Mamiya RB67 Pro-SD

APO

Lenses

The latest optical theory is realized in the tradition of Mamiya Apo lenses and come to life in the hands and through the eyes of professional photographers.

The Mamiya Apo Lens Series serves as an exacting all seeing eye for photographers.
The lenses incorporate the latest color balance, contrast, and resolving power in a variety of lens sizes.
Developed from sophisticated computer software, the resulting optical designs incorporated in the lenses have quickly become the favorites fo many professional and advanced amateur photographers.
The use of ultra low dispersion optical glass and the consequent elimination of chromatic aberrations has led to startling breakthroughs in the new high performance series with lenses significantly improved in both color balance and resolving power.

Mamiya RB67 Pro-SD

APO Lenses

An apochromat lens corrects colored light in the red (c), yellow (d) and blue (g) wavelengths while a standard photographic lens corrects chromatic aberrations in the red and blue wavelengths and focuses them on a point.

Ideally a lens must have the following three characteristics when refracting colored wavelengths.

1. Light rays radiated point-symmetrically should form a symmetrical image point.
2. A plane image should form an image on the plane.
3. Lateral magnification should be constant or similar at all points within the field.

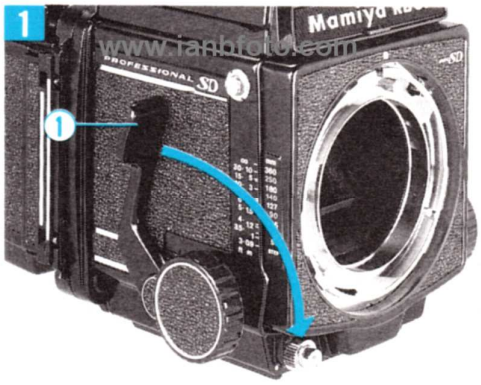
These "ideal" characteristics are, however, quite difficult to obtain due to optical aberration caused by factors like variations in wavelength, refraction problems and other optical abnormalities. Axial chromatic aberrations may, for example, occur as wavelengths change and the optical axis focal point may appear distorted. On the other hand, magnification or lateral aberrations may occur as a result of changes in light color and affect image size.

RB Pro-SD apochromatic lenses are indispensable in correcting the deteriorated images caused by chromatic aberrations found in long-focus lenses.

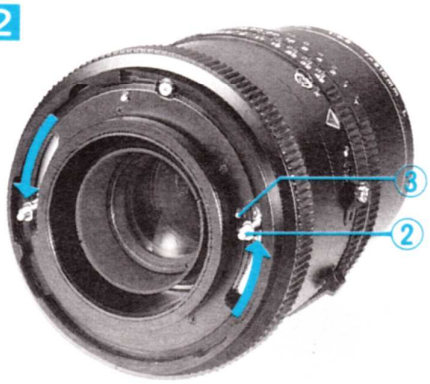
Mamiya's own in-house optical technology combined with their ultra low dispersion glass have resulted in a new series of advanced apochromatic Apo lenses which have had chromatic aberrations all but eliminated. When using infrared, black and white or color film, focal length adjustments are unnecessary after focusing – just make exposures regardless of the film type. All blurring of the image plane from differences in light color, whether it be in the center or the periphery have been eliminated thus ensuring sharp detailed images. An additional striking feature of the negatives produced by the Apo lenses is their ability to be precisely overlapped to produce exacting vivid color reproduction.

Mamiya APO Lenses

1



2

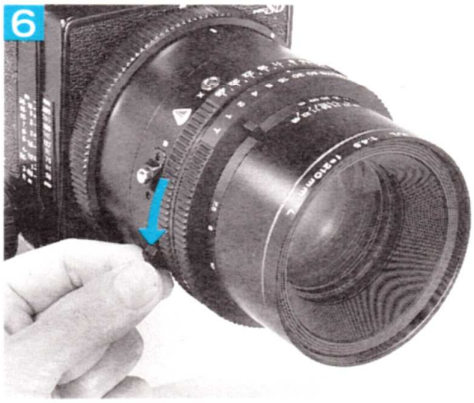


3

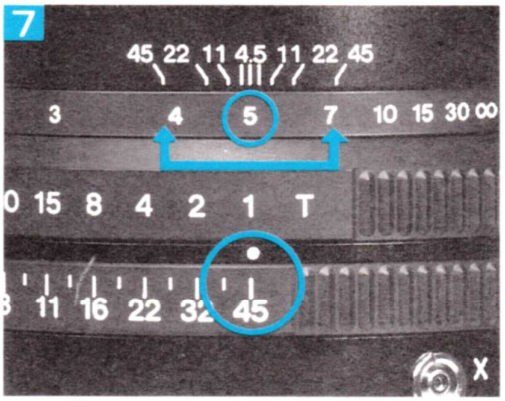
4

5

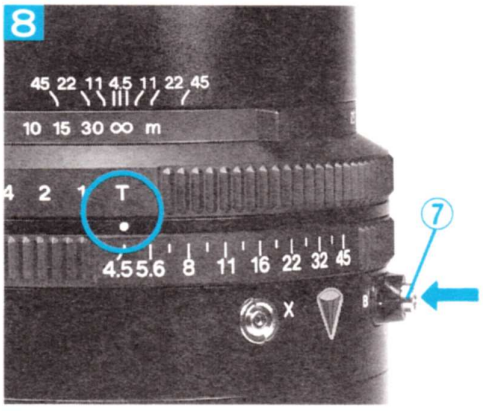
6



7



8



USING THE APO LENS

Mounting the lens

1 Set the mirror by depressing the cocking lever (1) as far as it will go toward the front of the camera body.

2 Remove the rear lens cap and make sure that the lens shutter has been cocked.

If it is not cocked, firmly rotate the lens cocking pins (2) as far as they will go toward the red dot or cocking index (3). When releasing the pins, they will return to the green dot and the shutter blades will remain open. Moving the shutter cocking pins only as far as the green dot will result in the shutter being incompletely cocked, so be sure they are set properly.

Whenever a lens is removed from the camera body, it is already cocked.

3 Rotate the bayonet ring until it reaches the white dot (4) on the lens and it is aligned with the white indicator on the lens.

4 Seat the lens on the camera body so that the white indicator on the lens lines up with the red alignment dot (5) on the camera body. Then, firmly rotate the lens bayonet ring clockwise, securing the lens to the camera body.

Removing the lens

Push the cocking lever of the camera body completely down, setting the mirror and cocking the lens shutter.

Rotate the bayonet ring of the lens counterclockwise until the white dot on the bayonet ring aligns with the white indicator on lens and then remove it.

If you try to rotate the bayonet ring counterclockwise without first depressing the cocking lever on the camera body, the movement of the ring will not function, making lens removal impossible.

5 If the lens is not used for a long time, it is advisable to release the shutter.

The shutter on a lens which has been removed from the camera body can be released by rotating the cocking pin (2) clockwise until it stops, while at the same time pressing the shutter cocking pin (6). Never stop the cocking pin halfway.

