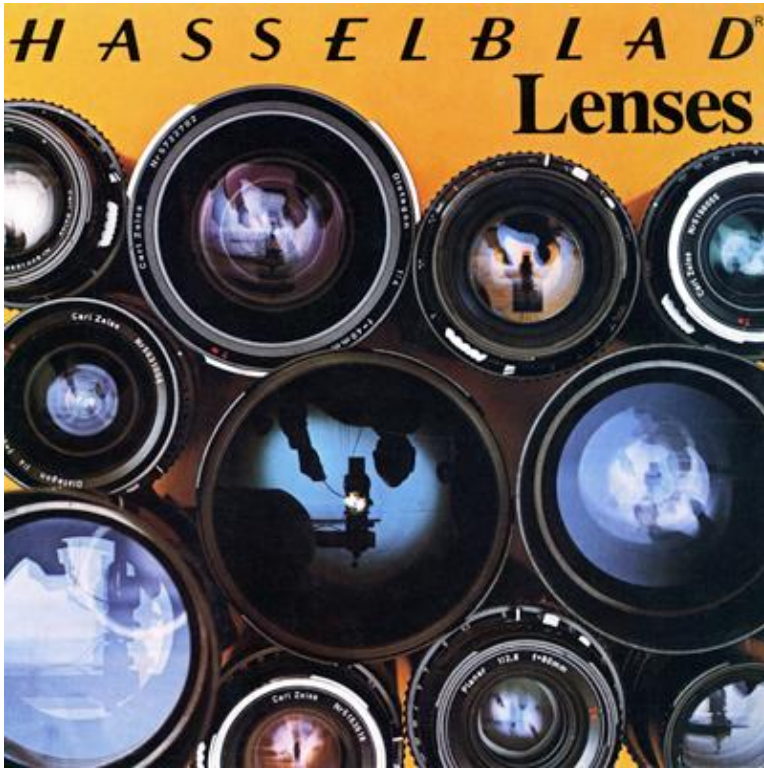


Hasselblad C T* Lenses

By: www.imagesandcameras.com



Hasselblad has the world's most comprehensive camera system for the 2¼X2¼ format-a system featuring the utmost flexibility and quality. Properties renowned throughout the world. The cornerstones of this system with its 150 components are the three cameras, the Hasselblad 500C/M, the Hasselblad 500EL/M and the Hasselblad SWC. The first two are single-lens reflex cameras with interchangeable lenses. The 500C/M is manually operated and the 500EL/M has a built-in electric motor which cocks the shutter and advances the film. The Hasselblad SWC is a special-purpose wide-angle camera with the famous Biogon as permanently attached lens.

The purpose of this blog is to describe the performance, uses and advantages of the different lenses and to serve as a guidance for the Hasselblad photographer in the selection of additional equipment. Each lens unit has been designed to assure optimum resolution, contrast and

colour transmittance and to provide the utmost mechanical reliability and durability. The wide range of lenses in the system enables you to deal with almost every conceivable application. So the only limits on the results you can achieve with the Hasselblad system are imposed by your own imagination.

All the lenses are made by Carl Zeiss, Oberkochen, West Germany, one of the world's leading manufacturers of optical products. Zeiss' research and technical know-how have resulted in a line-up of lenses unparalleled in many respects. Zeiss, known among experts for advanced methods for the computer-designing of lenses, has nearly a 10-year head start in the use of modern electronic devices for quality control in series production. All Zeiss-made lenses for the Hasselblad cameras are submitted to stringent tests before being passed for delivery. The range now comprises 15 different lenses in focal lengths from 30mm to 500mm and with diagonal angular fields from 180° to 9°. All the lenses provide coverage of the 2¼ x 2¼ format. The barrels of Hasselblad lenses have a matt-black, anti-reflection finish. All lenses are multicoated except for the special-purpose 250mm Sonnar Superachromat and 105mm UV-Sonnar. Multicoated lenses have a red T* (pronounced Tee star) engraved on the front identification ring. Multicoating greatly reduces flare and ghosts, thereby enhancing image contrast and colour saturation. All lenses are matched so as to provide similar colour transmittance. So transparencies made on the same film but with different Zeiss lenses all display similar colour rendition.

All the lenses have built-in Synchro-Compur leaf shutters fully synchronized for electronic and expendable flash at all shutter speeds, i.e. 1-1/500 s, "B" and "T" (for time exposures) and "V" (self-timer). Synchronization never varies more than a few milliseconds even at the fastest shutter speed. This is the biggest advantage of a leaf shutter.

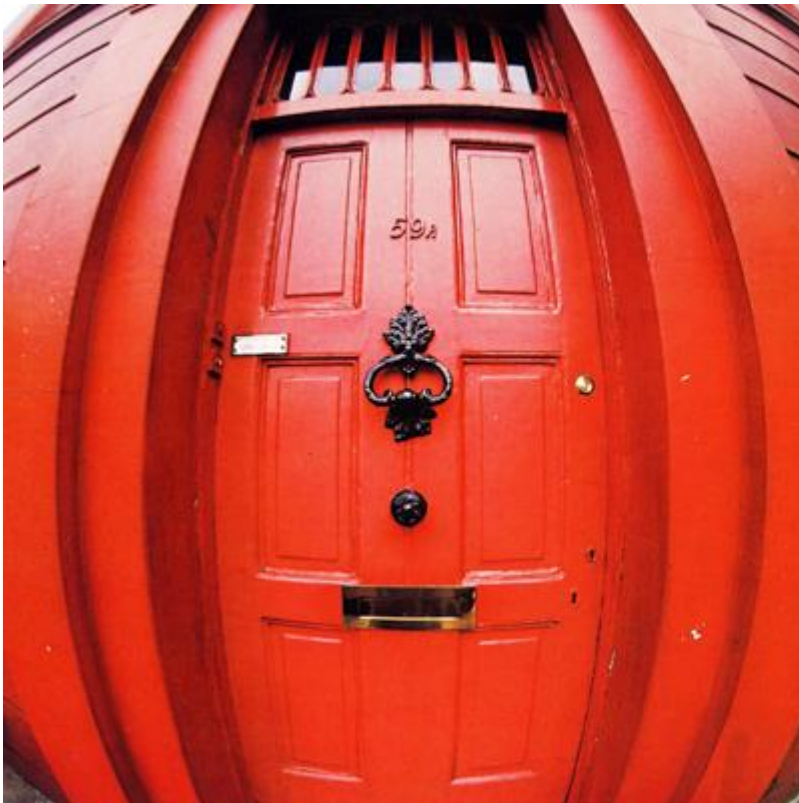
Automatic depth-of-field indicators immediately display the depth-of-field available. The cross-coupled aperture and shutter speed rings are set against the same index as the distance ring, making it possible to check out all settings at a glance. Aperture coupling can be disconnected when desired.

The camera normally operates with the lens wide open; it stops down to the preselected f/stop a fraction of a second before the exposure is made, so

you always see the brightest possible image on the focusing screen. The lens can also be stopped down manually for a check on depth-of-field prior to exposure.

The Lenses are designed in two colours and are available in: Black and Chrome.

