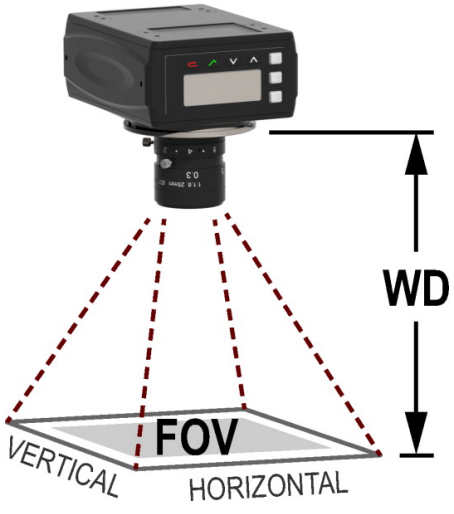
2MP Lens Charts

This paper offers information useful for selecting a C-mount lens for the VE Series 2MP 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 2MP VE sensor is 1600 x 1200 pixels, making a rectangular image where the vertical FOV is ¾ 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: 1600 px (H) × 1200 px (V)
Pixel Size: 4.5 µm × 4.5 µm
Image Size: 7.2 mm (H) × 5.4 mm (V), 9 mm (diagonal)

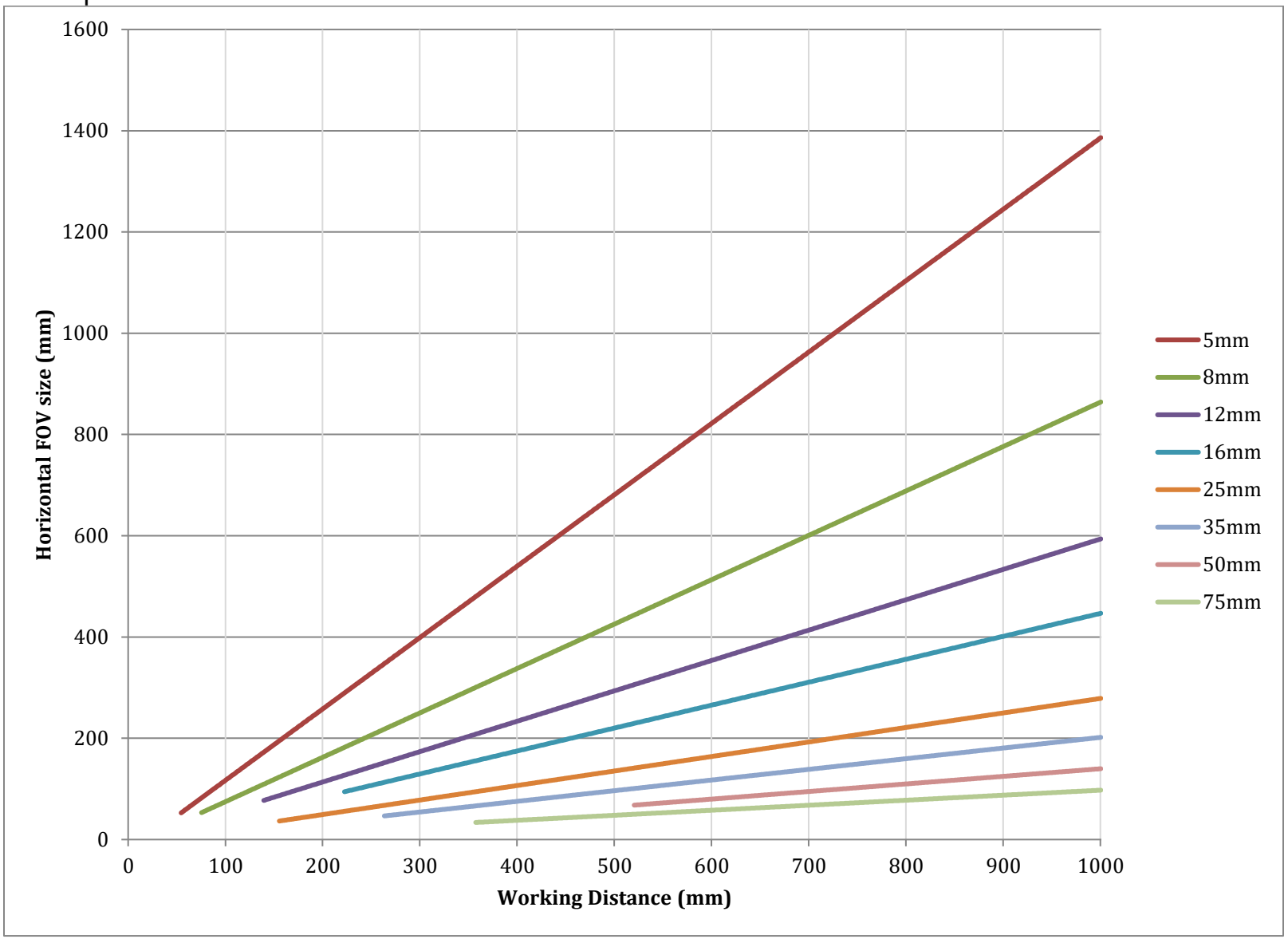
ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

