

Bi-Telecentric Lenses

∴ **114** types of bi - telecentric lenses
∴ **13** types of parallel beam back lights

Bi-Telecentric Lenses MTL Series

Bi-telecentric lens offered by MORITEX is cutting-edge products designed with technology proven by legacy telecentric lens.

Our bi-telecentric lens has wide range of selection and is capable of fitting to many cameras available in the market, and shows the best fit to wide range of precise measurement application.

Our unique optical design capabilities result in the tightest object and image side telecentricity in the market and enable near-zero distortion performance with the highest resolution from the center to the edge along the system FOV.

This enables an optimized measurement condition for the highest accuracy that can be easily achieved by coupling these lenses with matched telecentric backlight illuminators.

∴ High resolution design Designed for 3.5 μm/pixel sensor

∴ Offering **16** FOVs

25mm, 35mm, 45mm, 55mm, 65mm, 80mm, 90mm, 100mm
120mm 135mm, 150mm, 180mm, 195mm, 240mm, 265mm, 310mm

∴ Supporting **8** different sensor sizes Maximum sensor size 82mm

∴ Inspection report provided for each unit, proving that MORITEX achieves the best performance



Bi-Telecentric Lenses

MTL Series

Image Format 1/3" - 4/3"

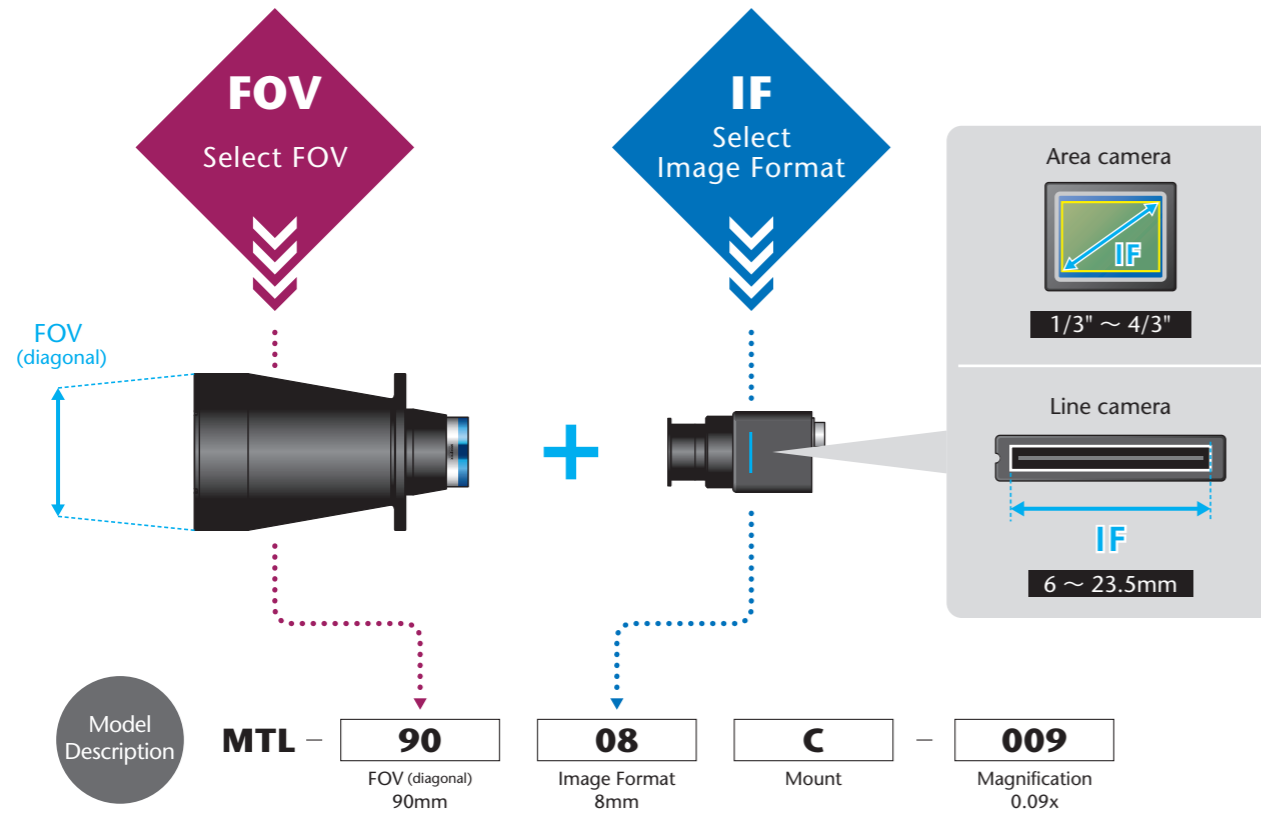
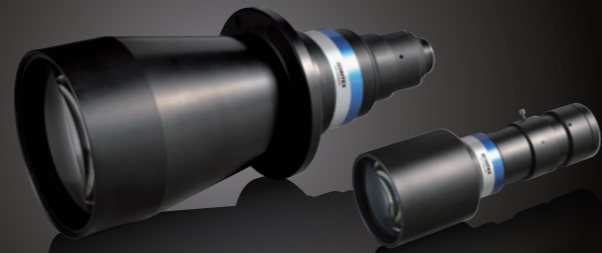


