

CLASSIC



ARCHITECTURALLY
DESIGNED ENCLOSURES

Vulcan
RADIATOR



CLASSIC ARCHITECTURALLY STYLED

ENCLOSURES

Classic Architecturally Styled Enclosures offer a standard of excellence unmatched in the industry. The clean, crisp classic look and streamlined anodized aluminum grille help make Classic the ideal choice for modern office buildings, banks, executive offices, luxury hotels – wherever enclosures are intended to enhance a building's interior statement.

Standard Classic Enclosures, with internally telescoping accessories for dramatic shadow effect, offer architects and engineers uninhibited design opportunities.

“J” Style Classic Enclosures provide an interlocking, slip-jointed construction that incorporates overlapping accessories to facilitate layout adjustments for variations of final building construction.

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DESIGN ADVANTAGE

STANDARD CLASSIC ARCHITECTURAL ENCLOSURES

- Enhances architectural style and design.
- Clean crisp designs with accenting extruded aluminum grilles in clear anodized or baked enamel finish.
- Enclosure designs allow modular/sectional installation.
- Enclosure is easily removed without disrupting adjoining accessories or enclosures.
- Enclosures can be installed inverted on a high wall allowing the anodized grille to be seen at the bottom.
- Enclosure and accessories are interchangeable with Linovector II utilizing same backplates and brackets.
- Enclosure is available in three standard depths with five standard heights and four basic designs.
- All accessories underlap the enclosure and telescope within, providing unlimited balancing and make-up in any enclosure run.
- Utilizing a backplate support, the enclosure can be easily installed on window mullions, providing a finished enclosure inside and out.
- Enclosure can be provided in heavy gauge steel, textured steel or aluminum.



“J” CLASSIC SLIP-JOINTED ARCHITECTURAL ENCLOSURES

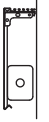

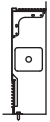







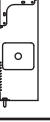
- Maintains the quality lines of the Architectural style enclosure.
- Enclosure features the Classic extruded aluminum grille in clear anodized or baked enamel finish.
- Sturdy 14 gauge internal gussets ensure the strength and durability of the grille and enclosure.
- Vertical internal reinforcing stiffeners provide structural integrity and an interlocking feature with the adjoining enclosure.
- Enclosure can be installed on Linovector II backplates and brackets as well.
- All accessories overlap the enclosure and are made with 90 degree formed edges to increase strength and rigidity.
- Enclosure can be provided in 14 gauge cold rolled steel, textured steel, aluminum or stainless steel.
- Enclosure and accessories are available in standard baked enamel (electrostatically applied) decorator colors or custom colors selected by the customer.



CLASSIC ENCLOSURE STYLES, HEIGHTS AND DEPTHS

CONTENTS

The standard Classic Enclosure and "J" Classic Enclosure have similar enclosure heights, depths and lengths. The designations for the depths are listed as "2" ($3\frac{9}{16}$), "3" ($4\frac{3}{8}$) and "4" ($5\frac{5}{16}$). All styles can be installed with either partial or full backplate. Standard brackets with bracket mounted hangers or water brackets are available for either the standard wiped edge or "J" slip-jointed enclosures. In situations where standard wiped edge Classic Enclosures have to be field cut, the "J" Classic overlapping accessories can be used to cover the area which has been altered. Consult factory for enclosure heights not shown.

STYLE	DESIGN	PG.	STYLE	DESIGN	PG.	STYLE	DESIGN	PG.
JV2 V2 11		4	JV3 JV4 ARS		12	JV3 JV4 V4 V3 EI		24
JV3 JV4 V4 V3 7		5	JV4 ARDS		17	JV4 V4 PM PM2		27
JV3 V3 14		7	JV3 JV4 V4 V3 10LI		20	TR		32
JV4 V4		8	JV3 JV4 V4 V3 LI		22	B/P SUPT		33
						PIPE ENCL		35

SPECIFICATIONS

ENCLOSURE

Classic Architectural.
Types Standard Classic Wiped Edge "J" Classic Slip-Jointed.
Styles Wall Mounted, Floor Mounted, Pedestal Mounted, Top Discharge, Extruded Aluminum Grille.
Offsets "4" = $5\frac{5}{16}$, "3" = $4\frac{3}{8}$, "2" = $3\frac{9}{16}$
Heights 7", 11", 14", 20", 24" nominal.
Lengths 2' thru 8' in 6" increments.
Materials Consult factory for special lengths. C.R.S. 16 gauge standard, 14 optional; Aluminum 14 gauge, 12 gauge available; Stainless Steel 16 and 14 gauge in "J" Style only.
Finish Electrostatically applied baked enamel.
Colors 10 standard colors. Consult factory for custom color matches.

BACKPLATES

Type Partial standard, full height optional.
Lengths Partial 8' only. Full 2' thru 8' in 6" increments.
Materials Partial 20 gauge, pre-painted standard; 18 gauge galvanized optional. Full 20 gauge galvanized, 18 gauge galvanized optional. Consult factory for painted finish.

ELEMENT RATINGS

Ratings are in BTU per hour, per lineal feet of active fin length. Active length is catalog length minus 4" for Copper, 5" for Steel.

ELEMENTS

Mechanically expanded. Copper tube aluminum fin, steel tube steel fin.
Types
Lengths 2' thru 12'6" in 1", 1 $\frac{1}{4}$ " CU/AL and 1", 1 $\frac{1}{4}$ ", 2" steel element. 2' thru 8' on $\frac{3}{4}$ " CU/ALUM element, all in 1" increments.
End Conditions Note: Elements VR01 thru VR10 available in 12" increments. CU/AL - Swaged one end. Swaged both ends optional. Steel - NPT threads standard. Chamfered for field welding optional.

BRACKETS/ HANGERS

Ball bearing with slide cradle adjustable for pitch or fixed for water systems. Die-formed channel type galvanized steel construction with enclosure securing posi-lock clips.

DAMPERS

Fully modulating damper blades with lateral stiffening bends or rolls operated by dial or concealed key operators (slide damper available in "4" offset enclosures).

ACCESSORIES

Standard Classic accessories will telescope internally inside the enclosure. "J" style Classic accessories will overlap the enclosure. All accessories will engage between the top of the backplate and the wall, while the bottom will return to the wall and be secured, utilizing the prepunched clearance holes for fasteners by others.

AIR SEAL

Optional air seal, factory or field installed, on back of backplate. Material is $\frac{1}{8}$ " x $\frac{3}{8}$ " closed cell with adhesive back.

STYLES V2 & JV2 "AR" CLASSIC SLIMLINE

STYLES

V2-AR-11 and JV2-AR-11

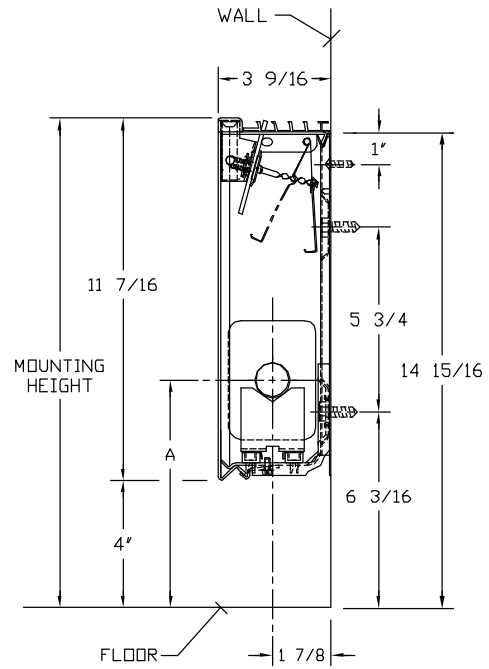
(Specify when used with steam, wall mounted brackets may be required.) Optional Dial Damper shown.

ACCESSORIES

V - Underlapping Reveal Type

JV - Overlapping Type

ELEMENT TUBE SIZE	FIN HEIGHT	CRADLE NO.	A
3/4" COPPER	2-1/2	1	6-5/16
3/4" COPPER	3-3/4	2	7
1" COPPER	2-1/2	1	6-1/2
1" COPPER	3-3/4	2	7-3/16
1" COPPER	5	3A	7-1/2
1-1/4" COPPER	3-3/4	2	7-5/16
1-1/4" COPPER	5	3A	7-11/16
1" STEEL	3-3/4	2	7-5/16
1" STEEL	5	3A	7-11/16
1-1/4" STEEL	3-3/4	2	7-1/2
1-1/4" STEEL	5	3A	7-15/16




CAT-39120F MOD

STYLES V2-AR-11 & JV2-AR-11

STEEL ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
1"	†VR11	2-3/4 x 3-3/4	40	0.024"	11	1	15-7/16	760	660	600	530	470	410	350
1"	†VR12	2-3/4 x 5	40	0.024"	11	1	"	820	710	640	570	510	440	370
1"	†VR15	2-3/4 x 5	50	0.024"	11	1	"	930	800	730	650	570	500	420
1-1/4"	†VR13	2-3/4 x 5	40	0.024"	11	1	"	780	680	610	540	480	420	360
1-1/4"	†VR16	2-3/4 x 5	50	0.024"	11	1	"	900	780	710	630	550	480	410

†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
3/4"	VR01	2-1/4 x 2-1/2	50	0.011	11	1	15 7/16	780	680	610	540	480	420	360
3/4"	VR02	2-3/4 x 2-1/2	60	0.011	11	"	"	1030	890	810	720	630	550	470
3/4"	VR04	2-3/4 x 3-3/4	50	0.011	11	"	"	1060	920	830	740	650	570	480
1"	VR03	2-3/4 x 2-1/2	55	0.011	11	"	"	1000	860	780	690	610	530	450
1"	VR05	2-3/4 x 3-3/4	50	0.011	11	"	"	1010	870	790	700	620	540	460
1"	VR06	2-3/4 x 5	40	0.020	11	"	"	1130	980	890	780	690	600	510
1"	VR07	2-3/4 x 5	50	0.020	11	"	"	1170	1010	920	810	720	630	530
1-1/4"	VR08	2-3/4 x 3-3/4	50	0.020	11	"	"	1140	990	890	790	700	610	520

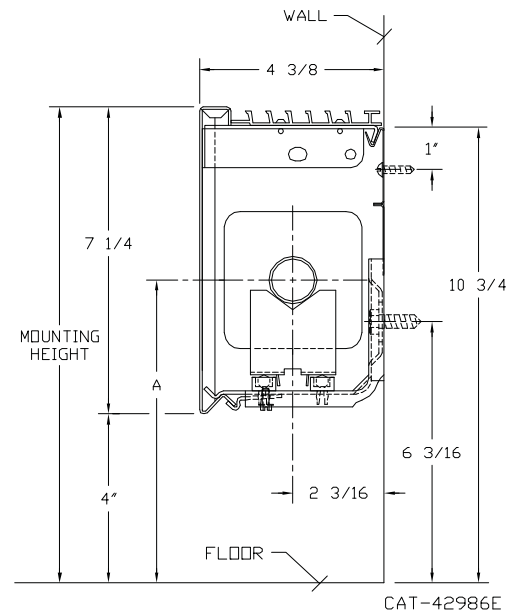
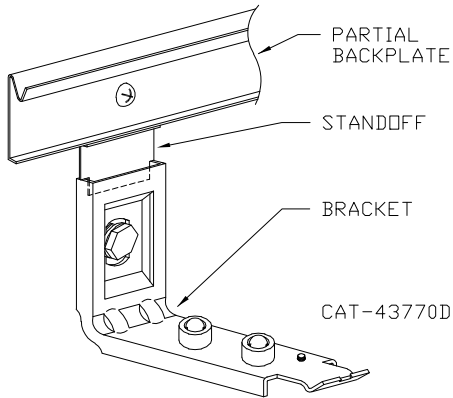
► Bold, italicized units are  rated ◀

STYLES V3 & JV3, V4 & JV4 "AR" CLASSIC LOW PROFILE

STYLES

V3-AR-LP7 and JV3-AR-LP7

ELEMENT TUBE SIZE	CRADLE NO.	A
3/4" COPPER	2	7
1" COPPER	2	7-3/16
1-1/4" COPPER	1	8-5/8
1-1/4" STEEL	1	6-13/16

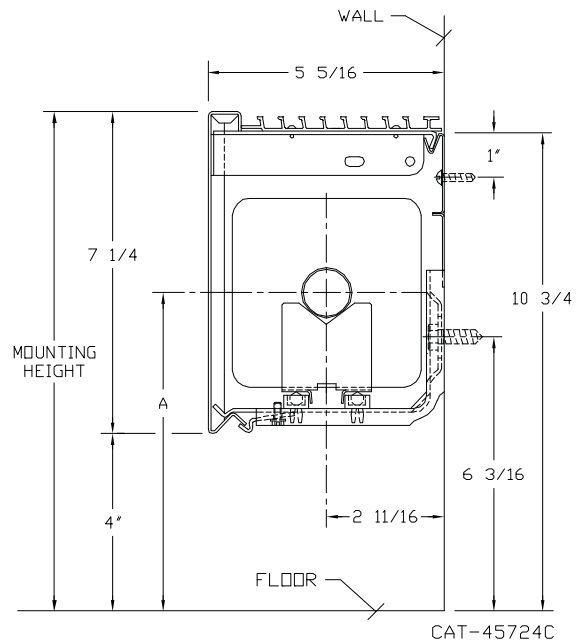


STYLES

V4-AR-LP7 and JV4-AR-LP7

Designed for use exclusively with hot water systems in buildings with window sill conditions low to the floor.

ELEMENT TUBE SIZE	CRADLE NO.	A
3/4" COPPER	2	7
1" COPPER	2	7-3/16
1-1/4" COPPER	2	7-5/16
1-1/4" STEEL	2	7-1/2
2" STEEL	1	7-1/4



ACCESSORIES

V3, V4 - Underlapping Reveal Type

JV3, JV4 - Overlapping Type

STYLES V3 & JV3, V4 & JV4 "AR" CLASSIC LOW PROFILE

STEEL ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		FACTOR					
								200°	190°	180°	170°	160°	150°	
1-1/4"	†VS133	3-1/4" SQ.	32	0.032"	7-1/4	1	11-1/4	770	660	600	530	470	410	350
1-1/4"	†VS134	3-1/4" SQ.	40	0.032"	"	1	11-1/4	870	750	680	600	530	460	390
1-1/4"	†VS143	4-1/4" SQ.	32	0.032"	7-1/4	1	11-1/4	1090	940	850	750	660	580	490
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	"	1	11-1/4	1210	1040	940	830	740	640	540
2"	†VS242	4-1/4" SQ.	25	0.032"	"	1	11-1/4	950	820	740	660	580	500	430
2"	†VS243	4-1/4" SQ.	32	0.032"	"	1	11-1/4	1130	970	880	780	690	600	510

†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		FACTOR					
								200°	190°	180°	170°	160°	150°	
3/4"	VC3/4-34	3-1/4" SQ.	40	0.020"	7-1/4	1	11-1/4	1000	860	780	690	610	530	450
3/4"	VC3/4-35	3-1/4" SQ.	50	0.020"	"	"	11-1/4	1010	870	790	700	620	540	450
1"	VC33	3-1/4" SQ.	32	0.020"	"	"	11-1/4	840	720	660	580	510	450	380
1"	VC34	3-1/4" SQ.	40	0.020"	"	"	11-1/4	970	830	760	670	590	510	440
1"	VC35	3-1/4" SQ.	50	0.020"	"	"	11-1/4	980	840	760	680	600	520	440
1-1/4"	VC133	3-1/4" SQ.	32	0.020"	"	"	11-1/4	810	700	630	560	490	430	360
1-1/4"	VC134	3-1/4" SQ.	40	0.020"	"	"	11-1/4	930	800	730	640	570	490	420
1-1/4"	VC135	3-1/4" SQ.	50	0.020"	"	"	11-1/4	940	810	730	650	570	500	420
3/4"	VC3/4-34	4-1/4 x 3-5/8	40	0.020"	7-1/4	"	11-1/4	1240	1070	970	860	760	660	560
3/4"	VC3/4-35	4-1/4 x 3-5/8	50	0.020"	"	"	11-1/4	1320	1140	1030	910	810	700	590
1"	VC433	4-1/4 x 3-5/8	32	0.020"	"	"	11-1/4	1150	990	900	790	700	610	520
1"	VC434	4-1/4 x 3-5/8	40	0.020"	"	"	11-1/4	1260	1080	980	870	770	670	570
1"	VC435	4-1/4 x 3-5/8	50	0.020"	"	"	11-1/4	1360	1170	1060	940	830	720	610
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	"	"	11-1/4	1120	960	870	770	680	590	500
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	"	"	11-1/4	1240	1070	970	860	760	660	560
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	"	"	11-1/4	1330	1140	1040	920	810	700	600
1"	VC43	4-1/4" SQ.	32	0.020"	"	"	11-1/4	1260	1080	980	870	770	670	570
1"	VC44	4-1/4" SQ.	40	0.020"	"	"	11-1/4	1390	1200	1080	960	850	740	630
1"	VC45	4-1/4" SQ.	50	0.020"	"	"	11-1/4	1410	1210	1100	970	860	750	630
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	"	"	11-1/4	1230	1060	960	850	750	650	550
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	"	"	11-1/4	1370	1180	1070	950	840	730	620
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	"	"	11-1/4	1390	1200	1080	960	850	740	630

NOTES: 1. See Element Ordering Information at bottom of page 27.

STYLES V3 & JV3 "AR" CLASSIC

STYLES

V3-AR-14 and JV3-AR-14

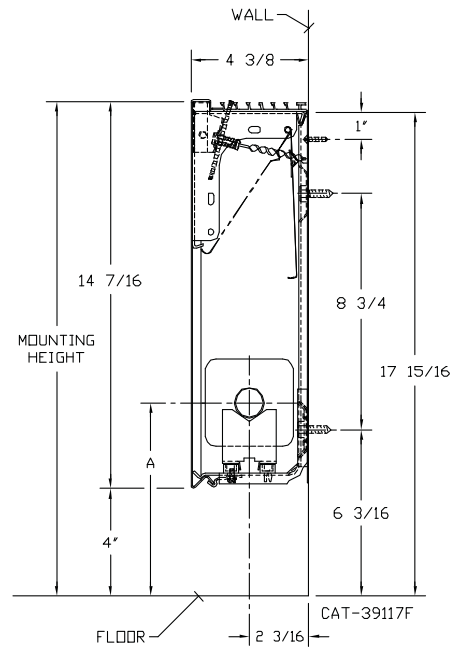
Optional Dial Damper shown.