F-Distagon f/3.5, 30mm Lens

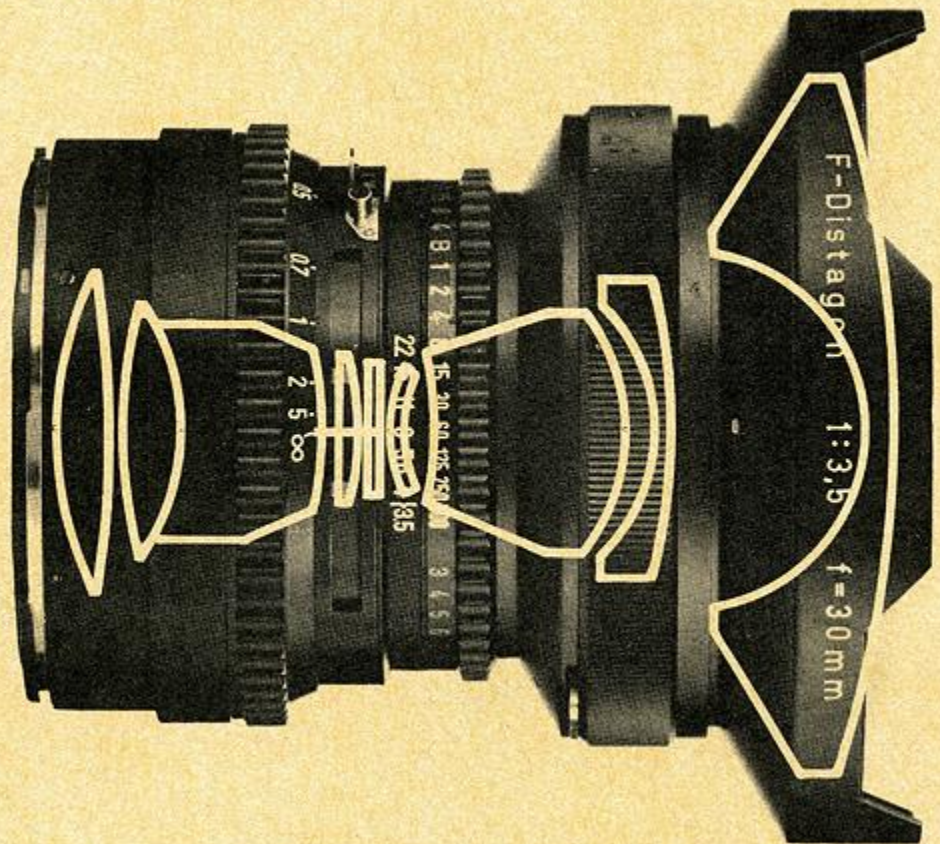
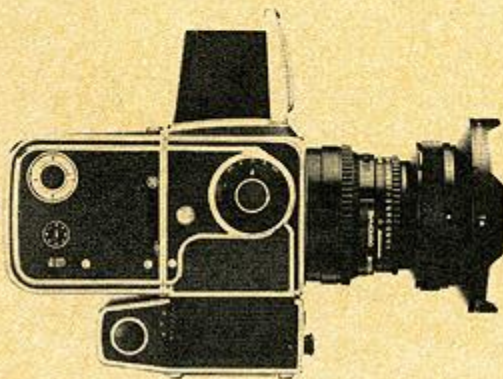


The 30mm F-Distagon is an ultra wide-angle fish-eye lens with a 180° diagonal and 112° horizontal angle of view. This lens yields outstanding corner-to-corner resolution even when used wide open. Sharpness is a very important feature in wide-angle photography, since subjects often contain a large amount of fine detail. The 30mm F-Distagon is an exciting lens to work with. It produces interesting perspective, and unusual visual effects can be achieved. The F-Distagon makes it easier to work in cramped spaces. It is a fascinating lens for the landscape, fashion and advertising photographer. The ability to check out composition and perspective on a focusing screen enables you to avoid excessive distortion. Or just opposite. A fish-eye lens produces barrel distortion. Straight lines through the center of the field remain straight, and

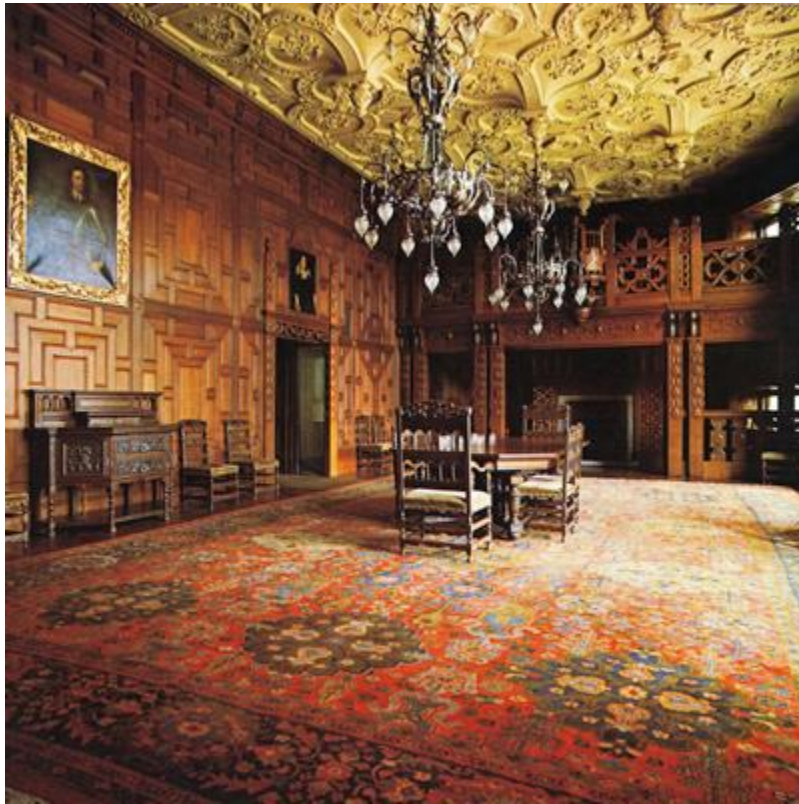
circles around the center of the field are reproduced as circles. Rectilinear distortion increases out toward the edges of the field, successively increasing the curvature of straight lines. These optical characteristics can be utilized to achieve intentional effects in composition. But a camera angle can often be found which emphasizes the extreme wide-angle effect without too much distortion being apparent.

The lens is supplied with three filters and a compensation glass. This compensation glass, or one of the filters, is an integral part of the optical system of the lens which should not be used without the compensation glass or a filter. The 30mm F-Distagon differs from the other Hasselblad lenses by having a permanently attached lens shade tailored to the extremely wide angle of view. Even a very shallow standard shade would intrude into the 180° angular field.

Max. aperture	f/3.5
Focal length	30mm
Angle of view, diagonal	180°
horizontal	112°
Diaphragm	f/3.5–22
No. of elements	9
Focusing range	11 1/2 in (0.3 m)–∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	108 mm diameter
	Filters supplied with each lens
Weight	48 1/4 oz (1370 g)
Length	4 1/2 in (115.5 mm)



Distagon f/4,40mm Lens



The Distagon 40mm f/4 is an extreme wide-angle lens. With an 88° diagonal and 69° horizontal angle of view, it covers nearly the same field as the Biogon lens on the Hasselblad SWC. In contrast to the Biogon lens, however, the Distagon is an extreme retrofocus design. This means that it leaves enough room for mirror movement in a single-lens reflex camera, despite the wide angle of view. The lens is also remarkably fast for its type. It also features excellent correction of all aberrations, thereby ensuring a high standard of image quality. Even correction for distortion, previously regarded as a weak point in the retrofocus design, has been very successful. The glass used in this lens does not pass ultraviolet radiation, so an ultraviolet filter is not necessary. But don't forget the lens shade. Filters are attached to the front bayonet mount in the customary manner.

Practical experience has shown that the 40mm Distagon on the camera, despite its size and weight (48 oz), rests nicely in the hand and is by no means front-heavy. Being able to determine composition and depth-of-field on a focusing screen prior to exposure is a big advantage for the

The 40mm Distagon opens up dramatic new perspectives for adventurous photographers. Exciting results can be obtained.



Distagon f/4, 50mm Lens

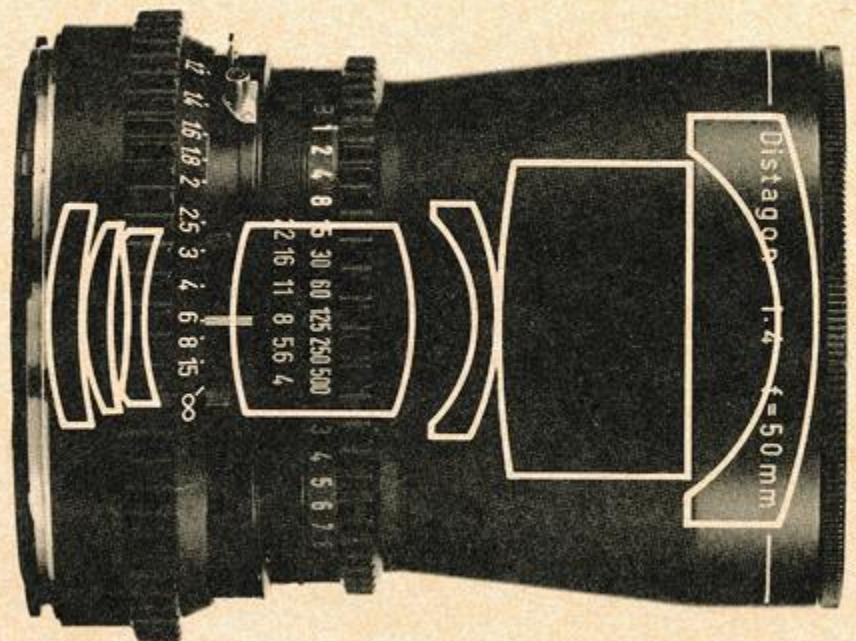
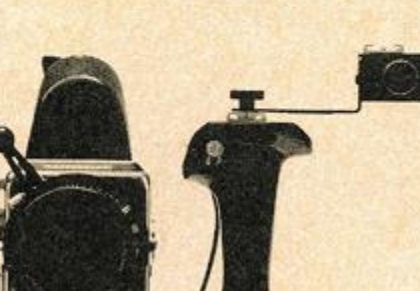


A great many Hasselblad photographers have discovered the usefulness of the 50mm Distagon with its 75° wide angle of view. But up to the start of the 1960's photographers working with 2¼-square single-lens reflex cameras had to make do with an angular field of only 67°.

