

2MP Lens Charts

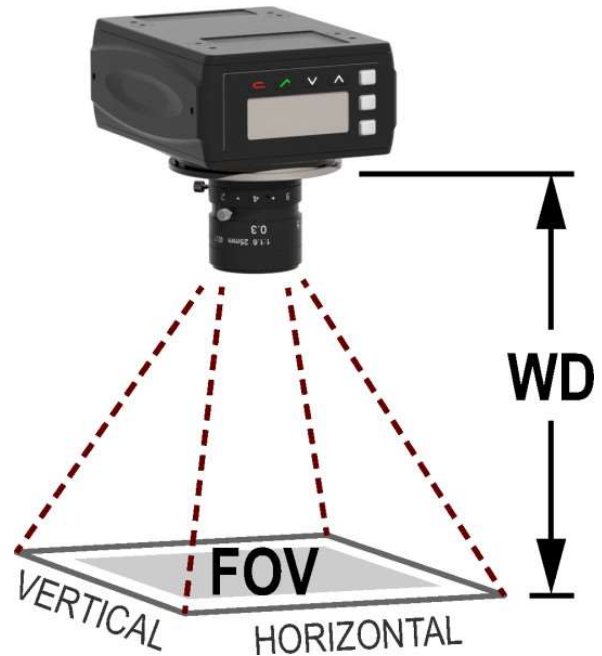
This paper offers information useful for selecting a C-mount lens for the VE Series 2MP vision sensor.

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 $\frac{3}{4}$ 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 will ensure 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.

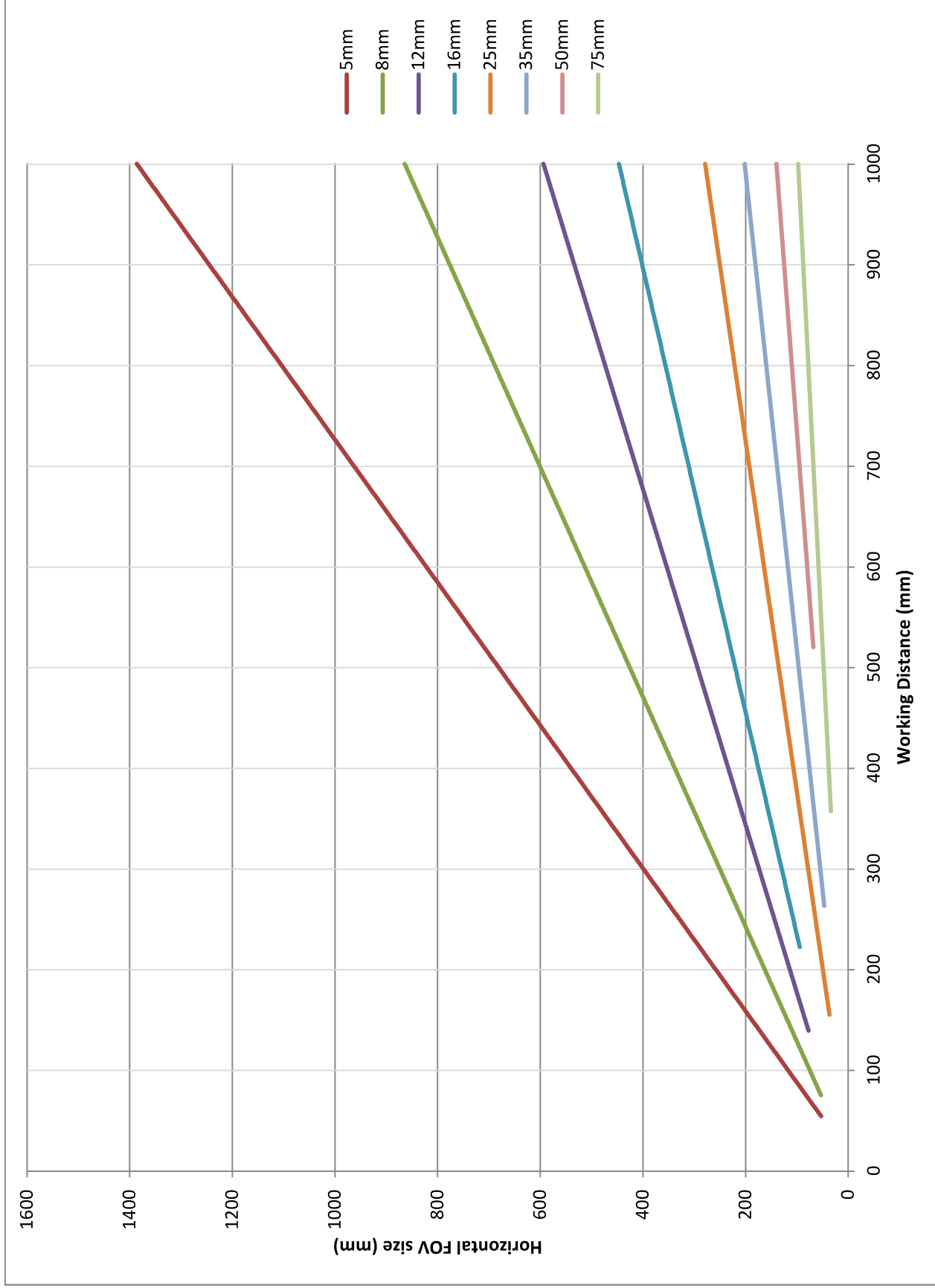
The lens charts which follow are divided into groups based on lens manufacturer.