Chart for sensors sizes

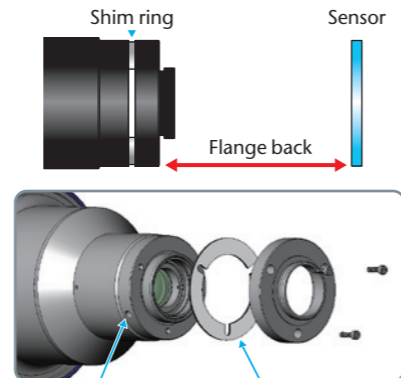
Max IF	8mm	11mm	18.5mm	23mm
Model name	MTL-xxx08C	MTL-xxx11C	MTL-xxx18C	MTL-xxx23P
Min Pixel size	3.5μm	3.5μm	3.5μm	3.5μm
Mount	C	C	C	P, C, M48, M58
Area camera	1/3"	○	○	○
	1/2.5"	○	○	○
	1/2"	●	○	○
	1/1.8"	○	○	○
	2/3"	○	●	○
	1"	○	○	○
	1.1"	○	○	●
	1.2"	○	○	○
Line camera	1K 10μm	○	○	○
	1K 14μm	○	○	○
	2K 7μm	○	○	○
	2K 10μm	○	○	○

● Recommendation
○ FOV varies according to a camera

Camera sensor position adjustment function

MORITEX's bi-telecentric lenses feature a camera adjustment function that can draw out the maximum performance. A filter can also be fitted to the lens, with the location designed with performance in mind.

Shim rings for adjustment based on camera sensor position



Camera rotation position adjustment screw
3 sets of M3 set-screw
Shim ring / 0.05mm : 1
0.1mm : 1