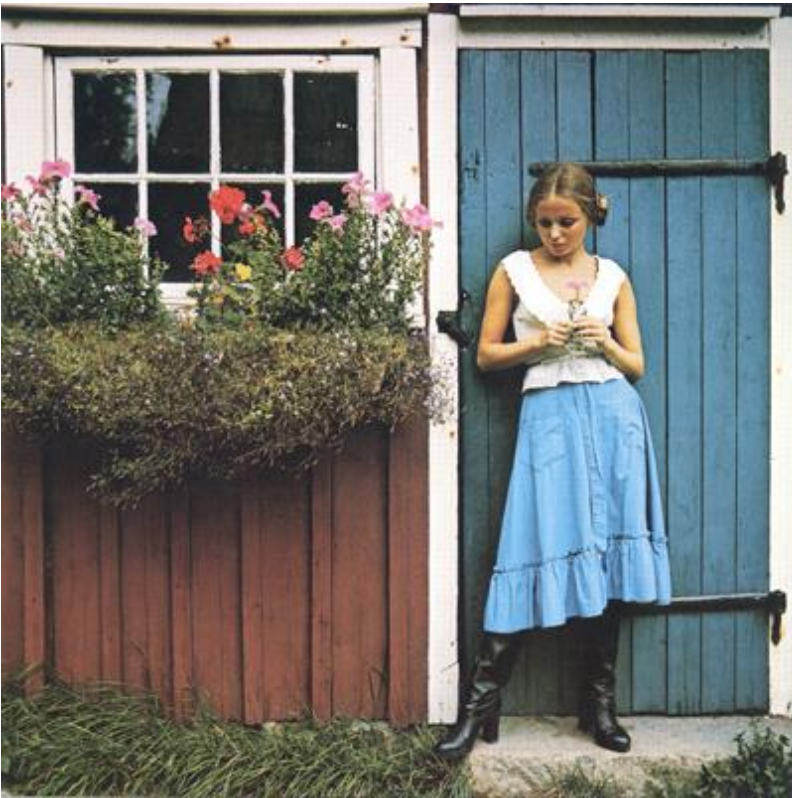
Since the distance between the rear lens vertex and the image plane had to be 36% longer than the focal length, problems arose involving correction and inconveniently large dimensions for the lens. The problems were solved, thanks in part to modern computer technology but mainly to creative

Despite its advanced technical specifications, the 50mm f/4 Distagon displays a superbly balanced correction of all optical aberrations. It also features a remarkably compact design. Resolution, contrast and illuminance are of the highest order for a wide-angle lens. The relatively wide angle of view makes it possible to photograph interiors and architectural assignments inaccessible with longer focal length lenses. As is the case with all extreme asymmetric optical systems, lens performance is best at long lens-to-object distances. So the lens should be stopped down for close-up work. The 50mm f/4 Distagon and 150mm Sonnar are the most popular accessory lenses in the Hasselblad line-up. Many photographers have learned to appreciate the versatility and wide-angle perspective of the 50mm Distagon, used by many as a universal lens.

of elements	7
ocusing range	19 in (0.5 m)– ∞
hro-Compur shutter	B, 1–1/500 s
t lens mount	63 mm diameter
ght	31 oz (885 g)
hth	4 in (100 mm)



Distagon f/3.5, 60mm Lens



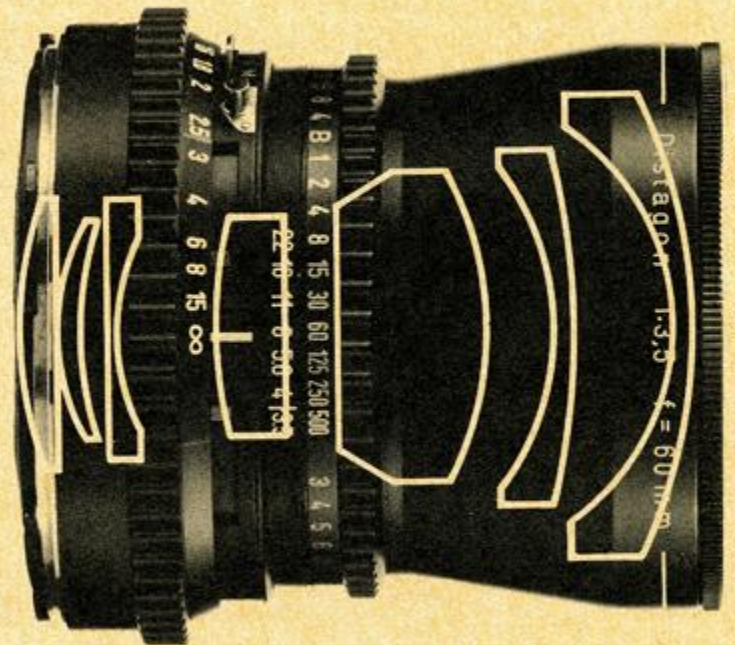
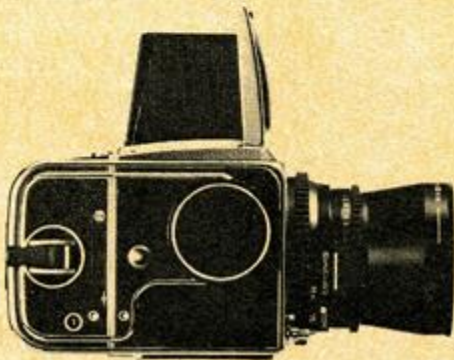
With the introduction of the 60mm Distagon Zeiss fulfilled the wishes of many photographers who fondly recalled the 60mm Distagon lens discontinued in 1960. The need for a moderate wide-angle lens is easy to understand if you remember that the object field of the 50mm Distagon is 2.5 times larger than the field of the 80mm Planar at the same lens-to-object distance. When the subject fills the whole format with these two lenses, calling for different lens-to-object distances, completely different perspectives are obtained.

The 60mm f/3.5 Distagon fills the gap between the 50mm and 80mm lenses. The object field of the 60mm lens is 1.8 times larger than the field of the standard 80mm Planar lens, but pictures taken with it do not show an exaggerated wide-angle perspective. These properties are a real boon for interior subjects where appearance must be reproduced as natural as possible. The 60mm Distagon can also be used for group shots at relatively short lens-to-object distances avoiding perspective distortion of heads near the edges of the field. The 60mm f/3.5 Distagon also comes into its own in landscape work, since the lens makes it easy to emphasize a

main subject in the foreground. Not to mention the advantage to fashion and advertising photographers of 1.8 times more depth-of-field than you get with the 80mm Planar.

With a 66° angle of view across the diagonal of the format and 50° from side to side, the 60mm f/3.5 Distagon is a truly versatile lens.

Max. aperture	f/3.5
Focal length	60mm
Angle of view, diagonal	66°
horizontal	50°
Diaphragm	f/3.5–22
No. of elements	7
Focusing range	24 in (0.6 m)– ∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	63 mm diameter
Weight	22 ³ / ₄ oz (645 g)
Length	3 ¹ / ₄ in (85 mm)



Planar f/2.8, 80mm Lens



The 80mm Planar is the normal lens for Hasselblad cameras. Its focal length corresponds to approximately the diagonal of the $2\frac{1}{4} \times 2\frac{1}{4}$ format. This means that the 80mm Planar has a 52° diagonal and 38° horizontal angle of view. The 80mm Planar is supplied as standard with the Hasselblad 500C/M and Hasselblad 500EL/M. The first Planar lens was designed by Zeiss as early as 1896. This lens design made it possible for the first time to achieve a relatively large maximum effective aperture combined with anastigmatic flatness of field (hence the designation "Planar") as well as correction of the Gaussian error.

