

## Benefits

Many optical applications need a defined surface structuring and scattering. The capability to mix brightness and color helps in a great variety of different cases in automotive lighting, general lighting and stage lighting. It gives your product the final and decisive difference to stand out from the crowd.

## Different Structures

- Faceted surfaces (micro lens arrays)
- Defined surfaces (e.g. sinus function)
- Random surfaces

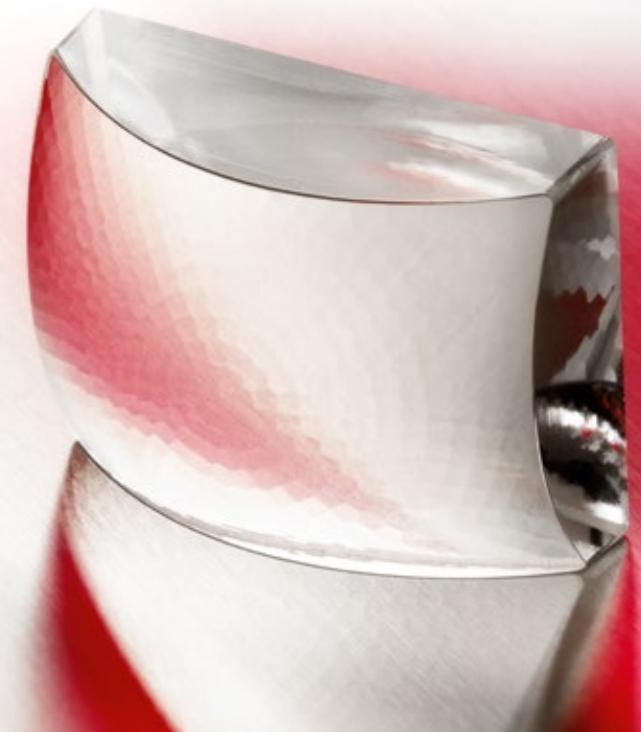
## Possible Effects

Structure	Color Mixing	Optical Efficiency
No structure	---	+++
S1	--	++
S2	-	++
S3	+	++
S4	++	+
S5	+++	-

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# MICROSTRUCTURES AND DIFFUSERS

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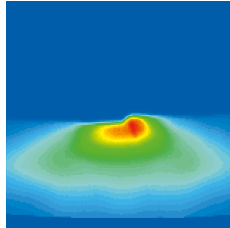


# Microstructures and Diffusers

## Applications

- Automotive Lighting

Smoothing of light distribution:  
with defined or faceted surfaces



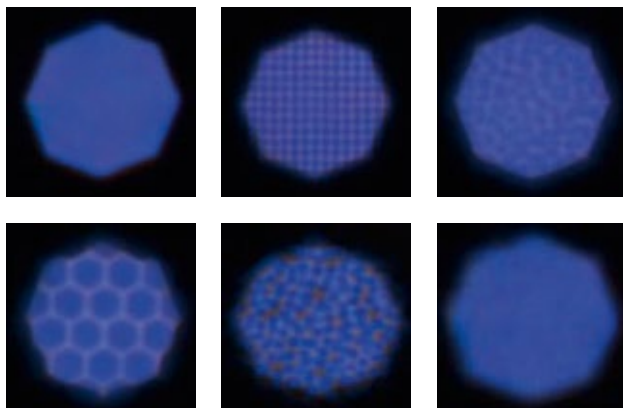
- Professional Lighting

Smoothing of light distribution,  
color mixing:  
with random or faceted surfaces



- Stage Lighting

Color mixing with light guides:  
with high scattering on the top surface



## Faceted Surfaces

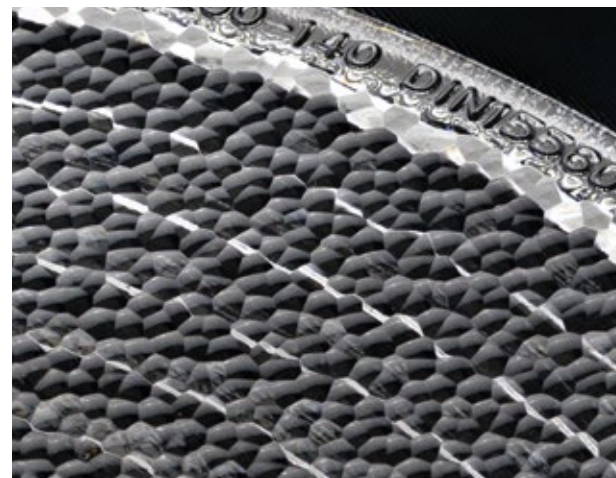
Faceted surfaces are mostly based on spherical facets.

Following parameters can be used:

	Direct pressing	Imprint
Sphere radius	$\geq 500 \mu\text{m}$	$\geq 100 \mu\text{m}$
Lattice spacing	$\geq 500 \mu\text{m}$	$\geq 100 \mu\text{m}$
Lattice type	hexagonal, square, irregular	

Irregular gratings avoid a far field imaging of the lattice symmetry.

Lattice form	convex, concave
Structured diameter	only limited by part size (direct pressing) 20 mm (imprint)



## Defined Surfaces

Modulation of the surface with a mathematical function

- e.g. 2-dimensional sinus
- Minimum modulation depth: approx.  $2 \mu\text{m}$
- Allows for high reproducibility of low scattering applications



## Random Surfaces

Mold structuring:

- EDM ( $R_z 9 - R_z 75 \mu\text{m}$ )
- Micro treatment

Glass structuring:

- Micro treatment

