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New Perspectives in an Old Port

Christian Merten works with striking perspectives and offbeat subjects. The Hamburg-based photographer, who specializes in fashion, cosmetics and portrait shots, tested the Carl Zeiss Distagon T* 3,5/18 ZE for Canon on a cloudy day in the Port of Hamburg.

**CLN:** You recently put the new Distagon lens through its paces. What were your impressions?

**Christian Merten:** This super wide-angle lens opens up a new dimension and hugely expands your photographic perspective – and I mean that both literally and figuratively! This is a lens that allows you to give free rein to your creativity on a wider scale, making exquisite little moments look really quite remarkable.

**CLN:** What subjects and backdrops did you choose for the test?

**Christian Merten:** I am typically a photographer who specializes in fashion and beauty shoots, so I was keen to focus on this theme for the Distagon test, too. That’s why I decided to get in touch with the fashion designer Birte Weiner, so that we could put together some ideas on how to showcase her collection in a novel and interesting way. She is a student at the Academy of Fashion and Design in Hamburg, and the clothes she designs cry out for airy, spacious settings. Where better to present clothes like that than the Port of Hamburg! Solid bridges, rustic-style backdrops, sweeping views...

**CLN:** What were you expecting from the lens?

Christian Merten: ZEISS lens are renowned for their top-notch precision. So my expectations were correspondingly high for my outing with the new Distagon T* 3,5/18 ZE.
CLN: So how did the lens perform in the Port of Hamburg tests?

Christian Merten: The lens totally fulfilled my expectations with regard to lens speed, sharpness and color rendition. It helped us to achieve top quality results that did justice to our original ideas. It lets you tinker with sharp focus and blur, and the lens copes brilliantly with backlighting. Colors are superbly rendered in natural tones. What a difference in quality compared to the results produced by other lenses! I am genuinely impressed; the Distagon T* 3.5/18 ZE has really been quite a revelation. And it’s great to be one of the first people to have tried out the very latest ZEISS lens!

Following the Distagon T* 3.5/18 ZE, Carl Zeiss now presents the second super wide angle lens with an EF bayonet: the Distagon T* 2.8/21 ZE is ideal for architecture photography and landscapes.
Carl Zeiss SLR Objective Lenses:
The Lenses for Digital Video and Photography

The briefly flashing eyes of the hero, the crumbling asphalt of the urban street canyon in which he’ll soon vanish, the unknown being gradually appearing in the foreground. Narration through pictures is always a matter of the technique used. Details and effects, such as the look of the film or the follow focus captivate the audience and pull the observer right into the action. Amazing effects can be realized in films and photography using the SLR objective lenses made by Carl Zeiss if you capitalize on their special features and follow one or two tips.

Video or film look?
The unmistakable look of moving pictures is the result of tiny details: for example, the color fidelity that is particularly evident in the hues of skin color, the specific aesthetics of movements captured at 24 frames per second as compared to the frames of TV, and the lower depth of field which makes the cinematic presentation of objects possible.

The low depth of field is a particularly attractive design tool, but at the same time a true challenge of digital cinematography. When the surroundings are imaged out of focus, the view of the observer is automatically directed to a point of interest which the cameraman can deliberately extract from the surroundings.

For a long time, low depth of field remained a domain of 35 mm film. This is due to the laws of physics as the comparatively small sensors of digital video cameras (1/3 to 2/3 of an inch in size) do not allow for low depth of field. Consequently, 35 mm film allows a person in a room to be set apart from the furnishings by the deliberate use of low definition.

The moving picture thus attains a soft aesthetic appearance, a grainy look – a smooth, non-digital overall image with no hard edges. The grain of the ground-glass screen introduces blur as a result of the motion blur of the screen. In this context, the rotating speed and the type of surface must be selected carefully to ensure that the image does not appear mushy or diffuse. Since the intermediate image needs to be flipped – i.e. unreversed and upright – another optical component, the flip module, is required. The back focus – i.e. focusing onto the imaging surface of the screen – must be set and fixed with high precision by the filmmaker to ensure that the images do not blurred.

This procedure also generates the desired depth of field in digital films. One crucial drawback is that the complex set-up leads to a loss of light intensity equivalent to up to three aperture stop settings. Considering that HD video cameras already have difficulties in low light conditions, this is a further shortcoming.

P&S-Technik (Germany) and later included in the products of Redrock (USA) and SG-Pro (England). The digital video camera captures a 35 mm intermediate image that is reproduced on a rotating ground glass screen by a high-speed camera lens. Particularly popular in this context are the purely manually-operated Canon-FD lenses and the manual Nikon lenses of the past.