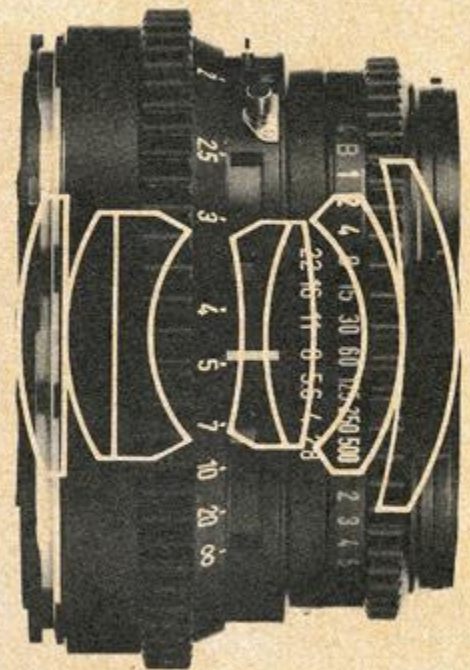
Since each lens half is characteristic of a Gauss telescope objective, this lens type is often referred to in technical literature as a "double Gauss lens". The Planar lens did not come into widespread use in cameras for amateurs and professionals until several decades later as the popularity of small formats increased. But doubts about the merits of lenses with more than 6 air-to-glass surfaces were dispelled after the introduction of anti-reflection coating by Zeiss, thereby greatly contributing to the breakthrough for Planar-

type lenses. Modern Planar lenses are vastly superior to their older counterparts. Despite its greater length, the special design of the 80mm Planar leaves enough space for adequate mirror movement between the vertex of the rear lens element and the film plane.

A characteristic feature of the 80mm Planar is extremely uniform sharpness right out to the corners of the field, even when the lens is used wide open. Field illuminance is also outstanding, and the lens is well corrected for all optical aberrations. It yields negatives with high contrast and crisp resolution.

The relatively large maximum aperture of $f/2.8$ makes it possible to use the 80mm Planar even in poor lighting. Combined with Proxars, extension tubes or bellows extension, this lens is also suitable for close-up work.

Max. aperture	$f/2.8$
Focal length	80mm
Angle of view, diagonal	52°
horizontal	38°
Diaphragm	$f/2.8-22$
No. of elements	7
Focusing range	3 ft (0.9 m)– ∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	50 mm diameter
Weight	16½ oz (465 g)
Length	2 in (51.7 mm)



Planar f/3.5,100mm Lens



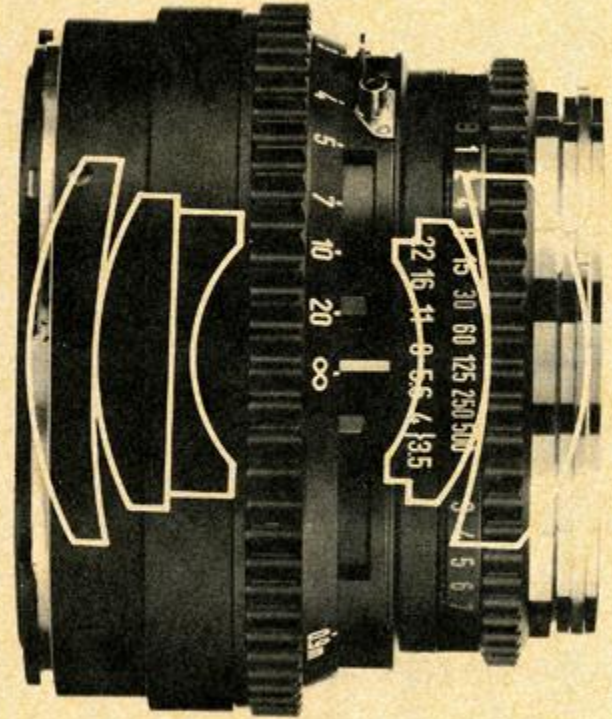
The 100mm f/3.5 Planar lens meets the highest demands for correction of distortion and resolution. This lens renders finest details right out to the edges of the $2\frac{1}{4} \times 2\frac{1}{4}$ format, even at maximum aperture. Thanks to an ideal combination of focal length and lens speed, distortion has virtually been eliminated.

The 100mm Planar is a lens designed to uncompromising optical standards. It even surpasses the standard 80mm Planar in resolution if both lenses are used at full aperture or stopped down at f/4 or f/5.6. Its properties are shown to best advantage at long lens-to-object distances.

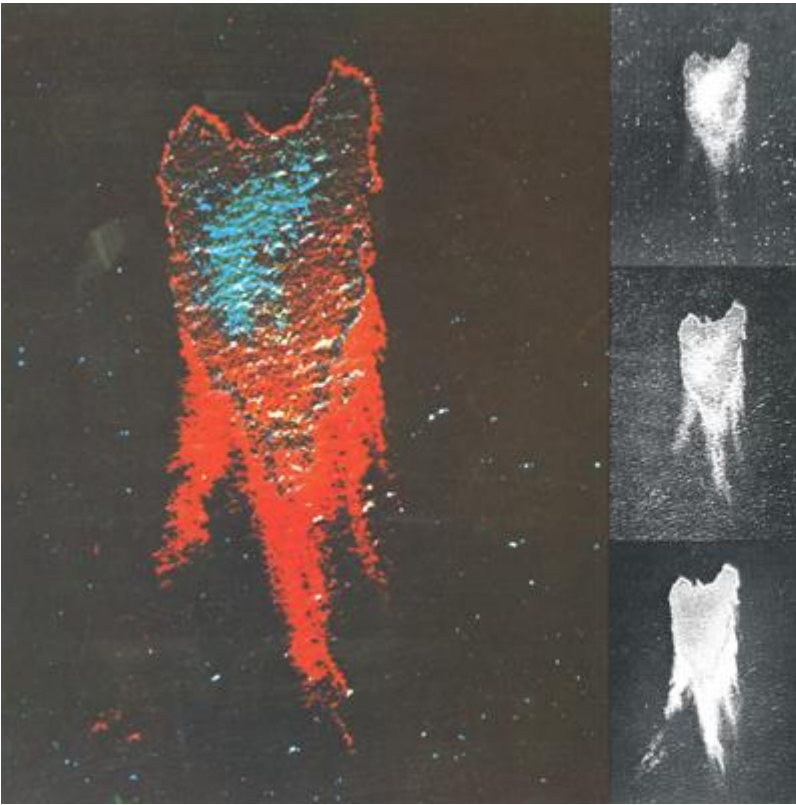
The 100mm Planar is recommended for all kinds of photography calling for exceptional resolving power and image brilliance, especially when big blow-ups of details are needed. Outstanding distortion correction makes the lens very suitable for photogrammetric purposes, aerial photography, architectural photography and other occasions when image geometry is especially important to interpretation by measurements. The lens can also be used to advantage for scientific and technical applications demanding extreme precision.

Residual aberrations in the 100mm Planar have been reduced to such a degree that the lens satisfies requirements for surveying optics.

Max. aperture	f/3.5
Focal length	100mm
Angle of view, diagonal	43°
horizontal	32°
Diaphragm	f/3.5–22
No. of elements	5
Focusing range	3 ft (0.9 m)–∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	50 mm diameter
Weight	21½ oz (610 g)
Length	2½ in (62 mm)



UV-Sonnar f/4.3, 105mm Lens



The 105mm UV-Sonnar is a special purpose lens for technical and scientific photography. This lens features especially good transmission characteristics in the ultraviolet (UV) spectral range. It is highly corrected for all aberrations in the range from short wave ultraviolet to near infrared, i.e. from 215-700 nm.

Lens elements in the UV-Sonnar are made solely of fluorite and quartz, since optical glass absorbs UV radiation.

The UV-Sonnar has outstanding resolving power and distortion correction throughout its wide spectral range. Correction for chromatic aberrations is genuinely apochromatic. In other words, the lens focal length is identical across the visible spectrum and the UV at 3 different wavelengths. The secondary spectrum, i.e. the residual deviations from the common focus for the remaining wavelengths are completely negligible. That is why the lens can be focused for UV work in visible light in the ordinary manner. Selected portions of the spectrum can be utilized for special purposes with the aid of various interference filters. The UV-Sonnar, fitted with a haze filter, can also be used like a normal lens. UV fogging of black & white film and colour film (a blue tinge) is then avoided. The UV-Sonnar makes it possible to solve

many complicated problems in UV research. For example, different textiles and sub- stances display varying reflection or transmission of UV light and visible light. Textiles, forged paintings, counterfeit stamps and ancient manuscripts covered by other text, etc. can all be examined with the aid of the UV-Sonnar.