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.

Computer C-mount Lenses on 2 MP VE Series



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

WD (mm)	FOV (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	
			53 x 40		53 x 40		77 x 58		94 x 71		37 x 28		47 x 35		68 x 51		34 x 26	
	Minimum		@ 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	

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)

H(W), mm

$$H = 1.41 \times W - 23.44 \text{ (minimum } W \sim 54 \text{ mm)}$$

W(H), mm

$$W = (H + 23.44)/1.41 \text{ (minimum } H \sim 53 \text{ mm)}$$

H(W), inches

$$H = 0.056 \times W - 0.923 \text{ (minimum } W \sim 2.1 \text{ inches)}$$

W(H), inches

$$W = (H + 0.923)/0.056 \text{ (minimum } H \sim 2.1 \text{ inches)}$$



8 mm Megapixel lens

Banner model: LCF08LMP (p/n 74300)

Computar model: M0814-MP2 (2/3-inch format)

H(W), mm

$$H = 0.88 \times W - 12.56 \text{ (minimum } W \sim 75 \text{ mm)}$$

W(H), mm

$$W = (H + 12.56)/0.88 \text{ (minimum } H \sim 53 \text{ mm)}$$

H(W), inches

$$H = 0.035 \times W - 0.49 \text{ (minimum } W \sim 2.1 \text{ inches)}$$

W(H), inches

$$W = (H + 0.49)/0.035 \text{ (minimum } H \sim 2.1 \text{ inches)}$$



12 mm Megapixel lens

Banner model: LCF12LMP (p/n 74299)

Computar model: M1214-MP2

H(W), mm

$$H = 0.5999 \times W - 6.0915 \text{ (minimum } W \sim 139 \text{ mm)}$$

W(H), mm

$$W = (H + 6.0915)/0.5999 \text{ (minimum } H \sim 77 \text{ mm)}$$

H(W), inches

$$H = 0.024 \times W - 0.24 \text{ (minimum } W \sim 5.5 \text{ inches)}$$

W(H), inches

$$W = (H + 0.24)/0.024 \text{ (minimum } H \sim 3 \text{ inches)}$$



16 mm Megapixel lens

Banner model: LCF16LCMP (p/n 11382)

Computar model: M1614-MP2

H(W), mm

$$H = 0.453 \times W - 6.1525 \text{ (minimum } W \sim 222 \text{ mm)}$$

W(H), mm

$$W = (H + 6.1525)/0.453 \text{ (minimum } H \sim 94 \text{ mm)}$$

H(W), inches

$$H = 0.018 \times W - 0.24 \text{ (minimum } W \sim 8.74 \text{ inches)}$$

W(H), inches

$$W = (H + 0.24)/0.018 \text{ (minimum } H \sim 3.7 \text{ inches)}$$



25 mm Megapixel lens

Banner model: LCF25LCMP (p/n 11383)

Computar model: M2514-MP2

H(W), mm

$$H = 0.2867 \times W - 7.8892 \text{ (minimum } W \sim 155 \text{ mm)}$$

W(H), mm

$$W = (H + 7.8892)/0.2867 \text{ (minimum } H \sim 37 \text{ mm)}$$

H(W), inches

$$H = 0.011 \times W - 0.31 \text{ (minimum } W \sim 6.1 \text{ inches)}$$

W(H), inches

$$W = (H + 0.31)/0.011 \text{ (minimum } H \sim 1.5 \text{ inches)}$$



35 mm Megapixel lens

Banner model: LCF35LCMP (p/n 11384)

