

VERSA-LINE

Submittal

VA-C / VB-C
Versa-Line
Copper/Aluminum and
Steel Element Ratings

Specification

VA-C Flat Top Enclosure

ENCLOSURE:

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

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

MAT'L: 18 Ga. CRS (Std)
 16 Ga. CRS (Opt'l)
 14 Ga. CRS (Opt'l)
 18 Ga. Stainless Steel (Opt'l)
 16 Ga. Stainless Steel (Opt'l)
 14 Ga. Stainless Steel (Opt'l)
 16 Ga. Aluminum (Opt'l)
 14 Ga. Aluminum (Opt'l)
 12 Ga. Aluminum (Opt'l)

HEIGHT: 5 5/8" (VA-C only)
 6 1/8" (VB-C only)
 11 5/8" (VA-C only)
 12 1/8" (VB-C only)
 17 5/8" (VA-C only)
 18 1/8" (VB-C only)

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

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

VB-C Flat Top Enclosure

BACKPLATE:

TYPE: Not Applicable

BRACKETS:

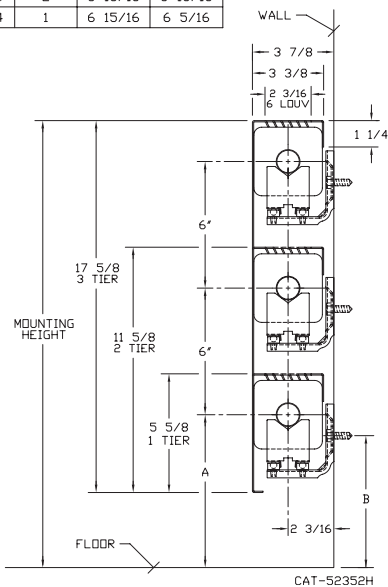
Wall Mtd B.B. Hngr

ACCESSORIES:

All Overlapping Type

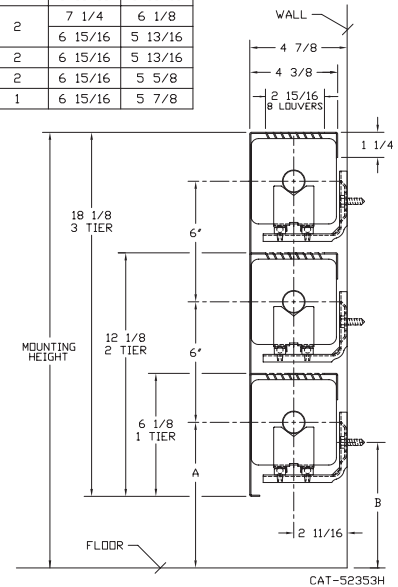
VA-C

ELEMENT TUBE SIZE	FIN SIZE HEIGHT x WIDTH	CRADLE NUMBER	A	B
3/4 COPPER	3 1/4 x 3 1/4	2	6 15/16	6 1/8
1" COPPER	3 1/4 x 3 1/4	2	6 15/16	5 15/16
1 1/4 COPPER	3 1/4 x 3 1/4	1	6 15/16	6 1/2
1" STEEL	3 1/4 x 3 1/4	2	6 15/16	5 13/16
1 1/4 STEEL	3 1/4 x 3 1/4	1	6 15/16	6 5/16



VB-C

ELEMENT TUBE SIZE	FIN SIZE HEIGHT x WIDTH	CRADLE NUMBER	A	B
3/4 COPPER	3 5/8 x 4 1/4	2	7 1/4	6 7/16
	4 1/4 x 4 1/4	3A	6 15/16	5 11/16
1" COPPER	3 5/8 x 4 1/4	2	7 1/4	6 1/4
	4 1/4 x 4 1/4	2	6 15/16	5 15/16
1 1/4 COPPER	3 5/8 x 4 1/4	2	7 1/4	6 1/8
	4 1/4 x 4 1/4	2	6 15/16	5 13/16
1" STEEL	4 1/4 x 4 1/4	2	6 15/16	5 13/16
1 1/4 STEEL	4 1/4 x 4 1/4	2	6 15/16	5 5/8
2" STEEL	4 1/4 x 4 1/4	1	6 15/16	5 7/8



