

ARRI / ZEISS MASTER PRIMES



BREATH TAKING

Rapid progress in lens design and manufacturing technology has finally realized a cinematographer's dream: lenses that are both fast and have an optical performance surpassing that of all current standard speed primes. The Master Primes, a complete set of 12 lenses developed in close collaboration between ARRI and Zeiss, are a revolutionary and unique new generation of high speed prime lenses with more resolution, more contrast and virtually no breathing.

ONE SET OF LENSES FOR ALL SITUATIONS

Whenever and wherever you want to shoot, the Master Primes open up new creative opportunities since they maintain their optical performance across the whole extended T-stop range from T1.3 to T22. Whether you shoot a day/exterior commercial with vibrant colors and high contrast, or a night/interior romantic candlelight dinner for a feature, the Master Primes are a truly universal set of lenses, usable in all lighting conditions.



At T1.3 the Master Primes give the cinematographer one extra stop of light to work with.



Candlelight image created with a Master Prime 40 mm at T1.3 and an ARRIFLEX 435 camera.
Actors and set visible were illuminated only with candles. Super 35 mm film frame scanned at 4K resolution with the ARRISCAN.

REALIZING THE IMPOSSIBLE

Creating a fast lens with excellent optical performance, a previously unattainable goal, was made possible through new manufacturing techniques, the use of exotic glass materials and aspherical glass surfaces. Incorporating aspherical glass surfaces in a lens design requires ultra-high precision and a complex holographic measuring process which was developed specifically for these lenses.

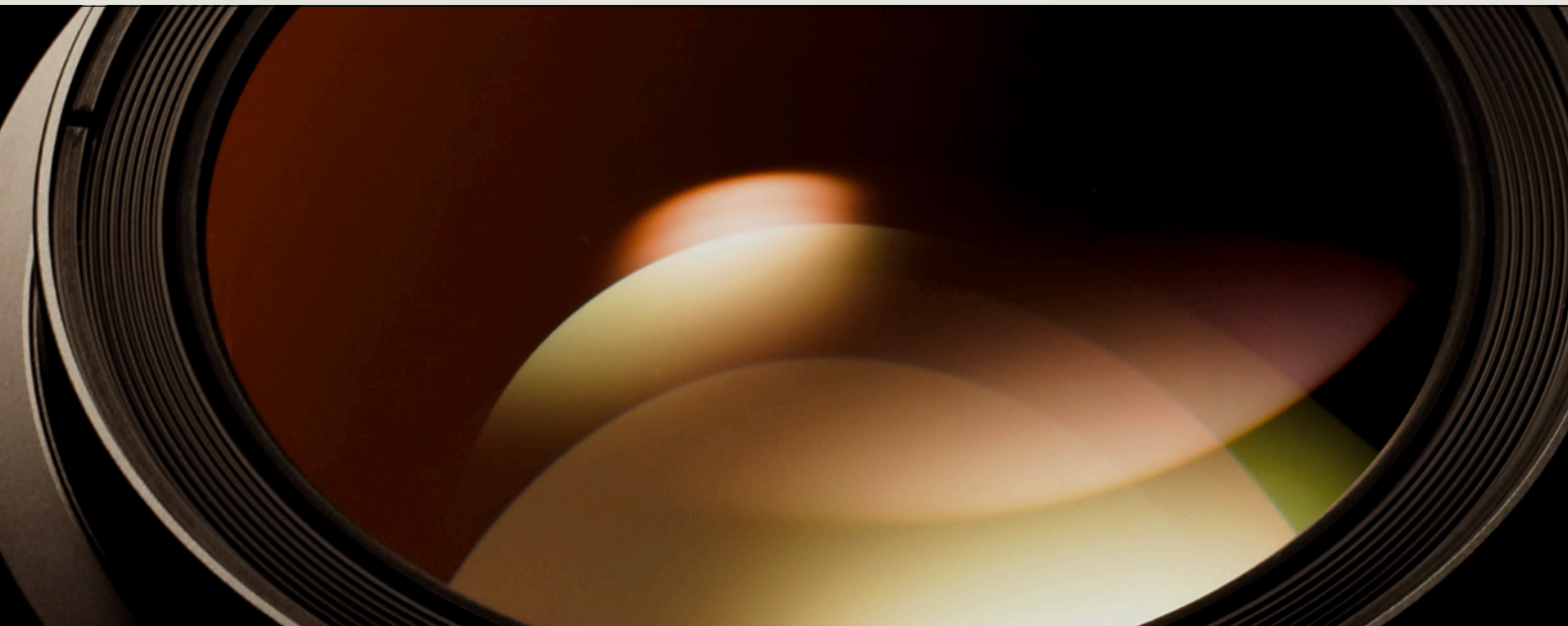
With a widest stop of T1.3 you can shoot in low or available light, reduce your lighting budget, get more natural looking shots and enjoy the cinematic look of an extremely shallow depth of field.