Computar model: M3514-MP

H(W), mm

$$H = 0.2106 \times W - 8.3086 \text{ (minimum } W \sim 263 \text{ mm)}$$

W(H), mm

$$W = (H + 8.3086)/0.2106 \text{ (minimum } H \sim 47 \text{ mm)}$$

H(W), inches

$$H = 0.008 \times W - 0.33 \text{ (minimum } W \sim 10.4 \text{ inches)}$$

W(H), inches

$$W = (H + 0.33)/0.008 \text{ (minimum } H \sim 1.85 \text{ inches)}$$



50 mm Megapixel lens

Banner model: LCF50LCMP (p/n 11385)

Computar model: M5018-MP2

H(W), mm

$$H = 0.1498 \times W - 9.9533 \text{ (minimum } W \sim 520 \text{ mm)}$$

W(H), mm

$$W = (H + 9.9533)/0.1498 \text{ (minimum } H \sim 68 \text{ mm)}$$

H(W), inches

$$H = 0.006 \times W - 0.392 \text{ (minimum } W \sim 20.5 \text{ inches)}$$

W(H), inches

$$W = (H + 0.392)/0.006 \text{ (minimum } H \sim 2.68 \text{ inches)}$$



75 mm Megapixel lens

Banner model: LCF75LCMP (p/n 11386)