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

STYLE "VA-C / VB-C" VERSA-LINE

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 DEPTH AND 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	
									1.00	0.86	0.78	0.69	0.61	0.53	0.45	.40	.33	.26	
3/4"	C3/4-33	3-1/4" SQ.	32	.020	5A	1	8-7/8	870	750	680	600	530	460	390	350	290	230		
					11A	2 @ 6 CL	14-7/8	1460	1260	1140	1010	890	770	660	580	480	380		
					17A	3 @ 6 CL	20-7/8	1930	1660	1510	1330	1180	1020	870	770	640	500		
3/4"	C3/4-34	3-1/4" SQ.	40	.020	5A	1	8-7/8	1030	890	800	710	630	550	460	410	340	270		
					11A	2 @ 6 CL	14-7/8	1600	1380	1250	1100	980	850	720	640	530	420		
					17A	3 @ 6 CL	20-7/8	2060	1770	1610	1420	1260	1090	930	820	680	540		
3/4"	C3/4-35	3-1/4" SQ.	50	.020	5A	1	8-7/8	1130	970	880	780	690	600	510	450	370	290		
					11A	2 @ 6 CL	14-7/8	1710	1470	1330	1180	1040	910	770	680	560	440		
					17A	3 @ 6 CL	20-7/8	2150	1850	1680	1480	1310	1140	970	860	710	560		
1"	C33	3-1/4" SQ.	32	.020	5A	1	8-7/8	870	750	680	600	530	460	390	350	290	230		
					11A	2 @ 6 CL	14-7/8	1460	1260	1140	1010	890	770	660	580	480	380		
					17A	3 @ 6 CL	20-7/8	1900	1630	1480	1310	1160	1010	860	760	630	490		
1"	C34	3-1/4" SQ.	40	.020	5A	1	8-7/8	970	830	760	670	590	510	440	390	320	250		
					11A	2 @ 6 CL	14-7/8	1570	1350	1220	1080	960	830	710	630	520	410		
					17A	3 @ 6 CL	20-7/8	1990	1710	1550	1370	1210	1050	900	800	660	520		
1"	C35	3-1/4" SQ.	50	.020	5A	1	8-7/8	1090	940	850	750	660	580	490	440	360	280		
					11A	2 @ 6 CL	14-7/8	1650	1420	1290	1140	1010	870	740	660	540	430		
					17A	3 @ 6 CL	20-7/8	2080	1790	1620	1440	1270	1100	940	830	690	540		
1-1/4"	C133	3-1/4" SQ.	32	.020	5A	1	8-7/8	870	750	680	600	530	460	390	350	290	230		
					11A	2 @ 6 CL	14-7/8	1430	1230	1120	990	870	760	640	570	470	370		
					17A	3 @ 6 CL	20-7/8	1890	1630	1470	1300	1150	1000	850	760	620	490		
1-1/4"	C134	3-1/4" SQ.	40	.020	5A	1	8-7/8	950	820	740	660	580	500	430	380	310	250		
					11A	2 @ 6 CL	14-7/8	1560	1340	1220	1080	950	830	700	620	510	410		
					17A	3 @ 6 CL	20-7/8	1960	1690	1530	1350	1200	1040	880	780	650	510		
1-1/4"	C135	3-1/4" SQ.	50	.020	5A	1	8-7/8	1050	900	820	720	640	560	470	420	350	270		
					11A	2 @ 6 CL	14-7/8	1620	1390	1260	1120	990	860	730	650	530	420		
					17A	3 @ 6 CL	20-7/8	2040	1750	1590	1410	1240	1080	920	820	670	530		
3/4"	C3/4-433	3-5/8" X 4-1/4"	32	.020	6B	1	9-3/8	1090	940	850	750	660	580	490	440	360	280		
					12B	2 @ 6 CL	15-3/8	1810	1560	1410	1250	1100	960	810	720	600	470		
					18B	3 @ 6 CL	21-3/8	2300	1980	1790	1590	1400	1220	1040	920	760	600		
3/4"	C3/4-434	3-5/8" X 4-1/4"	40	.020	6B	1	9-3/8	1310	1130	1020	900	800	690	590	520	430	340		
					12B	2 @ 6 CL	15-3/8	2120	1820	1650	1460	1290	1120	950	850	700	550		