ACCESSORIES

V3 - Underlapping Reveal Type

JV3 - Overlapping Type

ELEMENT TUBE SIZE	CRADLE NO.	A
3/4" COPPER	2	7
1" COPPER	2	7-3/16
1-1/4" COPPER	1	7-5/8
1-1/4" STEEL	1	6-13/16




STYLES V3-AR-14 & JV3-AR-14

STEEL ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
1-1/4"	†VS133	3-1/4" SQ.	32	0.032"	14	1	18-7/16	1.00	0.86	0.78	0.69	0.61	0.53	0.45
1-1/4"	†VS134	3-1/4" SQ.	40	0.032"	14	1	18-7/16	870	750	680	600	530	460	390
1-1/4"								980	840	760	680	600	520	440

†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

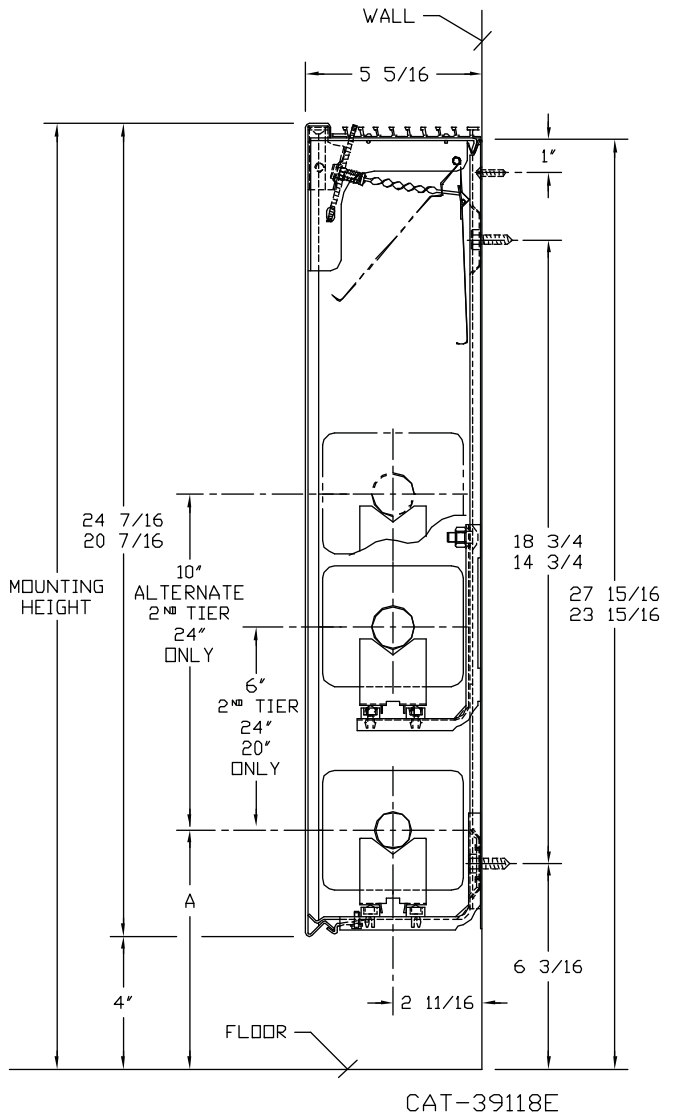
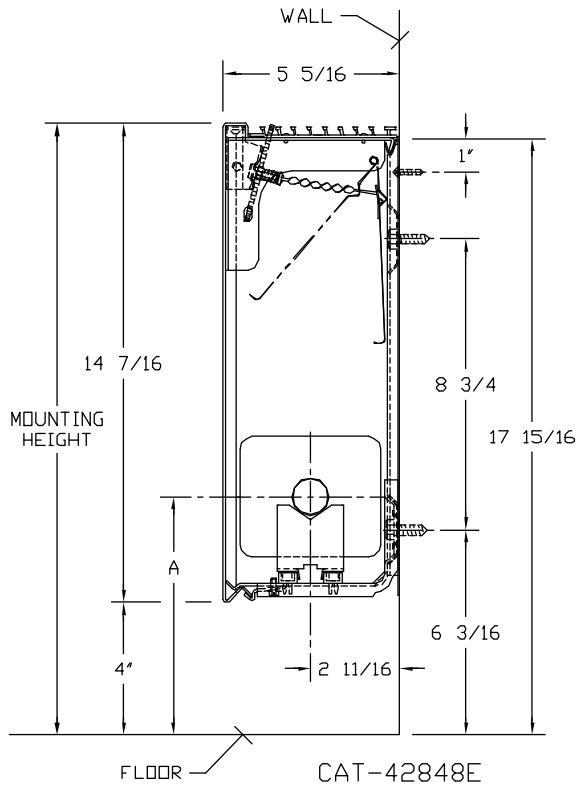
COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
3/4"	VC3/4-33	3-1/4" SQ.	32	0.020	14	1	18-7/16	1050	900	820	720	640	560	470
3/4"	VC3/4-34	3-1/4" SQ.	40	0.020	14	"	"	1230	1060	960	850	750	650	550
3/4"	VC3/4-35	3-1/4" SQ.	50	0.020	14	"	"	1370	1180	1070	950	840	730	620
1"	VC33	3-1/4" SQ.	55	0.020	14	"	"	1130	970	880	780	690	600	510
1"	VC34	3-1/4" SQ.	50	0.020	14	"	"	1270	1090	990	880	770	670	570
1"	VC35	3-1/4" SQ.	50	0.020	14	"	"	1320	1140	1030	910	810	700	590
1-1/4"	VC133	3-1/4" SQ.	32	0.020	14	"	"	960	830	750	660	590	510	430
1-1/4"	VC134	3-1/4" SQ.	40	0.020	14	"	"	1130	970	880	780	690	600	510
1-1/4"	VC135	3-1/4" SQ.	50	0.020	14	"	"	1270	1090	990	880	770	670	570

► Bold, italicized units are  rated ◀

STYLES V4 & JV4 "AR" CLASSIC

STYLES V4 & JV4-AR-20, 24

STYLE V4 & JV4-AR-14



ELEMENT TUBE SIZE	CRADLE NO.	A
3/4" COPPER	2	7
1" COPPER	2	7-3/16
1-1/4" COPPER	2	7-5/16
1-1/4" STEEL	2	7-1/2
2" STEEL	1	7-1/4

Optional Dial Damper shown.

STYLES V4 & JV4 "AR" CLASSIC

STEEL ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		1.00	0.86	0.78	0.69	0.61	0.53
1-1/4"	†VS143	4-1/4" SQ.	32	0.032"	14	1	18-7/16	1200	1030	940	830	730	640	540
					20	1	24-7/16	1260	1080	980	870	770	670	570
					"	2-6 CL	"	2060	1770	1610	1420	1260	1090	930
					24	1	28-7/16	1300	1120	1010	900	790	690	580
					"	2-6 CL	"	2100	1810	1640	1450	1280	1110	950
					"	2-10 CL	"	2180	1880	1700	1500	1330	1160	980
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	14	1	18-7/16	1430	1230	1120	990	870	760	640
					20	1	24-7/16	1520	1310	1190	1050	930	810	680
					"	2-6 CL	"	2240	1930	1750	1550	1370	1190	1010
					24	1	28-7/16	1590	1370	1240	1100	970	840	720
					"	2-6 CL	"	2300	1980	1790	1590	1400	1210	1040
					"	2-10 CL	"	2460	2120	1920	1700	1500	1300	1110
2"	†VS242	4-1/4" SQ.	25	0.032"	14	1	18-7/16	1090	940	850	750	670	580	490
					20	1	24-7/16	1130	970	880	780	690	600	510
					"	2-6 CL	"	1830	1570	1430	1260	1120	970	820
					24	1	28-7/16	1150	990	900	790	700	610	520
					"	2-6 CL	"	1850	1590	1440	1280	1130	980	830
					"	2-10 CL	"	1960	1690	1530	1350	1200	1040	880
2"	†VS243	4-1/4" SQ.	32	0.032"	14	1	18-7/16	1290	1110	1010	890	790	680	580
					20	1	24-7/16	1330	1140	1040	920	810	710	600
					"	2-6 CL	"	2030	1750	1580	1400	1240	1080	910
					24	1	28-7/16	1380	1190	1080	950	840	730	620
					"	2-6 CL	"	2060	1770	1610	1420	1260	1090	930
					"	2-10 CL	"	2210	1900	1720	1530	1350	1170	1000

†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

ACCESSORIES


V4 - Underlapping Reveal Type

JV4 - Overlapping Type

Bracket arrangement and requirements: Water brackets are to be used when there is no pitch adjustment required on the job. These brackets are designed specifically for water jobs.

STYLES V4 & JV4 "AR" CLASSIC

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.) FACTOR					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
3/4"	VC3/4-434	4-1/4 x 3-5/8	40	0.020"	14	1	18-7/16	1620	1390	1260	1120	990	860	730
					20	1	24-7/16	1710	1470	1330	1180	1040	910	770
					"	2-6 CL	"	2390	2060	1860	1650	1460	1270	1080
					24	1	28-7/16	1800	1550	1400	1240	1100	950	810
					"	2-6 CL	"	2490	2140	1940	1720	1520	1320	1120
					"	2-10 CL	"	2550	2190	1990	1760	1560	1350	1150
3/4"	VC3/4-435	4-1/4 x 3-5/8	50	0.020"	14	1	18-7/16	1780	1530	1390	1230	1090	940	800
					20	1	24-7/16	1940	1670	1510	1340	1180	1030	870
					"	2-6 CL	"	2400	2060	1870	1660	1460	1270	1080
					24	1	28-7/16	2080	1790	1620	1440	1270	1100	940
					"	2-6 CL	"	2530	2180	1970	1750	1540	1340	1140
					"	2-10 CL	"	2660	2290	2070	1840	1620	1410	1200
1"	VC433	4-1/4 x 3-5/8	32	0.020"	14	1	18-7/16	1410	1210	1100	970	860	750	630
					20	1	24-7/16	1450	1250	1130	1000	880	770	650
					"	2-6 CL	"	2320	2000	1810	1600	1420	1230	1040
					24	1	28-7/16	1480	1270	1150	1020	900	780	670
					"	2-6 CL	"	2410	2070	1880	1660	1470	1280	1080
					"	2-10 CL	"	2460	2120	1920	1700	1500	1300	1110
1"	VC434	4-1/4 x 3-5/8	40	0.020"	14	1	18-7/16	1690	1450	1320	1170	1030	900	760
					20	1	24-7/16	1800	1550	1400	1240	1100	950	810
					"	2-6 CL	"	2510	2160	1960	1730	1530	1330	1130
					24	1	28-7/16	1890	1630	1470	1300	1150	1000	850
					"	2-6 CL	"	2660	2290	2070	1840	1620	1410	1200
					"	2-10 CL	"	2770	2380	2160	1910	1690	1470	1250
1"	VC435	4-1/4 x 3-5/8	50	0.020"	14	1	18-7/16	1850	1590	1440	1280	1130	980	830
					20	1	24-7/16	2030	1750	1580	1400	1240	1080	910
					"	2-6 CL	"	2510	2160	1960	1730	1530	1330	1130
					24	1	28-7/16	2170	1870	1690	1500	1320	1150	980
					"	2-6 CL	"	2660	2290	2070	1840	1620	1410	1200
					"	2-10 CL	"	2770	2380	2160	1910	1690	1470	1250
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	14	1	18-7/16	1380	1190	1080	950	840	730	620
					20	1	24-7/16	1420	1220	1110	980	870	750	640
					"	2-6 CL	"	2280	1960	1780	1570	1390	1210	1030
					24	1	28-7/16	1450	1250	1130	1000	880	770	650
					"	2-6 CL	"	2370	2040	1850	1640	1450	1260	1070
					"	2-10 CL	"	2410	2070	1880	1660	1470	1280	1080
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	14	1	18-7/16	1660	1430	1290	1150	1010	880	750
					20	1	24-7/16	1760	1510	1370	1210	1070	930	790
					"	2-6 CL	"	2460	2120	1920	1700	1500	1300	1110
					24	1	28-7/16	1850	1590	1440	1280	1130	980	830
					"	2-6 CL	"	2600	2240	2030	1790	1590	1380	1170
					"	2-10 CL	"	2730	2350	2130	1880	1670	1450	1230
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	14	1	18-7/16	1760	1510	1370	1210	1070	930	790
					20	1	24-7/16	1920	1650	1500	1330	1170	1020	860
					"	2-6 CL	"	2370	2040	1850	1640	1450	1260	1070
					24	1	28-7/16	2050	1760	1600	1420	1250	1090	920
					"	2-6 CL	"	2500	2150	1950	1730	1530	1330	1130
					"	2-10 CL	"	2630	2260	2050	1820	1600	1390	1180

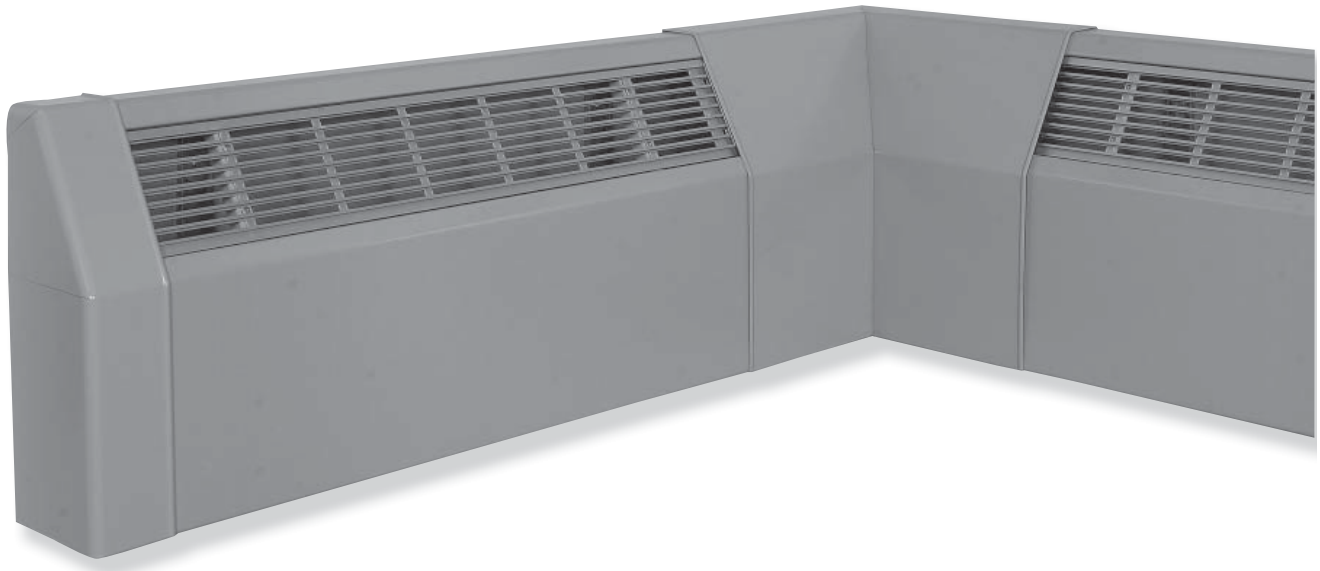
► Bold, italicized units are  rated ◀

STYLES V4 & JV4 "AR" CLASSIC

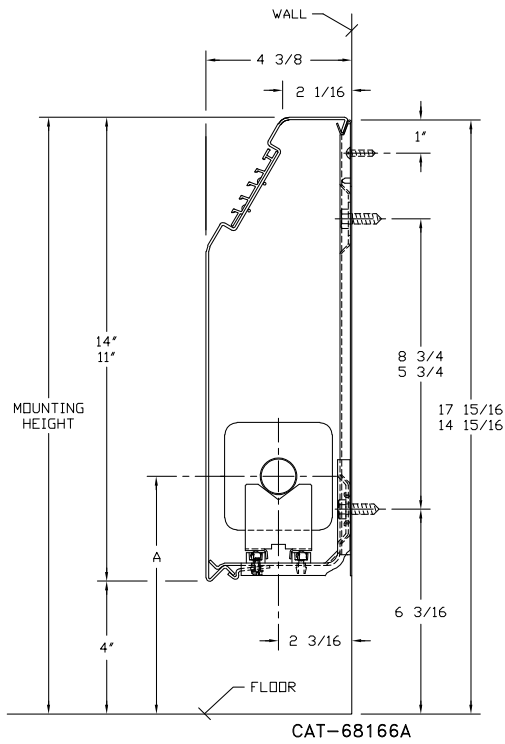
COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.) FACTOR					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
1"	VC43	4-1/4" SQ.	32	0.020"	14	1	18-7/16	1470	1260	1150	1010	900	780	660
					20	1	24-7/16	1540	1320	1200	1060	940	820	690
					"	2-6 CL	"	2340	2010	1830	1610	1430	1240	1050
					24	1	28-7/16	1580	1360	1230	1090	960	840	710
					"	2-6 CL	"	2440	2100	1900	1680	1490	1290	1100
					"	2-10 CL	"	2490	2140	1940	1720	1520	1320	1120
1"	VC44	4-1/4" SQ.	40	0.020"	14	1	18-7/16	1720	1480	1340	1190	1050	910	770
					20	1	24-7/16	1810	1560	1410	1250	1100	960	810
					"	2-6 CL	"	2510	2160	1960	1730	1530	1330	1130
					24	1	28-7/16	1920	1650	1500	1320	1170	1020	860
					"	2-6 CL	"	2600	2240	2030	1790	1590	1380	1170
					"	2-10 CL	"	2660	2290	2070	1840	1620	1410	1200
1"	VC45	4-1/4" SQ.	50	0.020"	14	1	18-7/16	1900	1630	1480	1310	1160	1010	860
					20	1	24-7/16	2090	1800	1630	1440	1270	1110	940
					"	2-6 CL	"	2510	2160	1960	1730	1530	1330	1130
					24	1	28-7/16	2250	1940	1760	1550	1370	1190	1010
					"	2-6 CL	"	2710	2330	2110	1870	1650	1440	1220
					"	2-10 CL	"	2830	2430	2210	1950	1730	1500	1270
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	14	1	18-7/16	1440	1240	1120	990	880	760	650
					20	1	24-7/16	1510	1300	1180	1040	920	800	680
					"	2-6 CL	"	2300	1980	1790	1590	1400	1220	1040
					24	1	28-7/16	1550	1330	1210	1070	950	820	700
					"	2-6 CL	"	2390	2060	1860	1650	1460	1270	1080
					"	2-10 CL	"	2440	2100	1900	1680	1490	1290	1100
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	14	1	18-7/16	1690	1450	1320	1170	1030	900	760
					20	1	24-7/16	1780	1530	1390	1230	1090	940	800
					"	2-6 CL	"	2460	2120	1920	1700	1500	1300	1110
					24	1	28-7/16	1890	1630	1470	1300	1150	1000	850
					"	2-6 CL	"	2550	2190	1990	1760	1560	1350	1150
					"	2-10 CL	"	2620	2250	2040	1810	1600	1390	1180
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	14	1	18-7/16	1870	1610	1460	1290	1140	990	840
					20	1	24-7/16	2050	1760	1600	1410	1250	1090	920
					"	2-6 CL	"	2460	2120	1920	1700	1500	1300	1110
					24	1	28-7/16	2210	1900	1720	1520	1350	1170	990
					"	2-6 CL	"	2650	2280	2070	1830	1620	1400	1190
					"	2-10 CL	"	2780	2390	2170	1920	1700	1470	1250

NOTES: 1. See Element Ordering Information at bottom of page 27.

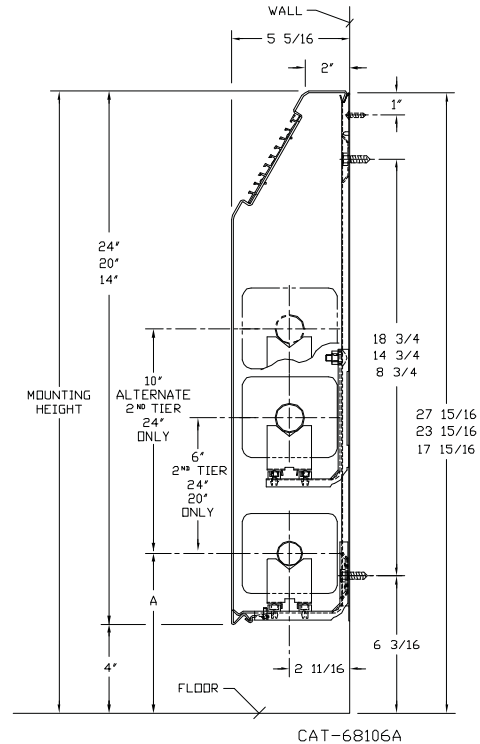
STYLES JV3 & JV4 "ARS" CLASSIC SLOPE



JV3-ARS



JV4-ARS



ELEMENT TUBE SIZE	CRADLE NO.	WITH WATER BRACKET (SHOWN)	ARS-14 WITH BRACKET MOUNTED HANGER	
		A	A MIN.	A MAX.
3/4" COPPER	2	7	7-3/8	9-5/8
1" COPPER	2	7-13/16	7-1/2	9-3/4
1-1/4" COPPER	1	6-5/8	7	9-1/4
1-1/4" STEEL	1	6-13/16	7-7/8	10-1/8

ELEMENT TUBE SIZE	CRADLE NO.	A MIN.	A MAX.
3/4" COPPER	2	7-3/8	8-3/4
1" COPPER	2	7-1/2	8-7/8
1-1/4" COPPER	2	7-5/8	9
1-1/4" STEEL	2	7-7/8	9-1/4
2" STEEL	1	7-5/8	9

See page 35 for element center line dimensions with water bracket installation.

