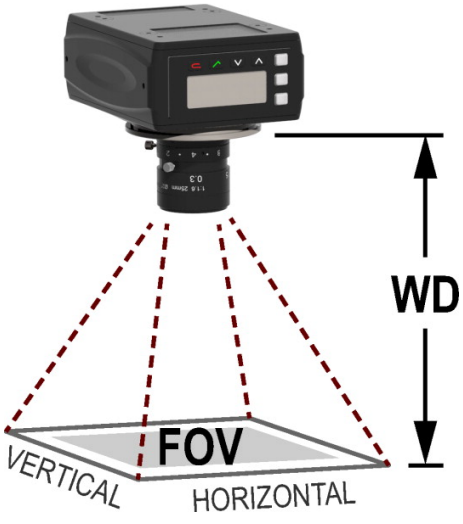
1.3 MP Lens Charts

This paper offers information useful for selecting a C-mount lens for the VE Series 1.3 MP smart camera.

Working Distance and Field of View

The two main variables involved when discussing a camera's lens choice are the **Working Distance** and the **Field of View** size. The Working Distance, or WD, is the distance from the camera to the target object. In the case of this collection of lens charts, the Working Distance is measured from the front surface of the threaded lens cover mount. The distance is not measured from the end of the lens because different lenses from different manufacturers, even with the same focal length, can vary in length.



The Field of View, or FOV, is the real world size of the picture the camera takes. This can also be broken down into a horizontal FOV size and a vertical FOV size. Note that the picture taken by a VE Series vision sensor is not square. The imager used in the 1.3 MP VE sensor is 1280 × 1024 pixels, making a rectangular image where the vertical FOV is 80% the size of the horizontal FOV.

The Working Distance and Field of View sizes are related by linear equations determined by the focal length of the lens. Choosing the correct lens for a given application might be a matter of selecting the desired size of the FOV, then seeing which of the options for focal length result in a good fit for camera Working Distance. The situation might also be reversed, where the desired mounting location of the camera is known (and thus the Working Distance is fixed) and the various focal length lenses give a range of FOV sizes to choose from. In all cases, only one of these two variables may be freely selected. The second variable then becomes a function of the first. This is the reason why we offer a broad range of lens focal lengths—to provide as many options as possible to suit different WD/FOV size requirements.

Multiple Manufacturers and Format Size

Banner does not manufacture any C-mount lenses used by our vision sensors. Instead we offer a range of lenses from different suppliers. Any C-mount lens will technically work in a VE Series vision sensor, but some lenses are better suited than others. Banner recommends using at least 2/3-inch format, or "megapixel"-rated, lenses. A lens of at least this format size ensures that the entire VE Series imager chip is used when taking pictures. These lenses are also better at resolving small features in the picture, allowing an inspection to make better use of the camera's resolution.

The lens charts which follow are divided into groups based on lens manufacturer.

Imager Resolution: 1280 px (H) × 1024 px (V)
Pixel Size: 5.3 µm × 5.3 µm
Image Size: 6.9 mm (H) × 5.5 mm (V), 8.7 mm (diagonal)

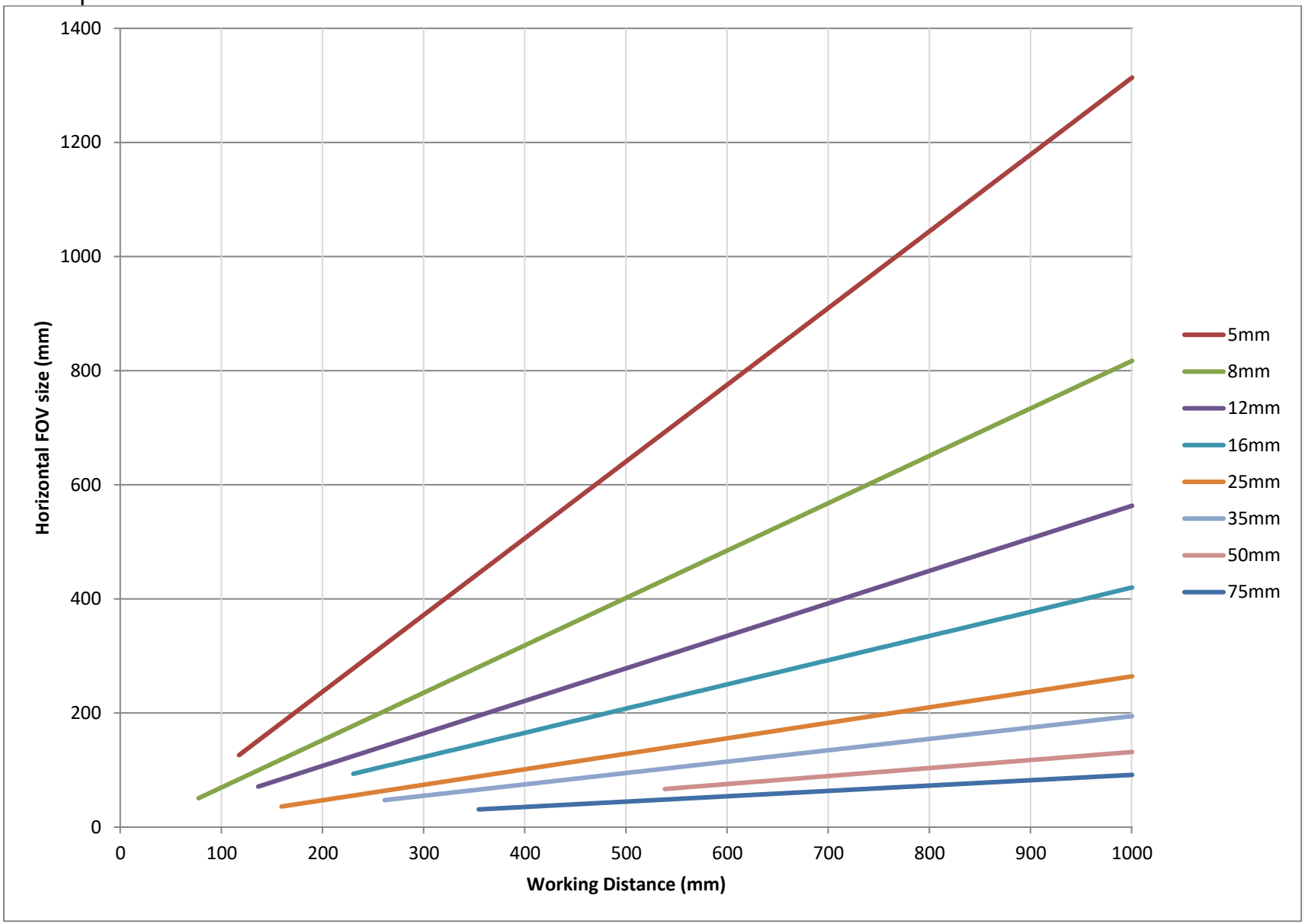
ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Off the Charts

In the pages that follow, graphical views of the Working Distance versus Horizontal FOV relationships are shown, out to a maximum working distance of 1 meter. These graphs offer a quick and easy way to estimate the FOV size for a given Working Distance and lens focal length. Also provided are two tables with entries out to 1.5 meters. The first shows FOV size as a function of Working Distance and the second shows Working Distance as a function of FOV size. The mathematical equations that describe the relationship between these two variables are also provided, allowing for calculations beyond what the chart and tables offer.

