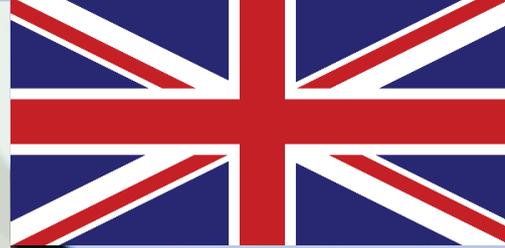


Barium Sulphate (BaSO_4)
Coating Service with Barium Sulphate (BaSO_4)



Optical Diffusive Reflecting Material
"OptoPolymer"

OptoPolymer

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Barium Sulphate (BaSO₄) Coating Service with Barium Sulphate (BaSO₄)

Barium Sulphate (BaSO₄)

Applications

Reflectance from our BaSO₄ coating OPRC

Order References for our Ready-Made Barium Sulphate Coating as a Container

Handling the Sprayer Combination

Coating Service with Barium Sulphate (BaSO₄)

Coating Service for Diffuse Reflecting Surfaces

Coating Service Process

Security for your „Know-How“

Quality of your Coating

Optical Diffusive Reflecting Material “OptoPolymer”

Optical Diffusive Reflecting Material “OptoPolymer”

Basic Characteristics of our Diffusive Reflecting Material

Reflectance Standards in our Optical Diffusive Reflecting Material “OptoPolymer”

Example of an Order Reference for Round Reflectance Standards

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Diffusive Reflecting Films with Different Reflectances

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Reflectance Targets with Different Reflectances

Raw Materials in our “OptoPolymer” Material

Raw Blocks Available in OptoPolymer

Customer-Specific Components and Systems in our “OptoPolymer” Material

Security for your „Know-How“

Our further Delivery Program

OptoPolymer

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Barium Sulphate (BaSO₄)

Based on high-purity barium sulphate BaSO₄, we produce a ready-to-use white reflective coating. We offer this optical white in various containers depending on the size of the surface to be coated.

This liquid is normally sprayed onto the carrier to be coated. We also offer the complete sprayer with container. However, this kit is recommended only for smaller to medium-sized surfaces.

Applications

- Diffusive reflecting coatings in the wavelength range from 300nm to 1.300nm
- Straightforward, optical coating on metal, plastic and glass substrates
- Coating with no expensive accessories

When is a coating with OPRC used?

The diffusive reflecting properties of different surfaces, e.g. such as one integrating sphere, are conventionally realised in barium sulphate BaSO₄. The consideration of whether BaSO₄ is "adequate" for your respective purpose or whether you should revert to OptoPolymer is determined by your respective application.

For optical applications in the visible wavelength range, our white reflective OPRC coating offers an ideal option. Its reflectivity in the range from approx. 300 to 1.300 nm is 95 – 98%. Thermal stability is guaranteed up to approx. 60 °C.



In combination with our sprayer and glass container, we enable you to realise high-quality optical diffusive reflecting surfaces in a cost-effective way with very little effort.

