

# PLEXIGLAS® EndLighten

A New Dimension of Light



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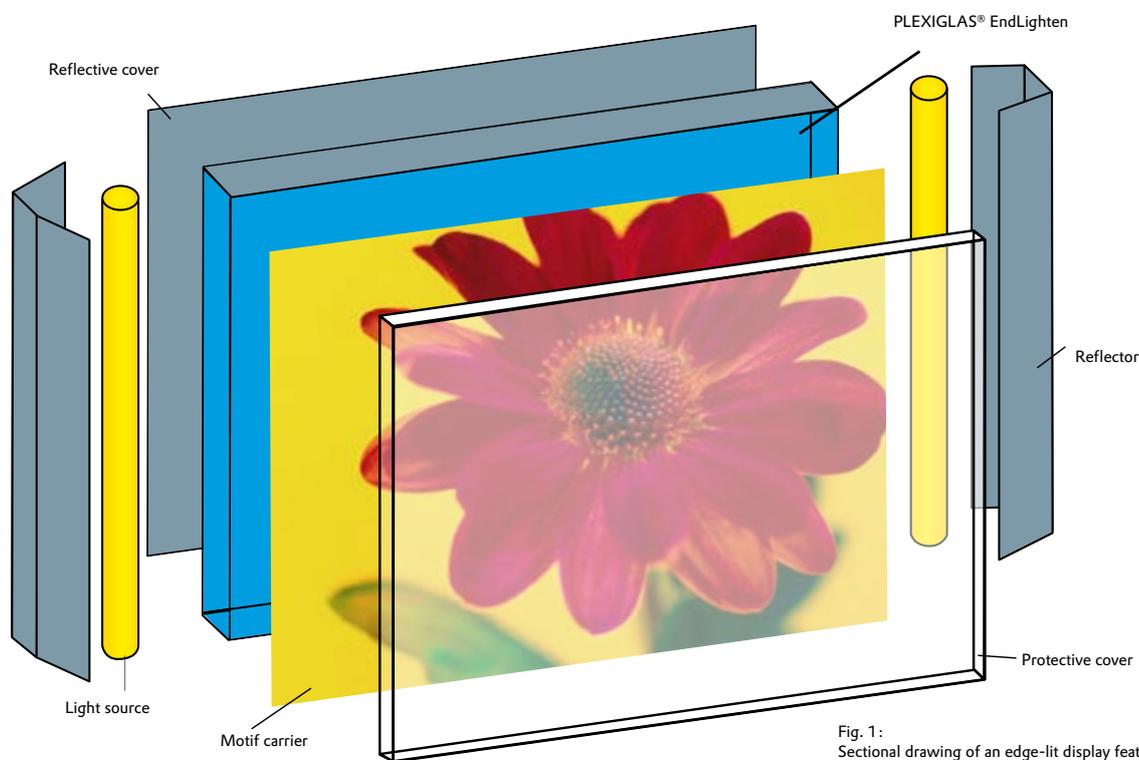


Fig. 1:  
Sectional drawing of an edge-lit display featuring PLEXIGLAS® EndLighten

## Product

Whether for artworks, signage or accent lighting, edge-lit PLEXIGLAS® EndLighten provides uniform backlighting of ultraslim units. The thickness tolerances of this product have been further reduced as compared with its predecessor, the well-known PLEXIGLAS® GS 1002, and the range has been extended to cover extremely large applications.

## Applications

PLEXIGLAS® EndLighten is a transparent, light-diffusing acrylic (PMMA) that exhibits special light-conducting properties. Luminous displays made with edge-lit sheets of PLEXIGLAS® EndLighten, distribute the light entering through their edges and emit it uniformly over their entire surfaces. PLEXIGLAS® EndLighten makes it possible to construct particularly flat, large-surface, single or double-sided, uniformly bright displays, light boxes, LCD displays, poster panels, room dividers, and much more.

# PLEXIGLAS® EndLighten

## Our Range

PLEXIGLAS® EndLighten	Thickness in mm	Recommended lamp spacing for illumination on both sides*
PLEXIGLAS® EndLighten L Grade number 0N001	6 and 8	300–600 mm
PLEXIGLAS® EndLighten XL Grade number 0N002	8 and 10	600–1300 mm
PLEXIGLAS® EndLighten XXL Grade number 0N003	10	1300–2000 mm

PLEXIGLAS® EndLighten is available in standard size 3050 x 2050 mm.  
Special lengths and thicknesses on request.