Each lens has a natural minimum Working Distance. If a camera using this lens were to move closer to the target than this minimum distance, the image would be out of focus and the lens alone would not be able to fix it. This is where extension tubes and shims are used. Extension tubes allow a lens to come into focus at a Working Distance closer than the minimum. The relationship between Working Distance and FOV size remains in effect as extension tubes are added, and so extension tubes are usually used to generate very small FOVs. A microscope is basically a high focal length lens with a large amount of extension tubes applied.

Computar C-mount Lenses on 1.3 MP VE Series



Computar C-mount Lenses on 1.3 MP VE Series, FOV as a function of WD Chart

	FOV (mm)							
WD (mm)	5mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm
Minimum	*123 x 98 @ 117mm*	*52 x 42 @ 77mm*	*71 x 57 @ 136mm*	*93 x 74 @ 230mm*	*36 x 29 @ 159mm*	*47 x 38 @ 261mm*	*68 x 54 @ 538mm*	*31 x 25 @ 354mm*
20								
40								
60								
80		53 x 43						
100		70 x 56						
120	130 x 104	86 x 69						
140	157 x 126	103 x 82	73 x 59					
160	184 x 147	120 x 96	85 x 68		36 x 29			
180	211 x 169	136 x 109	96 x 77		42 x 33			
200	238 x 190	153 x 122	108 x 86		47 x 38			
220	265 x 212	169 x 136	119 x 95		53 x 42			
240	292 x 233	186 x 149	130 x 104	98 x 78	58 x 46			
260	319 x 255	203 x 162	142 x 113	106 x 85	63 x 51			
280	345 x 276	219 x 175	153 x 122	115 x 92	69 x 55	51 x 41		
300	372 x 298	236 x 189	164 x 132	123 x 98	74 x 59	55 x 44		
320	399 x 319	252 x 202	176 x 141	132 x 105	80 x 64	59 x 47		
340	426 x 341	269 x 215	187 x 150	140 x 112	85 x 68	63 x 50		
360	453 x 362	286 x 229	199 x 159	149 x 119	91 x 72	67 x 54		32 x 25
380	480 x 384	302 x 242	210 x 168	157 x 126	96 x 77	71 x 57		33 x 27
400	507 x 405	319 x 255	221 x 177	165 x 132	101 x 81	75 x 60		35 x 28
420	534 x 427	336 x 268	233 x 186	174 x 139	107 x 86	79 x 63		37 x 30
440	561 x 448	352 x 282	244 x 195	182 x 146	112 x 90	83 x 66		39 x 31
460	588 x 470	369 x 295	256 x 205	191 x 153	118 x 94	87 x 70		41 x 33
480	614 x 492	385 x 308	267 x 214	199 x 160	123 x 99	91 x 73		43 x 34
500	641 x 513	402 x 322	278 x 223	208 x 166	129 x 103	95 x 76		45 x 36
520	668 x 535	419 x 335	290 x 232	216 x 173	134 x 107	99 x 79		47 x 37
540	695 x 556	435 x 348	301 x 241	225 x 180	139 x 112	103 x 82	67 x 54	48 x 39
560	722 x 578	452 x 361	313 x 250	233 x 187	145 x 116	107 x 85	70 x 56	50 x 40
580	749 x 599	468 x 375	324 x 259	242 x 193	150 x 120	111 x 89	73 x 58	52 x 42
600	776 x 621	485 x 388	335 x 268	250 x 200	156 x 125	115 x 92	76 x 60	54 x 43
620	803 x 642	502 x 401	347 x 277	259 x 207	161 x 129	119 x 95	78 x 63	56 x 45
640	830 x 664	518 x 415	358 x 287	267 x 214	167 x 133	123 x 98	81 x 65	58 x 46
660	856 x 685	535 x 428	370 x 296	276 x 221	172 x 138	127 x 101	84 x 67	60 x 48
680	883 x 707	552 x 441	381 x 305	284 x 227	177 x 142	131 x 105	87 x 69	62 x 49
700	910 x 728	568 x 454	392 x 314	293 x 234	183 x 146	135 x 108	90 x 72	63 x 51
720	937 x 750	585 x 468	404 x 323	301 x 241	188 x 151	139 x 111	92 x 74	65 x 52
740	964 x 771	601 x 481	415 x 332	310 x 248	194 x 155	143 x 114	95 x 76	67 x 54
760	991 x 793	618 x 494	427 x 341	318 x 255	199 x 159	147 x 117	98 x 78	69 x 55
780	1018 x 814	635 x 508	438 x 350	327 x 261	205 x 164	151 x 121	101 x 81	71 x 57
800	1045 x 836	651 x 521	449 x 359	335 x 268	210 x 168	155 x 124	104 x 83	73 x 58
820	1072 x 857	668 x 534	461 x 369	344 x 275	215 x 172	159 x 127	106 x 85	75 x 60
840	1099 x 879	684 x 548	472 x 378	352 x 282	221 x 177	163 x 130	109 x 87	77 x 61
860	1125 x 900	701 x 561	484 x 387	361 x 288	226 x 181	167 x 133	112 x 90	78 x 63
880	1152 x 922	718 x 574	495 x 396	369 x 295	232 x 185	171 x 137	115 x 92	80 x 64
900	1179 x 943	734 x 587	506 x 405	378 x 302	237 x 190	175 x 140	118 x 94	82 x 66
920	1206 x 965	751 x 601	518 x 414	386 x 309	243 x 194	179 x 143	120 x 96	84 x 67
940	1233 x 986	767 x 614	529 x 423	395 x 316	248 x 198	183 x 146	123 x 99	86 x 69
960	1260 x 1008	784 x 627	540 x 432	403 x 322	253 x 203	187 x 149	126 x 101	88 x 70
980	1287 x 1029	801 x 641	552 x 442	411 x 329	259 x 207	191 x 152	129 x 103	90 x 72
1000	1314 x 1051	817 x 654	563 x 451	420 x 336	264 x 211	195 x 156	132 x 105	92 x 73
1020	1341 x 1073	834 x 667	575 x 460	428 x 343	270 x 216	199 x 159	134 x 108	93 x 75
1040	1368 x 1094	851 x 680	586 x 469	437 x 350	275 x 220	203 x 162	137 x 110	95 x 76
1060	1394 x 1116	867 x 694	597 x 478	445 x 356	281 x 224	207 x 165	140 x 112	97 x 78
1080	1421 x 1137	884 x 707	609 x 487	454 x 363	286 x 229	210 x 168	143 x 114	99 x 79
1100	1448 x 1159	900 x 720	620 x 496	462 x 370	291 x 233	214 x 172	146 x 117	101 x 81
1120	1475 x 1180	917 x 734	632 x 505	471 x 377	297 x 238	218 x 175	148 x 119	103 x 82
1140	1502 x 1202	934 x 747	643 x 514	479 x 383	302 x 242	222 x 178	151 x 121	105 x 84
1160	1529 x 1223	950 x 760	654 x 524	488 x 390	308 x 246	226 x 181	154 x 123	107 x 85
1180	1556 x 1245	967 x 773	666 x 533	496 x 397	313 x 251	230 x 184	157 x 126	108 x 87
1200	1583 x 1266	983 x 787	677 x 542	505 x 404	319 x 255	234 x 188	160 x 128	110 x 88
1220	1610 x 1288	1000 x 800	689 x 551	513 x 411	324 x 259	238 x 191	162 x 130	112 x 90
1240	1637 x 1309	1017 x 813	700 x 560	522 x 417	329 x 264	242 x 194	165 x 132	114 x 91
1260	1663 x 1331	1033 x 827	711 x 569	530 x 424	335 x 268	246 x 197	168 x 134	116 x 93
1280	1690 x 1352	1050 x 840	723 x 578	539 x 431	340 x 272	250 x 200	171 x 137	118 x 94
1300	1717 x 1374	1066 x 853	734 x 587	547 x 438	346 x 277	254 x 203	174 x 139	120 x 96
1320	1744 x 1395	1083 x 866	746 x 596	556 x 445	351 x 281	258 x 207	177 x 141	122 x 97
1340	1771 x 1417	1100 x 880	757 x 606	564 x 451	357 x 285	262 x 210	179 x 143	123 x 99
1360	1798 x 1438	1116 x 893	768 x 615	573 x 458	362 x 290	266 x 213	182 x 146	125 x 100
1380	1825 x 1460	1133 x 906	780 x 624	581 x 465	367 x 294	270 x 216	185 x 148	127 x 102
1400	1852 x 1481	1150 x 920	791 x 633	590 x 472	373 x 298	274 x 219	188 x 150	129 x 103
1420	1879 x 1503	1166 x 933	803 x 642	598 x 478	378 x 303	278 x 223	191 x 152	131 x 105
1440	1906 x 1524	1183 x 946	814 x 651	607 x 485	384 x 307	282 x 226	193 x 155	133 x 106
1460	1932 x 1546	1199 x 959	825 x 660	615 x 492	389 x 311	286 x 229	196 x 157	135 x 108
1480	1959 x 1567	1216 x 973	837 x 669	624 x 499	395 x 316	290 x 232	199 x 159	137 x 109
1500	1986 x 1589	1233 x 986	848 x 679	632 x 506	400 x 320	294 x 235	202 x 161	138 x 111

