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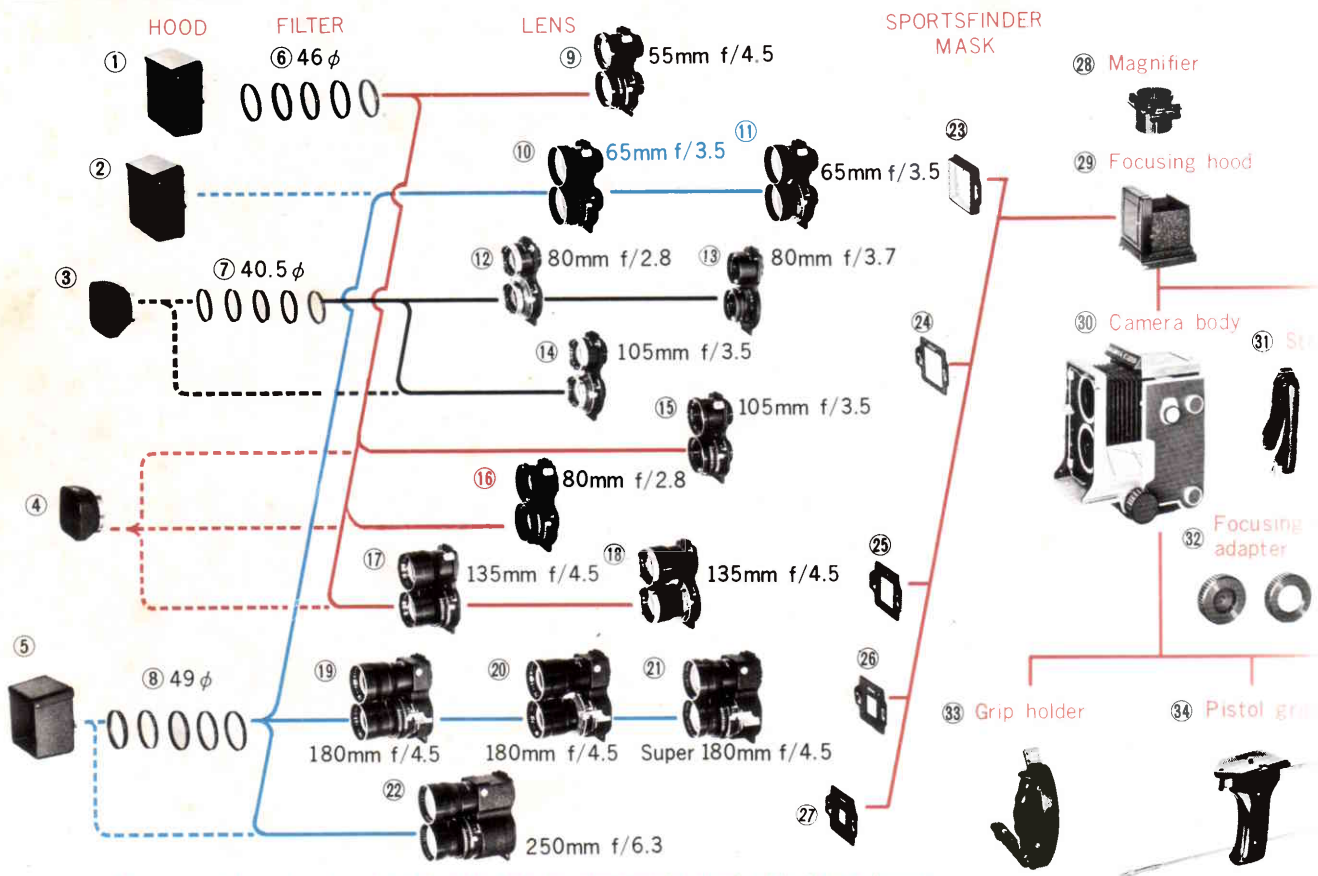
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■ Interchangeable Lenses and Accessories for MAMIYA



* Filters and lens hoods of each size can be commonly used with those lenses connected by lines.

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Paramender



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2. Lens hood for 65mm lens
3. Lens hood 42 ϕ for 80 and 105mm lenses
4. Lens hood 48 ϕ for 80, 105 and 135mm lenses
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6. Filter 46mm diam
7. Filter 40.5mm diam
8. Filter 49mm diam
9. 55mm f/4.5 lens
10. 65mm f/3.5 lens (Side Reading System)
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12. 80mm f/2.8 lens (F. R. S.)
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18. 135mm f/4.5 lens (F. R. S.)
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35. Paramender
36. Magnifying hood
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38. CdS Porrofinder
39. Prism finder
40. Compartment case

■ Angle of View Changes by Interchanging Lenses

All these pictures were taken from the same position, at an identical distance from the subject.

55mm ✓



65mm ✓



80mm ✓



105mm



135mm ✓



180mm ✓



250mm ✓



Specifications of Interchangeable Lenses

Lens	Composition	Picture Angle	Filter Diameter (mm)	Lens Hood Diameter (mm)	Close-Up Capabilities		Shutter
					Shortest Distance from Film to Subject	Subject Coverage	
55mm f/4.5	9 element 7 group	70°30'	46 ϕ	48 ϕ	9.1/2 in. (24.1 cm)	2.17/32 × 2.17/32 in. (6.4 × 6.4 cm)	Seiko
65mm f/3.5	6 element 5 group	63°	49 ϕ	50 ϕ	10.11/16 in. (27.1 cm)	2.21/32 × 2.21/32 in. (6.7 × 6.7 cm)	Seiko
80mm f/2.8	5 element 3 group	50°40'	* 40.5 ϕ ** 46 ϕ	* 42 ϕ ** 48 ϕ	1ft. 1.15/16 in. (35.4cm)	3.25/64 × 3.25/64 in. (8.6 × 8.6 cm)	Seiko
80mm f/3.7	4 element 3 group	50°40'	40.5 ϕ	42 ϕ	1ft. 1.15/16 in. (35.4cm)	3.25/64 × 3.25/64 in. (8.6 × 8.6 cm)	Copal
105mm f/3.5	4 element 3 group	41°20'	* 40.5 ϕ ** 46 ϕ	* 42 ϕ ** 48 ϕ	2ft. 1.25/64 in. (64.5cm)	8.19/32 × 8.19/32 in. (21.8 × 21.8 cm)	Seiko
135mm f/4.5	4 element 3 group	33°	46 ϕ	48 ϕ	2ft. 11.1/2 in. (90.2cm)	9.15/16 × 9.15/16 in. (25.2 × 25.2 cm)	Seiko
180mm f/4.5	4 element 3 group	24°30'	49 ϕ	50 ϕ	4 ft. 2 in. (1m 27cm)	10.11/16 × 10.11/16 in. (27.2 × 27.2 cm)	Seiko
Super 180mm f/4.5	5 element 4 group	24°30'	49 ϕ	50 ϕ	4 ft. 2 in. (1m 27cm)	10.11/16 × 10.11/16 in. (27.2 × 27.2 cm)	Seiko
250mm f/6.3	6 element 4 group	18°	49 ϕ	50 ϕ	6 ft. 8.3/4 in. (2 m 05 cm)	1ft. 1/4 in. × 1ft. 1/4 in. (31.1 × 31.1 cm)	Seiko