PLEXIGLAS® EndLighten, illumination on four sides with colored LEDs

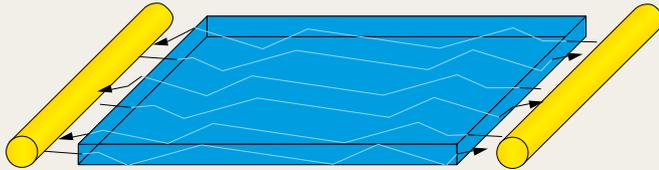


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## Operating Principle and Construction

PLEXIGLAS® EndLighten contains embedded colorless diffuser particles in the acrylic sheet, which cause the light to diffuse forwards. The propagation direction of the light entering the sheet is changed by scattering in such a manner that the total reflection on the surface is reduced and the light exits at small angles to the sheet surface (Figure 2). This effect produces a uniformly bright surface.

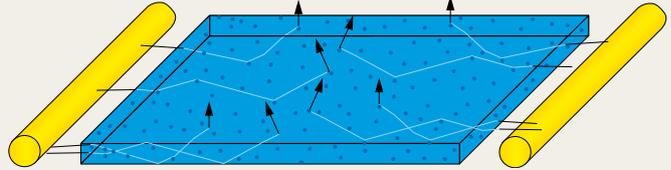
Fig. 2: Total reflection vs. forward diffusion



Normal colorless PMMA conducts light by internal total reflection. The light beams remain in the sheet and only exit at the edges.

## Double-sided or single-sided emission

The luminous signs may be constructed so as to emit light from one or both sides. For one-sided emission, the back cover should be made light-excluding and as strongly reflective as possible. Both reflective and diffusely reflective material may be used for this. For two-sided emission, both the covers and motif carrier should consist of the same material, if possible.



Diffusing particles embedded in PLEXIGLAS® EndLighten selectively reduce the total reflection. Light beams can also leave the sheet at the surfaces.

## Suggestions for Use

### Advantages of reflectors for lighting the edges

Different types of lamps may be used as light sources (neon tubing, aperture lamps, LEDs, cold cathode lamps, etc.). Suitable reflectors should be placed around the lamps to feed the maximum amount of light into the outside edges and keep the clearance between the lamp and edge as small as possible (Fig. 3).

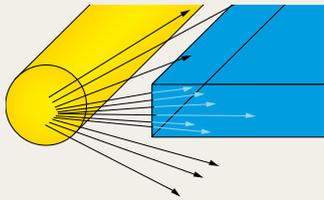


Fig. 3a: Without a reflector, part of the light is wasted

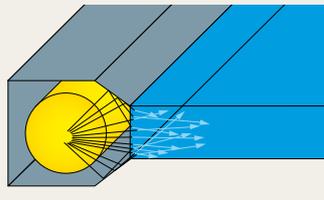


Fig. 3b: The reflector guides the light toward the edge of the sheet

## Advantages of smooth, glossy edges for edge lighting

To minimize scattering loss when beaming in the light, the roughness on the edge surfaces is smoothed by diamond milling or flame polishing (Fig. 4). Cutting the sheet to size with laser cutting machines results in edges that require no further polishing (Fig. 4). The smooth glossy edge reduces scattering losses by as much as 6% compared to a sawed edge.

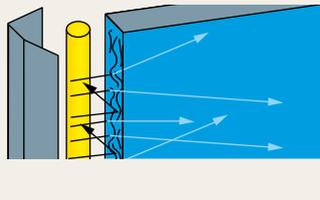


Fig. 4a: Rough edge: Some scattering on the sheet edge

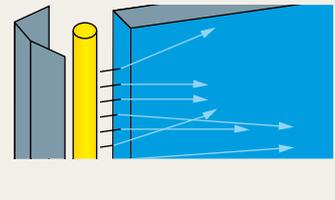


Fig. 4b: Smooth edge: Very little scattering on the sheet edge

## Advantages of reflective adhesive tape

Edges that are not lit should be covered with self-adhesive reflective tape (with a high-gloss adhesive side). This prevents unused light from escaping (Fig. 5).