Computar C-mount Lenses on 1.3 MP VE Series, WD as a function of FOV Chart

			WD (mm)																					
FOV (mm)			5mm			8mm			12mm			16mm			25mm			35mm			50mm			75mm		
		Minimum	123	x	98	52	x	42	71	x	57	93	x	74	36	x	29	47	x	38	68	x	54	31	x	25
			@ 117mm			@ 77mm			@ 136mm			@ 230mm			@ 159mm			@ 261mm			@ 538mm			@ 357mm		
20	x	16																							
40	x	32													173									450	
60	x	48				88									247			325						663	
80	x	64				112			152						321			425			632			877	
100	x	80				136			187			246			395			526			775			1090	
120	x	96				160			222			293			468			626			917			1303	
140	x	112	127			185			257			340			542			726			1060			1517	
160	x	128	142			209			292			387			616			827			1202			1730	
180	x	144	157			233			327			434			689			927			1345			1944	
200	x	160	172			257			362			481			763			1027			1487			2157	
220	x	176	187			281			397			529			837			1128			1630			2371	
240	x	192	202			305			433			576			910			1228			1772			2584	
260	x	208	216			329			468			623			984			1328			1915			2798	
280	x	224	231			353			503			670			1058			1429			2058			3011	
300	x	240	246			377			538			717			1131			1529			2200			3224	
320	x	256	261			401			573			764			1205			1629			2343			3438	
340	x	272	276			425			608			811			1279			1730			2485			3651	
360	x	288	291			449			643			859			1353			1830			2628			3865	
380	x	304	306			474			678			906			1426			1931			2770			4078	
400	x	320	321			498			713			953			1500			2031			2913			4292	
420	x	336	335			522			748			1000			1574			2131			3055			4505	
440	x	352	350			546			784			1047			1647			2232			3198			4719	
460	x	368	365			570			819			1094			1721			2332			3341			4932	
480	x	384	380			594			854			1142			1795			2432			3483			5145	
500	x	400	395			618			889			1189			1868			2533			3626			5359	
520	x	416	410			642			924			1236			1942			2633			3768			5572	
540	x	432	425			666			959			1283			2016			2733			3911			5786	
560	x	448	440			690			994			1330			2089			2834			4053			5999	
580	x	464	454			714			1029			1377			2163			2934			4196			6213	
600	x	480	469			738			1064			1425			2237			3034			4338			6426	
620	x	496	484			762			1100			1472			2311			3135			4481			6640	
640	x	512	499			787			1135			1519			2384			3235			4623			6853	
660	x	528	514			811			1170			1566			2458			3335			4766			7066	
680	x	544	529			835			1205			1613			2532			3436			4909			7280	
700	x	560	544			859			1240			1660			2605			3536			5051			7493	
720	x	576	559			883			1275			1708			2679			3637			5194			7707	
740	x	592	573			907			1310			1755			2753			3737			5336			7920	
760	x	608	588			931			1345			1802			2826			3837			5479			8134	
780	x	624	603			955			1380			1849			2900			3938			5621			8347	
800	x	640	618			979			1416			1896			2974			4038			5764			8561	
820	x	656	633			1003			1451			1943			3047			4138			5906			8774	
840	x	672	648			1027			1486			1990			3121			4239			6049			8988	
860	x	688	663			1051			1521			2038			3195			4339			6192			9201	
880	x	704	677			1075			1556			2085			3269			4439			6334			9414	
900	x	720	692			1100			1591			2132			3342			4540			6477			9628	
920	x	736	707			1124			1626			2179			3416			4640			6619			9841	
940	x	752	722			1148			1661			2226			3490			4740			6762			10055	
960	x	768	737			1172			1696			2273			3563			4841			6904			10268	
980	x	784	752			1196			1731			2321			3637			4941			7047			10482	
1000	x	800	767			1220			1767			2368			3711			5041			7189			10695	
1020	x	816	782			1244			1802			2415			3784			5142			7332			10909	
1040	x	832	796			1268			1837			2462			3858			5242			7475			11122	
1060	x	848	811			1292			1872			2509			3932			5342			7617			11335	
1080	x	864	826			1316			1907			2556			4005			5443			7760			11549	
1100	x	880	841			1340			1942			2604			4079			5543			7902			11762	
1120	x	896	856			1364			1977			2651			4153			5644			8045			11976	
1140	x	912	871			1389			2012			2698			4227			5744			8187			12189	
1160	x	928	886			1413			2047			2745			4300			5844			8330			12403	
1180	x	944	901			1437			2083			2792			4374			5945			8472			12616	
1200	x	960	915			1461			2118			2839			4448			6045			8615			12830	
1220	x	976	930			1485			2153			2886			4521			6145			8757			13043	
1240	x	992	945			1509			2188			2934			4595			6246			8900			13256	
1260	x	1008	960			1533			2223			2981			4669			6346			9043			13470	
1280	x	1024	975			1557			2258			3028			4742			6446			9185			13683	
1300	x	1040	990			1581			2293			3075			4816			6547			9328			13897	
1320	x	1056	1005			1605			2328			3122			4890			6647			9470			14110	
1340	x	1072	1020			1629			2363			3169			4963			6747			9613			14324	
1360	x	1088	1034			1653			2398			3217			5037			6848			9755			14537	
1380	x	1104	1049			1677			2434			3264			5111			6948			9898			14751	
1400	x	1120	1064			1702			2469			3311			5185			7048			10040			14964	
1420	x	1136	1079			1726			2504			3358			5258			7149			10183			15177	
1440	x	1152	1094			1750			2539			3405			5332			7249			10326			15391	
1460	x	1168	1109			1774			2574			3452			5406			7350			10468			15604	
1480	x	1184	1124			1798			2609			3500			5479			7450			10611			15818	
1500	x	1200	1138			1822			2644			3547			5553			7550			10753			16031	

Computar Lens equations for VE Series 1.3 MP

H = horizontal FOV size, W = working distance



5 mm Megapixel lens

Banner model: LCF05LCMP (p/n 11381)

