

NANOCOMP FLASH LENS, NAFLENS - PERFECT LED LIGHT COLLIMATION

The number of handheld consumer electric devices with integrated cameras and illumination are becoming increasingly common. Camera photoflash requires a collimated light output with high illumination intensity. If this illumination is created by LEDs, a powerful collimation lens is necessary. These flash Fresnel lenses are traditionally manufactured by injection molding, which is susceptible to tool wear, inadequate feature size of circular Fresnel structures, and poor replication accuracy.

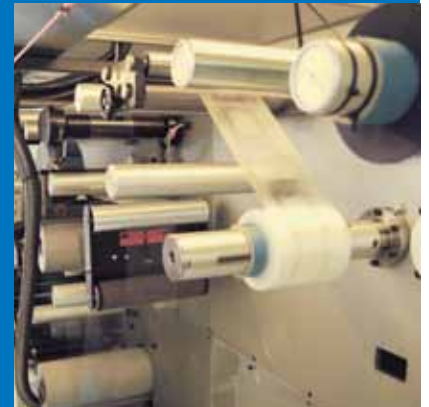
Nanocomp presents NAFLENS, a truly impressive solution for camera flash lenses. In-house design resources combined with a long experience in lithographic and tooling processes allow Nanocomp to produce customized flat photoflash lenses. A full mass production capability of reel-to-reel UV embossing, included in Nanocomp's portfolio, provides the entire supply chain from design to production of thin foil type optical components. As UV-curing also enables the design and replication of more complex structures, NAFLENS is an obvious performance improvement as compared to traditional lens solutions.

How to integrate

NAFLENS comes as a thin plastic film with a Fresnel lens structure replicated onto the other side of the film. The film is typically 0.250 mm thick. Lens size is typically 5 mm x 5 mm, but the size may be customized. Plastic film can be integrated in several ways depending on the customer specific requirements. It may be glued on with adhesive to an injection-molded base or potentially integrated directly during injection molding. One possibility is to insert a hard-coated flashlight lens as the outer layer of the module.

Advantages

- High efficiency compared to traditional IM-flash lenses
- Small feature sizes → light source less visible to end customer
- Uniform and comfortable surface to end customer
- Individual, line and matrix layout
- Flexible, bendable
- Extra thin (< 0.385 mm)



NANOCOMP LTD is a high-tech company with extensive experimental as well as theoretical knowledge on diffractive optics. Focusing on optimization, fabrication and replication of optical components, we carry out continuous research and development to provide versatile services for various branches of industry that use microstructured components in their products.

 **NANOCOMP**

Nanocomp Oy Ltd tel. +358 13 316 616
 Ensolantie 6 fax +358 13 316 617
 FI - 80710 Lehmo, FINLAND www.nanocomp.fi

NAFLENS DATA SHEET

Specifications (example)

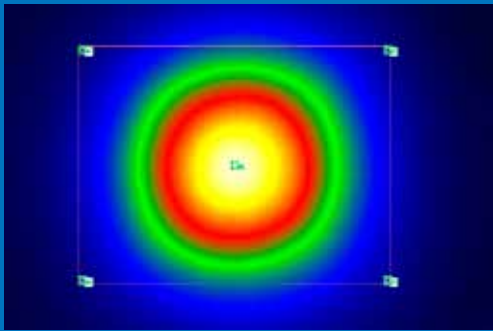
5 x 5 mm square-shaped beam-shaping lens
Thickness: 0.26 mm
Structure on LED side
Refraction index: 1.49
Distance from light source: 1.0 mm
Assumed size of light source: 1 mm x 1 mm

Optical specifications (example)

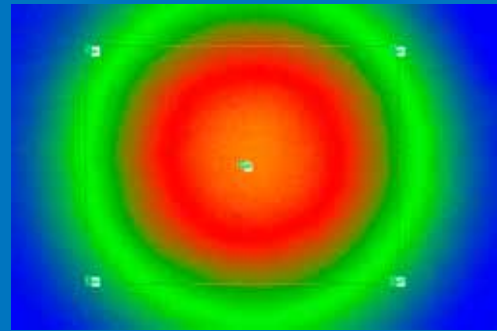
Focal length: 3 mm
Opening angle: 56 degrees x 44 degrees
Luminance gain (on axis): > 2.4

Most of the specifications are customizable and can be specified with customer.

MEASURED PERFORMANCE



LED with NAFLENS (0.260 mm)
Peak lux: 72.29



LED without lens
Peak lux: 29.6

→ **LUMINANCE GAIN: 2.44**

Delivery format & Materials

Delivery formats include roll, sheet and bulk. The roll may be from 1 cm to 30 cm wide (typically 15 cm). Sheet and bulk format are available through cutting processes.

Material options include PMMA (0.175 mm, 0.250 mm, 0.375 mm) and PET (0.100 mm, 0.200 mm). Also other material thicknesses are possible. Protective film is available, if required.

Production technology

- UV R2R technology enables thin lens production
- Highly cost-effective mass production technology
- Detailed and exact alignment marks can be produced directly for mass production tools
- Enables effective online quality control
- Allows several technologies for integration