BREATH TAKING PERFORMANCE EVEN UP CLOSE

Additional features that were previously considered contradictory are good close focus performance and reduced breathing (an unwanted shift in image size when focus is changed). In the past, the close focus performance of a lens could be improved by utilizing a floating element. However, this made it more difficult to control breathing, so lens designers always had to compromise.

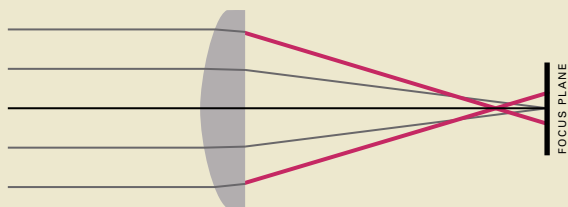
By using Dual Floating Elements™ (patent pending), Zeiss virtually eliminated breathing in the Master Primes while at the same time keeping the excellent close focus performance already established with the Ultra Primes. This unique combination of features allows for new angles and focus pulls that would have previously been impossible, creating new ways to block a scene and new image sequences for cinematographers to explore.

All these advances, combined with the improved T* XP anti-reflex coating, strategically painted lens rims and special light traps, result in lenses with unprecedented high resolution, high contrast and low veiling glare. Even in the darkest corner at night the Master Primes can capture details other lenses simply cannot see.

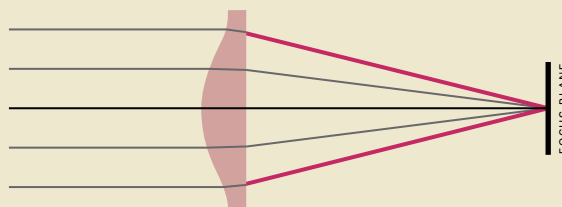


The improved T* XP anti-reflex coating reduces veiling glare and internal reflexes and creates a pleasing, gentle color balance. Compared to conventional coatings it has a better transmission and a more uniform performance across the lens from optical center to the edges, resulting in higher contrast and deeper, richer blacks.

SPHERICAL LENS



ASPHERICAL LENS



The above illustration shows the basic principle of how an aspherical lens works. Spherical lenses are subject to „spherical aberration“ and because of this they cannot focus all the light rays of a given color frequency onto the same plane. Therefore additional lens elements are needed to compensate, making the lens heavier and introducing other performance issues. The further away a light ray is from the optical center, the more pronounced this aberration becomes, making this a crucial issue for fast lenses with their larger diameter elements.

Aspherical lenses, on the other hand, are lenses with complex curved surfaces, offering excellent aberration correction and thereby providing superior resolution performance. Aspherical lenses can be made smaller, lighter and in general, better than similar lenses which employ only spherical elements.