					18B	3 @ 6 CL	21-3/8	2640	2270	2060	1820	1610	1400	1190	1060	870	690		
3/4"	C3/4-435	3-5/8" X 4-1/4"	50	.020	6B	1	9-3/8	1440	1240	1120	990	880	760	650	580	480	370		
					12B	2 @ 6 CL	15-3/8	2250	1940	1760	1550	1370	1190	1010	900	740	590		
					18B	3 @ 6 CL	21-3/8	2760	2370	2150	1900	1680	1460	1240	1100	910	720		
1"	C433	3-5/8" X 4-1/4"	32	.020	6B	1	9-3/8	1130	970	880	780	690	600	510	450	370	290		
					12B	2 @ 6 CL	15-3/8	1890	1630	1470	1300	1150	1000	850	760	620	490		
					18B	3 @ 6 CL	21-3/8	2400	2060	1870	1660	1460	1270	1080	960	790	620		
1"	C434	3-5/8" X 4-1/4"	40	.020	6B	1	9-3/8	1270	1090	990	880	770	670	570	510	420	330		
					12B	2 @ 6 CL	15-3/8	2060	1770	1610	1420	1260	1090	930	820	680	540		
					18B	3 @ 6 CL	21-3/8	2560	2200	2000	1770	1560	1360	1150	1020	840	670		
1"	C435	3-5/8" X 4-1/4"	50	.020	6B	1	9-3/8	1440	1240	1120	990	880	760	650	580	480	370		
					12B	2 @ 6 CL	15-3/8	2240	1930	1750	1550	1370	1190	1010	900	740	580		
					18B	3 @ 6 CL	21-3/8	2760	2370	2150	1900	1680	1460	1240	1100	910	720		
1-1/4"	C1433	3-5/8" X 4-1/4"	32	.020	6B	1	9-3/8	1180	1010	920	810	720	630	530	470	390	310		
					12B	2 @ 6 CL	15-3/8	1960	1690	1530	1350	1200	1040	880	780	650	510		
					18B	3 @ 6 CL	21-3/8	2500	2150	1950	1720	1530	1330	1130	1000	830	650		
1-1/4"	C1434	3-5/8" X 4-1/4"	40	.020	6B	1	9-3/8	1300	1120	1010	900	790	690	590	520	430	340		
					12B	2 @ 6 CL	15-3/8	2100	1810	1640	1450	1280	1110	950	840	690	550		
					18B	3 @ 6 CL	21-3/8	2610	2240	2040	1800	1590	1380	1170	1040	860	680		
1-1/4"	C1435	3-5/8" X 4-1/4"	50	.020	6B	1	9-3/8	1440	1240	1120	990	880	760	650	580	480	370		
					12B	2 @ 6 CL	15-3/8	2250	1940	1760	1550	1370	1190	1010	900	740	590		
					18B	3 @ 6 CL	21-3/8	2770	2380	2160	1910	1690	1470	1250	1110	910	720		
3/4"	C3/4 43	4-1/4" SQ.	32	.020	6B	1	9-3/8	1210	1040	940	830	740	640	540	480	400	310		
					12B	2 @ 6 CL	15-3/8	1990	1710	1550	1370	1210	1050	900	800	660	520		
					18B	3 @ 6 CL	21-3/8	2560	2200	2000	1770	1560	1360	1150	1020	840	670		
3/4"	C3/4 44	4-1/4" SQ.	40	.020	6B	1	9-3/8	1440	1240	1120	990	880	760	650	580	480	370		
					12B	2 @ 6 CL	15-3/8	2160	1860	1680	1490	1320	1140	970	860	710	560		
					18B	3 @ 6 CL	21-3/8	2660	2290	2070	1840	1620	1410	1200	1060	880	690		
3/4"	C3/4 45	4-1/4" SQ.	50	.020	6B	1	9-3/8	1490	1280	1160	1030	910	790	670	600	490	390		
					12B	2 @ 6 CL	15-3/8	2230	1920	1740	1540	1360	1180	1000	890	740	580		
					18B	3 @ 6 CL	21-3/8	2740	2360	2140	1890	1670	1450	1230	1100	900	710		
1"	C43	4-1/4" SQ.	32	.020	6B	1	9-3/8	1210	1040	940	830	740	640	540	480	400	310		
					12B	2 @ 6 CL	15-3/8	2010	1730	1570	1390	1230	1070	900	800	660	520		
					18B	3 @ 6 CL	21-3/8	2580	2220	2010	1780	1570	1370	1160	1030	850	670		

