Why is more limited range 35-70mm f/3.5 Nikkor (left) larger, heavier than 35-105 f/3.5-4.5 Nikkor, right? Read text.

Practical comments: Very diverse lenses. 35-70mm (10 elements in 9 groups) is two touch (separate zoom and focusing controls) with macro available only in 70mm position by means of special button allowing lens focusing to continue beyond usual range. 35-105mm (16 elements in 12 groups) is actually smaller than 35-70mm, uses single touch (combined zoom and focusing ring) with macro ring extending entire lens forward, providing max. macro at 35mm but closer focusing than normal at all focal lengths. Has macro magnification scale (which 35-70mm does not) but decreases in aperture ⅔ f/stop from min. focal length to maximum (which 35-70mm does not). Both lenses focus counter-clockwise from infinity to closest focusing distance. Higher price of 35-70mm indicates more complicated optical design caused by more sophisticated macro mode, constant aperture through zoom range. Both lenses made and finished to usual high Nikkor standard.

Field test slides: The 35-105mm f/3.5-4.5 Nikkor slides showed some softness wide open at 35mm with sharpness increasing to f/8 after which it was maintained. Pictures made at 50 and 105mm showed similar results. However, a complex mustache-shaped linear distortion was seen at 35mm. Overall, slides were crisp and snappy with an average to above average performance for a lens of this type. However, macro performance was above average.

The 35-70mm f/3.5 Nikkor also had very slight softness wide open but sharpness increased measurably by f/5.6. This was also true at 50 and 70mm. Corners at all focal lengths held up well with flare always well controlled. Macro quality was above average for a lens of this type (see charts). Overall performance in picture taking was judged to be superior.

Optical bench analysis (for optical experts only): On axis, the 35-105mm f/5-4.5 Nikkor on axis at 35mm showed slight overcorrected spherical aberration and slight axial color. It was diffraction limited by f/8. Off axis, slight skew-ray flare was mixed with very slight astigmatism. There was lateral color throughout. At 50mm on axis, performance was similar to that at 35mm. Off axis, performance was also similar to 35mm but with slight coma instead of astigmatism. At 105mm, spherical aberration was slightly undercorrected on axis, mixed with very slight yellow flare. It was diffraction limited by f/8. Off axis, slight skew-ray flare persisted with slight astigmatism but again with lateral color throughout.

The 35-70mm f/3.5 Nikkor exhibited slight axial color on axis at 35mm with very slight overcorrected spherical aberration. It was diffraction limited by f/8. Off axis we could see slight skew-ray flare mixed with astigmatism. Lateral color was present throughout. On and off axis at 50mm performance was similar to that at 35mm. The same was true on axis at 70mm but off axis the previously noted astigmatism gave way to coma.

MACRO RESOLUTION

NIKKOR 35-70mm f/3.5 at 70mm at 1: 4

f/	Center (l/mm)		Corner (l/mm)	
3.5	Accept	36	V. Good	29
5.6	Accept	40	Good	29
8	Accept	45	Accept	29
11	Good	45	Good	32
16	Good	45	Good	32
22	Good	45	Good	32

PERFORMANCE

Our Standard	as Tested
Focal length: ±5%	
(33.25-36.75mm)	35.84mm
(66.50-73.50mm)	69.69mm
Aperture: ±5%	
(f/3.33-3.68)	f/3.58
at 70mm: (f/3.33-3.68)	f/3.67
Distortion:	
35mm: (±2.5%) under 1% (barrel)	
70mm: (±2.%) under 1% (pincshn)	
Light falloff: at f/5.6	
+1 stop from theoretical limit	
35mm: (0-1.9 stops)	1.3 stops
70mm: (0-1.3 stops)	0.2 stops

NIKKOR 35-105mm

RESOLUTION

NIKKOR 35-105mm f/3.5-4.5 at 35mm at 1: 49

f/	Center (l/mm)		Corner (l/mm)	
3.5	V. Good	49	Excellent	44
5.6	V. Good	49	Excellent	49
8	V. Good	55	Excellent	49
11	Excellent	62	Excellent	55
16	Excellent	55	Excellent	49
22	Excellent	55	Excellent	49

