PLEXIGLAS® and EUROPLEX® Films
Always On Top

You meet PLEXIGLAS® every day, all your life. It provides a clear view, lens shape and brilliance to a variety of objects; it protects against rain, hail and stormy weather, can withstand extreme pressure and heat, is impact-resistant and faithfully reflects the world in all its colors.

Besides these properties, it is environmentally friendly and can be recycled after careful separation from other materials.

Thanks to its high functionality and many special grades, PLEXIGLAS® is surprisingly adaptable to new applications that call for novel properties. PLEXIGLAS® has made a name for itself in items that make life easier and safer, more varied and exciting, and that need to meet very stringent requirements.

Evonik is your reliable partner for PLEXIGLAS® since more then 70 years.

EUROPLEX® HC Films combine excellent weathering performance with outstanding chemical resistance due to the polyvinylidene fluoride (PVDF) surface.

PLEXIGLAS® and EUROPLEX® films

Evonik is offering a wide variety of film solutions to make your product look or perform better.

- PLEXIGLAS® films are pure polymethylmethacrylate (PMMA) films, with different loadings of UV-absorbers.
- EUROPLEX® films are PMMA films co-extruded with Polyvinylidene fluoride (PVDF), the fluoropolymer facing outside.
- PLEXIGLAS® and EUROPLEX® films are produced in thicknesses typically between 50 µm and 1.0 mm, both for decorative and protective end-use.
- They show very good abrasion resistance, weather resistance and are absolutely colorless, meaning there is no color shift in the decor applied to the back of the film.
- PLEXIGLAS® and EUROPLEX® films are delivered on rolls, 1.0 mm as sheets.

Chill-roll films

PLEXIGLAS® pure PMMA chill-roll films and EUROPLEX® PMMA/PVDF co-extruded chill-roll films are typically between 50 µm and 125 µm thick. The films manufactured by this process show a high-glossy surface.

Calendered films

PLEXIGLAS® pure PMMA films in thicknesses of 125 µm to 1.0 mm are typically made using a calender stack. As the melt leaves the die, the film is formed in the roll nip, transferring the mirror-like gloss of the calender rolls onto the film surface. This process makes it possible to obtain PLEXIGLAS® films with high-gloss surfaces which are demanded by the automotive industry. From 175 µm onward, a deep-view effect can be obtained on decorated surfaces using PLEXIGLAS® as carrier for your decoration.

UV-protective films for improved exterior weathering on polymeric substrates

Why do you need improved material performance?

- There is a clear drive in the market for longer warranties.

What can you do?

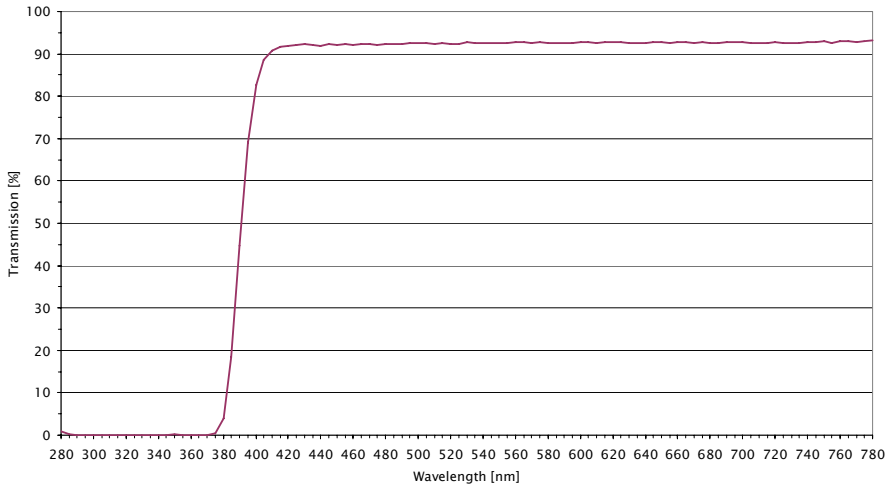
- Boost the performance of your products.
- Outperform the competition.
- Be with the no. 1 in the market.