Computar model: M7528-MP

H(W), mm

$$H = 0.0992 \times W - 1.6513 \text{ (minimum } W \sim 357 \text{ mm)}$$

W(H), mm

$$W = (H + 1.6513)/0.0992 \text{ (minimum } H \sim 34 \text{ mm)}$$

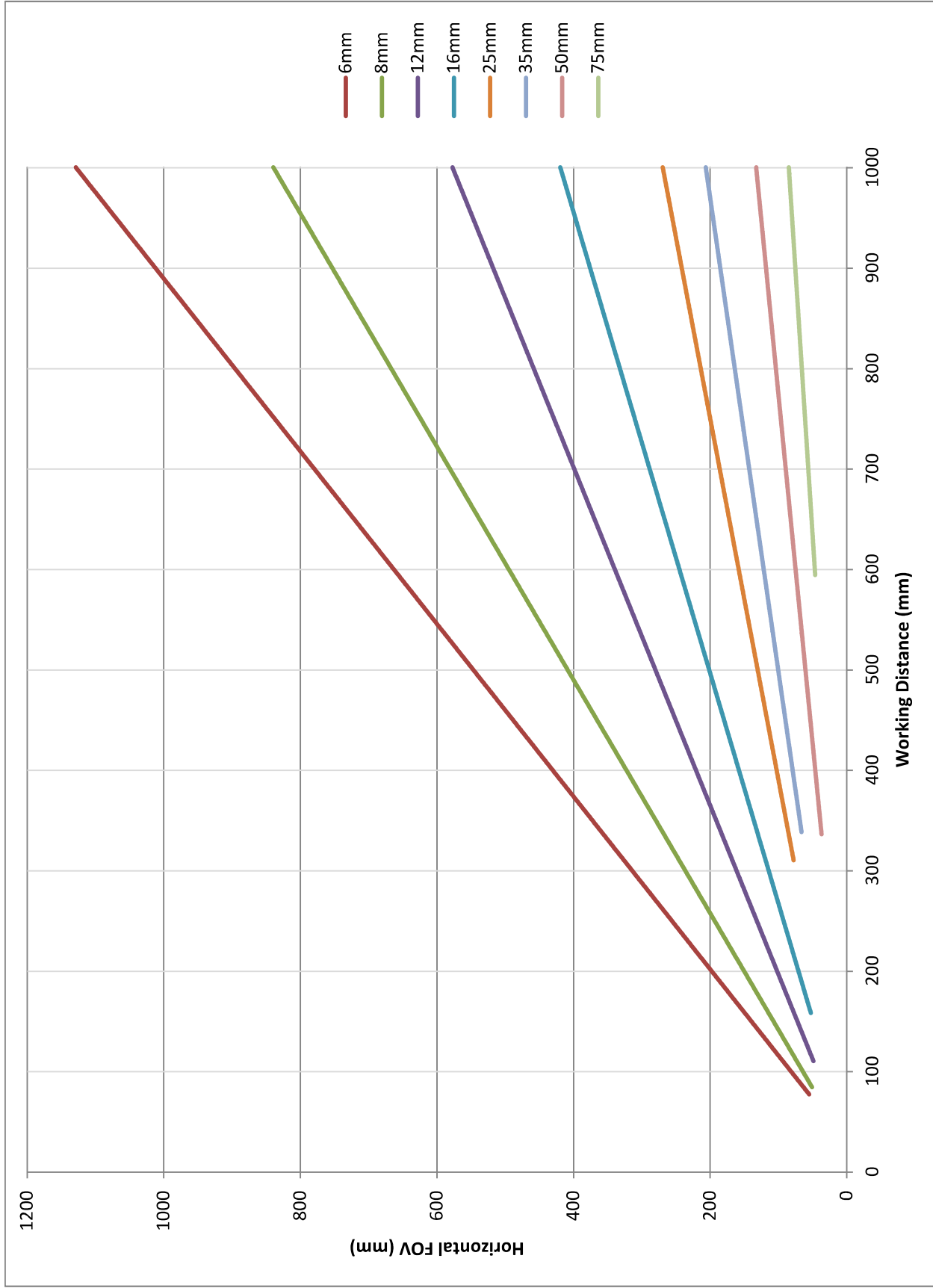
H(W), inches

$$H = 0.004 \times W - 0.065 \text{ (minimum } W \sim 14 \text{ inches)}$$

W(H), inches

$$W = (H + 0.065)/0.004 \text{ (minimum } H \sim 1.34 \text{ inches)}$$

Evetar C-mount Lenses on 2 MP VE Series



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

WD (mm)	FOV (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	
		55 x 41	51 x 38	49 x 37	53 x 40	78 x 59	66 x 50	37 x 28	46 x 35	75mm	
Minimum		@ 77mm	@ 84mm	@ 110mm	@ 158mm	@ 310mm	@ 338mm	@ 336mm	@ 594mm		
20 x 15											
40 x 30											
60 x 45		81	95	129	175			358		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)

H(W), mm

$H = 1.16 \times W - 34.49$ (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)

H(W), mm

$H = 0.86 \times W - 21.62$ (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)

H(W), mm

$H = 0.59 \times W - 16.62$ (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)

H(W), mm

$H = 0.44 \times W - 16.3$ (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)

H(W), mm

$H = 0.28 \times W - 8.39$ (minimum $W \sim 310$ mm)

W(H), mm

$W = (H + 8.39)/0.28$ (minimum $H \sim 78$ mm)



35 mm Megapixel lens

Banner model: LCF35LEVMP (p/n 97350)

Evetar model: MV23FM35C (2/3-inch format)

H(W), mm

$H = 0.21 \times W - 5.49$ (minimum $W \sim 338$ mm)

W(H), mm

$W = (H + 5.49)/0.21$ (minimum $H \sim 66$ mm)



50 mm Megapixel lens

Banner model: LCF50LEVMP (p/n 97351)

Evetar model: MV23FM50C (2/3-inch format)

H(W), mm

$H = 0.14 \times W - 11.57$ (minimum $W \sim 336$ mm)

W(H), mm

$W = (H + 11.57)/0.14$ (minimum $H \sim 37$ mm)



75 mm Megapixel lens

Banner model: LCF75LEVMP (p/n 97352)

Evetar model: MV11FM75C (1-inch format)

