



PLEXIGLAS® and EUROPLEX® Films

General information on EUROPLEX® and PLEXIGLAS® films for High Pressure Laminates

High Pressure Laminate (HPL)

Clothes make the man – and this equally applies to buildings: The look of a building facade influences our perception of the institutions or companies housed within. Faded colors and damaged areas are not a great advertisement; neither is graffiti or scratches. HPL panels can be given reliable protection by a layer made of PLEXIGLAS® or EUROPLEX® special films. These are used as cladding on many contemporary and prestigious buildings, playgrounds, interior construction and furniture.

Flat laminate panels known as high-pressure laminates or HPL panels are ideally suited for facade cladding: They are very lightweight and offer architects tremendous creative space for designing unique facades thanks to the wide variety of colors, decorative patterns and structures. However, the quality of HPL exterior facade panels stands and falls with the properties of the uppermost protective layer. It must be weather resistant and must never delaminate from the sheet, as this can ruin the appearance of the facade.

Films

PLEXIGLAS® and EUROPLEX® films for HPL can be easily applied on the panels during the HPL pressing with no adjustment of the process. All films guarantee an excellent adhesion to melamine décor with no delamination.

PLEXIGLAS® Film 99836 is our standard PLEXIGLAS® PMMA based film for HPL applications. The film has high surface hardness, is resistant to weathering and shows good forming behavior when thermoformed. It's available in 50 and 75µm.

EUROPLEX® HC Film OF700 brings additional values to the final product. The coextruded EUROPLEX® HC Film OF700 comes with a PVDF top layer and convinces with easy-to-clean surface as well as chemical resistance and anti-soiling properties.

Customized thicknesses and surfaces are available on request.

Product name	Thicknesses available [µm]	Remarks
PLEXIGLAS® Film 99836	50, 75	Coextruded film with PMMA based main layer and bonding optimized layer
EUROPLEX® HC Film OF700	53, 75	- Coextruded film, with a PVDF layer on top, a PMMA based main layer and a bonding optimized layer - Easy-to-clean surface, chemical resistance and anti-soiling properties
EUROPLEX® Film OF024	50, 75	Monolayer bonding film to melamine paper suitable to counterbalance on compact laminates backside
PLEXIGLAS® Film OF043	50, 75	Monolayer bonding film to PMMA film, melamine paper or melamine resin, metallic film, PVC and PC core material