Depth of field via adapters:
high effort, low-light transmission power
One way of attaining targeted blurring in digital films is the use of DOF adapters (DOF: depth of field). The best known approach to this issue was first provided by Thoralf Abgarjan produces multimedia content for music and advertising: music composition and production for Expedia.de, Exquisa, Erdinger, ADAC, ÖAMTC, film projects for Koch-Universal, Musik-Media-Verlag, YAMAHA, ADAC, ÖAMTC and many others.
Depth of field without tricks: the full-format sensor is key
The Canon EOS-5D Mark II is the first camera to enable cinematographic depth of field without additional loss of light intensity, a feature that makes it truly useful for professional filmmaking. The most interesting feature of the EOS-5D-Mark II to the video photographer is optical imaging onto a full-format sensor with the same geometric dimensions as 35 mm analog film. The recording is in full HD: progressive 1080p.

The camera initially utilized some kind of semiautomatic system which made it quite difficult to manually set the aperture stop. This was impractical for professional use, but this handicap was remedied with the release of the eagerly awaited firmware update 1.1 in June 2009. Aperture stop, ISO sensitivity and exposure time can now be set independently of each other in the manual mode. For filmmaking, the camera features sensational low light behavior. Even at night, exposures can be taken without any significant noise – provided you have a high-speed lens. One drawback is that the camera only offers a fixed frame rate of 30 fps, making users anticipate the next firmware update that will accommodate the frame rate of 25 fps in Europe.

Fixed focal length or zoom? Dedicated objective lenses for video-photography
Fixed focal length lenses have tremendous advantages over zoom lenses – especially in digital videography. Their speed is at least twice as high: the Canon EOS 5D Mark II excels through its superior low light behavior. It is therefore self-evident that only the fastest lenses, i.e. 1.4 - 1.2., should be used with the unit because even the most sensitive sensor is useless if too little light passes through the lens.

Working in full HD, you need to have razor-sharp images. Fixed focal length lenses produce much sharper images than zoom lenses and tend to exhibit less distortion at the periphery. This applies, in particular, to the Zeiss T* lenses. Moreover, fixed focal length lenses tend to exhibit substantially less „pumping” than zoom lenses. Pumping is observed when the geometry of the object appears to change while focusing. However, only the sharpness should shift while focusing, not the dimension of the image recorded.

Common and important fixed focus lengths:
The most important fixed focal lengths are 50 mm (the normal lens), 28 mm (wide-angle for landscapes and indoors), and the 85 mm telephoto lens which excels in portrait photography and „over-shoulder images” in which a person in the foreground is deliberately kept out of focus.

Autofocus or manual focus?
A film-maker uses selective focus mainly for scene design purposes and therefore as a creative element of style. For this reason, camera lenses are used in the manual mode exclusively in videography even if they feature autofocus. In addition, all autofocus strategies fail in high quality videography such as measuring fields and face recognition. Although lenses for SLR cameras can be switched to manual mode, this is basically only a minor application. They often run imprecisely, or even with substantial play in the worst case, and the focal points that are so important for videography are difficult to reproduce.

Purely manual lenses such as the ZEISS lenses are designed for manual focal adjustment. They offer much better precision than manually operated autofocus lenses.
Why lenses from ZEISS are particularly well-suited for videography:

- Carl Zeiss lenses are characterized by their high speed and are designed solely for use as manually adjusted lenses – ideal for videography.
- They produce razor-sharp images and enable selective focus. Their maximum aperture of 1.4 is optimal as larger aperture stops such as 1.2 have such a small focusing range that the overall image appears blurred. Limitation to 1.4 is therefore a realistic value.
- The lenses come with an excellent manual focus ring whose motion is perfectly suited for follow-focus.
- The lenses have a special look, the images appear fresh and the bokeh effect (area of blur) appears very classy. The bokeh plays a particularly important role in the overall impression of the image.

Accessories for videographers

As soon as you start working with the new ZEISS lenses, you develop a desire for selective focus adjustment. The following accessories are helpful and recommended for this:

1. Rig, lifting the camera to the standardized level of the optical axis and facilitating the attachment of follow focus and matte box
2. Follow focus: despite the precise motion of the focus ring, it is difficult to smoothly and precisely adjust the focus using the lens ring. The follow focus should be as precisely as possible. Only then can the capabilities of these sophisticated lenses be fully utilized.
3. Matte box to eliminate stray light and as a holder for filters such as ND (neutral density, for situations with too much light, sunlight, snow, etc.), polarizing filters (intensify sky, eliminate reflections) etc.
4. Monitor for focus assessment, preferably with „peaking“ display of the focal point using other colors

Based on the technical data alone, it is difficult to explain the differences in pricing of the accessories which are substantial in some cases. It’s the details that count: for example the direction of focus shift. The follow focus supplied by Munich-based Chrosziel has a reverse gear drive which I find extremely important. The intuitive component offered by a reverse gear drive should not be underestimated. Intuitive means that you rotate forwards to move the focal point farther away. The precision of the rig is evident from the firm and fixed attachment of the parts and by how easy they are to disassemble when needed without hurting your hands.

