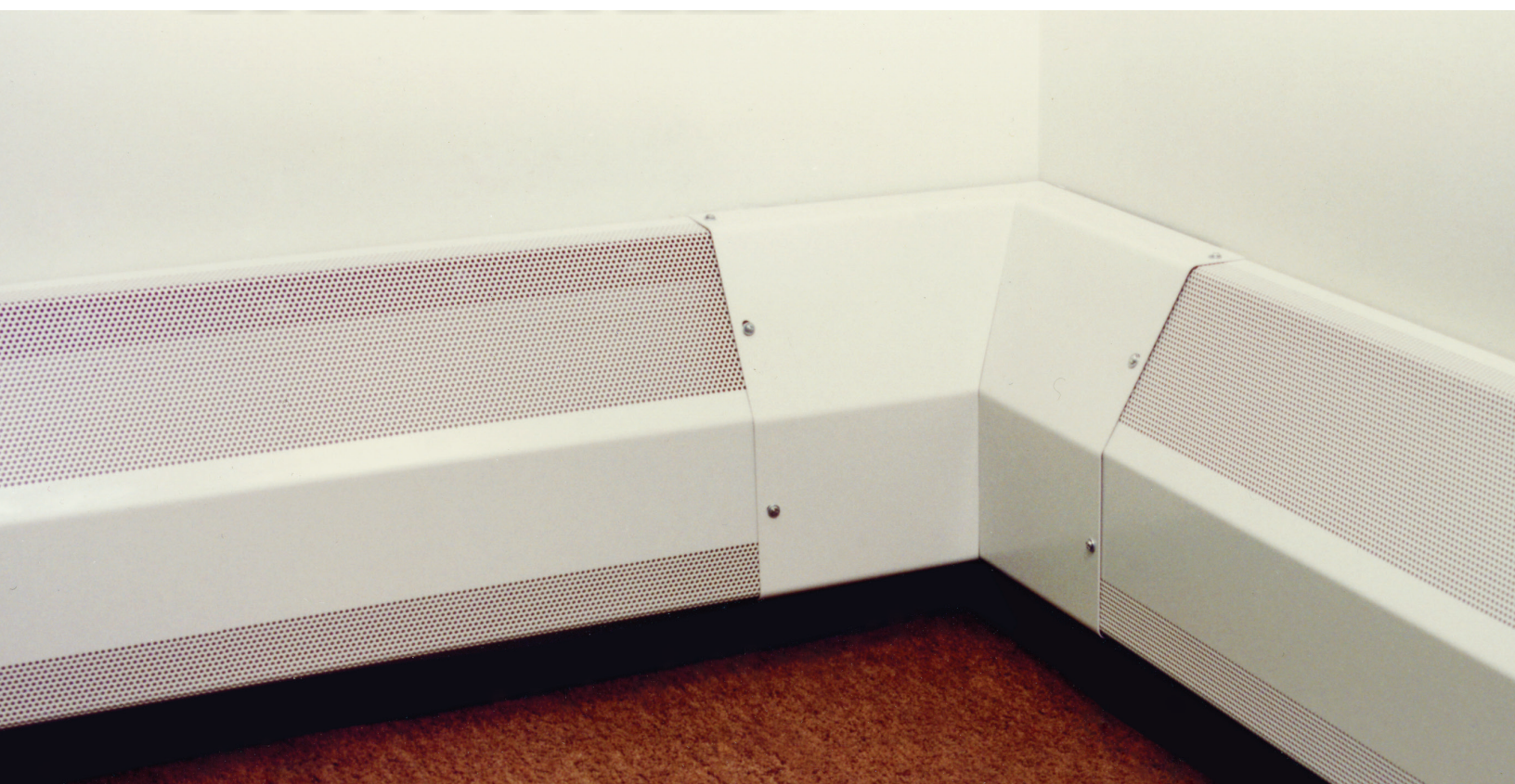


# VANGUARD®



SECURITY HYDRONIC HEATING  
ENCLOSURES FOR SECURE AND  
CONTROLLED ENVIRONMENTS  
PERFORATED HEAVY GAUGE



**Vulcan**  
R A D I A T O R

# VANGUARD SECURITY ENCLOSURES

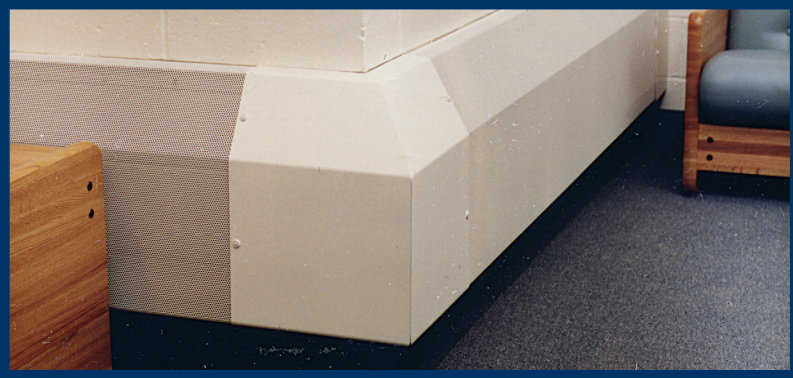
Vanguard Security Enclosures are a step above the competition with design features that meet or beat even the most stringent specifications. The Vanguard Security Enclosure is a proven design which lends itself to easy adaptation for some more sophisticated custom designs. The perforated area can be positioned on the cover to meet any requirement.

Tamper proof fasteners for securing accessories can be factory supplied upon request. Please verify the local and prevailing codes applicable to security fasteners.

All Vulcan commercial hydronic products are made from recycled materials. Material recycled contents can be obtained from your local Vulcan representative or by viewing the [www.vulcanrad.com](http://www.vulcanrad.com) website. Vulcan is a participating member of USGBC-LEEDS.

