Technical Guidelines

Adapter Choice

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Which adapter plate do I require?

The LiteRing attaches to your camera via an adapter plate that screws into the filter thread on the front of the lens. So that we can supply the correct adapter plate, you will need to ascertain the diameter (in millimeters) of the filter thread.

The filter thread diameter is almost always indicated by a legend printed on the front of the lens barrel, often indicated by the Ø symbol followed by the diameter in millimeters. For example, Ø 52mm indicates a 52mm diameter and would require a small LiteRing with a 52mm adapter. If there are no markings on the lens, then check the specifications page of the operating instructions that came with your camera/lens as the filter diameter is usually indicated there.

Should the filter thread be non-standard to our range of adaptors, step up or step down filter rings are available to accommodate intermediate sizes.

Some lenses - especially primes, cine style or ultra wide angles - may not have a filter thread. In this case an alternative clamp fixing for the LiteRing is available, as is a bracket that can be used with matte box rails.

Some cameras may need more specific solutions due to the filter thread being recessed or due to parts of the lens mechanism, microphone or viewfinder obstructing the fitting of the LiteRing.

Consult your dealer for solutions if you feel this may be the case.

More information will be available from the lens manufacturer's website.

All-in-One Bundles

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Reflecmedia has combined some of its essential products to offer a simple and effective all-in-one studio bundle solution. Equally at home on the road and in a small studio or classroom, these bundles give you all the items needed to create a chroma key studio anywhere. It is an easy, portable and cost effective solution for schools, small production houses, corporate, iptv, videographers and photographers everywhere.

Each bundle has been specifically designed to be easy to operate, small enough to take anywhere and to create full body shots wherever you are. They all have the required Chromatte background and LiteRing kit for your camera. They are the complete package for photographers looking for a simple and effective solution for product, event or model shots or indeed any greenscreen or knockout photographic shots.

There are three bundles available:

- **RM7225 Deskshoot Lite All-in-One Studio Bundle**
- **RM7221 Chromaflex All-in-One Studio Bundle**
- **RM7227 Wideshot All-in-One Studio Bundle**

Each bundle comprises:

Either a Chromaflex, a Deskshoot Lite or a Wideshot plus all the following items;
1 x Standard LiteRing kit of choice
1 x BaseMatte and tape (2 with the Wideshot)
2 x iZtac lights and stands with cables
2 x Backlights with cables
1 x Curtain support stand

Camera Basics

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In order to get the quality and style of pictures you desire from your camera, it is important to understand some of the basic lens and camera settings that control exposure. These fundamental principles remain the same whether you are using a stills camera, camcorder or an HD video camera.

Each parameter will interact with the others to affect the overall look of the picture.

Zooms, Primes and Focal Length

The focal length of a lens (in millimetres) produces a field of view for that lens (in degrees).

Zoom lenses have a variable focal length and can thus adjust the field of view (the framing of a shot) without moving the camera. A zoom lens with focal lengths ranging from 7mm to 70mm is normally referred to as a 7 x 10 zoom.
Prime lenses have a fixed focal length and therefore the framing of the shot is fixed and can only be changed by either moving the camera or changing the lens.

A long focal length results in a narrow field of view, a short focal length a wider the field of view.

Aperture/Iris

Light passing through the lens onto the camera imaging chips is controlled by the aperture or iris. The lens iris works in the same way as the iris in the human eye and controls the light by increasing or decreasing in diameter. The relative size of the aperture is represented by a series of numbers called f stops. A small f stop represents a large aperture and thus passes more light than a small aperture represented by a larger f number. A lens could be typically marked as follows:

More light 2 2.8 4 5.6 8 11 16 22 less light

Each change of f stop represents a doubling or having of the light to the camera.
The iris can usually be operated both manually and automatically.

Depth of field

When a lens is focused on a subject there appears to be an area both in front and behind the subject that remains in focus. Beyond these areas the image becomes increasingly defocused. The area in focus is known as the depth of field. DOF can be used to great effect to isolate a subject from its background or to change the viewers' point of interest by changing focus between foreground and background subjects, known as pulling focus. Depth of field is a result of the interaction between focal length and aperture

Narrow depth of field comes from longer focal lengths and wider apertures, whilst wide depth of field is a product of shorter focal lengths and narrower apertures.