Technical Specifications

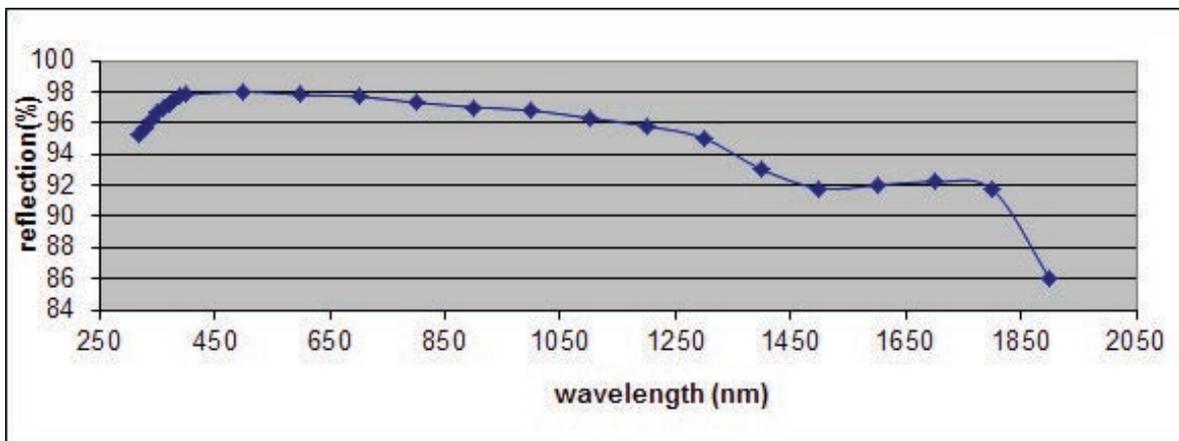
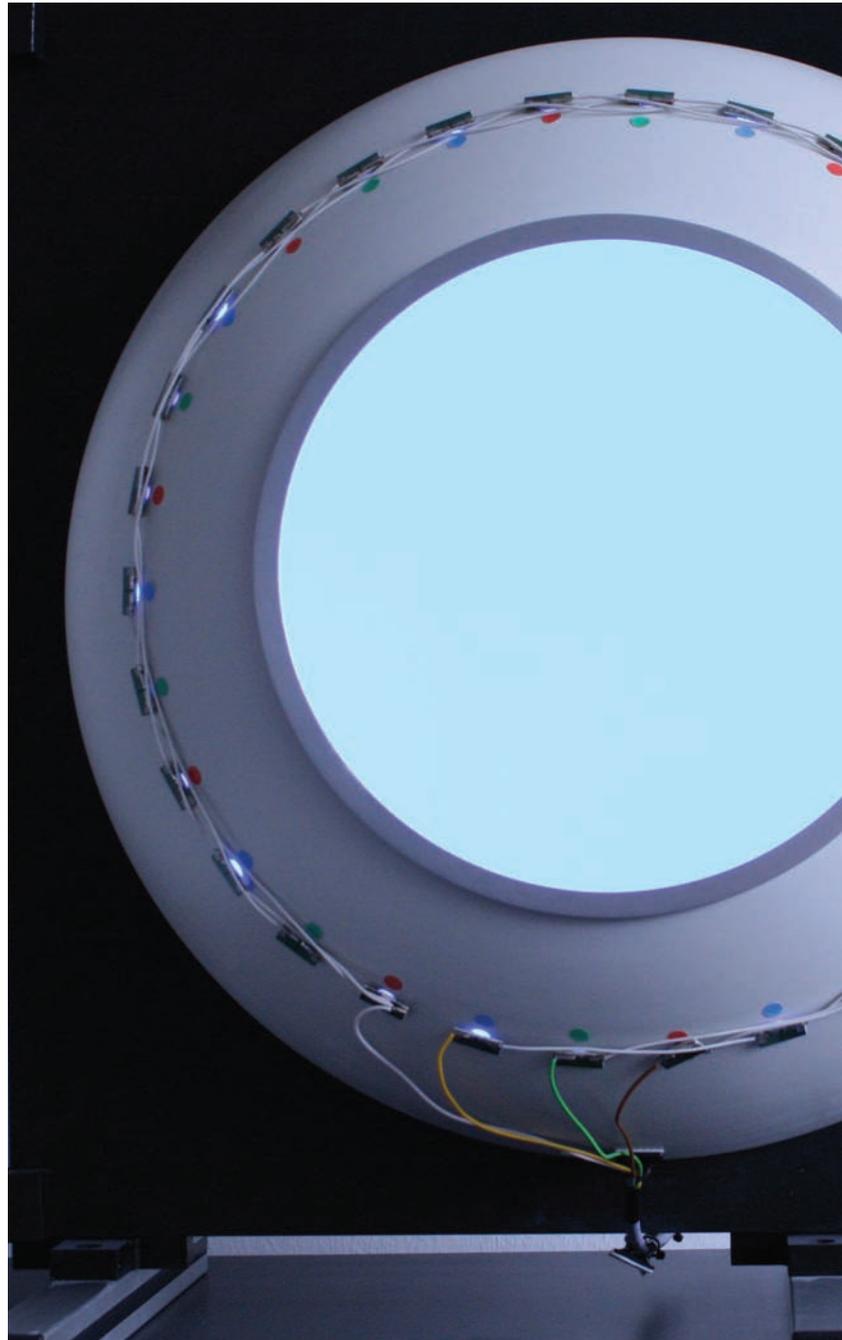
Effective spectral wavelength range:	300 - 1.300 nm
Reflectivity:	95 - 98 %
Thermal stability:	Approx. 60 °C

Application Information

Our OPRC coating is used wherever a highly diffusive reflecting surface is required. This may be metal, glass or plastic. Before treatment, these surfaces must be free of fats, oils or other residues. Surfaces that are not to be coated must be covered. Subsequent removal of the coating is almost impossible. The finished coating comprises several layers, each of which is applied very thinly. A total thickness of around 0.5 mm is recommended. Increasing the coating thickness will not necessarily increase reflection.

Reflection from our BaSO₄ coating OPRC

Wavelength (nm)	Reflection (%)
320	95,3
330	95,7
340	96,2
350	96,7
360	97
370	97,25
380	97,5
390	97,7
400	97,8
500	98
600	97,8
700	97,7
800	97,3
900	97
1000	96,8
1100	96,3
1200	95,8
1300	95
1400	93
1500	91,8
1600	92
1700	92,2
1800	91,7
1900	86