RESOLUTION

NIKKOR 35-70mm f/3.5 at 35mm at 1: 48

f/	Center (l/mm)		Corner (l/mm)	
3.5	V. Good	48	Excellent	43
5.6	Excellent	54	Excellent	48
8	Excellent	60	Excellent	54
11	Excellent	60	Excellent	54
16	Excellent	54	Excellent	48
22	V. Good	48	Excellent	43

CONTRAST

NIKKOR 35-70mm f/3.5 at 35mm at 30 lines/mm

f/	Center (%)		Corner (%)	
3.5	High	58	High	51
5.6	High	66	High	55
8	High	71	High	56
11	High	76	High	48
16	High	66	High	40
22	High	46	Medium	36

RESOLUTION

NIKKOR 35-70mm f/3.5 at 50mm at 1: 49

f/	Center (l/mm)		Corner (l/mm)	
3.5	V. Good	49	Excellent	44
5.6	Good	49	Excellent	44
8	Good	55	V. Good	49
11	Excellent	62	Excellent	55
16	V. Good	55	Excellent	49
22	Good	49	V. Good	44

CONTRAST

NIKKOR 35-70mm f/3.5 at 50mm at 30 lines/mm

f/	Center (%)		Corner (%)	
3.5	High	59	High	49
5.6	High	64	High	54
8	High	72	High	58
11	High	74	High	49
16	High	60	High	44
22	High	49	Medium	34

RESOLUTION

NIKKOR 35-70mm f/3.5 at 70mm at 1: 49

f/	Center (l/mm)		Corner (l/mm)	
3.5	V. Good	49	Excellent	44
5.6	Good	49	Excellent	44
8	Good	55	Excellent	49
11	Excellent	62	Excellent	55
16	V. Good	55	Excellent	49
22	Good	49	Excellent	44

CONTRAST

NIKKOR 35-70mm f/3.5 at 70mm at 30 lines/mm

f/	Center (%)		Corner (%)	
3.5	High	58	High	47
5.6	High	61	High	50
8	High	71	High	53
11	High	65	High	50
16	High	50	High	42
22	High	45	High	36

RESOLUTION

NIKKOR 35-105mm f/3.5-4.5 at 50mm at 1: 49

f/	Center (l/mm)		Corner (l/mm)	
3.5	Excellent	55	Excellent	49
5.6	Excellent	62	Excellent	49
8	V. Good	62	Excellent	55
11	Excellent	62	Excellent	55
16	V. Good	55	Excellent	49
22	V. Good	55	Excellent	49

RESOLUTION

NIKKOR 35-105mm f/3.5-4.5 at 105mm at 1: 49

f/	Center (l/mm)		Corner (l/mm)	
4.5	Excellent	55	Excellent	49
5.6	Excellent	62	Excellent	49
8	V. Good	62	Excellent	55
11	Excellent	62	Excellent	55
16	V. Good	55	Excellent	49
22	V. Good	55	Excellent	49

CONTRAST

NIKKOR 35-105mm f/3.5-4.5 at 105mm at 30 lines/mm

f/	Center (%)		Corner (%)	
4.5	High	55	High	45
5.6	High	59	High	51
8	High	63	High	53
11	High	72	High	55
16	High	60	High	47
22	High	44	High	38

CONTRAST

NIKKOR 35-105mm f/3.5-4.5 at 50mm at 30 lines/mm

f/	Center (%)		Corner (%)	
3.5	High	50	High	47
5.6	High	59	High	50
8	High	63	High	51
11	High	71	High	54
16	High	61	High	43
22	Medium	43	Medium	36

CONTRAST

NIKKOR 35-105mm f/3.5-4.5 at 35mm at 30 lines/mm

f/	Center (%)		Corner (%)	
3.5	High	57	High	51
5.6	High	65	High	53
8	High	71	High	55
11	High	74	High	46
16	High	62	High	40
22	High	47	Medium	38