STYLES JV3 & JV4 "ARS" CLASSIC SLOPE

STEEL ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		FACTOR					
								1.00	0.86	0.78	0.69	0.61	0.53	0.45
1"	†VR11	2-3/4" x 3-3/4"	40	0.024"	11	1	15	1290	1110	1010	890	790	680	580
1-1/4"	†VS133	3-1/4" SQ.	32	0.032"	"	1	15	920	790	720	640	560	490	410
1-1/4"	†VS134	3-1/4" SQ.	40	0.032"	"	1	15	1000	860	780	690	610	530	450
1-1/4"	†VS133	3-1/4" SQ.	32	0.032"	14	1	18	960	830	750	660	590	510	430
1-1/4"	†VS134	3-1/4" SQ.	40	0.032"	14	1	18	1120	960	870	770	680	590	500
1-1/4"	VS143	4-1/4" SQ.	32	0.032"	14	1	18	1400	1200	1090	970	850	740	630
					20	1	24	1450	1250	1130	1000	880	770	650
					"	2-6 CL	"	2180	1870	1700	1500	1330	1160	980
					24	1	28	1490	1280	1160	1030	910	790	670
					"	2-6 CL	"	2250	1940	1760	1550	1370	1190	1010
					"	2-10 CL	"	2280	1960	1780	1570	1390	1210	1030
1-1/4"	VS144	4-1/4" SQ.	40	0.032"	14	1	18	1570	1350	1230	1080	960	830	710
					20	1	24	1670	1440	1300	1150	1020	890	750
					"	2-6 CL	"	2370	2040	1850	1640	1450	1260	1070
					24	1	28	1730	1490	1350	1190	1060	920	780
					"	2-6 CL	"	2480	2130	1930	1710	1510	1310	1120
"	2-10 CL	"	2530	2180	1970	1750	1540	1340	1140					
2"	VS242	4-1/4" SQ.	25	0.032"	14	1	18	1200	1030	940	830	730	640	540
					20	1	24	1230	1060	960	850	750	650	550
					"	2-6 CL	"	1930	1660	1510	1330	1180	1020	870
					24	1	28	1250	1080	980	860	760	660	560
					"	2-6 CL	"	1940	1670	1510	1340	1180	1030	870
"	2-10 CL	"	2010	1730	1570	1390	1230	1070	910					
2"	VS243	4-1/4" SQ.	32	0.032"	14	1	18	1400	1200	1090	970	850	740	630
					20	1	24	1450	1250	1130	1000	890	770	650
					"	2-6 CL	"	2110	1820	1650	1460	1290	1120	950
					24	1	28	1490	1280	1160	1030	910	790	670
					"	2-6 CL	"	2180	1880	1700	1500	1330	1160	980
"	2-10 CL	"	2260	1940	1760	1560	1380	1200	1020					

†NOTES: 1. Steel fin furnished as .032 unless otherwise specified, consult factory.
 2. NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

STYLES JV3 & JV4 "ARS" CLASSIC SLOPE

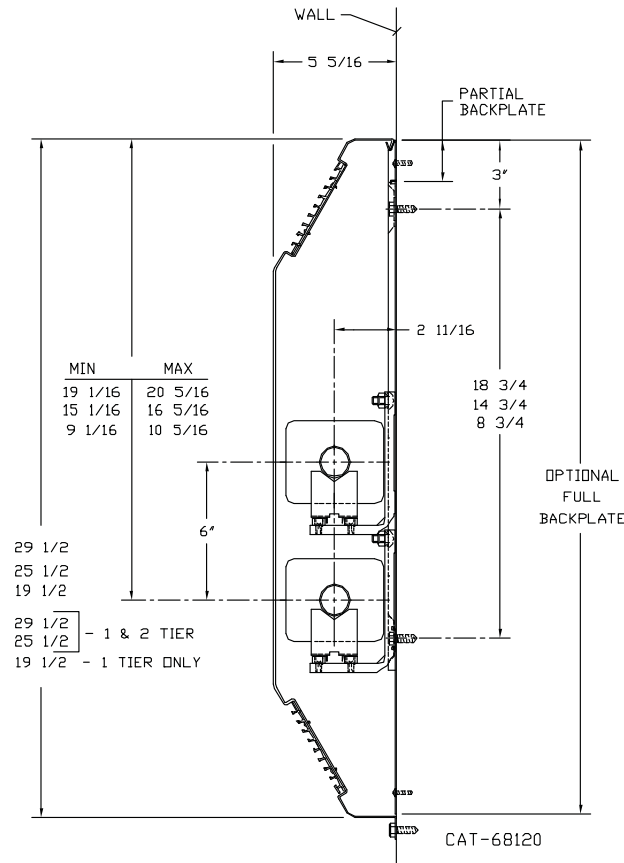
COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		1.00	0.86	0.78	0.69	0.61	0.53
3/4"	VC3/4-34	3-1/4" SQ.	40	0.020"	11	1	15	1180	1010	920	810	720	630	530
3/4"	VC3/4-35	3-1/4" SQ.	50	0.020"	"	"	"	1320	1140	1030	910	810	700	590
1"	VC33	3-1/4" SQ.	32	0.020"	"	"	"	980	840	760	680	600	520	440
1"	VC34	3-1/4" SQ.	40	0.020"	"	"	"	1150	990	900	790	700	610	520
1"	VC35	3-1/4" SQ.	50	0.020"	"	"	"	1260	1080	980	870	770	670	570
1-1/4"	VC133	3-1/4" SQ.	32	0.020"	"	"	"	920	790	720	630	560	490	410
1-1/4"	VC134	3-1/4" SQ.	40	0.020"	"	"	"	1080	930	840	750	660	570	490
1-1/4"	VC135	3-1/4" SQ.	50	0.020"	"	"	"	1190	1020	930	820	730	630	540
3/4"	VR01	2-1/4 x 2-1/2	50	0.011"	"	"	"	710	610	550	490	430	380	320
3/4"	VR02	2-3/4 x 2-1/2	60	0.011"	"	"	"	950	820	740	660	580	500	430
3/4"	VR04	2-3/4 x 3-3/4	50	0.011"	"	"	"	980	840	760	680	600	520	440
1"	VR05	2-3/4 x 3-3/4	50	0.011"	"	"	"	990	850	770	680	600	520	450
1"	VR03	2-3/4 x 2-1/2	55	0.011"	"	"	"	920	790	720	630	560	490	410
3/4"	VC3/4-34	3-1/4" SQ.	40	0.020"	14	1	18	1290	1110	1010	890	790	680	580
3/4"	VC3/4-35	3-1/4" SQ.	50	0.020"	"	"	"	1440	1240	1120	990	880	760	650
1"	VC33	3-1/4" SQ.	32	0.020"	"	"	"	1060	910	830	730	650	560	480
1"	VC34	3-1/4" SQ.	40	0.020"	"	"	"	1250	1080	980	860	760	660	560
1"	VC35	3-1/4" SQ.	50	0.020"	"	"	"	1370	1180	1070	950	840	730	620
1-1/4"	VC133	3-1/4" SQ.	32	0.020"	"	"	"	1020	880	800	700	620	540	460
1-1/4"	VC134	3-1/4" SQ.	40	0.020"	"	"	"	1190	1020	930	820	730	630	540
1-1/4"	VC135	3-1/4" SQ.	50	0.020"	"	"	"	1330	1140	1040	920	810	700	600
3/4"	VC3/4-434	4-1/4 x 3-5/8	40	0.020"	14	1	18	1700	1460	1330	1170	1040	900	770
					20	1	24	1820	1570	1420	1260	1110	960	820
					"	2-6 CL	"	2580	2220	2010	1780	1570	1370	1160
					24	1	28	1910	1640	1490	1320	1170	1010	860
					"	2-6 CL	"	2700	2320	2110	1860	1650	1430	1220
"	2-10 CL	"	2780	2390	2170	1920	1700	1470	1250					
3/4"	VC3/4-435	4-1/4 x 3-5/8	50	0.020"	14	1	18	1840	1580	1440	1270	1120	980	830
					20	1	24	2090	1800	1630	1440	1270	1110	940
					"	2-6 CL	"	2820	2430	2200	1950	1720	1490	1270
					24	1	28	2260	1940	1760	1560	1380	1200	1020
					"	2-6 CL	"	3110	2670	2430	2150	1900	1650	1400
"	2-10 CL	"	3220	2770	2510	2220	1960	1710	1450					
1"	VC433	4-1/4 x 3-5/8	32	0.020"	14	1	18	1540	1320	1200	1060	940	820	690
					20	1	24	1620	1390	1260	1120	990	860	730
					"	2-6 CL	"	2500	2150	1950	1730	1530	1330	1130
					24	1	28	1690	1450	1320	1170	1030	900	760
					"	2-6 CL	"	2590	2230	2020	1790	1580	1370	1170
"	2-10 CL	"	2640	2270	2060	1820	1610	1400	1190					
1"	VC434	4-1/4 x 3-5/8	40	0.020"	14	1	18	1780	1530	1390	1230	1090	940	800
					20	1	24	1900	1630	1480	1310	1160	1010	860
					"	2-6 CL	"	2660	2290	2070	1840	1620	1410	1200
					24	1	28	1990	1710	1550	1370	1210	1050	900
					"	2-6 CL	"	2770	2380	2160	1910	1690	1470	1250
"	2-10 CL	"	2850	2450	2220	1970	1740	1510	1280					
1"	VC435	4-1/4 x 3-5/8	50	0.020"	14	1	18	1930	1660	1510	1330	1180	1020	870
					20	1	24	2180	1870	1700	1500	1330	1160	980
					"	2-6 CL	"	2640	2270	2060	1820	1610	1400	1190
					24	1	28	2360	2030	1840	1630	1440	1250	1060
					"	2-6 CL	"	2910	2500	2270	2010	1780	1540	1310
"	2-10 CL	"	3000	2580	2340	2070	1830	1590	1350					

STYLES JV3 & JV4 "ARS" CLASSIC SLOPE

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		1.00	0.86	0.78	0.69	0.61	0.53
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	14	1	18	1450	1250	1130	1000	880	770	650
					20	1	24	1530	1320	1190	1060	930	810	690
					"	2-6 CL	"	2360	2030	1840	1630	1440	1250	1060
					24	1	28	1590	1370	1240	1100	970	840	720
					"	2-6 CL	"	2450	2110	1910	1690	1490	1300	1100
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	14	1	18	1740	1500	1360	1200	1060	920	780
					20	1	24	1880	1620	1470	1300	1150	1000	850
					"	2-6 CL	"	2610	2240	2040	1800	1590	1380	1170
					24	1	28	1950	1680	1520	1350	1190	1030	880
					"	2-6 CL	"	2710	2330	2110	1870	1650	1440	1220
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	14	1	18	1860	1600	1450	1280	1130	990	840
					20	1	24	2130	1830	1660	1470	1300	1130	960
					"	2-6 CL	"	2510	2160	1960	1730	1530	1330	1130
					24	1	28	2270	1950	1770	1570	1380	1200	1020
					"	2-6 CL	"	2810	2420	2190	1940	1710	1490	1260
1"	VC43	4-1/4" SQ.	32	0.020"	14	1	18	1650	1420	1290	1140	1010	880	740
					20	1	24	1740	1500	1360	1200	1060	920	780
					"	2-6 CL	"	2590	2230	2020	1790	1580	1370	1170
					24	1	28	1810	1560	1410	1250	1100	960	820
					"	2-6 CL	"	2830	2430	2210	1950	1730	1500	1270
1"	VC44	4-1/4" SQ.	40	0.020"	14	1	18	1880	1620	1470	1300	1150	1000	850
					20	1	24	2040	1750	1590	1410	1240	1080	920
					"	2-6 CL	"	2690	2310	2100	1860	1640	1430	1210
					24	1	28	2140	1840	1670	1480	1310	1130	960
					"	2-6 CL	"	2920	2510	2280	2010	1780	1550	1310
1"	VC45	4-1/4" SQ.	50	0.020"	14	1	18	2060	1770	1610	1420	1260	1090	930
					20	1	24	2340	2010	1830	1610	1430	1240	1050
					"	2-6 CL	"	2680	2300	2090	1850	1630	1420	1210
					24	1	28	2510	2160	1960	1730	1530	1330	1130
					"	2-6 CL	"	3000	2580	2340	2070	1830	1590	1350
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	14	1	18	1620	1390	1260	1120	990	860	730
					20	1	24	1710	1470	1330	1180	1040	910	770
					"	2-6 CL	"	2540	2180	1980	1750	1550	1350	1140
					24	1	28	1770	1520	1380	1220	1080	940	800
					"	2-6 CL	"	2780	2390	2170	1920	1700	1470	1250
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	14	1	18	1850	1590	1440	1280	1130	980	830
					20	1	24	2000	1720	1560	1380	1220	1060	900
					"	2-6 CL	"	2640	2270	2060	1820	1610	1400	1190
					24	1	28	2100	1810	1640	1450	1280	1110	950
					"	2-6 CL	"	2870	2470	2240	1980	1750	1520	1290
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	14	1	18	2020	1740	1580	1400	1230	1070	910
					20	1	24	2300	1980	1790	1590	1400	1220	1040
					"	2-6 CL	"	2630	2260	2050	1810	1600	1390	1180
					24	1	28	2470	2120	1930	1700	1510	1310	1110
					"	2-6 CL	"	2950	2540	2300	2040	1800	1560	1330
								3020	2600	2360	2080	1840	1600	1360

NOTES: 1. See element ordering information at bottom of page 27.

STYLE JV4-ARDS CLASSIC DOUBLE SLOPE



STEEL ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
1-1/4"	†VS143	4-1/4" SQ.	32	0.032"	19-1/2	1	—	1210	1040	940	830	740	640	540
					22-1/2	1	—	1280	1100	1000	880	780	680	580
					"	2-6 CL	—	1920	1650	1500	1320	1170	1020	860
					29-1/2	1	—	1350	1160	1050	930	820	720	610
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	19-1/2	1	—	1360	1170	1060	940	830	720	610
					22-1/2	1	—	1470	1260	1150	1010	900	780	660
					"	2-6 CL	—	2090	1800	1630	1440	1270	1110	940
					29-1/2	1	—	1560	1340	1220	1080	950	830	700
2"	†VS242	4-1/4" SQ.	25	0.032"	19-1/2	1	—	1050	900	820	720	640	560	470
					22-1/2	1	—	1110	950	870	770	680	590	500
					"	2-6 CL	—	1670	1440	1300	1150	1020	890	750
					29-1/2	1	—	1170	1010	910	810	710	620	530
2"	†VS243	4-1/4" SQ.	32	0.032"	19-1/2	1	—	1220	1050	950	840	740	650	550
					22-1/2	1	—	1290	1110	1010	890	790	680	580
					"	2-6 CL	—	1930	1660	1510	1330	1180	1020	870
					29-1/2	1	—	1360	1170	1060	940	830	720	610
						2-6 CL	—	2040	1750	1590	1410	1240	1080	920

†NOTES: 1. Steel fin furnished as .032 unless otherwise specified, consult factory.
 2. NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

STYLE JV4-ARDS CLASSIC DOUBLE SLOPE

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
									FACTOR					
3/4"	VC3/4-434	4-1/4 x 3-5/8	40	0.020"	19-1/2	1	—	1470	1265	1145	1015	895	780	660
					25-1/2	1	—	1570	1350	1225	1085	960	830	705
					"	2-6 CL	—	2230	1215	1740	1540	1360	1180	1005
					29-1/2	1	—	1650	1420	1285	1140	1010	875	740
					"	2-6 CL	—	2330	2000	1815	1610	1420	1235	1050
3/4"	VC3/4-435	4-1/4 x 3-5/8	50	0.020"	19-1/2	1	—	1590	1365	1240	1095	970	840	715
					25-1/2	1	—	1805	1550	1405	1245	1100	955	810
					"	2-6 CL	—	2435	2095	1900	1680	1485	1290	1095
					29-1/2	1	—	1950	1675	1520	1345	1190	1035	880
					"	2-6 CL	—	2685	2310	2095	1850	1640	1425	1210
1"	VC433	4-1/4 x 3-5/8	32	0.020"	19-1/2	1	—	1330	1145	1035	920	810	705	600
					25-1/2	1	—	1400	1205	1090	965	855	740	630
					"	2-6 CL	—	2160	1857	1685	1490	1320	1145	970
					29-1/2	1	—	1460	1255	1140	1010	890	775	660
					"	2-6 CL	—	2235	1920	1745	1540	1365	1185	1005
1"	VC434	4-1/4 x 3-5/8	40	0.020"	19-1/2	1	—	1535	1320	1195	1060	935	815	690
					25-1/2	1	—	1640	1410	1280	1130	1000	870	740
					"	2-6 CL	—	2300	1980	1795	1585	1405	1220	1035
					29-1/2	1	—	1720	1480	1340	1185	1050	910	775
					"	2-6 CL	—	2390	2055	1865	1650	1460	1265	1075
1"	VC435	4-1/4 x 3-5/8	50	0.020"	19-1/2	1	—	1665	1430	1300	1150	1015	880	750
					25-1/2	1	—	1880	1615	1465	1295	1145	995	845
					"	2-6 CL	—	2280	1960	1780	1575	1390	1210	1025
					29-1/2	1	—	2040	1755	1590	1410	1245	1080	920
					"	2-6 CL	—	2510	2160	1955	1730	1530	1330	1130
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	19-1/2	1	—	1250	1075	975	860	760	660	565
					25-1/2	1	—	1320	1135	1030	910	805	700	595
					"	2-6 CL	—	2040	1755	1590	1410	1245	1080	920
					29-1/2	1	—	1375	1180	1070	950	840	730	620
					"	2-6 CL	—	2115	1820	1650	1450	1290	1120	950
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	19-1/2	1	—	1500	1290	1170	1035	915	795	675
					25-1/2	1	—	1625	1390	1265	1120	990	860	730
					"	2-6 CL	—	2255	1940	1760	1555	1375	1195	1015
					29-1/2	1	—	1685	1450	1315	1160	1030	895	760
					"	2-6 CL	—	2340	2010	1825	1615	1425	1240	1055
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	19-1/2	1	—	1610	1385	1255	1110	980	855	725
					25-1/2	1	—	1840	1580	1435	1270	1120	975	830
					"	2-6 CL	—	2165	1860	1690	1495	1320	1150	975
					29-1/2	1	—	1960	1685	1530	1350	1195	1040	880
					"	2-6 CL	—	2425	2085	1890	1675	1480	1285	1090

STYLE JV4-ARDS CLASSIC DOUBLE SLOPE

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		1.00	0.86	0.78	0.69	0.61	0.53
1"	VC43	4-1/4" SQ.	32	0.020"	19-1/2	1	—	1425	1225	1110	985	870	755	640
					25-1/2	1	—	1500	1290	1170	1035	915	795	675
					"	2-6 CL	—	2235	1920	1745	1540	1365	1185	1005
					29-1/2	1	—	1565	1245	1220	1080	955	830	705
1"	VC44	4-1/4" SQ.	40	0.020"	19-1/2	1	—	1625	1395	1270	1120	990	860	730
					25-1/2	1	—	1760	1515	1370	1215	1075	930	790
					"	2-6 CL	—	2325	2000	1815	1605	1420	1230	1045
					29-1/2	1	—	1850	1590	1445	1275	1130	980	830
1"	VC45	4-1/4" SQ.	50	0.020"	19-1/2	1	—	1780	1530	1390	1230	1085	945	800
					25-1/2	1	—	2020	1735	1575	1400	1230	1070	910
					"	2-6 CL	—	2315	1990	1805	1595	1410	1225	1040
					29-1/2	1	—	2165	1860	1690	1495	1320	1150	975
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	19-1/2	1	—	1400	1205	1090	965	855	740	630
					25-1/2	1	—	1475	1270	1150	1015	900	780	665
					"	2-6 CL	—	2195	1885	1710	1515	1340	1165	990
					29-1/2	1	—	1530	1315	1195	1055	935	810	690
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	19-1/2	1	—	1600	1375	1250	1105	975	850	720
					25-1/2	1	—	1725	1485	1345	1190	1050	915	775
					"	2-6 CL	—	2280	1960	1780	1575	1390	1210	1025
					29-1/2	1	—	1815	1560	1415	1250	1110	960	815
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	19-1/2	1	—	1745	1500	1360	1205	1065	925	785
					25-1/2	1	—	1986	1710	1550	1370	1210	1050	895
					"	2-6 CL	—	2270	1950	1770	1565	1385	1205	1020
					29-1/2	1	—	2135	1835	1665	1475	1300	1130	960
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	"	2-6 CL	—	2545	2190	1985	1755	1550	1350	1145

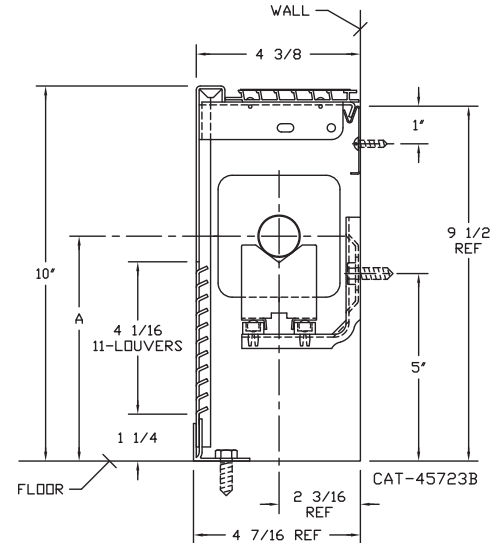
NOTES: 1. See element ordering information at bottom of page 27.