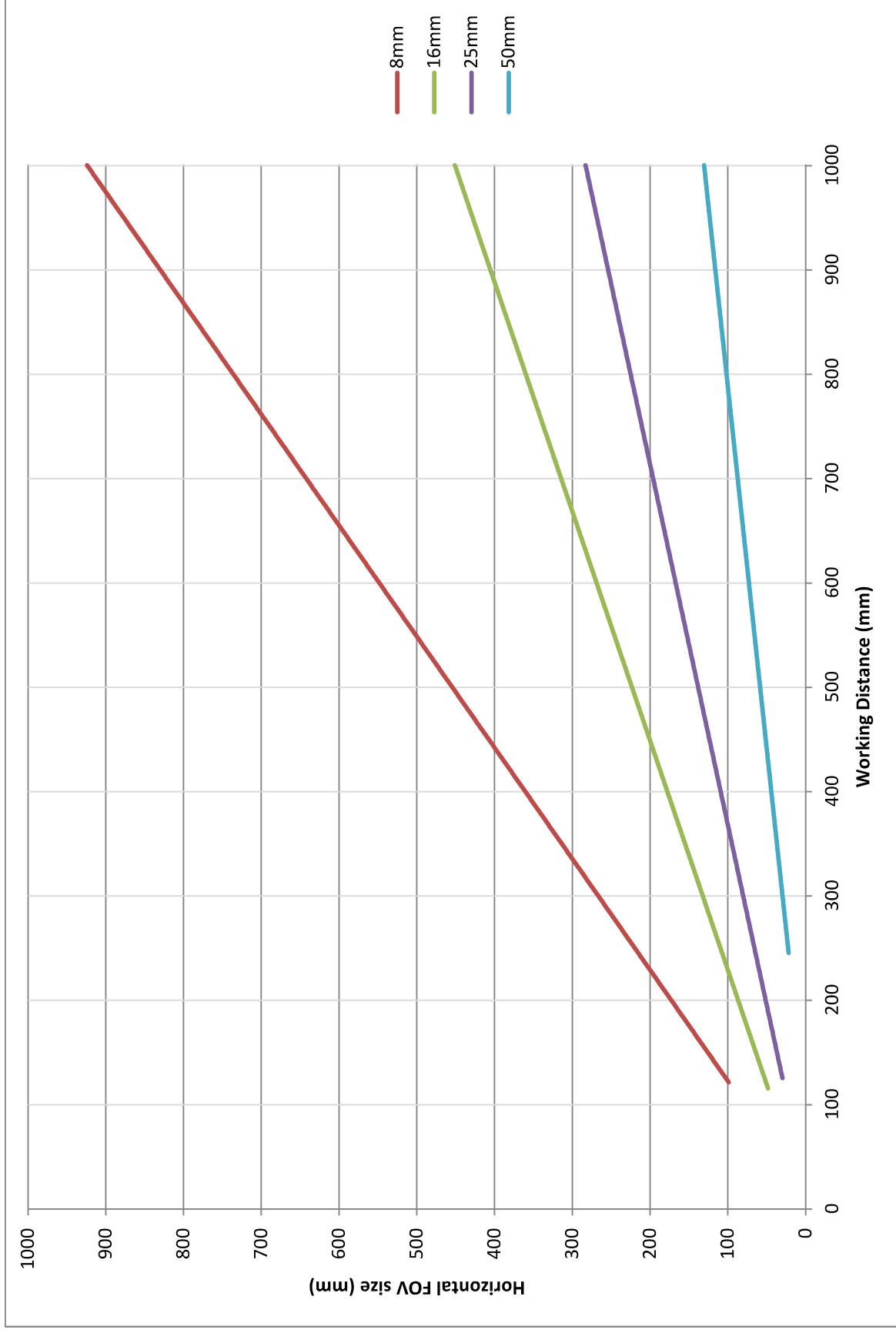
H(W), mm

$H = 0.095 \times W - 10.28$ (minimum $W \sim 594$ mm)

W(H), mm

$W = (H + 10.28)/0.095$ (minimum $H \sim 46$ 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	94	x 71	37	x 28	68	x 51
	@ 75mm		@ 222mm		@ 155mm		@ 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

VE Series

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)

H(W), mm

$H = 0.94 \times W - 14.59$ (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)

H(W), mm

$H = 0.455 \times W - 4.03$ (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)

H(W), mm

$H = 0.29 \times W - 6.37$ (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)