Depth-of-field

6 Depth-of-field preview

1. Set the aperture ring to the desire f-stop and focus the lens.

2. Depress the depth-of-field preview lever on the lens and you will be able to check depth-of-field directly on the focusing screen.

7 Using the depth-of-field scale

1. Check the camera-to-subject distance on the distance scale.

2. Rotate the lens distance scale knob until the previously noted camera-to-subject distance is aligned with the center index on the depth-of-field scale.

3. Locate the selected aperture on both sides of the depth-of-field scale.

4. The figures on the lens distance scale, appearing above the selected aperture, indicate the nearest and furthermost limits of sharpness for that aperture.

For example, when the 210mm lens is focused at 5m and stopped down to f/4.5, everything from approximately 4m to 7m will be in focus.

Since one side of the lens distance scale is in feet and the other in meters simply rotate 180° to calculate depth-of-field in either value.

Shutter speed

Use the shutter speed dial to set speeds between 1/400 seconds and 8 seconds, or at T (Time).

Since the lens is pre-adjsuted to a specific temperature constant, be sure to continually focus the lens even when it is on ∞ even up to the moment before pressing the shutter release button.

The bulb (B) unit is used to close the shutter when the shutter speed scale is set on Time (T). Press the button on the bulb or insert the cable release after releasing the shutter.

Time (T) exposures

8 To make a time exposure, first set the shutter speed ring to T and screw a cable release into the bulb socket. After doing so, the shutter will remain open upon depressing the shutter release button.

The shutter will be closed by pressing the plunger of the cable release without giving any shock to the camera.

The shutter can also be closed by following procedures.

1. depressing the bulb socket (7) by finger
2. turning the shutter speed ring toward 1sec.
3. pressing down on the shutter cocking lever about 30°

- Do not move the shutter cocking lever until just before closing the shutter.
- When the shutter is closed by the shutter cocking lever, the light baffle in the camera body drops down slightly; however no foging occurs.

When the shutter is closed by the shutter cocking lever, the lever is locked by the reverse motion stopper and does not return to its original position. when the shutter is cocked by further depressing the lever, the lever returns to its original position.

When using Apo KL lenses (210mm, 250mm, 350mm) with the RB Pro-S, remove the lens mount adapter ring.

- The APO 500mm f/6 lens (L5.6/500L) cannot be used with the RB Pro-S.

Reading the focal length scale and exposure compensation during close-up photography

In the case of the Apo 350mm and 210mm lenses, use the focal length scale and exposure correction scale on the camera body as follows:

Apo 350mm f/5.6

Focal length scale	Use scale indication for 360mm
Exposure correction scale	Read correcterd value for 360mm

Apo 210mm f/4.5

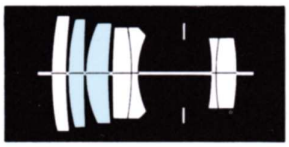
Focal length scale	Use intermediate scale indication between 180mm and 250mm
Exposure correction scale	Read corrected value for 250mm

Caution:
When an Apo lens is used with Auto Extension Tubes, poor peripheral light tansmission or vignetting may occur depending on the extent to which the body bellows are extended. So when used in any of those combinations, it is suggested that a test be carried out with say polaroid film.

- Neither the Auto Extension Tubes cannot be used with the Apo L500mm f/6 lens.

KL210mm f/4.5L

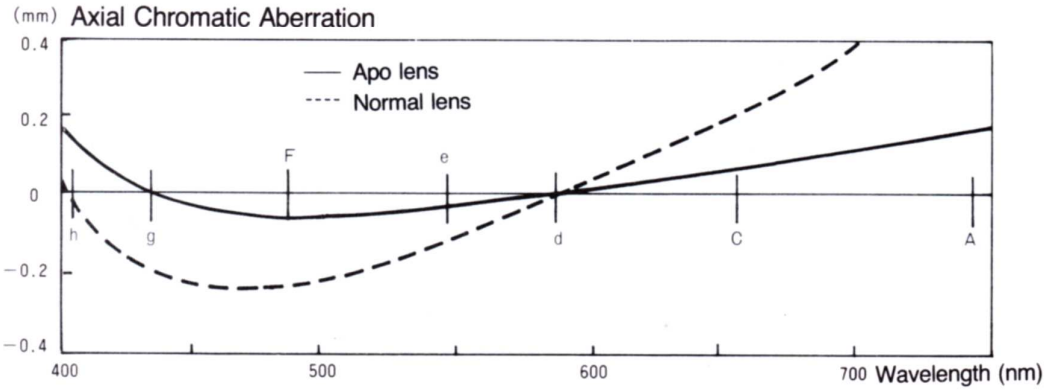
By combining two lenses which use ultra low dispersion glass with one that uses anomalous dispersion glass, the utmost in chromatic aberration correction has been achieved. Since spherical aberration is negligible, halo or aberration flare has been eliminated while coma and astigmatism have also been corrected to a significant extent. Chromatic aberration free, the 210mm assures high contrast image quality over the entire plane at open aperture. Even when stopped down to small apertures, resolving power and contrast remain almost unchanged. At f/11, however, there may be an indication of some deterioration in quality due to diffraction.
The spherical aberrations and fluctuations that result from the curvature of the field in close-up or short distance photography have also been eliminated. Pincushion distortion is less than 1%.