STYLES V3 & JV3, V4 & JV4 "AR" CLASSIC LOUVERED INLET "LI"

STYLES

V3 and JV3-AR-10LI

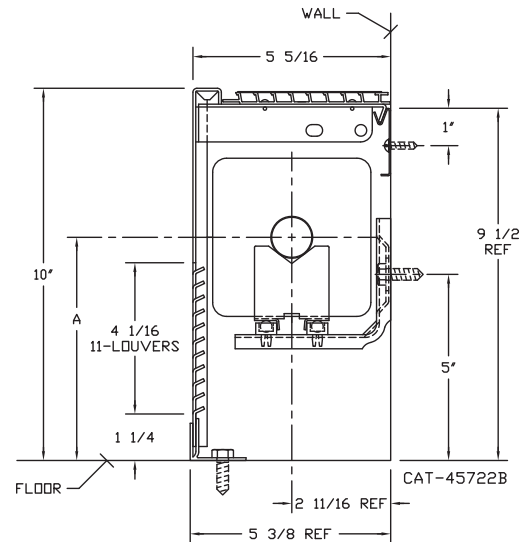
ELEMENT TUBE SIZE	CRADLE NO.	A
3/4" COPPER	2	5-13/16
1" COPPER	2	6
1-1/4" COPPER	1	5-7/16
1-1/4" STEEL	1	5-5/8



STYLES

V4 and JV4-AR-10LI

ELEMENT TUBE SIZE	CRADLE NO.	A
3/4" COPPER	2	7
1" COPPER	2	7-3/16
1-1/4" COPPER	2	7-5/16
1-1/4" STEEL	2	7-1/2
2" STEEL	1	7-1/4



ACCESSORIES

V3, V4 - Underlapping Reveal Type

JV3, JV4 - Overlapping Type

STYLES V3 & JV3, V4 & JV4 "AR" CLASSIC LOUVERED INLET "LI"

STEEL ELEMENT†								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
1-1/4"	†VS133	3-1/4" SQ.	32	0.032"	10	1	10	1.00	0.86	0.78	0.69	0.61	0.53	0.45
1-1/4"	†VS134	3-1/4" SQ.	40	0.032"	"	1	10	730	630	570	510	450	390	330
1-1/4"	†VS143	4-1/4" SQ.	32	0.032"	10	1	10	825	720	650	570	510	440	370
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	"	1	10	1035	900	810	720	630	550	470
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	"	1	10	1150	990	900	790	710	610	520
2"	†VS242	4-1/4" SQ.	25	0.032"	"	1	10	905	780	710	630	550	480	410
2"	†VS243	4-1/4" SQ.	32	0.032"	"	1	10	1075	840	840	740	660	570	490

†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

STYLES V3 & JV3, V4 & JV4 "AR" CLASSIC LOUVERED INLET "LI"

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		1.00	0.86	0.78	0.69	0.61	0.53
3/4"	VC3/4-34	3-1/4" SQ.	40	0.020"	10	1	10	950	820	740	655	580	510	430
3/4"	VC3/4-35	3-1/4" SQ.	50	0.020"	"	"	10	960	830	750	670	590	510	430
1"	VC33	3-1/4" SQ.	32	0.020"	"	"	10	800	690	620	550	490	430	360
1"	VC34	3-1/4" SQ.	40	0.020"	"	"	10	920	790	720	640	560	490	420
1"	VC35	3-1/4" SQ.	50	0.020"	"	"	10	930	800	720	650	570	500	420
1-1/4"	VC133	3-1/4" SQ.	32	0.020"	"	"	10	770	670	600	530	470	410	340
1-1/4"	VC134	3-1/4" SQ.	40	0.020"	"	"	10	880	760	700	610	540	470	400
1-1/4"	VC135	3-1/4" SQ.	50	0.020"	"	"	10	890	770	710	620	540	480	400
3/4"	VC3/4-434	4-1/4 x 3-5/8	40	0.020"	10	1	10	1180	1020	920	820	720	630	530
3/4"	VC3/4-435	4-1/4 x 3-5/8	50	0.020"	"	"	10	1255	1090	980	870	770	670	560
1"	VC433	4-1/4 x 3-5/8	32	0.020"	"	"	10	1090	940	860	750	670	580	500
1"	VC434	4-1/4 x 3-5/8	40	0.020"	"	"	10	1200	1030	930	830	730	640	540
1"	VC435	4-1/4 x 3-5/8	50	0.020"	"	"	10	1290	1120	1010	900	790	690	580
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	"	"	10	1070	920	830	730	650	560	480
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	"	"	10	1180	1020	920	820	720	630	530
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	"	"	10	1270	1090	990	880	770	670	570
1"	VC43	4-1/4" SQ.	32	0.020"	"	"	10	1200	1030	930	830	730	640	540
1"	VC44	4-1/4" SQ.	40	0.020"	"	"	10	1320	1140	1030	910	810	710	600
1"	VC45	4-1/4" SQ.	50	0.020"	"	"	10	1340	1150	1050	920	820	720	600
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	"	"	10	1170	1010	910	810	710	620	530
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	"	"	10	1300	1120	1020	900	800	700	590
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	"	"	10	1320	1030	1030	920	810	710	600

NOTES: 1. See element ordering information at bottom of page 27.

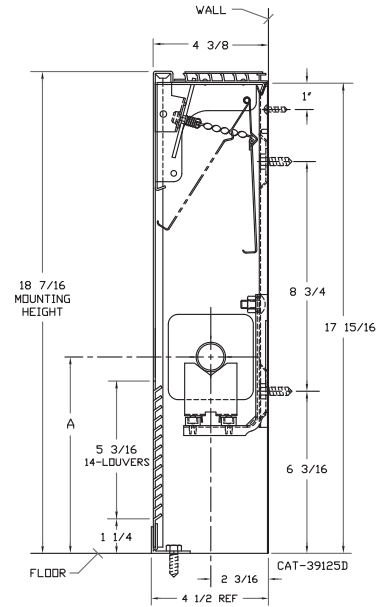
STYLES V3 & JV3-AR-18LI, V4 & JV4-AR-18, 24LI

STYLES

V3 and JV3-AR-18LI

ELEMENT TUBE SIZE	CRADLE NO.	A MIN.	A MAX.
3/4" COPPER	2	7	9-1/2
1" COPPER	2		9-3/4
1-1/4" COPPER	1		9-1/8
1-1/4" STEEL	1		9-3/8

Optional Dial Damper shown.

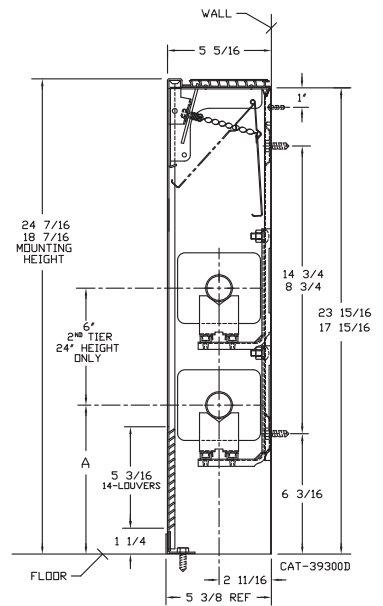


STYLES

V4 and JV4-AR-18, 24LI

ELEMENT TUBE SIZE	CRADLE NO.	A MIN.	A MAX.
3/4" COPPER	2	8	8-3/4
1" COPPER	2		8-7/8
1-1/4" COPPER	2		9
1-1/4" STEEL	2		9-1/4
2" STEEL	1		9

Optional Dial Damper shown.



ACCESSORIES

V3, V4 - Underlapping Reveal Type

JV3, JV4 - Overlapping Type

STYLES V3 & JV3-AR-18LI, V4 & JV4-AR-18, 24LI

STEEL ELEMENT†								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
1-1/4"	†VS133	3-1/4" SQ.	32	0.032"	18-7/16	1	18-7/16	870	750	680	600	530	460	390
1-1/4"	†VS134	3-1/4" SQ.	40	0.032"	18-7/16	1	18-7/16	980	840	760	680	600	520	440
1-1/4"	†VS143	4-1/4" SQ.	32	0.032"	18-7/16	1	18-7/16	1200	1030	930	830	730	640	540
					24-7/16	1	24-7/16	1260	1080	980	870	770	670	570
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	"	2-6 CL	"	2060	1770	1610	1420	1260	1090	930
					18-7/16	1	18-7/16	1430	1230	1120	990	870	760	640
					24-7/16	1	24-7/16	1520	1310	1190	1050	930	810	680
2"	†VS242	4-1/4" SQ.	25	0.032"	"	2-6 CL	"	2240	1930	1750	1550	1370	1190	1010
					18-7/16	1	18-7/16	1040	890	810	720	630	550	470
					24-7/16	1	24-7/16	1100	950	860	760	670	580	500
2"	†VS243	4-1/4" SQ.	32	0.032"	"	2-6 CL	"	1820	1570	1420	1260	1110	960	820
					18-7/16	1	18-7/16	1210	1040	940	830	740	640	540
					24-7/16	1	24-7/16	1270	1090	990	880	770	670	570
					"	2-6 CL	"	2000	1720	1560	1380	1220	1060	900

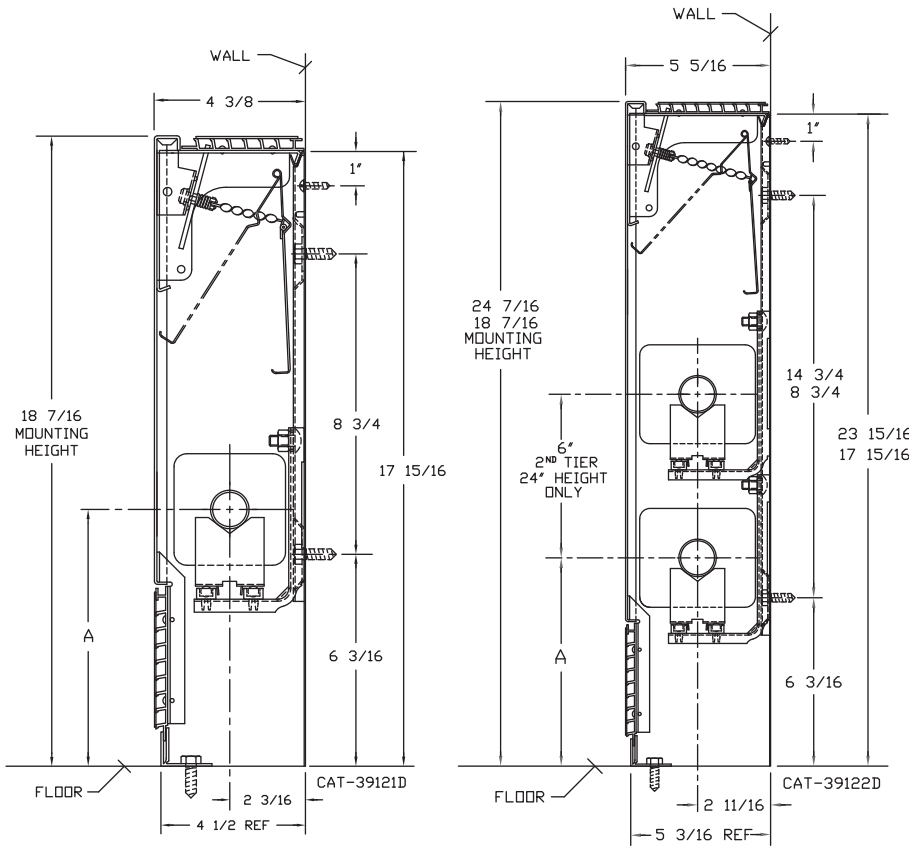
†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

STYLES V3 & JV3-AR-18LI, V4 & JV4-AR-18, 24LI

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.) FACTOR					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		1.00	0.86	0.78	0.69	0.61	0.53
3/4"	VC3/4-34	3-1/4" SQ.	40	0.020"	18-7/16	1	18-7/16	1410	1220	1100	980	870	750	640
3/4"	VC3/4-35	3-1/4" SQ.	50	0.020"	"	"	"	1450	1250	1130	1000	890	770	650
1"	VC33	3-1/4" SQ.	32	0.020"	"	"	"	1210	1040	940	840	740	640	550
1"	VC34	3-1/4" SQ.	40	0.020"	"	"	"	1360	1170	1060	940	830	720	610
1"	VC35	3-1/4" SQ.	50	0.020"	"	"	"	1410	1210	1100	970	860	750	640
1-1/4"	VC133	3-1/4" SQ.	32	0.020"	"	"	"	1130	970	880	780	690	600	510
1-1/4"	VC134	3-1/4" SQ.	40	0.020"	"	"	"	1320	1140	1030	910	810	700	590
1-1/4"	VC135	3-1/4" SQ.	50	0.020"	"	"	"	1350	1160	1050	930	820	720	610
3/4"	VC3/4-434	4-1/4 x 3-5/8	40	0.020"	18-7/16	1	18-7/16	1520	1310	1190	1050	930	810	680
					24-7/16	1	24-7/16	1610	1380	1260	1110	980	850	720
					"	2-6 CL	"	2460	2120	1920	1700	1500	1300	1110
3/4"	VC3/4-435	4-1/4 x 3-5/8	50	0.020"	18-7/16	1	18-7/16	1790	1540	1400	1240	1090	950	810
					24-7/16	1	24-7/16	1950	1680	1520	1350	1190	1030	880
					"	2-6 CL	"	2790	2400	2180	1930	1700	1480	1260
1"	VC433	4-1/4 x 3-5/8	32	0.020"	18-7/16	1	18-7/16	1410	1210	1100	970	860	750	630
					24-7/16	1	24-7/16	1490	1280	1160	1030	910	790	670
					"	2-6 CL	"	2190	1880	1710	1510	1340	1160	990
1"	VC434	4-1/4 x 3-5/8	40	0.020"	18-7/16	1	18-7/16	1580	1360	1230	1090	960	830	710
					24-7/16	1	24-7/16	1670	1440	1300	1150	1020	890	750
					"	2-6 CL	"	2540	2180	1980	1750	1550	1350	1140
1"	VC435	4-1/4 x 3-5/8	50	0.020"	18-7/16	1	18-7/16	1860	1600	1450	1280	1130	990	840
					24-7/16	1	24-7/16	2040	1750	1590	1410	1240	1080	920
					"	2-6 CL	"	2610	2240	2040	1800	1590	1380	1170
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	18-7/16	1	18-7/16	1380	1190	1080	950	840	730	620
					24-7/16	1	24-7/16	1460	1260	1140	1010	890	770	660
					"	2-6 CL	"	2150	1850	1670	1480	1310	1140	970
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	18-7/16	1	18-7/16	1550	1330	1210	1070	950	820	700
					24-7/16	1	24-7/16	1640	1410	1280	1130	1000	870	740
					"	2-6 CL	"	2490	2140	1940	1720	1520	1320	1120
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	18-7/16	1	18-7/16	1830	1570	1430	1260	1120	970	820
					24-7/16	1	24-7/16	2000	1720	1560	1380	1220	1060	900
					"	2-6 CL	"	2560	2200	2000	1770	1560	1360	1150
1"	VC43	4-1/4" SQ.	32	0.020"	18-7/16	1	18-7/16	1540	1320	1200	1060	940	820	690
					24-7/16	1	24-7/16	1630	1400	1270	1120	990	860	730
					"	2-6 CL	"	2500	2150	1950	1730	1530	1330	1130
1"	VC44	4-1/4" SQ.	40	0.020"	18-7/16	1	18-7/16	1750	1510	1370	1210	1070	930	790
					24-7/16	1	24-7/16	1850	1590	1440	1280	1130	980	830
					"	2-6 CL	"	2610	2240	2040	1800	1590	1380	1170
1"	VC45	4-1/4" SQ.	50	0.020"	18-7/16	1	18-7/16	1940	1670	1510	1340	1180	1030	870
					24-7/16	1	24-7/16	2130	1830	1660	1470	1300	1130	960
					"	2-6 CL	"	2610	2240	2040	1800	1590	1380	1170
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	18-7/16	1	18-7/16	1510	1300	1180	1040	920	800	680
					24-7/16	1	24-7/16	1600	1380	1250	1100	980	850	720
					"	2-6 CL	"	2450	2110	1910	1690	1490	1300	1100
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	18-7/16	1	18-7/16	1720	1480	1340	1190	1050	910	770
					24-7/16	1	24-7/16	1820	1570	1420	1260	1110	960	820
					"	2-6 CL	"	2560	2200	2000	1770	1560	1360	1150
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	18-7/16	1	18-7/16	1910	1640	1490	1320	1170	1010	860
					24-7/16	1	24-7/16	2090	1800	1630	1440	1270	1110	940
					"	2-6 CL	"	2560	2200	2000	1770	1560	1360	1150

NOTES: 1. See element ordering information at bottom of page 27.

STYLES V3 & JV3, V4 & JV4 "AR" CLASSIC EXTRUDED INLET "EI"



STYLES
V3 and JV3-AR-18EI

STYLES
V4 and JV4-AR-18, 24EI

Optional Dial Damper shown.