Extra-terrestrial ultraviolet photography and criminology are other important applications for this lens.

The adjacent colour photograph (above image) showing an oil discharge in water consists of three black & white photographs taken simultaneously with three different cameras. The top picture was taken on infrared film with a no. 89B filter. The middle picture was taken using panchromatic film and a green no. 58 filter. The bottom photograph was made on panchromatic film with a UV-Sonnar lens fitted with a no. 18A filter. The photograph taken with the UV-Sonnar discloses the thinnest oil slicks (red in the colour photograph) invisible in the other pictures.

Max. aperture	f/4.3
Focal length	107.2mm
Angle of view, diagonal	41°
horizontal	30°
Diaphragm	f/4.3–32
No. of elements	7
Focusing range	6 ft (1.8 m)–∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	50 mm diameter
Weight	23½ oz (670 g)
Length	3½ in (87 mm)



S-Planar f/5.6, 120mm Lens



As indicated by the designation “S”, the 120mm S-Planar is a special-purpose lens. In contrast to most lenses, where optimum correction is found at long lens-to-object distances, the 120mm S-Planar is designed for use at short focusing ranges.

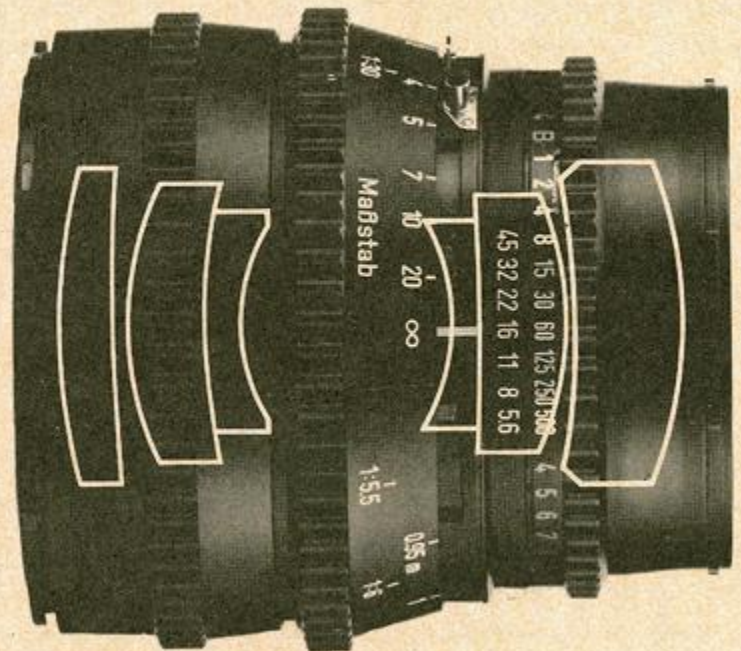
Its best performance is yielded at reproduction ratios from 1:10 to 1:2. Maximum correction is obtained at f/11. At this f/stop the modulation transfer factor in the center of the field is close to the value for an ideal field in a perfect optical system.

The S-Planar has been designed to satisfy the very high quality requirements of line-copy-work and technical photography calling for superior resolution and distortion correction. The 120mm S-Planar also differs from most normal lenses by having correction relatively insensitive to changes in image scale. It can therefore be used for long lens-to-object distances with excellent results but should then be stopped down somewhat more than is the case for a normal lens whose optimum correction is for long lens-to-object distances. The corresponding also applies for extremely short focusing distances and scales, only attainable with a bellows extension or extension tubes. At a lens-to-object distance of 5 ft, the scale

of reproduction without extension tubes is 1:10; the lens is at its best here. The closest focusing point for the lens is 3 ft (0.95 m), corresponding to a scale of 1:5.8. The frequently fascinating range of scales between 1:12 and 1:4 can be covered with the extension tube 10.

The combination of a 120mm S-Planar and the Hasselblad extension bellows yields reproduction ratios between 1:1.9 (a reduction of approximately 2 times) and 0.55:1, corresponding to an enlargement of about 1.8 times. These examples show that the lens is suitable both for applications calling for outstanding distortion correction and for a wide variety of assignments at relatively short lens-to-object distances. This lens is also suitable for most applications in industrial and advertising photography.

Max. aperture	f/5.6
Focal length	120mm
Angle of view, diagonal	36° (at ∞)
horizontal	26° (at ∞)
Diaphragm	f/5.6–45
No. of elements	6
Focusing range	3 ft (0.95 m)–∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	50 mm diameter
Weight	22½ oz (640 g)
Length	3½ in (86.5 mm)



S-Planar f/5.6, 135mm Lens



The 135mm S-Planar is a special-purpose lens designed for use with the Hasselblad bellows extension and therefore has no helical focusing mount. With the bellows extension, the focusing range of the lens is continuous from infinity to a scale of 1:1. The lens features optimal correction for close-range applications but can also be used over a wide range of image scales. It can even be used at long lens-to-object distances if stopped down.

Image resolution is not improved in close-up work when the diaphragm is stopped down more than two to three f/stops. At very small apertures, sharpness may be impaired (owing to the diffraction of light), as is the case with all photographic lenses. Since depth-of-field in extreme close-ups, such as a scale of 1:1, is greatly reduced and only amounts to less than a tenth of

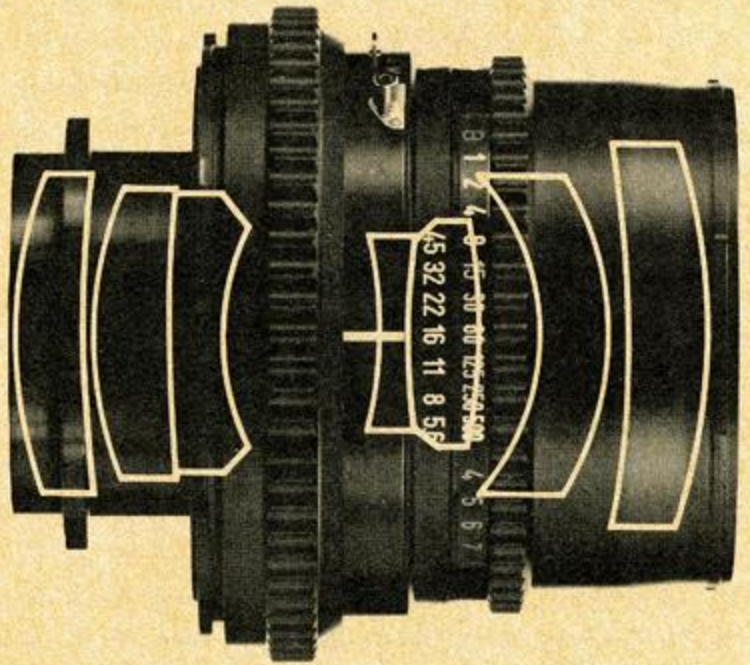
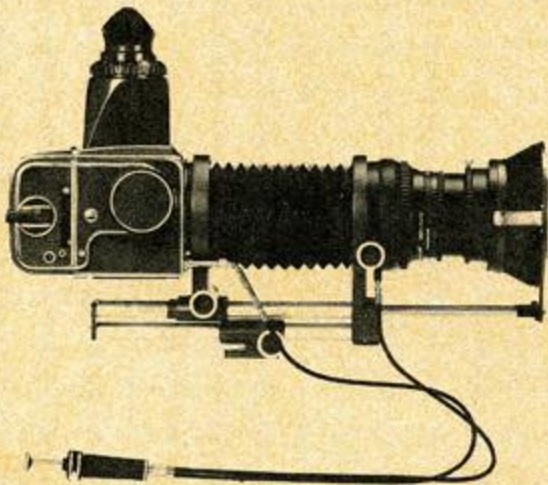
an inch at f/11, the lens can be stopped down all the way to f/45 in order to attain the best compromise between resolution and depth-of-field.

In such cases, it may be appropriate to first extend the bellows extension until the desired scale is obtained and then adjust the focus with the lens wide open by displacing camera and lens on the lower bellows rails.