Chrosziel was kind enough to custom-manufacture a gear ring for my 50 mm lens – I cannot imagine better customer service. It has come to my attention that Chrosziel is considering adding fixed gear rings to their product line for ZEISS lenses. The crank on the follow focus is also very convenient and important to me: it makes it much easier for me to overcome the limited range of angles that can be set with my left hand. The monitor with peaking function is indispensable as it allows me to assess the focus properly. Chrosziel supplies the matching solution in an additional kit for this application as well.

Objective lenses for videography and photography

The strengths of the lens – such as high-speed, razor-sharp images, a noble look and beautiful background blur – can also be advantageous to
normal photography. Photographers must be aware of the following:

- Snapshots are not a strength of ZEISS lenses since focusing usually takes more time than with auto-focus lenses.
- Planar-T* lenses are ideal for fully designed images with high aesthetic appeal.
- The imaging performance is so good and the images so sharp that checking via the measuring field of the camera does not provide sufficiently accurate feedback although it generally works. The manual assessment of focus via the viewfinder is also problematic, but the „live view“ feature can help. It magnifies the image in the display by a factor of 5 to 10 and you can see how far the measuring field determination or rough setting using the viewfinder are from the true focal point. While this permits perfectly focused images, it takes time. Having a good monitor with a „peaking“ feature significantly simplifies focusing in videography.

**Conclusion**

In my experience, the new SLR lenses from Carl Zeiss are first class and unparalleled in digital videography with the Canon EOS-5D-Mark II. As lenses for purely manual focusing, they are perfectly suited for this application. The brilliant look of the lenses, their crispness, and the stylish bokeh are excellent additions for photography unless you talking about snapshots and not well-balanced, perfectly-designed pictures for which you can takes your time. Nothing here is left to automatic controls! And this feature is the strength of these lenses. The photographer has everything under control and has the opportunity and the means to produce very good pictures.
"That’s one small step for man, one giant step for mankind" – words that would go down in history when Neil Armstrong became the first human to set foot on the moon in 1969. His baggage included a lens from Carl Zeiss. Deployed on a Hasselblad camera, it captured what had never been seen before – the dusty surface of the moon, its barren landscape pockmarked by numerous meteorites, the first footprints in the Sea of Tranquility. NASA also used cameras with Carl Zeiss optics for later trips to the moon. Now, 40 years later, the Space Dynamics Laboratory (SDL) at the University of Utah and the Washington Naval Research Laboratory (NRL) are once again preparing a ZEISS lens for space – albeit with a different mission in mind.

The two institutes jointly developed the prototype of a miniature star camera that will be used to determine the position of extremely small, one-kilogram satellites. The camera will be integrated into nano-satellites where it will take pictures of the stars during flight. A computer program will then compare the size, brightness and arrangement of the celestial bodies in the images with known stars listed in a NASA star catalog. The program can determine precisely where the satellite was when it took the picture. The new star camera is based on an SDL camera model known for its particularly accurate target localization and extremely low energy consumption. The prototype will demonstrate its capabilities during a test flight on the International Space Station.

The costs and development time for such a camera are enormous. The scientists wanted to use existing lenses and modify them for the current job in order to keep costs to a minimum. They put to the test three lenses from different manufacturers. The Planar T* 1,4/85 ZF-I was quickly identified as the best of the three. In the industrial version of the ZF lenses, the focus ring and aperture can be fixed with just five screws. Furthermore, Carl Zeiss supplied the institutes with very detailed information on the lens, which was vital for the successful modification. The first-class quality of the lenses, for which Carl Zeiss is known the world over, also played a key role.

A lens has to take a lot of punishment in space. Mechanical forces during launch, temperature fluctuations, pressure and the vacuum of space demand the utmost. Like the moon lens for Apollo 11, the Planar T* 1,4/85 ZF-I was modified to survive in these extreme conditions.

The researchers first took the lens completely apart, and removed the grease, lubricants and cements. These substances, which normally ensure that the lenses remain in one piece and work properly, would contaminate the optics in space. The scientists then took precautions to maintain optimal pressure compensation. To do this, they aired out the spaces between the single lens elements and bored holes in the lens housing to enable air exchange. Finally, they removed the diaphragm that is not needed for the special mission of the camera. After all, every gram and every millimeter counts when it comes to adapting the camerato the size and weight limits of the nano-satellites.
The greatest challenge was properly reassembling the lens after the corrections. Excellent image quality requires each part of the lens to be perfectly aligned and matched to the other components. During production, Carl Zeiss therefore conducts extensive measurements and quality controls after each step to ensure the high quality.