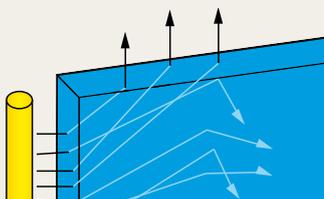


Fig. 5a: No mirror coating: Light leaves the sheet unused

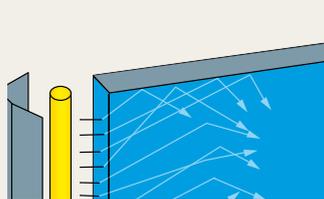


Fig. 5b: With mirror coating: Light is reflected back into the sheet

## Attaching the motif carrier

The covers and motif carriers should not be glued or laminated to the entire surface of the sheet of PLEXIGLAS® EndLighten, since disturbing bright and dark spots would appear if optical contact were made (Fig. 6). An appropriate distance needs to be maintained in the structure.

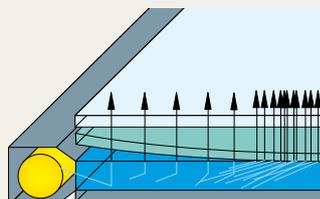


Fig. 6a: Optical contactSheet/poster: Optical distortions Advantages

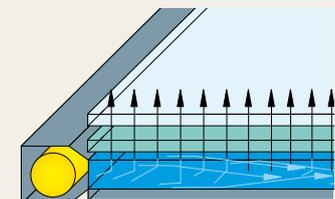


Fig. 6b: No optical contactSheet/poster: Light is only emitted by the PLEXIGLAS® EndLighten sheet



Fig. 7: Sectional drawing of an edge-lit display featuring PLEXIGLAS® EndLighten

If only one side is to be light-emitting, then an opaque and strongly reflecting material should be chosen for the opposite side. The motif carriers to be illuminated may be attached to translucent PLEXIGLAS® sheets, papers or films, possibly behind colorless protective covers, and they may be easily replaced in front of the light-diffusion sheet made of PLEXIGLAS® EndLighten.

A covering made of light-diffusing material (such as PLEXIGLAS® Satin Ice) causes the light beams to be deflected from the sheet at small angles, primarily in the desired direction normal to the sheet. This method makes the sheet appear brighter when observed in a vertical position.

### Luminance and brightness of illuminated frames

The table below examples of the luminance/brightness of illuminated frames. These data are based on calculations and measurements with different types of lamps, lamp power and frame sizes. The lamps are mounted on both longitudinal sides and completely encased by an aluminum reflector. Light is deflected on one side by a matte white surface on the back. Luminance was measured using a Minolta Chroma Meter, CS-100.

The data show the excellent light distribution properties of EndLighten, irrespective of the lamp types used, and a distinctly more uniform light distribution than that provided by conventional matte acrylic, for example (see table). As mentioned above, the data apply to the stated boundary conditions and must be examined on a case-to-case basis when transferred to alternative structures.

Frame Size	PLEXIGLAS® Type	Luminance/brightness in cd/m <sup>2</sup>	
		Half distance from frame center	Frame center
DIN A3 (420 x 300 mm) <sup>a</sup>	PLEXIGLAS® EndLighten L, 8 mm	55	54
DIN A3 (420 x 300 mm) <sup>b</sup>	PLEXIGLAS® EndLighten L, 8 mm	223	218
DIN A0 (1190 x 840 mm) <sup>c</sup>	PLEXIGLAS® EndLighten XL, 8 mm	579	551

<sup>a</sup>) Illuminated on both sides with LED, OSRAM LINEAR Light OS-LM1A-W1-854, 450 mm

<sup>b</sup>) Illuminated on both sides with a specific luminosity of ca. 1560 lumen/m, corresponding to T5 neon tubes of type OSRAM L 8W/840

<sup>c</sup>) Illuminated on both sides with a specific luminosity of ca. 3500 lumen/m, corresponding to T5 neon tubes of type Philips TL5 HO 39W/865 or OSRAM FQ 39W/860

® = registered trademark

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Certified to DIN EN ISO 9001 (Quality)  
and DIN EN ISO 14001 (Environment)

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