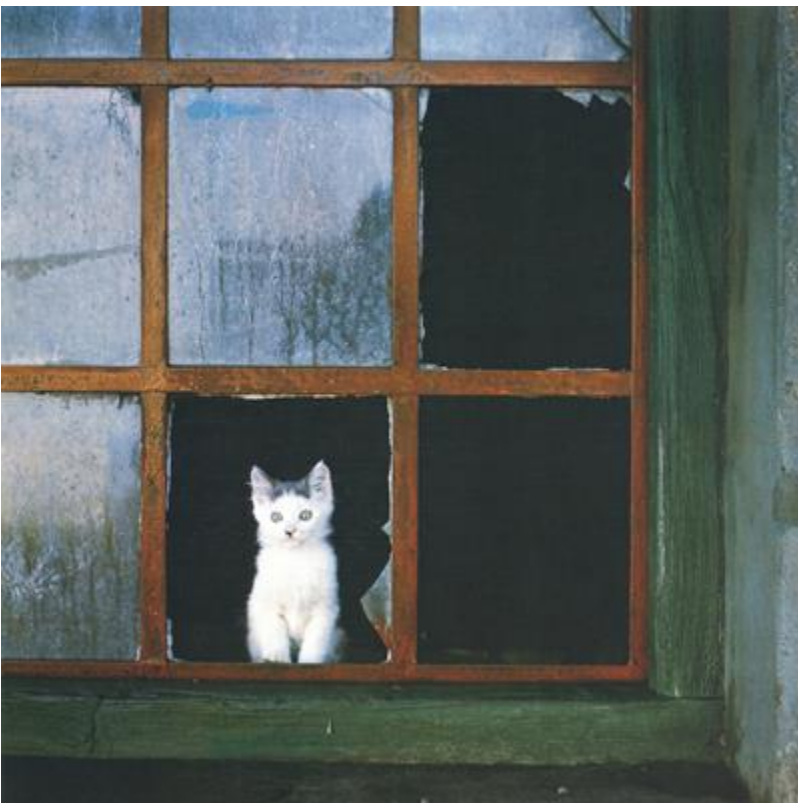
The 135mm S-Planar is unsurpassed for rapid, full-format reproduction of large and small objects. In nature photography, for example, the object is often to show vegetation and animals in their natural surroundings but often also in large scale so as to emphasize important details. The same problem is frequently encountered by the industrial photographer who has to show men at work with their tools, details of which are only visible in close-ups. The relatively long focal length of the lens is also an asset appreciated for purely practical reasons, since you get a convenient working distance between the lens and the subject.

The bellows extension and camera combination are operated with a double cable release. All shutter and camera functions operate in the same sequence as usual. The 135mm S-Planar plus the Hasselblad bellows extension can be used with the Hasselblad 500C/M and Hasselblad 500EL/M.

Max. aperture	f/5.6
Focal length	135mm
Angle of view, diagonal	32° (at ∞)
horizontal	23° (at ∞)
Diaphragm	f/5.6–45
No. of elements	7
Focusing range with bellows extension	21 in (535 mm)–∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	50 mm diameter
Weight	19¾ oz (560 g)
Length	3¼ in (85 mm)



Sonnar f/4, 150mm Lens



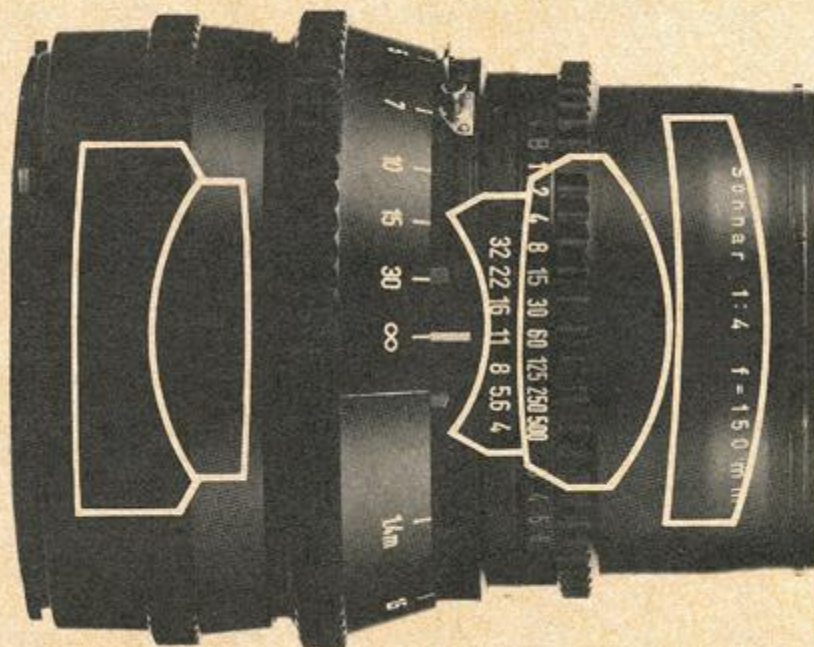
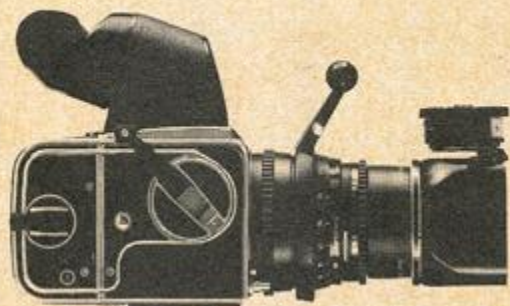
Apart from the 50mm Distagon the 150mm Sonnar is the most popular accessory lens for many photographers. The moderately long focal length of this lens plus its relatively high speed make the 150mm Sonnar a universally useful lens. It is especially suitable for portrait work. The 30° diagonal and 21° horizontal angle of view have made it a favourite with professional photographers. When combined with an extension tube 10, you can get tight close-ups of faces without crowding the model. The linear size of the object field is reduced by 2/3 when the extension tube 10 is used with maximum lens extension.

The 150mm Sonnar covers the 2¼ x 2¼ format with excellent sharpness and brilliant contrast, even when used wide open. The compact element groupings, typical of the “long” Sonnar design, yield outstanding corner-to-corner illumination of the field.

The 150mm Sonnar is easily used in hand-held work and can be recommended as a truly universal lens with a modest telephoto effect. It is practically indispensable and should be part of the standard equipment of every Hasselblad photographer.

Even when the lighting is poor, as in news coverage in bad weather, the high speed of the 150mm Sonnar makes it possible to use relatively fast shutter speeds, eliminating the need for a tripod. Flash synchronization at all shutter speeds facilitates the use of electronic flash for sports photography outdoors, in an indoor arena or in other situations with poor lighting.

Max. aperture	f/4
Focal length	150mm
Angle of view, diagonal	30°
horizontal	21°
Diaphragm	f/4-32
No. of elements	5
Focusing range	5 ft (1.4 m)-∞
Synchro-Compur shutter	B, 1-1/500 s
Front lens mount	50 mm diameter
Weight	25 oz (710 g)
Length	3 3/4 in (96 mm)