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 2 MP VE Series



Computar C-mount Lenses on 2 MP VE Series, FOV as a function of WD Chart

	FOV (mm)							
WD (mm)	5mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm
Minimum	*53 x 40 @ 54mm*	*53 x 40 @ 75mm*	*77 x 58 @ 139mm*	*94 x 71 @ 222mm*	*37 x 28 @ 155mm*	*47 x 35 @ 263mm*	*68 x 51 @ 520mm*	*34 x 26 @ 357mm*
20								
40								
60	61 x 46							
80	89 x 67	58 x 43						
100	118 x 88	75 x 56						
120	146 x 109	93 x 69						
140	174 x 130	110 x 83	78 x 58					
160	202 x 152	128 x 96	90 x 67		38 x 28			
180	230 x 173	145 x 109	102 x 76		44 x 33			
200	259 x 194	163 x 122	114 x 85		49 x 37			
220	287 x 215	180 x 135	126 x 94		55 x 41			
240	315 x 236	198 x 148	138 x 103	103 x 77	61 x 46			
260	343 x 257	215 x 162	150 x 112	112 x 84	67 x 50			
280	371 x 278	233 x 175	162 x 121	121 x 91	72 x 54	51 x 38		
300	400 x 300	250 x 188	174 x 130	130 x 97	78 x 59	55 x 41		
320	428 x 321	268 x 201	186 x 139	139 x 104	84 x 63	59 x 44		
340	456 x 342	286 x 214	198 x 148	148 x 111	90 x 67	63 x 47		
360	484 x 363	303 x 227	210 x 157	157 x 118	95 x 71	68 x 51		34 x 26
380	512 x 384	321 x 240	222 x 166	166 x 124	101 x 76	72 x 54		36 x 27
400	540 x 405	338 x 254	234 x 175	175 x 131	107 x 80	76 x 57		38 x 29
420	569 x 427	356 x 267	246 x 184	184 x 138	113 x 84	80 x 60		40 x 30
440	597 x 448	373 x 280	258 x 193	193 x 145	118 x 89	84 x 63		42 x 31
460	625 x 469	391 x 293	270 x 202	202 x 152	124 x 93	89 x 66		44 x 33
480	653 x 490	408 x 306	282 x 211	211 x 158	130 x 97	93 x 70		46 x 34
500	681 x 511	426 x 319	294 x 220	220 x 165	135 x 102	97 x 73		48 x 36
520	710 x 532	443 x 333	306 x 229	229 x 172	141 x 106	101 x 76	68 x 51	50 x 37
540	738 x 553	461 x 346	318 x 238	238 x 179	147 x 110	105 x 79	71 x 53	52 x 39
560	766 x 575	478 x 359	330 x 247	248 x 186	153 x 114	110 x 82	74 x 55	54 x 40
580	794 x 596	496 x 372	342 x 256	257 x 192	158 x 119	114 x 85	77 x 58	56 x 42
600	822 x 617	514 x 385	354 x 265	266 x 199	164 x 123	118 x 89	80 x 60	58 x 43
620	851 x 638	531 x 398	366 x 274	275 x 206	170 x 127	122 x 92	83 x 62	60 x 45
640	879 x 659	549 x 411	378 x 283	284 x 213	176 x 132	126 x 95	86 x 64	62 x 46
660	907 x 680	566 x 425	390 x 292	293 x 220	181 x 136	131 x 98	89 x 67	64 x 48
680	935 x 701	584 x 438	402 x 301	302 x 226	187 x 140	135 x 101	92 x 69	66 x 49
700	963 x 723	601 x 451	414 x 310	311 x 233	193 x 145	139 x 104	95 x 71	68 x 51
720	992 x 744	619 x 464	426 x 319	320 x 240	199 x 149	143 x 107	98 x 73	70 x 52
740	1020 x 765	636 x 477	438 x 328	329 x 247	204 x 153	148 x 111	101 x 76	72 x 54
760	1048 x 786	654 x 490	450 x 337	338 x 254	210 x 158	152 x 114	104 x 78	74 x 55
780	1076 x 807	671 x 504	462 x 346	347 x 260	216 x 162	156 x 117	107 x 80	76 x 57
800	1104 x 828	689 x 517	474 x 355	356 x 267	221 x 166	160 x 120	110 x 82	78 x 58
820	1133 x 849	706 x 530	486 x 364	365 x 274	227 x 170	164 x 123	113 x 85	80 x 60
840	1161 x 871	724 x 543	498 x 373	374 x 281	233 x 175	169 x 126	116 x 87	82 x 61
860	1189 x 892	741 x 556	510 x 382	383 x 288	239 x 179	173 x 130	119 x 89	84 x 63
880	1217 x 913	759 x 569	522 x 391	392 x 294	244 x 183	177 x 133	122 x 91	86 x 64
900	1245 x 934	777 x 582	534 x 400	402 x 301	250 x 188	181 x 136	125 x 94	88 x 66
920	1274 x 955	794 x 596	546 x 409	411 x 308	256 x 192	185 x 139	128 x 96	90 x 67
940	1302 x 976	812 x 609	558 x 418	420 x 315	262 x 196	190 x 142	131 x 98	92 x 69
960	1330 x 997	829 x 622	570 x 427	429 x 322	267 x 201	194 x 145	134 x 100	94 x 70
980	1358 x 1019	847 x 635	582 x 436	438 x 328	273 x 205	198 x 149	137 x 103	96 x 72
1000	1386 x 1040	864 x 648	594 x 445	447 x 335	279 x 209	202 x 152	140 x 105	98 x 73
1020	1415 x 1061	882 x 661	606 x 454	456 x 342	285 x 213	207 x 155	143 x 107	100 x 75
1040	1443 x 1082	899 x 674	618 x 463	465 x 349	290 x 218	211 x 158	146 x 109	102 x 76
1060	1471 x 1103	917 x 688	630 x 472	474 x 356	296 x 222	215 x 161	149 x 112	104 x 78
1080	1499 x 1124	934 x 701	642 x 481	483 x 362	302 x 226	219 x 164	152 x 114	105 x 79
1100	1527 x 1146	952 x 714	654 x 490	492 x 369	307 x 231	223 x 168	155 x 116	107 x 81
1120	1556 x 1167	969 x 727	666 x 499	501 x 376	313 x 235	228 x 171	158 x 118	109 x 82
1140	1584 x 1188	987 x 740	678 x 508	510 x 383	319 x 239	232 x 174	161 x 121	111 x 84
1160	1612 x 1209	1005 x 753	690 x 517	519 x 389	325 x 244	236 x 177	164 x 123	113 x 85
1180	1640 x 1230	1022 x 767	702 x 526	528 x 396	330 x 248	240 x 180	167 x 125	115 x 87
1200	1668 x 1251	1040 x 780	714 x 535	537 x 403	336 x 252	244 x 183	170 x 127	117 x 88
1220	1697 x 1272	1057 x 793	726 x 544	547 x 410	342 x 256	249 x 186	173 x 130	119 x 90
1240	1725 x 1294	1075 x 806	738 x 553	556 x 417	348 x 261	253 x 190	176 x 132	121 x 91
1260	1753 x 1315	1092 x 819	750 x 562	565 x 423	353 x 265	257 x 193	179 x 134	123 x 93
1280	1781 x 1336	1110 x 832	762 x 571	574 x 430	359 x 269	261 x 196	182 x 136	125 x 94
1300	1809 x 1357	1127 x 845	774 x 580	583 x 437	365 x 274	265 x 199	185 x 139	127 x 95
1320	1837 x 1378	1145 x 859	786 x 589	592 x 444	371 x 278	270 x 202	188 x 141	129 x 97
1340	1866 x 1399	1162 x 872	798 x 598	601 x 451	376 x 282	274 x 205	191 x 143	131 x 98
1360	1894 x 1420	1180 x 885	810 x 607	610 x 457	382 x 287	278 x 209	194 x 145	133 x 100
1380	1922 x 1442	1197 x 898	822 x 616	619 x 464	388 x 291	282 x 212	197 x 148	135 x 101
1400	1950 x 1463	1215 x 911	834 x 625	628 x 471	393 x 295	287 x 215	200 x 150	137 x 103
1420	1978 x 1484	1232 x 924	846 x 634	637 x 478	399 x 299	291 x 218	203 x 152	139 x 104
1440	2007 x 1505	1250 x 938	858 x 643	646 x 485	405 x 304	295 x 221	206 x 154	141 x 106
1460	2035 x 1526	1268 x 951	870 x 652	655 x 491	411 x 308	299 x 224	209 x 157	143 x 107
1480	2063 x 1547	1285 x 964	882 x 661	664 x 498	416 x 312	303 x 228	212 x 159	145 x 109
1500	2091 x 1568	1303 x 977	894 x 670	673 x 505	422 x 317	308 x 231	215 x 161	147 x 110