Table 1: Available EUROPLEX® and PLEXIGLAS® films for High Pressure Laminates



PLEXIGLAS® and EUROPLEX® Films

Typical construction of HPL protected by film

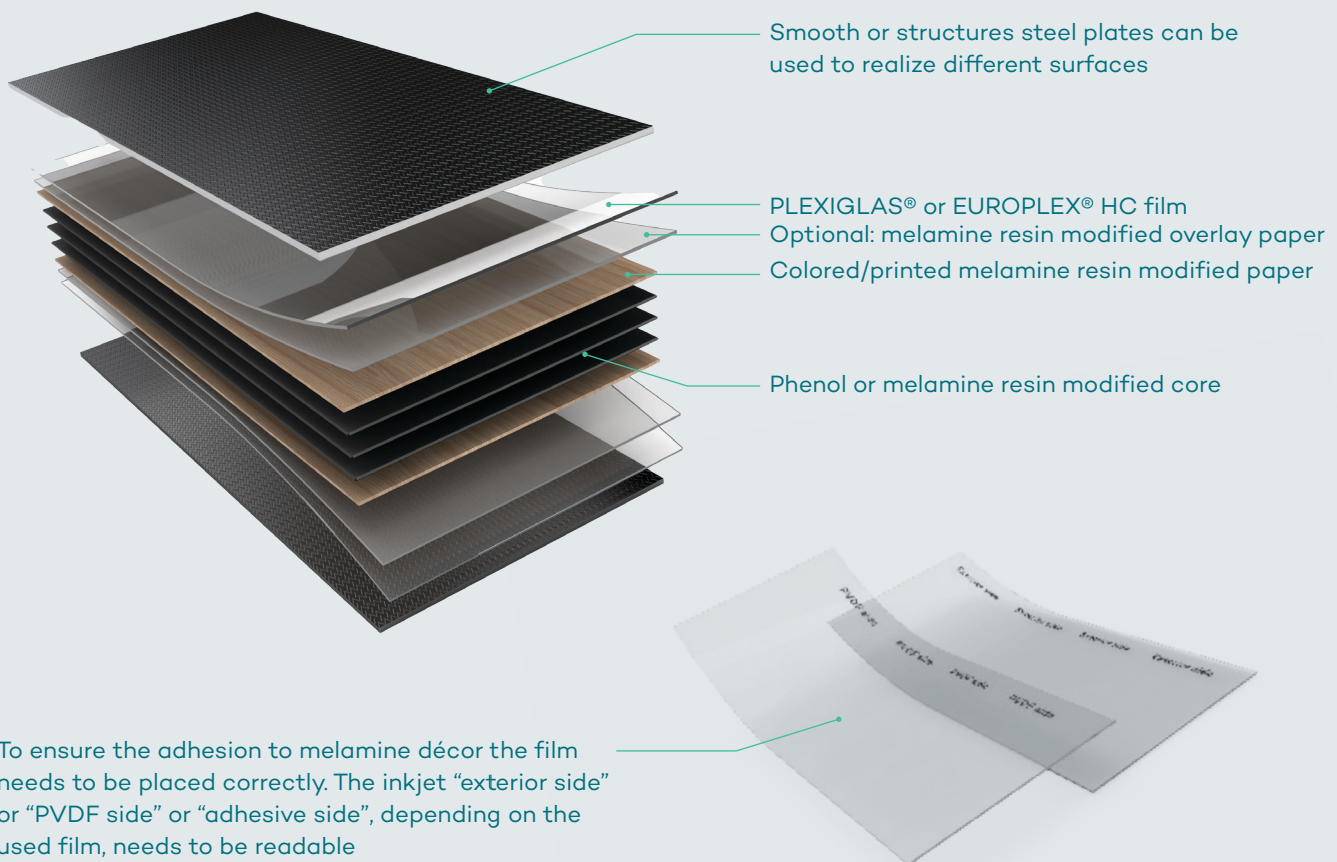
PLEXIGLAS® and EUROPLEX® films for HPL serve as a protective layer for high-quality HPL Panels in outdoor and indoor applications. They are applied as outer layer on the panels during the HPL pressing.

A release film or release paper is not necessarily needed for EUROPLEX® HC 0F700. Due to the fluoropolymer (PVDF side) of EUROPLEX® HC 0F700, the release force is reduced. For PLEXIGLAS® 99836 the use of release paper is recommended.

Best results are achievable with melamine resin impregnated décor and / or overlay papers. Release agents / wetting agents to be avoided in melamine resin formulation.

Preparation of the metal press plates

Ensure that the used metal press plates, especially structured ones, are free of phenol / melamine dust from previous productions. Otherwise, the dust will be pressed into the film surface and causes an optical effect. In case of a handling mistake (e.g. by applying the wrong film side) and depending on the used metal plates, mechanical treatments such as sandblasting can be used to remove film remains on or in the structure of the metal plates.





PLEXIGLAS® and EUROPLEX® Films

General recommendations

All films can directly be applied during the manufacturing process of the HPL. No additional process step or adhesive treatment is necessary.

The adhesive side of the multilayer film must be in contact with the overlay.

Recommended solvents to remove tiny film remains on or in the structure of the metal plates, are acetone, methyl ethyl ketone (MEK), ethyl acetate for the PMMA part and polar solvents with consideration of their dangerousness; n-methyl 2-pyrrolidone (NMP), dimethylformamide (DMF), dimethyl acetamide (DMA), dimethyl sulfoxide (DMSO) for the PVDF part.