## INSTALLED IN

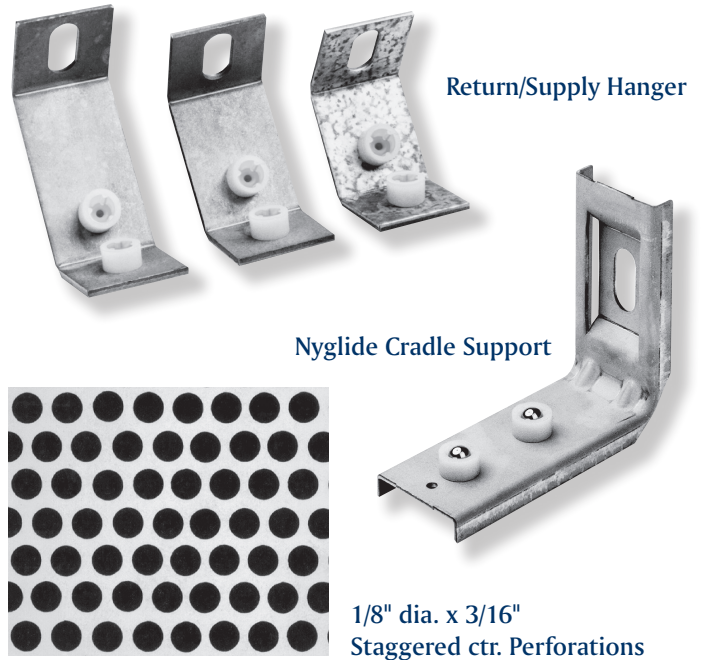
- Corrections Facilities  
State and Federal
- Detention Homes
- Psychiatric Centers
- Nursing Homes
- Athletic Facilities
- Day Care Centers
- Dormitories
- Holding Cells



## FEATURES

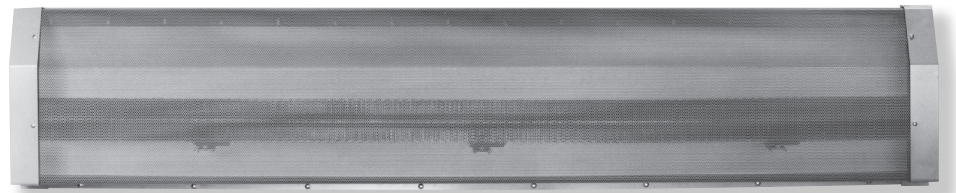
The Vanguard security enclosures are available in both twelve (12) and fourteen (14) gauge material with a full view, full perforated, or extra strength partial perforated pattern. The perforated pattern is based on the industry standard of 1/8" diameter holes on 3/16" staggered centers.

- Partial perforated enclosures are manufactured with standard integral underlapping joiner support.
- Full perforated enclosures are designed to utilize standard external (overlapping) joiner pieces.
- 14 gauge standard (12 gauge optional) backplate available in partial or full height.
- 14 gauge standard (12 gauge optional) accessories, overlapping style with vertical bottom flange for direct wall anchoring.
- Contact your Vulcan agent for 16, 14 or 12 gauge perforated stainless steel enclosures.



## CONSTRUCTION

The enclosure is of the full wrap-around style, which allows full engagement of the backplate at the top with a continuous integral bottom flange for direct wall anchoring. Wall mounted element support brackets

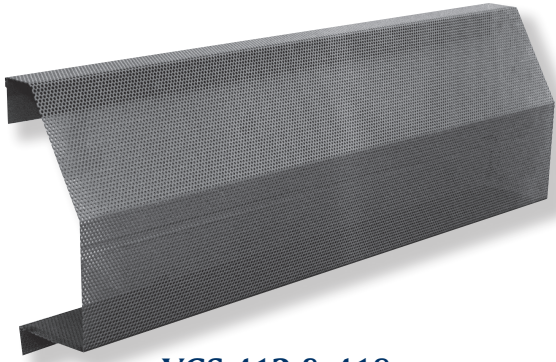


are die formed, wiped edge, channel type construction using 14 gauge galvanized steel incorporating rugged nylon inserts surrounding chromium plated ball bearings. These offer nearly silent element travel while being rust resistant. Backplates, both full and partial, are 14-gauge steel. Both are available in 12 gauge steel. The full backplate is provided with pre-punched slots for mounting fasteners. Consult your Vulcan agent for cost and availability. The roll pipe hangers that are offered to support supply or return pipes are made of 1/8" flat stock galvanized steel. They utilize the nylon insert for a silent glide operation.

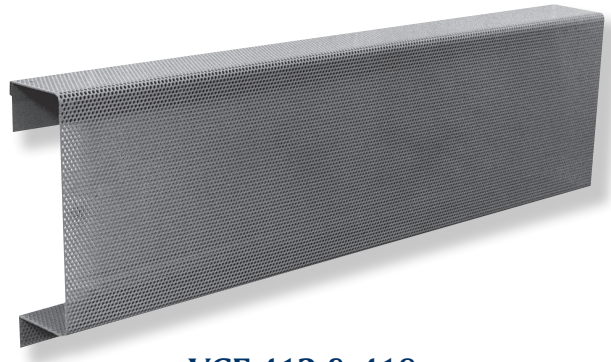
## INSTALLATION

The continuous one-piece backplate design provides a condition that directs and maintains the top flange of the enclosure to nest against the mounting wall. This creates a minimum seam at the enclosure top. When the full height backplate is installed, the backplate stops just above the bottom of the enclosure as it returns to the wall. This allows the bottom enclosure flange to mount flush against the wall leaving no unnecessary cracks or seams to be tampered with. Optional 14 gauge wall sleeve supports are available to ensure secure installation and provide additional make-up in runs when used with wide wall sleeves (4", 6" & 8") where standard length enclosures will not provide enough support to the wall sleeves being used. They also provide additional security at the ends of the enclosure runs in higher security areas. The backplate is designed to be used with both 14 gauge and 12 gauge covers. This installation allows the security enclosure to mount directly against the wall so that a minimum number of seams or potential entry areas are accessible. A variety of tamper resistant fasteners are available as an option. These fasteners are used to secure the overlapping accessories to the cover. Fasteners used to secure material to the construction wall are to be supplied by others.

