

**SCHOTT**  
glass made of ideas

**MIROGARD®**

Anti-Reflective Glass  
for Art Glazing



SCHOTT is an international technology group with 130 years of experience in the areas of specialty glasses and materials and advanced technologies. With our high-quality products and intelligent solutions, we contribute to our customers' success and make SCHOTT part of everyone's life.

SCHOTT works closely with architects and designers to extend the boundaries of design and create new opportunities for building culture – in terms of design and space, indoors and outdoors, aesthetics and functionality. That's what makes SCHOTT a qualified partner for architecture.

SCHOTT MIROGARD® is an anti-reflective, completely transparent glass for use in glazing pictures. In addition it is available in two versions: MIROGARD® plus and MIROGARD® Protect, which also features enhanced UV-protection. It minimizes reflections to less than 1% and provides artlovers with an experience of the work that is true to the original. The ideal invisible protection – for Old Masters and young talents alike.



## Masterful picture glazing

### Low in reflection, neutral in color, nearly invisible

Museums, collections and galleries all over the world have been relying on SCHOTT MIROGARD® Anti-Reflective Glass for decades. This practically invisible glass features an anti-reflective optical interference coating that protects valuable works of art without disturbing the pleasure of looking at them.

Conventional glass reflects approximately 8 % of incident light, creating undesirable reflections. MIROGARD® Anti-Reflective Glass reduces reflections to under 1 %, giving viewers an unobstructed view of the artwork. MIROGARD® Anti-Reflective Glass is also completely neutral in color, which means the brilliance of the glazed artwork remains true to the original and is rendered in its natural colors.

#### UV-protection made to order

MIROGARD® Anti-Reflective Glass also protects paintings, graphics and prints from the destructive effects of UV-radiation. 48 % of the UV-radiation in wavelengths from 300 to 380 nanometers is absorbed and reflected. This means MIROGARD® Anti-Reflective Glass already offers better protection than other art glazing products, even in its standard version. Extremely sensitive artworks can be displayed with MIROGARD® plus and MIROGARD® Protect, giving them added protection that absorbs or reflects up to 99 % of UV-radiation.

#### High-tech manufacturing

SCHOTT invest a great deal of effort to ensure that art lovers the world over are not distracted by the glazing. MIROGARD® Anti-Reflective Glass is dip coated using the sol-gel process. The coating production process takes place under clean room conditions. Multiple titanium dioxide and silicon dioxide layers are applied one after another with nanometer accuracy and then burned in. The result is a high-tech, anti-reflective art glass of the highest quality with a surface that is extremely stable and easy to clean.

#### SCHOTT MIROGARD® – Anti-Reflective Glass for Art Glazing

- Anti-reflective to the highest extent possible
- Up to less than 1 % residual reflection
- Highly transparent
- Up to 99 % light transmission
- Color rendering index up to  $R_a=100$
- Durable
- Easy to clean
- Product variations **MIROGARD® plus** and **MIROGARD® Protect** are available for higher and even the highest UV protection.

Left: MIROGARD® Anti-Reflective Glass in the Ciurlionis Museum in Lithuania

Right: Various graphic works from Pablo Picasso's art books from the exhibition "Picasso Art Books" at the Museum Brandhorst, Munich

© Succession Picasso/VG Bild-Kunst, Bonn 2011







Black-and-white photography displayed with minimal reflections and UV protected by MIROGARD® Anti-Reflective Glass in a living room.

## SCHOTT MIROGARD® – Anti-Reflective Glass for Art Glazing

### Proven and innovative

The anti-reflective specialty glass MIROGARD® has been constantly further developed since it was first introduced in the 1970s. For instance, SCHOTT recently optimized the color shade of its minimal residual reflection based on intensive research by its experts. The coating that the company has further developed improves the visual impression of the residual reflection that can be seen from certain viewing angles. Now, the color shade no longer distracts attention from the actual artwork.