Computar model: H0514-MP

1/2-inch format, 43 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 1.34 × W – 31.15 (minimum W ~ 117 mm)

W(H), mm

W = (H + 31.15)/1.34 (minimum H ~ 123 mm)



8 mm Megapixel lens

Banner model: LCF08LMP (p/n 74300)

Computar model: M0814-MP2

2/3-inch format, 30.5 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.83 × W – 13.31 (minimum W ~ 77 mm)

W(H), mm

W = (H + 13.31)/0.83 (minimum H ~ 52 mm)



12 mm Megapixel lens

Banner model: LCF12LMP (p/n 74299)

Computar model: M1214-MP2

2/3-inch format, 30.5 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.57 × W – 6.42 (minimum W ~ 136 mm)

W(H), mm

W = (H + 6.42)/0.57 (minimum H ~ 71 mm)



16 mm Megapixel lens

Banner model: LCF16LCMP (p/n 11382)

Computar model: M1614-MP2

2/3-inch format, 30.5 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.424 × W – 4.15 (minimum W ~ 230 mm)

W(H), mm

W = (H + 4.15)/0.424 (minimum H ~ 93 mm)



25 mm Megapixel lens

Banner model: LCF25LCMP (p/n 11383)

Computar model: M2514-MP2

2/3-inch format, 30.5 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.27 × W – 7.08 (minimum W ~ 159mm)

W(H), mm

W = (H + 7.08)/0.27 (minimum H ~ 36mm)



35 mm Megapixel lens

Banner model: LCF35LCMP (p/n 11384)

Computar model: M3514-MP

2/3-inch format, 30.5 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.199 × W – 4.76 (minimum W ~ 261 mm)

W(H), mm

W = (H + 4.76)/0.199 (minimum H ~ 47 mm)



50 mm Megapixel lens

Banner model: LCF50LCMP (p/n 11385)

Computar model: M5018-MP2

2/3-inch format, 30.5 mm filter, minimum f/1.8, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.14 × W – 8.67 (minimum W ~ 538 mm)

W(H), mm

W = (H + 8.67)/0.14 (minimum H ~ 68 mm)



75 mm Megapixel lens

Banner model: LCF75LCMP (p/n 11386)

Computar model: M7528-MP

2/3-inch format, 30.5 mm filter, minimum f/2.8, does not fit with a sealed lens cover

H(W), mm

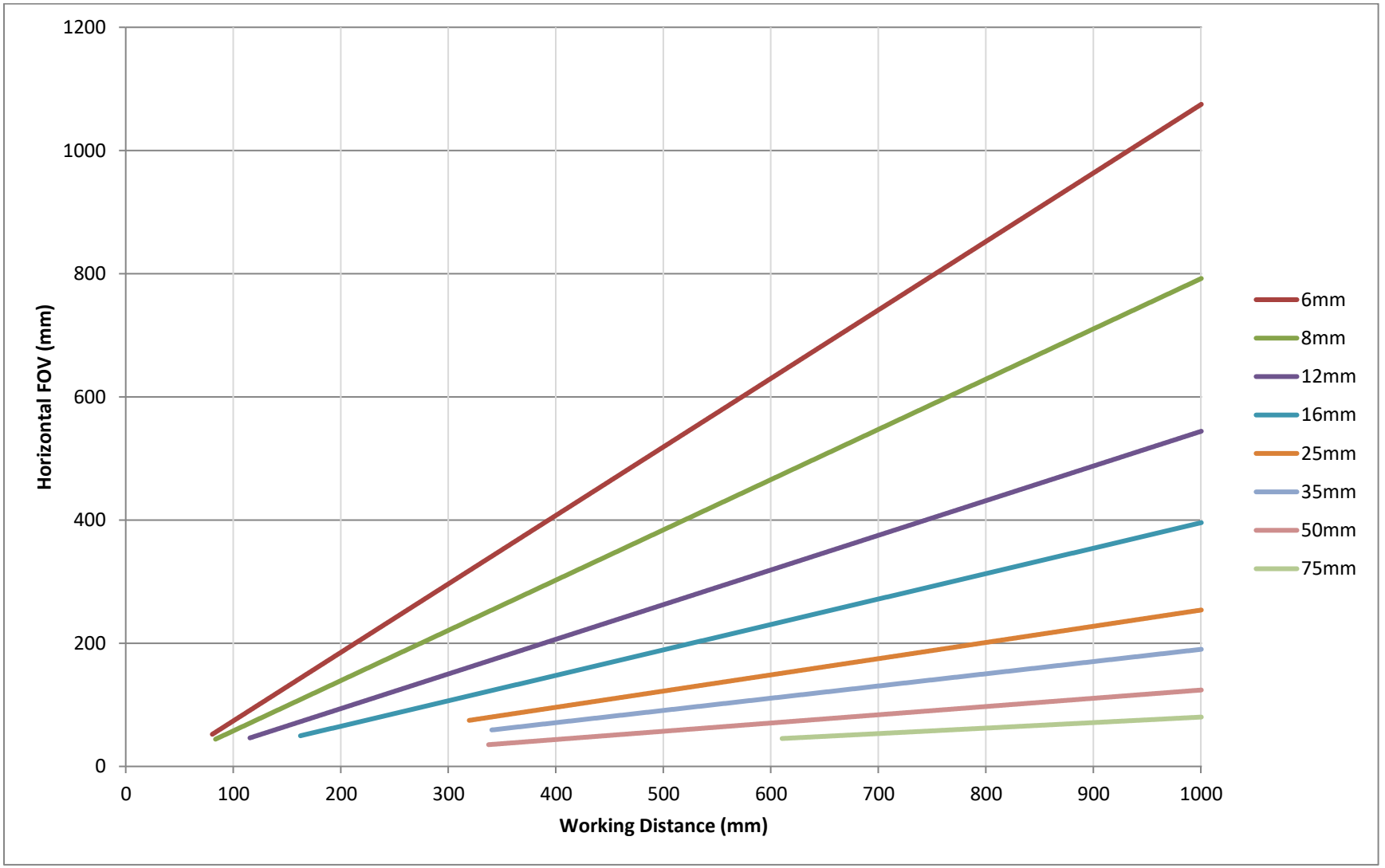
H = 0.09 × W – 2.13 (minimum W ~ 357 mm)

W(H), mm

W = (H + 2.13)/0.09 (minimum H ~ 31 mm)

NOTE: The factory setting for the Focal Range is 0.3 m–1.2 m. The focus can be adjusted to infinity by removing the Focus Limit Screw.