# VANGUARD STYLES



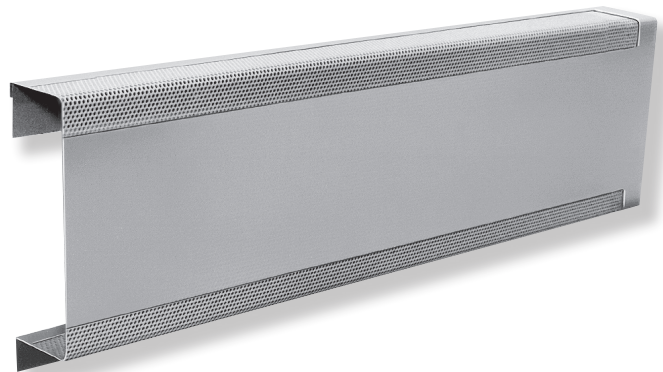
**VGS 412 & 418**  
Full Perforated



**VGF 412 & 418**  
Full Perforated



**VGS 412P & 418P**

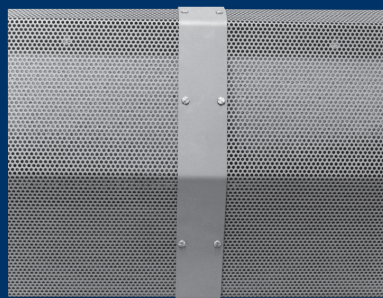


**VGF 412P & 418P**

# ACCESSORIES



**4", 6" & 8" Wall Sleeve**  
(LH, RH or both sides)



**2" Intermediate Joiner Piece**



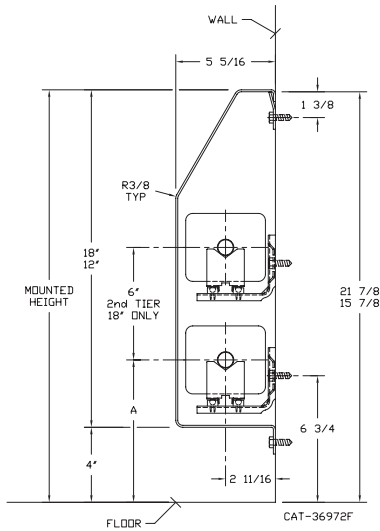
**3" End Cap**



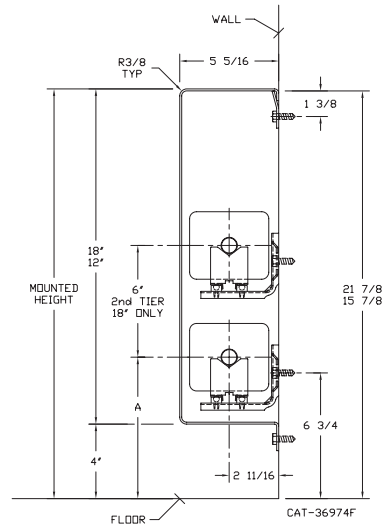
**90° Inside or Outside Corner**

# VANGUARD DIMENSIONAL DATA

## VGS 412 & 418

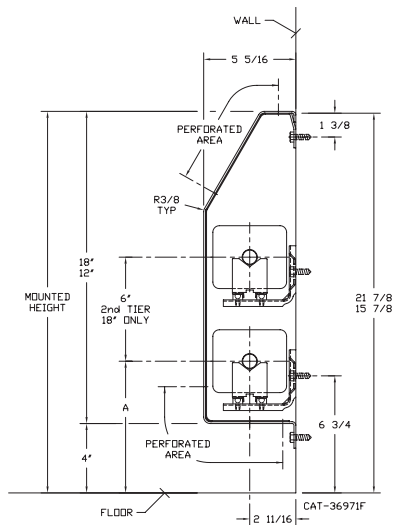


## VGf 412 & 418

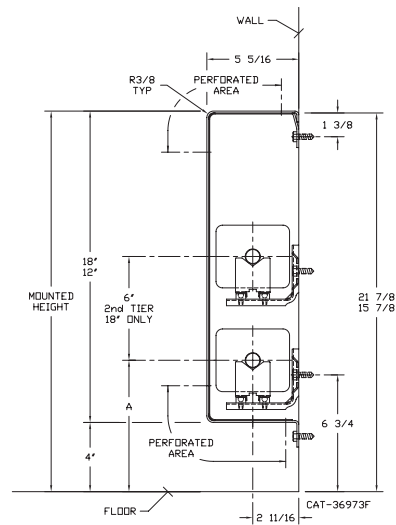


ELEMENT TUBE SIZE	FIN SIZE HEIGHT X WIDTH	CRADLE NUMBER	A
3/4 COPPER	3 5/8 x 4 1/4	2	7 9/16
3/4 COPPER	4 1/4 x 4 1/4	3A	7 15/16
1' COPPER	3 5/8 x 4 1/4	2	7 3/4
1' COPPER	4 1/4 x 4 1/4	2	7 3/4
1 1/4 COPPER	3 5/8 x 4 1/4	2	7 7/8
1 1/4 COPPER	4 1/4 x 4 1/4	2	7 7/8
1' STEEL	4 1/4 x 4 1/4	2	7 7/8
1 1/4 STEEL	4 1/4 x 4 1/4	2	8 1/16
2" STEEL	4 1/4 x 4 1/4	1	7 13/16