Shutter

All types of digital cameras have an electronic shutter that has a similar effect on exposure to that of the traditional mechanical shutter. Increasing the shutter speed will decrease the light into the camera. With respect to say 1/50 a speed of 1/100 sec represents a halving of light to the camera. The shutter can also be used in the control of depth of field as the iris will have to be opened to compensate for the loss of light, as a result of the increase in shutter speed thus reducing depth of field.

The faster the shutter speed the less light enters the camera.

Gain/Sensitivity

All cameras can be increased in sensitivity by increasing the ISO setting or switching in electronic gain. This increase can correct under exposure issues. An increase in gain will also increase picture noise or grain and make the pictures more contrasty.
Gain should be used sparingly and should not be used as an excuse to not light the subject.
Some cameras may have an automatic gain function that should be disabled if you wish to have control over the exposure.

White balance

In order that a camera reproduces the colours in a scene correctly under different lighting conditions, the individual RGB channels within the camera have to be adjusted. By exposing the camera to a reference white, the RGB values can be adjusted to give a true white. This process is known as white balancing. A camera may do this automatically at switch on, another may require the operator to press a button or select a menu item in order to start the AWB. With some cameras the white balance is continually monitored and the camera will continually adjust for changes in colour temperature, this is referred to as Auto Tracking White or ATW. Most cameras will also have white balance presets for standard lighting conditions such as daylight, tungsten and fluorescent.

Cameras and Operators

Most Pro-Sumer cameras have lots of menus to master and are often much more difficult to adjust than professional cameras which use physical knobs and switches to both operate the lens and setup the camera.
Spend time to find out how the zoom, focus, iris, shutter, gain and white balance are adjusted on the camera you will be using.

You have better control of exposure and will achieve more repeatable results when the camera is in full manual mode.

Halo and Shadow

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The function of a retroflective camera system is to cast a key coloured light (usually green or blue) originating from the lens, in the direction of a subject being filmed in front of a retroflective screen. The emitted light covers the camera's entire field of view and thus where the camera “sees” the screen, the coloured key light is reflected directly back down the lens to the image sensor.

You may notice that when using a Chromatte drape or a Chromaflex that there may be darkness around or to the sides of the subject. This darkness, depending on the cause can be identified as halo or shadow or more usually a combination of both. Halo and shadow are both optical effects caused by the physics of the lens interacting with the retro reflective media and are the results of the source of light (specifically, the blue or green litering) being in a different location along the optical path, to the reflected light converging on the film or CCD plane of the camera.

If the iris of the lens was stopped down to create a single point of convergence for the incoming light and the light that was emitted to illuminate the retro reflective screen emanated from this same single point, there would then be no halo or shadow when using retro reflective systems. By deviating or expanding laterally from this position (in the case of an iris), we create halo. By deviating linearly from this position, we create shadow.

Halo

A function of the light source not being a single point in the center of the lens (rather spread out around the lens). This effect is exaggerated due to the iris not being a single point in the center of the lens but rather a variable sized circle of acceptance for the incoming light. Halo is distinctly different from shadow in that it gets brighter as you move away from the edge of the subject and since it is created by the optical imaging system, you can only evaluate it relative to your camera by looking through your camera, not by looking off-axis at the screen with your eyes.

Shadow

A function of the light source (even if it is a single point in the centre of the lens) being in front of or behind the point where light imaged by the camera appears to converge. Maintaining this relationship is made more difficult, by the fact that when you zoom a lens, this convergence point will move closer or farther away, while the retroflective light source remains stationary. Shadow is literally cast by the subject blocking the light that is otherwise illuminating the retro-reflective target. If the source (the litering) is behind the destination (ccd or film plane) then the camera will represent a narrower angle than the illuminator relative to the subject so the shadow of the subject will appear smaller than the subject. Likewise, if the source is in front of the destination, the camera will represent a greater angle than the illuminator relative to the subject and the shadow will thus be greater than the subject.

As there are some obvious laws of physics working against this optimal setup, we attempt to get the best possible results by having the light source and destination both mechanically and optically as close to each other as possible.

Halo and Shadow

The closer the subject comes to the camera the more the effects of halo and shadow are exaggerated, so in many cases, a similar shot framing can be achieved with less halo and shadow by backing off the camera away from the subject and zooming the lens in (or using a tighter prime lens).