FROM THE FIELD

The proof, of course, is in the pudding, or in this case, on film. Cinematographers who have already used the Master Primes are enthusiastic. Bill Bennett, ASC, one of the first to test the Master Primes, put it like this: „These are spectacular lenses, especially considering how fast they are. You guys have done the impossible; you have made them faster and at the same time improved the optical quality! People are going to be shocked because of how good and fast these lenses are. In my tests they looked optically better at T1.3 than other primes at T2!“



Cinematographer Bill Bennett, ASC
(Photo: Michael Helms)

CONSISTENT PERFORMANCE

Most prime lenses get visibly darker in the corners, where they also lose resolution. The Master Primes exhibit an extremely even illumination across the whole Super 35 frame and retain high resolution all the way from the center to the edges. Even more exciting, they can deliver this optical performance wide open and at their close focus setting. With this consistency across frame, T-stops and focus range you can concentrate on the images you want to create instead of having to adjust your style to the shortcomings of your lens.

SPECIAL OPTICAL EFFECTS

The use of aspherical elements and exotic glass types with “anomalous partial dispersion”, like fluor crown and barium dense flint, greatly reduces chromatic aberration. This not only improves the overall image quality, but also leads to better chroma keys. Since the Master Primes have almost no visible geometric distortion, their footage can be matched easier with computer generated imagery than the footage of conventional prime lenses.

COLOR MATCHING AND IRIS LEAVES

The whole set of Master Primes are Super Color Matched, so the cinematographer is able to concentrate on creating a look rather than matching lenses in post. Additionally, the iris opening of each Master Prime is created by at least nine high precision leaves, resulting in round and natural looking out of focus highlights.

The Master Primes' iris opening stays consistently round and symmetrical over the whole T-stop range, which translates into natural and pleasing out of focus highlights (left), here compared to those of other manufacturers (right).





The Lens Data Display for Focus Puller (LDD-FP) can be used wired or wirelessly, showing accurate lens and camera information as well as an interactive depth of field bar graph.

BUILT-IN LENS DATA SYSTEM

All 12 lenses have the Lens Data System built-in, showing real-time lens status and depth of field information either on the video assist or on a dedicated Lens Data Display. The Lens Data System gives assistants an extra edge to work faster and more securely, especially when the camera is in remote situations like on a crane or Steadicam.

The Master Primes can be used on cameras that have built-in LDS contacts, like the ARRICAM Studio, ARRICAM Lite, and ARRIFLEX 435 Xtreme. Through an optional external connector and the use of the Universal Motor Controller UMC-3, Lens Data System features can also be enjoyed with the Master Primes mounted on any camera with a standard PL lens mount.



LENS ERGONOMICS RE-THOUGHT

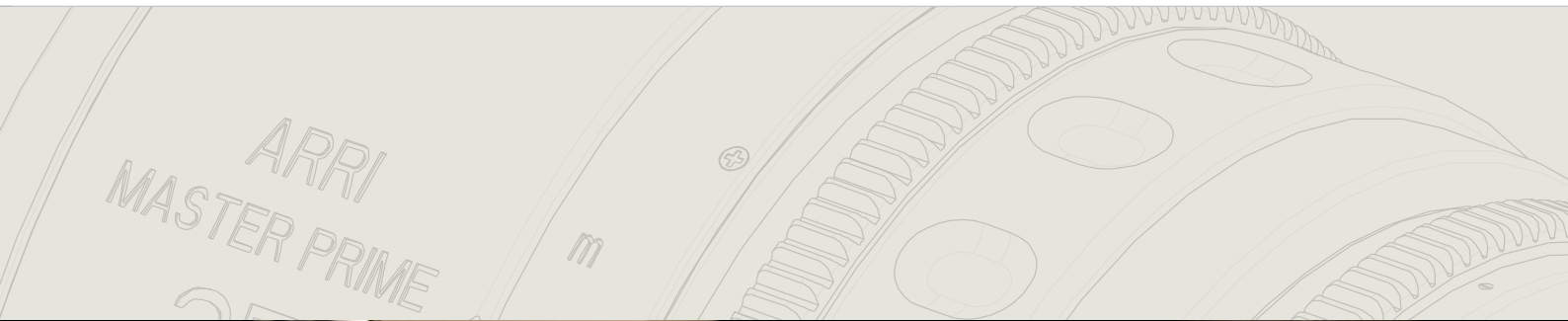
Camera assistants will appreciate the cam driven optics for an extended focus scale with more space between focus marks for distant shots. In addition, all focus scales are individually calibrated and engraved with large fluorescent markings for better visibility in low light conditions. Torque (the amount of strength needed to rotate a lens ring) has been temperature stabilized and carefully set for the best combination of easy movement and a secure and smooth feel. To allow the assistant to work quickly and comfortably with the Master Primes, the shape of the lens housing has been optimized for the greatest number of lens motor combinations. All Master Primes use internal focusing, have a uniform front diameter of 114 mm/4.5 inches and focus and iris rings are all in the same position. Thus matte box, follow focus and lens motors can remain in exactly the same position for each lens change.