Specification

Max IF (mm)	FOV type	Mag. (x)	WD (mm)	Field of View												Optical specifications				Mechanical specifications			Model name		
				1/2" 6.4 x 4.8 x 8			2/3" 8.8 x 6.6 x 11			1.1" 14.1 x 10.3 x 18.1			4/3" 18.1 x 13.6 x 22.6			Effective F#	Distortion (%)	Telecentricity (deg.)	Resolution @520μm		DOF @40μm (mm)	Outer dia. (φmm)		Length (mm)	Weight (kg)
8mm	90	0.089	120	72	54	90									5.5				0.02	0.03			39.6		
	100	0.080	220	80	60	100									5.5	0.01	0.03	44.0	69.2	125	281.0	1.83	C	MTL-10008C-008	
	120	0.067	175	96	72	119									5.5	0.03	0.04	49.8	89.8	160	349.0	3.14	C	MTL-12008C-007	
	135	0.059	260	108	81	136									5.5	0.02	0.05	59.3	126.1	160	362.0	3.49	C	MTL-13508C-006	
	150	0.053	300	121	91	151									5.5	0.02	0.04	66.0	156.2	180	393.0	4.39	C	MTL-15008C-005	
	180	0.045	350	142	107	178									5.5	0.02	0.04	79.1	224.1	210	446.0	7.03	C	MTL-18008C-004	
	195	0.041	365	156	117	195									5.5	0.05	0.04	85.8	263.7	230	490.0	7.89	C	MTL-19508C-004	
	240	0.033	375	194	145	242									5.5	0.04	0.05	105.4	398.2	300	639.0	15.1	C	MTL-24008C-003	
	265	0.030	540	213	160	267									5.5	0.02	0.05	116.8	488.6	300	674.0	15.1	C	MTL-26508C-003	
	310	0.026	470	246	185	308									5.5	0.04	0.05	136.4	666.9	350	718.0	25.3	C	MTL-31008C-003	
11mm	90	0.122	120	52	39	66	72	54	90						8.0	0.02	0.03	41.8	43.1	125	301.0	1.85	C	MTL-9011C-012	
	100	0.110	220	58	44	73	80	60	100						8.0	0.01	0.03	46.4	53.2	125	297.0	1.89	C	MTL-10011C-011	
	120	0.092	175	70	52	87	96	72	120						8.0	0.02	0.04	55.2	75.6	160	365.0	3.20	C	MTL-12011C-009	
	135	0.082	260	78	59	98	107	80	134						8.0	0.02	0.05	62.6	96.9	160	378.0	3.55	C	MTL-13511C-008	
	150	0.073	300	88	66	110	121	90	151						8.0	0.01	0.04	69.7	120.0	180	409.0	4.45	C	MTL-15011C-007	
	180	0.061	350	105	79	131	144	108	180						8.0	0.01	0.04	83.5	172.1	210	462.0	7.09	C	MTL-18011C-006	
	195	0.056	365	114	86	143	157	118	196						8.0	0.05	0.04	90.6	202.6	230	506.0	7.95	C	MTL-19511C-006	
	240	0.046	375	139	104	174	191	143	239						8.0	0.04	0.05	111.3	305.9	300	655.0	15.2	C	MTL-24011C-005	
	265	0.041	540	156	117	195	215	161	268						8.0	0.03	0.05	123.3	375.5	300	690.0	15.2	C	MTL-26511C-004	
	310	0.035	470	183	137	229	251	189	314						8.0	0.04	0.05	144.0	512.5	350	734.0	25.4	C	MTL-31011C-004	
18.5mm	25	0.740	65	9	6	11	12	9	15	19	14	24			8.0	0.05	0.05	6.9	1.2	50	126.0	0.46	C	MTL-2518C-074	
	35	0.527	95	12	9	15	17	13	21	27	20	34			8.0	0.03	0.05	9.6	2.3	60	139.0	0.51	C	MTL-3518C-053	
	45	0.410	110	16	12	20	21	16	27	34	25	44			8.0	0.04	0.05	12.4	3.8	71	164.0	0.69	C	MTL-4518C-041	