Among interchangeable lenses, there are two different types of lenses for the same focal length: (1) Side Reading System lenses which indicate the shutter speed and aperture scale on top of the lens, observable from above the camera being hand held; (2) Front Reading System lenses which indicate those scales on the front of the lens. Those of you who own older type lenses,

of course, can use them with your Mamiya C220.

Filters and lens hoods can be commonly used between these different types of lenses except the 80mm f/2.8 lens and 105mm f/3.5 lens, because the diameter of the filters and of lens hoods for these two lenses differ according to F.R.S. and S.R.S.

Accessories

Filters

There are five different types of filters (Y2, YG, O2, UV and SL) for each filter size described in the lens specifications table.

Precautions

There are two different diameters for the 80mm f/2.8 lens and the 105mm f/3.5 lens. When you order filters for these lenses, always specify the diameter of your lens.

Lenses with a 49mm filter diameter have a particular filter mount and do not accept other than Mamiya filters. When you order filters for these lenses, always specify the MAMIYA C type.

For attaching filters to lenses of 49mm filter diameter, put your palm on the protective ring screwed into the front barrel of the lens, turn the ring counterclockwise to remove it, then screw in the filter. When filters are not used, always replace the ring to protect the lens barrel.

Lens hoods

There are five different types of lens hoods available for interchangeable lenses.

† Lens hood for 55mm lens
† Lens hood for 65mm lens
Lens hood 42 ϕ for 80mm f/3.7 80mm f/2.8* 105mm f/3.5*
Lens hood 48 ϕ for 80mm f/2.8** 105mm f/3.5** 135mm f/4.5
† Lens hood for 180mm Super 180mm 250mm

Lenses marked * are Front Reading System.

Lenses marked ** are Side Reading System.

Lens hoods marked † have a side plate which can be inclined.

All of these lens hoods are the comparatively new type attached only to the taking lens. Old type lens hoods are also acceptable.

For the 80mm f/2.8 lens and 105mm f/3.5 lens, attach a 48mm ϕ lens hood to lenses with S.R.S., and a 42mm ϕ lens hood to lenses with F.R.S. Lens hood of 48mm ϕ can also be attached to 135mm lenses. In the above table, lens hoods marked † are hoods whose a side plate can be inclined. Attach the hood to the lens with this plate upward. When reflected light from the lens hood to the viewing lens becomes annoying while focusing, due to a certain light condition, incline the plate so that the annoying reflection is eliminated.

Grip holder

The grip holder is a very convenient accessory for hand-holding the camera while taking pictures or for carrying the camera. Its accessory shoe is attached on the top of the grip.



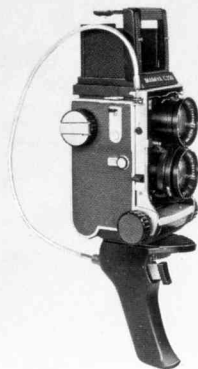
Magnifier

A very convenient accessory for accurate focusing, this magnifying glass, used by attaching it to the side plates of the focusing hood from above, magnifies the picture on the ground glass focusing screen 5.5 times. By turning the eye lens ring of the magnifier, visibility can be adjusted.



Pistol grip

This grip, which supports the camera from the bottom, has a trigger type shutter release button which many persons prefer when following sports action.



Paramender

This is a parallax-correcting instrument used between the camera base and a tripod. Keep the part attached to the camera base downward while focusing, then raise the camera position by turning the handle until it stops just before releasing the shutter. Thus, the taking lens is lifted to the position where the viewing lens was, and parallax is hereby automatically corrected.



Porrofinder

By attaching this Porrofinder instead of the regular focusing hood, the camera can be held at eye level. The image in the finder is right side up and correct right to left ... actual visual focusing.

Magnification of this finder approximately doubles the image on the ground glass focusing screen.



Prism Finder

As with the magnifying hood, this prism finder may be used instead of the focusing hood. Through this prism finder, the image on the ground glass focusing screen appears exactly as the subject is seen. Really an indispensable accessory for eye-level photo-journal photos or candid shots.

Magnification of this finder is approximately 2.5 times the image on the ground glass focusing screen, particularly bright and clear.



CdS Porrofinder

This is a Porrofinder with built-in CdS exposure meter. Match the index needles with the dial on the back of the finder, and read the dial scale. This device measures the amount of light traveling through the viewing lens, offering correct exposure setting even for amateurs.

Especially important...there is no need to worry over exposure correction on close-up shots by extending the bellows camera. However, when a filter is attached to the taking lens, the exposure must be adjusted according to the filter factor. An eyecup prevents disturbing light from entering the finder through the finder eyepiece.

Magnification of this finder approximately doubles the image on the ground glass focusing screen.



Eye Correction Lens

This lens, designed to correct visibility, is installed inside the eyepiece ring of the Porrofinder, CdS Porrofinder, or Prism Finder.

The image in the finder coincides with persons with ordinary eyesight who easily visualize objects without becoming fatigued. Persons who do not wear glasses in spite of their nearsightedness or farsightedness, or whose sight is not sufficiently corrected by glasses, usually find it very difficult to observe the finder image. Such persons may find this lens a boon to facilitating picture taking.

Nine types of lenses are provided from +2.5 to -2 diopter (each diopter is +2.5, +2.0, +1.5, +1.0, +0.5, -0.5, -1.0, -1.5, and -2.0).

The diopter has no relation to values such as 1.0 in a test of visual power, and cannot be converted to other values; therefore, have an optician determine the diopter suitable to your glasses.

Supposing that your glasses were +1.5 diopter, it would be very easy to view the finder image when using a lens having +1.5 diopter. Of course, if the individual wears glasses perfectly fitted to his eyes, this accessory lens is unnecessary.