BETTER HANDLING IN RENTAL

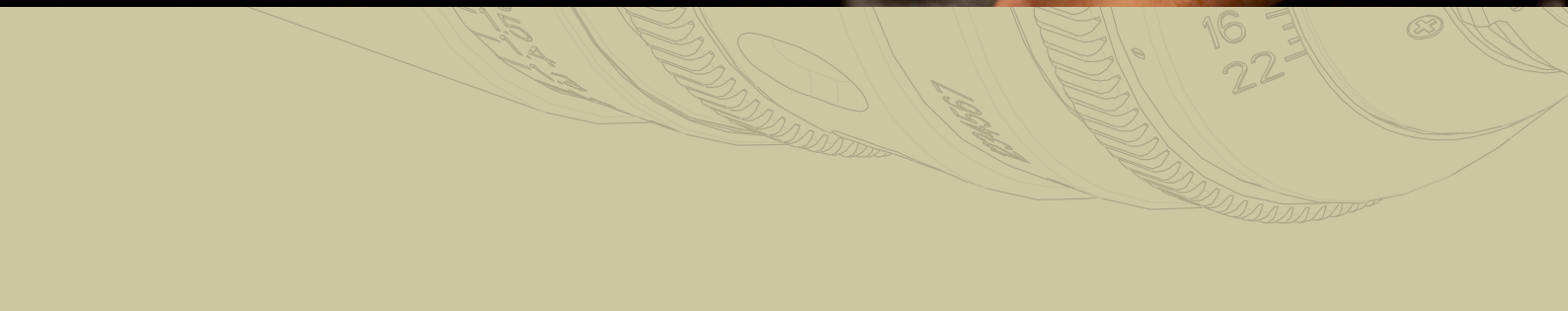
Discussions with rental houses have led to further improvements. The focus ring of the Master Primes, for example, has highly accurate scales for both feet and meters engraved. By removing and reversing the focus ring, rentals can quickly switch between meters and feet. Their rugged construction keeps the lenses functioning even under adverse environmental conditions, but if they should get damaged, serviceability has been improved. Various repairs can be performed without an optical re-adjustment, including exchanging the front ring, exchanging iris and focus rings and adjusting or exchanging LDS components. To avoid unsightly scratches, all gear surfaces have been specially hardened with a Permatur™ surface treatment, making them ten times harder than traditional gear rings.

MASTER DIOPTERS

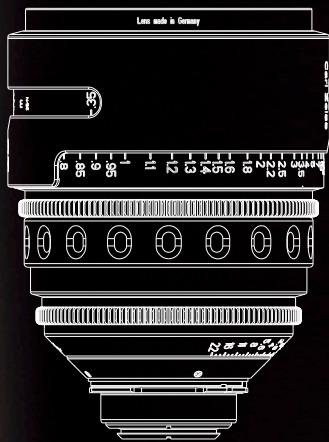
The Master Primes are accompanied by a set of achromatic close focus diopters that allow the crew to quickly grab an extreme close up or get a wide angle shot with shallow depth of field, all with unprecedented sharpness and contrast and without the optical aberrations of traditional diopters. The three Master Diopters (+0.5, +1 and +2) are optically matched to the Master Primes for optimal color, contrast and overall image quality. However, since their optical quality is far better than that of conventional diopters, they can also be used with most Ultra Primes, the ARRI/Zeiss Lightweight Zoom LWZ-1 and other lenses with excellent results.