How can you do it?

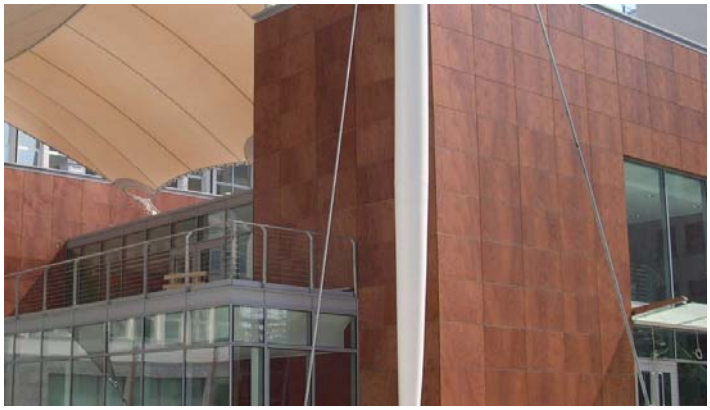
- Protect your products with PLEXIGLAS® or EUROPLEX® films

Processing

Laminating PLEXIGLAS® or EUROPLEX® films onto your polymeric substrates –films or sheets – is relatively easy. The most common technology for binding them to another substrate is the in-line heat lamination (heat-fusing). The bond between PVC / ABS / PC and PMMA is a melt bond. Typical lamination temperatures are between 140 – 180 °C. Most suitable grades for these lamination applications are PLEXIGLAS Film 0F008 or 0F032 matt.
For laminates with optical surfaces, like retro reflective traffic signs, PLEXIGLAS Film 0F016 is the right grade.
Bonding to polyolefins is possible through an adhesive.



Spectral transmittance PLEXIGLAS® Film 0F008, thickness = 53 µm



UV protective films for improved exterior weatherable high-pressure laminates (HPL)

PLEXIGLAS® 99836 is our standard UV protective film for exterior grade compact laminates. It absorbs over 98% of the UV radiation and shows optimal performance in long time outdoor weathering.

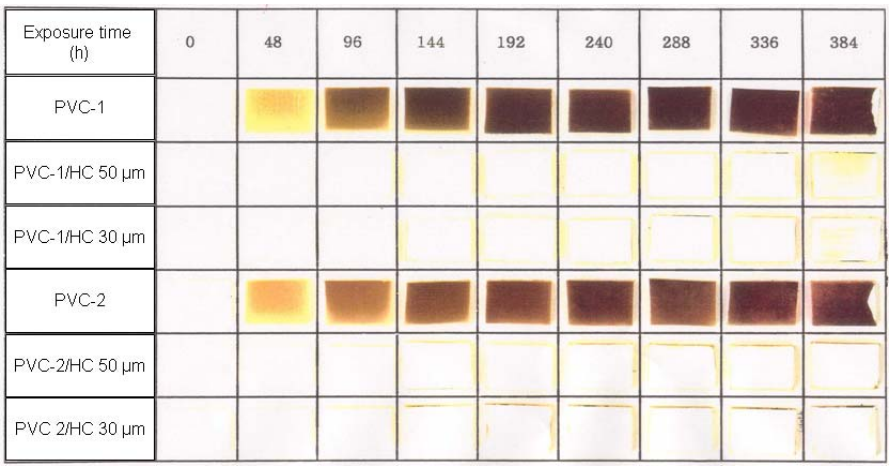
EUROPLEX® HC 99716 is our premium film for the HPL market segment. Virtually on top to the UV protection performance of PLEXIGLAS® 99836, it adds PVDF on its top layer. In addition, the PVDF provides superior chemical resistance and an anti soiling / easy to clean surface.

Both products include a tailored formulation of the PMMA base layer that achieves a chemical bonding onto your panels.