Order References for our Ready-Made Barium Sulphate Coating as a Container

Reference	Quantity	Packing Unit	Description
OPRC05	500 ml	1 x 500 ml bottle	BaSO ₄ coating
OPRC1	1 litre	1 x 1 litre bottle	BaSO ₄ coating
OPRC2	2 litres	2 x 1 litre bottle	BaSO ₄ coating
OPRC3	3 litres	3 x 1 litre bottle	BaSO ₄ coating
OPRC4	4 litres	4 x 1 litre bottle	BaSO ₄ coating
OPRC5	5 litres	1 x 5 litre bottle	BaSO ₄ coating
OPRC10	10 litres	2 x 5 litre bottle	BaSO ₄ coating
OPSP1	1 unit		Sprayer
OPSP5	5 units		Sprayer
OPGL	1 unit		Container for Sprayer
OPRC-Set 1	1 unit	Set contains	
1 unit	OPRC05	500 ml	BaSO ₄ coating
2 units	OPSP1		Sprayer
1 unit	OPGL		Container for Sprayer

Please contact us to determine the required quantity for your application



Specifications of the Spray Combination „OPSP“ and „OPGL“

Glass container: Can be filled to max. 170 ml

Spray pressure: 4,4 bar constant

Propellant gas cartridge: 97 g, of which 58 g propellant gas

Weight: 21,5% propane, 28,5% isobutane, 50% dimethyl ether

Disposal: In normal refuse. The sprayer is empty and has no paint residues left.

Caution! The propellant gas is flammable.
The sprayer cannot be refilled.



Handling the Spray Combination

- Pour the liquid into the glass. The viscosity is correct if the liquid flows out without flaking and without becoming ropery.
- Insert the suction tube into the cartridge base.
- Screw the cartridge onto the glass.
- Turn the spray button so it points in the same direction as the notch in the plastic cartridge base (because of the forced ventilation required).
- Press the spray button, spray.
- Spray distance between 15 and 25 cm.

Cleaning

Unscrew the cartridge and spray through thinner until the spray jet is clean.

Storage

- Leave the liquid in the glass and seal with a screw cap.
- Store in a dark place if possible. Do not expose to sunshine.
- The coating has a limited shelf life



Coating Service with Barium Sulphate (BaSO₄)

Coating service for

- Products with an old coating (recoating service)
- Prototypes to specification
- Small batches
- Large batches
- Plus design, mechanical production and coating as desired by the customer

Coating Service for Diffusive Reflecting Surfaces

We offer our diffusive reflecting surface coating services for “all” optical applications. These services range from recoating existing, used products (e.g. recoating of integrating spheres) through coating individual components or systems to coating large batches.

Coating Service Process

Without exception, this type of service concerns customer-specific processes.

No product is alike for two different customers.

For this reason, we would ask you to contact us as required. In order to be able to give a specific statement about the costs and options for the individual coating of your product, we require a drawing – or better still a sample – of your part to be coated.

Only using your details can we generate the optimum result for you.

Security for your “Know-How”

At this point, we wish to expressly point out that we neither make your documents available to any third parties nor distribute them in any way. However, depending on the nature of the service to be performed, it may be necessary to disclose certain features of your product to third party companies. As an example here, we would mention the measuring of the reflectance of your individual coating.

To prevent the occurrence of any misunderstandings concerning this point, we offer our customers a non-disclosure agreement. This agreement governs who is permitted to gain knowledge of your product and for which purpose.