Computar C-mount Lenses on 2 MP VE Series, WD as a function of FOV Chart

	WD (mm)							
FOV (mm)	5mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm
Minimum	53 x 40	53 x 40	77 x 58	94 x 71	37 x 28	47 x 35	68 x 51	34 x 26
	@ 54mm	@ 75mm	@ 139mm	@ 222mm	@ 155mm	@ 263mm	@ 520mm	@ 357mm
20 x 15								
40 x 30					167			420
60 x 45	59	83			237	324		621
80 x 60	73	106	144		307	419	600	823
100 x 75	88	128	177	234	376	514	734	1025
120 x 90	102	151	210	278	446	609	868	1226
140 x 105	116	174	244	323	516	704	1001	1428
160 x 120	130	197	277	367	586	799	1135	1630
180 x 135	144	220	310	411	655	894	1268	1831
200 x 150	158	242	344	455	725	989	1402	2033
220 x 165	173	265	377	499	795	1084	1535	2234
240 x 180	187	288	410	543	865	1179	1669	2436
260 x 195	201	311	444	588	934	1274	1802	2638
280 x 210	215	334	477	632	1004	1369	1936	2839
300 x 225	229	356	510	676	1074	1464	2069	3041
320 x 240	244	379	544	720	1144	1559	2203	3242
340 x 255	258	402	577	764	1213	1654	2336	3444
360 x 270	272	425	610	808	1283	1749	2470	3646
380 x 285	286	448	644	852	1353	1844	2603	3847
400 x 300	300	471	677	897	1423	1939	2737	4049
420 x 315	315	493	710	941	1492	2034	2870	4251
440 x 330	329	516	744	985	1562	2129	3004	4452
460 x 345	343	539	777	1029	1632	2224	3137	4654
480 x 360	357	562	810	1073	1702	2319	3271	4855
500 x 375	371	585	844	1117	1772	2414	3404	5057
520 x 390	385	607	877	1161	1841	2509	3538	5259
540 x 405	400	630	910	1206	1911	2604	3671	5460
560 x 420	414	653	944	1250	1981	2699	3805	5662
580 x 435	428	676	977	1294	2051	2793	3938	5863
600 x 450	442	699	1010	1338	2120	2888	4072	6065
620 x 465	456	721	1044	1382	2190	2983	4205	6267
640 x 480	471	744	1077	1426	2260	3078	4339	6468
660 x 495	485	767	1110	1471	2330	3173	4472	6670
680 x 510	499	790	1144	1515	2399	3268	4606	6871
700 x 525	513	813	1177	1559	2469	3363	4739	7073
720 x 540	527	835	1210	1603	2539	3458	4873	7275
740 x 555	542	858	1244	1647	2609	3553	5006	7476
760 x 570	556	881	1277	1691	2678	3648	5140	7678
780 x 585	570	904	1310	1735	2748	3743	5273	7880
800 x 600	584	927	1344	1780	2818	3838	5407	8081
820 x 615	598	950	1377	1824	2888	3933	5540	8283
840 x 630	612	972	1410	1868	2957	4028	5674	8484
860 x 645	627	995	1444	1912	3027	4123	5807	8686
880 x 660	641	1018	1477	1956	3097	4218	5941	8888
900 x 675	655	1041	1510	2000	3167	4313	6074	9089
920 x 690	669	1064	1544	2044	3236	4408	6208	9291
940 x 705	683	1086	1577	2089	3306	4503	6341	9492
960 x 720	698	1109	1610	2133	3376	4598	6475	9694
980 x 735	712	1132	1644	2177	3446	4693	6609	9896
1000 x 750	726	1155	1677	2221	3515	4788	6742	10097
1020 x 765	740	1178	1710	2265	3585	4883	6876	10299
1040 x 780	754	1200	1744	2309	3655	4978	7009	10501
1060 x 795	769	1223	1777	2354	3725	5073	7143	10702
1080 x 810	783	1246	1810	2398	3795	5168	7276	10904
1100 x 825	797	1269	1844	2442	3864	5263	7410	11105
1120 x 840	811	1292	1877	2486	3934	5358	7543	11307
1140 x 855	825	1315	1910	2530	4004	5453	7677	11509
1160 x 870	839	1337	1944	2574	4074	5548	7810	11710
1180 x 885	854	1360	1977	2618	4143	5642	7944	11912
1200 x 900	868	1383	2010	2663	4213	5737	8077	12113
1220 x 915	882	1406	2044	2707	4283	5832	8211	12315
1240 x 930	896	1429	2077	2751	4353	5927	8344	12517
1260 x 945	910	1451	2111	2795	4422	6022	8478	12718
1280 x 960	925	1474	2144	2839	4492	6117	8611	12920
1300 x 975	939	1497	2177	2883	4562	6212	8745	13121
1320 x 990	953	1520	2211	2927	4632	6307	8878	13323
1340 x 1005	967	1543	2244	2972	4701	6402	9012	13525
1360 x 1020	981	1565	2277	3016	4771	6497	9145	13726
1380 x 1035	995	1588	2311	3060	4841	6592	9279	13928
1400 x 1050	1010	1611	2344	3104	4911	6687	9412	14130
1420 x 1065	1024	1634	2377	3148	4980	6782	9546	14331
1440 x 1080	1038	1657	2411	3192	5050	6877	9679	14533
1460 x 1095	1052	1679	2444	3237	5120	6972	9813	14734
1480 x 1110	1066	1702	2477	3281	5190	7067	9946	14936
1500 x 1125	1081	1725	2511	3325	5259	7162	10080	15138

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Computar Lens equations for VE Series 2 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 = 1.41 × W – 23.44 (minimum W ~ 54 mm)

W(H), mm

W = (H + 23.44)/1.41 (minimum H ~ 53 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 = 0.88 × W – 12.56 (minimum W ~ 75 mm)

W(H), mm

W = (H + 12.56)/0.88 (minimum H ~ 53 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 = 0.5999 × W – 6.0915 (minimum W ~ 139 mm)

W(H), mm

W = (H + 6.0915)/0.5999 (minimum H ~ 77 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 = 0.453 × W – 6.1525 (minimum W ~ 222 mm)