As a result, a ZEISS lens is once again making its way into space. It is uncertain if it will ever return to the earth – weight limits have forced astronauts to leave many cameras and lenses behind over the past 40 years.

Additional holes are drilled to enable air exchange which enables optimal pressure compensation.

The finished camera module must deliver excellent image quality despite the modifications.
Strong Portraits in Near Darkness

There’s just something about abandoned buildings. Where people used to live and work; where the machines have long been silent. Silence spreads like wildfire. The relics of the past are literally peeling, decaying, and covered in leaves and dust, but somehow still present. When I am out on the road, I am always on the lookout for old factory buildings, warehouses and deserted train stations. If I notice an interesting site, I immediately think of ways to take pictures. It often takes a bit of courage to climb in, get dirty and explore the old ruins. Every discovery is exciting: what is hiding behind the next door?

Because of my passion for dilapidated buildings, I took my ZEISS Planar T* 1,4/50 ZE and Distagon T* 2,8/21 ZF lenses with me into the abandoned buildings and tested how well they capture the room and work to perfection with so little light.

The first shoot was in an empty structure near Stuttgart. The light was not good, however, the Planar T* 1,4/50 ZE certainly proved its metal in the gloomy ambience. I obtained high image quality even at full aperture. When taking portraits, I like to work with the contrast created between focused and blurred areas because it adds a very distinctive character to the picture. I liked the strong, selective definition achieved with the lens. I was also impressed by the astoundingly natural color rendition.

I then tested the Planar T* 1,4/50 for pictures in an old train station in Stuttgart. In portrait photography, the objective is to embed the models in their environment, to come to terms with the lighting and to find the right image composition. While taking pictures against this backdrop, I wanted the few light areas to lift the model out of the darkness. The lens did a very good job of capturing the contrasts, resulting in really breathtaking images. I was impressed.

Finally, I used a Distagon T* 2,8/21 ZF in an old building near Berlin. I usually use 50 mm lenses for portraits because they make it possible to generate a feeling of closeness. However, if space is to be a key element of the composition, I need a wide-angle lens that captures the
dimensions. The super wide-angle enabled me to completely capture the large room and infuse the image with enormous depth. Despite the difficult lighting conditions, I was once again able to achieve fantastic image quality.

The fixed focal length of the ZEISS lenses turned out to be perfect for portraits. With manual focusing, you work more carefully and know precisely when you press the trigger.

As a result, you are more likely to capture that special moment. There are certainly situations, such as glare, when manual focusing can be a bit tricky. However, the precise setting possibilities are a clear advantage when I want to specifically showcase a subject. My models should not have empty faces but appeal to and engage the observer. People, composition, details, light and colors must interact perfectly. When I succeed in showing character and vibrancy, the portrait is a success.

**Delia Baum** takes amazing portraits in the nooks and crannies of abandoned buildings. The young photographer from Leonberg, Germany, tested the Planar T* 1,4/50 ZE and Distagon T* 2,8/ 21 ZF lenses with a Nikon D3 in her favorite environment. At first she found working with a fixed focal length a bit unusual, but soon became a fan. Delia Baum is 22 and is currently learning to be a photographer at the René Staud Studio in Leonberg.
What is distortion?

The majority of camera lenses produce images in line with the laws of central perspective. This kind of projection of three-dimensional space onto a two-dimensional image surface is also called gnomonic projection. This Greek term (gnomon = gnomon = shadow-producing rod) denotes a type of sundial because, as with a sundial, an image point is produced by connecting a point in the object space to the center of the projection using a straight line; the image point is where this straight line intersects the flat projection surface. The center of projection of the image is the tip of the rod used by Dürer’s artist to draw attention to the charms of the young lady in this picture. The projection surface is the frame fitted with a grid placed between the two and is used by the artist to transfer the image points onto his drawing paper with the proper perspective.

The center of projection of camera lenses is their entrance pupil, i.e. the image of the aperture stop viewed from the front. When taking panorama photos, it is necessary to swivel around the entrance pupil to ensure that objects in the foreground and background are not shifted with respect to each other.

This special point is often also called the nodal point, but it has a very different meaning in optics. There is nothing particularly mysterious about the entrance pupil either, since anyone can see it without any special aids and estimate its approximate position. However, the entrance pupil is not the physical aperture stop, but rather its virtual image – and as such may even be situated outside the lens altogether. This is often the case with short telescopic lenses.

The gnomonic (central perspective) projection has a special feature where all straight lines of the object space are reproduced in the image as a straight line regardless of where they are situated and to where they are projected.

Distortion is defined as an image aberration in which this property is no longer exactly fulfilled. A lens that exhibits distortion produces slightly warped images of lines that do not pass through the center of the image.