Processing

Our UV protective films 99836 and HC 99716 are directly applied during the manufacturing process of the panels. No additional equipment, process step or adhesive is necessary. Standard process temperatures of 135°C to 155°C as well as standard process pressures of 70 to 100 bars are perfect compatible with the incorporation of our films and the achievement of the proper chemical bonding. You can also optimize your process and stop using release films. The surface of both films will not stick to your press plates.

In order to achieve a proper performance, we recommend to contact us. We offer to support in finding a suitable formulation for the high pressure laminate (HPL), to achieve the maximum in long term durability.



Accelerated UV test: Measurement of the color difference of PVC; super UV-tester SUV-W11, Irradiance: 83mW/cm²; 300-400 nm, black panel temperature 63°C, Humidity: 60%.
PVC-1,
PVC-2, modified formulation
HC = EUROPLEX® Film HC 99710 cap layer

PLEXIGLAS® films for light scattering applications

PLEXIGLAS® White 99532 and White 99547 light scattering films are based on impact-modified polymethyl methacrylate and offer an ideal combination of transmission and light diffusion. The key properties compared to other materials suitable for illumination purposes are the pure white color, fewer inclusions, extreme weatherability and UV resistance. They will not show yellowing in lighting applications, were white PVC or PC films, for example, show color change within a short period of time. In addition, these films with two high-gloss surfaces have good resistance to weak acids and alkalis as well as to non-polar solvents.

PLEXIGLAS® light scattering films can be printed by all techniques, including gravure, flexographic, screen and digital printing. Furthermore, the films can be die-cut using steel rule dies and column-guided tools.

PLEXIGLAS® films for graphic screen printing

The grade PLEXIGLAS® Film Clear 99524 is most suitable for the insert molding process. High gloss surfaces can be achieved with an excellent deep view effect. PLEXIGLAS® Film Clear 99524 can be used for optical applications like light guides. Very precise optical structures can be embossed into the film. The film matches perfect optical requirements, when coated with acrylate based hardcoats. Additionally, the films can be delivered with a matt surface.

Our product range

	Thickness range	Remarks
Lamination films		
PLEXIGLAS® Film 0F008	53 µm	PVC lamination
PLEXIGLAS® Film 0F014	53 and 75 µm	high impact strength, high quality lamination, gravure printing
PLEXIGLAS® Film 0F016	60 and 75 µm	good surface hardness, high quality lamination, gravure printing
PLEXIGLAS® Film 0F032	70 µm	matt / smooth surface, PVC lamination, gravure printing
PLEXIGLAS® Film 99836	50 µm	one side bonding optimized
EUROPLEX ® Film HC 99710	50 µm	one side PMMA / one side PVDF
EUROPLEX ® Film HC 99716	50 µm	one side PMMA, bonding optimized / one side PVDF
Calendared films		
PLEXIGLAS® Film 99524	175, 250, 375, 500, 750 and 1000 µm	high gloss, graphic quality
PLEXIGLAS® Film 0F003	250 µm	one side matt, one side gloss
Light Scattering films		
PLEXIGLAS® Film white 99547	250 µm	soft light
PLEXIGLAS® Film white 99532	500 and 1000 µm	soft light