W(H), mm

W = (H + 6.1525)/0.453 (minimum H ~ 94 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 = 0.2867 × W – 7.8892 (minimum W ~ 155 mm)

W(H), mm

W = (H + 7.8892)/0.2867 (minimum H ~ 37 mm)



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 = 0.2106 × W – 8.3086 (minimum W ~ 263 mm)

W(H), mm

W = (H + 8.3086)/0.2106 (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 = 0.1498 × W – 9.9533 (minimum W ~ 520 mm)

W(H), mm

W = (H + 9.9533)/0.1498 (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

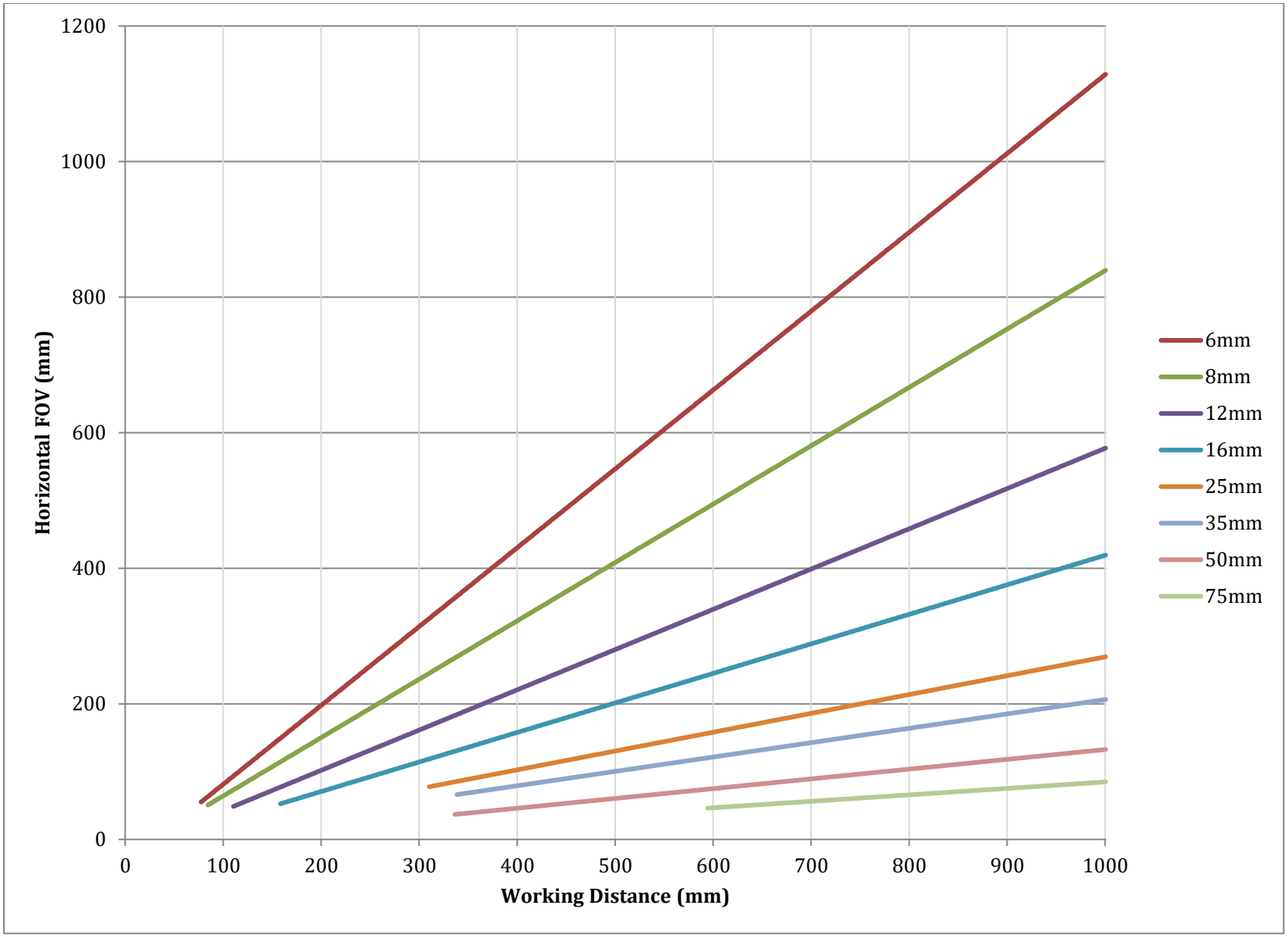
H = 0.0992 × W – 1.6513 (minimum W ~ 357 mm)

W(H), mm

W = (H + 1.6513)/0.0992 (minimum H ~ 34 mm)

NOTE: The factory setting for the Focal Range is 0.3 m–1.2 m (0.98 ft–3.94 ft). The focus can be adjusted to infinity by removing the Focus Limit Screw.