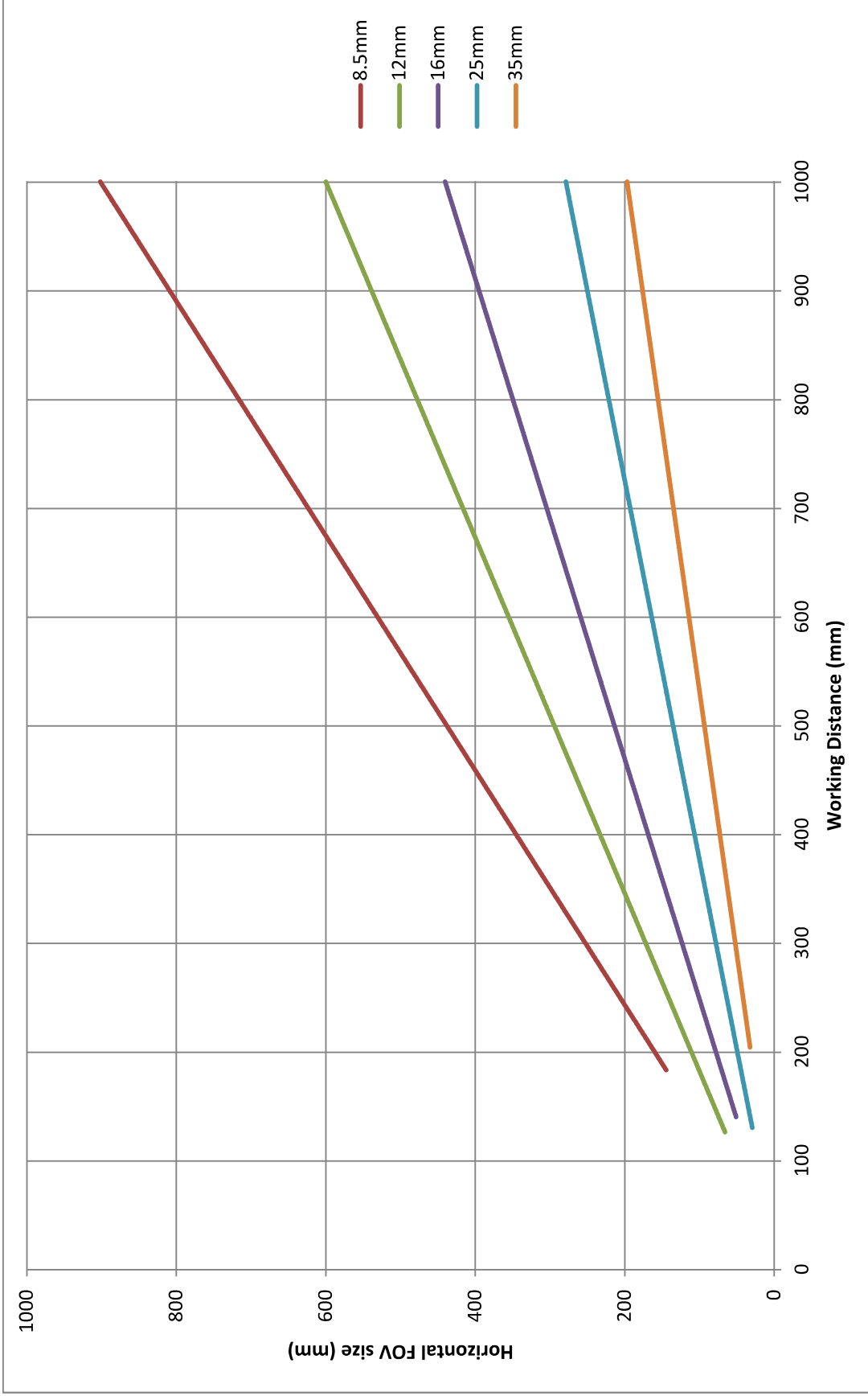
H(W), mm

$H = 0.144 \times W - 13.4$ (minimum W ~ 520 mm)