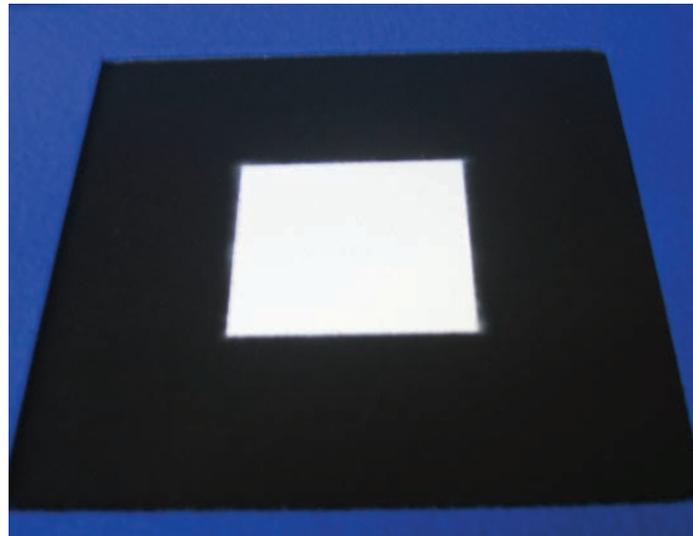
Quality of our Coating

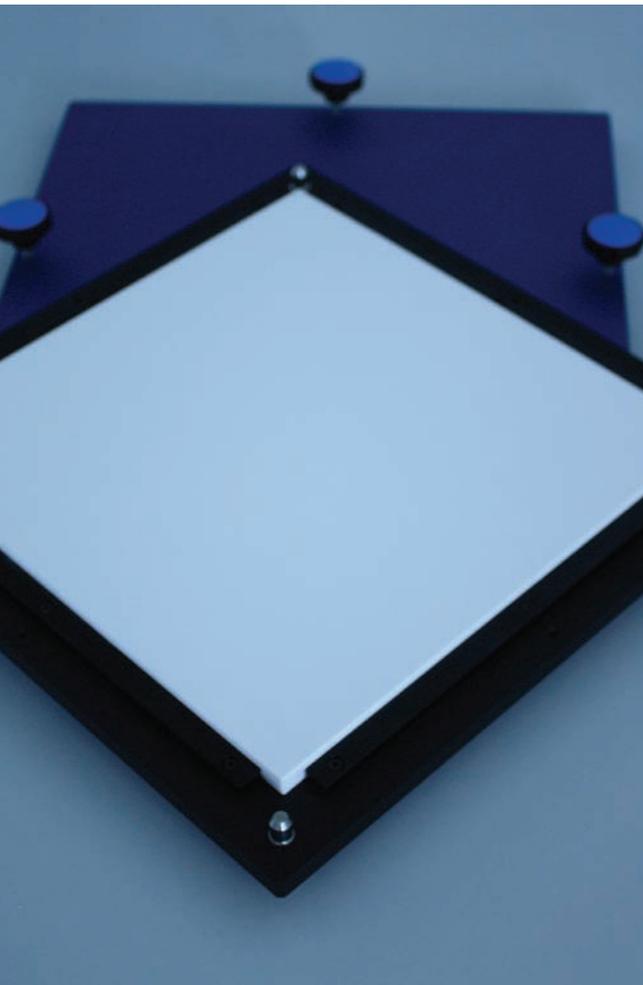
Based on our many years of experience in the area of optical diffusive reflecting coatings, a high standard of quality is guaranteed.

To give you a precise statement on the reflectivity of “your coating”, the option of reflectance measurement is available in the range from 250 nm to 2,500 nm.

This measurement is performed by an independent company and serves you as a measuring report for a specific quality statement.

We will be pleased to advise you concerning the options.





Optical Diffusive Reflecting Material “OptoPolymer”

The optical diffusive reflecting material OptoPolymer is a plastic that is used in numerous photometric applications because of its high-quality production, purity, and highly diffusive reflectance behaviour. Our material has also gained acceptance among many users in optical metrology.

The following advantages make “OptoPolymer” indispensable in the optical industry and research.

Specifications

- | | |
|---------------------------|--|
| • Useful wavelength range | 250 nm – 2.500 nm |
| • Reflectance | ≥ 98,5 % in the visible and 93 % in the wavelength range 250 – 2.500 nm* |
| • Density | 1.5 g/cm ³ |
| • Temperature range | Min. -200 °C to max. +260 °C |
| • Hardness | 30-40 Shore D |
| • Water solubility** | Insoluble |
| • Resistance to chemicals | High |
| • Flammability | Non-flammable under UL class V-0 |
| • High UV stability | |

* With a material thickness of min. 8 mm.

** The reflectance properties change in the case of damp or even wet material.

Basic Characteristics of our Diffusive Reflecting Material

Reflectance Behaviour

The extremely high reflectance behaviour of our “OptoPolymer” is caused by volume reflectance. This means, in order to achieve the specified reflectance values, the material thickness should be no less than 8 mm (a material thickness of 10 mm is recommended). If this material thickness is not possible in your application, a reduction in reflectance must be expected. Depending on the nature of the application, however, this feature can be reduced.

Material Surface

Oil, fat and other lipid substances such as fingerprints have a serious impact on the reflectance of the material.

Furthermore, shiny patches on the surface also alter the reflectance behaviour. This impairs the almost ideal Lambertian characteristic.

The ideal material surface should be “even and a little rough”.

Cleaning

Our optical diffusive reflecting material OptoPolymer is extremely resistant to chemical influences. This applies to acids, bases and other organic solvents.