When installing the lens on the finder, hold the milled portion of the eyepiece ring with the thumb and finger, and turn it counterclockwise to remove the ring. When the lens is a plus (convex) lens, position it with the flat surface outside, and when it is a minus (concave) lens, place the concave surface on the exterior, then screw the ring into its original position.

Magnifying Hood

This magnifying hood may be used instead of the focusing hood. By turning the knob on the side of this hood, either 3.5X or 6X magnification can be selected.



Focusing Knob Adapter

An adapter for attaching to the focusing knob to facilitate precise focusing.



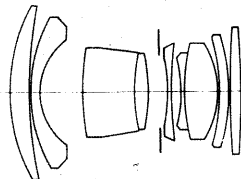
Compartment Case

A roomy carrying case for active photographers, accommodating your Mamiya C220 with lens and grip holder, interchangeable lenses, lens hoods, and other accessories. Wonderfully convenient!



Depth of Field Table

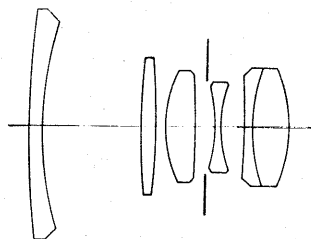
55mm f/4.5



Aperture	Distance (in feet)										
	∞	30	15	7	5	3	2.5	2	1.5	1	9½'
4.5	29' 1" ∞	14' 11" ∞	10' 30' 1'	5' 9" 9'	4' 4¼" 5' 11"	2' 9¾" 3' 3¾"	2' 4⅝" 2' 8¾"	1' 10⅝" 2' 1⅝"	1' 5½" 1' 6½"	11⅜" 1' ⅝"	9⅞" 9⅞"
5.6	23' 2" ∞	13' 3" ∞	9' 3" 40' 8"	5' 6" 9' 8½"	4' 2½" 6' 2"	2' 8½" 3' 4¾"	2' 4¼" 2' 9½"	1' 10⅝" 2' 1½"	1' 5⅝" 1' 6¾"	11⅜" 1' ⅝"	9⅞" 9⅞"
8	16' 5" ∞	10' 9" ∞	8' 145'	5' 1" 11' 7"	3' 11½" 6' 10"	2' 7½" 3' 6¾"	2' 3⅝" 2' 10⅝"	1' 10⅝" 2' 2¼"	1' 5⅝" 1' 7"	11⅜" 1' ⅝"	9⅞" 9⅞"
11	11' 8" ∞	8' 6" ∞	6' 9" ∞	4' 6½" 16' 1"	3' 7¾" 8' 2"	2' 5⅝" 3' 9½"	2' 2¼" 3' ⅜"	1' 9¾" 2' 3¾"	1' 4¾" 1' 7½"	11⅜" 1' ⅝"	9⅞" 9⅞"
16	8' 4" ∞	6' 8" ∞	5' 6" ∞	3' 11¾" 35' 10"	3' 3½" 11' 1"	2' 4⅜" 4' 3¾"	2' ⅞" 3' 4¼"	1' 8⅝" 2' 5"	1' 4¾" 1' 8¼"	11⅜" 1' ⅝"	9⅞" 9⅞"
22	5' 11½" ∞	5' 1" ∞	4' 5" ∞	3' 4¾" ∞	2' 10¾" 23' 8"	2' 1⅜" 5' 1"	1' 11⅝" 3' 10¾"	1' 7½" 2' 7¾"	1' 3¾" 1' 9¾"	11⅜" 1' ⅝"	9⅞" 9⅞"

Aperture	Distance (in meter)											
	∞	5	3	2	1.5	1.1	0.8	0.6	0.5	0.4	0.3	0.25
4.5	8.87 ∞	3.24 11.11	2.28 4.42	1.66 2.52	1.31 1.76	1.00 1.23	0.75 0.86	0.57 0.63	0.48 0.52	0.391 0.410	0.296 0.304	0.249 0.251
5.6	7.07 ∞	2.98 16.28	2.15 5.04	1.59 2.70	1.27 1.85	0.98 1.26	0.74 0.88	0.57 0.64	0.48 0.52	0.389 0.412	0.296 0.305	0.248 0.252
8	5.02 ∞	2.56 ∞	1.93 7.04	1.47 3.17	1.19 2.05	0.93 1.35	0.71 0.91	0.56 0.65	0.47 0.53	0.384 0.418	0.294 0.307	0.248 0.253
11	3.57 ∞	2.13 ∞	1.68 16.81	1.33 4.21	1.10 2.42	0.88 1.49	0.68 0.97	0.54 0.68	0.46 0.55	0.378 0.425	0.291 0.309	0.247 0.254
16	2.55 ∞	1.73 ∞	1.43 ∞	1.17 7.97	0.99 3.27	0.81 1.76	0.65 1.07	0.52 0.72	0.45 0.57	0.370 0.437	0.288 0.314	0.245 0.255
22	1.82 ∞	1.37 ∞	1.18 ∞	1.00 ∞	0.87 6.65	0.73 2.37	0.60 1.25	0.49 0.79	0.43 0.61	0.359 0.455	0.283 0.320	0.243 0.257