Evetar C-mount Lenses on 1.3 MP VE Series



Evetar C-mount Lenses on 1.3 MP VE Series, FOV as a function of WD Chart

	FOV (mm)							
WD (mm)	6mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm
Minimum	*53 x 42 @ 80mm*	*45 x 36 @ 83mm*	*47 x 38 @ 115mm*	*51 x 41 @ 162mm*	*75 x 60 @ 319mm*	*60 x 48 @ 340mm*	*35 x 28 @ 337mm*	*44 x 35 @ 610mm*
20								
40								
60								
80	52 x 42							
100	74 x 60	58 x 46						
120	97 x 77	74 x 60	49 x 39					
140	119 x 95	91 x 73	60 x 48					
160	141 x 113	107 x 86	72 x 57					
180	163 x 131	123 x 99	83 x 66	57 x 46				
200	186 x 148	140 x 112	94 x 75	65 x 52				
220	208 x 166	156 x 125	105 x 84	74 x 59				
240	230 x 184	172 x 138	117 x 93	82 x 66				
260	252 x 202	189 x 151	128 x 102	90 x 72				
280	275 x 220	205 x 164	139 x 111	98 x 79				
300	297 x 237	221 x 177	150 x 120	107 x 85				
320	319 x 255	238 x 190	162 x 129	115 x 92	75 x 60			
340	341 x 273	254 x 203	173 x 138	123 x 99	80 x 64	59 x 47	36 x 29	
360	363 x 291	270 x 216	184 x 147	131 x 105	86 x 68	63 x 51	38 x 31	
380	386 x 309	286 x 229	195 x 156	140 x 112	91 x 73	67 x 54	41 x 33	
400	408 x 326	303 x 242	207 x 165	148 x 118	96 x 77	71 x 57	44 x 35	
420	430 x 344	319 x 255	218 x 174	156 x 125	101 x 81	75 x 60	46 x 37	
440	452 x 362	335 x 268	229 x 183	165 x 132	107 x 85	79 x 63	49 x 39	
460	475 x 380	352 x 281	240 x 192	173 x 138	112 x 90	83 x 66	52 x 41	
480	497 x 397	368 x 294	252 x 201	181 x 145	117 x 94	87 x 70	54 x 44	
500	519 x 415	384 x 307	263 x 210	189 x 151	122 x 98	91 x 73	57 x 46	
520	541 x 433	401 x 321	274 x 219	198 x 158	128 x 102	95 x 76	60 x 48	
540	564 x 451	417 x 334	285 x 228	206 x 165	133 x 106	99 x 79	62 x 50	
560	586 x 469	433 x 347	297 x 237	214 x 171	138 x 111	103 x 82	65 x 52	
580	608 x 486	450 x 360	308 x 246	222 x 178	143 x 115	107 x 85	68 x 54	
600	630 x 504	466 x 373	319 x 255	231 x 184	149 x 119	111 x 89	71 x 56	
620	653 x 522	482 x 386	330 x 264	239 x 191	154 x 123	115 x 92	73 x 59	46 x 37
640	675 x 540	499 x 399	342 x 273	247 x 198	159 x 127	119 x 95	76 x 61	48 x 38
660	697 x 558	515 x 412	353 x 282	255 x 204	165 x 132	123 x 98	79 x 63	50 x 40
680	719 x 575	531 x 425	364 x 291	264 x 211	170 x 136	127 x 101	81 x 65	52 x 41
700	741 x 593	547 x 438	375 x 300	272 x 217	175 x 140	131 x 105	84 x 67	53 x 43
720	764 x 611	564 x 451	387 x 309	280 x 224	180 x 144	135 x 108	87 x 69	55 x 44
740	786 x 629	580 x 464	398 x 318	288 x 231	186 x 148	139 x 111	89 x 71	57 x 46
760	808 x 647	596 x 477	409 x 327	297 x 237	191 x 153	143 x 114	92 x 74	59 x 47
780	830 x 664	613 x 490	420 x 336	305 x 244	196 x 157	147 x 117	95 x 76	60 x 48
800	853 x 682	629 x 503	432 x 345	313 x 251	201 x 161	150 x 120	97 x 78	62 x 50
820	875 x 700	645 x 516	443 x 354	321 x 257	207 x 165	154 x 124	100 x 80	64 x 51
840	897 x 718	662 x 529	454 x 363	330 x 264	212 x 169	158 x 127	103 x 82	66 x 53
860	919 x 735	678 x 542	465 x 372	338 x 270	217 x 174	162 x 130	105 x 84	68 x 54
880	942 x 753	694 x 555	477 x 381	346 x 277	222 x 178	166 x 133	108 x 86	69 x 56
900	964 x 771	711 x 569	488 x 390	354 x 284	228 x 182	170 x 136	111 x 89	71 x 57
920	986 x 789	727 x 582	499 x 399	363 x 290	233 x 186	174 x 139	113 x 91	73 x 58
940	1008 x 807	743 x 595	510 x 408	371 x 297	238 x 191	178 x 143	116 x 93	75 x 60
960	1031 x 824	760 x 608	522 x 417	379 x 303	243 x 195	182 x 146	119 x 95	77 x 61
980	1053 x 842	776 x 621	533 x 426	387 x 310	249 x 199	186 x 149	121 x 97	78 x 63
1000	1075 x 860	792 x 634	544 x 435	396 x 317	254 x 203	190 x 152	124 x 99	80 x 64
1020	1097 x 878	809 x 647	555 x 444	404 x 323	259 x 207	194 x 155	127 x 101	82 x 66
1040	1119 x 896	825 x 660	567 x 453	412 x 330	264 x 212	198 x 158	129 x 104	84 x 67
1060	1142 x 913	841 x 673	578 x 462	421 x 336	270 x 216	202 x 162	132 x 106	85 x 68
1080	1164 x 931	857 x 686	589 x 471	429 x 343	275 x 220	206 x 165	135 x 108	87 x 70
1100	1186 x 949	874 x 699	600 x 480	437 x 350	280 x 224	210 x 168	137 x 110	89 x 71
1120	1208 x 967	890 x 712	612 x 489	445 x 356	286 x 228	214 x 171	140 x 112	91 x 73
1140	1231 x 985	906 x 725	623 x 498	454 x 363	291 x 233	218 x 174	143 x 114	93 x 74
1160	1253 x 1002	923 x 738	634 x 507	462 x 369	296 x 237	222 x 178	145 x 116	94 x 76
1180	1275 x 1020	939 x 751	645 x 516	470 x 376	301 x 241	226 x 181	148 x 119	96 x 77
1200	1297 x 1038	955 x 764	657 x 525	478 x 383	307 x 245	230 x 184	151 x 121	98 x 78
1220	1320 x 1056	972 x 777	668 x 534	487 x 389	312 x 249	234 x 187	154 x 123	100 x 80
1240	1342 x 1073	988 x 790	679 x 543	495 x 396	317 x 254	238 x 190	156 x 125	102 x 81
1260	1364 x 1091	1004 x 803	690 x 552	503 x 402	322 x 258	242 x 193	159 x 127	103 x 83
1280	1386 x 1109	1021 x 816	702 x 561	511 x 409	328 x 262	246 x 197	162 x 129	105 x 84
1300	1409 x 1127	1037 x 830	713 x 570	520 x 416	333 x 266	250 x 200	164 x 131	107 x 86
1320	1431 x 1145	1053 x 843	724 x 579	528 x 422	338 x 271	254 x 203	167 x 134	109 x 87
1340	1453 x 1162	1070 x 856	735 x 588	536 x 429	343 x 275	258 x 206	170 x 136	110 x 88
1360	1475 x 1180	1086 x 869	747 x 597	544 x 436	349 x 279	262 x 209	172 x 138	112 x 90
1380	1497 x 1198	1102 x 882	758 x 606	553 x 442	354 x 283	266 x 212	175 x 140	114 x 91
1400	1520 x 1216	1118 x 895	769 x 615	561 x 449	359 x 287	270 x 216	178 x 142	116 x 93
1420	1542 x 1234	1135 x 908	780 x 624	569 x 455	364 x 292	274 x 219	180 x 144	118 x 94
1440	1564 x 1251	1151 x 921	792 x 633	577 x 462	370 x 296	277 x 222	183 x 146	119 x 96
1460	1586 x 1269	1167 x 934	803 x 642	586 x 469	375 x 300	281 x 225	186 x 149	121 x 97
1480	1609 x 1287	1184 x 947	814 x 651	594 x 475	380 x 304	285 x 228	188 x 151	123 x 98
1500	1631 x 1305	1200 x 960	825 x 660	602 x 482	386 x 308	289 x 231	191 x 153	125 x 100