	55	0.335	135	19	14	24	26	20	33	42	31	54			8.0	0.03	0.04	15.2	5.7	78	199.0	0.79	C	MTL-5518C-034	
	65	0.285	135	22	17	28	31	23	39	49	36	64			8.0	0.04	0.04	17.8	7.9	86	224.0	0.85	C	MTL-6518C-029	
	80	0.231	165	28	21	35	38	29	48	61	45	78			8.0	0.03	0.03	22.0	12.0	115	274.0	1.33	C	MTL-8018C-023	
	90	0.206	120	31	23	39	43	32	53	68	50	88			8.0	0.02	0.03	24.7	15.2	125	332.0	2.07	C	MTL-9018C-021	
	100	0.185	220	35	26	43	48	36	59	76	56	98			8.0	0.02	0.03	27.5	18.7	125	328.0	2.11	C	MTL-10018C-019	
	120	0.154	175	42	31	52	57	43	71	92	67	118			8.0	0.02	0.04	33.0	27.0	160	396.0	3.42	C	MTL-12018C-015	
	135	0.137	260	47	35	58	64	48	80	103	75	132			8.0	0.03	0.05	37.1	34.1	160	410.0	3.77	C	MTL-13518C-014	
	150	0.123	300	52	39	65	72	54	89	115	84	147			8.0	0.02	0.04	41.2	42.2	180	440.0	4.67	C	MTL-15018C-012	
	180	0.103	350	62	47	78	85	64	107	137	100	176			8.0	0.02	0.04	49.4	60.5	210	493.0	7.31	C	MTL-18018C-010	
	195	0.095	365	67	51	84	93	69	116	148	108	191			8.0	0.04	0.04	53.6	71.3	230	537.0	8.17	C	MTL-19518C-009	
	240	0.077	375	83	62	104	114	86	143	183	134	235			8.0	0.05	0.05	65.8	107.6	300	686.0	15.5	C	MTL-24018C-008	
265	0.070	540	91	69	114	126	94	157	201	147	259			8.0	0.03	0.05	72.9	132.1	300	721.0	15.5	C	MTL-26518C-007		
310	0.060	470	107	80	133	147	110	183	235	172	302			8.0	0.04	0.05	85.2	180.2	350	765.0	25.6	C	MTL-31018C-006		
23mm	25	0.920	65	7	5	9	10	7	12	15	11	20	20	15	25	8.0	0.05	0.05	5.5	0.8	50	152.0	0.50	P	MTL-2523P-092
	35	0.655	95	10	7	12	13	10	17	22	16	28	28	21	35	8.0	0.03	0.05	7.7	1.5	60	165.0	0.55	P	MTL-3523P-066
	45	0.510	110	13	9	16	17	13	22	28	20	35	35	27	44	8.0	0.04	0.05	10.0	2.5	71	190.0	0.73	P	MTL-4523P-051
	55	0.417	135	15	12	19	21	16	26	34	25	43	43	33	54	8.0	0.04	0.04	12.2	3.7	78	225.0	0.83	P	MTL-5523P-042
	65	0.354	135	18	14	23	25	19	31	40	29	51	51	38	64	8.0	0.04	0.04	14.3	5.1	86	249.0	0.89	P	MTL-6523P-035
	80	0.288	165	22	17	28	31	23	38	49	36	63	63	47	78	8.0	0.03	0.03	17.6	7.7	115	300.0	1.38	P	MTL-8023P-029
	90	0.256	120	25	19	31	34	26	43	55	40	71	71	53	88	8.0	0.02	0.03	19.9	9.8	125	358.0	2.14	P	MTL-9023P-026
	100	0.230	220	28	21	35	38	29	48	61	45	79	79	59	98	8.0	0.02	0.03	22.1	12.1	125	354.0	2.18	P	MTL-10023P-023
	120	0.192	175	33	25	42	46	34	57	73	54	94	94	71	118	8.0	0.02	0.04	26.4	17.4	160	422.0	3.49	P	MTL-12023P-019
	135	0.171	260	37	28	47	51	39	64	82	60	106	106	80	132	8.0	0.03	0.05	29.8	22.0	160	436.0	3.84	P	MTL-13523P-017
	150	0.153	300	42	31	52	58	43	72	92	67	118	118	89	148	8.0	0.01	0.04	33.1	27.3	180	466.0	4.74	P	MTL-15023P-0