65mm f/3.5

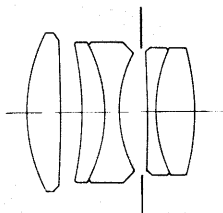


Aperture	Distance (in feet)										
	∞	30	15	7	5	3	2	1.75	1.5	1.25	1
3.5	50' 2 3/4" ∞	18' 11 1/4" 73' 1 1/4"	11' 8" 21' 1"	6' 2 1/2" 8' 3/4"	4' 7 1/4" 5' 5 1/4"	2' 10 1/2" 3' 1 1/4"	1' 11 1/4" 2' 1/2"	1' 8 1/2" 1' 9 1/2"	1' 5 1/2" 1' 6 1/2"	1' 2 1/2" 1' 3 1/2"	11 1/2" 1' 3/8"
4	43' 11 1/2" ∞	17' 11 3/4" 92' 1 1/4"	11' 3 3/4" 22' 4 1/2"	6' 1 1/2" 8' 2 1/4"	4' 6 1/2" 5' 6 1/4"	2' 10 1/4" 3' 2"	1' 11 1/4" 2' 3/4"	1' 8 1/2" 1' 9 1/2"	1' 5 1/2" 1' 6 1/2"	1' 2 1/2" 1' 3 1/2"	11 1/2" 1' 3/8"
5.6	31' 5 1/2" ∞	15' 6 1/4" 155' 9"	10' 3 1/2" 27' 11"	5' 9 3/4" 8' 9 3/4"	4' 4 3/4" 5' 9 3/4"	2' 9 1/2" 3' 3"	1' 11" 2' 1"	1' 8 1/2" 1' 9 1/2"	1' 5 1/2" 1' 6 1/2"	1' 2 1/2" 1' 3 1/2"	11 1/2" 1' 3/8"
8	22' 1" ∞	12' 10 1/2" 44' 5 3/4"	9' 1" 9' 11"	5' 5 1/4" 9' 11"	4' 2" 6' 3"	2' 8 1/2" 3' 4 1/2"	1' 10 1/2" 2' 1 1/2"	1' 8" 1' 10 1/2"	1' 5 1/2" 1' 6 1/2"	1' 2 1/2" 1' 3 1/2"	11 1/2" 1' 3/8"
11	16' 1 1/2" ∞	10' 7 1/2" 175' 8"	7' 11 1/4" 11' 9 1/4"	5' 3/4" 6' 11"	3' 11 1/4" 6' 11"	2' 7 1/2" 3' 6 1/4"	1' 10 1/4" 2' 2 1/4"	1' 7 1/2" 1' 10 1/2"	1' 5 1/2" 1' 7 1/2"	1' 2 1/2" 1' 3 1/2"	11 1/2" 1' 3/8"
16	11' 1 1/4" ∞	8' 3" ∞	6' 6 3/4" ∞	4' 5 1/2" 17' 2 3/4"	3' 7 1/4" 8' 5"	2' 5 1/4" 3' 10 1/4"	1' 9 1/2" 2' 3 1/2"	1' 7 1/2" 1' 11 1/2"	1' 4 1/2" 1' 7 1/2"	1' 2 1/4" 1' 3 1/2"	11 1/2" 1' 3/8"
22	8' 2" ∞	6' 6 1/4" ∞	5' 5 1/4" ∞	3' 11 1/4" 39' 3/4"	3' 3" 11' 5"	2' 4" 4' 3 1/4"	1' 8 1/2" 2' 5"	1' 6 1/2" 2' 1/2"	1' 4 1/2" 1' 8 1/4"	1' 1 3/4" 1' 4 1/4"	11 1/2" 1' 1/2"
32	5' 8 1/4" ∞	4' 10 1/4" ∞	4' 3" ∞	3' 3 1/2" ∞	2' 10" 29' 3/4"	2' 1 1/2" 5' 5 1/4"	1' 7 1/4" 2' 8 1/4"	1' 5 1/2" 2' 2 1/2"	1' 3 1/2" 1' 9 1/2"	1' 1 1/4" 1' 4 1/2"	11 1/2" 1' 1/2"

Aperture	Distance (in meter)											
	∞	5	3	2	1.2	1	0.8	0.65	0.6	0.5	0.4	0.3
3.5	15.31	3.81	2.54	1.79	1.12	0.95	0.77	0.63	0.585	0.490	0.395	0.298
	∞	7.32	3.68	2.27	1.29	1.06	0.83	0.67	0.616	0.510	0.405	0.302
4	13.40	3.68	2.48	1.76	1.12	0.94	0.77	0.63	0.582	0.489	0.394	0.298
	∞	7.84	3.80	2.31	1.30	1.06	0.84	0.67	0.619	0.512	0.406	0.302
5.6	9.59	3.33	2.32	1.68	1.09	0.92	0.75	0.62	0.576	0.485	0.392	0.297
	∞	10.16	4.26	2.47	1.34	1.09	0.85	0.68	0.627	0.517	0.409	0.303
8	6.73	2.92	2.12	1.58	1.04	0.89	0.73	0.61	0.566	0.478	0.388	0.296
	∞	18.35	5.21	2.75	1.42	1.14	0.88	0.70	0.639	0.524	0.413	0.304
11	4.91	2.53	1.91	1.46	1.00	0.86	0.71	0.59	0.554	0.471	0.384	0.294
	∞	∞	7.25	3.21	1.52	1.20	0.92	0.72	0.655	0.534	0.418	0.306
16	3.40	2.07	1.64	1.31	0.93	0.81	0.68	0.57	0.536	0.459	0.378	0.292
	∞	∞	20.27	4.30	1.73	1.33	0.98	0.75	0.684	0.551	0.426	0.309
22	2.49	1.71	1.41	1.16	0.85	0.76	0.64	0.55	0.516	0.446	0.370	0.289
	∞	∞	∞	8.48	2.09	1.52	1.07	0.80	0.723	0.573	0.437	0.313
32	1.73	1.32	1.14	0.98	0.76	0.68	0.59	0.51	0.486	0.425	0.358	0.284
	∞	∞	∞	∞	3.21	2.00	1.28	0.91	0.801	0.616	0.457	0.319

Depth of Field Table

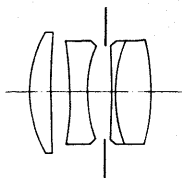
80mm f/2.8



Aperture	Distance (in feet)								
	∞	30	15	10	7	5	4	3	1.5
2.8	102' 7" ∞	23' 4¼" 42' ¼"	13' 2" 17' 5"	9' 2" 11'	6' 7¾" 7' 5½"	4' 9¾" 5' 2½"	3' 10½" 4' 1½"	2' 11¼" 3' ¾"	1' 5¾" 1' 6¾"
4	71' 10½" ∞	21' 4" 50' 9¼"	12' 6¼" 18' 8¾"	8' 10½" 11' 5¾"	6' 5¼" 7' 8"	4' 8¾" 5' 3¾"	3' 10" 4' 2¼"	2' 11" 3' 1¼"	1' 5¾" 1' 6¾"
5.6	51' 5" ∞	19' 1½" 70' 4"	11' 9" 20' 9½"	8' 5¾" 12' 2½"	6' 3" 7' 11¾"	4' 7¾" 5' 5½"	3' 9¾" 4' 3¾"	2' 10½" 3' 1½"	1' 5¾" 1' 6¾"
8	36' ¾" ∞	16' 7" 167' 5¾"	10' 9¼" 24' 11½"	7' 11½" 13' 5¾"	5' 11¾" 8' 5¾"	4' 5¾" 5' 8"	3' 8" 4' 4¾"	2' 10" 3' 2¼"	1' 5¾" 1' 6¾"
11	26' 3¾" ∞	14' 2½" ∞	9' 8¾" 33' 3¾"	7' 5" 15' 6½"	5' 8" 9' 2½"	4' 3¾" 5' 11¾"	3' 6¾" 4' 6¾"	2' 9¾" 3' ¾"	1' 5¾" 1' 6¾"
16	18' 1¾" ∞	11' 6" ∞	8' 5" 76' 3¾"	6' 7½" 20' 10¼"	5' 2½" 10' 9½"	4' ¾" 6' 6¾"	3' 4¾" 4' 10½"	2' 8" 3' 5"	1' 5¾" 1' 6¾"
22	13' 3¾" ∞	9' 4½" ∞	7' 3" 35' 8"	5' 10¾" 35' 8"	4' 9¾" 13' 7"	3' 9¾" 7' 5¾"	3' 2¾" 5' 4"	2' 7" 3' 7½"	1' 5¾" 1' 7"
32	9' 2¼" ∞	7' 2¼" ∞	5' 10¾" ∞	5' ∞	4' 2¼" 24' 2¼"	3' 5¾" 9' 7¾"	2' 11½" 6' 3¾"	2' 5" 4'	1' 4¾" 1' 7½"