Evetar C-mount Lenses on 1.3 MP VE Series, WD as a function of FOV Chart

			WD (mm)							
FOV (mm)			6mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm
		Minimum	55 x 44 @ 77mm	51 x 41 @ 84mm	49 x 39 @ 110mm	53 x 42 @ 158mm	78 x 62 @ 310mm	66 x 53 @ 338mm	37 x 30 @ 336mm	46 x 37 @ 594mm
20	x	16								
40	x	32							372	
60	x	48	87	102	139	187			522	775
80	x	64	105	127	175	235	339	445	671	999
100	x	80	123	151	210	284	415	546	820	1223
120	x	96	141	176	246	332	491	646	970	1447
140	x	112	159	200	282	381	567	747	1119	1671
160	x	128	177	225	317	429	643	848	1268	1895
180	x	144	195	249	353	478	719	949	1418	2118
200	x	160	213	274	388	526	795	1050	1567	2342
220	x	176	231	299	424	574	871	1150	1716	2566
240	x	192	249	323	459	623	947	1251	1866	2790
260	x	208	267	348	495	671	1023	1352	2015	3014
280	x	224	285	372	530	720	1099	1453	2165	3238
300	x	240	303	397	566	768	1175	1554	2314	3462
320	x	256	321	421	602	817	1251	1654	2463	3686
340	x	272	339	446	637	865	1327	1755	2613	3910
360	x	288	357	470	673	913	1403	1856	2762	4134
380	x	304	375	495	708	962	1479	1957	2911	4358
400	x	320	393	519	744	1010	1555	2058	3061	4582
420	x	336	411	544	779	1059	1631	2158	3210	4806
440	x	352	429	568	815	1107	1707	2259	3359	5030
460	x	368	447	593	850	1156	1783	2360	3509	5254
480	x	384	465	617	886	1204	1859	2461	3658	5478
500	x	400	483	642	921	1253	1935	2562	3808	5702
520	x	416	501	666	957	1301	2011	2662	3957	5926
540	x	432	519	691	993	1349	2087	2763	4106	6150
560	x	448	537	715	1028	1398	2163	2864	4256	6374
580	x	464	555	740	1064	1446	2239	2965	4405	6598
600	x	480	573	764	1099	1495	2315	3066	4554	6822
620	x	496	591	789	1135	1543	2391	3166	4704	7046
640	x	512	609	813	1170	1592	2467	3267	4853	7270
660	x	528	627	838	1206	1640	2543	3368	5002	7494
680	x	544	645	862	1241	1688	2619	3469	5152	7718
700	x	560	663	887	1277	1737	2695	3570	5301	7942
720	x	576	681	911	1313	1785	2771	3671	5451	8166
740	x	592	699	936	1348	1834	2847	3771	5600	8389
760	x	608	717	961	1384	1882	2923	3872	5749	8613
780	x	624	735	985	1419	1931	2999	3973	5899	8837
800	x	640	753	1010	1455	1979	3075	4074	6048	9061
820	x	656	771	1034	1490	2028	3151	4175	6197	9285
840	x	672	789	1059	1526	2076	3227	4275	6347	9509
860	x	688	807	1083	1561	2124	3303	4376	6496	9733
880	x	704	825	1108	1597	2173	3379	4477	6645	9957
900	x	720	843	1132	1632	2221	3456	4578	6795	10181
920	x	736	861	1157	1668	2270	3532	4679	6944	10405
940	x	752	879	1181	1704	2318	3608	4779	7094	10629
960	x	768	897	1206	1739	2367	3684	4880	7243	10853
980	x	784	915	1230	1775	2415	3760	4981	7392	11077
1000	x	800	933	1255	1810	2463	3836	5082	7542	11301
1020	x	816	951	1279	1846	2512	3912	5183	7691	11525
1040	x	832	969	1304	1881	2560	3988	5283	7840	11749
1060	x	848	987	1328	1917	2609	4064	5384	7990	11973
1080	x	864	1004	1353	1952	2657	4140	5485	8139	12197
1100	x	880	1022	1377	1988	2706	4216	5586	8288	12421
1120	x	896	1040	1402	2024	2754	4292	5687	8438	12645
1140	x	912	1058	1426	2059	2803	4368	5787	8587	12869
1160	x	928	1076	1451	2095	2851	4444	5888	8737	13093
1180	x	944	1094	1475	2130	2899	4520	5989	8886	13317
1200	x	960	1112	1500	2166	2948	4596	6090	9035	13541
1220	x	976	1130	1524	2201	2996	4672	6191	9185	13765
1240	x	992	1148	1549	2237	3045	4748	6291	9334	13989
1260	x	1008	1166	1573	2272	3093	4824	6392	9483	14213
1280	x	1024	1184	1598	2308	3142	4900	6493	9633	14437
1300	x	1040	1202	1623	2343	3190	4976	6594	9782	14660
1320	x	1056	1220	1647	2379	3238	5052	6695	9932	14884
1340	x	1072	1238	1672	2415	3287	5128	6796	10081	15108
1360	x	1088	1256	1696	2450	3335	5204	6896	10230	15332
1380	x	1104	1274	1721	2486	3384	5280	6997	10380	15556
1400	x	1120	1292	1745	2521	3432	5356	7098	10529	15780
1420	x	1136	1310	1770	2557	3481	5432	7199	10678	16004
1440	x	1152	1328	1794	2592	3529	5508	7300	10828	16228
1460	x	1168	1346	1819	2628	3578	5584	7400	10977	16452
1480	x	1184	1364	1843	2663	3626	5660	7501	11126	16676
1500	x	1200	1382	1868	2699	3674	5736	7602	11276	16900

Evetar Lens equations for VE Series 1.3 MP

H = horizontal FOV size, W = working distance



6 mm Megapixel lens

Banner model: LCF06LEVMP (p/n 97345)

Evetar model: MV118FM06C

1/1.8-inch format, 34 mm filter, minimum f/1.6, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 1.11 × W – 36.79 (minimum W ~ 80 mm)

W(H), mm

W = (H + 36.79)/1.11 (minimum H ~ 53 mm)



8 mm Megapixel lens

Banner model: LCF08LEVMP (p/n 97346)

Evetar model: MV118FM08C

1/1.8-inch format, 27mm filter, min f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.82 × W – 23.49 (minimum W ~ 83 mm)

W(H), mm

W = (H + 23.49)/0.82 (minimum H ~ 45 mm)



12 mm Megapixel lens

Banner model: LCF12LEVMP (p/n 97347)

Evetar model: MV23FM12C

2/3-inch format, 27 mm filter, minimum f/1.6, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.56 × W – 18.43 (minimum W ~ 115 mm)

W(H), mm

W = (H + 18.43)/0.56 (minimum H ~ 47 mm)



16 mm Megapixel lens

Banner model: LCF16LEVMP (p/n 97348)

Evetar model: MV23FM16CR1

2/3-inch format, 27 mm filter, minimum f/1.6, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.41 × W – 17.16 (minimum W ~ 162 mm)

W(H), mm

W = (H + 17.16)/0.41 (minimum H ~ 51mm)



25 mm Megapixel lens

Banner model: LCF25LEVMP (p/n 97349)

Evetar model: MV23FM25C

2/3-inch format, 27 mm filter, minimum f/1.8, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.26 × W – 9.15 (minimum W ~ 319 mm)

W(H), mm

W = (H + 9.15)/0.26 (minimum H ~ 75 mm)