In both cases of shadow (whether larger or smaller than the subject) it will probably be visible, and even if the shadow is the same size as the subject, if the light source and lens destination are not single points, there will also be halo.

Optimized camera set-up for required exposure range:

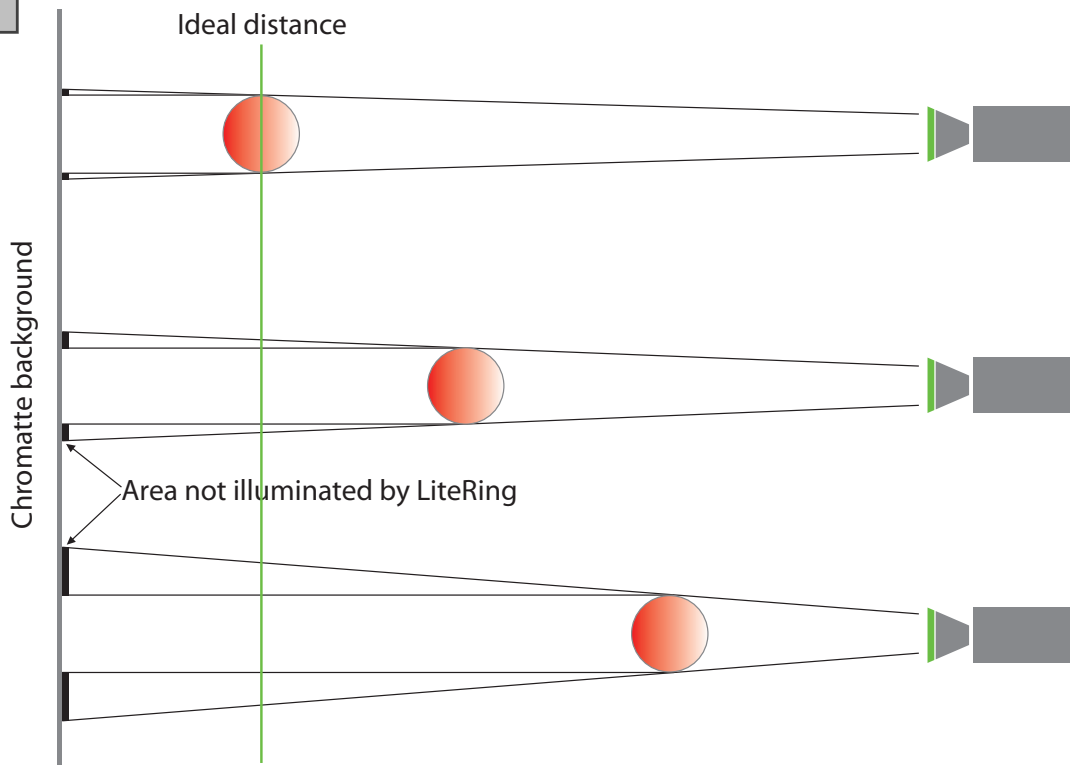
Halo is a function of the retroflective light source not being in the center of the lens, and the iris being opened wider exaggerates it. In situations where you can not reduce halo to an acceptable level, it is often effective to close down the iris to reduce its effect. Consequently, there will be a reduction in exposure. More light can be added to bring the exposure back to the previous level, without adding to the halo effect.