Lamination films

Property	Test method	Unit	PLEXIGLAS® Film 0F032 matt	PLEXIGLAS® Film 0F008 gloss	PLEXIGLAS® Film 0F014 gloss	PLEXIGLAS® Film 0F016 gloss	PLEXIGLAS® Film 99836 gloss
Mechanical							
Yield stress	ISO 527-3	MPa	35	45	47	43	52
Yield strain	ISO 527-3	%	6	5	6	6	5
Nominal strain at break	ISO 527-3	%	> 50	> 50	> 50	25	12
Thermal							
Vicat softening temp.[1)]	ISO 306	°C	78	86	86	96	–
Specific heat	/	kJ/kgK	1.5	1.5	1.5	1.5	1.5
Weatherability							
Xenontest 1200 / 8000 h	/	/	No visible change	No visible change	No visible change	No visible change	No visible change
Optical							
Light Transmittance D65	DIN 5036	%	90	92	92	92	92
UV- Transmittance (280 - 380 nm)	DIN 5036	%	≤ 1	≤ 1	≤ 1.5	≤ 1.5	< 1
Haze	ASTM D1003	%	/	≤ 1	≤ 1	≤ 1	≤ 1.5
Yellowness index	ASTM D1925	/	≤ 1.5	–	≤ 1.5	≤ 1.5	< 1
Refractive index	ISO 489	/	1.49	1.49	1.49	1.49	1.49
Gloss (60°) [3)]	DIN 67 530	/	22	–	–	–	–
Electrical							
Volume resistivity	IEC 250	Ohm cm	> 10^{13}	> 10^{13}	> 10^{13}	> 10^{13}	> 10^{13}
Relative permittivity 100 Hz - 1Mhz	IEC 250	/	0.04 - 0.03	0.04 - 0.03	0.04 - 0.03	0.04 - 0.03	0.04 - 0.03
Others							
Surface tension	/	mN/m	50	50	50	50	50
Density [1)]	ISO 1183	g/cm³	1.15	1.14	1.13	1.15	1.15

1) based on molding compound

High pressure laminate (HPL) films

Property	Test method	Unit	EUROPLEX® Film HC 99710 gloss	EUROPLEX® Film HC 99716 gloss
Mechanical				
Yield stress	ISO 527-3	MPa	45	45
Yield strain	ISO 527-3	%	-	-
Nominal strain at break	ISO 527-3	%	> 50	> 50
Thermal				
Vicat softening temp.[1)]	ISO 306	°C	-	-
Specific heat	/	kJ/kgK	-	-
Weatherability				
Xenontest 1200 / 8000 h	/	/	No visible change	No visible change
Optical				
Light Transmittance D65	DIN 5036	%	93	93
UV- Transmittance (280 - 380 nm)	DIN 5036	%	< 1	< 2
Haze	ASTM D1003	%	2	2
Yellowness index	ASTM D1925	/	< 1	< 1
Refractive index	ISO 489	/	-	-
Gloss (60°) [3)]	DIN 67 530	/	-	-
Electrical				
Volume resistivity	IEC 250	Ohm cm	-	-
Relative permittivity 100 Hz - 1Mhz	IEC 250	/	-	-
Others				
Surface Tension	/	mN/m	23	23
Density [1)]	ISO 1183	g/cm³	1.2	1.2

1) based on molding compound



Insert and light scattering films

Property	Test method	Unit	PLEXIGLAS® Film 99524 gloss	PLEXIGLAS® Film 99547 White	PLEXIGLAS® 99532 White opaque
Mechanical					
Yield stress	ISO 527-3	MPa	54	55	51
Yield strain	ISO 527-3	%	5	4.5	4.5
Nominal strain at break	ISO 527-3	%	35	–	–
Thermal					
Vicat softening temp.[1)]	ISO 306	°C	100	100	98
Specific heat	/	kJ/kgK	1.5	1.5	1.5
Weatherability					
Xenontest 1200 / 8000 h	/	/	–	–	–
Optical					
Light Transmittance D65	DIN 5036	%	92	54.5/0.25 mm	57.5 / 0.5 mm
Haze	ASTM D1003	%	< 1	–	–
Refractive index	ISO 489	/	1,49	–	–
Gloss (60°)	DIN 67 530	/	83	–	–
Electrical					
Volume resistivity	IEC 250	Ohm cm	> 10^{13}	> 10^{13}	> 10^{13}
Relative permittivity 100 Hz – 1Mhz	IEC 250	/	0.05- 0.03	0.05 – 0.03	0.04 – 0.03
Others					
Surface Tension	/	mN/m	50	50	50
Density [1)]	ISO 1183	g/cm³	1.16	1.16	1.16

1) based on molding compound

® = registered trademark

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Ref-No. 112-4 March 2011

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