35 mm Megapixel lens

Banner model: LCF35LEVMP (p/n 97350)

Evetar model: MV23FM35C

2/3-inch format, 27 mm filter, minimum f/2.0, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.198 × W – 8.23 (minimum W ~ 340 mm)

W(H), mm

W = (H + 8.23)/0.198 (minimum H ~ 60 mm)



50 mm Megapixel lens

Banner model: LCF50LEVMP (p/n 97351)

Evetar model: MV23FM50C

2/3-inch format, 30.5 mm filter, minimum f/2.6, fits with VELC85 lens cover

H(W), mm

H = 0.134 × W – 9.83 (minimum W ~ 337 mm)

W(H), mm

W = (H + 9.83)/0.134 (minimum H ~ 35 mm)



75 mm Megapixel lens

Banner model: LCF75LEVMP (p/n 97352)

Evetar model: MV11FM75C

1-inch format, 34 mm filter, minimum f/2.8, does not fit with a sealed lens cover

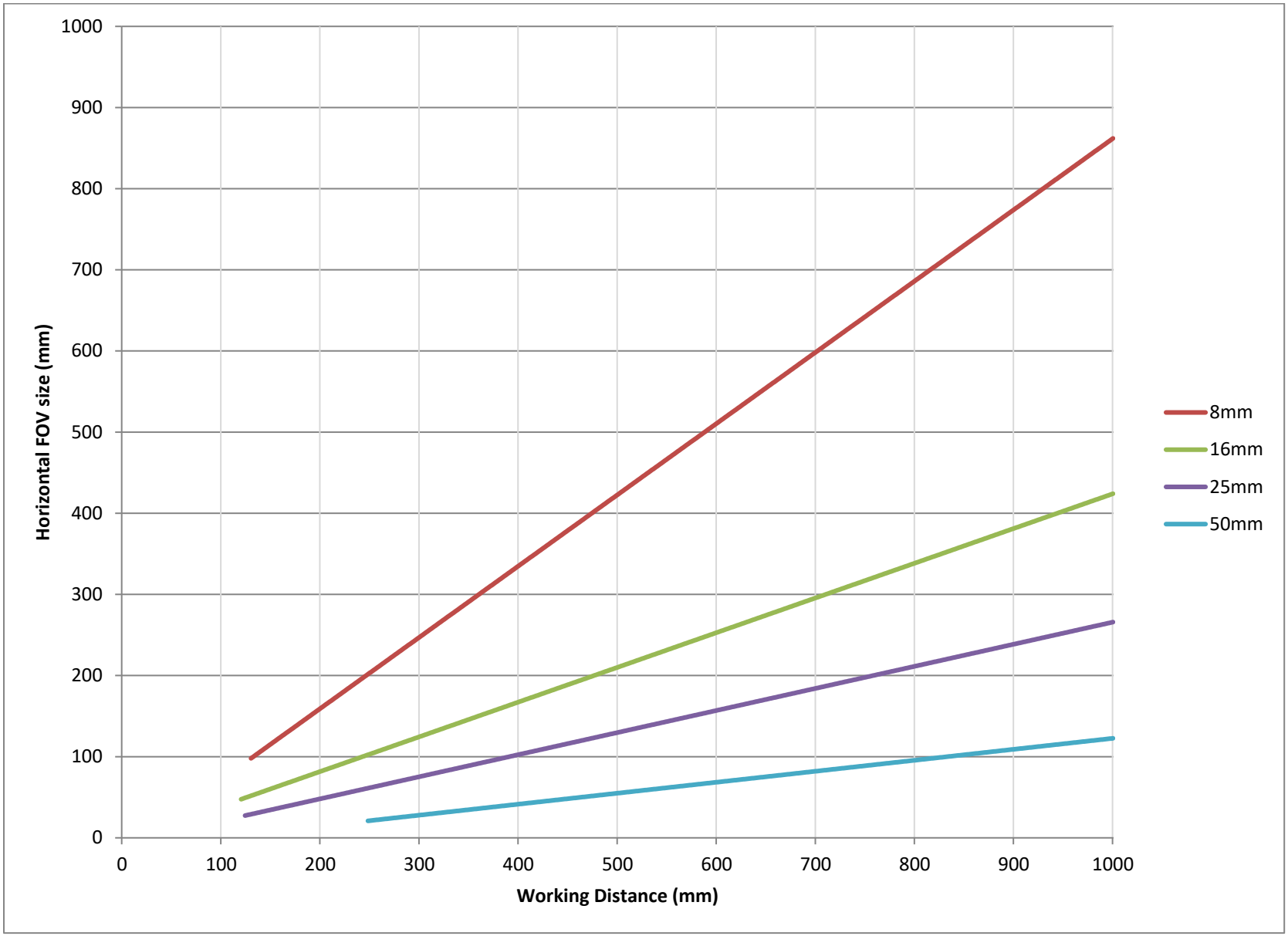
H(W), mm

H = 0.089 × W – 9.18 (minimum W ~ 610 mm)

W(H), mm

W = (H + 9.18)/0.089 (minimum H ~ 44 mm)