An extended focus scale and individually calibrated and engraved bright fluorescent focus marks improve the ergonomics of focus pulling.



Both metric and imperial scales are engraved on a single focus ring which can be easily removed and reversed to switch between feet and meters.



SPECIFICATIONS

Name	Type	Aperture	Close focus (5)	Length (lens mount to front)	Front diameter
Master Prime T1.3/16 mm	Distagon T* XP	T1.3 to T22	0.35m / 14"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/18 mm	Distagon T* XP	T1.3 to T22	0.35m / 14"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/21 mm	Distagon T* XP	T1.3 to T22	0.35m / 14"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/25 mm	Distagon T* XP	T1.3 to T22	0.35m / 14"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/27 mm	Distagon T* XP	T1.3 to T22	0.35m / 14"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/32 mm	Distagon T* XP	T1.3 to T22	0.35m / 14"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/35 mm	Distagon T* XP	T1.3 to T22	0.35m / 14"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/40 mm	Distagon T* XP	T1.3 to T22	0.4m / 16"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/50 mm	Planar T* XP	T1.3 to T22	0.5m / 20"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/65 mm	Planar T* XP	T1.3 to T22	0.65m / 2'3"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/75 mm	Sonnar T* XP	T1.3 to T22	0.8m / 2'9"	205mm / 8"	114mm / 4.5"
Master Prime T1.3/100 mm	Sonnar T* XP	T1.3 to T22	1m / 3'6"	205mm / 8"	114mm / 4.5"

(1) Horizontal angle of view for an ANSI Super 35 Silent camera aperture (aspect ratio 1:1.33, dimensions 24.9mm x 18.7mm / 0.980" x 0.7362").
Ground glasses available for ARRICAM, ARRIFLEX 235 and all 435 and 535 models.

(2) Horizontal angle of view for a DIN Super 35 Silent camera aperture (aspect ratio 1:1.33, dimensions 24mm x 18mm / 0.944" x 0.7087").
Ground glasses available for ARRIFLEX 235 and all 435 and 535 models.

(3) Horizontal angle of view for a Normal 35 Academy camera aperture (aspect ratio 1:1.37, dimensions 22mm x 16mm / 0.8661" x 0.6299").
Ground glasses available for ARRICAM, ARRIFLEX 235 and all 435 and 535 models.

(4) l' is the radius of the image circle needed for the respective format. It is the same as the distance from the image center to a corner.

(5) Close focus is measured from the film plane.

T* XP is the trademark for the improved Zeiss anti-reflex lens coating that reduces veiling glare and other reflections.
XP stands for extended performance.

ARRI MASTER PRIME

100

Carl Zeiss

Weight	Horiz. angle of view ANSI Super 35 (1) l'=12.45mm (4)	Horiz. angle of view DIN Super 35 (2) l'=12.00mm (4)	Horiz. angle of view Normal 35 (3) l'=11.00mm (4)
2.2kg / 4.8lbs	77.0°	75.0°	70.2°
2.2kg / 4.8lbs	70.6°	68.6°	64.0°
2.4kg / 5.3lbs	62.1°	60.2°	56.0°
2.3kg / 5.1lbs	53.8°	52.0°	48.2°
2.2kg / 4.8lbs	49.2°	47.6°	44.0°
2.3kg / 5.1lbs	43.6°	42.0°	38.8°
2.2kg / 4.8lbs	39.4°	38.0°	35.0°
2.3kg / 5.1lbs	34.8°	33.6°	31.0°
2.7kg / 5.9lbs	28.2°	27.2°	25.0°
2.6kg / 5.7lbs	21.8°	21.0°	19.2°
2.8kg / 6.2lbs	18.8°	18.2°	16.6°
2.9kg / 6.4lbs	14.2°	13.8°	12.6°

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