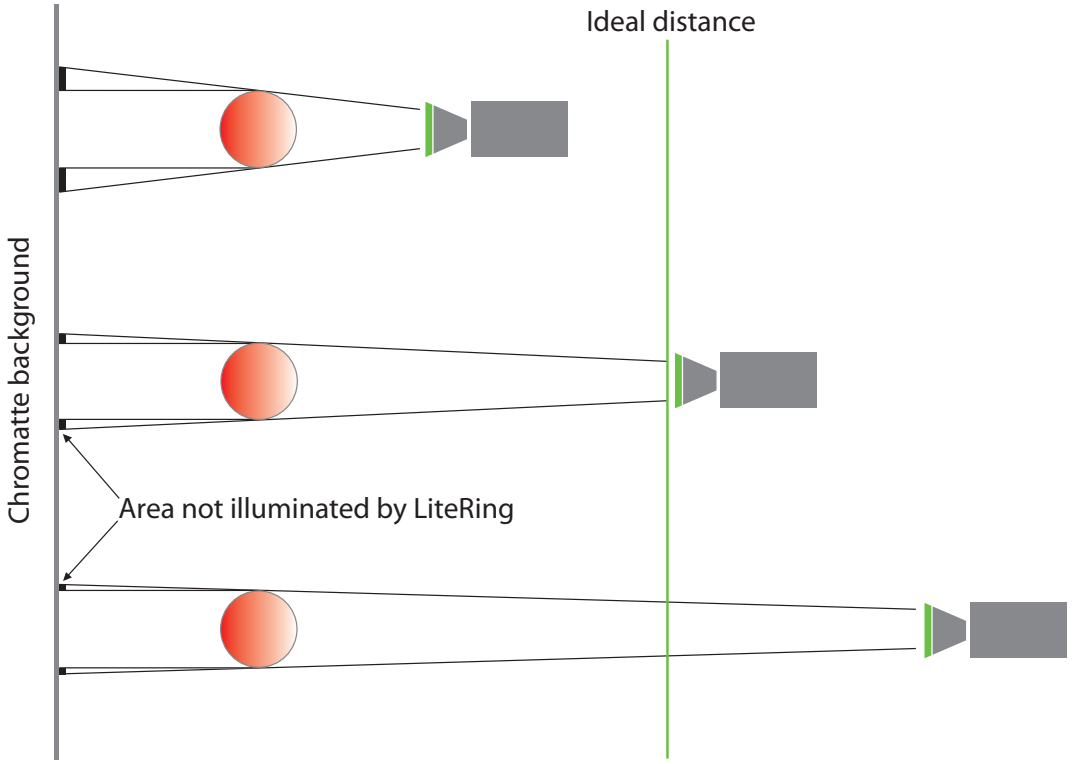
Optimized camera set-up for required zoom range:

Considering the fact that the destination point of the lens changes when you zoom, you cannot hope to have perfect linear placement of the litering across all zoom ranges. This sometimes results in one end of the zoom range having a greater shadow by product than the other. In this case, assuming that the mechanical design will allow, it may be possible to shift the litering to a more optimal location along the lens axis causing the shadow to be reduced to a minimum where you need it most, at your most critical zoom range.

It is important to note that in most situations where halo and shadow appear, it is not because the scene can be shot in a way that allows one to completely avoid halo and shadow, but rather because the layout of the shot (including the retroflective screen, litering, subject and camera) has not been setup with the goal of minimising the effects of halo and shadow. If the person responsible for creating the key is aware of the above issues, an optimal image may be achieved.

Halo and Shadow





Lighting Basics

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Subject lighting is important to us for several reasons both technically and creatively. At its most basic we light to **illuminate** a scene simply so that the camera can "see" the subject. When light falls on an object some of this light is reflected back to the viewer, the direction and the amount of light returned depends on the reflectance of the object and gives the object its luminosity or brightness. Even modern image sensors cannot resolve the vast contrast range that the human eye can and so we use lighting to **control the contrast range** in a scene (the **contrast ratio**). By lighting up dark areas or holding back highlights, the camera can cope with a ratio of about 40:1. Designers can also assist lighting by choosing a limited range of luminance values for the colours in sets.

We also utilise lighting to **create** mood and atmosphere. Sensitive use of position, intensity, colour and texture will enhance the look of the scene.

How we define light

Brightness

This is the often represented by the power of the lamp measured in watts. More correctly the brightness should be represented by lumens, lux or foot candles. The light falling on the subject is referred to as the incident light and the light emitted from the subject as the reflected light. The brightness of a light can be varied by using a dimmer, by altering the light to subject distance or by selecting alternative wattage lamps.

Colour Temperature

This is the hue of the light source and is measured in degrees Kelvin. The higher the colour temperature the more blue the light appears, the lower the colour temperature the more red the light appears. The human eye is very tolerant to changes in colour temperature and we maintain correct colour vision across a broad range of temperatures. An electronic camera however must be readjusted each time the colour temperature varies. This is known as performing a white balance and is achieved by framing the camera on a reference white card and operating the auto white control. Cameras will also have preset controls for both tungsten and daylight setups.