Recommended processing parameters

Recommended Temperature Range: 140–150°C

Recommended Pressure: 70–100 bar (specific pressure)

Recommended total cycle time: 60–90 minutes

The usage of decoration paper with high light stable pigmentation; minimum "Level 7" on the Blue Wool Scale is recommended.

Cleaning instruction

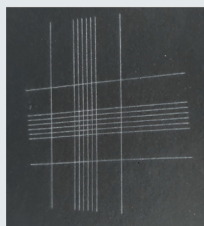
- PLEXIGLAS® and EUROPLEX® HC films provide an easy-to-clean surface. Dust and pollution is easily washed away.
- No cleaning chemicals are necessary.
- The usage of soapy water and soft cloth is recommended.
- Aggressive cleaning is not necessary nor recommended for long term high optical quality.
- EUROPLEX® HC films withstand contact with chemicals.
- Highly adherent contamination like Graffiti can be removed from EUROPLEX® HC films with suitable cleaning agents without leaving a shadow picture.

Test methods chemical bonding

In case of any doubt regarding the achievement of a proper chemical adhesion onto HPL panels, we highly recommend the following delamination tests according to EN 438-2, 12 and 15:

- 2 hours in boiling water
- 48 hours in 65°C water

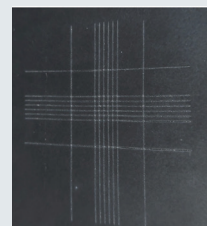
After this treatment, a cross hatch test should be performed to check for a potential delamination.



after 48 h at 65°C



after 2 h at 100°C



after 8 h at 100°C

Key properties

PLEXIGLAS® and EUROPLEX® films are suitable for interior and exterior applications. Depending on their location, facades must be protected against surface damage in addition to weather influences. Facades of low-lying building sections are particularly vulnerable to damage, for example through scratches caused by bicycles leaning against the facade, vandalism or graffiti.

	PLEXIGLAS® 99836	EUROPLEX® HC OF700
Film composition	Impact modified polymethyl methacrylate (PMMA)	PMMA layer with co-extruded PVDF
Optics	Clear	Glossy
UV protection 10 years	++	+++
UV protection 20 years+		+++
Chemical resistance		+
Easy to clean including graffiti		++
Anti-soiling		++
High scratch resistance		

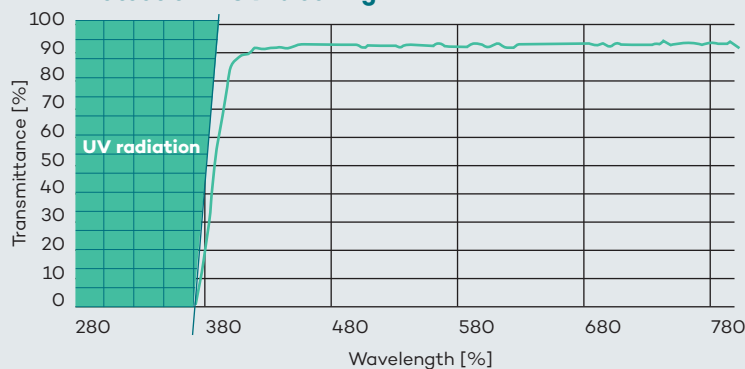


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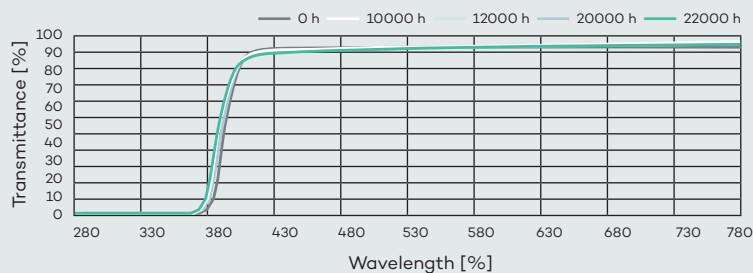
UV protection for permanently true colors

HPL panels consist of multiple layers. The decorative layer gives the application and appearance reminiscent of wood, stone or metal. The highly transparent films retain their brilliance even when subjected to intense solar radiation. PLEXIGLAS® and EUROPLEX® films permanently protect the color layer of the HPL panel against yellowing and therefore guarantee their color stability.