## VGS 412P & 418P



## VGf 412P & 418P



# VANGUARD STEAM & HOT WATER RATINGS



ELEMENT RATINGS

All Ratings are Based on 3 FPS Velocity

SLOPING TOP ENCLOSURES – FULLY PERFORATED – VGS										HOT WATER (AVG.)									
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE HEIGHT X WIDTH	FINS PER FT.	FIN THICKNESS IN INCHES	ENCLOSURE DEPTH AND HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MOUNTING HEIGHT IN INCHES	STEAM 215° FACTOR 1.00	200°	190°	180°	170°	160°	150°	140°	130°	120°	110°	100°
									CORRECTION FACTORS FOR AVERAGE WATER TEMPERATURES										
									0.86	0.78	0.69	0.61	0.53	0.45	0.40	0.33	0.26	0.20	0.15
3/4"	VC3/4-433	3-5/8" x 4-1/4"	32	.020	12 (5-5/16")	1	16	1030	890	800	710	630	550	460	410	340	270	210	150
					18 (5-5/16")	1	22	1080	930	840	750	660	570	490	430	360	280	220	160
					"	2 @ 6 CL	"	1910	1640	1490	1320	1170	1010	860	760	630	500	380	290
3/4"	VC3/4-434	3-5/8" x 4-1/4"	40	.020	12 (5-5/16")	1	16	1240	1070	970	860	760	660	560	500	410	320	250	190
					18 (5-5/16")	1	22	1290	1110	1010	890	790	680	580	520	430	340	260	190
					"	2 @ 6 CL	"	2230	1920	1740	1540	1360	1180	1000	890	740	580	450	330
3/4"	VC3/4-435	3-5/8" x 4-1/4"	50	.020	12 (5-5/16")	1	16	1350	1160	1050	930	820	720	610	540	450	350	270	200
					18 (5-5/16")	1	22	1400	1200	1090	970	850	740	630	560	460	360	280	210
					"	2 @ 6 CL	"	2390	2060	1860	1650	1460	1270	1080	960	790	620	480	360
1"	VC433	3-5/8" x 4-1/4"	32	.020	12 (5-5/16")	1	16	1070	920	830	740	650	570	480	430	350	280	210	160
					18 (5-5/16")	1	22	1120	960	870	770	680	590	500	450	370	290	220	170
					"	2 @ 6 CL	"	1990	1710	1550	1370	1210	1050	900	800	660	520	400	300
1"	VC434	3-5/8" x 4-1/4"	40	.020	12 (5-5/16")	1	16	1210	1040	940	830	740	640	540	480	400	310	240	180
					18 (5-5/16")	1	22	1250	1080	980	860	760	660	560	500	410	330	250	190
					"	2 @ 6 CL	"	2170	1870	1690	1500	1320	1150	980	870	720	560	430	330
1"	VC435	3-5/8" x 4-1/4"	50	.020	12 (5-5/16")	1	16	1350	1160	1050	930	820	720	610	540	450	350	270	200
					18 (5-5/16")	1	22	1400	1200	1090	970	850	740	630	560	460	360	280	210
					"	2 @ 6 CL	"	2380	2050	1860	1640	1450	1260	1070	950	790	620	480	360
1-1/4"	VC1433	3-5/8" x 4-1/4"	32	.020	12 (5-5/16")	1	16	1120	960	870	770	680	590	500	450	370	290	220	170
					18 (5-5/16")	1	22	1170	1010	910	810	710	620	530	470	390	300	230	180
					"	2 @ 6 CL	"	2070	1780	1610	1430	1260	1100	930	830	680	540	410	310
1-1/4"	VC1434	3-5/8" x 4-1/4"	40	.020	12 (5-5/16")	1	16	1230	1060	960	850	750	650	550	490	410	320	250	180
					18 (5-5/16")	1	22	1280	1100	1000	880	780	680	580	510	420	330	260	190
					"	2 @ 6 CL	"	2210	1900	1720	1520	1350	1170	990	880	730	570	440	330
1-1/4"	VC1435	3-5/8" x 4-1/4"	50	.020	12 (5-5/16")	1	16	1350	1160	1050	930	820	720	610	540	450	350	270	200
					18 (5-5/16")	1	22	1400	1200	1090	970	850	740	630	560	460	360	280	210
					"	2 @ 6 CL	"	2390	2060	1860	1650	1460	1270	1080	960	790	620	480	360
3/4"	VC3/4-43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1140	980	890	790	700	600	510	460	380	300	230	170
					18 (5-5/16")	1	22	1190	1020	930	820	730	630	540	480	390	310	240	180
					"	2 @ 6 CL	"	2200	1890	1720	1520	1340	1170	990	880	730	570	440	330
3/4"	VC3/4-44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1250	1080	980	860	760	660	560	500	410	330	250	190
					18 (5-5/16")	1	22	1300	1120	1010	900	790	690	590	520	430	340	260	200
					"	2 @ 6 CL	"	2250	1940	1760	1550	1370	1190	1010	900	740	590	450	340
3/4"	VC3/4-45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1380	1190	1080	950	840	730	620	550	460	360	280	210
					18 (5-5/16")	1	22	1440	1240	1120	990	880	760	650	580	480	370	290	220
					"	2 @ 6 CL	"	2460	2120	1920	1700	1500	1300	1110	980	810	640	490	370
1"	VC43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1130	970	880	780	690	600	510	450	370	290	230	170
					18 (5-5/16")	1	22	1180	1010	920	810	720	630	530	470	390	310	240	180
					"	2 @ 6 CL	"	2230	1920	1740	1540	1360	1180	1000	890	740	580	450	330
1"	VC44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1430	1230	1120	990	870	760	640	570	470	370	290	210
					18 (5-5/16")	1	22	1480	1270	1150	1020	900	780	670	590	490	380	300	220
					"	2 @ 6 CL	"	2560	2200	2000	1770	1560	1360	1150	1020	840	670	510	380
1"	VC45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1470	1260	1150	1010	900	780	660	590	490	380	290	220
					18 (5-5/16")	1	22	1530	1320	1190	1060	930	810	690	610	500	400	310	230
					"	2 @ 6 CL	"	2590	2230	2020	1790	1580	1370	1170	1040	850	670	520	390
1-1/4"	VC143	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1180	1010	920	810	720	630	530	470	390	310	240	180
					18 (5-5/16")	1	22	1230	1060	960	850	750	650	550	490	410	320	250	180
					"	2 @ 6 CL	"	2320	2000	1810	1600	1420	1230	1040	930	770	600	460	350
1-1/4"	VC144	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1400	1200	1090	970	850	740	630	560	460	360	280	210
					18 (5-5/16")	1	22	1460	1260	1140	1010	890	770	660	580	480	380	290	220
					"	2 @ 6 CL	"	<b>2520</b>	<b>2170</b>	<b>1970</b>	<b>1740</b>	<b>1540</b>	<b>1340</b>	<b>1130</b>	<b>1010</b>	<b>830</b>	<b>660</b>	<b>500</b>	<b>380</b>
1-1/4"	VC145	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1440	1240	1120	990	880	760	650	580	480	370	290	220
					18 (5-5/16")	1	22	1500	1290	1170	1040	920	800	680	600	500	390	300	230
					"	2 @ 6 CL	"	2550	2190	1990	1760	1560	1350	1150	1020	840	660	510	380
1"	VS43	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	1120	960	870	770	680	590	500	450	370	290	220	170
					18 (5-5/16")	1	22	1160	1000	900	800	710	610	520	460	380	300	230	170
					"	2 @ 6 CL	"	2140	1840	1670	1480	1310	1130	960	860	710	560	430	320
1"	VS44	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1260	1080	980	870	770	670	570	500	420	330	250	190
					18 (5-5/16")	1	22	1310	1130	1020	900	800	690	590	520	430	340	260	200
					"	2 @ 6 CL	"	2260	1940	1760	1560	1380	1200	1020	900	750	590	450	340
1"	VS45	4-1/4" SQ.	50	.032	12 (5-5/16")	1	16	1340	1150	1050	920	820	710	600	540	440	350	270	200
					18 (5-5/16")	1	22	1390	1200	1080	960	850	740	630	560	460	360	280	210
					"	2 @ 6 CL	"	2320	2000	1810	1600	1420	1230	1040	930	770	600	460	350
1-1/4"	VS143	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	1110	950	870	770	680	590	500	440	370	290	220	170
					18 (5-5/16")	1	22	1150	990	900	790	700	610	520	460	380	300	230	170
					"	2 @ 6 CL	"	2120	1820	1650	1460	1290	1120	950	850	700	550	420	320
1-1/4"	VS144	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1250	1080	980	860	760	660	560	500	410	330	250	190
					18 (5-5/16")	1	22	1300	1120	1010	900	790	690	590	520	430	340	260	200
					"	2 @ 6 CL	"	2250	1940	1760	1550	1370							