MACRO RESOLUTION

NIKKOR 35-105mm f/3.5-4.5 at 35mm at 1: 4

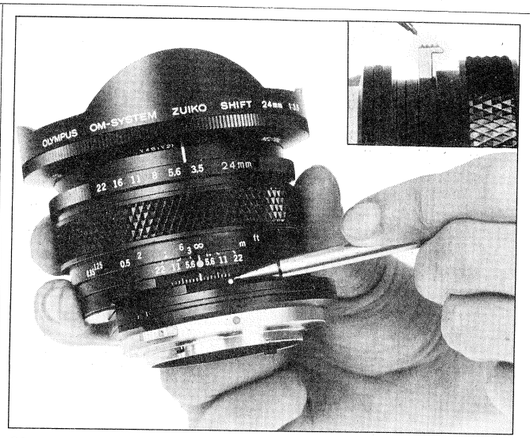
f/	Center (l/mm)		Corner (l/mm)	
3.5	Accept	32	V. Good	29
5.6	Accept	32	V. Good	29
8	Accept	36	Good	29
11	Good	40	Good	29
16	V. Good	45	Accept	25
22	V. Good	45	Accept	25

PERFORMANCE

Our Standard	as Tested
Focal length: ±5%	
(33.25- 36.75mm)	36.30mm
(99.75-110.25mm)	103.25mm
Aperture: ±5%	
(f/3.33-3.68)	f/3.48
at 105mm: (f/4.28-4.73)	f/4.71
Distortion:	
35mm: (±2.5%) under 1%	
105mm: (±2.5%) 1.38% (pincshn)	
Light falloff: at f/5.6	
+1 stop from theoretical limit	
35mm: (0-1.9 stops)	1.4 stops
105mm: (0-1.1 stops)	0.5 stops

SUPERWIDE PC LENS FROM OLYMPUS

Specifications: 24mm f/3.5 Olympus Zuiko Shift in fixed bayonet mounts for Olympus OM series SLRs; f/3.5-f/22, click stops at full stop intervals; min. foc. dist. 1.25 ft. (.35m). Shifts ±8mm and rises ± 10mm; built-in 4 filter turret; no provision for front-mounted accessories, integral cut-away lens shade; semi-automatic control of diaphragm.
Serial No.: 101456. Size: 3⅜ in. diam. × 3 in. long (85mm × 76mm). Weight: 1 lb. 2⅜ oz. (522g) Price: $1085.00 with fitted case.



Olympus 24mm F/3.5 Shift lens at maximum 8mm shift to left. Filter turret set for yellow. Olympus PC lens has convenient, manual stop down latch (inset).

Practical comments. Perspective control (better known as PC) lenses have been around for a long time, but this one allows the user to move the lens up to 10mm off the optical axis without appreciable loss of sharpness or fall-off in illumination despite its ultrawide length and relatively wide f/3.5 aperture. To achieve this requires the lens to cover a 57mm circle—an angle of view of about 100°, so the Olympus' 24mm Shift uses 12 elements in 10 groups, one of which is a deeply curved 72mm front element reminiscent of a fish-eye lens. At first glance, its optical construction looks like that of a fish-eye, yet the lens shows a low 1.09% barrel distortion. Light fall-off at the extreme edges of the image in full shift position is a measured 2.3 stops. In actual field tests, however, it is barely noticeable, even at the extreme off-axis position.

Because of its wide angle of view and high speed, front-mounted filters and attachments cannot be fitted. Instead, the 24mm PC has a rotating, click-stopped filter wheel positioning neutral, Y48 yellow, 056 orange and R60 red filters within the barrel of the lens.

Although the rear cell of the lens is easily accessible, it is unthreaded. With some ingenuity, it could be adopted to take small screw-in auxiliary filters or gelatine cut-outs.