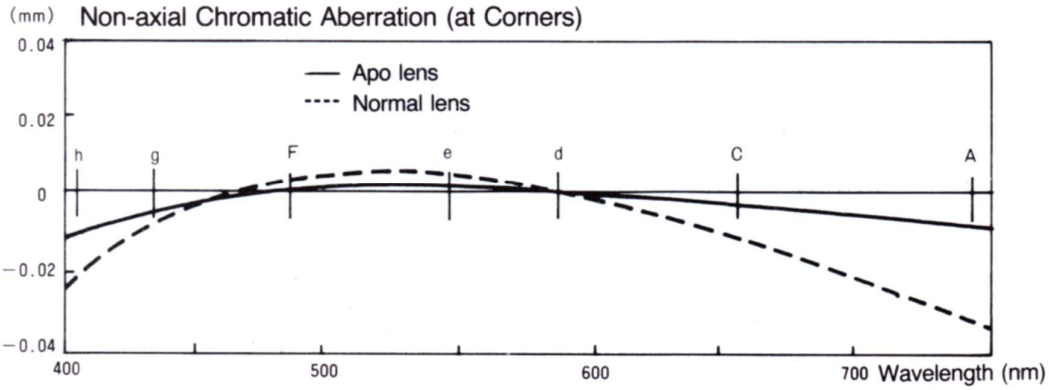


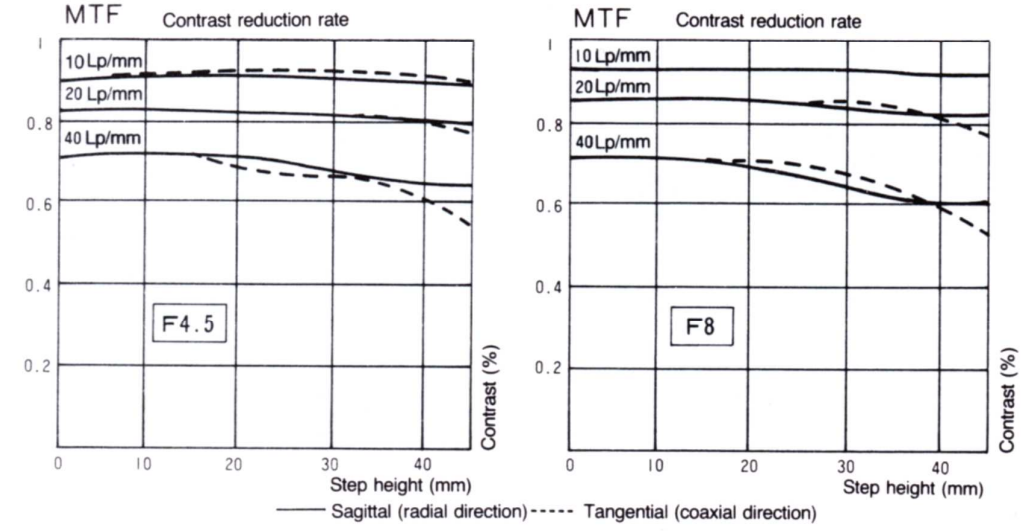
Optical construction: 7 elements in 5 groups
Diaphragm: Automatic
Minimum aperture: 45
Minimum focusing distance: 1,155mm
(from the front of the lens rim)
Area covered: 256 × 318mm
Filter size: 77mm
Lens hood: Attached to lens: Screw in
Dimensions/weight: 114 (long) × 97.2mm
(outside diameter)/1,020g

KL210mm f/4.5L

Focal lenght: 210mm
Angle of view: Diagonal 23°50′ Lateral 18°40′ Vertical 15°10′
Position of entrance pupil
(from the 1st lens vertex): 79.6mm rear side
Position of front principal point
(from the 1st lens vertex): 28.1mm front side
Position of rear principal point
(from the final lens vertex): 82.9mm front side
Lens back: 127.1mm
Telephoto ratio: 1.02

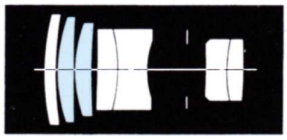






KL250mm f/4.5L

Similar to the 210mm f/4.5, the 250mm f/4.5 combines two lenses which use ultra low dispersion glass with one that uses anomalous dispersion glass, thus producing similar image quality, with less chromatic aberrations.
The 250mm also features high contrast and resolving power. Spherical aberrations and fluctuations fo curvture of the field during short distance photography have been remedied, preventing image deterioration. Pincushion distortion is less than 1%.

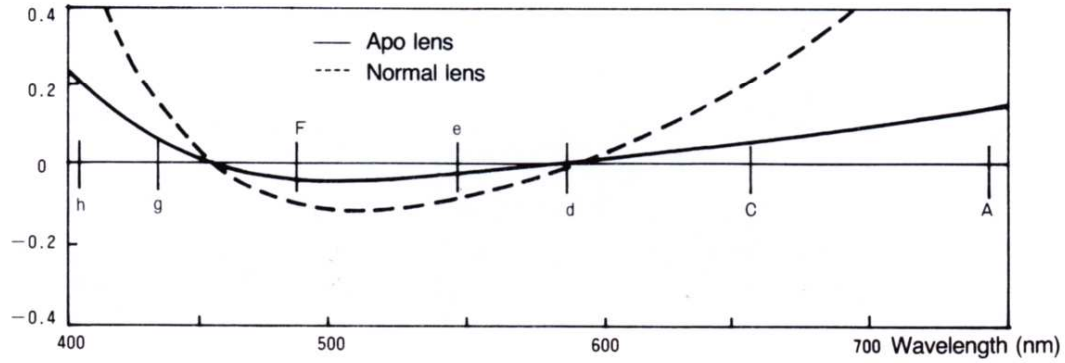


Optical construction: 7 elements in 5 groups
Diaphragm: Automatic
Minimum aperture: 45
Minimum focusing distance: 1,564mm
(from the front of the lens rim)
Area covered: 298 × 370mm
Filter size: 77mm
Lens hood: Attached to lens; screw in
Dimensions/weight: 137.8 (long) × 97.2mm
(outside diameter)/1,370g