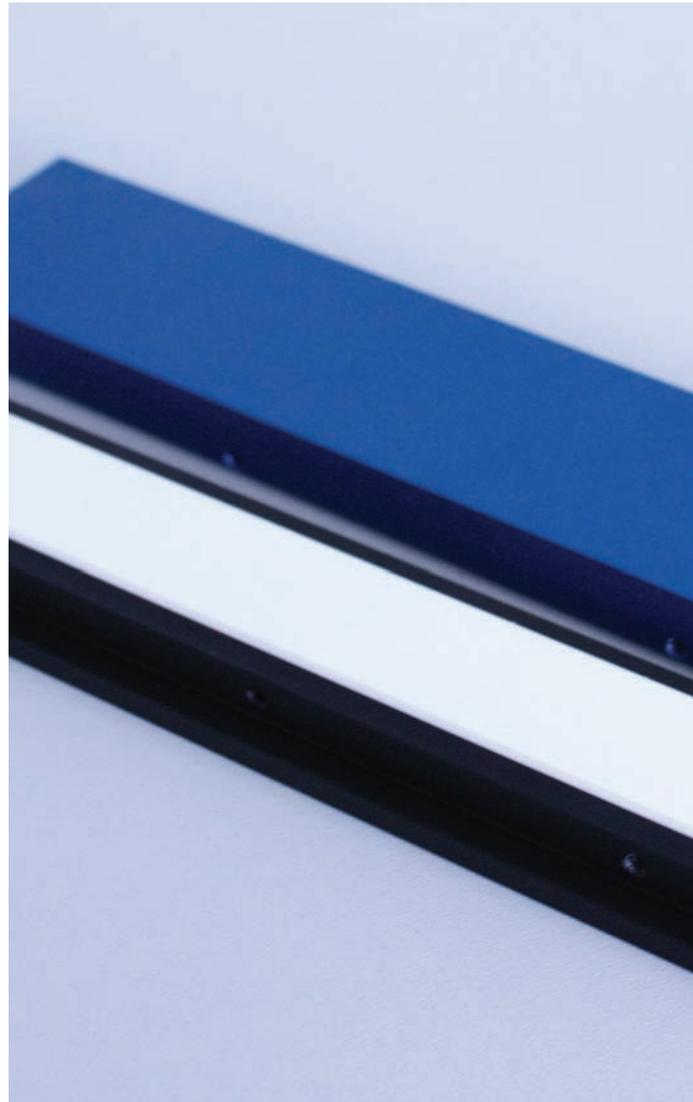
Because of the relatively high mechanical stability, it is possible to clean the material surface. The different methods of cleaning are largely dependent on the nature and level of the dirt.

As such, dust can be removed simply with clean, dry air or nitrogen. If this is unsuccessful without further difficulty, pure alcohol may be used as an additional aid. Depending on the quantity of liquid cleaning agent used, it will penetrate more or less into the material. If this is the case, the liquid can be extracted from the material by heating.

If mechanical damage to the reflectance side of the material occurs during this cleaning process, or even without it, the surface can be treated with fine sandpaper.

You can also return the reflectance standard to us for cleaning.

Bear in mind that the calibration data potentially pertaining to the reflectance standard will no longer be correct. In this case, recalibration is required.



Reflectance Standards

All of our reflectance standards can be supplied with or without a calibration certificate. Moreover, the different sizes of our reflectance standards can be supplied with corresponding storage containers. These naturally differ according to shape.

Typical reflectance curves of our reflectance standards according to reflectance can be seen below.

- Round / square / rectangular
- Reflectance: 2%, 5%, 10%, 20%, 40%, 50%, 70%, 80% und max. reflectance*
- Calibrated in 50 nm stages in the wavelength range 250 – 2,500nm**
- In the sealable storage container**

* Any deviating reflectance values on request

** Available as an option

Order Number	Diameter	Order Number	Edge Length
OPST25 D.10-99-C.B	25,4mm (1.0")	OPST25.25.10-99-C.B	25,0mm (1.0")
OPST32 D.10-99-C.B	32,0mm (1.25")	OPST32.32.10-99-C.B	32,0mm (1.25")
OPST50 D.10-99-C.B	50,0mm (2.0")	OPST50.50.10-99-C.B	50,0mm (2.0")
OPST76 D.10-99-C.B	76,0mm (3.0")	OPST76.76.10-99-C.B	76,0mm (3.0")
OPST80 D.10-99-C.B	80,0mm (3.15")	OPST80.80.10-99-C.B	80,0mm (3.15")
OPST100 D.10-99-C.B	100,0mm (4.0")	OPST100.100.10-99-C.B	100,0mm (4.0")
		OPST200.200.10-99-C.B	200,0mm (8.0")
		OPST250.250.10-99-C.B	250,0mm (10.0")
		OPST300.300.10-99-C.B	300,0mm (10.0")
		OPST430.430.10-99-C.B	430,0mm
		OPST500.500.10-99-C.B	500,0mm



Example of an Order Reference for Round Reflectance Standards

OPST100D.10-99-C.B

OP = OptoPolymer

ST = Standard

100D.10 = Shape of the standard with round shape (mm): Diameter - Height

99 = Reflectance

02 = 2%

05 = 5%

10 = 10%

20 = 20%

40 = 40%

50 = 50%

70 = 70%

80 = 80%

99 = Max. reflectance

C = Calibrated, or U = Uncalibrated

B = In the container, or O = Without the container, Packaged in optical paper

Example of an Order Reference for Rectangular or Square Reflectance Standards

OPST100.100.10-99-C.B

OP = OptoPolymer

ST = Standard

100.100.10 = Shape of the standard as a rectangle or square (mm): Length - Width - Height