Sonnar f/5.6, 250mm Lens



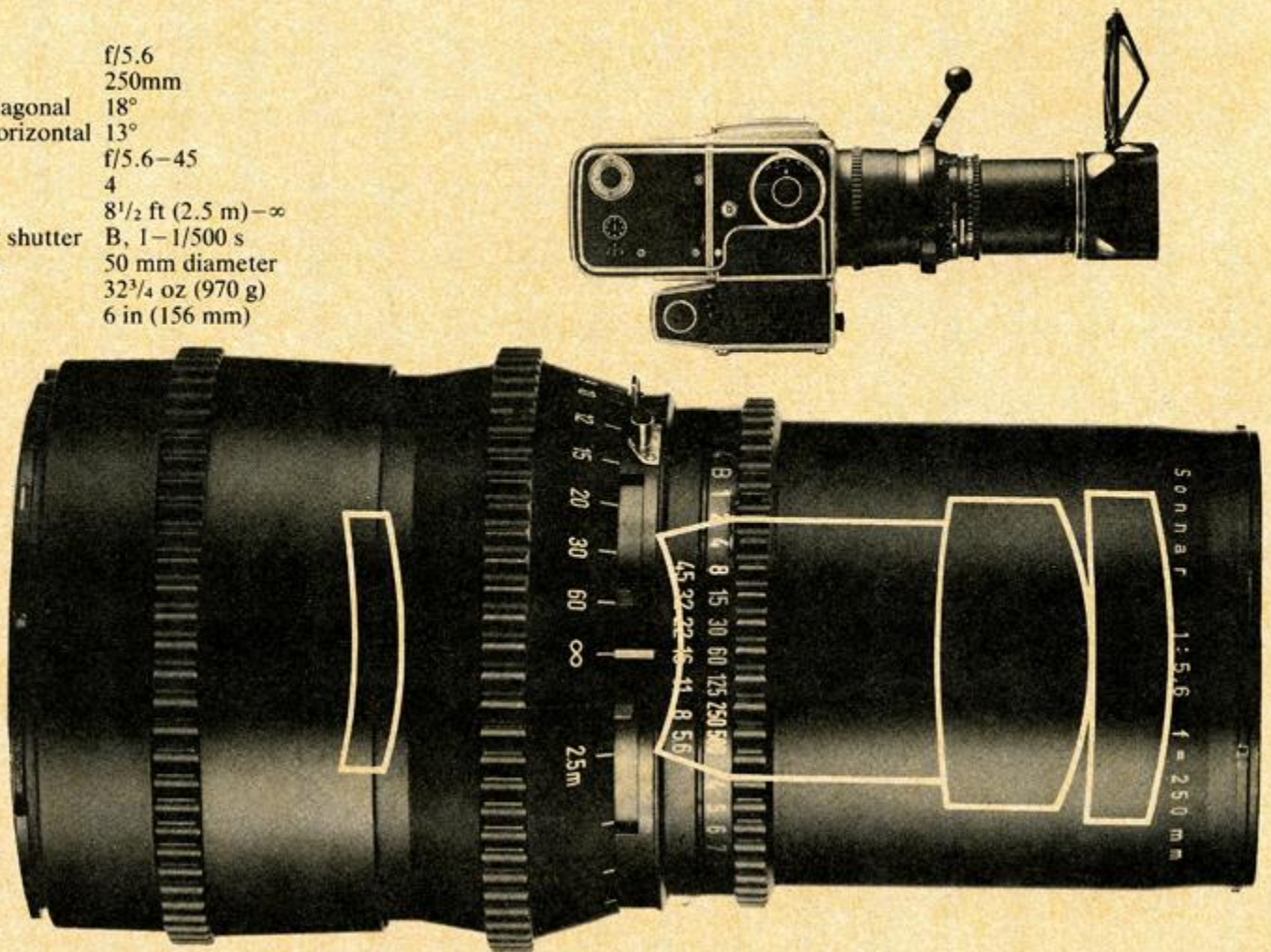
The focal length of the 250mm Sonnar is equal to about three times the diagonal of the film format. This lens is a synthesis of speed, ease of use and exceptional optical performance. Image quality can not be improved to any extent by stopping down the lens. Its compact, convenient design is of utmost importance in hand-held work.

The rather long focal length of this lens, compared to the standard lens, makes it possible to operate at long lens-to-object distances. The portrait photographer is able to work at a discreet distance from his model. This makes the lens especially suitable for child photography. Landscape perspectives are compressed and accentuated by the telephoto effect. Since the focal length of the 250mm Sonnar is 1.7 times longer than that of the 150mm Sonnar, the background included around a main subject is greatly reduced. This largely eliminates the need to search for an uncluttered background. Depth-of-field is also reduced, especially with the lens wide open, so that subjects stand out against a blurred background. Electronic flash can be used even at the fastest shutter speeds, a real advantage in news and sports assignments.

The 250mm Sonnar is a modern design developed in response to insistent demands for a medium telephoto lens. The element groupings are not typical of a telephoto lens, since priority was given to razor sharp resolution across the entire 18° angle of view.

Only the exterior of the lens reveals it to be of telephoto design. The distance from the front element of the lens to the film plane is about 10% less than the focal length with the lens focused on infinity.

Max. aperture	f/5.6
Focal length	250mm
Angle of view, diagonal	18°
horizontal	13°
Diaphragm	f/5.6–45
No. of elements	4
Focusing range	8½ ft (2.5 m)–∞
Synchro-Compur shutter	B, 1–1/500 s
Front lens mount	50 mm diameter
Weight	32¾ oz (970 g)
Length	6 in (156 mm)



Sonnar Superachromat f/5.6, 250mm Lens



The Sonnar Superachromat is a completely new and unique design displaying hitherto unsurpassed correction of chromatic aberration. It is also the first camera lens ever with superachromatic correction. The secondary spectrum, i.e. the predominant aberration in long focal length lenses, has been corrected for the entire spectral range between 400 and 1000 nm so effectively that residual aberrations are less than the Rayleigh criterion of resolving power.

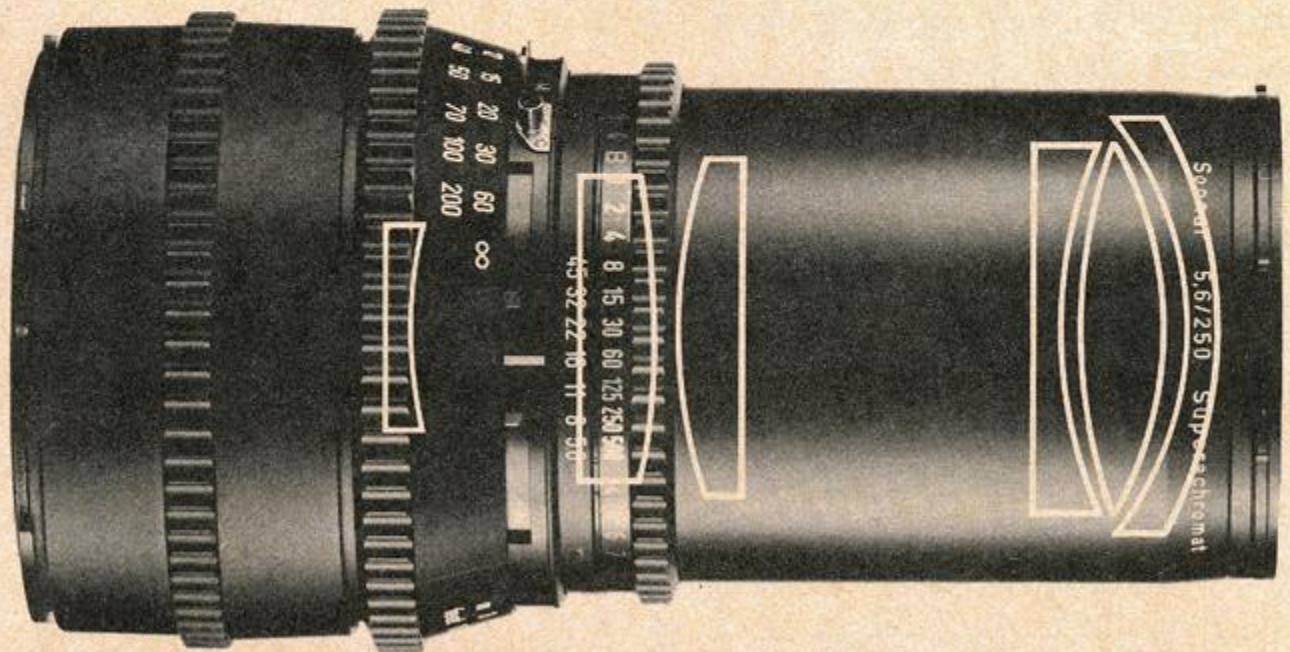
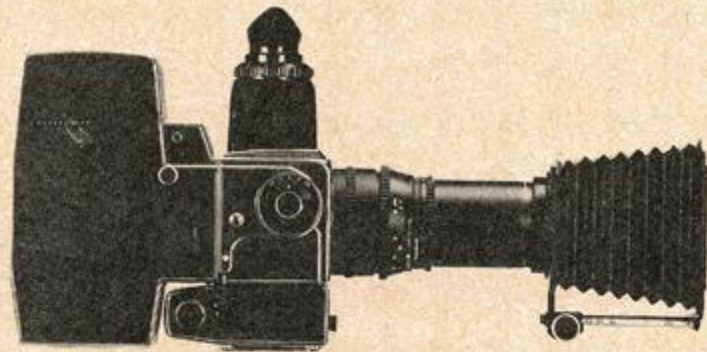
The secondary spectrum is negligible, since the wave nature of light makes it impossible to go below this criterion. Wavelengths less than 400 nm, i.e. below the short wave light visible, are no longer active here, since transmission of glass, as is the case for all regular lenses, is too poor. And the long wave limit towards the infrared beyond 1000 nm is set by the long wave sensitivity to light of the infrared emulsion.