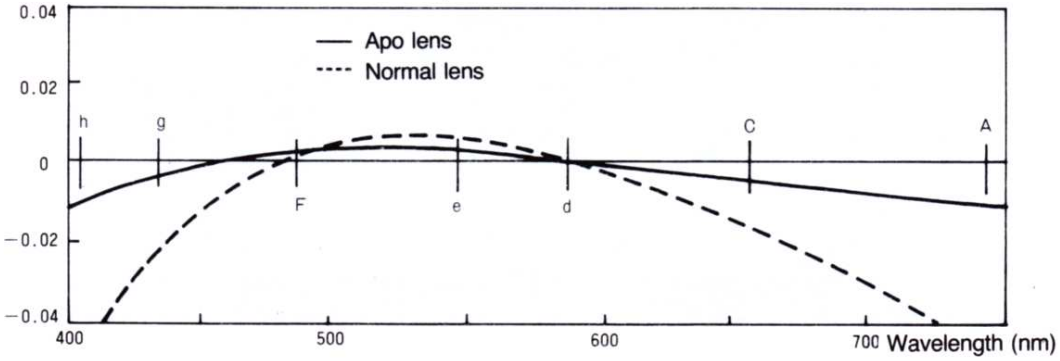
KL250mm f/4.5L

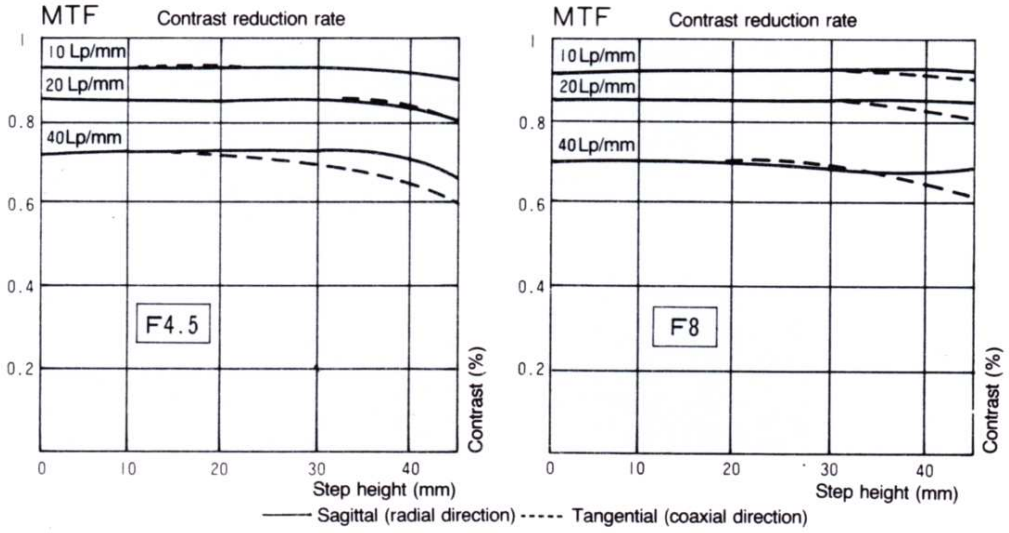
Focal lenght: 250mm
Angle of view: Diagonal 20°30′ Lateral 16°0′ Vertical 13°0′
Position of entrance pupil
(from the 1st lens vertex): 130.6mm rear side
Position of front principal point
(from the 1st lens vertex): 21.5mm front side
Position of rear principal point
(from the final lens vertex): 122.5mm front side
Lens back: 122.4mm
Telephoto ratio: 0.99

(mm) Axial Chromatic Aberration



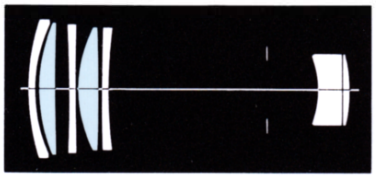
(mm) Non-axial Chromatic Aberration (at Corners)





KL350mm f/5.6L

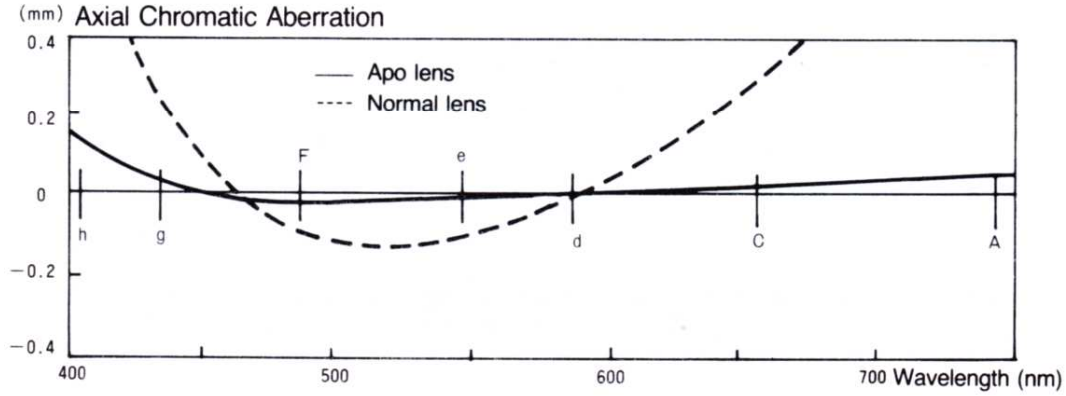
The 350mm f/5.6 combines two lenses that use ultra low dispersion glass with four out of the remaining five lenses using anoma lous dispersion glass, and is corrected for a wide range of chromatic aberrations from 400nm to 1,000nm. All longitudinal distortions, such as spherical aberration, astigmatism and curvature of the field, have been corrected to less than 0.1mm: coma and flare have been eliminated. Due to high contrast and reduced curvature of the field, fluctuations and/or deterioration in picture quality are negligible. Pincushion distoriton is less than 1%.

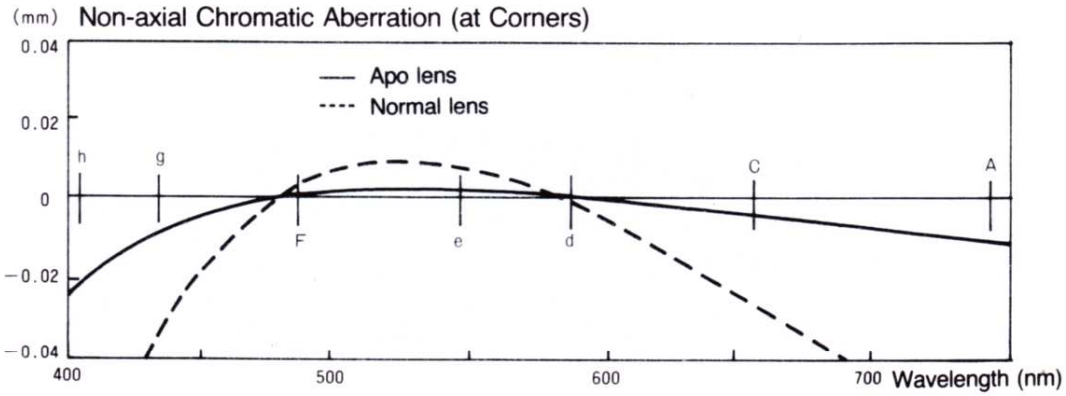


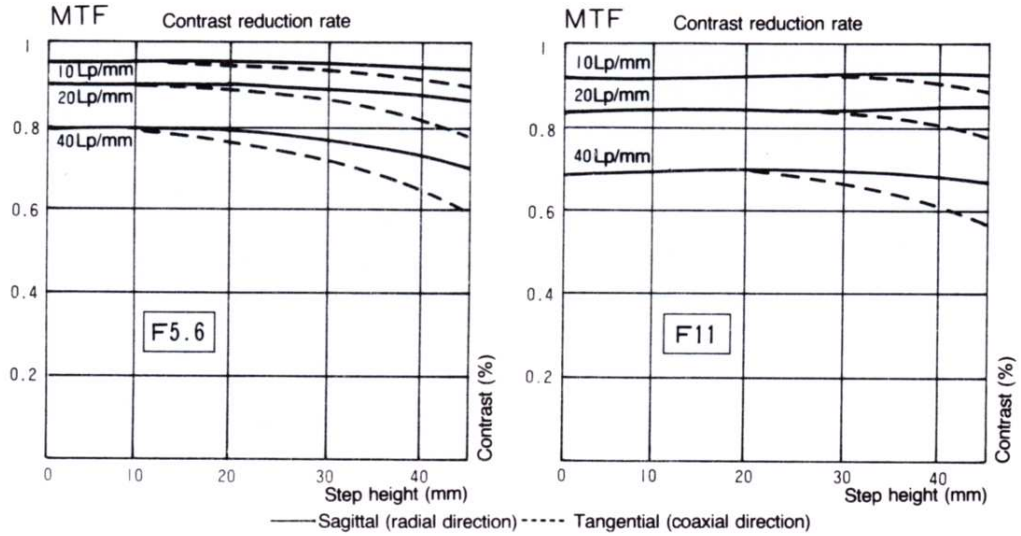
Optical construction: 7 elements in 6 groups
Diaphragm: Automatic
Minimum aperture: 45
Minimum focusing distance: 3,081mm
(from the front of the lens rim)
Area covered: 420 × 521mm
Filter size: 77mm
Lens hood: Attached to lens; screw in
Dimensions/weight: 184.2 (long) × 97.2mm
(outside diameter)/1,440g