# VANGUARD STEAM & HOT WATER RATINGS (continued)



ELEMENT RATINGS

All Ratings are Based on 3 FPS Velocity

SLOPING TOP ENCLOSURES – PARTIALLY PERFORATED – VGS-P										HOT WATER (AVG.)									
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE HEIGHT X WIDTH	FINS PER FT.	FIN THICKNESS IN INCHES	ENCLOSURE DEPTH AND HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MOUNTING HEIGHT IN INCHES	STEAM 215° FACTOR 1.00	CORRECTION FACTORS FOR AVERAGE WATER TEMPERATURES										
									200°	190°	180°	170°	160°	150°	140°	130°	120°	110°	100°
									0.86	0.78	0.69	0.61	0.53	0.45	.40	.33	.26	.20	.15
3/4"	VC3/4-433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	1090	940	850	750	660	580	490	440	360	280	220	160
					18 (5-5/16")	1	22	1290	1110	1010	890	790	680	580	520	430	340	260	190
					"	2 @ 6 CL	"	1940	1670	1510	1340	1180	1030	870	780	640	500	390	290
3/4"	VC3/4-434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1310	1130	1020	900	800	690	590	520	430	340	260	200
					18 (5-5/16")	1	22	1550	1330	1210	1070	950	820	700	620	510	400	310	230
					"	2 @ 6 CL	"	2270	1950	1770	1570	1380	1200	1020	910	750	590	450	340
3/4"	VC3/4-435	3-5/8" X 4-1/4"	<b>50</b>	<b>.020</b>	12 (5-5/16")	1	16	1430	1230	1120	990	870	760	640	570	470	370	290	210
					<b>18 (5-5/16")</b>	<b>1</b>	<b>22</b>	<b>1790</b>	<b>1540</b>	<b>1400</b>	<b>1240</b>	<b>1090</b>	<b>950</b>	<b>810</b>	<b>720</b>	<b>590</b>	<b>470</b>	<b>360</b>	<b>270</b>
					"	2 @ 6 CL	"	2400	2060	1870	1660	1460	1270	1080	960	790	620	480	360
1"	VC433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	1140	980	890	790	700	600	510	460	380	300	230	170
					18 (5-5/16")	1	22	1340	1150	1050	920	820	710	600	540	440	350	270	200
					"	2 @ 6 CL	"	2020	1740	1580	1390	1230	1070	910	810	670	530	400	300
1"	VC434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1270	1090	990	880	770	670	570	510	420	330	250	190
					18 (5-5/16")	1	22	1510	1300	1180	1040	920	800	680	600	500	390	300	230
					"	2 @ 6 CL	"	2210	1900	1720	1520	1350	1170	990	880	730	570	440	330
1"	VC435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1430	1230	1120	990	870	760	640	570	470	370	290	210
					18 (5-5/16")	1	22	1790	1540	1400	1240	1090	950	810	720	590	470	360	270
					"	2 @ 6 CL	"	2390	2060	1860	1650	1460	1270	1080	960	790	620	480	360
1-1/4"	VC1433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	1180	1010	920	810	720	630	530	470	390	310	240	180
					18 (5-5/16")	1	22	1390	1200	1080	960	850	740	630	560	460	360	280	210
					"	2 @ 6 CL	"	2100	1810	1640	1450	1280	1110	950	840	690	550	420	320
1-1/4"	VC1434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1300	1120	1010	900	790	690	590	520	430	340	260	200
					18 (5-5/16")	1	22	1540	1320	1200	1060	940	820	690	620	510	400	310	230
					"	2 @ 6 CL	"	2250	1940	1760	1550	1370	1190	1010	900	740	590	450	340
1-1/4"	VC1435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1430	1230	1120	990	870	760	640	570	470	370	290	210
					18 (5-5/16")	1	22	1790	1540	1400	1240	1090	950	810	720	590	470	360	270
					"	2 @ 6 CL	"	2400	2060	1870	1660	1460	1270	1080	960	790	620	480	360
3/4"	VC3/4-43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1210	1040	940	830	740	640	540	480	400	310	240	180
					18 (5-5/16")	1	22	1430	1230	1120	990	870	760	640	570	470	370	290	210
					"	2 @ 6 CL	"	2130	1830	1660	1470	1300	1130	960	850	700	550	430	320
3/4"	VC3/4-44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1320	1140	1030	910	810	700	590	530	440	340	260	200
					18 (5-5/16")	1	22	1560	1340	1220	1080	950	830	700	620	510	410	310	230
					"	2 @ 6 CL	"	2180	1870	1700	1500	1330	1160	980	870	720	570	440	330
3/4"	VC3/4-45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1470	1260	1150	1010	900	780	660	590	490	380	290	220
					18 (5-5/16")	1	22	1830	1570	1430	1260	1120	970	820	730	600	480	370	270
					"	2 @ 6 CL	"	2370	2040	1850	1640	1450	1260	1070	950	780	620	470	360
1"	VC43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1210	1040	940	830	740	640	540	480	400	310	240	180
					18 (5-5/16")	1	22	1430	1230	1120	990	870	760	640	570	470	370	290	210
					"	2 @ 6 CL	"	2160	1860	1680	1490	1320	1140	970	860	710	560	430	320
1"	VC44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1490	1280	1160	1030	910	790	670	600	490	390	300	220
					18 (5-5/16")	1	22	1730	1490	1350	1190	1060	920	780	690	570	450	350	260
					"	2 @ 6 CL	"	2390	2060	1860	1650	1460	1270	1080	960	790	620	480	360
1"	VC45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1570	1350	1220	1080	960	830	710	630	520	410	310	240
					18 (5-5/16")	1	22	1980	1700	1540	1370	1210	1050	890	790	650	510	400	300
					"	2 @ 6 CL	"	2260	1940	1760	1560	1380	1200	1020	900	750	590	450	340
1-1/4"	VC143	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1240	1070	970	860	760	660	560	500	410	320	250	190
					18 (5-5/16")	1	22	1430	1230	1120	990	870	760	640	570	470	370	290	210
					"	2 @ 6 CL	"	2170	1870	1690	1500	1320	1150	980	870	720	560	430	330
1-1/4"	VC144	4-1/4" SQ.	<b>40</b>	<b>.020</b>	12 (5-5/16")	1	16	1470	1260	1150	1010	900	780	660	590	490	380	290	220
					18 (5-5/16")	1	22	1700	1460	1330	1170	1040	900	770	680	560	440	340	260
					<b>18 (5-5/16")</b>	<b>2 @ 6 CL</b>	<b>22</b>	<b>2350</b>	<b>2020</b>	<b>1830</b>	<b>1620</b>	<b>1430</b>	<b>1250</b>	<b>1060</b>	<b>940</b>	<b>780</b>	<b>610</b>	<b>470</b>	<b>350</b>
1-1/4"	VC145	4-1/4" SQ.	<b>50</b>	<b>.020</b>	12 (5-5/16")	1	16	1540	1320	1200	1060	940	820	690	620	510	400	310	230
					18 (5-5/16")	1	22	1940	1670	1510	1340	1180	1030	870	780	640	500	390	290
					"	2 @ 6 CL	"	2220	1910	1730	1530	1350	1180	1000	890	730	580	440	330
1"	VS43	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	1140	980	890	790	700	600	510	460	380	300	230	170
					18 (5-5/16")	1	22	1230	1060	960	850	750	650	550	490	410	320	250	180
					"	2 @ 6 CL	"	2030	1750	1580	1400	1240	1080	910	810	670	530	410	300
1"	VS44	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1290	1110	1010	890	790	680	580	520	430	340	260	190
					18 (5-5/16")	1	22	1390	1200	1080	960	850	740	630	560	460	360	280	210
					"	2 @ 6 CL	"	2150	1850	1680	1480	1310	1140	970	860	710	560	430	320
1"	VS45	4-1/4" SQ.	50	.032	12 (5-5/16")	1	16	1370	1180	1070	950	840	730	620	550	450	360	270	210
					18 (5-5/16")	1	22	1470	1260	1150	1010	900	780	660	590	490	380	290	220
					"	2 @ 6 CL	"	2200	1890	1720	1520	1340	1170	990	880	730	570	440	330
1-1/4"	VS143	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	1130	970	880	780	690	600	510	450	370	290	230	170
					18 (5-5/16")	1	22	1220	1050	950	840	740	650	550	490	400	320	240	180
					"	2 @ 6 CL	"	2010	1730	1570	1390	1230	1070	900	800	660	520	400	300
1-1/4"	VS144	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1280	1100	1000	880	780	680	580	510	420	330	260	190
					18 (5-5/16")	1	22	1380	1190	1080	950	840	730	62					

