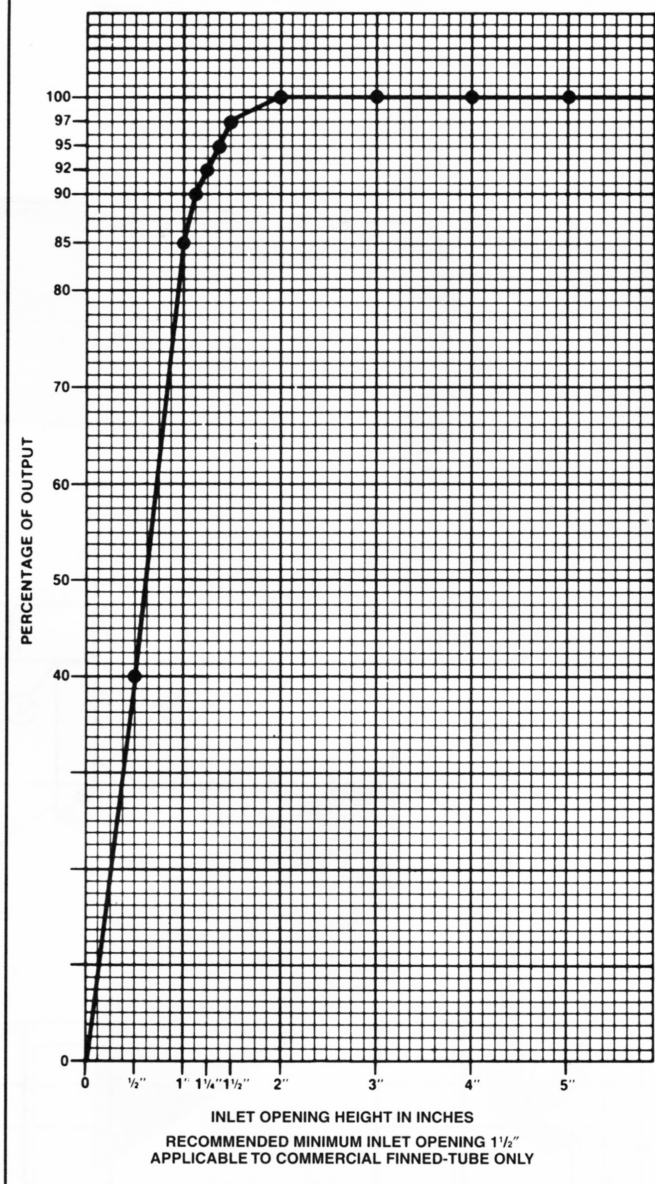
Fluid Temperature 180°F

% Solution	Ethylene Glycol	Propylene Glycol
20	.946	.982
30	.913	.961
40	.879	.934
50	.842	.902

Fluid Temperature 140°F

% Solution	Ethylene Glycol	Propylene Glycol
20	.934	.97
30	.898	.946
40	.861	.916
50	.821	.881

INLET VS. OUTPUT/BTUH CAPACITY REDUCTION



ALTITUDE FACTORS

Approximate factors for convective heat value at varying altitudes

Altitude	Ferrous Units	Copper Alum. Units
Sea Level	1.000	1.000
1,000 ft.	.984	.969
2,000 ft.	.968	.938
3,000 ft.	.952	.908
4,000 ft.	.936	.878
5,000 ft.	.920	.850
6,000 ft.	.904	.822
7,000 ft.	.889	.795
8,000 ft.	.874	.768
9,000 ft.	.859	.743
10,000 ft.	.844	.718
15,000 ft.	.771	.603
20,000 ft.	.703	.502