V3 and JV3-AR-18EI

ELEMENT TUBE SIZE	CRADLE NO.	A MIN.	A MAX.
3/4" COPPER	2	7-1/2	9-1/2
1" COPPER	2		9-3/4
1-1/4" COPPER	1		9-1/8
1-1/4" STEEL	1		9-3/8

V4 and JV4-AR-18, 24EI

ELEMENT TUBE SIZE	CRADLE NO.	A MIN.	A MAX.
3/4" COPPER	2	8	8-3/4
1" COPPER	2		8-7/8
1-1/4" COPPER	2		9
1-1/4" STEEL	2		9-1/4
2" STEEL	1		9

ACCESSORIES

V3, V4 - Underlapping Reveal Type
JV3, JV4 - Overlapping Type

STYLES V3 & JV3, V4 & JV4 "AR" CLASSIC EXTRUDED INLET "EI"

STEEL ELEMENT†								STEAM	HOT WATER (AVG.)						
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES	FACTOR	215°	200°	190°	180°	170°	160°	150°
									1.00	0.86	0.78	0.69	0.61	0.53	0.45
1-1/4"	†VS133	3-1/4" SQ.	32	0.032"	18-7/16	1	18-7/16	830	710	650	570	510	440	370	
1-1/4"	†VS134	3-1/4" SQ.	40	0.032"	18-7/16	1	18-7/16	940	810	730	650	570	500	420	
1-1/4"	†VS143	4-1/4" SQ.	32	0.032"	18-7/16	1	18-7/16	1140	980	890	790	700	600	510	
					24-7/16	1	24-7/16	1200	1030	930	830	730	640	540	
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	"	2-6 CL.	"	1960	1690	1530	1350	1200	1040	880	
					18-7/16	1	18-7/16	1360	1170	1060	940	830	720	610	
					24-7/16	1	24-7/16	1440	1240	1120	990	880	760	650	
2"	†VS242	4-1/4" SQ.	25	0.032"	"	2-6 CL.	"	2130	1830	1660	1470	1300	1130	960	
					18-7/16	1	18-7/16	990	850	770	680	600	520	450	
					24-7/16	1	24-7/16	1040	890	810	720	630	550	470	
2"	†VS243	4-1/4" SQ.	32	0.032"	"	2-6 CL.	"	1730	1490	1350	1190	1060	920	780	
					18-7/16	1	18-7/16	1150	990	900	790	700	610	520	
					24-7/16	1	24-7/16	1200	1030	940	830	730	640	540	
					"	2-6 CL.	"	1900	1630	1480	1310	1160	1010	860	

†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

STYLES V3 & JV3-AR-18EI, V4 & JV4-AR-18, 24EI

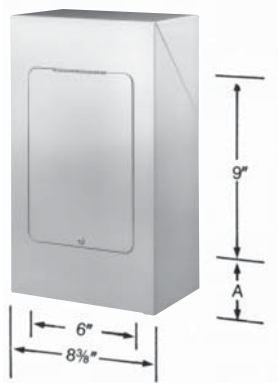
COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.) FACTOR					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
3/4"	VC3/4-34	3-1/4" SQ.	40	0.020"	18-7/16	1	18-7/16	1230	1060	960	850	750	650	550
3/4"	VC3/4-35	3-1/4" SQ.	50	0.020"	"	"	"	1380	1190	1080	950	840	730	620
1"	VC33	3-1/4" SQ.	32	0.020"	"	"	"	990	850	770	680	600	520	450
1"	VC34	3-1/4" SQ.	40	0.020"	"	"	"	1190	1020	930	820	730	630	540
1"	VC35	3-1/4" SQ.	50	0.020"	"	"	"	1330	1140	1040	920	810	700	600
1-1/4"	VC133	3-1/4" SQ.	32	0.020"	"	"	"	950	820	740	660	580	500	430
1-1/4"	VC134	3-1/4" SQ.	40	0.020"	"	"	"	1140	980	890	790	700	600	510
1-1/4"	VC135	3-1/4" SQ.	50	0.020"	"	"	"	1280	1100	1000	880	780	680	580
3/4"	VC3/4-434	4-1/4 x 3-5/8	40	0.020"	18-7/16	1	18-7/16	1440	1240	1120	990	880	760	650
					24-7/16	1	24-7/16	1530	1320	1190	1060	930	810	690
					"	2-6 CL	"	2340	2010	1830	1610	1430	1240	1050
3/4"	VC3/4-435	4-1/4 x 3-5/8	50	0.020"	18-7/16	1	18-7/16	1700	1460	1330	1170	1040	900	770
					24-7/16	1	24-7/16	1850	1590	1440	1280	1130	980	830
					"	2-6 CL	"	2650	2280	2070	1830	1620	1400	1190
1"	VC433	4-1/4 x 3-5/8	32	0.020"	18-7/16	1	18-7/16	1340	1150	1050	920	820	710	600
					24-7/16	1	24-7/16	1420	1220	1110	980	870	750	640
					"	2-6 CL	"	2080	1790	1620	1440	1270	1100	940
1"	VC434	4-1/4 x 3-5/8	40	0.020"	18-7/16	1	18-7/16	1500	1290	1170	1040	920	800	680
					24-7/16	1	24-7/16	1590	1370	1240	1100	970	840	720
					"	2-6 CL	"	2110	1810	1650	1460	1290	1120	950
1"	VC435	4-1/4 x 3-5/8	50	0.020"	18-7/16	1	18-7/16	1770	1520	1380	1220	1080	940	800
					24-7/16	1	24-7/16	1940	1670	1510	1340	1180	1030	870
					"	2-6 CL	"	2480	2130	1930	1710	1510	1310	1120
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	18-7/16	1	18-7/16	1310	1130	1020	900	800	690	590
					24-7/16	1	24-7/16	1390	1200	1080	960	850	740	630
					"	2-6 CL	"	2040	1750	1590	1410	1240	1080	920
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	18-7/16	1	18-7/16	1470	1260	1150	1010	900	780	660
					24-7/16	1	24-7/16	1560	1340	1220	1080	950	830	700
					"	2-6 CL	"	2360	2030	1840	1630	1440	1250	1060
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	18-7/16	1	18-7/16	1740	1500	1360	1200	1060	920	780
					24-7/16	1	24-7/16	1900	1630	1480	1310	1160	1010	860
					"	2-6 CL	"	2430	2090	1900	1680	1480	1290	1090
1"	VC43	4-1/4" SQ.	32	0.020"	18-7/16	1	18-7/16	1460	1260	1140	1010	890	770	660
					24-7/16	1	24-7/16	1550	1330	1210	1070	950	820	700
					"	2-6 CL	"	2370	2040	1850	1640	1450	1260	1070
1"	VC44	4-1/4" SQ.	40	0.020"	18-7/16	1	18-7/16	1660	1430	1290	1150	1010	880	750
					24-7/16	1	24-7/16	1760	1510	1370	1210	1070	930	790
					"	2-6 CL	"	2480	2130	1930	1710	1510	1310	1120
1"	VC45	4-1/4" SQ.	50	0.020"	18-7/16	1	18-7/16	1840	1580	1440	1270	1120	980	830
					24-7/16	1	24-7/16	2020	1740	1580	1390	1230	1070	910
					"	2-6 CL	"	2480	2130	1930	1710	1510	1310	1120
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	18-7/16	1	18-7/16	1370	1180	1070	950	840	730	620
					24-7/16	1	24-7/16	1430	1230	1120	990	870	760	640
					"	2-6 CL	"	2180	1870	1700	1500	1330	1160	980
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	18-7/16	1	18-7/16	1630	1400	1270	1120	990	860	730
					24-7/16	1	24-7/16	1730	1490	1350	1190	1060	920	780
					"	2-6 CL	"	2430	2090	1900	1680	1480	1290	1090
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	18-7/16	1	18-7/16	1810	1560	1410	1250	1100	960	810
					24-7/16	1	24-7/16	1990	1710	1550	1370	1210	1050	900
					"	2-6 CL	"	2430	2090	1900	1680	1480	1290	1090

NOTES: 1. See element ordering information at bottom of page 27.

CLASSIC STYLE ACCESSORIES



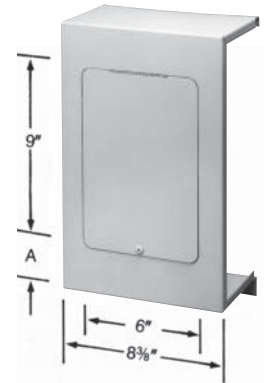
End



**End
w/access door**



Wall Sleeve



**Wall Sleeve
w/access door**



Outside Corner



Inside Corner



Valve Compartment

7" enclosure height accessories with access door are provided with 5" x 6" doors.

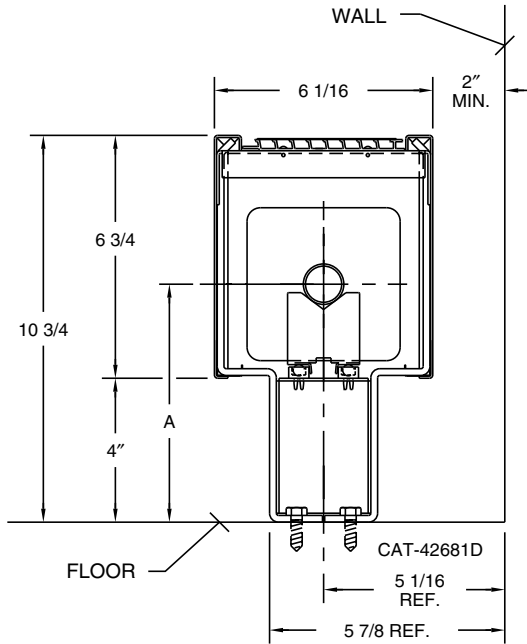
PRODUCT	ACCESS DOOR LOCATION			DOOR SIZE
	"A" DIMENSION			
	END	WALL SLEEVE	VALVE COMPARTMENT	
V3, JV3-AR14	3"	3"	2"	6" x 9"
V4, JV4-AR14	3"	3"	2"	6" x 9"
V4, JV4-AR20	7"	7"	4-1/2"	6" x 9"
V4, JV4-AR24	11"	11"	8"	6" x 9"

ACCESSORIES

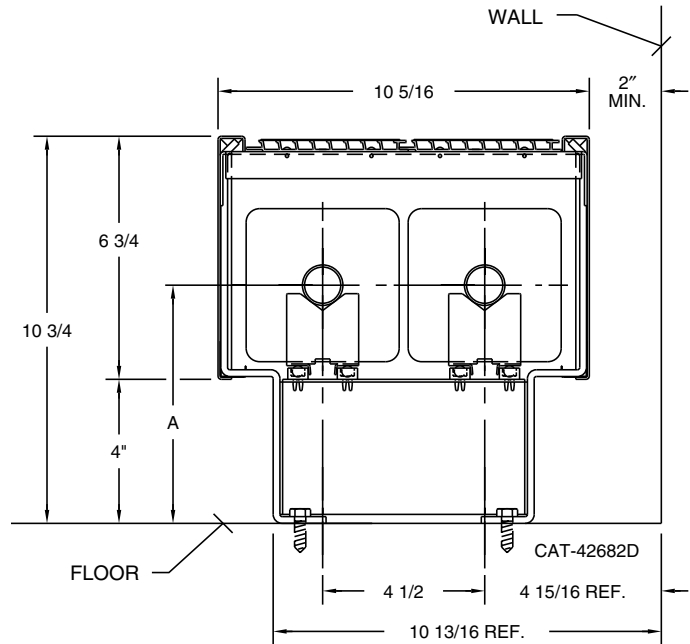
V3, V4 - Underlapping Reveal Type

JV3, JV4 - Overlapping Type

STYLES V4 & JV4-AR-PM & V4 & JV4-AR-PM2 CLASSIC



STYLES
V4-AR-PM
JV4-AR-PM



STYLES
V4-AR-PM2
JV4-AR-PM2

ELEMENT TUBE SIZE	CRADLE NO.	A
3/4" COPPER	2	6-7/16
1" COPPER	1	6-5/8
1-1/4" COPPER	2	6-3/4
1-1/4" STEEL	2	6-15/16
2" STEEL	1	6-11/16

See page 31 for supply or return pipe in enclosure.

ACCESSORIES

V4 - Underlapping Reveal Type

JV4 - Overlapping Type

STYLES V4 & JV4-AR-PM & V4 & JV4-AR-PM2

Not Recommended for Steam Applications

STEEL ELEMENT†								STEAM 215° FACTOR	HOT WATER (AVG.) FACTOR					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCLOSURE HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
1-1/4"	†VS134	4-1/4" SQ.	32	0.032"	6-3/4	—	10-3/4	1330	1150	1040	920	810	710	600
					"	2-W	"	1830	1570	1430	1260	1120	970	830
1-1/4"	†VS144	4-1/4" SQ.	40	0.032"	6-3/4	—	10-3/4	1460	1260	1150	1020	900	780	660
					"	2-W	"	2240	1920	1750	1550	1370	1190	1020
2"	†VS242	4-1/4" SQ.	25	0.032"	6-3/4	—	10-3/4	1160	990	900	800	710	610	520
					"	2-W	"	1590	1370	1240	1100	970	850	720
2"	†VS243	4-1/4" SQ.	32	0.032"	6-3/4	—	10-3/4	1350	1160	1050	930	830	710	600
					"	2-W	"	1840	1580	1440	1270	1120	980	830

†NPT threads furnished on steel elements. Please use domestic fittings for proper installation.

Ratings based on 47°F EAT. To determine rating with 65°F EAT, divide the selected rating by 1.20.

STYLES V4 & JV4-AR-PM & V4 & JV4-AR-PM2 CLASSIC

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	ENCL DEPTH AND HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MTG. HEIGHT IN INCHES		200°	190°	180°	170°	160°	150°
								1.00	FACTOR					
								0.86	0.78	0.69	0.61	0.53	0.45	
3/4"	VC3/4-434	4-1/4 x 3-5/8	40	0.020"	6-3/4	—	10-3/4	1400	1200	1100	970	860	740	640
					"	2-W	"	2150	1850	1680	1490	1310	1130	970
3/4"	VC3/4-435	4-1/4 x 3-5/8	50	0.020"	6-3/4	—	10-3/4	1520	1310	1190	1050	930	800	680
					"	2-W	"	2340	2010	1820	1620	1430	1240	1050
1"	VC433	4-1/4 x 3-5/8	32	0.020"	6-3/4	—	10-3/4	1290	1110	1000	890	780	680	580
					"	2-W	"	1990	1710	1560	1380	1220	1060	900
1"	VC434	4-1/4 x 3-5/8	40	0.020"	6-3/4	—	10-3/4	1450	1250	1130	1000	890	770	650
					"	2-W	"	2240	1920	1750	1550	1370	1190	1020
1"	VC435	4-1/4 x 3-5/8	50	0.020"	6-3/4	—	10-3/4	1580	1360	1240	1090	970	840	710
					"	2-W	"	2440	2100	1900	1690	1490	1300	1100
1-1/4"	VC1433	4-1/4 x 3-5/8	32	0.020"	6-3/4	—	10-3/4	1260	1090	980	870	770	670	570
					"	2-W	"	1950	1680	1520	1350	1190	1030	870
1-1/4"	VC1434	4-1/4 x 3-5/8	40	0.020"	6-3/4	—	10-3/4	1430	1230	1110	980	870	760	640
					"	2-W	"	2200	1890	1710	1510	1330	1170	990
1-1/4"	VC1435	4-1/4 x 3-5/8	50	0.020"	6-3/4	—	10-3/4	1560	1350	1220	1070	960	830	700
					"	2-W	"	2400	2070	1860	1650	1460	1270	1070
1"	VC43	4-1/4" SQ.	32	0.020"	6-3/4	—	10-3/4	1500	1290	1170	1040	910	790	670
					"	2-W	"	2360	2030	1840	1630	1440	1250	1060
1"	VC44	4-1/4" SQ.	40	0.020"	6-3/4	—	10-3/4	1700	1460	1320	1170	1040	900	770
					"	2-W	"	2890	2490	2250	1990	1760	1530	1300
1"	VC45	4-1/4" SQ.	50	0.020"	6-3/4	—	10-3/4	1750	1500	1360	1200	1060	920	790
					"	2-W	"	3000	2570	2340	2070	1830	1590	1350
1-1/4"	VC143	4-1/4" SQ.	32	0.020"	6-3/4	—	10-3/4	1230	1050	960	850	740	650	560
					"	2-W	"	2370	2040	1850	1640	1450	1260	1060
1-1/4"	VC144	4-1/4" SQ.	40	0.020"	6-3/4	—	10-3/4	1580	1360	1240	1090	970	840	710
					"	2-W	"	2700	2330	2110	1860	1650	1430	1220
1-1/4"	VC145	4-1/4" SQ.	50	0.020"	6-3/4	—	10-3/4	1740	1490	1360	1190	1060	920	780
					"	2-W	"	2990	2570	2330	2070	1820	1580	1350

NOTES: 1. See element ordering information below.

Ratings based on 47°F EAT. To determine rating with 65°F EAT, divide the selected rating by 1.20.

ELEMENT ORDERING INFORMATION

When ordering element specify fin thickness

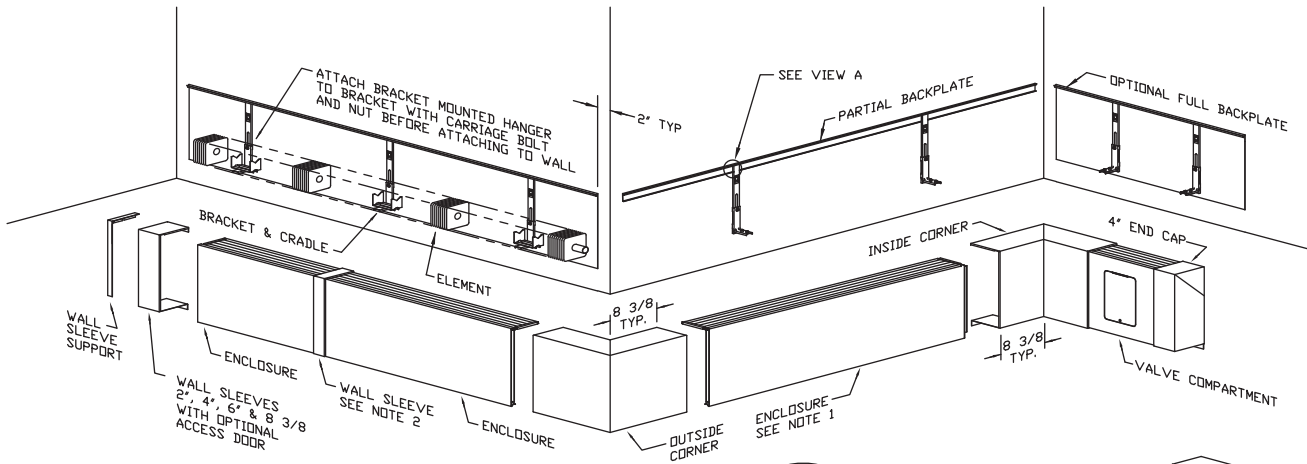
steel = .024, .032; copper = .020, .011 as shown on Selection Pages.

Steel Elements, Fins painted black.

The ratings shown in this catalog are in BTU per hour per lineal foot of *active* fin length. Active fin length is catalog ordering length less 4" on copper/aluminum element and less 5" on steel elements. The water ratings shown are based on a water velocity flow rate of (3 FPS) three feet per second as determined by I=B=R and applying factors to the steam rating.

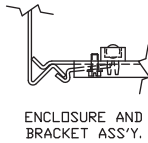
ACCESSORIES

INSTALLATION LAYOUT TYPICAL FOR "J" CLASSIC WITH SLIP-JOINED EDGES, OVERLAPPING ACCESSORIES.



NOTES:

- ENCLOSURE SECTIONS AVAILABLE IN FOLLOWING STANDARD LENGTHS: 1' THRU 8' IN 6" INCREMENTS. CONSULT FACTORY FOR SPECIAL LENGTHS.
- WALL SLEEVES MAY BE AT ENDS OR PLACED IN RUN FOR DIMENSIONAL MAKE-UP.
- FOR DAMPER INSTALLATION SEE DAMPER INSTRUCTION SHEET.

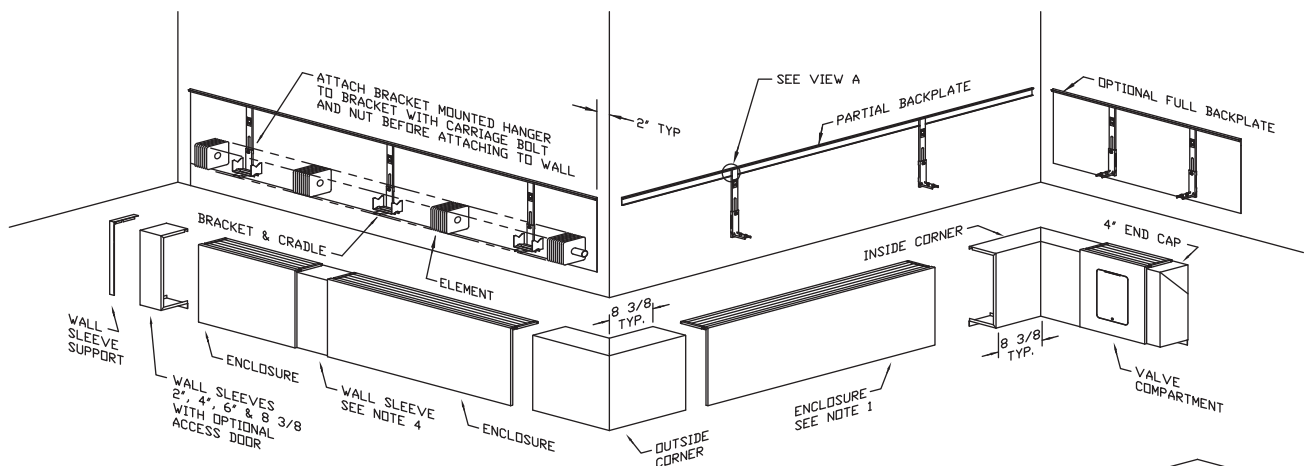


8 3/8 END CAP WITH OPTIONAL ACCESS DOOR



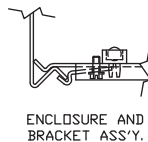
CAT-38925B

INSTALLATION LAYOUT TYPICAL FOR STANDARD CLASSIC WITH WIPED EDGE, UNDERLAPPING ACCESSORIES.