99 = Reflectance

02 = 2%

05 = 5%

10 = 10%

20 = 20%

40 = 40%

50 = 50%

70 = 70%

80 = 80%

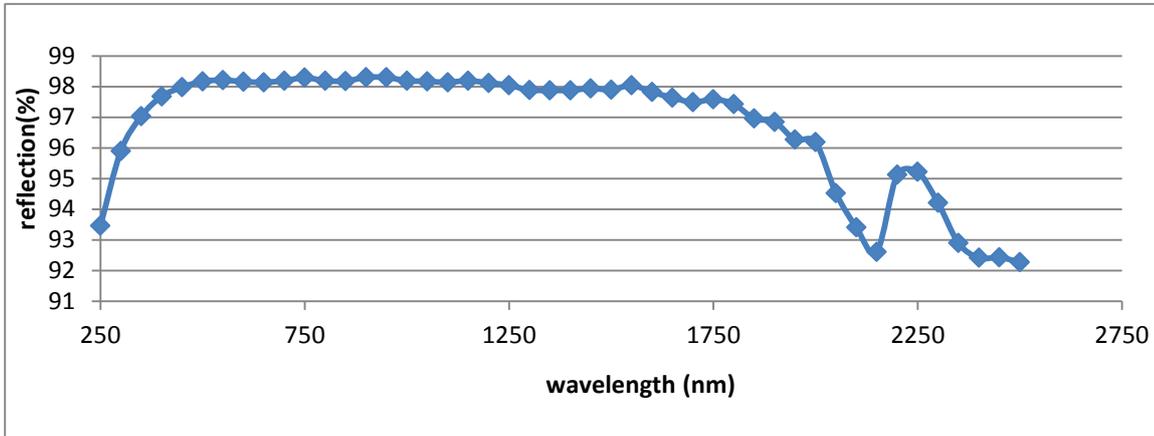
99 = Max. reflectance

C = Calibrated, or U = Uncalibrated

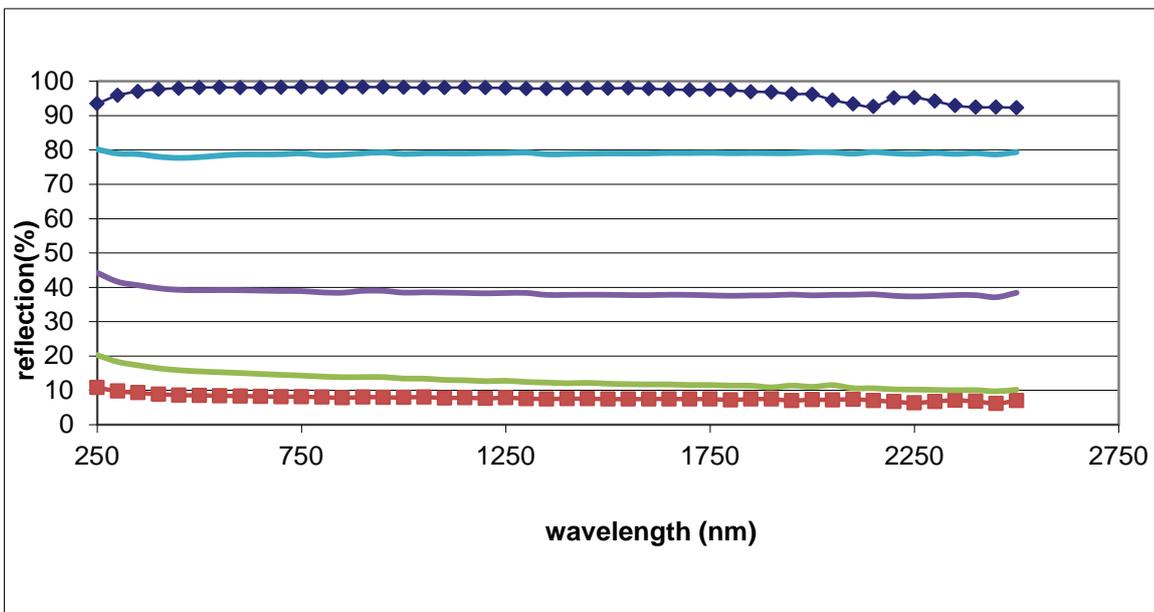
B = In the container, or O = Without the container, Packaged in optical paper

Reflectance from our Optical Diffusive Reflecting Material „OptoPolymer“

Typical reflectance with a material thickness of 10mm



Example from our Optical Diffusive Reflecting Material „OptoPolymer“, with different Reflectance, with a thickness of 10mm



Films in our Optical Diffusive Reflectance Material "OptoPolymer"

The base material for our films is the high-quality material in which our reflectance standards are also produced. In this case, films are peeled from the raw blocks. This precise peeling process allows extremely fine adjustments over the entire surface, guaranteeing exceptional film homogeneity. As such, the films with thicknesses from 200 μm to 3 mm stand out for their exceptional homogeneity in terms of both reflectance and transmission behaviour.