The lens is lightweight and well-balanced in spite of its impressive size and is easy to handle in all respects. Like its older but more conservative brother, the Zuiko 35 Shift, the 24 has a bottom-mounted diaphragm stop-down lever. Push it in and the lens stops down for shooting. Push again, and it opens up for focusing and viewing—a commendable convenience but you must keep your wits about you when changing lenses rapidly lest you forget that you've now mounted a lens without an automatic diaphragm. If your Olympus SLR is in aperture-preferred auto-exposure mode, a glance at the shutter speed indicator should remind you. However, in manual mode, it is recommended that you read your set aperture with the lens centered, and then shift. Also, in automatic mode, the exposure indicated in the finder may not be correct when the lens is shifted but the exposure on film proved to be quite accurate when using Olympus models which read off the film plane (e.g. the OM-2, OM-2 S program, and OM-4).

Controls, from front to rear are as follows: A thin ⅛ in. wide knurled filter setting ring clicks into position (make sure it does as intermediate position, will blend filter effects unpredictably). Next, a 3/32 in. wide aperture ring sets white engraved f/stops opposite a white indicator. A ¾ in. in wide Olympus diamond patterned rubber focusing grip comes next. Footage scales are in gold, meters in white, and white depth of field indicators engraved for every other f/stop. Engraved, white millimeter scales with central indicators and click stops indicate the degree of sideways shift and vertical rise or fall. No creep was found on either setting, a tribute to the effective oil damping of the twin dove-tail soiders. Mechanical stops on both movements keep you from exceeding the lens' coverage in any direction. In practice, you just look through the finder and move the lens whichever way you want with your focusing hand. It's very fast and easy to use. The lens close-focuses to 15 in. without changing length—the focusing mechanism is internal.

All in all, this is a lens to gladden the heart of any architectural photographer working in confined spaces inside or out. And the optical quality is remarkably good for a lens of this type.

Field test slides: Our Kodachrome slides were sharp and contrasty at all settings, and were judged excellent 2 or 3 stops down from maximum aperture. Unshifted, slides were sharp and contrasty without color fringing. The colors showed slight softness wide-open, and slight green-purple fringing. Performance was much improved when stopped down 2 stops. At 10mm (full) shift, sharpness was still good centrally with slight loss of contrast. Corner images showed slight softness due to astigmatism but improved greatly at f/5.6 on down.

Optical bench analysis (for optical experts only): On axis, very slight overcorrected spherical aberration at f/3.5, with the lens diffraction limited by f/8. Off axis, slight skew-ray flare with slight coma and slight astigmatism which were gone by f/8. A slight lateral color was present throughout. With the lens shifted 5mm, we found a slight high order coma, with very slight lateral color. Coma was gone by f/5.6. Shifted 10mm, we saw a slight yellow skew-ray flare to f/5.6. Lateral color negligible.

PERFORMANCE

Our Standard	as Tested
Focal length: ±5% (22.80-25.20mm)	24.06mm
Aperture: ±5% (f/3.33-3.68)	f/3.43
Distortion: (±4%)	1.09% (barrel)
Light falloff: at f/5.6 +1 stop from theoretical limit (0-3.0 stops)	2.3 stops

RESOLUTION

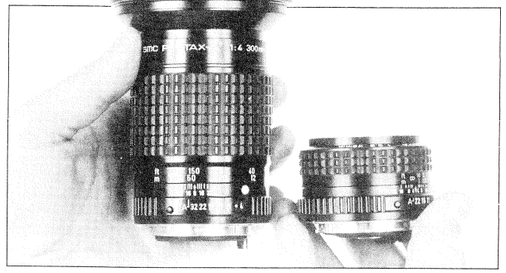
OLYMPUS SHIFT 24mm f/3.5 at 1:49

f/	Center (l/mm)		Corner (l/mm)	
3.5	Excellent	55	Excellent	44
5.6	Excellent	62	Excellent	49
8	Excellent	69	Excellent	49
11	Excellent	69	Excellent	49
16	Excellent	62	Excellent	49
22	V. Good	55	Excellent	44

CONTRAST

OLYMPUS SHIFT 24mm f/3.5 at 30 lines/mm

f/	Center (%)		Corner (%)	
3.5	High	48	High	30
5.6	High	58	High	34
8	High	58	Medium	39
11	High	56	Medium	37
16	High	51	Medium	35
22	Medium	37	Low	28



Compact 28mm f/2.8 and 300mm f/4 Pentax-A lenses are in KA-mount for new program exposure Pentax SLRs as well as all K-mount Pentaxes and other cameras.

knurled rubber focusing ring and ⅜ in. wide aperture ring; close focus to infinity in about 90

28mm f/2.8 features bright satin black finish, heavily knurled rubberized focusing rings, raised white mounting indicator dots, blue footage, yellow meter markings.