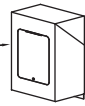


NOTES:

- ENCLOSURE SECTIONS AVAILABLE IN FOLLOWING STANDARD LENGTHS: 1' THRU 8' IN 6" INCREMENTS. CONSULT FACTORY FOR SPECIAL LENGTHS.
- SCHEDULE ENCLOSURE TO OVERLAP ACCESSORIES 1' TO 3" BACKPLATE MUST COVER AT LEAST THIS PORTION OF WALL FOR HANGING ACCESSORIES. HOWEVER, IT MAY EXTEND BEYOND THE ENCLOSURE.
- WHEN AN END IS USED FOR SHORT-OF-WALL INSTALLATIONS THE BACKPLATE CAN NOT EXTEND MORE THAN 1/2".
- WALL SLEEVES MAY BE AT ENDS OR PLACED IN RUN FOR DIMENSIONAL MAKE-UP.
- FOR DAMPER INSTALLATION SEE DAMPER INSTRUCTION SHEET.



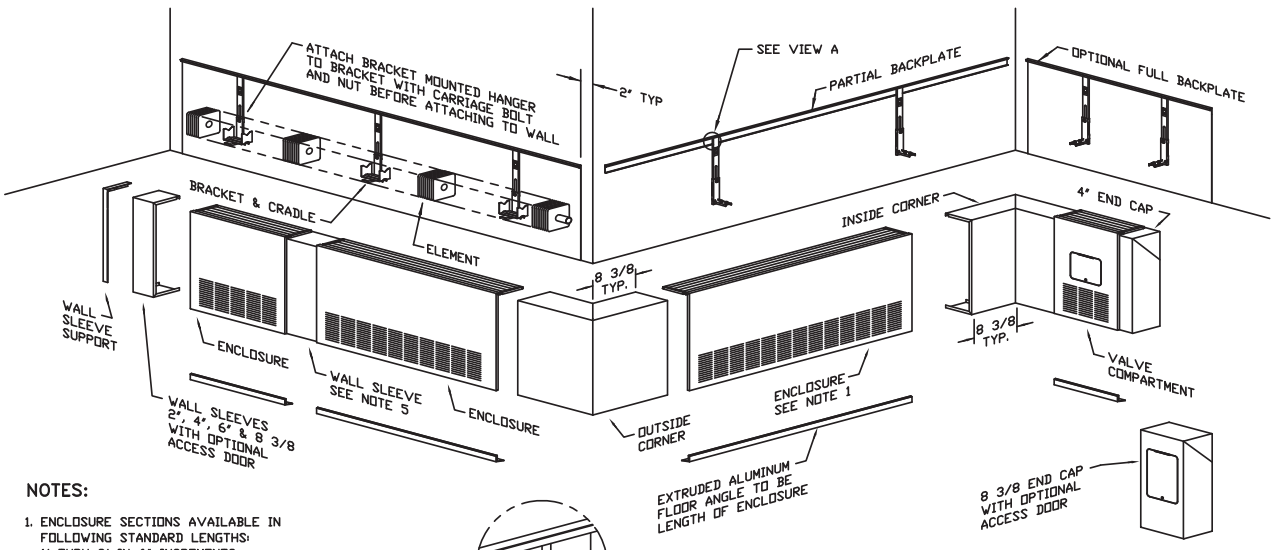
8 3/8 END CAP WITH OPTIONAL ACCESS DOOR



CAT-38926B

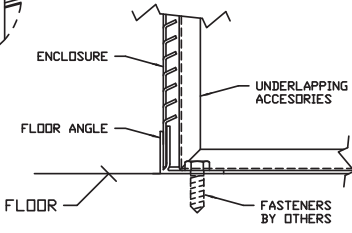
ACCESSORIES

INSTALLATION LAYOUT FOR FLOOR MOUNTED ENCLOSURES V3 & V4



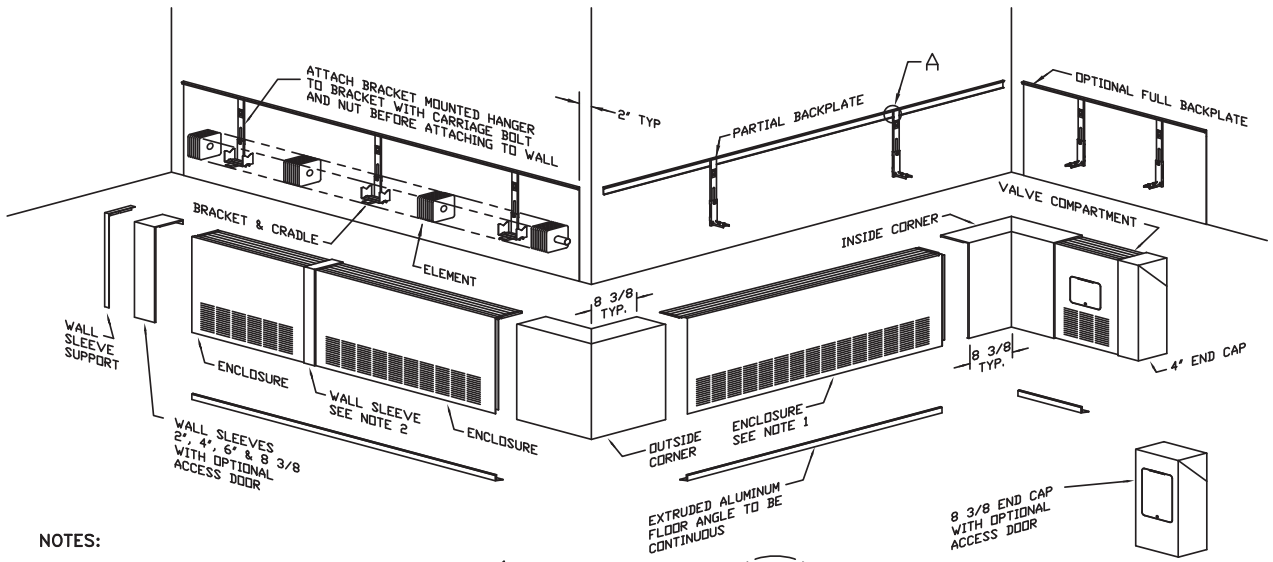
NOTES:

1. ENCLOSURE SECTIONS AVAILABLE IN FOLLOWING STANDARD LENGTHS: 1' THRU 8' IN 6" INCREMENTS. CONSULT FACTORY FOR SPECIAL LENGTHS.
2. SCHEDULE ENCLOSURE TO OVERLAP ACCESSORIES 1' TO 3'. BACKPLATE MUST COVER AT LEAST THIS PORTION OF WALL FOR HANGING ACCESSORIES. HOWEVER, IT MAY EXTEND BEYOND THE ENCLOSURE.
3. WHEN AN END IS USED FOR SHORT - OF - WALL INSTALLATIONS THE BACKPLATE CAN NOT EXTEND MORE THAN 1/2'.
4. BRACKETS MAY EXTEND TO FLOOR (IF REQ'D ON INSTALLATION) INSTALLATION DETAILS MAY VARY.
5. WALL SLEEVES MAY BE AT ENDS OR PLACED IN RUN FOR DIMENSIONAL MAKE-UP
6. FOR DAMPER INSTALLATION SEE DAMPER INSTRUCTION SHEET.



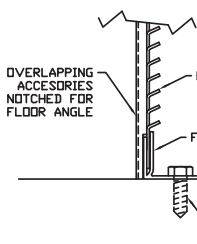
CAT-38927B

INSTALLATION LAYOUT FOR FLOOR MOUNTED ENCLOSURES JV3 & JV4



NOTES:

1. ENCLOSURE SECTIONS AVAILABLE IN FOLLOWING STANDARD LENGTHS: 1' THRU 8' IN 6" INCREMENTS. CONSULT FACTORY FOR SPECIAL LENGTHS.
2. WALL SLEEVES MAY BE AT ENDS OR PLACED IN RUN FOR DIMENSIONAL MAKE-UP.
3. FOR DAMPER INSTALLATION SEE DAMPER INSTRUCTION SHEET.

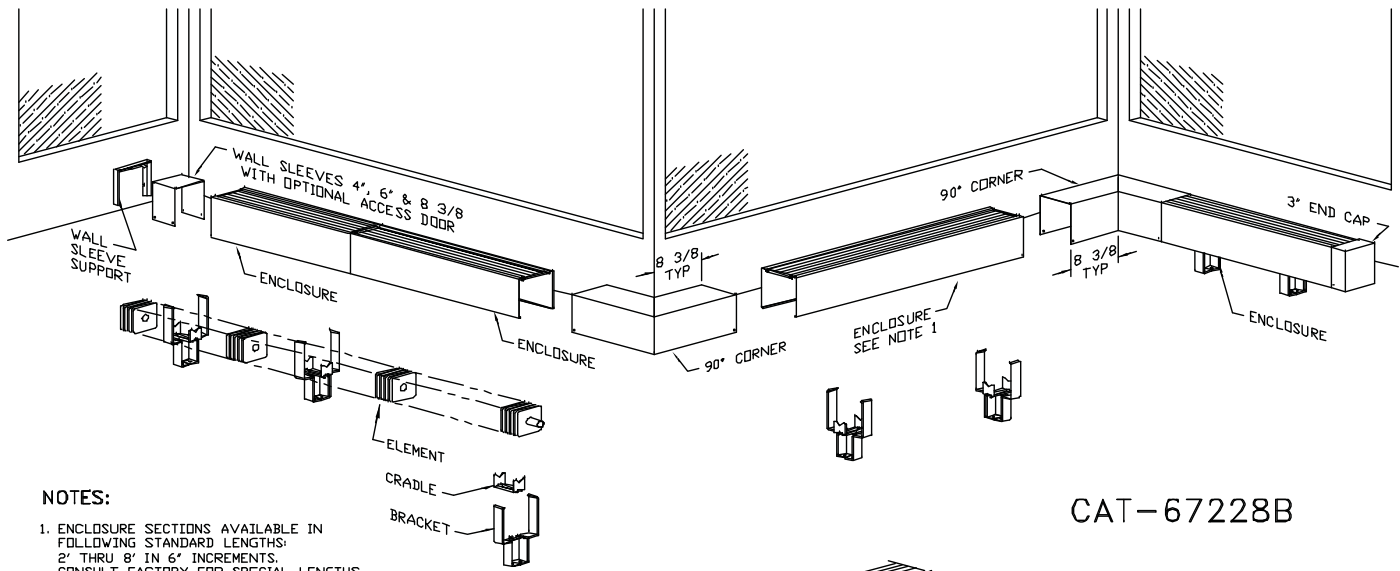


CAT-64444A

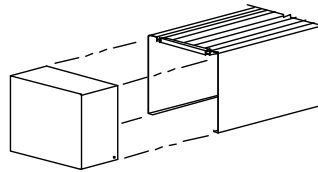
ACCESSORIES

INSTALLATION LAYOUT FOR PEDESTAL MOUNT PM ENCLOSURE

SLIP JOINTED ENCLOSURE WITH OVERLAPPING WRAPPER ACCESSORIES



CAT-67228B



NOTE: FASTEN ACCESSORIES WITH SHEET METAL SCREW THRU SOLID PART OF ENCLOSURE.

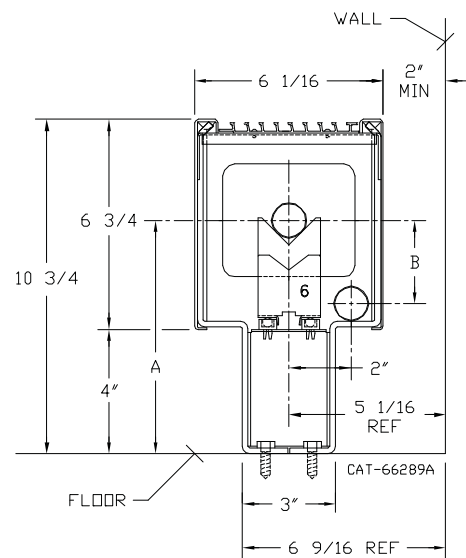
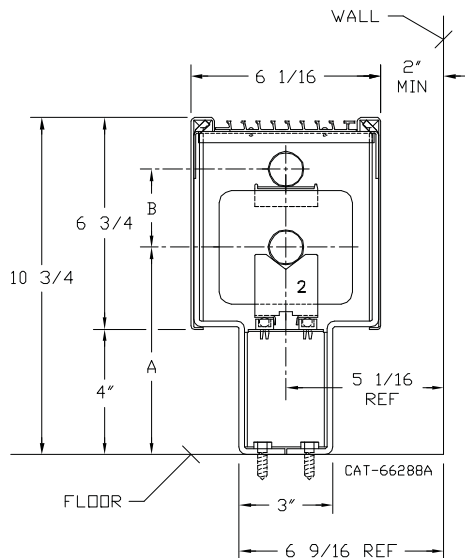
ALTERNATE PIPING CAPABILITY WITH 3/4" AND 1" COPPER TUBE ELEMENTS

JV4-AR-PM or V4-AR-PM with Return Above Element

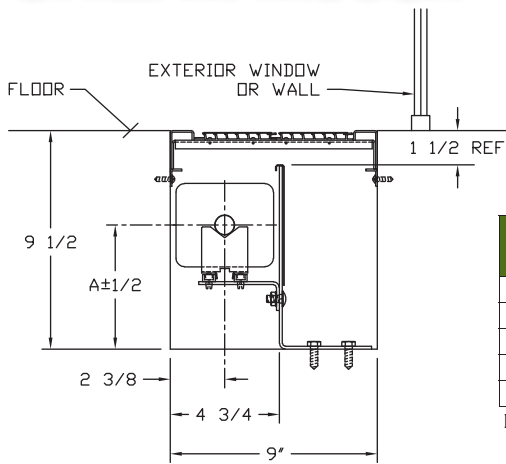
JV4-AR-PM or V4-AR-PM with Return Below Element

ELEMENT TUBE SIZE	ELEMENT FIN SIZE	A	B
3/4" (20) COPPER	4-1/4" (108) x 3-5/8" (92)	6-7/16 (164)	2-3/8 (60)
1" (25) COPPER	4-1/4" (108) x 3-5/8" (92)	6-5/8 (168)	2-1/2 (64)

ELEMENT TUBE SIZE	ELEMENT FIN SIZE	A	B 3/4" RETURN	B 1" RETURN
3/4" (20) COPPER	4-1/4" (108) x 3-5/8" (92)	7-3/8 (187)	2-5/8 (67)	2-1/2 (64)
1" (25) COPPER	4-1/4" (108) x 3-5/8" (92)	7-1/2 (190)	2-7/8 (73)	2-11/16 (68)



STYLE TR TROUGH



CAT-66965A

ELEMENT	TUBE/FIN MATERIAL	TUBE SIZE	FIN SIZE	FIN THK.	FINS/FOOT	CRADLE NO.	A
VC3/4 435	CU/AL	3/4"	4-1/4 x 3-5/8	.020	50	2	5-3/8
VC45	CU/AL	1"	4-1/4 x 4-1/4	.020	50	2	5-9/16
VC145	CU/AL	1-1/4"	4-1/4 x 4-1/4	.020	50	2	5-11/16
†VS144-032	STL/STL	1-1/4"	4-1/4 x 4-1/4	.032	40	2	4-7/8
†VS243-032	STL/STL	2"	4-1/4 x 4-1/4	.032	32	1	4-5/8

NOTES: 1. Shown with C3/4-435 element.
2. Trough liner optional (not shown).

STYLE TR TROUGH

STEEL ELEMENT†								STEAM 215° FACTOR	HOT WATER (AVG.)					
I.P.S. SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	DEPTH & HEIGHT HEIGHT IN INCHES	NUMBER OF ELEMENTS	ENTERING AIR TEMP (°F)		200°	190°	180°	170°	160°	150°
								FACTOR						
								1.00	0.86	0.78	0.69	0.61	0.53	0.45
1-1/4"	†VS143	4-1/4 x 4-1/4	32	.032"	9-1/2 x 9	1	47°	1090	940	860	760	670	580	500
1-1/4"	†VS144	4-1/4 x 4-1/4	40	"	"	1	47°	1230	1060	960	850	760	660	560
2"	†VS242	4-1/4 x 3-5/8	25	.032"	9-1/2 x 9	1	47°	950	820	750	660	580	510	430
2"	†VS243	4-1/4 x 3-5/8	32	"	"	1	47°	1100	950	860	760	680	590	500

†NOTES: 1. Ratings are based on 24 sq. in. of free area per lineal foot of air inlet and outlet each.
2. To determine ratings with 65°F Entering Air Temperature, select the appropriate rating from the chart above and divide by 1.20.
3. For systems using steam, consult factory.

COPPER/ALUMINUM ELEMENT								STEAM 215° FACTOR	HOT WATER (AVG.)					
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE IN INCHES	FIN/FT	FIN THICKNESS	DEPTH & HEIGHT HEIGHT IN INCHES	NUMBER OF ELEMENTS	ENTERING AIR TEMP (°F)		200°	190°	180°	170°	160°	150°
								FACTOR						
								1.00	0.86	0.78	0.69	0.61	0.53	0.45
3/4"	VC3/4 433	4-1/4 x 3-5/8	32	20"	9-1/2 x 9	1	47°	1090	940	860	760	670	580	500
3/4"	VC3/4 434	4-1/4 x 3-5/8	40	"	"	1	47°	1230	1060	960	850	760	660	560
3/4"	VC3/4 435	4-1/4 x 3-5/8	50	"	"	1	47°	1330	1150	1040	920	820	710	600
1"	VC 433	4-1/4 x 3-5/8	32	20"	9-1/2 x 9	1	47°	1130	980	890	780	690	600	510
1"	VC 434	4-1/4 x 3-5/8	40	"	"	1	47°	1270	1100	1000	880	780	680	580
1"	VC 435	4-1/4 x 3-5/8	50	"	"	1	47°	1390	1200	1090	960	850	740	630
1-1/4"	VC 1433	4-1/4 x 3-5/8	32	20"	9-1/2 x 9	1	47°	1110	960	870	770	680	590	500
1-1/4"	VC 1434	4-1/4 x 3-5/8	40	"	"	1	47°	1250	1080	980	870	770	670	570
1-1/4"	VC 1435	4-1/4 x 3-5/8	50	"	"	1	47°	1370	1180	1070	950	840	730	620
1"	VC 43	4-1/4 x 4-1/4	32	20"	9-1/2 x 9	1	47°	1240	1070	970	860	760	660	560
1"	VC 44	4-1/4 x 4-1/4	40	"	"	1	47°	1410	1220	1100	980	870	750	640
1"	VC 45	4-1/4 x 4-1/4	50	"	"	1	47°	1450	1250	1140	1010	890	770	660
1-1/4"	VC 143	4-1/4 x 4-1/4	32	20"	9-1/2 x 9	1	47°	1220	1050	960	850	750	650	550
1-1/4"	VC 144	4-1/4 x 4-1/4	40	"	"	1	47°	1380	1190	1080	960	850	740	630
1-1/4"	VC 145	4-1/4 x 4-1/4	50	"	"	1	47°	1420	1230	1110	980	870	760	640

†NOTES: 1. Ratings are based on 24 sq. in. of free area per lineal foot of air inlet and outlet each.
2. To determine ratings with 65°F Entering Air Temperature, select the appropriate rating from the chart above and divide by 1.20.
3. For systems using steam, consult factory.