Protection – UV-blocking



Excellent UV protection even after 22000 h in the accelerated weathering according to ISO 4892-2

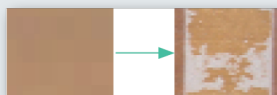


Weather resistance

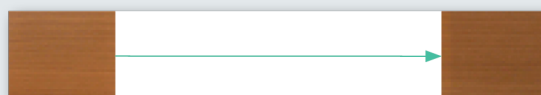
PLEXIGLAS® and EUROPLEX® films show excellent weather resistance in tests according to ISO 4892-2 (EN 438-2, 28).

While the official recommendation according to EN 438-2, 19 is to test exterior laminates for 3000 hours, PLEXIGLAS® 99836 successfully performed weathering test for 8000 hours. EUROPLEX® HC 0F700 successfully performed even more than 15000 hours.

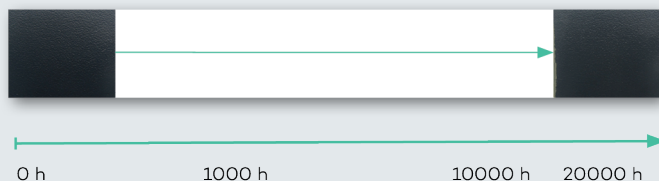
HPL without UV Protection film



HPL protected by PLEXIGLAS® 99836



HPL protected by EUROPLEX® HC 0F700



Chemical bonding

Chemical reaction between adhesive promoter and the melamine resin of the décor paper achieves a covalent bond after adhesive promoter is activated during HPL pressing process.

Easy-to-clean

EUROPLEX® HC film provides an easy-to-clean surface. Dirt, dust, pollutions, soil, will be washed away by the rain.

HPL panels with EUROPLEX® HC Film 0F700 withstand graffiti removal with suitable cleaning agents according to requirements of NF F 31-112 without leaving a shadow picture / ghost image.





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Technical data						
Properties	Test method	Unit	PLEXIGLAS® HC 99836	EUROPLEX® HC OF700	EUROPLEX® OF024	PLEXIGLAS® OF043
Optical						
Luminous transmittance (D65/10°)	DIN EN ISO 11664	%	92	92	92	92
UV transmittance (280–380nm)	DIN EN 410	%	< 1	< 0.5	< 1	< 2
Refractive Index	DIN EN 410	%	1.49	N/A	N/A	approx. 1.49
Mechanical *						
Tensile yield stress (σ_y)	DIN EN ISO 527-3	MPa	59	59	37	47
Yield strain (ϵ_y)	DIN EN ISO 527-3	%	6	8	100	> 25
Nominal strain at break (ϵ_{IB})	DIN EN ISO 527-3	%	20	60	N/A	97
Thermal						
Glass transition temperature T _g (DSC)	DIN EN ISO 11357	°C	96	N/A	approx. 97	approx. 97
Miscellaneous						
Accelerated weathering resistance	DIN EN ISO 4892-2, method A, cycle 1	h	7500	15000	N/A	N/A
UV transmittance (280–380nm) after weathering resistance test	DIN EN 410	%	< 10	< 5	N/A	N/A
Density	DIN EN ISO 1183	g/cm ³	1.17	1.22	1.19	1.14
Surface tension	DIN ISO 8296	mN/m	40	26	approx. 40	approx. 40

* Measured before pressing

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® = registered trademark

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