Evetar C-mount Lenses on 2 MP VE Series



Evetar C-mount Lenses on 2 MP VE Series, FOV as a function of WD Chart

	FOV (mm)							
WD (mm)	6mm	8mm	12mm	16mm	25mm	35mm	50mm	75mm
Minimum	*55 x 41 @ 77mm*	*51 x 38 @ 84mm*	*49 x 37 @ 110mm*	*53 x 40 @ 158mm*	*78 x 59 @ 310mm*	*66 x 50 @ 338mm*	*37 x 28 @ 336mm*	*46 x 35 @ 594mm*
20								
40								
60								
80	59 x 44							
100	82 x 61	64 x 48						
120	105 x 79	82 x 61	55 x 41					
140	128 x 96	99 x 74	67 x 50					
160	152 x 114	116 x 87	78 x 59	53 x 40				
180	175 x 131	133 x 100	90 x 68	62 x 47				
200	198 x 149	151 x 113	102 x 77	71 x 53				
220	221 x 166	168 x 126	114 x 86	80 x 60				
240	245 x 184	185 x 139	126 x 94	88 x 66				
260	268 x 201	202 x 152	138 x 103	97 x 73				
280	291 x 218	219 x 165	150 x 112	106 x 79				
300	315 x 236	237 x 178	162 x 121	114 x 86				
320	338 x 253	254 x 190	173 x 130	123 x 92	81 x 60			
340	361 x 271	271 x 203	185 x 139	132 x 99	86 x 65	67 x 50	37 x 28	
360	384 x 288	288 x 216	197 x 148	141 x 105	92 x 69	71 x 53	40 x 30	
380	408 x 306	306 x 229	209 x 157	149 x 112	97 x 73	75 x 56	43 x 32	
400	431 x 323	323 x 242	221 x 166	158 x 118	103 x 77	79 x 59	46 x 35	
420	454 x 341	340 x 255	233 x 175	167 x 125	108 x 81	84 x 63	49 x 37	
440	477 x 358	357 x 268	245 x 184	175 x 132	114 x 85	88 x 66	52 x 39	
460	501 x 375	374 x 281	257 x 192	184 x 138	119 x 90	92 x 69	55 x 41	
480	524 x 393	392 x 294	268 x 201	193 x 145	125 x 94	96 x 72	58 x 43	
500	547 x 410	409 x 307	280 x 210	202 x 151	131 x 98	100 x 75	61 x 45	
520	570 x 428	426 x 320	292 x 219	210 x 158	136 x 102	105 x 79	63 x 48	
540	594 x 445	443 x 333	304 x 228	219 x 164	142 x 106	109 x 82	66 x 50	
560	617 x 463	461 x 345	316 x 237	228 x 171	147 x 110	113 x 85	69 x 52	
580	640 x 480	478 x 358	328 x 246	236 x 177	153 x 115	117 x 88	72 x 54	
600	663 x 498	495 x 371	340 x 255	245 x 184	158 x 119	122 x 91	75 x 56	47 x 35
620	687 x 515	512 x 384	352 x 264	254 x 190	164 x 123	126 x 94	78 x 58	49 x 37
640	710 x 533	529 x 397	363 x 273	263 x 197	169 x 127	130 x 98	81 x 61	51 x 38
660	733 x 550	547 x 410	375 x 282	271 x 203	175 x 131	134 x 101	84 x 63	52 x 39
680	757 x 567	564 x 423	387 x 290	280 x 210	181 x 135	139 x 104	86 x 65	54 x 41
700	780 x 585	581 x 436	399 x 299	289 x 217	186 x 140	143 x 107	89 x 67	56 x 42
720	803 x 602	598 x 449	411 x 308	297 x 223	192 x 144	147 x 110	92 x 69	58 x 44
740	826 x 620	616 x 462	423 x 317	306 x 230	197 x 148	151 x 113	95 x 71	60 x 45
760	850 x 637	633 x 475	435 x 326	315 x 236	203 x 152	156 x 117	98 x 74	62 x 46
780	873 x 655	650 x 488	447 x 335	324 x 243	208 x 156	160 x 120	101 x 76	64 x 48
800	896 x 672	667 x 500	459 x 344	332 x 249	214 x 160	164 x 123	104 x 78	66 x 49
820	919 x 690	684 x 513	470 x 353	341 x 256	219 x 165	168 x 126	107 x 80	68 x 51
840	943 x 707	702 x 526	482 x 362	350 x 262	225 x 169	173 x 129	110 x 82	70 x 52
860	966 x 724	719 x 539	494 x 371	358 x 269	231 x 173	177 x 133	112 x 84	72 x 54
880	989 x 742	736 x 552	506 x 380	367 x 275	236 x 177	181 x 136	115 x 86	73 x 55
900	1012 x 759	753 x 565	518 x 388	376 x 282	242 x 181	185 x 139	118 x 89	75 x 56
920	1036 x 777	771 x 578	530 x 397	385 x 288	247 x 185	189 x 142	121 x 91	77 x 58
940	1059 x 794	788 x 591	542 x 406	393 x 295	253 x 190	194 x 145	124 x 93	79 x 59
960	1082 x 812	805 x 604	554 x 415	402 x 301	258 x 194	198 x 148	127 x 95	81 x 61
980	1106 x 829	822 x 617	565 x 424	411 x 308	264 x 198	202 x 152	130 x 97	83 x 62
1000	1129 x 847	839 x 630	577 x 433	419 x 315	269 x 202	206 x 155	133 x 99	85 x 64
1020	1152 x 864	857 x 643	589 x 442	428 x 321	275 x 206	211 x 158	136 x 102	87 x 65
1040	1175 x 882	874 x 655	601 x 451	437 x 328	281 x 210	215 x 161	138 x 104	89 x 66
1060	1199 x 899	891 x 668	613 x 460	446 x 334	286 x 215	219 x 164	141 x 106	91 x 68
1080	1222 x 916	908 x 681	625 x 469	454 x 341	292 x 219	223 x 168	144 x 108	92 x 69
1100	1245 x 934	926 x 694	637 x 478	463 x 347	297 x 223	228 x 171	147 x 110	94 x 71
1120	1268 x 951	943 x 707	649 x 486	472 x 354	303 x 227	232 x 174	150 x 112	96 x 72
1140	1292 x 969	960 x 720	660 x 495	480 x 360	308 x 231	236 x 177	153 x 115	98 x 74
1160	1315 x 986	977 x 733	672 x 504	489 x 367	314 x 235	240 x 180	156 x 117	100 x 75
1180	1338 x 1004	994 x 746	684 x 513	498 x 373	319 x 240	245 x 183	159 x 119	102 x 76
1200	1361 x 1021	1012 x 759	696 x 522	507 x 380	325 x 244	249 x 187	161 x 121	104 x 78
1220	1385 x 1039	1029 x 772	708 x 531	515 x 386	331 x 248	253 x 190	164 x 123	106 x 79
1240	1408 x 1056	1046 x 785	720 x 540	524 x 393	336 x 252	257 x 193	167 x 125	108 x 81
1260	1431 x 1073	1063 x 798	732 x 549	533 x 400	342 x 256	262 x 196	170 x 128	110 x 82
1280	1455 x 1091	1081 x 810	744 x 558	541 x 406	347 x 260	266 x 199	173 x 130	111 x 84
1300	1478 x 1108	1098 x 823	755 x 567	550 x 413	353 x 265	270 x 202	176 x 132	113 x 85
1320	1501 x 1126	1115 x 836	767 x 575	559 x 419	358 x 269	274 x 206	179 x 134	115 x 86
1340	1524 x 1143	1132 x 849	779 x 584	568 x 426	364 x 273	278 x 209	182 x 136	117 x 88
1360	1548 x 1161	1149 x 862	791 x 593	576 x 432	369 x 277	283 x 212	185 x 138	119 x 89
1380	1571 x 1178	1167 x 875	803 x 602	585 x 439	375 x 281	287 x 215	187 x 141	121 x 91
1400	1594 x 1196	1184 x 888	815 x 611	594 x 445	381 x 285	291 x 218	190 x 143	123 x 92
1420	1617 x 1213	1201 x 901	827 x 620	602 x 452	386 x 290	295 x 222	193 x 145	125 x 94
1440	1641 x 1230	1218 x 914	839 x 629	611 x 458	392 x 294	300 x 225	196 x 147	127 x 95
1460	1664 x 1248	1236 x 927	850 x 638	620 x 465	397 x 298	304 x 228	199 x 149	129 x 96
1480	1687 x 1265	1253 x 940	862 x 647	629 x 471	403 x 302	308 x 231	202 x 151	130 x 98
1500	1710 x 1283	1270 x 953	874 x 656	637 x 478	408 x 306	312 x 234	205 x 154	132 x 99