Applications of our Films

- Projection screens for the highest demands
- Frontlit projection
- Backlit projection
- Background lighting of displays
- Reflective diffusers
- Transmissive diffusers



Specifications

- | | |
|--|----------------------------------|
| • Useful wavelength range | 250 nm – 2.500 nm |
| • Reflectance is dependent on the film thickness | |
| • Density | 1.5 g/cm ³ |
| • Temperature range | Min. -200 °C to max. +260 °C |
| • High UV stability | |
| • Hardness | 30-40 Shore D |
| • Water solubility** | Insoluble |
| • Resistance to chemicals | High |
| • Flammability | Non-flammable under UL class V-0 |

How you get our Films

The maximum width of the optical diffusive reflecting/transmitting films is dependent on the film thickness. The following film thicknesses can be supplied.

The available length can be adjusted to your application and is around 10 m, depending on film thickness.

Part-No.	Film Thickness	Max. Width
OPF002	200 μm	300 mm
OPF003	300 μm	300 mm
OPF005	500 μm	500 mm
OPF008	800 μm	500 mm
OPF100	1 mm	500 mm
OPF200	2 mm	500 mm
OPF300	3 mm	500 mm

Example of an Order Reference for our Standard Films

OPF100-1500.80

- OP = OptoPolymer
- F = Film
- 100 = Thickness of the film
 - 020 = 200 µm film
 - 030 = 300 µm film
 - 050 = 500 µm film
 - 080 = 800 µm film
 - 100 = 1 mm film
 - 200 = 2 mm film
 - 300 = 3 mm film
- 1500.80 = Dimensions of the film - 1.500 x 80 mm (L x W)* is customer-specific
DIN A4 = In A4 format

Diffusive Reflecting Film with Different Reflectances

As in the case of the reflectance standards in our diffusive reflecting material OptoPolymer, films can also be supplied in the different reflectances already listed. The respective reflectance value specified is based on a material thickness of 10 mm and thus varies with the different film thicknesses.

OPF100-1500.80-50

- OP = OptoPolymer
- F = Film
- 100 = Thickness of the film
 - 020 = 200 µm film
 - 030 = 300 µm film
 - 050 = 500 µm film
 - 080 = 800 µm film
 - 100 = 1 mm film
 - 200 = 2 mm film
 - 300 = 3 mm film
- 1500.80 = Dimensions of the film
1.500 x 80 mm (L x W)* is customer-specific
DIN A4 = In A4 format
- 50 = Reflectance
 - 02 = 2%
 - 05 = 5%
 - 10 = 10%
 - 20 = 20%
 - 40 = 40%
 - 50 = 50%
 - 70 = 70%
 - 80 = 80%
 - 99 = Max. reflectance

Diffusive Reflecting Film with Adhesive Backing

For certain applications, the film has to be applied directly to a carrier. In this case, we offer our diffusive reflecting films with adhesive backing.

As such, the film can be stuck onto a carrier on your site with no problem.

The order reference is as described above plus “-KB”.

As in the case of films with maximum reflectance, optical films with different reflectances can also be supplied with an adhesive film on the back.

The order reference is as described above plus “-KB”.

Reflectance Targets with Difference Reflectances

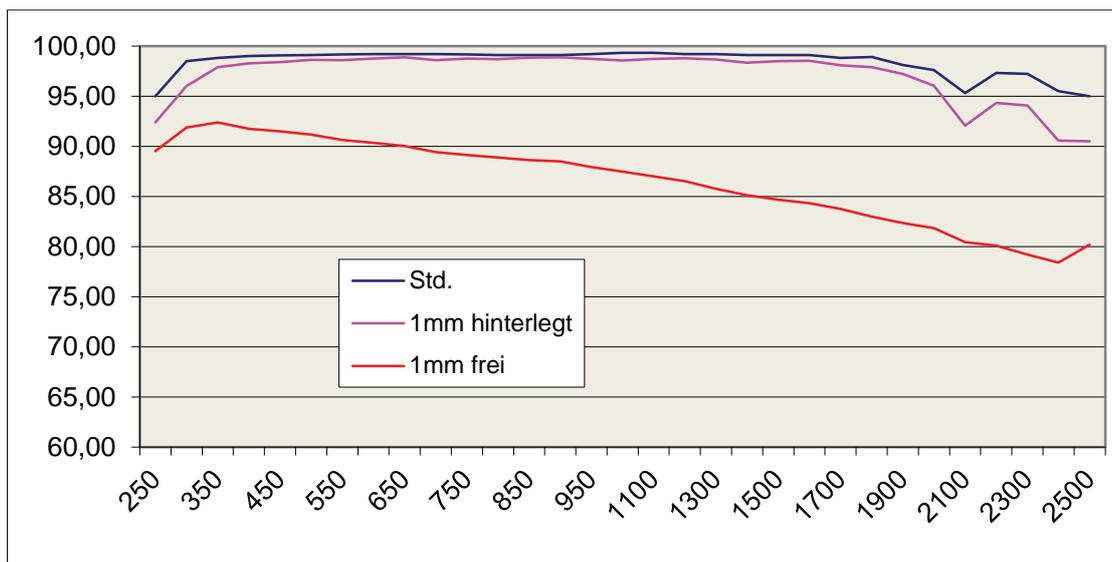
Based on our diffusive reflecting films with different reflectances, these are also offered as reflectance targets.