Aperture	Distance (in meter)								
	∞	10	5	3	2	1.5	1.2	1	0.45
2.8	31.27 ∞	7.62 14.57	4.34 5.90	2.76 3.29	1.89 2.12	1.44 1.56	1.16 1.24	0.98 1.02	0.447 0.453
4	21.91 ∞	6.92 18.13	4.11 6.40	2.66 3.44	1.85 2.18	1.42 1.59	1.15 1.26	0.97 1.04	0.446 0.454
5.6	15.67 ∞	6.16 26.92	3.84 7.21	2.55 3.65	1.80 2.26	1.39 1.63	1.13 1.28	0.95 1.05	0.444 0.456
8	10.99 ∞	5.30 99.80	3.49 8.91	2.40 4.02	1.72 2.39	1.35 1.70	1.10 1.32	0.94 1.07	0.442 0.458
11	8.01 ∞	4.51 ∞	3.14 12.65	2.23 4.62	1.64 2.57	1.30 1.78	1.07 1.37	0.91 1.11	0.439 0.462
16	5.53 ∞	3.62 ∞	2.69 42.83	2.00 6.14	1.52 2.97	1.22 1.96	1.02 1.46	0.88 1.16	0.434 0.467
22	4.04 ∞	2.93 ∞	2.30 ∞	1.78 10.25	1.39 3.64	1.14 2.21	0.97 1.59	0.84 1.24	0.429 0.474
32	2.80 ∞	2.23 ∞	1.85 ∞	1.51 ∞	1.23 5.90	1.04 2.84	0.89 1.87	0.79 1.40	0.420 0.486

80mm f/3.7

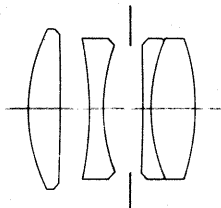


Aperture	Distance (in feet)								
	∞	30	15	10	7	5	4	3	1.5
3.7	71' 11" ∞	21' 4" 50'	12' 6" 18' 8"	8' 10½" 11' 5"	6' 5" 7' 8"	4' 8¾" 5' 3½"	3' 10" 4' 2¼"	2' 11" 3' 1"	1' 5½" 1' 6¾"
4	66' 7" ∞	20' 10" 53'	12' 4" 19' 1"	8' 9½" 11' 7"	6' 4½" 7' 9"	4' 8½" 5' 4"	3' 9¾" 4' 2½"	2' 10¾" 3' 1¼"	1' 5¾" 1' 6¾"
5.6	47' 1" ∞	18' 6" 80'	11' 6" 21' 7"	8' 4½" 12' 5"	6' 2" 8' 1"	4' 7" 5' 6"	3' 9" 4' 3½"	2' 10¼" 3' 1¾"	1' 5½" 1' 6¾"
8	33' 5" ∞	16' 268'	10' 6" 26' 5"	7' 10" 13' 10"	5' 10½" 8' 7"	4' 5¼" 5' 8½"	3' 7¾" 4' 5"	2' 9¾" 3' 2½"	1' 5¾" 1' 6¾"
11	23' 8" ∞	13' 5" ∞	9' 4½" 38' 9"	7' 2½" 16' 7"	5' 6½" 9' 6"	4' 3" 6' 1"	3' 6¾" 4' 7½"	2' 9" 3' 3¾"	1' 5½" 1' 6¾"
16	16' 10" ∞	11' ∞	8' 1½" 116'	6' 5½" 22' 11"	5' 1½" 11' 3"	4' 6' 8½"	3' 4¼" 4' 11¾"	2' 7¾" 3' 5½"	1' 5½" 1' 6¾"
22	12' ∞	8' 8½" ∞	6' 10½" ∞	5' 8" 15' 9"	4' 7¾" 10' 9"	3' 8½" 7' 10½"	3' 1¾" 5' 6½"	2' 6¼" 3' 8¾"	1' 5" 1' 7¾"
32	8' 6½" ∞	6' 9½" ∞	5' 7½" ∞	4' 9¾" ∞	4' ½" 30' 8"	3' 4¼" 10' 5"	2' 11" 6' 7½"	2' 4¾" 4' 1¾"	1' 4¾" 1' 7¾"

Aperture	Distance (in meter)								
	∞	10	5	3	2	1.5	1.2	1	0.45
3.7	21.92 ∞	6.92 18.13	4.11 6.40	2.67 3.43	1.85 2.18	1.42 1.59	1.15 1.26	0.97 1.04	0.446 0.454
4	20.29 ∞	6.75 19.41	4.05 6.55	2.64 3.48	1.84 2.19	1.41 1.60	1.15 1.26	0.96 1.04	0.446 0.455
5.6	14.37 ∞	5.96 31.93	3.76 7.52	2.52 3.72	1.78 2.28	1.38 1.65	1.13 1.29	0.95 1.06	0.444 0.456
8	10.18 ∞	5.11 ∞	3.41 9.52	2.36 4.14	1.71 2.42	1.34 1.71	1.10 1.33	0.93 1.08	0.441 0.459
11	7.23 ∞	4.25 15.31	3.02 4.92	2.17 4.92	1.61 2.66	1.28 1.82	1.06 1.39	0.91 1.12	0.438 0.463
16	5.13 ∞	3.45 ∞	2.60 ∞	1.95 6.73	1.49 3.09	1.21 2.01	1.01 1.49	0.87 1.18	0.433 0.469
22	3.65 ∞	2.72 ∞	2.17 ∞	1.71 14.23	1.35 4.02	1.12 2.34	0.95 1.65	0.83 1.28	0.426 0.477
32	2.61 ∞	2.11 ∞	1.77 ∞	1.46 ∞	1.19 7.08	1.01 3.08	0.88 1.97	0.77 1.45	0.418 0.490