Evetar C-mount Lenses on 2 MP VE Series, WD as a function of FOV Chart

FOV (mm)			WD (mm)													
			6mm		8mm		12mm		16mm		25mm		35mm		50mm		75mm	
		Minimum	55 x 41 @ 77mm		51 x 38 @ 84mm		49 x 37 @ 110mm		53 x 40 @ 158mm		78 x 59 @ 310mm		66 x 50 @ 338mm		37 x 28 @ 336mm		46 x 35 @ 594mm	
20	x	15																
40	x	30													358			
60	x	45	81		95		129		175						496		739	
80	x	60	98		118		163		221		318		403		635		949	
100	x	75	116		141		196		267		390		498		774		1160	
120	x	90	133		164		230		313		462		592		912		1370	
140	x	105	150		188		264		359		534		687		1051		1580	
160	x	120	167		211		297		405		606		781		1190		1791	
180	x	135	184		234		331		451		678		875		1328		2001	
200	x	150	202		257		365		496		750		970		1467		2211	
220	x	165	219		281		398		542		822		1064		1606		2421	
240	x	180	236		304		432		588		894		1159		1745		2632	
260	x	195	253		327		466		634		966		1253		1883		2842	
280	x	210	270		350		499		680		1038		1347		2022		3052	
300	x	225	288		373		533		726		1110		1442		2161		3263	
320	x	240	305		397		567		772		1182		1536		2299		3473	
340	x	255	322		420		600		818		1254		1630		2438		3683	
360	x	270	339		443		634		864		1326		1725		2577		3894	
380	x	285	356		466		668		910		1398		1819		2715		4104	
400	x	300	373		490		701		955		1470		1914		2854		4314	
420	x	315	391		513		735		1001		1542		2008		2993		4525	
440	x	330	408		536		769		1047		1614		2102		3132		4735	
460	x	345	425		559		803		1093		1686		2197		3270		4945	
480	x	360	442		583		836		1139		1758		2291		3409		5155	
500	x	375	459		606		870		1185		1830		2386		3548		5366	
520	x	390	477		629		904		1231		1902		2480		3686		5576	
540	x	405	494		652		937		1277		1974		2574		3825		5786	
560	x	420	511		675		971		1323		2046		2669		3964		5997	
580	x	435	528		699		1005		1369		2118		2763		4102		6207	
600	x	450	545		722		1038		1415		2190		2857		4241		6417	
620	x	465	563		745		1072		1460		2262		2952		4380		6628	
640	x	480	580		768		1106		1506		2334		3046		4518		6838	
660	x	495	597		792		1139		1552		2406		3141		4657		7048	
680	x	510	614		815		1173		1598		2478		3235		4796		7258	
700	x	525	631		838		1207		1644		2550		3329		4935		7469	
720	x	540	649		861		1240		1690		2622		3424		5073		7679	
740	x	555	666		884		1274		1736		2694		3518		5212		7889	
760	x	570	683		908		1308		1782		2766		3613		5351		8100	
780	x	585	700		931		1341		1828		2838		3707		5489		8310	
800	x	600	717		954		1375		1874		2910		3801		5628		8520	
820	x	615	735		977		1409		1919		2982		3896		5767		8731	
840	x	630	752		1001		1442		1965		3054		3990		5905		8941	
860	x	645	769		1024		1476		2011		3126		4084		6044		9151	
880	x	660	786		1047		1510		2057		3198		4179		6183		9362	
900	x	675	803		1070		1543		2103		3270		4273		6322		9572	
920	x	690	821		1094		1577		2149		3342		4368		6460		9782	
940	x	705	838		1117		1611		2195		3414		4462		6599		9992	
960	x	720	855		1140		1644		2241		3486		4556		6738		10203	
980	x	735	872		1163		1678		2287		3558		4651		6876		10413	
1000	x	750	889		1186		1712		2333		3630		4745		7015		10623	
1020	x	765	906		1210		1745		2378		3702		4840		7154		10834	
1040	x	780	924		1233		1779		2424		3774		4934		7292		11044	
1060	x	795	941		1256		1813		2470		3846		5028		7431		11254	
1080	x	810	958		1279		1846		2516		3918		5123		7570		11465	
1100	x	825	975		1303		1880		2562		3990		5217		7709		11675	
1120	x	840	992		1326		1914		2608		4062		5311		7847		11885	
1140	x	855	1010		1349		1947		2654		4134		5406		7986		12095	
1160	x	870	1027		1372		1981		2700		4206		5500		8125		12306	
1180	x	885	1044		1395		2015		2746		4278		5595		8263		12516	
1200	x	900	1061		1419		2049		2792		4350		5689		8402		12726	
1220	x	915	1078		1442		2082		2838		4422		5783		8541		12937	
1240	x	930	1096		1465		2116		2883		4494		5878		8679		13147	
1260	x	945	1113		1488		2150		2929		4566		5972		8818		13357	
1280	x	960	1130		1512		2183		2975		4638		6067		8957		13568	
1300	x	975	1147		1535		2217		3021		4710		6161		9095		13778	
1320	x	990	1164		1558		2251		3067		4782		6255		9234		13988	
1340	x	1005	1182		1581		2284		3113		4854		6350		9373		14199	
1360	x	1020	1199		1604		2318		3159		4926		6444		9512		14409	
1380	x	1035	1216		1628		2352		3205		4998		6538		9650		14619	
1400	x	1050	1233		1651		2385		3251		5070		6633		9789		14829	
1420	x	1065	1250		1674		2419		3297		5142		6727		9928		15040	
1440	x	1080	1268		1697		2453		3342		5214		6822		10066		15250	
1460	x	1095	1285		1721		2486		3388		5286		6916		10205		15460	
1480	x	1110	1302		1744		2520		3434		5358		7010		10344		15671	
1500	x	1125	1319		1767		2554		3480		5430		7105		10482		15881	

Evetar Lens equations for VE Series 2 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 = 1.16 × W – 34.49 (minimum W ~ 77 mm)

W(H), mm

W = (H + 34.49)/1.16 (minimum H ~ 55 mm)



8 mm Megapixel lens

Banner model: LCF08LEVMP (p/n 97346)

Evetar model: MV118FM08C

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

H(W), mm

H = 0.86 × W – 21.62 (minimum W ~ 84 mm)

W(H), mm

W = (H + 21.62)/0.86 (minimum H ~ 51 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 = 0.59 × W – 16.62 (minimum W ~ 110 mm)

W(H), mm

W = (H + 16.62)/0.59 (minimum H ~ 49 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 = 0.44 × W – 16.3 (minimum W ~ 158 mm)