Bi-Telecentric Lenses

MTL Series

Image Format 35mm - 82mm

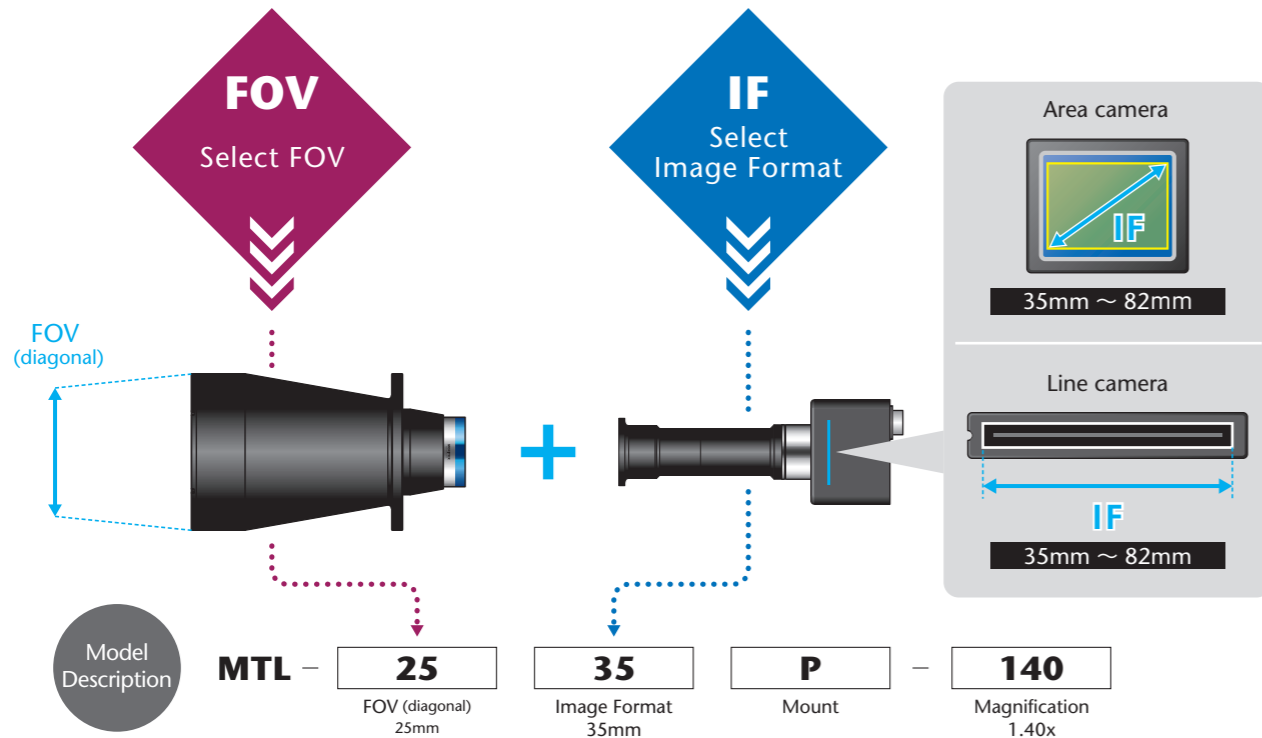
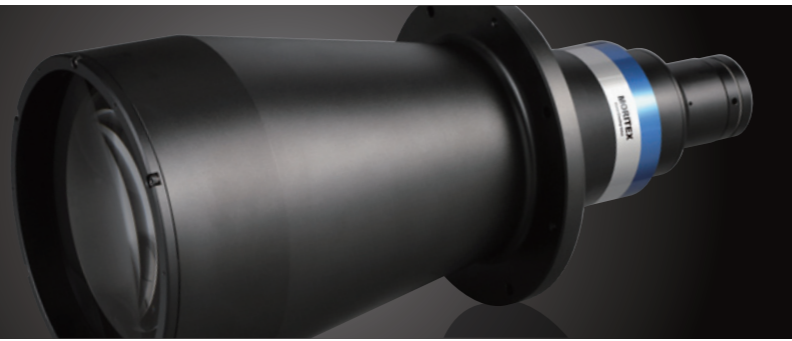
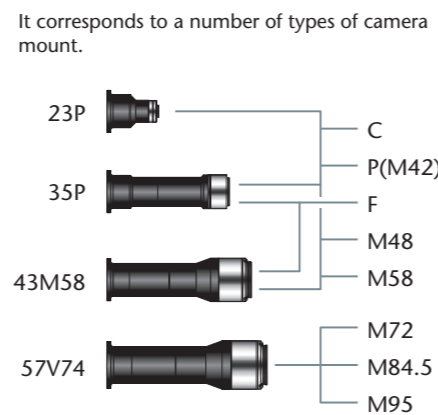


Chart for sensors sizes

	35mm	43.5mm	57.3mm	82mm
Max IF	35mm	43.5mm	57.3mm	82mm
Model name	MTL-xxx35P	MTL-xxx43M58	MTL-xxx57V74	MTL-xxx82M95
Min Pixel size	3.5µm	5µm	5µm	5µm
Mount	P, F, M48, M58	P, F, M48, M58	V74(CA-M72)	M95
Area camera	12M pixel	○	○	○
	16M pixel	○	○	○
	20M pixel	○	○	○
	25M pixel	●	○	○
	29M pixel	○	●	○
	47M pixel	○	○	○
	60M pixel	○	○	○
	71M pixel	○	○	○
80M pixel	○	○	○	
Line camera	4K 7µm	○	○	○
	6K 7µm	○	○	○
	8K 3.5µm	●	○	○
	8K 7µm	○	○	○
	12K 3.5µm	○	●	○
	12K 5µm	○	○	○
	16K 3.5µm	○	○	●
16K 5µm	○	○	○	
18K 3.5µm	○	○	○	