How we describe light

Texture

This is much more subjective and describes our perception of the shadow edge that the light produces.

Direct light from a focussed or point light source (e.g. the sun) produces defined shadows and is referred to as hard light. Indirect or diffused light (e.g. a bright cloudy day) produces less defined shadows and is referred to as soft light.

Warmth

The colour of light used can create a particular feel to the pictures. A correctly white balanced camera will produce a neutral picture correctly reproducing the colours within a scene. By adding certain colours to a scene we can either warm up or cool down the pictures to create a particular mood or atmosphere.

Simple Three Point Lighting

The Key Light

The key light is almost always the brightest light in a scene and establishes much of the character of the lighting. In many situations the position of the key will be motivated by the lighting we would expect in a scene i.e. motivated by sunlight or by a practical light in the room. The key light is usually a focusable light.

The Fill Light

The fill light is used to light (or fill in) shadow areas in a scene and helps to control the contrast ratio of the lighting. The stronger the fill the less contrasty the scene will be. The fill light is usually placed on the opposite side of the camera to the key and is normally a softlight.

The Back Light

Back lights shine from behind and above the subject and produce an area of highlight or rim around the subjects edge. As TV is a two dimensional medium, the back light can add depth and help separate the subject from the background. Focusable lights produce the best backlight as they are very controllable, however care must be taken to avoid flare into the camera lens.

The Background Light

The background light enables you to light the scene behind the subject. This light can be used to reinforce the direction of the keylight, to suggest the light from a window, or simply illuminate the background itself. Colour added to this light may further reinforce the mood or atmosphere of a scene.

Controlling Lights

You can control a lights effect in a number of ways:

- Move the light towards the subject to increase its effect, away from the subject to reduce it
- Flood the light to reduce its effect, spot it to increase the output
- Use a dimmer to adjust the output
- Change the light to a larger or smaller wattage type
- Use neutral density filter (ND) or scrim on the lights to reduce the output

Q & A

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Q. **Do I white balance with the LiteRing on or off?**

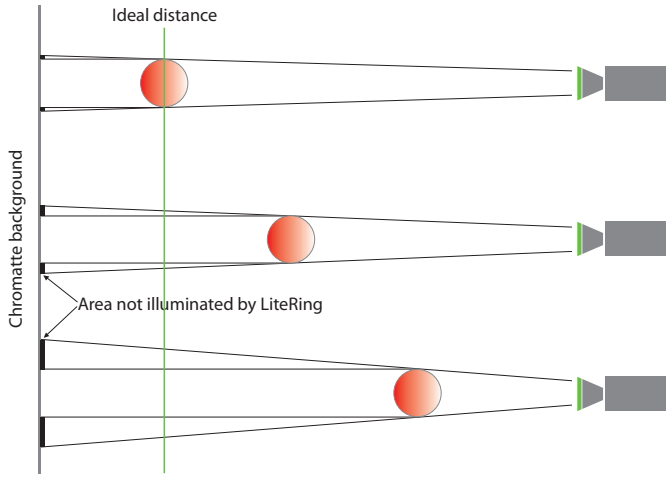
A. You white balance with the LiteRing off. White balancing with the LiteRing on will not give a true representation of the blue emitted from the LiteRing.

Q. **Is there any way to get better results on shooting hair or fine objects?**

A. A lot of new cameras have a detail setting built in, which electronically sharpens the image. This can also be called Core Processing, Contour Setting or Aperture Correction. Most camera presets have the detail setting set at high. Reduce the detail setting to Medium setting.

Q. **I'm getting a darker blue/green shadow around the subject.**

A. The shadow or halo is caused by the returning light from the Chromatte. When the light is emitted from the LiteRing, some of the sateLITE dishes will return light slightly off axis due their random placement. This shouldn't affect the key, however by moving the subject closer to the Chromatte, moving the camera further back or decreasing the level of the LiteRing will reduce the shadow.



Q. **My Curtain appears desaturated. Why is this?**

A. This could be because there is too much light directed at the curtain. Large quantities of ambient light may affect your key. This could also be because your camera aperture and LiteRing controller settings require adjustment. Try opening the aperture slightly and re-white and black balancing the camera. Decrease the level of the LiteRing and your blue/green background should appear less saturated.