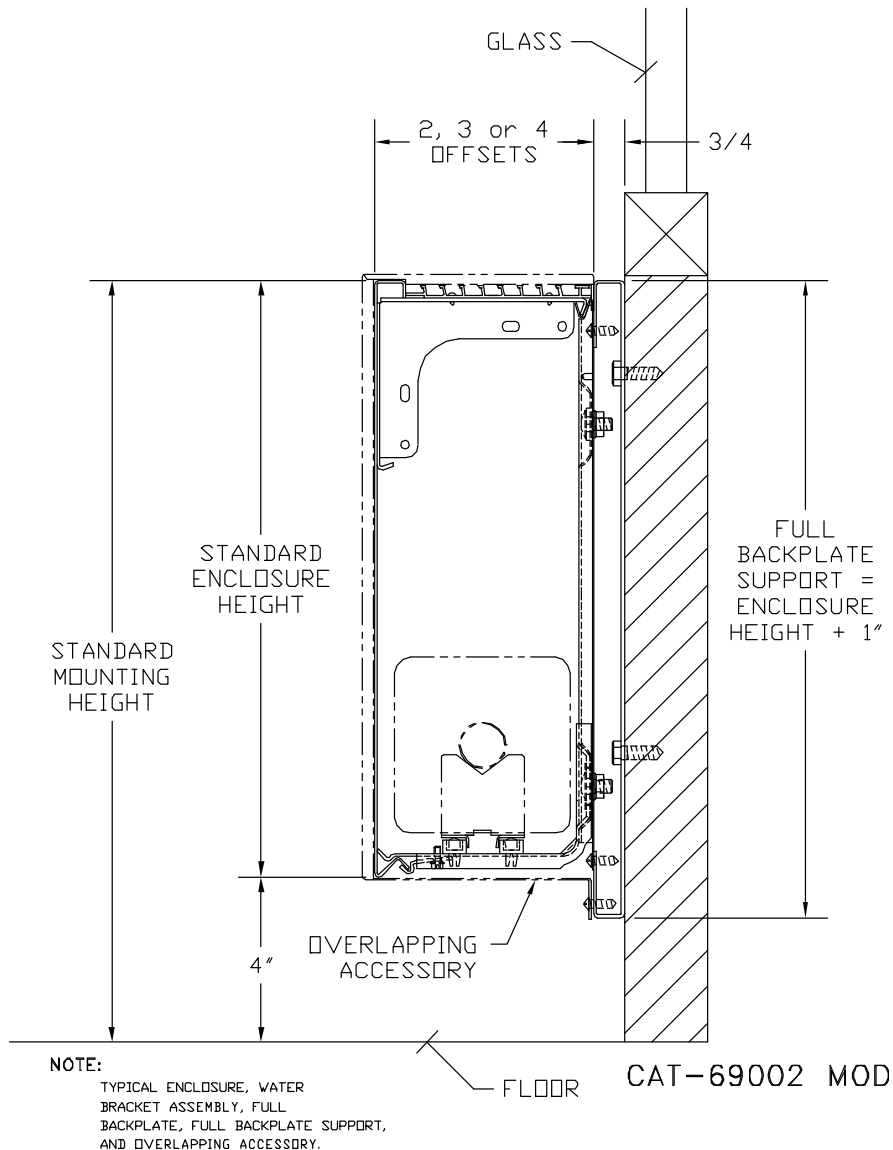
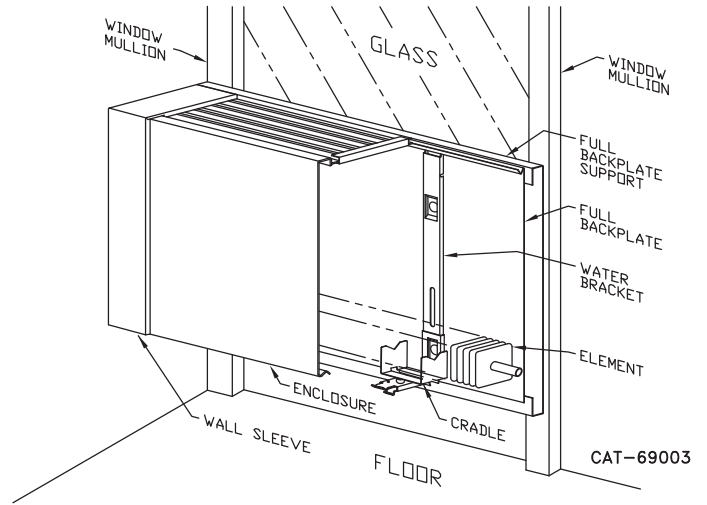
BACKPLATE SUPPORTS FOR WINDOW MULLIONS

Radiation is easily adaptable to panel wall, curtain wall and window wall construction.

All that is necessary for the full support of the assemblies are the mullions used in this type of construction.

The assemblies are just as easily installed as in any other type of construction. Consult us for unusual dimensional applications. (71/4" min. ht.)

Typical panel-wall installation using the Vulcan bracket with ball-bearing cradle, and full backplate. Note how the backplate support lag to the mullions and the backplate to the backplate support. Then the brackets attach to the backplate. Consult us for variations.



PIPE ENCLOSURES

VULCAN COLUMN ENCLOSURES

Column Enclosures can give an installation that finished, custom-made look.

It is designed to blend into the installation, both in color and in form. It installs easily without a single bolt showing, yet is highly practical in use.

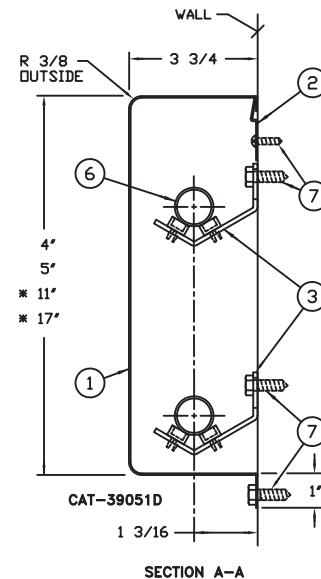
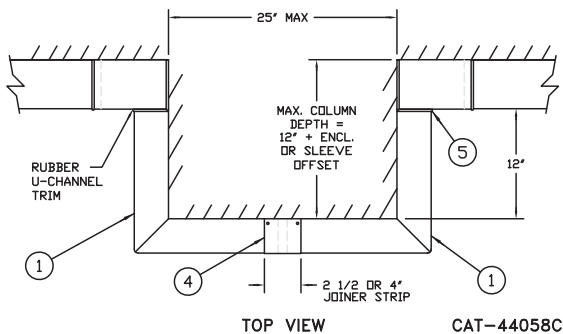
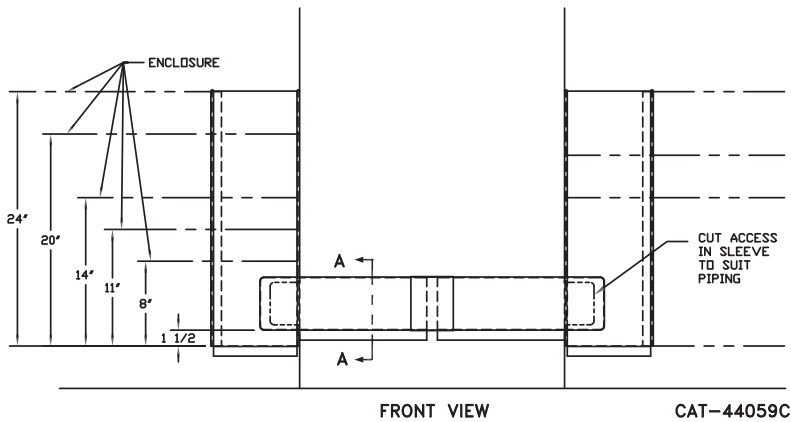
This picture shows the smooth contours and precision fabrication. The drawing below gives full details and dimensions.



DETAILS & DIMENSIONS

- Column Enclosure - 18 Gauge CRS (SRP-15820)
- Hanger Strip - 18 Gauge CRS
- Roll Pipe Hanger
- Joiner Strip - 2-1/2" or 4" wide (SRP-15821) with #8 x 1/2 Truss Head Screws
- Rubber U-Channel Trim 1/16 x 3/16 x 5/16
- Pipe By Others
- Fasteners By Others Unless Specified

COLUMN ENCLOSURES



NOTE: All parts supplied to maximum dimensions, as shown to be cut on the job to suit individual column sizes.

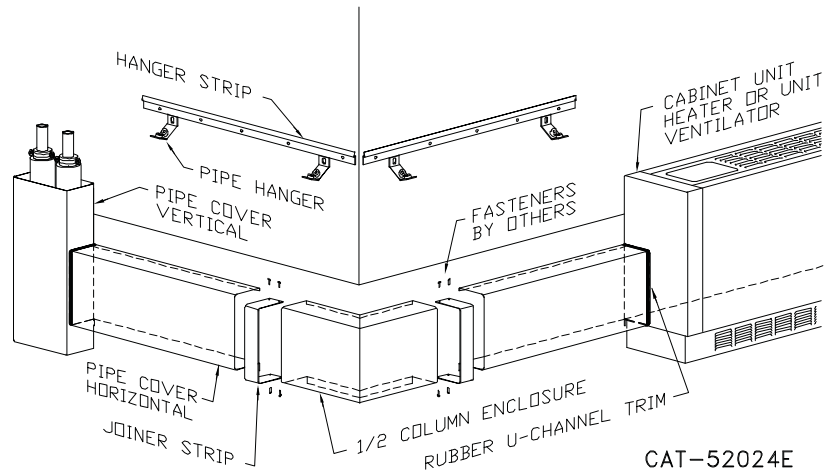
*Piping may be 1 or 2 tiers as required. Install hangers to suit enclosure piping.

See page 34 for straight Pieces 4", 5", 11" or 17"

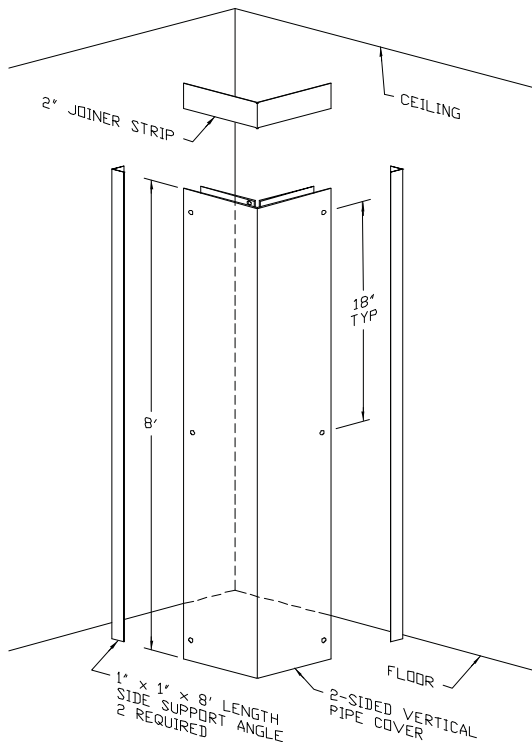
PIPE ENCLOSURES SEE PAGE 33 FOR COLUMN ENCLOSURES

METAL PIPE ENCLOSURES

CATALOG NUMBER	DESCRIPTION
HORIZONTAL	
HPC-4	4" HIGH 18 GA - 8' LENGTHS
HPC-5	5" HIGH 18 GA - 8' LENGTHS
HPC-11	11" HIGH 18 GA - 8' LENGTHS
HPC-17	17" HIGH 18 GA - 8' LENGTHS
V610	MOUNTING STRIP
RPH-2	ROLL PIPE HANGER
VERTICAL	
VPC-52	5 x 5 TWO SIDE 18 GA - 8' LENGTHS
VPC-82	8 x 8 TWO SIDE 18 GA - 8' LENGTHS
VPC-53	5 x 5 THREE SIDE 18 GA - 8' LENGTHS
VPC-83	8 x 8 THREE SIDE 18 GA - 8' LENGTHS
1 x 1 FA	1 x 1 SIDE SUPPORT ANGLE - 8' LENGTHS (2 PER VERTICAL PIPE ENCLOSURE)
1 x 1 FAB	1 x 1 SIDE SUPPORT ANGLE - 8' LENGTHS (2 PER VERTICAL PIPE ENCLOSURE)



See page 33 for cross section view.

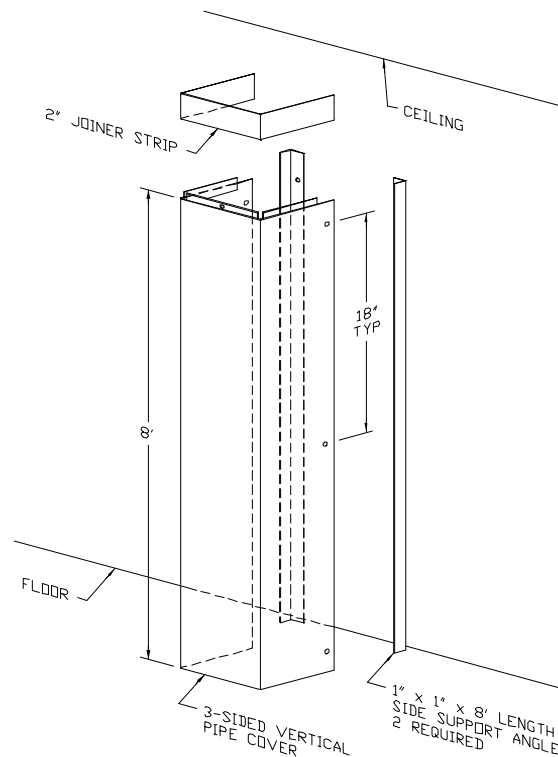


FASTENERS ARE BY OTHERS.

FOR CEILING HEIGHTS GREATER THAN 8', MULTIPLE PIECES WILL BE REQUIRED.

CAT-68234

VERTICAL 2 SIDED -52 5' x 5' x 8' LENGTHS
VERTICAL 2 SIDED -82 8' x 8' x 8' LENGTHS



FASTENERS ARE BY OTHERS.

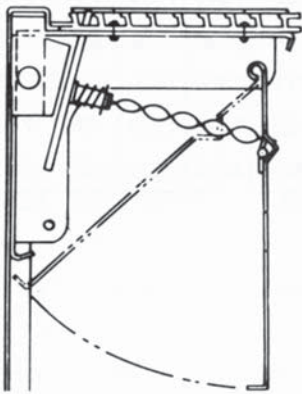
FOR CEILING HEIGHTS GREATER THAN 8', MULTIPLE PIECES WILL BE REQUIRED.

CAT-68235

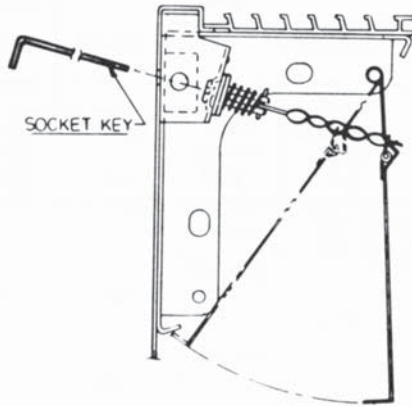
VERTICAL 3 SIDED -53 5' x 5' x 8' LENGTHS
VERTICAL 3 SIDED -83 8' x 8' x 8' LENGTHS

DESIGN FEATURES

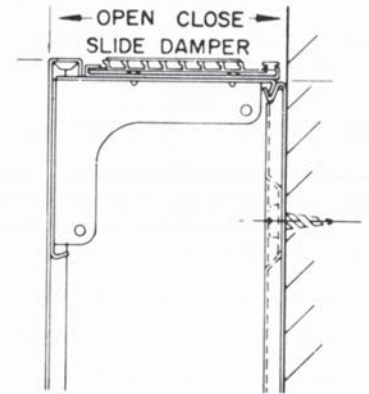
OPTIONAL DAMPER ASSEMBLIES



CAT - 71791



CAT - 71792



CAT - 71793

DIAL (D) – OPTIONAL

The damper assembly option is provided with a neatly concealed dial operated, fully modulating damper blade assembly. The damper blade is manufactured with rolled edges for lateral rigidity.

TAMPER RESISTANT (TP) – OPTIONAL

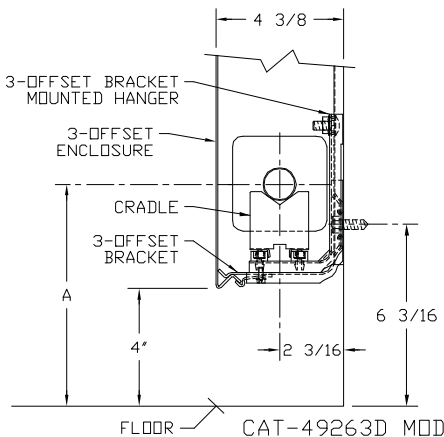
The damper assembly option is provided with a concealed operator requiring a specialty tool to position fully modulating damper blade.

SLIDE DAMPER (SD) – OPTIONAL

The slide damper assembly consisting of two integrated extruded aluminum clear anodized grille plates provide air discharge control by front to back positioning which requires no mechanical actuating parts. Available in “4” offset enclosures. Not recommended to be painted.

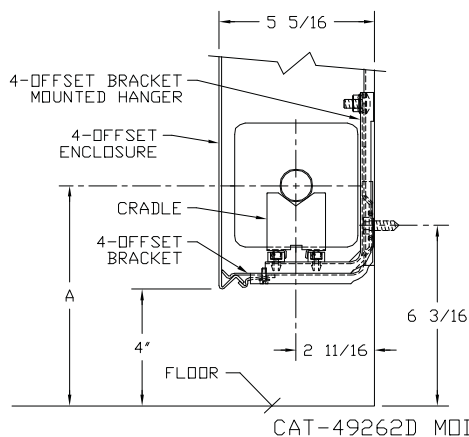
VERTICAL ELEMENT CENTERLINE DIMENSIONS FOR INSTALLATIONS USING STEAM BRACKETS WITH

“3” OFFSET



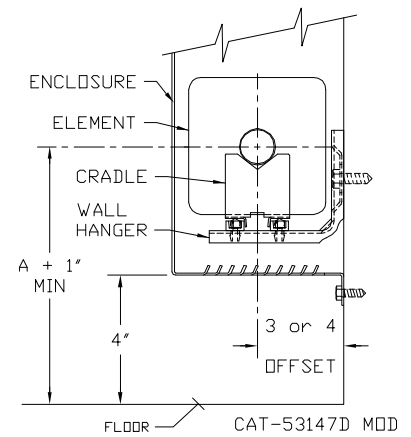
CAT-49263D MOD

“4” OFFSET



CAT-49262D MOD

LOUVERED INLET RETURN TO WALL “J” CLASSIC ONLY



CAT-53147D MOD

Standard brackets with bracket mounted hangers are required for single or multiple tier installations where pitch adjustment is necessary. The hangers are to incorporate ball bearings/nylon inserts for smooth element travel during expansion and contraction.