W(H), mm

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

Edmund Optics C-mount Lenses on VE Series



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

WD (mm)	8.5mm			12mm			16mm			25mm			35mm		
Minimum	144	x	108	66	x	50	51	x	38	29	x	22	32	x	24
	@ 183mm			@ 126mm			@ 140mm			@ 130mm			@ 204mm		
20															
40															
60															
80															
100															
120															
140				74	x	56	51	x	38	32	x	24			
160				87	x	65	60	x	45	38	x	28			
180				99	x	74	69	x	52	44	x	33			
200	160	x	120	111	x	83	78	x	59	49	x	37			
220	179	x	134	123	x	92	87	x	65	55	x	41	36	x	27
240	197	x	148	136	x	102	96	x	72	61	x	46	40	x	30
260	216	x	162	148	x	111	105	x	79	67	x	50	44	x	33
280	234	x	176	160	x	120	114	x	86	72	x	54	48	x	36
300	253	x	190	172	x	129	123	x	93	78	x	59	52	x	39
320	271	x	204	184	x	138	133	x	99	84	x	63	56	x	42
340	290	x	218	197	x	147	142	x	106	90	x	67	60	x	45
360	309	x	231	209	x	157	151	x	113	95	x	71	65	x	48
380	327	x	245	221	x	166	160	x	120	101	x	76	69	x	52
400	346	x	259	233	x	175	169	x	127	107	x	80	73	x	55
420	364	x	273	246	x	184	178	x	133	113	x	84	77	x	58
440	383	x	287	258	x	193	187	x	140	118	x	89	81	x	61
460	401	x	301	270	x	202	196	x	147	124	x	93	85	x	64
480	420	x	315	282	x	212	205	x	154	130	x	97	89	x	67
500	438	x	329	294	x	221	214	x	161	135	x	102	94	x	70
520	457	x	343	307	x	230	223	x	167	141	x	106	98	x	73
540	475	x	357	319	x	239	232	x	174	147	x	110	102	x	76
560	494	x	370	331	x	248	241	x	181	153	x	114	106	x	79
580	512	x	384	343	x	257	250	x	188	158	x	119	110	x	83
600	531	x	398	356	x	267	259	x	194	164	x	123	114	x	86
620	550	x	412	368	x	276	268	x	201	170	x	127	118	x	89
640	568	x	426	380	x	285	277	x	208	176	x	132	122	x	92
660	587	x	440	392	x	294	286	x	215	181	x	136	127	x	95
680	605	x	454	404	x	303	296	x	222	187	x	140	131	x	98
700	624	x	468	417	x	312	305	x	228	193	x	145	135	x	101
720	642	x	482	429	x	322	314	x	235	199	x	149	139	x	104
740	661	x	496	441	x	331	323	x	242	204	x	153	143	x	107
760	679	x	509	453	x	340	332	x	249	210	x	158	147	x	110
780	698	x	523	466	x	349	341	x	256	216	x	162	151	x	114
800	716	x	537	478	x	358	350	x	262	221	x	166	156	x	117
820	735	x	551	490	x	367	359	x	269	227	x	170	160	x	120
840	753	x	565	502	x	377	368	x	276	233	x	175	164	x	123
860	772	x	579	514	x	386	377	x	283	239	x	179	168	x	126
880	791	x	593	527	x	395	386	x	290	244	x	183	172	x	129
900	809	x	607	539	x	404	395	x	296	250	x	188	176	x	132
920	828	x	621	551	x	413	404	x	303	256	x	192	180	x	135
940	846	x	635	563	x	423	413	x	310	262	x	196	185	x	138
960	865	x	649	576	x	432	422	x	317	267	x	201	189	x	141
980	883	x	662	588	x	441	431	x	323	273	x	205	193	x	145
1000	902	x	676	600	x	450	440	x	330	279	x	209	197	x	148
1020	920	x	690	612	x	459	449	x	337	285	x	213	201	x	151
1040	939	x	704	624	x	468	458	x	344	290	x	218	205	x	154
1060	957	x	718	637	x	478	468	x	351	296	x	222	209	x	157
1080	976	x	732	649	x	487	477	x	357	302	x	226	213	x	160
1100	994	x	746	661	x	496	486	x	364	307	x	231	218	x	163
1120	1013	x	760	673	x	505	495	x	371	313	x	235	222	x	166
1140	1032	x	774	686	x	514	504	x	378	319	x	239	226	x	169
1160	1050	x	788	698	x	523	513	x	385	325	x	244	230	x	172
1180	1069	x	801	710	x	533	522	x	391	330	x	248	234	x	176
1200	1087	x	815	722	x	542	531	x	398	336	x	252	238	x	179
1220	1106	x	829	734	x	551	540	x	405	342	x	256	242	x	182
1240	1124	x	843	747	x	560	549	x	412	348	x	261	247	x	185
1260	1143	x	857	759	x	569	558	x	419	353	x	265	251	x	188
1280	1161	x	871	771	x	578	567	x	425	359	x	269	255	x	191
1300	1180	x	885	783	x	588	576	x	432	365	x	274	259	x	194
1320	1198	x	899	796	x	597	585	x	439	371	x	278	263	x	197
1340	1217	x	913	808	x	606	594	x	446	376	x	282	267	x	200
1360	1235	x	927	820	x	615	603	x	453	382	x	287	271	x	203
1380	1254	x	940	832	x	624	612	x	459	388	x	291	275	x	207
1400	1273	x	954	844	x	633	621	x	466	393	x	295	280	x	210
1420	1291	x	968	857	x	643	631	x	473	399	x	299	284	x	213
1440	1310	x	982	869	x	652	640	x	480	405	x	304	288	x	216
1460	1328	x	996	881	x	661	649	x	486	411	x	308	292	x	219
1480	1347	x	1010	893	x	670	658	x	493	416	x	312	296	x	222
1500	1365	x	1024	906	x	679	667	x	500	422	x	317	300	x	225