Depth of Field Table

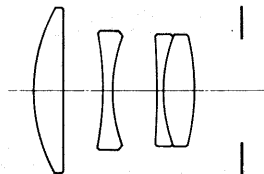
105mm f/3.5



Aperture	Distance (in feet)								
	∞	30	15	10	7	5	4.5	4	3
3.5	131' 5¼" ∞	24' 7" 38' 6½"	13' 6¾" 16' 9½"	9' 4¼" 10' 8¾"	6' 8¾" 7' 4"	4' 10¼" 5' 2"	4' 4¾" 4' 7½"	3' 11" 4' 1"	2' 11¾" 3' ¾"
4	115' ½" ∞	23' 11½" 40' 2"	13' 4½" 17' 1"	9' 3¼" 10' 10¼"	6' 7¾" 7' 4½"	4' 10" 5' 2¼"	4' 4¾" 4' 7¾"	3' 10¾" 4' 1¼"	2' 11¾" 3' ⅝"
5.6	82' 3¼" ∞	22' 2¼" 46' 6¾"	12' 9¾" 18' 1¼"	9' ¼" 11' 2¾"	6' 6¼" 7' 6¾"	4' 9¼" 5' 3"	4' 3¾" 4' 8½"	3' 10¼" 4' 1¾"	2' 11¾" 3' ¾"
8	57' 8¼" ∞	19' 11¾" 60' 11¾"	12' 1" 19' 10½"	8' 7¾" 11' 10½"	6' 4" 7' 9¾"	4' 8¼" 5' 4½"	4' 3" 4' 9½"	3' 9¾" 4' 2¾"	2' 10¾" 3' 1½"
11	42' ½" ∞	17' 9¼" 100' ½"	11' 3" 22' 7¾"	8' 3" 12' 9¾"	6' 1½" 8' 2¼"	4' 6¾" 5' 6¼"	4' 2" 4' 11"	3' 8¾" 4' 3¾"	2' 10¾" 3' 1¾"
16	28' 11½" ∞	15' ∞	10' 1½" 29' 7"	7' 7¾" 14' 7½"	5' 9¾" 8' 10½"	4' 4¾" 5' 9¾"	4' ¼" 5' 1½"	3' 7½" 4' 5½"	2' 9¾" 3' 2½"
22	21' 2¼" ∞	12' 8" ∞	9' ½" 38' 6½"	7' ¾" 17' 9"	5' 5½" 9' 10½"	4' 2¾" 6' 2¾"	3' 10½" 5' 5"	3' 6" 4' 8"	2' 8¾" 3' 3¾"
32	14' 8" ∞	10' 1" ∞	7' 8¾" 5180' 3¼"	6' 2½" 27' 9¼"	4' 11¾" 12' 2¼"	3' 11¾" 6' 11¾"	3' 7¾" 5' 11¾"	3' 4" 4' ¾"	2' 7¾" 3' 5¾"

Aperture	Distance (in meter)									
	∞	10	5	3	2	1.5	1.3	1.2	1	0.65
3.5	40.06 ∞	8.05 13.21	4.48 5.67	2.81 3.22	1.92 2.09	1.46 1.55	1.27 1.33	1.17 1.23	0.98 1.02	0.645 0.655
4	35.07 ∞	7.84 13.85	4.41 4.78	2.79 3.25	1.91 2.10	1.45 1.55	1.26 1.34	1.17 1.23	0.98 1.02	0.644 0.656
5.6	25.08 ∞	7.21 16.38	4.21 6.16	2.71 3.36	1.87 2.15	1.43 1.58	1.25 1.35	1.16 1.24	0.97 1.03	0.642 0.659
8	17.58 ∞	6.45 22.59	3.95 6.85	2.60 3.55	1.83 2.21	1.41 1.61	1.23 1.38	1.14 1.26	0.96 1.04	0.638 0.663
11	12.82 ∞	5.70 43.09	3.66 7.96	2.48 3.81	1.77 2.31	1.37 1.66	1.21 1.41	1.12 1.29	0.95 1.06	0.634 0.667
16	8.84 ∞	4.77 ∞	3.27 10.92	2.30 4.35	1.68 2.48	1.32 1.74	1.17 1.47	1.09 1.34	0.93 1.09	0.627 0.676
22	6.46 ∞	4.00 ∞	2.90 19.91	2.12 5.26	1.59 2.74	1.27 1.85	1.13 1.54	1.07 1.40	0.90 1.12	0.618 0.686
32	4.47 ∞	3.16 ∞	2.44 ∞	1.87 8.08	1.45 3.30	1.19 2.08	1.07 1.69	1.00 1.51	0.87 1.19	0.605 0.704

135mm f/4.5

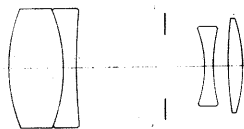


Aperture	Distance (in feet)								
	∞	30	15	10	7	6	4	3.5	3
4.5	159' 3½" ∞	25' 4¼" 36' 8"	13' 9½" 16' 5¼"	9' 5¾" 10' 7"	6' 9" 7' 3¾"	5' 10" 6' 2¼"	3' 11¼" 4' ¾"	3' 5½" 3' 6½"	2' 11½" 3' ½"
5.6	128' ¾" ∞	24' 5¾" 38' 9¼"	13' 6½" 16' 10"	9' 4¼" 10' 9"	6' 8¾" 7' 4"	5' 9½" 6' 2¾"	3' 11" 4' 1"	3' 5¼" 3' 6¾"	2' 11½" 3' ½"
8	89' 8¾" ∞	22' 8½" 44' 4¼"	13' 17' 9"	9' 1¼" 11' 1¼"	6' 7" 7' 5¾"	5' 8¾" 6' 4"	3' 10½" 4' 1½"	3' 5" 3' 7"	2' 11¾" 3' ¾"
11	65' 4" ∞	20' 9¾" 54' 1¾"	12' 4½" 19' 1"	8' 9¾" 11' 9"	6' 5¾" 7' 8¾"	5' 7" 6' 5¾"	3' 10" 4' 2¾"	3' 4½" 3' 7½"	2' 11" 3' 1"
16	45' ¼" ∞	18' 3¾" 85' 6¾"	11' 5¾" 21' 9½"	8' 4¼" 12' 5¾"	6' 2½" 8' ¾"	5' 5" 6' 8¾"	3' 9¾" 4' 3¾"	3' 4" 3' 8¾"	2' 10¾" 3' 1½"
22	32' 10" ∞	15' 11¾" 286' 2¼"	10' 6¾" 26' 3½"	7' 10¾" 13' 9¾"	5' 11¼" 8' 6½"	5' 2¾" 7' ¾"	3' 8¾" 4' 4½"	3' 3¾" 3' 9¾"	2' 10¾" 3' 2"
32	22' 8" ∞	13' 2½" ∞	9' 3¾" 40' 2¾"	7' 2¼" 16' 8"	5' 6¾" 9' 6"	4' 11¼" 7' 8"	3' 6¾" 4' 7"	3' 2¼" 3' 10¾"	2' 9¾" 3' 3¾"
45	16' 2½" ∞	10' 9½" ∞	8' 1" 132' 8"	6' 5¾" 23' ¾"	5' 1¾" 11' 2"	4' 7¾" 8' 8¾"	3' 5" 4' 10½"	3' ¾" 4' 3¾"	2' 8¾" 3' 4¾"