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# SCHOTT MIROGARD® – Anti-Reflective Glass for Art Glazing

## Technical Data Sheet

Dimensions (net/without dipping edge (min.))	Thickness / (Type)		Thickness tolerance	Standard box contents			Luminous reflectance	Luminous trans- mittance	UV trans- mittance	Color rendering index
	mm × mm	mm		mm	m <sup>2</sup>	Pieces				
<b>MIROGARD®</b>										
1,770 × 1,220	2.0		0 -0.2	approx. 33	5 small-scale- packaging à 3 sheets, approx. 35 kg	approx. 260	0.9	99	52	100
1,770 × 1,220	2.0		0 -0.2	approx. 50	23	approx. 330	0.9	99	52	100
885 × 1,220	2.0		0 -0.2	approx. 55	10 small-scale- packaging à 5 sheets, approx. 29 kg	approx. 335	0.9	99	52	100
885 × 1,220	2.0		0 -0.2	approx. 50	46	approx. 310	0.9	99	52	100
1,770 × 1,220	3.0		0 -0.2	approx. 40	18	approx. 370	0.9	99	51	100
1,770 × 1,220	4.0		0 -0.2	approx. 30	14	approx. 420	0.9	99	49	100
3,180 × 1,770	3.0		0 -0.2	approx. 140	25	approx. 1300	0.9	99	51	100
3,180 × 1,770	4.0		0 -0.2	approx. 124	22	approx. 1350	0.9	99	49	100
<b>MIROGARD® plus</b>										
1,770 × 1,220	2.0		0 -0.2	approx. 33	5 small-scale- packaging à 3 sheets, approx. 35 kg	approx. 260	1.1	98	18 ± 2	98
1,770 × 1,220	2.0		0 -0.2	approx. 50	23	approx. 330	1.1	98	18 ± 2	98
885 × 1,220	2.0		0 -0.2	approx. 50	46	approx. 310	1.1	98	18 ± 2	98
885 × 1,220	2.0		0 -0.2	approx. 54	10 small-scale- packaging à 5 sheets, approx. 29 kg	approx. 335	1.1	98	18 ± 2	98
1,770 × 1,220	3.0		0 -0.2	approx. 38	18	approx. 370	1.1	98	18 ± 2	98
3,180 × 1,770	3.0		0 -0.2	approx. 140	25	approx. 1300	1.1	98	18 ± 2	98
3,180 × 1,770	4.0		0 -0.2	approx. 124	22	approx. 1350	1.1	98	18 ± 2	98
<b>MIROGARD® Protect</b>										
1,770 × 1,220	4.38	4/2	0 -0.4	approx. 15	7	approx. 260	0.9	98	< 1	100
1,770 × 1,220	6.38	6/2	0 -0.4	approx. 15	7	approx. 310	0.9	98	< 1	100
1,770 × 1,220	8.38	8/2	0 -0.4	approx. 13	6	approx. 325	0.9	98	< 1	100
<b>MIROGARD® Protect Ultra</b>										
1,770 × 1,220	2.95		± 0.20	approx. 38	18	approx. 310	0.9	98	< 0.05	100

\* (300 nm to 380 nm)

# SCHOTT MIROGARD® – Anti-Reflective Glass for Art Glazing

## Technical Data Sheet

### Virtually no reflections

Conventional glass reflects about 8% of light. This results in an undesirable reflection effect. With SCHOTT's optical interference coated Anti-Reflective Glass, reflection is reduced to approx. 1%, which means it is virtually eliminated.

### Highest transparency

Normal glass has light transmission of only 91%. With MIROGARD® glasses, it is close to 99%. This means that MIROGARD®, MIROGARD® plus, MIROGARD® Protect and MIROGARD® Protect Ultra are nearly invisible under normal viewing conditions. MIROGARD®, MIROGARD® Protect and MIROGARD® Protect Ultra portray the colors of the pictures glazed as neutrally as possible thanks to their high color rendering index  $R_a = 100$ . The result: The brilliance of colors in works of art is reproduced without losing any of its original quality.

### Lightweight and very thin

Because it is only 2.95 mm thick, MIROGARD® Protect Ultra can easily be used in existing standard picture framing solutions. At the time it is extremely mechanical stable and weighs only 6.5 kg/square meter.