W(H), mm

W = (H + 16.3)/0.44 (minimum H ~ 53 mm)



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 = 0.28 × W – 8.39 (minimum W ~ 310 mm)

W(H), mm

W = (H + 8.39)/0.28 (minimum H ~ 78 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 = 0.21 × W – 5.49 (minimum W ~ 338 mm)

W(H), mm

W = (H + 5.49)/0.21 (minimum H ~ 66 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 = 0.14 × W – 11.57 (minimum W ~ 336 mm)

W(H), mm

W = (H + 11.57)/0.14 (minimum H ~ 37 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

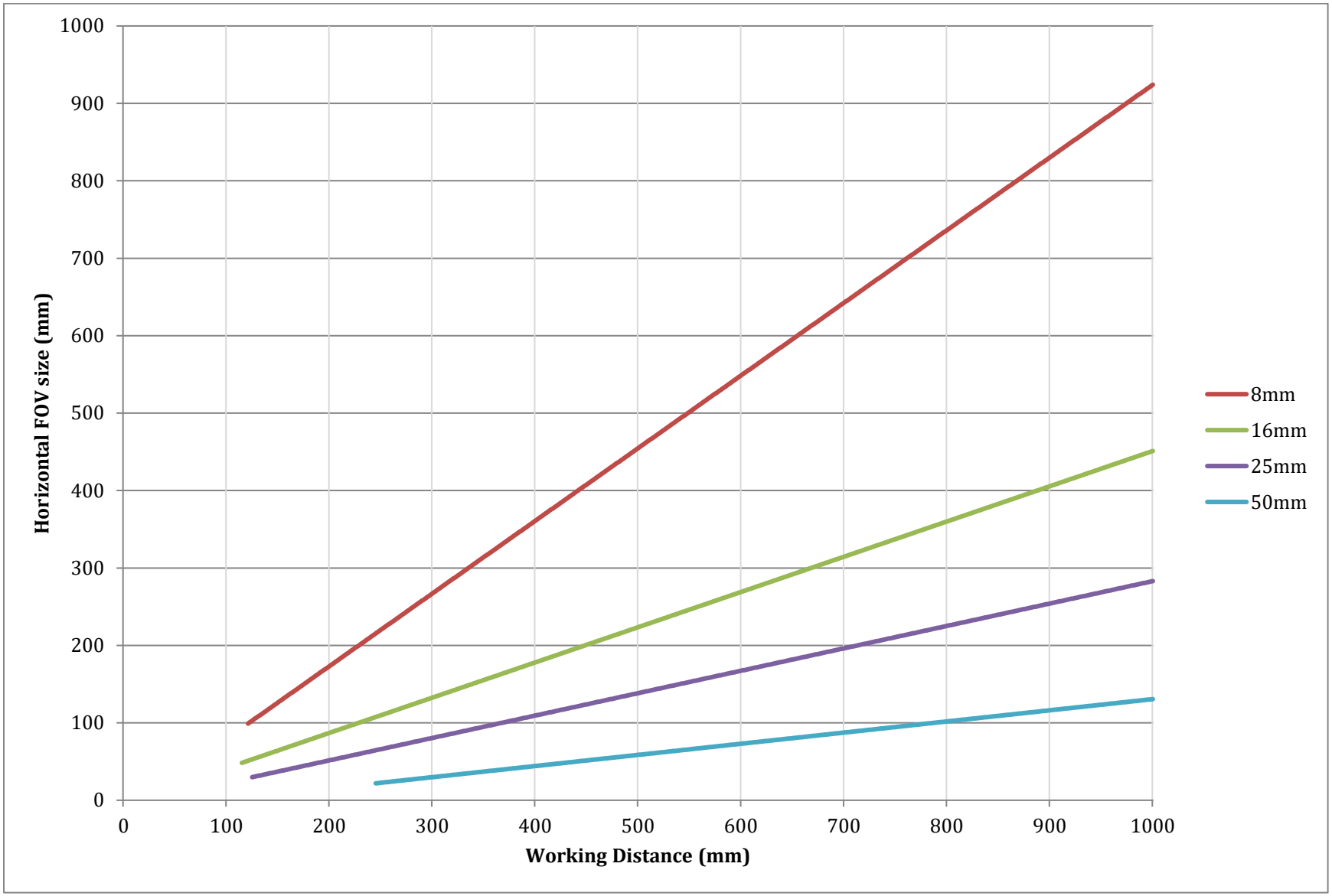
H(W), mm

H = 0.095 × W – 10.28 (minimum W ~ 594 mm)

W(H), mm

W = (H + 10.28)/0.095 (minimum H ~ 46 mm)