Tamron C-mount Lenses on 1.3MP VE Series



Tamron C-mount Lenses on 1.3 MP VE Series, FOV as a function of WD Chart

WD (mm)	8mm	16mm	25mm	50mm
Minimum	*99 x 79*	*47 x 38*	*27 x 22*	*20 x 16*
	@ 130mm	*@ 120mm*	*@ 124mm*	*@ 248mm*
20				
40				
60				
80				
100				
120		48 x 38		
140	107 x 85	56 x 45	32 x 25	
160	124 x 99	65 x 52	37 x 30	
180	142 x 113	73 x 59	43 x 34	
200	159 x 128	82 x 65	48 x 38	
220	177 x 142	90 x 72	54 x 43	
240	195 x 156	99 x 79	59 x 47	
260	212 x 170	107 x 86	64 x 52	23 x 18
280	230 x 184	116 x 93	70 x 56	25 x 20
300	247 x 198	125 x 100	75 x 60	28 x 22
320	265 x 212	133 x 106	81 x 65	31 x 25
340	282 x 226	142 x 113	86 x 69	33 x 27
360	300 x 240	150 x 120	92 x 73	36 x 29
380	318 x 254	159 x 127	97 x 78	39 x 31
400	335 x 268	167 x 134	103 x 82	41 x 33
420	353 x 282	176 x 141	108 x 86	44 x 35
440	370 x 296	184 x 148	113 x 91	47 x 38
460	388 x 310	193 x 154	119 x 95	50 x 40
480	405 x 324	202 x 161	124 x 99	52 x 42
500	423 x 338	210 x 168	130 x 104	55 x 44
520	440 x 352	219 x 175	135 x 108	58 x 46
540	458 x 366	227 x 182	141 x 113	60 x 48
560	476 x 380	236 x 189	146 x 117	63 x 51
580	493 x 395	244 x 196	152 x 121	66 x 53
600	511 x 409	253 x 202	157 x 126	69 x 55
620	528 x 423	261 x 209	162 x 130	71 x 57
640	546 x 437	270 x 216	168 x 134	74 x 59
660	563 x 451	279 x 223	173 x 139	77 x 61
680	581 x 465	287 x 230	179 x 143	79 x 63
700	599 x 479	296 x 237	184 x 147	82 x 66
720	616 x 493	304 x 243	190 x 152	85 x 68
740	634 x 507	313 x 250	195 x 156	87 x 70
760	651 x 521	321 x 257	201 x 160	90 x 72
780	669 x 535	330 x 264	206 x 165	93 x 74
800	686 x 549	339 x 271	211 x 169	96 x 76
820	704 x 563	347 x 278	217 x 174	98 x 79
840	721 x 577	356 x 285	222 x 178	101 x 81
860	739 x 591	364 x 291	228 x 182	104 x 83
880	757 x 605	373 x 298	233 x 187	106 x 85
900	774 x 619	381 x 305	239 x 191	109 x 87
920	792 x 633	390 x 312	244 x 195	112 x 89
940	809 x 647	398 x 319	250 x 200	115 x 92
960	827 x 661	407 x 326	255 x 204	117 x 94
980	844 x 676	416 x 332	260 x 208	120 x 96
1000	862 x 690	424 x 339	266 x 213	123 x 98
1020	880 x 704	433 x 346	271 x 217	125 x 100
1040	897 x 718	441 x 353	277 x 221	128 x 102
1060	915 x 732	450 x 360	282 x 226	131 x 105
1080	932 x 746	458 x 367	288 x 230	133 x 107
1100	950 x 760	467 x 374	293 x 234	136 x 109
1120	967 x 774	475 x 380	299 x 239	139 x 111
1140	985 x 788	484 x 387	304 x 243	142 x 113
1160	1003 x 802	493 x 394	309 x 248	144 x 115
1180	1020 x 816	501 x 401	315 x 252	147 x 118
1200	1038 x 830	510 x 408	320 x 256	150 x 120
1220	1055 x 844	518 x 415	326 x 261	152 x 122
1240	1073 x 858	527 x 421	331 x 265	155 x 124
1260	1090 x 872	535 x 428	337 x 269	158 x 126
1280	1108 x 886	544 x 435	342 x 274	161 x 128
1300	1125 x 900	552 x 442	348 x 278	163 x 131
1320	1143 x 914	561 x 449	353 x 282	166 x 133
1340	1161 x 928	570 x 456	358 x 287	169 x 135
1360	1178 x 943	578 x 463	364 x 291	171 x 137
1380	1196 x 957	587 x 469	369 x 295	174 x 139
1400	1213 x 971	595 x 476	375 x 300	177 x 141
1420	1231 x 985	604 x 483	380 x 304	179 x 144
1440	1248 x 999	612 x 490	386 x 309	182 x 146
1460	1266 x 1013	621 x 497	391 x 313	185 x 148
1480	1284 x 1027	629 x 504	397 x 317	188 x 150
1500	1301 x 1041	638 x 510	402 x 322	190 x 152

Tamron C-mount Lenses on 1.3 MP VE Series, WD as a function of FOV Chart

FOV (mm)			8mm	16mm	25mm	50mm
Minimum			99 x 79	47 x 38	27 x 22	20 x 16
			@ 130mm	@ 120mm	@ 124mm	@ 248mm
20	x	16				241
40	x	32			170	389
60	x	48		149	244	537
80	x	64		196	317	685
100	x	80	132	243	391	833
120	x	96	155	289	464	980
140	x	112	178	336	538	1128
160	x	128	201	383	611	1276
180	x	144	223	430	685	1424
200	x	160	246	476	758	1572
220	x	176	269	523	831	1719
240	x	192	292	570	905	1867
260	x	208	315	617	978	2015
280	x	224	337	663	1052	2163
300	x	240	360	710	1125	2311
320	x	256	383	757	1199	2459
340	x	272	406	803	1272	2606
360	x	288	428	850	1346	2754
380	x	304	451	897	1419	2902
400	x	320	474	944	1493	3050
420	x	336	497	990	1566	3198
440	x	352	519	1037	1640	3345
460	x	368	542	1084	1713	3493
480	x	384	565	1131	1787	3641
500	x	400	588	1177	1860	3789
520	x	416	611	1224	1934	3937
540	x	432	633	1271	2007	4085
560	x	448	656	1318	2081	4232
580	x	464	679	1364	2154	4380
600	x	480	702	1411	2228	4528
620	x	496	724	1458	2301	4676
640	x	512	747	1505	2374	4824
660	x	528	770	1551	2448	4971
680	x	544	793	1598	2521	5119
700	x	560	816	1645	2595	5267
720	x	576	838	1692	2668	5415
740	x	592	861	1738	2742	5563
760	x	608	884	1785	2815	5711
780	x	624	907	1832	2889	5858
800	x	640	929	1878	2962	6006
820	x	656	952	1925	3036	6154
840	x	672	975	1972	3109	6302
860	x	688	998	2019	3183	6450
880	x	704	1021	2065	3256	6598
900	x	720	1043	2112	3330	6745
920	x	736	1066	2159	3403	6893
940	x	752	1089	2206	3477	7041
960	x	768	1112	2252	3550	7189
980	x	784	1134	2299	3624	7337
1000	x	800	1157	2346	3697	7484
1020	x	816	1180	2393	3770	7632
1040	x	832	1203	2439	3844	7780
1060	x	848	1225	2486	3917	7928
1080	x	864	1248	2533	3991	8076
1100	x	880	1271	2580	4064	8224
1120	x	896	1294	2626	4138	8371
1140	x	912	1317	2673	4211	8519
1160	x	928	1339	2720	4285	8667
1180	x	944	1362	2767	4358	8815
1200	x	960	1385	2813	4432	8963
1220	x	976	1408	2860	4505	9110
1240	x	992	1430	2907	4579	9258
1260	x	1008	1453	2954	4652	9406
1280	x	1024	1476	3000	4726	9554
1300	x	1040	1499	3047	4799	9702
1320	x	1056	1522	3094	4873	9850
1340	x	1072	1544	3140	4946	9997
1360	x	1088	1567	3187	5020	10145
1380	x	1104	1590	3234	5093	10293
1400	x	1120	1613	3281	5167	10441
1420	x	1136	1635	3327	5240	10589
1440	x	1152	1658	3374	5313	10736
1460	x	1168	1681	3421	5387	10884
1480	x	1184	1704	3468	5460	11032
1500	x	1200	1726	3514	5534	11180

Tamron Lens equations for VE Series 1.3 MP

H = horizontal FOV size, W = working distance



8 mm Megapixel lens

Banner model: LCF08LTMP (p/n 81530)

Tamron model: M118FM08

1/1.8-inch format, 25.5 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.88 × W – 16.21 (minimum W ~ 130 mm)

W(H), mm

W = (H + 16.21)/0.88 (minimum H ~ 99 mm)



16 mm Megapixel lens

Banner model: LCF16LTMP (p/n 81532)

Tamron model: M118FM16

1/1.8-inch format, 25.5 mm filter, minimum f/1.4, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.428 × W – 3.81 (minimum W ~ 120 mm)

W(H), mm

W = (H + 3.81)/0.428 (minimum H ~ 47 mm)



25 mm Megapixel lens

Banner model: LCF25LTMP (p/n 81533)

Tamron model: M118FM25

1/1.8-inch format, 25.5 mm filter, minimum f/1.6, fits with either the VELC60 or VELC85 lens cover

H(W), mm

H = 0.27 × W – 6.33 (minimum W ~ 124 mm)

W(H), mm

W = (H + 6.33)/0.27 (minimum H ~ 27 mm)



50 mm Megapixel lens

Banner model: LCF50LTMP (p/n 81534)

Tamron model: M118FM50

1/1.8-inch format, 25.5 mm filter, minimum f/2.8, fits with VELC85 lens cover

H(W), mm

H = 0.135 × W – 12.64 (minimum W ~ 248 mm)

W(H), mm

W = (H + 12.64)/0.135 (minimum H ~ 20 mm)