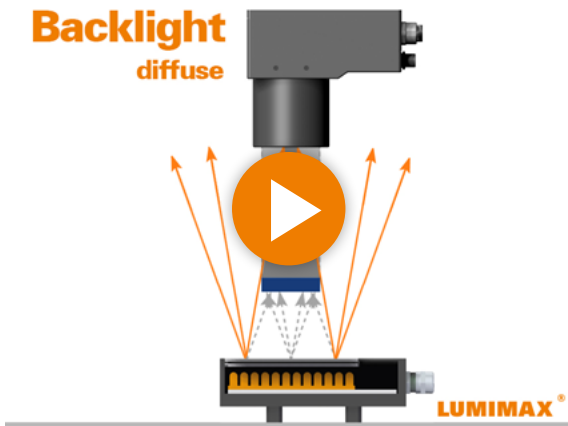


1.5 Diffuse backlight

With this form of lighting, a diffuse light source is positioned behind the object. Unlike reflected-light lighting, this means the contours of the object are lit instead of the object itself.

A "shadow image" is the result. In the shadow image created, the object's outline and (open) inside contours are readily visible. The object appears as a black area in front of a white background. The high level of contrast achieved hugely simplifies the subsequent image analysis.

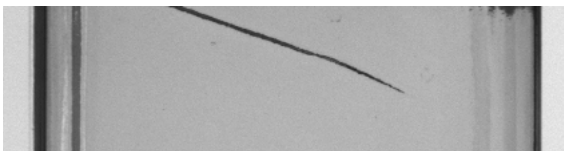


Video can be viewed at <https://www.iim-ag.com/en/lumimax/useful-facts/videos/video-diffused-backlight.html>

Diffuse backlight lighting is primarily used in the following applications:

- Contour inspection
- Presence inspection
- Machined hole inspection
- Orientation/rotary orientation inspection
- Residual soiling analysis

In addition, diffuse backlight lighting is also useful for the imaging of transparent and semi-transparent objects. This can be used to check the fill levels of bottles and jars during filling, for example. With longwave light, this approach even works with transparent liquids such as water. Diffuse backlight lighting is also well-suited to applications requiring the high-contrast imaging of defects or features in diaphanous glass or plastics.



Rotary orientation detection for a glass surface in backlight using an edge in the glass

Both scratches in glass and features such as embossing or grinding can be imaged using this form of backlighting. With the help of polarisation filters, the current range of possible applications now even includes testing glass for stress fractures.

For diffuse backlight applications, the recommended light source is a diffuse, homogeneous form of area lighting. Since the size of the light field must be adjusted to the object size for most kinds of application tasks, large area lighting systems are typically used. New technologies, such as the lateral coupling of LEDs into optical fibre, permit the creation of homogeneous, high-intensity lighting systems with lengths of 1 m or more to a side. This technology is used in LUMIMAX[®] Lighting in the LG series.



Punched part in backlight



Machined hole inspection

Influence of the lighting angle

Wavelengths

Optical filters

Flash vs. continuous

Fluorescence applications

Lighting systems for the reading and verification of codes

Lighting technology for shape-from-shading