Tamron C-mount Lenses on 2MP VE Series



Tamron C-mount Lenses on 2 MP VE Series, FOV as a function of WD Chart

WD (mm)	8mm	16mm	25mm	50mm
Minimum	*53 x 40 @ 75mm*	*94 x 71 @ 222mm*	*37 x 28 @ 155mm*	*68 x 51 @ 520mm*
20				
40				
60				
80	61 x 45			
100	79 x 59			
120	98 x 74			
140	117 x 88			
160	136 x 102		40 x 30	
180	154 x 116		46 x 34	
200	173 x 130		52 x 39	
220	192 x 144		57 x 43	
240	211 x 158	105 x 79	63 x 47	
260	229 x 172	114 x 86	69 x 52	
280	248 x 186	123 x 93	75 x 56	
300	267 x 200	133 x 99	80 x 60	
320	286 x 214	142 x 106	86 x 65	
340	305 x 228	151 x 113	92 x 69	
360	323 x 243	160 x 120	98 x 73	
380	342 x 257	169 x 127	104 x 78	
400	361 x 271	178 x 134	109 x 82	
420	380 x 285	187 x 140	115 x 86	
440	398 x 299	196 x 147	121 x 91	
460	417 x 313	205 x 154	127 x 95	
480	436 x 327	214 x 161	133 x 99	
500	455 x 341	224 x 168	138 x 104	
520	474 x 355	233 x 174	144 x 108	61 x 46
540	492 x 369	242 x 181	150 x 112	64 x 48
560	511 x 383	251 x 188	156 x 117	67 x 50
580	530 x 397	260 x 195	161 x 121	70 x 53
600	549 x 411	269 x 202	167 x 125	73 x 55
620	567 x 426	278 x 209	173 x 130	76 x 57
640	586 x 440	287 x 215	179 x 134	79 x 59
660	605 x 454	296 x 222	185 x 138	82 x 61
680	624 x 468	305 x 229	190 x 143	85 x 63
700	643 x 482	315 x 236	196 x 147	87 x 66
720	661 x 496	324 x 243	202 x 151	90 x 68
740	680 x 510	333 x 250	208 x 156	93 x 70
760	699 x 524	342 x 256	214 x 160	96 x 72
780	718 x 538	351 x 263	219 x 165	99 x 74
800	736 x 552	360 x 270	225 x 169	102 x 76
820	755 x 566	369 x 277	231 x 173	105 x 79
840	774 x 580	378 x 284	237 x 178	108 x 81
860	793 x 595	387 x 291	243 x 182	110 x 83
880	811 x 609	396 x 297	248 x 186	113 x 85
900	830 x 623	406 x 304	254 x 191	116 x 87
920	849 x 637	415 x 311	260 x 195	119 x 89
940	868 x 651	424 x 318	266 x 199	122 x 91
960	887 x 665	433 x 325	271 x 204	125 x 94
980	905 x 679	442 x 331	277 x 208	128 x 96
1000	924 x 693	451 x 338	283 x 212	131 x 98
1020	943 x 707	460 x 345	289 x 217	133 x 100
1040	962 x 721	469 x 352	295 x 221	136 x 102
1060	980 x 735	478 x 359	300 x 225	139 x 104
1080	999 x 749	487 x 366	306 x 230	142 x 107
1100	1018 x 763	497 x 372	312 x 234	145 x 109
1120	1037 x 778	506 x 379	318 x 238	148 x 111
1140	1056 x 792	515 x 386	324 x 243	151 x 113
1160	1074 x 806	524 x 393	329 x 247	154 x 115
1180	1093 x 820	533 x 400	335 x 251	157 x 117
1200	1112 x 834	542 x 407	341 x 256	159 x 120
1220	1131 x 848	551 x 413	347 x 260	162 x 122
1240	1149 x 862	560 x 420	352 x 264	165 x 124
1260	1168 x 876	569 x 427	358 x 269	168 x 126
1280	1187 x 890	579 x 434	364 x 273	171 x 128
1300	1206 x 904	588 x 441	370 x 277	174 x 130
1320	1224 x 918	597 x 448	376 x 282	177 x 133
1340	1243 x 932	606 x 454	381 x 286	180 x 135
1360	1262 x 947	615 x 461	387 x 290	182 x 137
1380	1281 x 961	624 x 468	393 x 295	185 x 139
1400	1300 x 975	633 x 475	399 x 299	188 x 141
1420	1318 x 989	642 x 482	405 x 303	191 x 143
1440	1337 x 1003	651 x 488	410 x 308	194 x 145
1460	1356 x 1017	660 x 495	416 x 312	197 x 148
1480	1375 x 1031	670 x 502	422 x 316	200 x 150
1500	1393 x 1045	679 x 509	428 x 321	203 x 152

Tamron C-mount Lenses on 2 MP VE Series, WD as a function of FOV Chart

FOV (mm)			8mm	16mm	25mm	50mm
Minimum			53 x 40	94 x 71	37 x 28	68 x 51
			@ 75mm	@ 222mm	@ 155mm	@ 520mm
20	x	15				
40	x	30			160	
60	x	45	79		229	
80	x	60	101		298	649
100	x	75	122	229	368	788
120	x	90	143	273	437	926
140	x	105	165	316	506	1065
160	x	120	186	360	575	1204
180	x	135	207	404	644	1343
200	x	150	229	448	713	1482
220	x	165	250	492	782	1621
240	x	180	271	536	851	1760
260	x	195	293	580	920	1899
280	x	210	314	624	990	2038
300	x	225	335	668	1059	2176
320	x	240	356	712	1128	2315
340	x	255	378	756	1197	2454
360	x	270	399	800	1266	2593
380	x	285	420	844	1335	2732
400	x	300	442	888	1404	2871
420	x	315	463	932	1473	3010
440	x	330	484	976	1542	3149
460	x	345	506	1020	1612	3288
480	x	360	527	1064	1681	3426
500	x	375	548	1108	1750	3565
520	x	390	569	1151	1819	3704
540	x	405	591	1195	1888	3843
560	x	420	612	1239	1957	3982
580	x	435	633	1283	2026	4121
600	x	450	655	1327	2095	4260
620	x	465	676	1371	2164	4399
640	x	480	697	1415	2233	4538
660	x	495	719	1459	2303	4676
680	x	510	740	1503	2372	4815
700	x	525	761	1547	2441	4954
720	x	540	783	1591	2510	5093
740	x	555	804	1635	2579	5232
760	x	570	825	1679	2648	5371
780	x	585	846	1723	2717	5510
800	x	600	868	1767	2786	5649
820	x	615	889	1811	2855	5788
840	x	630	910	1855	2925	5926
860	x	645	932	1899	2994	6065
880	x	660	953	1942	3063	6204
900	x	675	974	1986	3132	6343
920	x	690	996	2030	3201	6482
940	x	705	1017	2074	3270	6621
960	x	720	1038	2118	3339	6760
980	x	735	1060	2162	3408	6899
1000	x	750	1081	2206	3477	7038
1020	x	765	1102	2250	3547	7176
1040	x	780	1123	2294	3616	7315
1060	x	795	1145	2338	3685	7454
1080	x	810	1166	2382	3754	7593
1100	x	825	1187	2426	3823	7732
1120	x	840	1209	2470	3892	7871
1140	x	855	1230	2514	3961	8010
1160	x	870	1251	2558	4030	8149
1180	x	885	1273	2602	4099	8288
1200	x	900	1294	2646	4169	8426
1220	x	915	1315	2690	4238	8565
1240	x	930	1337	2734	4307	8704
1260	x	945	1358	2777	4376	8843
1280	x	960	1379	2821	4445	8982
1300	x	975	1400	2865	4514	9121
1320	x	990	1422	2909	4583	9260
1340	x	1005	1443	2953	4652	9399
1360	x	1020	1464	2997	4721	9538
1380	x	1035	1486	3041	4790	9676
1400	x	1050	1507	3085	4860	9815
1420	x	1065	1528	3129	4929	9954
1440	x	1080	1550	3173	4998	10093
1460	x	1095	1571	3217	5067	10232
1480	x	1110	1592	3261	5136	10371
1500	x	1125	1613	3305	5205	10510

Tamron Lens equations for VE Series 2 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 = 0.94 × W – 14.59 (minimum W ~ 75 mm)

W(H), mm

W = (H + 14.59)/0.94 (minimum H ~ 53 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 = 0.455 × W – 4.03 (minimum W ~ 222 mm)

W(H), mm

W = (H + 4.03)/0.455 (minimum H ~ 94 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 = 0.29 × W – 6.37 (minimum W ~ 155 mm)

W(H), mm

W = (H + 6.37)/0.29 (minimum H ~ 37 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 = 0.144 × W – 13.4 (minimum W ~ 520 mm)

W(H), mm

W = (H + 13.4)/0.144 (minimum H ~ 68 mm)