● Recommendation
○ FOV varies according to a camera

Mounts



Specification

Max IF (mm)	FOV type	Mag. (x)	WD (mm)	Field of View												Optical specifications					Mechanical specifications				Model name
				35mm 31.0 x 24.1 x 35			43.5mm 36 x 24 x 43.5			57.3mm 48.7 x 29 x 56.7			82mm 16K 5µm			Effective F#	Distortion (%)	Telecentricity (deg.)	Resolution @520µm (µm)	DOF @40µm (mm)	Outer dia. (φmm)	Length (mm)	Weight (kg)	Standard Mount	
25	1.400	65	22 17 25												9.2	0.05	0.05	4.2	0.4	50	210.0	0.80	P	MTL-2535P-140	
35	0.999	95	31 24 35												9.2	0.03	0.05	5.8	0.7	60	222.0	0.86	P	MTL-3535P-100	
45	0.776	110	40 31 45												9.2	0.04	0.05	7.5	1.2	71	247.0	1.04	P	MTL-4535P-078	
55	0.635	135	49 38 55												9.2	0.04	0.04	9.2	1.8	78	282.0	1.14	P	MTL-5535P-064	
65	0.540	135	57 45 65												9.2	0.04	0.04	10.8	2.5	86	307.0	1.20	P	MTL-6535P-054	
80	0.438	165	71 55 80												9.2	0.03	0.03	13.3	3.8	115	357.0	1.68	P	MTL-8035P-044	
90	0.390	120	79 62 90												9.2	0.02	0.03	14.9	4.8	125	416.0	2.35	P	MTL-9035P-039	
100	0.351	220	88 69 100												9.2	0.02	0.03	16.6	6.0	125	412.0	2.39	P	MTL-10035P-035	
120	0.292	175	106 83 120												9.2	0.02	0.04	20.0	8.7	160	481.0	3.70	P	MTL-12035P-029	
135	0.260	260	119 93 135												9.2	0.03	0.05	22.4	10.9	160	493.0	4.05	P	MTL-13535P-026	
150	0.234	300	132 103 150												9.2	0.02	0.04	24.9	13.5	180	524.0	4.95	P	MTL-15035P-023	
180	0.195	350	159 124 179												9.2	0.02	0.04	29.8	19.3	210	576.0	7.59	P	MTL-18035P-019	
195	0.180	365	172 134 194												9.2	0.04	0.04	32.4	22.7	230	621.0	8.45	P	MTL-19535P-018	
240	0.146	375	212 165 240												9.2	0.05	0.05	39.8	34.3	300	770.0	15.7	P	MTL-24035P-015	
265	0.132	540	235 183 265												9.2	0.03	0.05	44.1	42.1	300	805.0	15.7	P	MTL-26535P-013	
310	0.113	470	274 213 310												9.2	0.04	0.05	51.5	57.5	350	849.0	25.9	P	MTL-31035P-011	
25	1.740	65	18 14 20	21 14 25											13.7	0.05	0.05	5.0	0.4	50	241.0	0.72	M58	MTL-2543M58-174	
35	1.240	95	25 19 28	29 19 35											13.7	0.04	0.05	7	0.7	60	254.0	0.78	M58	MTL-3543M58-124	
45	0.964	110	32 25 36	37 25 45											13.7	0.04	0.05	9	1.2	71	279.0	0.96	M58	MTL-4543M58-096	
55	0.788	135	39 31 44	46 30 55											13.7	0.04	0.04	11	1.8	78	314.0	1.06	M58	MTL-5543M58-079	
65	0.670	135	46 36 52	54 36 65											13.7	0.04	0.04	13	2.4	86	339.0	1.12	M58	MTL-6543M58-067	
80	0.543	165	57 44 64	66 44 80											13.7	0.03	0.03	16.0	3.7	115	389.0	1.60	M58	MTL-8043M58-054	
90	0.484	120	64 50 72	74 50 90											13.7	0.02	0.03	18	4.7	125	447.0	2.50	M58	MTL-9043M58-048	
100	0.435	220	71 55 80	83 55 100											13.7	0.02	0.03	20	5.8	125	443.0	2.54	M58	MTL-10043M58-044	
120	0.363	175	86 66 97	99 66 120											13.7	0.02	0.04	24.0	8.3	160	512.0	3.85	M58	MTL-12043M58-036	
135	0.323	260	96 75 108	111 74 135											13.7	0.03	0.05	26.9	10.5	160	525.0	4.20	M58	MTL-13543M58-032	