135mm f/2.8 has well-knurled aperture ring for auto operation; 1¼ in. wide focusing collar; built-in sliding lenshood; good finish and fine detailing.

300mm f/4 has built-in sliding lens hood, smooth focusing and aperture controls, rugged quality construction, 28mm has 7 elements in 7 groups; 300mm has 7 elements in 8 groups.

Field test slides: 24mm: Distortion is minimal and flare is well controlled. Center of field is sharp with some loss of sharpness evident at corners, especially at wider apertures. Above average performance overall for this type.

28mm f/2.8 produced crisp, snappy images which were well exposed by camera with crisp detail in corners, flare very well controlled.

135mm f/2.8: Sharpness good in center, softer at corners, especially at wider apertures. Average for lens of this type.

300mm f/4 provided somewhat soft images at widest apertures with the fine detail slightly lacking.

Optical bench analysis (for optical experts only): 24mm f/2.8: On axis, undercorrected primary photographic chromatic aberration, diffraction limited by f/8. Off axis, high coma mixed with skew-ray flare, improved at smaller apertures. No lateral color visible.

28mm f/2.8 on axis showed very slight orange flare at f/2.8 which was gone by f/5.6. The diffraction limit was reached by f/5.6. Off axis, slight skew-ray flare was nearly gone by f/5.6. There was slight lateral color

Continued on page 98

PERFORMANCE

Our Standard	as Tested
Focal length: ±5% (22.80-25.20mm)	25.16mm
Aperture: ±5% (f/2.66-2.94)	f/2.85
Distortion: (±4%)	1.13% (barrel)
Light falloff: at f/5.6 +1 stop from theoretical limit (0-3.0 stops)	1.2 stops

RESOLUTION

PENTAX SMCP 24mm f/2.8 at 1:49

f/	Center (l/mm)		Corner (l/mm)	
2.8	V. Good	49	Excellent	44
3.5	Excellent	69	Excellent	44
5.6	Excellent	78	Excellent	44
8	Excellent	69	Excellent	49
11	Excellent	62	Excellent	49
16	V. Good	55	Excellent	44
22	Good	49	Excellent	44

CONTRAST

PENTAX SMCP 24mm f/2.8 at 30 lines/mm

f/	Center (%)		Corner (%)	
2.8	High	46	High	38
3.5	High	48	High	40
5.6	High	55	High	64
8	High	65	High	62
11	High	60	High	68
16	High	61	High	66
22	High	56	High	58

PERFORMANCE

Our Standard	as Tested
Focal length: ±5% (26.60-29.40mm)	28.68mm
Aperture: ±5% (f/2.66-2.94)	f/2.84
Distortion: (±2.5%)	less than 1% (barrel)
Light falloff: at f/5.6 +1 stop from theoretical limit (0-2.0 stops)	1.6 stops

RESOLUTION

PENTAX A 28mm f/2.8 at 1: 51

f/	Center (l/mm)		Corner (l/mm)	
2.8	Excellent	57	Excellent	40
4	Excellent	64	Excellent	45
5.6	Excellent	72	Excellent	45
8	Excellent	64	Excellent	51
11	Excellent	64	Excellent	45
16	Excellent	57	V. Good	40
22	Good	45	Good	36

CONTRAST

PENTAX A 28mm f/2.8 at 30 lines/mm

f/	Center (%)		Corner (%)	
2.8	High	50	High	50
4	High	64	High	56
5.6	High	64	High	62
8	High	64	High	63
11	High	60	High	60
16	High	56	High	49
22	Low	43	High	42

More charts on page 128

Would you like to test your own lens? Get MODERN's Lens Test Kit, $13.95 plus $2.00 handling. Write to Lens Test Kit, MODERN PHOTOGRAPHY, 825 Seventh Ave., NY, NY 10019. Please allow at least 4-6 weeks for delivery.