# VANGUARD STEAM & HOT WATER RATINGS (continued)

FLAT TOP ENCLOSURES – FULLY PERFORATED – VGF									ELEMENT RATINGS All Ratings are Based on 3 FPS Velocity										
TUBE SIZE	CATALOG DESIGNATION	FIN SIZE HEIGHT X WIDTH	FINS PER FT.	FIN THICKNESS IN INCHES	ENCLOSURE DEPTH AND HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MOUNTING HEIGHT IN INCHES	STEAM 215° FACTOR 1.00	HOT WATER (AVG.)										
									200°	190°	180°	170°	160°	150°	140°	130°	120°	110°	100°
									CORRECTION FACTORS FOR AVERAGE WATER TEMPERATURES										
									0.86	0.78	0.69	0.61	0.53	0.45	.40	.33	.26	.20	.15
3/4"	VC3/4-433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	950	820	740	660	580	500	430	380	310	250	190	140
					18 (5-5/16")	1	22	980	840	760	680	600	520	440	390	320	250	200	150
					"	2 @ 6 CL	"	1750	1510	1370	1210	1070	930	790	700	580	460	350	260
3/4"	VC3/4-434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1140	980	890	790	700	600	510	460	380	300	230	170
					18 (5-5/16")	1	22	1170	1010	910	810	710	620	530	470	390	300	230	180
					"	2 @ 6 CL	"	2040	1750	1590	1410	1240	1080	920	820	670	530	410	310
3/4"	VC3/4-435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1270	1090	990	880	770	670	570	510	420	330	250	190
					18 (5-5/16")	1	22	1290	1110	1010	890	790	680	580	520	430	340	260	190
					"	2 @ 6 CL	"	2280	1960	1780	1570	1390	1210	1030	910	750	590	460	340
1"	VC433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	990	850	770	680	600	520	450	400	330	260	200	150
					18 (5-5/16")	1	22	1020	880	800	700	620	540	460	410	340	270	200	150
					"	2 @ 6 CL	"	1820	1570	1420	1260	1110	960	820	730	600	470	360	270
1"	VC434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1110	950	870	770	680	590	500	440	370	290	220	170
					18 (5-5/16")	1	22	1140	980	890	790	700	600	510	460	380	300	230	170
					"	2 @ 6 CL	"	1980	1700	1540	1370	1210	1050	890	790	650	510	400	300
1"	VC435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1270	1090	990	880	770	670	570	510	420	330	250	190
					18 (5-5/16")	1	22	1290	1110	1010	890	790	680	580	520	430	340	260	190
					"	2 @ 6 CL	"	2270	1950	1770	1570	1380	1200	1020	910	750	590	450	340
1-1/4"	VC1433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	1030	890	800	710	630	550	460	410	340	270	210	150
					18 (5-5/16")	1	22	1060	910	830	730	650	560	480	420	350	280	210	160
					"	2 @ 6 CL	"	1900	1630	1480	1310	1160	1010	860	760	630	490	380	290
1-1/4"	VC1434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1130	970	880	780	690	600	510	450	370	290	230	170
					18 (5-5/16")	1	22	1160	1000	900	800	710	610	520	460	380	300	230	170
					"	2 @ 6 CL	"	2020	1740	1580	1390	1230	1070	910	810	670	530	400	300
1-1/4"	VC1435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1270	1090	990	880	770	670	570	510	420	330	250	190
					18 (5-5/16")	1	22	1290	1110	1010	890	790	680	580	520	430	340	260	190
					"	2 @ 6 CL	"	2280	1960	1780	1570	1390	1210	1030	910	750	590	460	340
3/4"	VC3/4-43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1050	900	820	720	640	560	470	420	350	270	210	160
					18 (5-5/16")	1	22	1090	940	850	750	660	580	490	440	360	280	220	160
					"	2 @ 6 CL	"	2100	1810	1640	1450	1280	1110	950	840	690	550	420	320
3/4"	VC3/4-44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1150	990	900	790	700	610	520	460	380	300	230	170
					18 (5-5/16")	1	22	1180	1010	920	810	720	630	530	470	390	310	240	180
					"	2 @ 6 CL	"	2150	1850	1680	1480	1310	1140	970	860	710	560	430	320
3/4"	VC3/4-45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1300	1120	1010	900	790	690	590	520	430	340	260	200
					18 (5-5/16")	1	22	1340	1150	1050	920	820	710	600	540	440	350	270	200
					"	2 @ 6 CL	"	2360	2030	1840	1630	1440	1250	1060	940	780	610	470	350
1"	VC43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1180	1010	920	810	720	630	530	470	390	310	240	180
					18 (5-5/16")	1	22	1200	1030	940	830	730	640	540	480	400	310	240	180
					"	2 @ 6 CL	"	2330	2000	1820	1610	1420	1230	1050	930	770	610	470	350
1"	VC44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1310	1130	1020	900	800	690	590	520	430	340	260	200
					18 (5-5/16")	1	22	1330	1140	1040	920	810	700	600	530	440	350	270	200
					"	2 @ 6 CL	"	2450	2110	1910	1690	1490	1300	1100	980	810	640	490	370
1"	VC45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1380	1190	1080	950	840	730	620	550	460	360	280	210
					18 (5-5/16")	1	22	1420	1220	1110	980	870	750	640	570	470	370	280	210
					"	2 @ 6 CL	"	2460	2120	1920	1700	1500	1300	1110	980	810	640	490	370
1-1/4"	VC143	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1080	930	840	750	660	570	490	430	360	280	220	160
					18 (5-5/16")	1	22	1100	950	860	760	670	580	500	440	360	290	220	170
					"	2 @ 6 CL	"	2220	1910	1730	1530	1350	1180	1000	890	730	580	440	330
1-1/4"	VC144	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1280	1100	1000	880	780	680	580	510	420	330	260	190
					18 (5-5/16")	1	22	1310	1130	1020	900	800	690	590	520	430	340	260	200
					"	2 @ 6 CL	"	2410	2070	1880	1660	1470	1280	1080	960	800	630	480	360
1-1/4"	VC145	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1360	1170	1060	940	830	720	610	540	450	350	270	200
					18 (5-5/16")	1	22	1400	1200	1090	970	850	740	630	560	460	360	280	210
					"	2 @ 6 CL	"	2420	2080	1890	1670	1480	1280	1090	970	800	630	480	360
1"	VS43	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	1000	860	780	690	610	530	450	400	330	260	200	150
					18 (5-5/16")	1	22	1040	890	810	720	630	550	470	420	340	270	210	160
					"	2 @ 6 CL	"	1980	1700	1540	1370	1210	1050	890	790	650	510	400	300
1"	VS44	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1130	970	880	780	690	600	510	450	370	290	230	170
					18 (5-5/16")	1	22	1170	1010	910	810	710	620	530	470	390	300	230	180
					"	2 @ 6 CL	"	2090	1800	1630	1440	1270	1110	940	840	690	540	420	310
1"	VS45	4-1/4" SQ.	50	.032	12 (5-5/16")	1	16	1200	1030	940	830	730	640	540	480	400	310	240	180
					18 (5-5/16")	1	22	1240	1070	970	860	760	660	560	500	410	320	250	190
					"	2 @ 6 CL	"	2140	1840	1670	1480	1310	1130	960	860	710	560	430	320
1-1/4"	VS143	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	990	850	770	680	600	520	450	400	330	260	200	150
					18 (5-5/16")	1	22	1030	890	800	710	630	550	460	410	340	270	210	150
					"	2 @ 6 CL	"	1960	1690	1530	1350	1200	1040	880	780	650	510	390	290
1-1/4"	VS144	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1120	960	870	770	680	590	500	450	370	290	220	170
					18 (5-5/16")	1	22	1160	1000	900	800	710	610	520	460	380	300	230	170
					"	2 @ 6 CL	"	2080	1790	1620	1440	1270	1100	940	830	690	540	420	310
1-1/4"	VS145	4-1/4" SQ.	50	.032	12 (5-5/16")	1	16	1170	1010										