150	0.290	300	107 83 121	124 83 150											13.7	0.02	0.04	30	13.0	180	556.0	5.10	M58	MTL-15043M58-029	
180	0.242	350	128 100 145	149 99 180											13.7	0.02	0.04	35.9	18.7	210	608.0	7.74	M58	MTL-18043M58-024	
195	0.223	365	139 108 157	161 108 195											13.7	0.04	0.04	39	22.0	230	652.0	8.60	M58	MTL-19543M58-022	
240	0.182	375	170 132 192	198 132 239											13.7	0.05	0.05	47.9	33.2	300	801.0	15.8	M58	MTL-24043M58-018	
265	0.164	540	189 147 213	220 146 265											13.7	0.03	0.05	53	40.8	300	836.0	15.8	M58	MTL-26543M58-016	
310	0.140	470	221 172 250	257 171 311											13.7	0.04	0.05	61.9	55.7	350	880.0	26.0	M58	MTL-31043M58-014	
25	2.292	65	14 11 15	16 10 19	21 13 25										15.0	0.04	0.05	4.2	0.2	50	283.0	1.20	V74	MTL-2557V74-229	
35	1.636	95	19 15 21	22 15 27	30 18 35										15.0	0.03	0.05	5.8	0.4	60	296.0	1.26	V74	MTL-3557V74-164	
45	1.272	110	24 19 28	28 19 34	38 23 45										15.0	0.03	0.05	7.5	0.7	71	320.0	1.44	V74	MTL-4557V74-127	
55	1.040	135	30 23 34	35 23 42	47 28 55										15.0	0.03	0.04	9.2	1.1	78	355.0	1.54	V74	MTL-5557V74-104	
65	0.884	135	35 27 40	41 27 49	55 33 64										15.0	0.04	0.04	10.8	1.5	86	380.0	1.60	V74	MTL-6557V74-088	
80	0.716	165	43 34 49	50 34 61	68 41 79										15.0	0.03	0.03	13.3	2.3	115	431.0	2.08	V74	MTL-8057V74-072	
90	0.638	120	49 38 55	56 38 68	76 45 89										15.0	0.03	0.03	14.9	3.0	125	489.0	2.97	V74	MTL-9057V74-064	
100	0.574	220	54 42 61	63 42 76	85 51 99										15.0	0.03	0.03	16.6	3.6	125	485.0	3.01	V74	MTL-10057V74-057	
120	0.477	175	65 51 73	75 50 91	102 61 119										15.0	0.03	0.04	19.9	5.3	160	553.0	4.32	V74	MTL-12057V74-048	
135	0.426	260	73 57 82	85 56 102	114 68 133										15.0	0.04	0.05	22.4	6.6	160	567.0	4.67	V74	MTL-13557V74-043	
150	0.382	300	81 63 92	94 63 114	127 76 148										15.0	0.02	0.04	24.9	8.2	180	597.0	5.57	V74	MTL-15057V74-038	
180	0.319	350	97 76 110	113 75 136	153 91 178										15.0	0.03	0.04	29.8	11.8	210	649.0	8.21	V74	MTL-18057V74-032	
195	0.294	365	105 82 119	122 82 148	166 99 193										15.0	0.03	0.04	32.4	13.9	230	694.0	9.07	V74	MTL-19557V74-029	
240	0.240	375	129 100 146	150 100 181	203 121 236										15.0	0.05	0.05	39.8	20.9	300	843.0	16.3	V74	MTL-24057V74-024	
265	0.216	540	144 112 162	167 111 201	225 134 263										15.0	0.03	0.05	44.1	25.7	300	878.0	16.3	V74	MTL-26557V74-022	
310	0.185	470	168 130 189	195 130 235	263 157 306										15.0	0.05	0.05	51.5	35.1	350	922.0	26.5	V74	MTL-31057V74-019	
45	1.822	110	17 13 19	20 13 24	27 16 31	-	-	45							18.0	0.03	0.05	6.27	0.4	71	518.0	2.06	M95	MTL-4582M95-182	
55	1.491	135	21 16 23	24 16 29	33 19 38	-	-	55							18.0	0.03	0.04	7.66	0.6	78	553.0	2.16	M95	MTL-5582M95-149	
65	1.262	135	25 19 28	29 19 34	39 23 45	-	-	65							18.0	0.03	0.04	9.05	0.9	86	578.0	2.22	M95	MTL-6582M95-126	
80	1.025	165	30 24 34	35 23 42	48 28 55	-	-	80							18.0	0.0									