VE Series

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

FOV (mm)		8.5mm	12mm	16mm	25mm	35mm
Minimum		144 x 108 @ 183mm	66 x 50 @ 126mm	51 x 38 @ 140mm	29 x 22 @ 130mm	32 x 24 @ 204mm
20 x 15						
40 x 30					167	241
60 x 45				160	237	338
80 x 60			149	204	307	434
100 x 75			182	248	376	531
120 x 90			215	292	446	628
140 x 105			247	336	516	725
160 x 120	200		280	381	586	821
180 x 135	221		313	425	655	918
200 x 150	243		346	469	725	1015
220 x 165	264		378	513	795	1112
240 x 180	286		411	557	865	1208
260 x 195	308		444	602	934	1305
280 x 210	329		476	646	1004	1402
300 x 225	351		509	690	1074	1499
320 x 240	372		542	734	1144	1596
340 x 255	394		575	778	1213	1692
360 x 270	416		607	822	1283	1789
380 x 285	437		640	867	1353	1886
400 x 300	459		673	911	1423	1983
420 x 315	480		705	955	1492	2079
440 x 330	502		738	999	1562	2176
460 x 345	523		771	1043	1632	2273
480 x 360	545		804	1088	1702	2370
500 x 375	567		836	1132	1772	2466
520 x 390	588		869	1176	1841	2563
540 x 405	610		902	1220	1911	2660
560 x 420	631		935	1264	1981	2757
580 x 435	653		967	1308	2051	2853
600 x 450	674		1000	1353	2120	2950
620 x 465	696		1033	1397	2190	3047
640 x 480	718		1065	1441	2260	3144
660 x 495	739		1098	1485	2330	3240
680 x 510	761		1131	1529	2399	3337
700 x 525	782		1164	1574	2469	3434
720 x 540	804		1196	1618	2539	3531
740 x 555	825		1229	1662	2609	3627
760 x 570	847		1262	1706	2678	3724
780 x 585	869		1294	1750	2748	3821
800 x 600	890		1327	1794	2818	3918
820 x 615	912		1360	1839	2888	4014
840 x 630	933		1393	1883	2957	4111
860 x 645	955		1425	1927	3027	4208
880 x 660	977		1458	1971	3097	4305
900 x 675	998		1491	2015	3167	4402
920 x 690	1020		1524	2059	3236	4498
940 x 705	1041		1556	2104	3306	4595
960 x 720	1063		1589	2148	3376	4692
980 x 735	1084		1622	2192	3446	4789
1000 x 750	1106		1654	2236	3515	4885
1020 x 765	1128		1687	2280	3585	4982
1040 x 780	1149		1720	2325	3655	5079
1060 x 795	1171		1753	2369	3725	5176
1080 x 810	1192		1785	2413	3795	5272
1100 x 825	1214		1818	2457	3864	5369
1120 x 840	1235		1851	2501	3934	5466
1140 x 855	1257		1883	2545	4004	5563
1160 x 870	1279		1916	2590	4074	5659
1180 x 885	1300		1949	2634	4143	5756
1200 x 900	1322		1982	2678	4213	5853
1220 x 915	1343		2014	2722	4283	5950
1240 x 930	1365		2047	2766	4353	6046
1260 x 945	1386		2080	2811	4422	6143
1280 x 960	1408		2113	2855	4492	6240
1300 x 975	1430		2145	2899	4562	6337
1320 x 990	1451		2178	2943	4632	6433
1340 x 1005	1473		2211	2987	4701	6530
1360 x 1020	1494		2243	3031	4771	6627
1380 x 1035	1516		2276	3076	4841	6724
1400 x 1050	1538		2309	3120	4911	6820
1420 x 1065	1559		2342	3164	4980	6917
1440 x 1080	1581		2374	3208	5050	7014
1460 x 1095	1602		2407	3252	5120	7111
1480 x 1110	1624		2440	3297	5190	7208
1500 x 1125	1645		2472	3341	5259	7304

Edmund Optics Lens equations for VE Series 2 MP

H = horizontal FOV size, W = working distance



8.5 mm Megapixel lens

Banner model: LCF08LEMP (p/n 11387)

Edmund Optics model: 58-000 (2/3-inch format)

H(W), mm

$H = 0.93 \times W - 25.13$ (minimum W ~ 183 mm)

W(H), mm

$W = (H + 25.13)/0.93$ (minimum H ~ 144 mm)



12 mm Megapixel lens

Banner model: LCF12LEMP (p/n 11388)

Edmund Optics model: 58-001 (2/3-inch format)

H(W), mm

$H = 0.61 \times W - 11.19$ (minimum W ~ 126 mm)

W(H), mm

$W = (H + 11.19)/0.61$ (minimum H ~ 66 mm)



16 mm Megapixel lens

Banner model: LCF16LEMP (p/n 11389)

Edmund Optics model: 59-870 (2/3-inch format)

H(W), mm

$H = 0.45 \times W - 12.33$ (minimum W ~ 140 mm)

W(H), mm

$W = (H + 12.33)/0.45$ (minimum H ~ 51 mm)



25 mm Megapixel lens

Banner model: LCF25LEMP (p/n 11390)

Edmund Optics model: 59-871 (2/3-inch format)

H(W), mm

$H = 0.29 \times W - 7.89$ (minimum W ~ 130 mm)

W(H), mm

$W = (H + 7.89)/0.29$ (minimum H ~ 29 mm)



35 mm Megapixel lens

Banner model: LCF35LEMP (p/n 11391)

Edmund Optics model: 59-872 (2/3-inch format)

H(W), mm

$H = 0.21 \times W - 9.79$ (minimum $W \sim 204$ mm)

W(H), mm

$W = (H + 9.79)/0.21$ (minimum $H \sim 32$ mm)