Here, the broadest range of films is supplied applied to an aluminium carrier. The respective aluminium carrier can be installed for your application with different ready-made mounting options.

As standard, we use an aluminium honeycomb for the carrier in order to keep the weight as light as possible.



Typical Reflectance from our Film with 1mm thickness

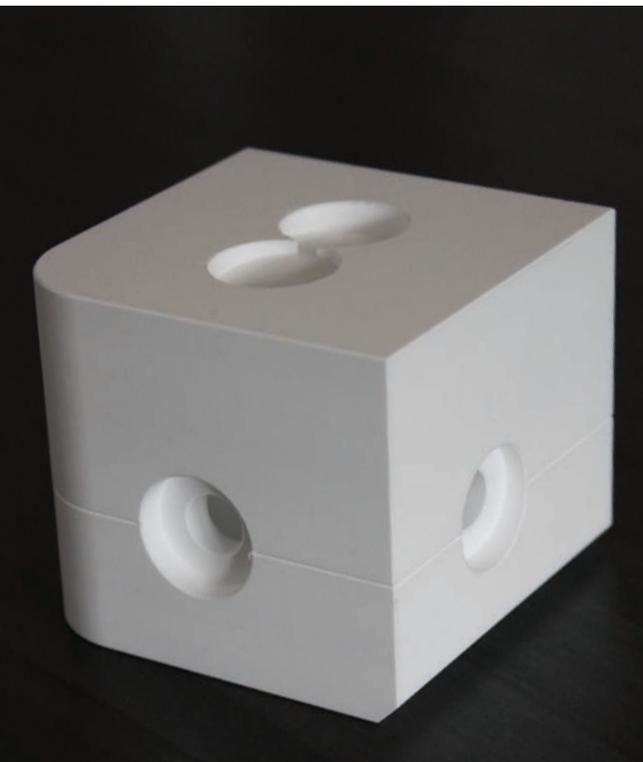




Raw Materials in our OptoPolymer Material

The reflectance behaviour, long-term stability, temperature resistance, processability, availability and price/performance ratio are of particular interest to you as the user of such materials. Our optical diffusive reflecting material OptoPolymer fulfils these requirements. We offer you high-quality materials and an extensive range of services. With our many years of know-how in the processing of optical diffusive materials, we are able to offer you our services particularly in the production of customer-specific parts.

You can, of course, also obtain unprocessed block material for you to process in-house. However, knowledge of plastics processing is an essential requirement here.



Raw Blocks Available in OptoPolymer

Reference	Dimensions*
OPRB5D3	50 Ø x 300 mm
OPRB1D3	100 Ø x 300 mm
OPRB111	120 x 120 x 120 mm
OPRB116	120 x 120 x 60 mm
OPRB666	60 x 60 x 60 mm
OPRB222	200 x 200 x 200 mm

* Deviations may occur due to the production process.
Other dimensions or sizes included in the standard dimensions are available on request.

Customer-Specific Components and Systems in our OptoPolymer Material

This product sector includes what is arguably the broadest product area in our range.

We produce customer-specific components in the different base materials of our diffusive reflecting material OptoPolymer (whether with maximum or different reflectances). Production here ranges from prototypes through small batches to the manufacture of large batches.

The focus in this area is on special integrating spheres (including for the area of lighting in image processing), diffusive reflecting solids and sheets, lamp housings, laser cavities and calibration standards for the broadest range of optical applications.



Security for your “Know-How”

At this point, we wish to expressly point out that we neither make your documents available to any third parties nor distribute them in any way. However, depending on the nature of the service to be performed, it may be necessary to disclose certain features of your product to third party companies. As an example here, we would mention the measuring of the reflectance of your individual coating or the mechanical dimensions in the production of your component.

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Our further Delivery Program

OptoPolymer

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- Optical Diffusive Reflecting Material
- Reflectance Standards
- Films in our Optical Diffusive Reflecting Material. From 0,2 - 5,0mm thickness
- Integrating Spheres in our Diffusive Reflecting Material „OptoPolymer“
- Barium Sulphate (BaSO₄)
- Coating Service with Barium Sulphate (BaSO₄)
- Integrating Spheres with Barium Sulphate (BaSO₄) coating
- Integrating Spheres with Gold coating
- Accelerated UV Material testing
- Reference Cells for Sun Simulators



- Optical Detectors in UV-, VIS-, NIR-range
- UV Measuring equipments and Radiometer
- Sun Simulators and UV-Lightsources

SP SPECTRAL PRODUCTS

- Monochromators
- Detectors
- Spectrometers
- Lightsources
- Filters and Filter Wheels
- Optical Fibers and Fiber holders
- Accessories



Stability Environments, Inc.

- Reach-in Environment Chambers
- Walk-in Environment Rooms
- Environmental Rooms and Chambers Measurement Systems

OptoPolymer

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