FOUR PENTAX LENSES IN KA MOUNT

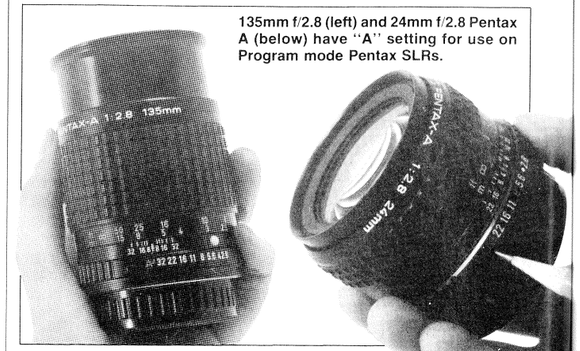
Specifications: 24mm f/2.8 Pentax-A, for Pentax K-mount bayonet; No. 5212747; accepts 52mm filters; f/2.8 to f/22 and "A", ½ stop detents; min. foc. dist. .79 ft. (.25m); 1⅝ in. long, 2⅜ in. diam. (41.5 x 63mm); 7.2 oz. (205 g); $222.

Specifications: 28mm f/2.8 SMX Pentax-A in KA bayonet mount; No. 5092365, accepts 49mm accessories; f/2.8 to f/22 plus A setting with half-stop detents to f/11; full stop detents to f/22; min. foc. 1 ft. (0.3m); focusing turns clockwise 90° to inf.; 1 7/16 in. long, 2 7/16 in. diam. (37mm × 60mm) 6 oz. (170g); $130.00

Specifications: 135mm f/2.8 Pentax-A, for Pentax K-mount bayonet; No. 5008191; accepts 52mm filters; f/2.8 to f/32, ½ stop detents; min. foc. dist. 4 ft. (1.2m); 3 in. long, 2½ in. diam. (76.5 x 65 mm); 12 oz. (340 g); $142.

Specifications: 300mm f/4 SMC Pentax-A in KA bayonet mount; No. 5304067, accepts 77mm accessories; f/2.8 to f/32, half-stop detents to f/16; full stop to f/32; min. foc. 13 ft. (4m); focusing turns clockwise 225° to inf.; 5⅛ in. long, 3¼ in. diam. (130mm × 83mm); 30 oz. (850g); $633.00

Practical comments: "A" series is designed specifically for Super Program camera but works with all bayonet-mount Pentax cameras. 24mm f/2.8 compact, well-balanced wide-angle is about size and weight of "normal" lens; nicely finished in typical Pentax fashion; deeply



135mm f/2.8 (left) and 24mm f/2.8 Pentax A (below) have "A" setting for use on Program mode Pentax SLRs.

MODERN PHOTOGRAPHY APPROVED

LIMITED WARRANTY BY
Pentax Corp.
9 Inverness Drive East
Englewood, CO 80110

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"The equipment, like the sample tested by MODERN PHOTOGRAPHY *will equal or better* MODERN PHOTOGRAPHY*'s laboratory and field-test performance requirements or the item will be repaired or replaced until it does. Purchaser must notify warranty issuer of such failure within 45 days of receiving item from store where it was purchased. If the equipment cannot be furnished to specifications, the purchaser will receive a refund of actual purchase price provided items are returned in original condition and packing, together with the sales slip, at the expense of the purchaser. The supplier will pay postage to return merchandise to the purchaser. This warranty gives the purchaser specific legal rights and he may also have other rights that vary from state to state."*

The Seal may appear on the product itself, in advertisements, in promotional materials, or on warranty cards at the discretion of the supplier. *Repair, replacement or refunding will be done by the supplier and at his discretion and not by* MODERN PHOTOGRAPHY Magazine. This limited warranty is in addition to whatever warrantees, limited or full, that the supplier may give. Purchasers must furnish adequate proof of the equipment's disability. In terms of inaccurate exposures, shutter speeds or poor optical quality, films or slides showing proof must be furnished with proper identification of the warranty issuer—the same type of proof your repairman would like to have to check malfunctioning equipment.