STYLE "VA-C / VB-C" VERSA-LINE

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 DEPTH AND 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								
								1.00	0.86	0.78	0.69	0.61	0.53	0.45	.40	.33	.26
1"	C44	4-1/4" SQ.	40	.020	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1340 2120 2660	1150 1820 2290	1050 1650 2070	920 1460 1840	820 1290 1620	710 1120 1410	600 950 1200	540 850 1060	440 700 880	350 550 690
1"	C45	4-1/4" SQ.	50	.020	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1510 2250 2770	1300 1940 2380	1180 1760 2160	1040 1550 1910	920 1370 1690	800 1190 1470	680 1010 1250	600 900 1110	500 740 910	390 590 720
1-1/4"	C143	4-1/4" SQ.	32	.020	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1260 2100 2690	1080 1810 2310	980 1640 2100	870 1450 1860	770 1280 1640	670 1110 1430	570 950 1210	500 840 1080	420 690 890	330 550 700
1-1/4"	C144	4-1/4" SQ.	40	.020	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1490 2280 2790	1280 1960 2400	1160 1780 2180	1030 1570 1930	910 1390 1700	790 1210 1480	670 1030 1260	600 910 1120	490 750 920	390 590 730
1-1/4"	C145	4-1/4" SQ.	50	.020	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1540 2090 2560	1320 1800 2200	1200 1630 2000	1060 1440 1770	940 1270 1560	820 1110 1360	690 940 1150	620 840 1020	510 690 840	400 540 670

Note: Copper tube furnished flared one end standard.