KL350mm f/5.6L

Focal lenght: 350mm
Angle of view: Diagonal 14°40′ Lateral 11°30′ Vertical 9°20′
Position of entrance pupil
(from the 1st lens vertex): 221.4mm rear side
Position of front principal point
(from the 1st lens vertex): 150.6mm front side
Position of rear principal point
(from the final lens vertex): 217.7mm front side
Lens back: 127.3mm
Telephoto ratio: 0.85

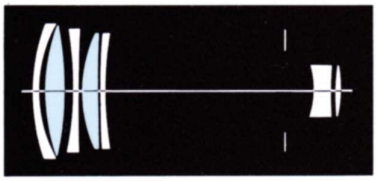






L500mm f/6L

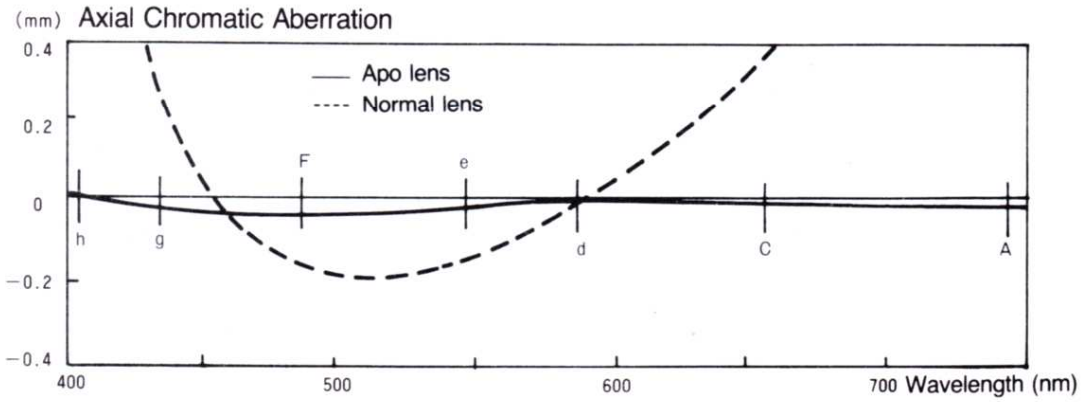
When the total length of a telephoto lens is shortened, aberrations tend to increase so that it has been considered optically very difficult to produce a compact lens free of aberrations. Mamiya's own optical technology has been able to surmount those design perplexities and the 500mm f/6 is proof of that innovation. It is 20.5mm shorter than the RB500mm and like the 350mm, combines two lenses that use ultra low dispersion glass with four that use anomalous dispersion glass: all chromatic aberrations within the 400 to 1,000nm range have been eliminated. In addition, all longitudinal distortions in the form of spherical aberrations, astigmatism and curvature of the field, have been corrected to less than 0.1mm: coma and flare are a thing of the past. Thus, crystal sharp, high contrast, high resolution images are generated. Picture deterioration due to distortion caused by spherical aberration and curvature of the field in short distance photography have been rectified and likewise are a thing of the past. Pincushion distortion is less than 1%.

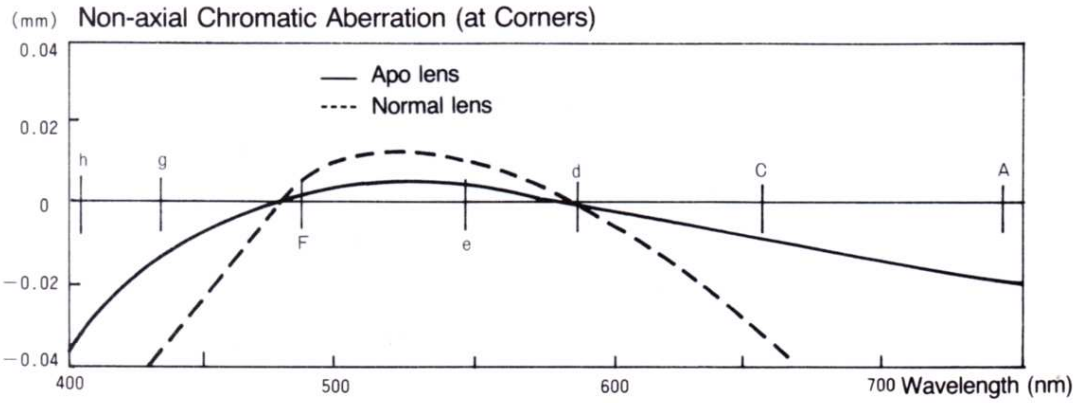


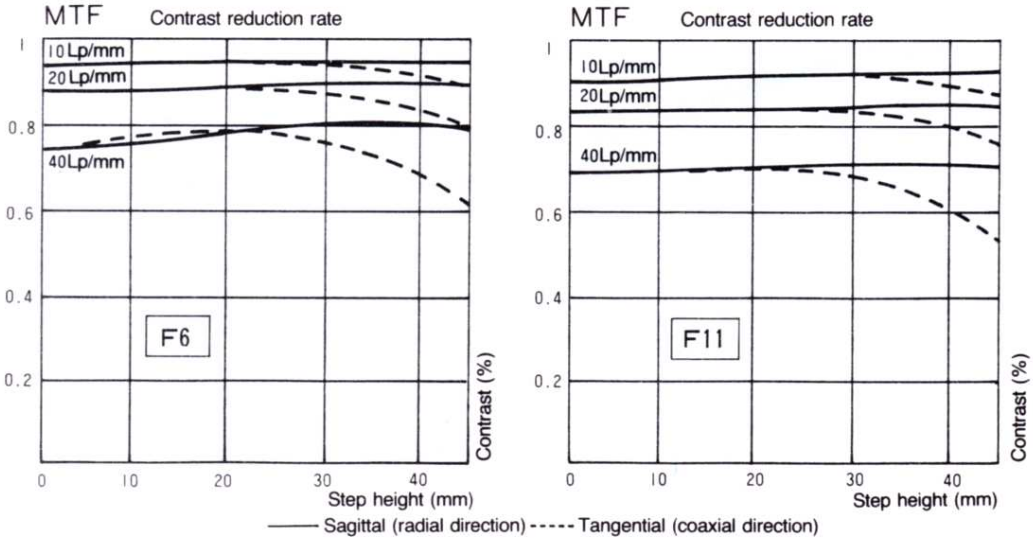
Optical construction: 7 elements in 7 groups
Diaphragm: Automatic
Minimum aperture: 45
Minimum focusing distance: 6,064mm
(from the front of the lens rim)
Area covered: 597 × 740mm
Filter size: 105mm
Lens hood: Attached to lens; screw in
Dimensions/weight: 271.5 (long) × 108mm
(outside diameter)/2,360g