Even in monochromatic light this lens displays outstanding correction plus a useful speed and field size. The lens can be focused in visible light, ensuring optimal sharpness in every instance, even when infrared-sensitive black & white or colour film is used.

The 250mm Superachromat opens up completely new possibilities for Hasselblad cameras in science and technology. The emphasis is naturally on applications in which correction of aberrations extending into the infrared range invisible to the naked eye is of vital importance. Landscape and architectural photography with special effects, geological, archeological and hydrological documentation (including aerial photos), botany, plant pathology, environmental control and multi-spectral photography are examples of the wide range of applications for this extraordinary lens.

The Sonnar Superachromat's phenomenal correction also makes the lens valuable for "normal" work, since it always yields superior image resolution by virtue of its ability to bring all the colours of the spectrum to a common focus.

Max. aperture	f/5.6
Focal length	250mm
Angle of view, diagonal	18°
horizontal	13°
Diaphragm	f/5.6-45
No. of elements	6
Focusing range	9 ft (2.8 m)-∞
Synchro-Compur shutter	B, 1-1/500 s
Front lens mount	50 mm diameter
Weight	26 ³ / ₄ oz (760 g)
Length	6 in (155 mm)



Tele-Tessar f/5.6, 350mm Lens



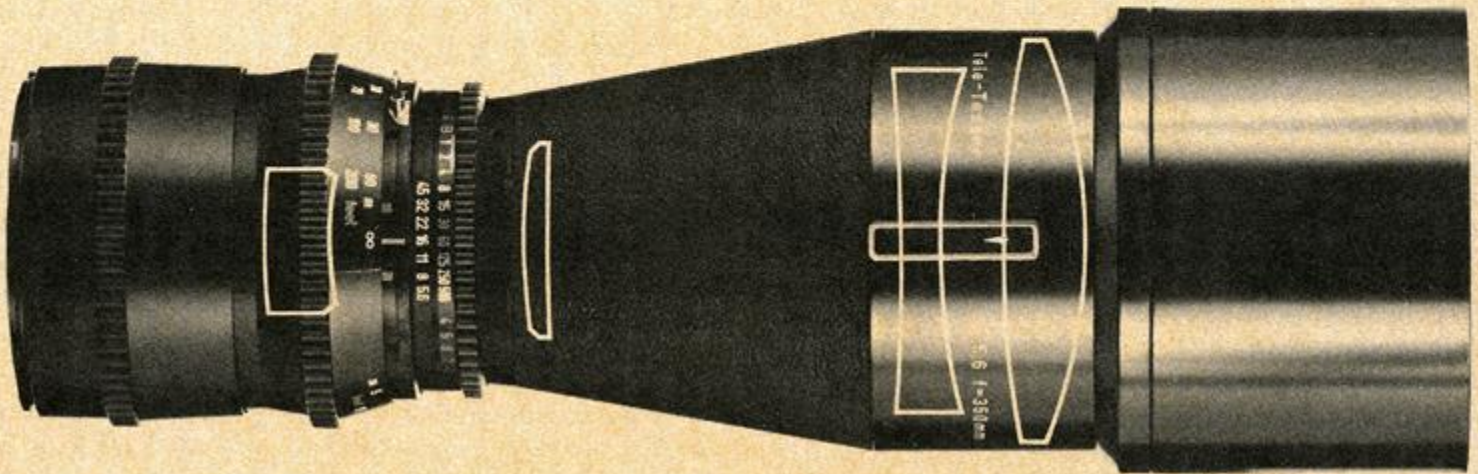
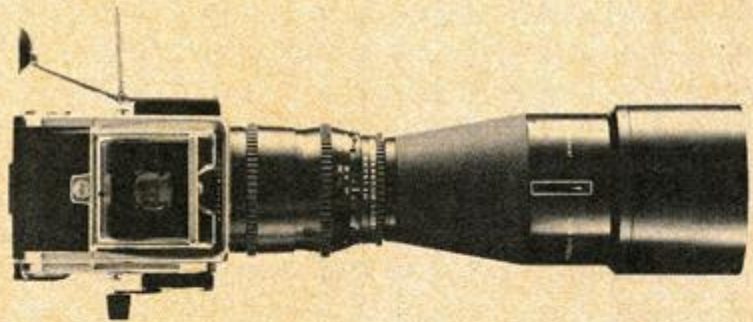
Despite its considerable focal length, the 350mm Tele-Tessar is only 8.8 in long. This compact design and a relatively fast f/5.6 maximum aperture make the lens useful for many fields of practical photography.

The telephoto design is also unique in that the exit pupil is located far back. Its distance from the film plane is unusually short and thus all the rays emerging from the lens reach the film plane right into the format corners without any interception by lens barrel or camera body.

Even at its maximum aperture the 350mm Tele-Tessar displays exceptional sharpness for a lens of this focal length and design. Even pincushion distortion, which tends to be a characteristic feature of telephoto lenses, has been perfectly corrected. Thus, this lens is further evidence of the progress attained in the design of lenses employing new programs in electronic computers. The handy size of this lens, its silky-smooth focusing mount and efficient automatic diaphragm facilitate maximum utilization of the outstanding optical properties.

The 350mm Tele-Tessar can often be used without a tripod when there is a special need for mobility. It also keeps the photographer in the center of things. The lens is ideal for the news, fashion, animal and nature photographer among many others. The telephoto effect, which is more pronounced than with the 250mm Sonnar with its 30% shorter focal length, presents opportunities for interesting effects. If the background becomes distracting, you just open up the lens until its shallow depth-of-field throws the background out of focus. The photographer is thus able to concentrate on his main subject, which then stands out against the blurred background.

Max. aperture	f/5.6
Focal length	350mm
Angle of view, diagonal	13°
horizontal	9°
Diaphragm	f/5.6-45
No. of elements	4
Focusing range	16 1/2 ft (5 m)-∞
Synchro-Compur shutter	B, 1-1/500 s
Front lens mount	86 mm diameter
Weight	47 1/2 oz (1350 g)
Length	9 in (224 mm)



Tele-Tessar f/8, 500mm Lens



The 500mm Tele-Tessar has the longest focal length in the Hasselblad range of lenses. Despite its considerable focal length, the 500mm Tele-Tessar presents a convenient size, so that there are only 15 in between the vertex of the front element and the film plane. It can also be used without a tripod at the fastest shutter speeds. The 500mm Tele-Tessar is an ideal lens when a distant subject has to be reproduced as large as possible. The animal photographer can work at distances where he is safe from spooking his subjects. The sports and news photographer can also make excellent use of the 500mm Tele-Tessar and get tight close-ups without even being noticed.

One rule of thumb states that depth-of-field, irrespective of lens type, declines at a given f/stop in inverse ratio to the square of the focal length. So you can achieve a striking effect with a 500mm lens. The main subject, in sharp focus, can be made to stand out in relief against the blurred background. On the other hand, depth-of-field with the lens wide open only amounts to 10 inches at a lens-to-object distance of 30 ft but increases to 25 ft at 150 ft and to 100 ft at a distance of 300 ft. So the news photographer covering a football game from the stands can simply

concentrate on events near the goal posts with no need to keep readjusting focus.

The long focal length also compresses perspective. This effect is naturally most obvious with the 500mm Tele-Tessar whose diagonal angle of view is only 9° (6.5° horizontal). Images acquire a special atmosphere, an effect employed by many advertising photographers searching for ways to attain new visual results. For example, a row of houses looks tightly packed together when photographed with this lens.

Max. aperture	f/8
Focal length	500mm
Angle of view, diagonal	9°
horizontal	6.5°
Diaphragm	f/8-64
No. of elements	5
Focusing range	28 ft (8.5 m)-∞
Synchro-Compur shutter	B, 1-1/500 s
Front lens mount	86 mm diameter
Weight	74 oz (2100 g)
Length	12 1/2 in (316 mm)



Every Photograph in this series below was taken from the exact same camera position. The main subject remained at the same spot. Only the lenses were changed.



This series below of photographs shows the change in perspective obtained when the main subject in all the photographs has the same size. The Camera was successively backed off after every change of lens. The main subject remained stationary throughout.