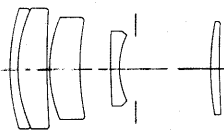
Aperture	Distance (in meter)								
	∞	10	5	3	2	1.75	1.2	1.0	0.95
4.5	48.55	8.34	4.56	2.85	1.93	1.70	1.18	0.99	0.94
	∞	12.49	5.53	3.17	2.07	1.80	1.22	1.01	0.96
5.6	39.03	8.02	4.47	2.81	1.92	1.69	1.17	0.98	0.94
	∞	13.30	5.68	3.22	2.09	1.81	1.23	1.02	0.96
8	27.35	7.39	4.27	2.74	1.89	1.67	1.16	0.98	0.93
	∞	15.51	6.03	3.32	2.13	1.84	1.24	1.02	0.97
11	19.92	6.74	4.05	2.65	1.85	1.64	1.15	0.97	0.92
	∞	19.56	6.54	3.46	2.18	1.88	1.25	1.03	0.98
16	13.72	5.87	3.74	2.52	1.79	1.59	1.13	0.96	0.91
	∞	34.79	7.61	3.73	2.28	1.95	1.28	1.05	0.99
22	10.01	5.09	3.41	2.37	1.72	1.54	1.11	0.94	0.90
	∞	566.22	9.49	4.10	2.40	2.04	1.31	1.07	1.01
32	6.91	4.17	2.99	2.17	1.62	1.46	1.07	0.92	0.88
	∞	∞	16.18	4.94	2.65	2.21	1.37	1.10	1.04
45	4.94	3.39	2.58	1.95	1.50	1.37	1.03	0.89	0.85
	∞	∞	217.48	6.75	3.05	2.47	1.46	1.15	1.08

Depth of Field Table

180mm f/4.5



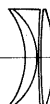
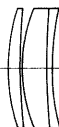
Super 180mm f/4.5



Aperture	Distance (in feet)										
	∞	60	30	15	12	10	8	7	6	5	4.5
4.5	299' ∞	50' 2" 74' 8"	27' 4 1/2" 33' 2 1/4"	14' 4 1/4" 15' 8 1/2"	11' 7" 12' 5 1/4"	9' 8 3/4" 10' 3 1/2"	7' 10" 8' 2 1/4"	6' 10 1/2" 7' 1 1/2"	5' 11" 6' 1"	4' 11 1/4" 5' 3/4"	4' 5 1/2" 4' 6 1/2"
5.6	240' ∞	48' 3" 79' 5"	26' 9 3/4" 34' 3/4"	14' 2 1/2" 15' 10 3/4"	11' 6" 12' 6 1/2"	9' 8" 10' 4 1/2"	7' 9 1/2" 8' 2 3/4"	6' 10" 7' 2"	5' 10 3/4" 6' 1 1/4"	4' 11 1/4" 5' 1"	4' 5 1/4" 4' 6 3/4"
8	168' ∞	44' 6" 92' 3"	25' 7 3/4" 36' 2"	13' 10 1/2" 16' 3 3/4"	11' 3 1/2" 12' 9 3/4"	9' 6 1/4" 10' 6 1/2"	7' 8 1/2" 8' 3 3/4"	6' 9 1/4" 7' 2 3/4"	5' 10 1/4" 6' 2"	4' 10 3/4" 5' 1 1/4"	4' 5" 4' 7"
11	122' ∞	40' 7" 115' 7"	24' 4" 39' 2 1/4"	13' 6" 16' 1 1/2"	11' 1/2" 13' 1 1/2"	9' 4 1/4" 10' 9"	7' 7 1/4" 8' 5 1/2"	6' 1/2" 7' 4"	5' 9 1/2" 6' 2 3/4"	4' 10 1/4" 5' 1 3/4"	4' 4 3/4" 4' 7 3/4"
16	84' 2" ∞	35' 5" 200'	22' 4 1/4" 45' 6 1/2"	12' 11" 17' 10 3/4"	10' 8" 13' 8 3/4"	9' 1" 11' 1 1/2"	7' 5" 8' 8"	6' 6 3/4" 7' 6"	5' 8 1/4" 6' 4"	4' 9 3/4" 5' 2 1/2"	4' 4 1/4" 4' 8"
22	61' 3" ∞	30' 8" 166'	20' 5 1/2" 56' 7"	12' 3 1/2" 19' 3 3/4"	10' 3" 14' 6 1/4"	8' 9 3/4" 11' 7 1/2"	7' 2 3/4" 8' 1 1/2"	6' 5" 7' 8 3/4"	5' 7" 6' 5 3/4"	4' 8 3/4" 5' 3 1/2"	4' 3 3/4" 4' 8 3/4"
32	42' 3" ∞	25' 2" ∞	17' 10 1/4" 95' 2"	11' 4 1/4" 22' 2"	9' 7 1/4" 16' 1/2"	8' 3 3/4" 12' 6 3/4"	6' 11 1/4" 9' 5 1/4"	6' 2 1/4" 8' 3/4"	5' 5" 6' 8 3/4"	4' 7 1/4" 5' 5 1/2"	4' 2 1/2" 4' 10"
45	30' 1" ∞	20' 4" ∞	15' 4 3/4" 87'	10' 4 1/4" 27' 8"	8' 10 3/4" 18' 7 1/2"	7' 9 1/2" 14' 1/2"	6' 7" 10' 3"	5' 11" 8' 7 3/4"	5' 2 3/4" 7' 3/4"	4' 5 3/4" 5' 8"	4' 1 1/4" 5'