ELEMENT TUBE SIZE	CRADLE NO.	A MIN	A MAX
3/4" COPPER	2	7-3/8	9-5/8
1" COPPER	2	7-1/2	9-3/4
1-1/4" COPPER	1	7	9-1/4
2" STEEL	1	7-7/8	10-1/8

ELEMENT TUBE SIZE	CRADLE NO.	A MIN	A MAX
3/4" COPPER	2	7-3/8	8-3/4
1" COPPER	2	7-1/2	8-7/8
1-1/4" COPPER	2	7-3/8	9
1-1/4" STEEL	2	7-7/8	9-1/4
2" STEEL	1	7-5/8	9

DESIGN DATA

COMMERCIAL FINNED-TUBE CHARTS FOR RATING CORRECTIONS

Catalog finned-tube ratings are based upon the following conditions:

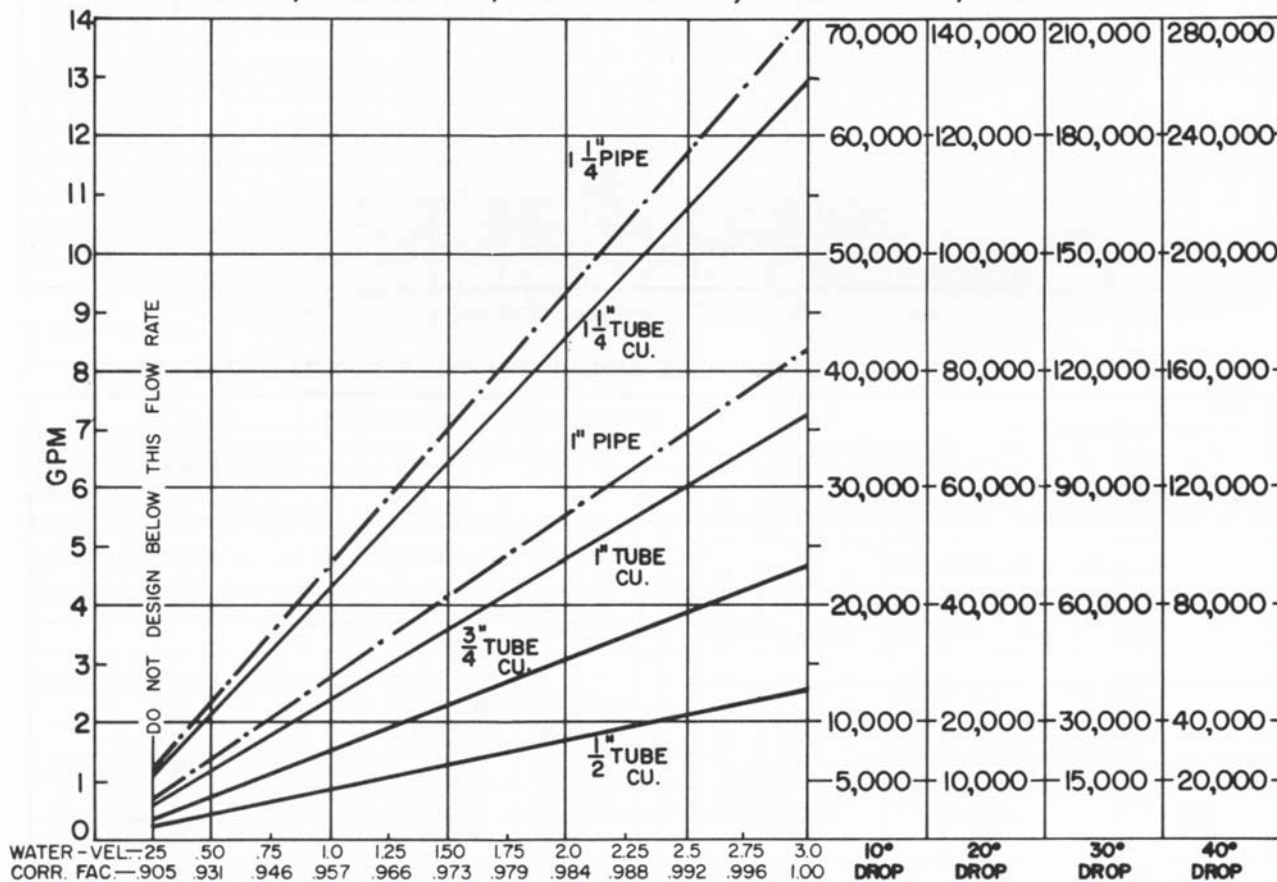
- Steam ratings are based on .899 pounds of steam @ 215°F and 65°F entering air temperature at sea level.
- Water ratings shown are based on 3 Ft/sec. velocity and have been determined by applying correction factors developed by I=B=R to the steam ratings. For velocities less than 3 Ft/sec., see chart below for applicable correction factors.
- Ratings are based on active (finned) length. Steel element fins have black enamel finish.
- Ratings are based on mounting heights indicated in tables shown.

Use the following calculation with correction factors for job conditions to determine corrected rating:

$$\text{Corrected Rating} = (215^\circ\text{f Catalog Rating}) \times \left(\begin{array}{c} \text{Correction Factor For} \\ \text{Steam Or Water And} \\ \text{Average Air Temp.} \end{array} \right) \\ \times \left(\begin{array}{c} \text{Correction Factor} \\ \text{For Flow Rate} \end{array} \right) \times \left(\begin{array}{c} \text{Correction For Mounting} \\ \text{Hgt. See Catalog Rating} \end{array} \right)$$

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	2.83	3.66						
1" PIPE		.37	.79	1.3	2.00	2.70	3.70	4.80					
1 1/4" COP ALUM.	.16	.33	.55	.79	1.08	1.33	1.8	2.25	2.26	2.91	3.3		
1 1/4" PIPE	.09	.18	.31	.5	.70	1.0	1.1	1.3	1.6	1.8	2.58	2.3	3.3

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

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.

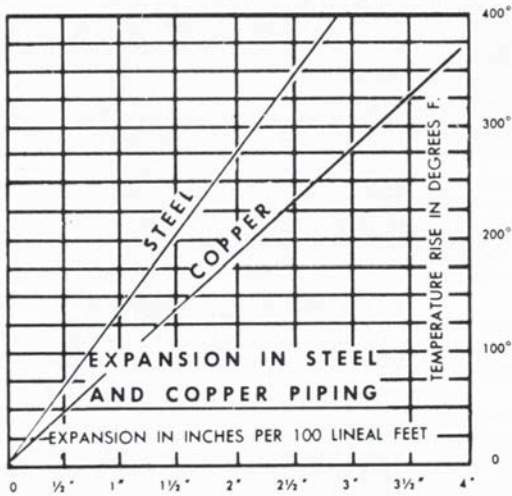
MAXIMUM PRESSURES AT OTHER TEMPERATURES ARE AVAILABLE UPON REQUEST.

PIPE WATER CAPACITIES AND QUANTITIES CIRCULATED AT VELOCITY OF 3* FEET PER SECOND

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 Basis for Hot Water Rating Factors Shown on this Page.

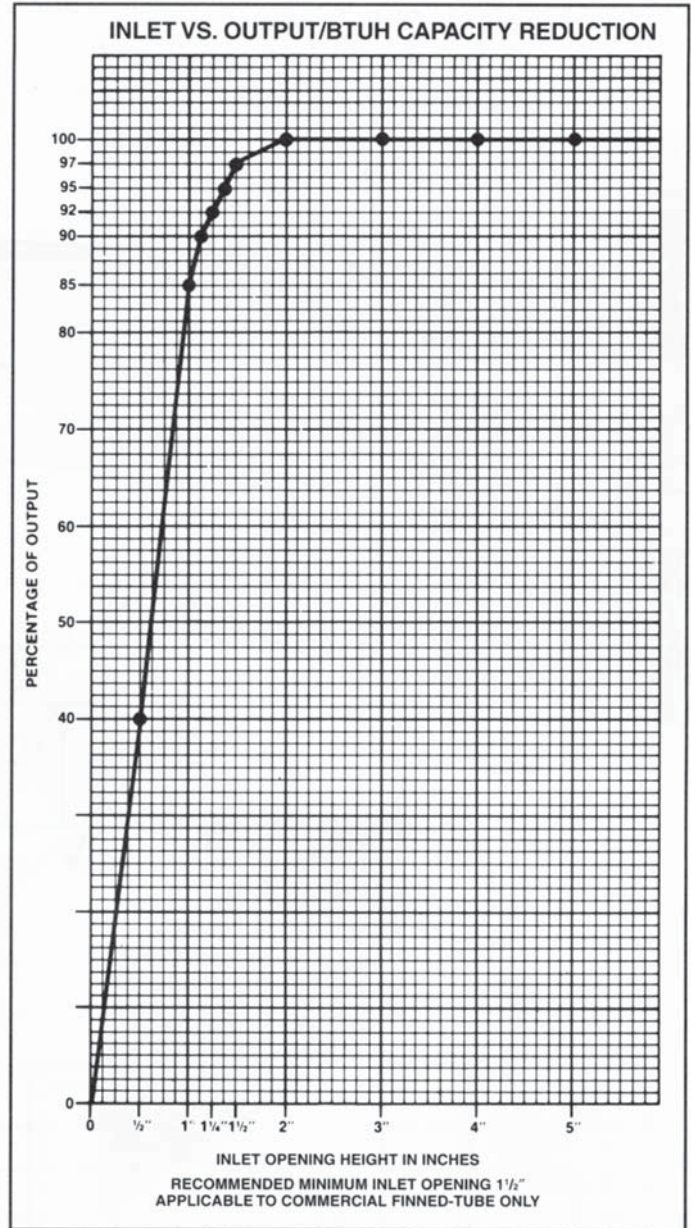
$$\text{VELOCITY FT./SEC.} = \frac{\text{LBS. PER HOUR}}{(\text{GALS. PER FT.}) (3600) (8.3)}$$



† CORRECTIONS WHEN USING GLYCOL SOLUTION IN SYSTEM

		ETHYLENE PROPYLENE GLYCOL GLYCOL	
		ETHYLENE GLYCOL	PROPYLENE GLYCOL
1. Heat transfer @ 180°F, with no increase in flow rate	20% Solution	.946*	.982*
	30% Solution	.913*	.961*
	40% Solution	.879*	.934*
	50% Solution	.842*	.902*
2. G.P.M. Req'd. @ 180°F, (No correction to pump curve)	20° Δt	114%*	110%*
3. Pump head req'd. @ 180°F, with increase in G.P.M.		123%*	123%*
4. Freezing Point	50% by volume	-37°F	-28°F
	40%	-14°F	-13°F
	30%	+ 2°F	+ 4°F
	20%	+15°F	+17°F

*Compared To Water.



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

† Note: The heat output of standard heat distributing units is not affected enough to be considered in sizing the units, when the flow rate has been increased as shown at left. If not increased, apply appropriate heat transfer correction factor indicated.

DESIGN DATA

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.

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	.60								
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	

DESIGN FEATURES

ENCLOSURES

Both the standard wiped edge Classic and the “J” slip-jointed Classic incorporate durable extruded aluminum, clear anodized, pencil proof grilles, attached to rugged 14 gauge internal gussets. The grille/gusset design provides for concealed engagement with backplate, yet allows for easy installation without marking or scratching of the wall surface. The Classic line offers both internally telescoping accessories or the “J” style overlapping accessories. All accessories engage between backplate and the wall at the top and return to wall at the bottom. Pre-punched holes are provided to allow for anchoring with fasteners by others. Both of the Classic styles utilize either full or partial backplate. Brackets and hangers are interchangeable between both types. The aesthetically pleasing enclosures are available in a wide range of material thickness and types with a selection of standard electrostatically applied baked enamel colors. Special colors are available with approved paint chips. (See photos A and B.)

BRACKETS AND ELEMENT SUPPORT HANGERS WALL OR BRACKET MOUNTED

All brackets and element support hangers are die-formed, wiped edge channel type construction which provides the strongest and most rigid support for either the enclosure or element available anywhere. The standard bracket (D) is used with an adjustable bracket mounted element support. This will allow vertical movement of the element simply by loosening a nut. Silent glide action is provided by the nickel chromium plated ball bearings encased in a rugged space age nylon insert. The isolation effect on the nylon material creates an optimum noise deadening condition and therefore, element expansion noise is virtually eliminated. (See photo D.)

The water brackets (E) (F) are also available with the silent glide ball bearing assembly directly mounted so that the element support hanger is eliminated when pitch is not required. These “water brackets” allow an even faster installation.

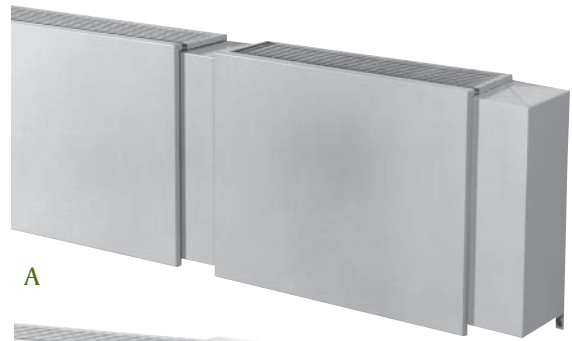
All elements are nested onto a die-formed 18 gauge galvanized slide cradle which rests on the silent glide ball bearings. These slide cradles are designed to support the element tube or pipe only, so that fin drag will not create undesirable noise. (See photos D and E.) Lateral movement up to 3" is available for expansion and contraction.

Enclosure brackets are formed at the top to engage the top inside bend of either the partial or full backplate. This automatic locating design simplifies installation and helps keep costs down. (See photos C, D and E.)

All enclosure brackets (standard or water type) are provided with posi-lock enclosures locks. These provide a quick and sure method of securing the enclosure to the bracket and deters vandalism. The bracket is designed to positively snap and secure the enclosure bottom. The posi-lock makes sure it stays there, no matter what. The posi-lock also provides the additional holding force for those installations that require the enclosure assembly to be mounted in an inverted position. (See photo F.)

ROLL PIPE HANGERS

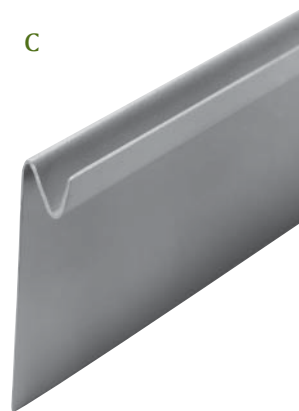
These are designed to support the supply or return pipes within the enclosures. The nylon insert acts as an isolator so that pipe noise is not transmitted as readily through the enclosure. Smooth lateral movement is a definite plus. (See photo G.)



A



B



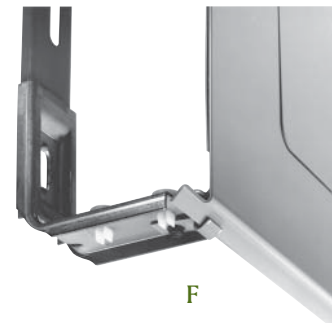
C



D



E



F



G

SPECIAL GENERAL SPECIFICATIONS

Furnish and install where shown on all plans/ drawings, Finned-Tube Assemblies as described in the specifications below or approved equal quality and capacity. Approved I=B=R ratings must be submitted as required.

HEATING ELEMENTS

All copper/aluminum heating elements shall be manufactured with seamless copper tubing mechanically expanded into the diameter of the equally spaced aluminum fins. The ends of the copper tube shall be finished O.D. (male) and finished I.D. (female, swaged) as to allow the use of standard domestic copper fittings.

All steel heating elements shall be manufactured with steel pressure tubing mechanically expanded into the diameter of the equally spaced steel (.024, .032) fins. The ends of the steel tube shall be threaded to accept all domestic NPT threaded fittings or cut square and chamfered for welding in field. All steel fins shall be pre-painted black with an enamel based black paint.

BACKPLATE

All full backplates will be one piece construction, 20 gauge galvanized steel (18 gauge optional) with a die-formed mounting channel into which the enclosed shall self-locate and secure. Self-adhesive closed cell neoprene air seal gasket to be provided when requested to prevent dirt streaking (specify factory or field installed).

All partial backplates are to be machine roll formed, pre-painted, 20 gauge steel with formed mounting channel into which the enclosure shall self-locate and secure. 18 gauge partial backplates will be provided as galvanized finish. Self-adhesive closed cell neoprene air seal gasket to be provided when requested to prevent dirt streaking (specify factory or field installed).

BRACKET HANGERS

All brackets and hangers are to be die-formed 14 gauge galvanized steel with channel type wiped edge construction for rigidity. Nickel-chromium plated ball bearings inserted into a nylon isolator insert are to be used in conjunction with an 18 gauge galvanized die-formed element support cradle to provide friction free lateral movement during expansion and contraction. Brackets are to have pre-formed contour at the top allowing the bracket to interlock with the backplate channel. Brackets are to be self-locating in the vertical (height) position. Hangers are to provide for vertical element adjustment when pitch is required (steam). Water jobs will not require adjustable hangers. Full engagement enclosure locks are to be supplied with each bracket. Bracket locations are recommended to be 2'6" to 4'0" on center located not more than 12" in from ends of enclosure based on individual design applications.

ENCLOSURE AND ACCESSORIES

Standard Classic Finned-Tube Enclosures are to be of style and size as shown on plans. Material will be 16 gauge standard, 14 gauge optional, degreased and phosphatized and sealer coated cold rolled steel with an electrostatically applied temperature

cured baked enamel or primer finish. Internally welded 14 gauge gussets shall occur at regular intervals to which the "pencil proof" clear anodized extruded aluminum grille will be affixed. The gussets are designed to engage the backplate at installation and, at the same time, provide location and support for damper pivot pins when required. All enclosures will be manufactured with male and female slip joints at opposing ends, providing positive engagement and alignment of adjoining enclosures at installation. The slip joints are to be of such design and form that they will provide vertical stiffening for the front skirt.

Accessories will be internally telescoping within the standard Classic enclosure. The top rear flange shall mount between the backplate and wall, while the bottom flange with pre-punched holes will be secured to the wall after location. All accessories can be mounted prior to cover to allow for adjustments.

"J Classic" Finned-Tube Enclosures are to be of style and size as shown on plans. Material will be 16 gauge standard, 14 gauge optional, degreased and phosphatized and sealer coated cold rolled steel with an electrostatically applied temperature cured baked enamel or primer finish. Internally welded 14 gauge gussets shall occur at regular intervals to which the "pencil proof" clear anodized extruded aluminum grille will be affixed. The gussets are designed to engage the backplate at installation and, at the same time, provide location and support for damper pivot pins when required. All enclosures will be manufactured with male and female slip joints at opposing ends, providing positive engagement and alignment of adjoining enclosures at installation. The slip joints are to be of such design and form that they will provide vertical stiffening for the front skirt.

Accessories will be overlapping design and will provide a raised border appearance resulting from the wiped edge on both sides. The wiped edge flange of the accessories provides vertical stiffening action. The top rear flange shall mount between the backplate and the wall, while the bottom flange with pre-punched holes will be secured to the wall after location. All accessories will be mounted after the enclosure is set and adjustments made.

ACCESS DOORS

When indicated, access doors will be provided at mixer, shut-off or flow control valves. Doors will be 6" x 9" (or 5" x 6") and hinged at top. Access doors will be located in accessories or enclosure as noted on plans. Door latch head shall be of tamper resistant type.

DAMPERS

Dampers will be provided where indicated on plans. Damper blades will have rolled edges for rigidity. Damper actuation will be controlled by dial or tamper resistant operator or slide damper. "4" offset enclosure can be provided with optional slide damper.

OTHER PRODUCTS FOR COMMERCIAL APPLICATIONS

LINOVECTOR II

LINOVECTOR II Finned-Tube Radiation is Vulcan's most versatile and flexible, multi-purpose commercial hydronic heating enclosure line. It provides users an outstanding BTU output/penny of cost. LINOVECTOR II offers contractors and engineers a full range of enclosures styles, height, depths, lengths and element selections. LINOVECTOR II features include small tube sizes and low water temperature ratings.

ASK FOR A LINOVECTOR II CATALOG

"SPECIALS" — CUSTOM ENCLOSURES

When you cannot find exactly what you want in any of the Commercial Finned Tube catalogs, it does not mean that it cannot be made. Vulcan Radiator has been providing specially designed enclosures, cabinets, sills, stools, curtain pockets and anything that you would associate with sheet metal for four decades. From curved wall conditions to fan coil enclosures, Vulcan's quality engineering and manufacturing is combined to yield the highest quality products available. No challenge is too great for us. We like to think that Vulcan can build a better mousetrap. Call your Vulcan representative and discuss your innovative ideas with them.

CONSULT YOUR REPRESENTATIVE.

LIMITED WARRANTY

COMMERCIAL FIN-TUBE RADIATION

1. The Manufacturer warrants to the original owner at the original installation site that the Commercial Fin-Tube (the "Product") will be free from defects in material or workmanship for a period not to exceed (1) year from date of shipment from the factory. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective.
2. This limited warranty does not apply:
 - (a) if the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way by any unauthorized person.
 - (b) to any expenses, including labor or material, incurred during removal or reinstallation of the defective Product or part thereof.
 - (c) to any workmanship of any installer of the Product.
3. This limited warranty is conditional upon:
 - (a) shipment, to Manufacturer, of that part of the Product thought to be defective. Goods may only be returned with the prior written approval of the Manufacturer. All returns must be freight prepaid.
 - (b) determination in the reasonable opinion of the Manufacturer that there exists a defect in material or workmanship.
4. Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period
5. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.



Vulcan

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