# VANGUARD STEAM & HOT WATER RATINGS (continued)

ELEMENT RATINGS

All Ratings are Based on 3 FPS Velocity

## FLAT TOP ENCLOSURES – PARTIALLY PERFORATED – VGF-P

TUBE SIZE	CATALOG DESIGNATION	FIN SIZE HEIGHT X WIDTH	FINS PER FT.	FIN THICKNESS IN INCHES	ENCLOSURE DEPTH AND HEIGHT IN INCHES	TIERS AND CENTERS IN INCHES	MOUNTING HEIGHT IN INCHES	STEAM 215° FACTOR 1.00	HOT WATER (AVG.)												
									200°	190°	180°	170°	160°	150°	140°	130°	120°	110°	100°		
									CORRECTION FACTORS FOR AVERAGE WATER TEMPERATURES												
											0.86	0.78	0.69	0.61	0.53	0.45	.40	.33	.26	.20	.15
3/4"	VC3/4-433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	1000	860	780	690	610	530	450	400	330	260	200	150		
					18 (5-5/16")	1	22	1170	1010	910	810	710	620	530	470	390	300	230	180		
					"	2 @ 6 CL	"	1780	1530	1390	1230	1090	940	800	710	590	460	360	270		
3/4"	VC3/4-434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1200	1030	940	830	730	640	540	480	400	310	240	180		
					18 (5-5/16")	1	22	1400	1200	1090	970	850	740	630	560	460	360	280	210		
					"	2 @ 6 CL	"	2080	1790	1620	1440	1270	1100	940	830	690	540	420	310		
3/4"	VC3/4-435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1350	1160	1050	930	820	720	610	540	450	350	270	200		
					18 (5-5/16")	1	22	1610	1380	1260	1110	980	850	720	640	530	420	320	240		
					"	2 @ 6 CL	"	2290	1970	1790	1580	1400	1210	1030	920	760	600	460	340		
1"	VC433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	1040	890	810	720	630	550	470	420	340	270	210	160		
					18 (5-5/16")	1	22	1220	1050	950	840	740	650	550	490	400	320	240	180		
					"	2 @ 6 CL	"	1860	1600	1450	1280	1130	990	840	740	610	480	370	280		
1"	VC434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1170	1010	910	810	710	620	530	470	390	300	230	180		
					18 (5-5/16")	1	22	1360	1170	1060	940	830	720	610	540	450	350	270	200		
					"	2 @ 6 CL	"	2020	1740	1580	1390	1230	1070	910	810	670	530	400	300		
1"	VC435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1350	1160	1050	930	820	720	610	540	450	350	270	200		
					18 (5-5/16")	1	22	1610	1380	1260	1110	980	850	720	640	530	420	320	240		
					"	2 @ 6 CL	"	2280	1960	1780	1570	1390	1210	1030	910	750	590	460	340		
1-1/4"	VC1433	3-5/8" X 4-1/4"	32	.020	12 (5-5/16")	1	16	1080	930	840	750	660	570	490	430	360	280	220	160		
					18 (5-5/16")	1	22	1270	1090	990	880	770	670	570	510	420	330	250	190		
					"	2 @ 6 CL	"	1930	1660	1510	1330	1180	1020	870	770	640	500	390	290		
1-1/4"	VC1434	3-5/8" X 4-1/4"	40	.020	12 (5-5/16")	1	16	1190	1020	930	820	730	630	540	480	390	310	240	180		
					18 (5-5/16")	1	22	1390	1200	1080	960	850	740	630	560	460	360	280	210		
					"	2 @ 6 CL	"	2060	1770	1610	1420	1260	1090	930	820	680	540	410	310		
1-1/4"	VC1435	3-5/8" X 4-1/4"	50	.020	12 (5-5/16")	1	16	1350	1160	1050	930	820	720	610	540	450	350	270	200		
					18 (5-5/16")	1	22	1610	1380	1260	1110	980	850	720	640	530	420	320	240		
					"	2 @ 6 CL	"	2290	1970	1790	1580	1400	1210	1030	920	760	600	460	340		
3/4"	VC3/4-43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1080	930	840	750	660	570	490	430	360	280	220	160		
					18 (5-5/16")	1	22	1230	1060	960	850	750	650	550	490	410	320	250	180		
					"	2 @ 6 CL	"	1960	1690	1530	1350	1200	1040	880	780	650	510	390	290		
3/4"	VC3/4-44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1330	1140	1040	920	810	700	600	530	440	350	270	200		
					18 (5-5/16")	1	22	1520	1310	1190	1050	930	810	680	610	500	400	300	230		
					"	2 @ 6 CL	"	2210	1900	1720	1520	1350	1170	990	880	730	570	440	330		
3/4"	VC3/4-45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1440	1240	1120	990	880	760	650	580	480	370	290	220		
					18 (5-5/16")	1	22	1730	1490	1350	1190	1060	920	780	690	570	450	350	260		
					"	2 @ 6 CL	"	2130	1830	1660	1470	1300	1130	960	850	700	550	430	320		
1"	VC43	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1080	930	840	750	660	570	490	430	360	280	220	160		
					18 (5-5/16")	1	22	1230	1060	960	850	750	650	550	490	410	320	250	180		
					"	2 @ 6 CL	"	1990	1710	1550	1370	1210	1050	900	800	660	520	400	300		
1"	VC44	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1360	1170	1060	940	830	720	610	540	450	350	270	200		
					18 (5-5/16")	1	22	1550	1330	1210	1070	950	820	700	620	510	400	310	230		
					"	2 @ 6 CL	"	2290	1970	1790	1580	1400	1210	1030	920	760	600	460	340		
1"	VC45	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1470	1260	1150	1010	900	780	660	590	490	380	290	220		
					18 (5-5/16")	1	22	1770	1520	1380	1220	1080	940	800	710	580	460	350	270		
					"	2 @ 6 CL	"	2150	1850	1680	1480	1310	1140	970	860	710	560	430	320		
1-1/4"	VC143	4-1/4" SQ.	32	.020	12 (5-5/16")	1	16	1130	970	880	780	690	600	510	450	370	290	230	170		
					18 (5-5/16")	1	22	1290	1110	1010	890	790	680	580	520	430	340	260	190		
					"	2 @ 6 CL	"	2070	1780	1610	1430	1260	1100	930	830	680	540	410	310		