L500mm f/6L

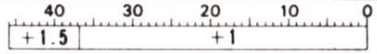
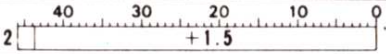
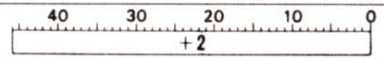
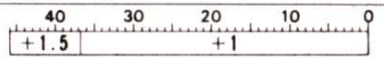
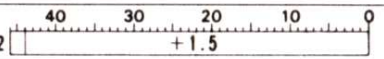
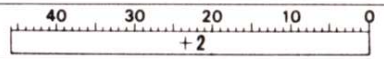
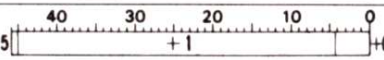
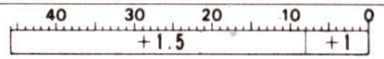
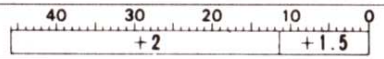
Focal lenght: 500mm
Angle of view: Diagonal 10°20′ Lateral 8°0′ Vertical 6°30′
Position of entrance pupil
(from the 1st lens vertex): 474.4mm rear side
Position of front principal point
(from the 1st lens vertex): 354.9mm front side
Position of rear principal point
(from the final lens vertex): 345.3mm front side
Lens back: 144.7mm
Telephoto ratio: 0.78







Close-up/Auto Extension Tube Table NA701……45mm NA702……82mm

Lens	Tube	Magnification	Subject Distance (cm)	Area Covered (cm)	Bellows Extension(mm) / Exposure Factor (STEP)
APO KL210mmF4.5	45mm	0.21~0.43	118.9~ 69.3	(26.1×32.5)~(12.9×16.1)	
	82mm	0.40~0.61	74.6~ 55.3	(14.4×17.8)~(9.2×11.4)	
	※45mm+82mm	0.60~0.82	55.7~ 46.3	(9.3×11.5)~(6.8×8.4)	
APO KL250mmF4.5	45mm	0.18~0.37	159.3~ 91.9	(30.5×37.8)~(15.1×18.7)	
	82mm	0.34~0.52	99.2~ 72.9	(16.7×20.8)~(10.7×13.3)	
	※45mm+82mm	0.52~0.71	73.2~ 60.7	(10.8×13.4)~(7.9×9.8)	
APO KL350mmF5.6	45mm	0.13~0.26	313.9~180.2	(42.9×53.3)~(21.2×26.4)	
	82mm	0.24~0.37	194.5~142.4	(23.6×29.2)~(15.1×18.7)	
	※45mm+82mm	0.37~0.50	143.1~118.2	(15.2×18.9)~(11.2×13.9)	

1. "Subject Distance" refers to the distance between the subject and the front rim of the lens.

2. Two sets of figures (i.e. 0.21 – 0.43) which appear above, indicate on the left (0.21) a setting at zero bellows extension, while on the right (0.43) a setting at maximum bellows extension or 46mm.

3. For clarity, the exposure factors on the extreme right are shown in 1/2 stop increments (+1, +1.5, +2, +2.5); however, for precise exposure compensation, the division between the two stops should be read as 1/4 stop. Thus the separation between +1 and +1.5 is actually +1¼. Similarly, +1.5 and +2 is +1¾.

● As in close-up photography using the Auto Extension Tubes or in macro-photography using extended bellows, the quantity of light reaching the film changes as the lens is extended. Consequently, be sure to calculate exposure after focusing.

※ When the Auto Extension Tubes are used in this combination, it is advised to exercise the utmost care since poor peripheral light transmission or vignetting may occur due to the aperture setting or when bellows are used.

Mamiya

被写界深度表 DEPTH OF FIELD TABLE (m)

APO-KL 210mmF4.5L

絞り Aperture	距離 Distance (m)									
	∞	30	15	10	7	5	4	3	2.5	2.3
4.5	∞ 142.84	37.81 24.87	16.69 13.62	10.71 9.38	7.33 6.70	5.16 4.85	4.10 3.91	3.05 2.95	2.53 2.47	2.33 2.72
5.6	∞ 114.91	40.36 23.88	17.16 13.33	10.90 9.24	7.42 6.63	5.20 4.81	4.12 3.88	3.06 2.94	2.54 2.46	2.34 2.27
8	∞ 81.30	47.12 22.02	18.25 12.74	11.32 8.96	7.60 6.49	5.29 4.74	4.18 3.84	3.09 2.91	2.56 2.44	2.35 2.25
11	∞ 57.52	61.75 19.84	20.06 11.99	11.97 8.59	7.89 6.30	5.42 4.64	4.25 3.77	3.13 2.88	2.59 2.42	2.37 2.24
16	∞ 40.71	110.22 17.41	23.33 11.07	13.04 8.12	8.32 6.04	5.62 4.51	4.37 3.69	3.19 2.83	2.62 2.39	2.40 2.20
22	∞ 28.83	∞ 14.84	30.33 9.99	14.93 7.53	9.04 5.72	5.92 4.33	4.55 3.57	3.28 2.77	2.68 2.34	2.44 2.17
32	∞ 20.42	∞ 12.29	52.86 8.79	18.80 6.84	10.28 5.32	6.41 4.11	4.82 3.42	3.41 2.68	2.76 2.28	2.51 2.12
45	∞ 14.48	∞ 9.89	∞ 7.51	29.75 6.05	12.74 4.85	7.27 3.83	5.27 3.23	3.62 2.57	2.89 2.21	2.61 2.05

APO-KL 250mmF4.5L

絞り Aperture	距離 Distance (m)										
	∞	30	15	10	7	6	5	4.5	4	3.5	3
4.5	∞ 192.81	35.40 26.03	16.21 13.96	10.51 9.54	7.24 6.78	6.17 5.84	5.12 4.89	4.59 4.41	4.07 3.93	3.55 3.45	3.04 2.96
5.6	∞ 156.14	36.96 25.25	16.52 13.74	10.64 9.43	7.30 6.73	6.21 5.80	5.14 4.36	4.61 4.39	4.08 3.92	3.57 3.44	3.05 2.96
8	∞ 110.44	40.90 23.70	17.25 13.27	10.93 9.22	7.43 6.62	6.31 5.72	5.21 4.81	4.66 4.35	4.13 3.88	3.59 3.41	3.07 2.94
11	∞ 78.12	48.16 21.80	18.39 12.67	11.37 8.93	7.62 6.47	6.44 5.61	5.30 4.74	4.73 4.29	4.18 3.83	3.63 3.38	3.09 2.91
16	∞ 55.27	64.33 19.59	20.30 11.90	12.05 8.55	7.92 6.28	6.65 5.47	5.43 4.63	4.84 4.21	4.26 3.77	3.69 3.33	3.13 2.88
22	∞ 39.12	122.60 17.13	23.79 10.97	13.17 8.07	8.37 6.02	6.96 5.28	5.63 4.50	5.00 4.10	4.38 3.68	3.78 3.26	3.19 2.83
32	∞ 27.69	∞ 14.56	31.47 9.87	15.18 7.47	9.11 5.69	7.46 5.03	5.94 4.32	5.24 3.95	4.56 3.57	3.91 3.17	3.28 2.76
45	∞ 19.61	∞ 12.01	57.99 8.66	19.36 6.77	10.42 5.28	8.30 4.71	6.45 4.09	5.62 3.76	4.84 3.41	4.11 3.05	3.41 2.68