STEEL ELEMENTS

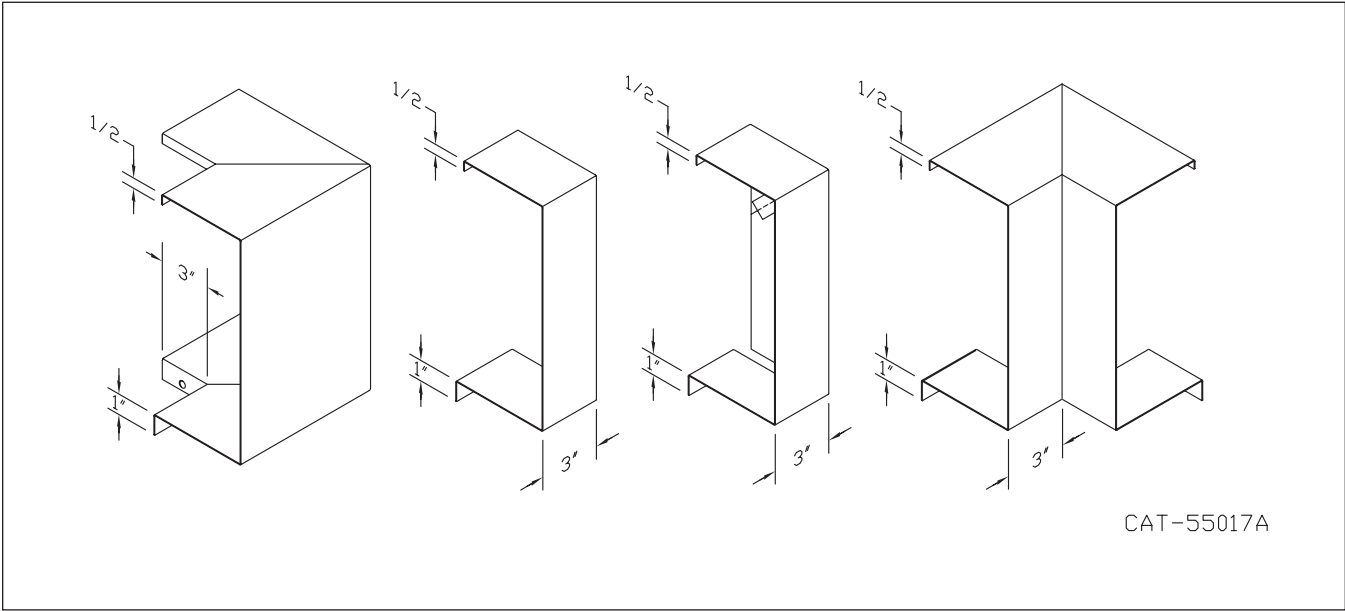
ALL RATINGS ARE IN BTU/HR/LIN FT AND BASED ON 3 FPS VELOCITY, 65° EAT

TUBE SIZE	CATALOG DESIGNATION	FIN SIZE HEIGHT X WIDTH	FINS PER FT.	FIN THICKNESS IN INCHES	ENCL DEPTH AND 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								
								1.00	0.86	0.78	0.69	0.61	0.53	0.45	.40	.33	.26
1"	S33	3-1/4" SQ.	32	.032	5A 11A 17A	1 2 @ 6 CL 3 @ 6 CL	8-7/8 14-7/8 20-7/8	820 1340 1760	710 1150 1510	640 1050 1370	570 920 1210	500 820 1070	430 710 930	370 600 790	330 540 700	270 440 580	210 350 460
1"	S34	3-1/4" SQ.	40	.032	5A 11A 17A	1 2 @ 6 CL 3 @ 6 CL	8-7/8 14-7/8 20-7/8	890 1450 1880	770 1250 1620	690 1130 1470	610 1000 1300	540 880 1150	470 770 1000	400 650 850	360 580 750	290 480 620	230 380 490
1"	S35	3-1/4" SQ.	50	.032	5A 11A 17A	1 2 @ 6 CL 3 @ 6 CL	8-7/8 14-7/8 20-7/8	950 1520 1960	820 1310 1690	740 1190 1530	660 1050 1350	580 930 1200	500 810 1040	430 680 880	380 610 780	310 500 650	250 400 510
1-1/4"	S133	3-1/4" SQ.	32	.032	5A 11A 17A	1 2 @ 6 CL 3 @ 6 CL	8-7/8 14-7/8 20-7/8	810 1380 1790	700 1190 1540	630 1080 1400	560 950 1240	490 840 1090	430 730 950	360 620 810	320 550 720	270 460 590	210 360 470
1-1/4"	S134	3-1/4" SQ.	40	.032	5A 11A 17A	1 2 @ 6 CL 3 @ 6 CL	8-7/8 14-7/8 20-7/8	900 1450 1800	770 1250 1550	700 1130 1400	620 1000 1240	550 880 1100	480 770 950	410 650 810	360 580 720	300 480 590	230 380 470
1-1/4"	S135	3-1/4" SQ.	50	.032	5A 11A 17A	1 2 @ 6 CL 3 @ 6 CL	8-7/8 14-7/8 20-7/8	930 1490 1820	800 1280 1570	730 1160 1420	640 1030 1260	570 910 1110	490 790 960	420 670 820	370 600 730	310 490 600	240 390 470
1"	S43	4-1/4" SQ.	32	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1190 1970 2440	1020 1690 2100	930 1540 1900	820 1360 1680	730 1200 1490	630 1040 1290	540 890 1100	480 790 980	390 650 810	310 510 630
1"	S44	4-1/4" SQ.	40	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1340 2080 2540	1150 1790 2180	1050 1620 1980	920 1440 1750	820 1270 1550	710 1100 1350	600 940 1140	540 830 1020	440 690 840	350 540 660
1"	S45	4-1/4" SQ.	50	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1420 2130 2580	1220 1830 2220	1110 1660 2010	980 1470 1780	870 1300 1570	750 1130 1370	640 960 1160	570 850 1030	470 700 850	370 550 670
1-1/4"	S143	4-1/4" SQ.	32	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1100 1960 2420	950 1690 2080	860 1530 1890	760 1350 1670	670 1200 1480	580 1040 1280	500 880 1090	440 780 970	360 650 800	290 510 630
1-1/4"	S144	4-1/4" SQ.	40	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1330 2070 2540	1140 1780 2180	1040 1610 1980	920 1430 1750	810 1260 1550	700 1100 1350	600 930 1140	530 830 1020	440 680 840	350 540 660
1-1/4"	S145	4-1/4" SQ.	50	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1400 2090 2560	1200 1800 2200	1090 1630 2000	970 1440 1770	850 1270 1560	740 1110 1360	630 940 1150	560 840 1020	460 690 840	360 540 670
2"	S242	4-1/4" SQ.	25	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1030 1730 2160	890 1490 1860	800 1350 1680	710 1190 1490	630 1060 1320	550 920 1140	460 780 970	410 690 860	340 570 710	270 450 560
2"	S243	4-1/4" SQ.	32	.032	6B 12B 18B	1 2 @ 6 CL 3 @ 6 CL	9-3/8 15-3/8 21-3/8	1190 1900 2330	1020 1630 2000	930 1480 1820	820 1310 1610	730 1160 1420	630 1010 1230	540 860 1050	480 760 930	390 630 770	310 490 610

- Notes: 1) Steel fins furnished as .032 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.