Q. **Chromatte appears grainy when I use the green LiteRing. Why is this?**

A. The white signal on a video camera is made up of R (red) 0.3, G (green) 0.59, and B (blue) 0.1. When you white balance a camera the contour processing takes a reference from the green channel. This sharpens the green in the image causing finer detail to be seen in the green channel. This will not affect your key because there is a sufficient amount of equal green to perform a key.

Initial Setup

The distance from camera to subject will depend on the framing of the shot and the type of lens on the camera but typically a distance of about 3 to 5 metres is normal. At greater distances you will have to increase the
LiteRing power or iris the camera open to compensate for the distances involved.

You can place your subject as close to the Chromatte background curtain as you wish. You do not need to leave the large separation from subject to background that is require with a traditional blue screen, however you may wish to leave a small gap (approx. 0.5m) to accommodate the back light.

Before you start to light ensure the camera is set up as follows:

Iris - manual
Gain - 0db
ATW - off
White balance preset or manual white balance

Setting the camera's white balance

Ensure the LiteRing is switched off.
Make sure there are no coloured gels on any of the lights at this time.

If you are using dimmers to control your lights, then set the faders for the key light you use for white balancing to 70% (all lights should be set to this nominal value for initial lighting).

Focus the camera onto a reference white (a test chart / white paper)
Light the white card evenly with your key light
Use the iris to expose the card correctly
Press the auto white button or select manual white balance from the menu

If for any reason you alter the white balance, go through the above process again ensuring the light you use does not have any coloured gels on and that all other lights and the LiteRing are switched off.

ADJUSTING THE WHITE BALANCE WHILST THE LITERING IS ON WILL CAUSE THE BLUE OR GREEN LED's TO INFLUENCE THE COLOUR OF THE FOREGROUND OBJECT/PERSON

Setting your lights to illuminate your subject

The lighting levels required depend very much on the sensitivity of camera you are using, however as a general rule you should be trying to light to around 500 lux. This is typical of an RM7512 iZtac lamp at approximately 2.5m (8') from the subject.

Do not place a key light directly above or on axis to the camera as the light from this lamp could dilute the effect of the Chromatte by creating a hot spot as this can cause the blue/green returned by the Chromatte to be slightly washed out.

Light your talent creatively and do not worry about small amounts of spill from your lighting hitting the Chromatte however it is important to avoid strong spill light from lighting on axis with the camera to fall onto the Chromatte

The use of a steep focussed back light behind the subject illuminating the head and shoulders is also recommended. This light can be placed anywhere behind and above the subject but is normally placed on the same side as the key light to add both direction and separation to the key. Its position may be dictated by the direction of the keylight in the background image you will be adding. The use of two backlights is optional.

Adjusting the LiteRing

Switch the LiteRing on and set it initially to 0 in the Controller. (The camera should iris at approx f2.8 with the controller on "0", any greater than this and you may be using too much light).

Using the viewfinder or a monitor, turn and adjust the LiteRing until the Chromatte appears as an evenly coloured blue or green with some detail still apparent in the cloth. Increasing the intensity of the LiteRing beyond this may create blue or green spill on the talent.

Subtle adjustments to both the Iris and the LiteRing Controller will enhance your results.

Still Photo Guidelines

General guidelines for using Reflecmedia products in still photography

The latest generation of digital stills cameras are also capable of shooting HD video and whilst there are obvious differences between stills photography and video production, the two formats are now similar enough that the use of chroma key technology is becoming more popular for stills applications. This enables photographers to offer the customer a greater choice of creative backgrounds.

Reflecmedia Chromatte curtains and Chromaflex pop-ups offer the professional stills photographer greater ease in capturing the subject with a completely uniform coloured background. This enables the process of separating out the subject, be it person or product, to be achieved simply with a click of the mouse.

Unlike traditional chroma key backgrounds where a great deal of light is necessary to properly illuminate the backdrop, Chromatte's sole illumination is from a low energy LED LiteRing placed around camera lens. No additional background lighting is necessary. The only lighting the photographer now requires is the creative lighting to illuminate the subject.

The nature of retro-reflective photography is that no subject light source should be on axis with the camera lens and so on-camera flashes may not be used and, when using Chromatte, continuous or hot lighting is recommended for lighting the subject.