APO-KL 350mmF5.6L

絞り Aperture	距離 Distance (m)										
	∞	50	20	15	12	10	8	7	6	5	4.5
5.6	∞ 309.53	59.44 43.15	21.32 18.84	15.72 14.35	12.45 11.58	10.30 9.71	8.19 7.82	7.14 6.86	6.10 5.90	5.07 4.93	4.55 4.45
8	∞ 218.89	64.48 40.83	21.92 18.39	16.04 14.09	12.64 11.42	10.44 9.60	8.27 7.75	7.20 6.81	6.14 5.86	5.10 4.91	4.58 4.43
11	∞ 154.80	73.28 37.95	22.82 17.80	16.51 13.75	12.93 11.20	10.63 9.44	8.39 7.65	7.29 6.73	6.20 5.81	5.14 4.87	4.61 4.40
16	∞ 109.48	90.81 34.51	24.24 17.03	17.23 13.29	13.36 10.89	10.91 9.23	8.56 7.51	7.41 6.63	6.29 5.73	5.19 4.82	4.65 4.36
22	∞ 77.44	137.25 30.59	26.58 16.04	18.35 12.69	14.02 10.49	11.34 8.95	8.81 7.33	7.60 6.49	6.42 5.63	5.28 4.75	4.72 4.30
32	∞ 54.78	496.94 26.36	30.78 14.82	20.23 11.93	15.07 9.97	12.00 8.57	9.20 7.08	7.88 6.30	6.62 5.49	5.41 4.65	4.82 4.22
45	∞ 38.75	∞ 22.05	39.64 13.39	23.66 10.99	16.84 9.32	13.09 8.10	9.81 6.76	8.32 6.05	6.91 5.30	5.59 4.52	4.96 4.12

APO-L 500mmF6L

絞り Aperture	距離 Distance (m)									
	∞	100	50	30	20	17	15	12	11	10
6	∞ 580.53	120.51 85.45	54.59 46.12	31.57 28.58	20.67 19.37	17.48 16.55	15.37 14.65	12.23 11.78	11.19 10.32	10.15 9.85
8	∞ 441.35	128.85 81.70	56.22 45.02	32.10 28.16	20.89 19.18	17.63 16.41	15.48 14.54	12.30 11.71	11.25 10.76	10.20 9.80
11	∞ 312.05	146.33 75.94	59.27 43.23	33.05 27.46	21.28 18.86	17.91 16.18	15.69 14.36	12.43 11.60	11.36 10.66	10.29 9.73
16	∞ 220.63	181.07 69.06	64.21 40.94	34.51 26.53	21.87 18.43	18.31 15.86	16.00 14.12	12.62 11.44	11.51 10.53	10.42 9.62
22	∞ 155.98	272.52 61.21	72.76 38.08	36.80 25.32	22.74 17.85	18.92 15.43	16.46 13.78	12.89 11.22	11.73 10.34	10.60 9.47
32	∞ 110.27	952.98 52.73	89.66 34.65	40.61 23.78	24.11 17.08	19.84 14.87	17.15 13.33	13.30 10.93	12.07 10.10	10.87 9.26
45	∞ 77.94	∞ 44.09	133.46 30.74	47.56 21.90	26.36 16.11	21.32 14.13	18.23 12.74	13.93 10.54	12.58 9.77	11.27 8.99

DEPTH OF FIELD TABLE (feet)

APO-KL 210mmF4.5L

Aperture	Distance (feet)								
	∞	100′	50′	30′	20′	15′	10′	8′	7.5
4.5	∞ 469′ 0″	127′ 0″ 82′ 8″	55′ 9″ 45′ 4″	31′11″ 28′ 4″	20′10″ 19′ 3″	15′ 5″ 14′ 7″	10′ 2″ 9′10″	8′ 1″ 7′11″	7′ 7″ 7′ 5″
5.6	∞ 377′ 0″	135′ 0″ 79′ 4″	57′ 4″ 44′ 4″	32′ 5″ 27′11″	21′ 0″ 19′ 1″	15′ 7″ 14′ 6″	10′ 3″ 9′ 9″	8′ 1″ 7′10″	7′ 7″ 7′ 4″
8	∞ 267′ 0″	159′ 0″ 73′ 1″	61′ 1″ 42′ 4″	33′ 7″ 27′ 2″	21′ 6″ 18′ 9″	15′ 9″ 14′ 4″	10′ 4″ 9′ 8″	8′ 2″ 7′10″	7′ 8″ 7′ 4″
11	∞ 189′ 0″	209′ 0″ 65′ 9″	67′ 3″ 39′10″	35′ 3″ 26′ 1″	22′ 2″ 18′ 3″	16′ 2″ 14′ 0″	10′ 5″ 9′ 7″	8′ 3″ 7′ 9″	7′ 9″ 7′ 3″
16	∞ 134′ 0″	384′ 0″ 57′ 8″	78′ 6″ 36′ 9″	38′ 1″ 24′ 9″	23′ 2″ 17′ 7″	16′ 8″ 13′ 8″	10′ 8″ 9′ 5″	8′ 4″ 7′ 8″	7′10″ 7′ 2″
22	∞ 94′ 7″	∞ 49′ 1″	103′ 0″ 33′ 2″	42′11″ 23′ 1″	24′10″ 16′ 9″	17′ 5″ 13′ 2″	10′11″ 9′ 2″	8′ 6″ 7′ 6″	7′11″ 7′ 1″
32	∞ 67′ 0″	∞ 40′ 7″	184′ 0″ 29′ 1″	52′ 3″ 21′ 1″	27′ 7″ 15′ 9″	18′ 9″ 12′ 6″	11′ 5″ 8′11″	8′10″ 7′ 4″	8′ 2″ 6′11″
45	∞ 47′ 6″	∞ 32′ 7″	∞ 24′10″	75′ 8″ 18′10″	32′ 9″ 14′ 6″	20′11″ 11′ 9″	12′ 1″ 8′ 6″	9′ 2″ 7′ 1″	8′ 6″ 6′ 8″