STYLE "VA-C / VB-C" VERSA-LINE

STYLE C ACCESSORIES



Design Data

Correction Factor Chart for Non-Standard Mounting Heights

MOUNTING HEIGHT (Inches)	ENCLOSURE STYLE						
	BARE FIN ALL SIZES	FRONT OUTLET	FT (FRONT & TOP)		SLOPE		
			3 1/4" FINS	4 1/4" FINS	2 3/4" FINS	3 1/4" FINS	4 1/4" FINS
40 or more	1.000	1.000	1.000	1.000	1.000	1.000	1.000
38	1.000	1.000	1.000	1.000	1.000	1.000	1.003
36	1.000	1.004	1.005	1.005	1.006	1.007	1.009
34	1.010	1.014	1.011	1.010	1.012	1.013	1.016
32	1.020	1.024	1.017	1.015	1.019	1.020	1.025
30	1.030	1.039	1.029	1.024	1.031	1.033	1.039
29	1.040	1.049	1.035	1.029	1.038	1.040	1.045
28	1.050	1.059	1.041	1.034	1.045	1.047	1.052
27	1.060	1.069	1.046	1.039	1.051	1.053	1.059
26	1.070	1.079	1.052	1.044	1.058	1.060	1.065
25	1.080	1.089	1.058	1.049	1.065	1.067	1.072
24	1.090	1.099	1.064	1.054	1.071	1.073	1.079
23	1.100	1.109	1.070	1.059	1.078	1.080	1.085
22	1.110	1.119	1.076	1.064	1.085	1.087	1.092
21	1.120	1.129	1.082	1.069	1.091	1.093	1.099
20	1.130	1.139	1.088	1.074	1.098	1.100	1.100
19	1.140	1.149	1.089	1.075	1.100	1.100	1.100
18 or less	1.150	1.150	1.089	1.075	1.100	1.100	1.100

TOP OUTLET "T" IS NOT AFFECTED.

The AHRI Ratings cataloged include the factor shown for the recommended mounting height.

If the unit is to be installed at a different height than that recommended, the AHRI Rating (except for Top Outlet) must be adjusted as follows: AHRI Rating multiplied by

$$\frac{\text{Factor from Table Above for actual mounting height}}{\text{Factor from Table Above for recommended mounting height}}$$

FORMULA:

$$\text{Catalog Rating} \times \frac{\text{Factor at 30" Height}}{\text{Factor at 18" Height}}$$

$$\text{SOLUTION: } 1950 \times \frac{1.039}{1.150} = 1760 \text{ BTU/Hr.}$$

DYNAMIC FORMULAS

$$\text{BTU} = \text{GPM} \times 500 \times \text{TD}$$

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

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

Design Data

COMMERCIAL FINNED TUBE RATING CORRECTION CHARTS

CATALOG FINNED TUBE RATINGS ARE BASED UPON THE FOLLOWING CONDITIONS:

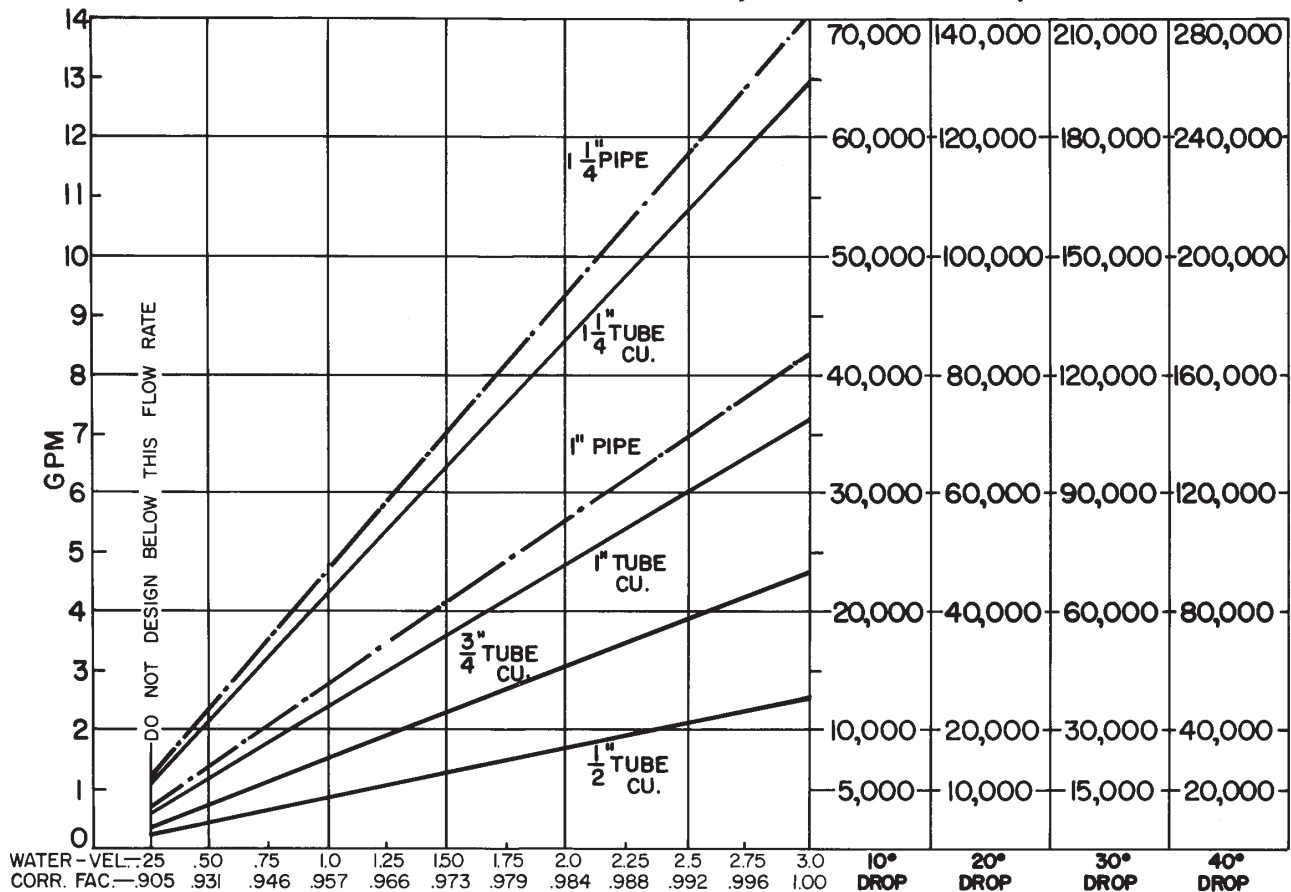
- 215°F AVERAGE WATER OR STEAM TEMPERATURE
- 65°F ENTERING AIR TEMPERATURE
- 3 FEET PER SECOND WATER FLOW RATE
- CATALOG MOUNTING HEIGHT

USE THE FOLLOWING CALCULATION WITH CORRECTION FACTORS FOR JOB CONDITIONS TO DETERMINE CORRECTED RATING:

$$\text{CORRECTED RATING} = (\text{215°F CATALOG RATING}) \times \left(\frac{\text{CORRECTION FACTOR FOR STEAM OR WATER AND AVERAGE AIR TEMP.}}{\text{CORRECTION FACTOR FOR FLOW RATE}} \right) \times \left(\frac{\text{CORRECTION FOR MOUNTING HTG.-SEE CATALOG RATING}}{\text{CORRECTION FACTOR FOR FLOW RATE}} \right)$$

USE THE FOLLOWING CHARTS TO SELECT CORRECTION FACTORS

CHART/WATER VEL./CORR. FACTOR / PRESS. DROP/TOTAL BTU.