MODERN will continue to test products and report on them whether or not the supplier decides to accept the Seal of Approval. The lack of a Seal in no way reflects on a product's quality. The Seal is merely an indication that the supplier has agreed to accept certain responsibilities as to minimum standards for every product sold as stated.

Minimum Resolution Standards

Type	Aperture: Max. lines/mm Center	Max. lines/mm Corner	Next lines/mm Center	Next lines/mm Corner	Middle lines/mm Center	Middle lines/mm Corner	f/11-22 lines/mm Center	f/11-22 lines/mm Corner
35mm Camera Lenses								
Fisheye (to 16mm)	36	20	36	20	40	22	40	24
17 to 24.5mm	36	20	36	20	40	28	40	28
25 to 39.5mm	36	25	36	25	40	28	40	32
to 39.5mm/faster than f/2.1	36	22	36	22	40	27	40	28
40 to 60.5mm	40	25	40	30	45	36	45	36
40 to 60.5mm/faster than f/1.4	36	24	40	25	45	32	45	36
61 to 135mm	36	25	36	28	40	32	40	32
136 to 250.5mm	32	25	32	25	40	32	40	32
251 to 500.5mm	32	24	32	24	36	32	32	32
501mm and longer	32	24	32	24	36	32	32	28
Zoom Lenses								
to 39.5mm	32	23	32	23	36	25	36	25
40 to 60.5mm	36	25	40	28	45	36	40	32
61 to 135.5mm	36	23	40	25	45	28	40	28
136mm and longer	28	23	28	23	36	28	32	28
2¼ x 2¼ Camera Lenses								
to 74.5mm	28	14	32	18	32	18	32	22
75 to 94.5mm	28	18	32	20	36	22	32	22
95mm and longer	25	18	28	20	32	20	28	20
2¼ x 2¾ Camera Lenses								
to 59.5mm	16	9	18	10	22	12	22	14
60 to 89.5mm	18	11	20	12	22	14	25	16
90 to 119.5mm	20	12	22	14	25	16	25	18
120 to 499.5mm	18	11	20	12	22	14	25	16
500mm and longer	16	11	18	12	20	14	22	16
4 x 5 Camera Lenses								
all	28	22	28	22	34	25	34	25

MODERN PHOTOGRAPHY Minimum test requirements for Seal of Approval

Still camera and lens field-test standards

All features and controls must operate properly for the equivalent of 25 rolls of film, producing adequately exposed photographs of sufficient quality to meet professional standards for a camera and lens of that size and negative format when 11 x 14 in. black-and-white prints made from negatives of that camera and/or lens, or slides are projected on a 40 x 40 in. screen and are viewed at normal viewing distances.

Still camera & lens laboratory standards

(Photographic products of special benefit or interest to readers which fall below our minimums may also appear with explanation in the text.)

Resolution: See chart. **Exposure accuracy:** ±1 stop of proper exposure. **Shutter-speed accuracy:** ±½ stop of marked speed.

Apparent Viewing distance: Between infinity and 20 in. **Apparent viewing distance of finder information:** within ½ diopter of measured viewing distance. **View Area Compared to film:** Between 90% and 100%. **Focusing Accuracy at Maximum Aperture:** Within depth of focus. **Image Magnification:** Within 0.1X of Manufacturer's specification. **Actual Picture Size:** Normal picture size ±2.5%. **Curtain travel evenness:** ±0.33 stop. Camera insulation from sync: More than 7 megohms. **Sync contact efficiency:** More than 60% **Sync delay time:** X; Within full opening, M;16-20ms. **Shutter curtain bounce:** Not allowed. **Self timer delay:** 7-15 secs.