APO-KL 250mmF4.5L

Aperture	Distance (feet)							
	∞	100′	50′	30′	20′	15′	12′	10′
4.5	∞ 633′ 0″	118′ 0″ 86′ 7″	54′ 1″ 46′ 6″	31′ 5″ 28′ 9″	20′ 7″ 19′ 5″	15′ 4″ 14′ 8″	12′ 2″ 11′10″	10′ 2″ 9′10″
5.6	∞ 512′ 0″	124′ 0″ 83′11″	55′ 2″ 45′ 9″	31′ 9″ 28′ 5″	20′ 9″ 19′ 4″	15′ 5″ 14′ 8″	12′ 3″ 11′ 9″	10′ 2″ 9′10″
8	∞ 362′ 0″	137′ 0″ 78′ 9″	57′ 8″ 44′ 2″	32′ 6″ 27′10″	21′ 1″ 19′ 1″	15′ 7″ 14′ 6″	12′ 4″ 11′ 8″	10′ 3″ 9′ 9″
11	∞ 256′ 0″	162′ 0″ 72′ 4″	61′ 7″ 42′ 1″	33′ 8″ 27′ 1″	21′ 6″ 18′ 8″	15′10″ 14′ 3″	12′ 6″ 11′ 7″	10′ 4″ 9′ 8″
16	∞ 181′ 0″	219′ 0″ 64′11″	68′ 1″ 39′ 7″	35′ 6″ 26′ 0″	22′ 2″ 18′ 2″	16′ 2″ 14′ 0″	12′ 8″ 11′ 5″	10′ 5″ 9′ 7″
22	∞ 128′ 0″	430′ 0″ 56′ 9″	80′ 1″ 36′ 5″	38′ 5″ 24′ 8″	23′ 3″ 17′ 7″	16′ 8″ 13′ 8″	13′ 0″ 11′ 2″	10′ 8″ 9′ 5″
32	∞ 90′10″	∞ 48′ 1″	107′ 0″ 32′ 9″	43′ 6″ 22′11″	25′ 0″ 16′ 8″	17′ 6″ 13′ 2″	13′ 6″ 10′10″	11′ 0″ 9′ 2″
45	∞ 64′ 4″	∞ 39′ 8″	203′ 0″ 28′ 8″	53′ 6″ 20′11″	27′10″ 15′ 8″	18′10″ 12′ 6″	14′ 3″ 10′ 5″	11′ 5″ 8′11″

APO-KL 350mmF5.6L

Aperture	Distance (feet)									
	∞	150′	70′	50′	40′	30′	25′	20′	17′	15′
5.6	∞ 1016′ 0″	175′ 0″ 131′ 0″	75′ 0″ 65′ 8″	52′ 5″ 47′ 9″	41′ 6″ 38′ 7″	30′10″ 29′ 3″	25′ 7″ 24′ 6″	20′ 4″ 19′ 8″	17′ 3″ 16′ 9″	15′ 2″ 14′10″
8	∞ 718′ 0″	189′ 0″ 124′ 0″	77′ 3″ 64′ 0″	53′ 6″ 46′11″	42′ 2″ 38′ 0″	31′ 2″ 28′11″	25′10″ 24′ 3″	20′ 6″ 19′ 6″	17′ 4″ 16′ 8″	15′ 3″ 14′ 9″
11	∞ 508′ 0″	211′ 0″ 116′ 0″	80′ 8″ 61′10″	55′ 1″ 45′ 9″	43′ 2″ 37′ 3″	31′ 8″ 28′ 6″	26′ 2″ 23′11″	20′ 8″ 19′ 4″	17′ 6″ 16′ 7″	15′ 4″ 14′ 8″
16	∞ 359′ 0″	254′ 0″ 106′ 0″	86′ 1″ 59′ 0″	57′ 7″ 44′ 2″	44′ 7″ 36′ 3″	32′ 5″ 27′11″	26′ 8″ 23′ 7″	21′ 0″ 19′ 1″	17′ 8″ 16′ 4″	15′ 6″ 14′ 6″
22	∞ 254′ 0″	357′ 0″ 95′ 0″	95′ 3″ 55′ 4″	61′ 5″ 42′ 2″	46′10″ 34′11″	33′ 7″ 27′ 1″	27′ 5″ 23′ 0″	21′ 5″ 18′ 9″	18′ 0″ 16′ 1″	15′ 9″ 14′ 4″
32	∞ 180′ 0″	838′ 0″ 82′ 6″	112′ 0″ 51′ 0″	67′10″ 39′ 7″	50′ 5″ 33′ 2″	35′ 4″ 26′ 1″	28′ 6″ 22′ 3″	22′ 1″ 18′ 3″	18′ 5″ 15′ 9″	16′ 1″ 14′ 1″
45	∞ 127′ 0″	∞ 69′ 6″	149′ 0″ 45′10″	79′ 8″ 36′ 6″	56′ 7″ 31′ 0″	38′ 2″ 24′ 9″	30′ 3″ 21′ 4″	23′ 1″ 17′ 8″	19′ 1″ 15′ 4″	16′ 7″ 13′ 8″

APO-L 500mmF6L

Aperture	Distance (feet)							
	∞	300′	100′	70′	60′	50′	40′	30′
6	∞ 1905′ 0″	355′ 0″ 260′ 0″	105′ 0″ 95′ 2″	72′ 6″ 67′ 8	61′12″ 53′ 3″	51′ 3″ 48′10″	40′ 9″ 39′ 3″	30′ 5″ 29′ 7″
8	∞ 1448′ 0″	377′ 0″ 249′ 0″	107′ 0″ 93′ 9″	73′ 4″ 66′11	62′ 5″ 57′ 9″	51′ 8″ 48′ 5″	41′ 0″ 39′ 0″	30′ 7″ 29′ 6″
11	∞ 1024′ 0″	422′ 0″ 233′ 0″	110′ 0″ 91′ 5″	74′10″ 65′ 9″	63′ 6″ 56′11″	52′ 4″ 47′10″	41′ 6″ 38′ 8″	30′ 9″ 29′ 3″
16	∞ 724′ 0″	508′ 0″ 213′ 0″	115′ 0″ 88′ 3″	77′ 0″ 64′ 2″	65′ 1″ 55′ 3″	53′ 5″ 47′ 0″	42′ 1″ 38′ 1″	31′ 1″ 28′11″
22	∞ 512′ 0″	711′ 0″ 190′ 0″	123′ 0″ 84′ 2″	80′ 5″ 62′ 0″	67′ 5″ 54′ 1″	54′11″ 45′10″	43′ 0″ 37′ 4″	31′ 7″ 28′ 7″
32	∞ 362′ 0″	1644′ 0″ 165′ 0″	136′ 0″ 79′ 0″	85′ 8″ 59′ 2″	71′ 3″ 51′11″	57′ 4″ 44′ 4″	44′ 5″ 36′ 4″	32′ 4″ 28′ 0″
45	∞ 256′ 0″	∞ 139′ 0″	160′ 0″ 72′ 8″	94′ 4″ 55′ 7″	76′10″ 49′ 2″	61′ 0″ 42′ 4″	46′ 7″ 35′ 1″	33′ 5″ 27′ 3″