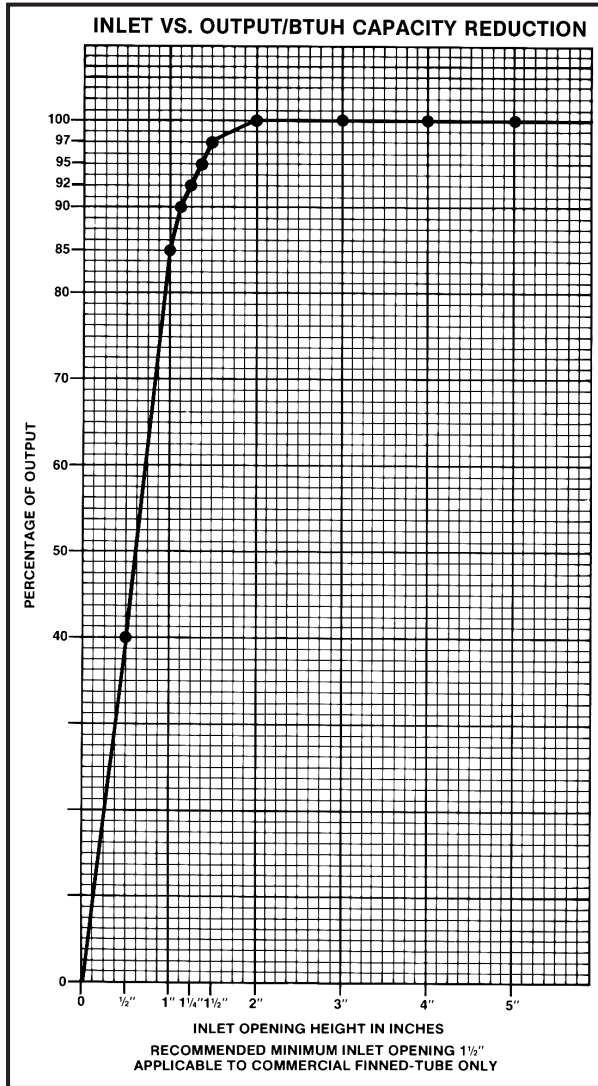


1/2" COP. ALUM.	1.80	2.33	5.33	9.16		
3/4" COP. ALUM.	.5	1.5	3.16	5.4	6.25	
1" COP. ALUM.	.233	.41	.83	1.45	2.16	3.66
1" PIPE		.37	.79	1.3	2.00	3.70
1 1/4" COP. ALUM.	.16	.33	.55	.79	1.08	1.33
1 1/4" PIPE	.09	.18	.31	.5	.70	1.0

PRESSURE DROP PER 100 LINEAR FT., IN FEET OF HEAD

Design Data

INLET AIR CORRECTION FACTOR



GUARANTEED WORKING PRESSURES

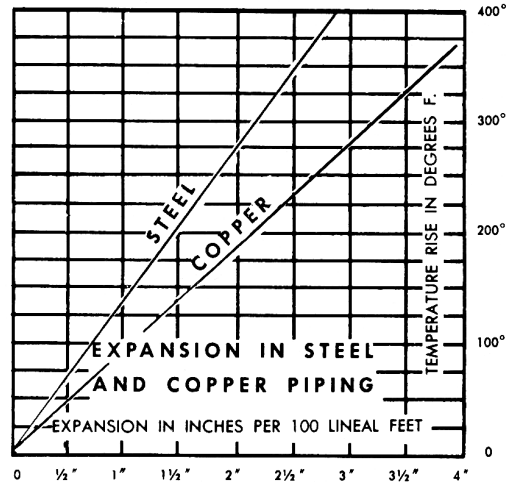
- 1" IPS — 780 AT TEMPERATURES UP TO 650°F.
 - 1 1/4" IPS — 660 AT TEMPERATURES UP TO 650°F.
 - 2" IPS — 405 AT TEMPERATURES UP TO 650°F.
 - 1 1/4" CU — 194 AT TEMPERATURES UP TO 300°F.
 - 1" CU — 204 AT TEMPERATURES UP TO 300°F.
 - 3/4" CU — 218 PSI AT TEMPERATURES UP TO 300°F.
- MAXIMUM PRESSURES AT OTHER TEMPERATURES ARE AVAILABLE UPON REQUEST.

RATE OF PITCH FOR STEAM 1/2" DROP OVER 20 FT. RUN.

PIPE WATER CAPACITIES AND QUANTITIES CIRCULATED AT VELOCITY OF 3* FEET PER SECOND			
Pipe Size	Gals. Per Linear Ft.	Gals./Min. @ 3' Sec. Vel.*	Lbs./Hr. @ 3' Sec. Vel.*
1/2"	.016	2.88	1440
3/4"	.023	4.14	2070
1"	.040	7.20	3600
1 1/4"	.063	11.34	5660
1 1/2"	.102	18.36	9160
2"	.170	30.60	15300
2 1/2"	.275	49.50	24850
3"	.390	70.20	35000

*3 Ft./Sec. Velocity is Basic for Hot Water Rating Factors Shown on this Page.

$$\text{VELOCITY FT./SEC.} = \frac{\text{LBS. PER HOUR}}{(\text{GALS. PER FT.}) (3600) (8.3)}$$



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

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

Design Data

CORRECTION FACTORS FOR STEAM PRESSURES AND AIR TEMPERATURES OTHER THAN STANDARD

STEAM		ENTERING AIR TEMPERATURE, °F														
Pressure		Temp.			STD											
Gauge	Abs. Psi	°F	45	55	65	70	75	80	85	90	100	110	120	130	140	150
(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
(Vac) 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	258.8	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.

CORRECTION FACTORS FOR WATER TEMPERATURES AND AIR TEMPERATURES OTHER THAN STANDARD

AVERAGE WATER TEMP. °F	ENTERING AIR TEMPERATURE, °F														
	45	55	STD	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