### Protection from UV-radiation

All types of MIROGARD® glass reduce UV-radiation by absorption and reflection. Various versions of the product are available, depending on the level of protection required.

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# SCHOTT MIROGARD® Protect Ultra – Lightweight, Premium UV & Splinter Protection and very thin

Museums, collections and galleries all over the world have been relying on SCHOTT MIROGARD® for decades. The optical interference coated, anti-reflective glass protects precious artworks without detracting from the viewing enjoyment.

## More protection than other picture framing glasses

The laminated glass SCHOTT MIROGARD® Protect Ultra protects high-quality paintings, graphics and prints extremely well against the destructive effects of UV radiation. 99.9% of the damaging UV radiation in the 300 to 380 nm wavelength is absorbed and reflected.

In addition, the laminated glass MIROGARD® Protect Ultra offers the best possible splinter protection.

## Brilliant rendering of color without any annoying reflections

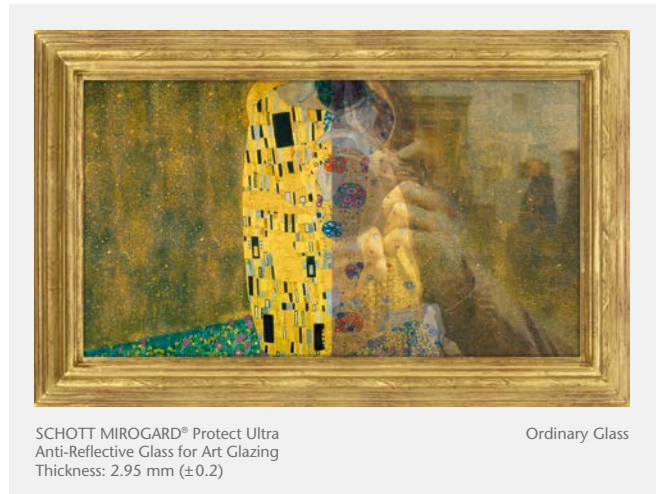
The high-quality anti-reflective coating with less than 1% residual reflection allows for undisturbed viewing of artworks. MIROGARD® Protect Ultra guarantees genuine colors with a general color rendering index of  $R_a = 100$ .

## Safe and easy handling thanks to its light weight

Due to the composite film we use, MIROGARD® Protect Ultra remains extremely mechanical stable, yet is light in weight. One m<sup>2</sup> weighs only 6.5 kg.

## Easy integration into existing frame solutions

Because it is only 2.95 mm thick, MIROGARD® Protect Ultra can easily be used in existing standard picture framing solutions.

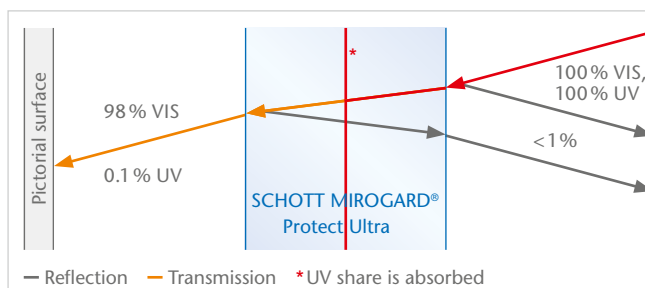


## Applications for picture glazing

- Museums
- High-quality art collections
- Galleries
- For ensured loans to exhibitions

## Benefits

- Anti-reflective coating
- Low specific weight
- Best possible color rendering
- Outstanding UV protection
- Splinter protection
- High mechanical stability



MIROGARD® Protect Ultra absorbs almost 100% of harmful UV light. Nevertheless, it still transmits nearly 100% of the visible light, with no annoying reflections and with the acknowledged excellent  $R_a = 100$  color rendering index of SCHOTT MIROGARD®.

## Specification MIROGARD® Protect Ultra

Glass thickness 2.95 mm (±0.2 mm)

Available in sizes up to 1,770 mm x 1,220 mm

Visual reflectance	< 1%
Luminous transmittance	98%
General color rendering index	$R_a = 100$
UV protection (300–380 nm)	99.9%
Mechanical protection	splinter protection

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