1-1/4"	VC144	4-1/4" SQ.	40	.020	12 (5-5/16")	1	16	1340	1150	1050	920	820	710	600	540	440	350	270	200		
					18 (5-5/16")	1	22	1530	1320	1190	1060	930	810	690	610	500	400	310	230		
					"	2 @ 6 CL	"	2250	1940	1760	1550	1370	1190	1010	900	740	590	450	340		
1-1/4"	VC145	4-1/4" SQ.	50	.020	12 (5-5/16")	1	16	1450	1250	1130	1000	880	770	650	580	480	380	290	220		
					18 (5-5/16")	1	22	1740	1500	1360	1200	1060	920	780	700	570	450	350	260		
					"	2 @ 6 CL	"	2110	1810	1650	1460	1290	1120	950	840	700	550	420	320		
1"	VS43	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	1030	890	800	710	630	550	460	410	340	270	210	150		
					18 (5-5/16")	1	22	1100	950	860	760	670	580	500	440	360	290	220	170		
					"	2 @ 6 CL	"	1890	1630	1470	1300	1150	1000	850	760	620	490	380	280		
1"	VS44	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1160	1000	900	800	710	610	520	460	380	300	230	170		
					18 (5-5/16")	1	22	1240	1070	970	860	760	660	560	500	410	320	250	190		
					"	2 @ 6 CL	"	1990	1710	1550	1370	1210	1050	900	800	660	520	400	300		
1"	VS45	4-1/4" SQ.	50	.032	12 (5-5/16")	1	16	1220	1050	950	840	740	650	550	490	400	320	240	180		
					18 (5-5/16")	1	22	1310	1130	1020	900	800	690	590	520	430	340	260	200		
					"	2 @ 6 CL	"	2040	1750	1590	1410	1240	1080	920	820	670	530	410	310		
1-1/4"	VS143	4-1/4" SQ.	32	.032	12 (5-5/16")	1	16	1020	880	800	700	620	540	460	410	340	270	200	150		
					18 (5-5/16")	1	22	1090	940	850	750	660	580	490	440	360	280	220	160		
					"	2 @ 6 CL	"	1870	1610	1460	1290	1140	990	840	750	620	490	370	280		
1-1/4"	VS144	4-1/4" SQ.	40	.032	12 (5-5/16")	1	16	1150	990	900	790	700	610	520	460	380	300	230	170		
					18 (5-5/16")	1	22	1230	1060	960	850	750	650	550	490	410	320	250	180		
					"	2 @ 6 CL	"	1980	1700	1540	1370	1210	1050	890	790	650	510	400	300		

# WARRANTY

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.

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.

This limited warranty is conditional upon:

- (a) shipment, to the 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.

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.

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.

In the interest of product improvement, we reserve the right to make changes without notice.

# VANGUARD SPECIFICATIONS

Furnish and install where shown on plans, Vanguard Security finned tube assemblies are equal in quality and performance. Ratings must be provided as required and so stated if I.B.R. tested.

All enclosure panels shall be manufactured with 1/8" diameter holes on 3/16" staggered centers in either a partial (inlet and outlet) or full (entire enclosure) pattern as specified. Enclosures will be manufactured from either 12 or 14 gauge steel material (C.R.S.) with a full wrap-around design allowing complete engagement at the wall so that unauthorized material cannot be inserted into them. The enclosure will be supplied with a factory applied baked prime finish suitable for field painting when required.

The Vanguard Security enclosure is to be mounted into a continuous 14 gauge mounting strip or optional full height mounting backplate, while being secured to the wall at the bottom flange with tamper resistant fasteners supplied by others. The accessories supplied are to be manufactured from solid 14 gauge C.R.S. with clearance holes for #8 x 1/2" long stainless steel type BP self tapping, truss head, tamper resistant sheet metal screws with #8 stainless steel flat washers. \*(Tamper resistant fastener styles are to be defined by the residing government agency when applicable. The heads can be: Spanner head, holt head, oval head one way, trox pin head, or any other approved type recommended stainless steel.)

The partial perforated pattern enclosure (P) will incorporate integral underlapping joiner/support. This provides a positive support and fastening point where two enclosures engage each other in a typical run.

Fully perforated enclosures will be provided with overlapping accessories. Where two adjoining enclosures meet, an overlapping intermediate joiner piece will be required for securing.

Copper/aluminum heating elements shall be manufactured with seamless copper tube permanently bonded to aluminum fins by a mechanical process.

Steel heating elements shall be manufactured with pressure tubing permanently bonded to steel fins by a mechanical process.

Wall mounted element support brackets shall be die formed 14 gauge galvanealed steel with channel type wiped edges for rigidity. Galvanized element cradles shall be provided to support the element while providing a solid, smooth contact surface for the nickel-chromium plated ball bearings encased in a rugged nylon insert.



# Vulcan

R A D I A T O R

260 North Elm Street • Westfield, MA 01085  
Tel: 413-568-9571 • Fax: 413-564-5661  
[www.vulcanrad.com](http://www.vulcanrad.com)