Aperture	Distance (in meter)											
	∞	20	10	7	5	4	3	2.5	2	1.7	1.5	1.3
4.5	91.00 ∞	16.46 25.49	9.05 11.18	6.53 7.54	4.76 5.26	3.85 4.16	2.92 3.09	2.45 2.56	1.97 2.03	1.68 1.72	1.48 1.52	1.29 1.31
5.6	73.14 ∞	15.78 27.32	8.84 11.51	6.42 7.69	4.71 5.33	3.81 4.20	2.90 3.11	2.43 2.57	1.96 2.04	1.67 1.73	1.48 1.52	1.29 1.31
8	51.22 ∞	14.47 32.42	8.43 12.30	6.21 8.03	4.59 5.49	3.74 4.30	2.86 3.16	2.40 2.60	1.94 2.06	1.66 1.74	1.47 1.53	1.28 1.32
11	37.27 ∞	13.12 42.28	7.96 13.34	5.95 8.50	4.46 5.70	3.65 4.42	2.81 3.22	2.37 2.65	1.92 2.09	1.65 1.76	1.46 1.54	1.27 1.33
16	25.65 ∞	11.35 85.96	7.29 16.00	5.58 9.42	4.25 6.09	3.51 4.65	2.73 3.33	2.32 2.72	1.89 2.13	1.62 1.79	1.44 1.56	1.26 1.34
22	18.68 ∞	9.77 ∞	6.62 20.67	5.18 10.84	4.02 6.63	3.36 4.95	2.64 3.48	2.25 2.81	1.85 2.18	1.59 1.82	1.42 1.59	1.25 1.36
32	12.87 ∞	7.94 ∞	5.74 40.37	4.64 14.46	3.69 7.79	3.14 5.55	2.50 3.75	2.16 2.98	1.79 2.28	1.55 1.88	1.39 1.63	1.22 1.39
45	9.17 ∞	6.39 ∞	4.90 ∞	4.08 25.69	3.34 10.10	2.88 6.60	2.35 4.18	2.04 3.23	1.71 2.41	1.50 1.97	1.35 1.69	1.19 1.43

250mm f/6.3



Aperture	Distance (in feet)										
	∞	200	100	50	30	20	15	12	10	8	7
6.3	412'	135'	81'	44' 11"	28' 2"	19' 2"	14' 7"	11' 9"	9' 10"	7' 11"	6' 11½"
	∞	385'	131'	56' 5"	32' 1"	20' 10"	15' 5"	12' 3"	10' 2"	8' 1"	7' ½"
8	325'	125'	77'	43' 8"	27' 8"	19'	14' 5"	11' 8"	9' 9½"	7' 10½"	6' 11"
	∞	513'	143'	58' 6"	32' 8"	21' 1"	15' 7"	12' 4"	10' 2"	8' 1½"	7' 1"
11	230'	108'	70' 4"	41' 6"	26' 10"	18' 7"	14' 3"	11' 6"	9' 8½"	7' 10"	6' 10½"
	∞	1474'	174'	62' 11"	34'	21' 7"	15' 10"	12' 6"	10' 3"	8' 2"	7' 1½"
16	163'	90' 7"	62' 9"	38' 10"	25' 9"	18' 1"	14'	11' 3"	9' 7"	7' 9"	6' 10"
	∞	∞	252'	70' 6"	36'	22' 4"	16' 2"	12' 8"	10' 5"	8' 3"	7' 2"
22	116'	74'	54' 5"	35' 7"	24' 4"	17' 5"	13' 7"	11' 2"	9' 5"	7' 8"	6' 9"
	∞	∞	688'	85' 2"	39' 3"	23' 6"	16' 9"	13'	10' 8"	8' 4½"	7' 2½"
32	82' 1"	58' 10"	45' 11"	31' 10"	22' 7"	16' 7"	13' 1"	10' 10"	9' 2½"	7' 6½"	6' 8"
	∞	∞	∞	121'	45' 2"	25' 4"	17' 7"	13' 7"	10' 11"	8' 6"	7' 4"
45	58' 5"	45' 9"	37' 7"	27' 9"	20' 6"	15' 6"	12' 5"	10' 5"	8' 11½"	7' 4½"	6' 6½"
	∞	∞	∞	303'	57' 6"	28' 7"	19'	14' 3"	11' 4"	8' 9"	7' 6"
64	41' 8"	34' 11"	30' 1"	23' 6"	18' 3"	14' 3"	11' 8"	9' 10½"	8' 6½"	7' 1½"	6' 4½"
	∞	∞	∞	∞	94' 4"	34' 11"	21' 5"	15' 6"	12' 1"	9' 1½"	7' 9"

Aperture	Distance (in meter)										
	∞	50	30	20	15	10	7	5	4	3	2.5
6.3	125.6	35.97	24.37	17.37	13.49	9.33	6.68	4.84	3.91	2.95	2.47
	∞	82.30	39.08	23.59	16.90	10.78	7.36	5.17	4.10	3.05	2.53
8	99.02	33.44	23.20	16.78	13.14	9.16	6.60	4.80	3.88	2.94	2.46
	∞	99.75	42.57	24.80	17.50	11.01	7.46	5.21	4.13	3.06	2.54
11	70.12	29.43	21.22	15.73	12.50	8.86	6.45	4.73	3.83	2.92	2.45
	∞	170.3	51.56	27.55	18.80	11.49	7.67	5.31	4.18	3.09	2.56
16	49.69	25.17	18.94	14.46	11.70	8.46	6.24	4.62	3.77	2.88	2.42
	∞	∞	73.65	32.70	21.02	12.26	7.98	5.45	4.27	3.13	2.58
22	35.24	20.91	16.45	12.99	10.73	7.96	5.98	4.49	3.68	2.84	2.39
	∞	∞	188.4	44.55	25.26	13.54	8.48	5.66	4.39	3.19	2.62
32	25.03	16.90	13.89	11.36	9.61	7.35	5.64	4.31	3.57	2.77	2.35
	∞	∞	∞	92.02	3.55	15.91	9.31	5.99	4.57	3.28	2.67
45	17.81	13.32	11.41	9.67	8.39	6.63	5.23	4.08	3.42	2.69	2.30
	∞	∞	∞	∞	83.74	21.20	10.82	6.54	4.86	3.41	2.75
64	12.70	10.29	9.13	8.00	7.13	5.84	4.74	3.79	3.23	2.58	2.23
	∞	∞	∞	∞	∞	40.55	14.09	7.54	5.36	3.62	2.87