

PLEXIGLAS® LED

For backlighting, white

WH14, WH72, WH51, WM51 (previously PLEXIGLAS truLED®, White)

Product

These white translucent sheets were specially developed for backlighting with LEDs. Combining LEDs with PLEXIGLAS® LED makes for maximum efficiency and superior lighting technology, especially in illuminated signs, store fixtures and exhibition booths.

PLEXIGLAS® LED for backlighting offers a high degree of white opacity in incident light and daylight. Its translucency has been optimized to offer extremely high transmission paired with high light diffusion, which prevents any LED hot spots. Two PLEXIGLAS® LED variants are offered in thicknesses of 3–10 mm: WH14 with high transmission and WH72 with pronounced light diffusion.

Grades WH51 and WM51 provide the same properties in the form of thicker sheets. WH51 diffuses light to a greater extent and offers better white opacity in incident light and during the day. For technical reasons, given balanced diffusion of LED light in incident and transmitted light, grades WH51 and WM51 show identical properties in a thickness of 30 mm (see Fig. 1). Therefore, WM51 is the only grade available from stock in 30mm thickness.

Properties

In addition to the well-known and proven properties of PLEXIGLAS®, such as

- extremely high weather resistance,
- ease of fabrication,
- 100% recyclability,

PLEXIGLAS® LED WH14, WH72, WH51 and WM51 offer the following characteristics:

- broad processing latitude: light diffusion and uniform illumination are ideal for a broad range of options (shallow and deep routing)
- brilliant, extremely weather-stable whiteness in incident light
- no LED hot spots due to optimum light diffusion
- high luminous efficiency, and therefore cost savings, through improved diffusion

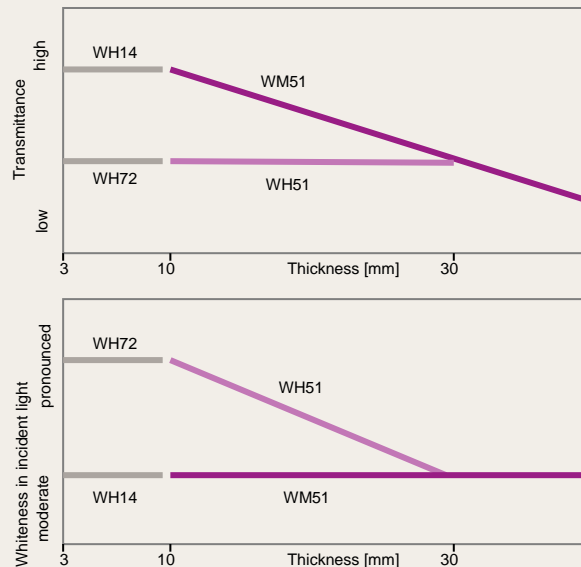


Fig. 1: Transmittance (top) and white opacity in incident light as a function of thickness.

Applications

These properties make PLEXIGLAS® LED especially suitable as:

- a thin sheet (WH14, WH72) for advertising signs: glowing letters, light boxes, backlighting in exhibition booths and store fixtures (see Fig. 2). The lighting example in Fig. 1 shows greater brightness with PLEXIGLAS® LED than with a conventional grade with comparable light diffusion.
- a thick sheet/block (WH51, WM51) with a material thickness of 12–40 mm: routed letters in illuminated signs, backlighting in furniture and store fixtures. Figs. 3.1–3.3. show different variants of these applications.

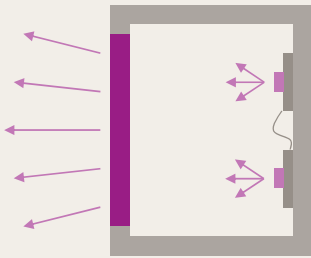


Fig. 2: Illuminated sign with a thin sheet

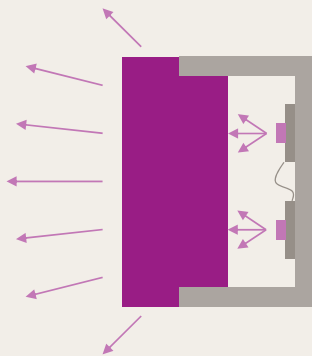


Fig. 3.1: Backlighting with a thick sheet

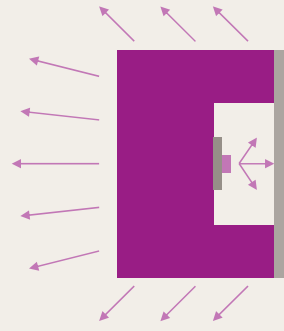


Fig. 3.2a: Backlighting with routing

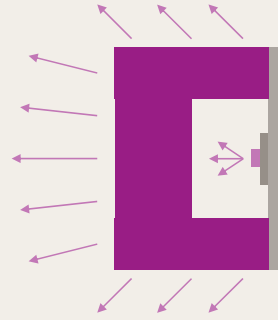


Fig. 3.2b: Indirect backlighting with routing

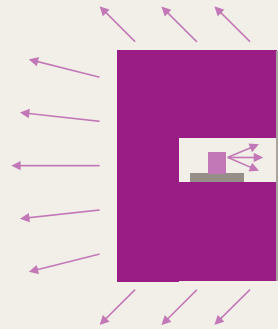


Fig. 3.3 : Backlighting with embedded flexible LED strips (side emitters)

Machining

PLEXIGLAS® LED can be machined just like standard PLEXIGLAS® GS. The following Guidelines for Workshop Practice are available for PLEXIGLAS®:

- Machining PLEXIGLAS® (Ref. No. 311-1)
- Forming PLEXIGLAS® (Ref. No. 311-2)
- Joining PLEXIGLAS® (Ref. No. 311-3)
- Fabricating Tips for PLEXIGLAS® Solid Sheet (Ref. No. 311-5)

Notes on routing letters out of thick sheets (WH51 and WM51):

- **Example:** Cut out the contour of a letter sized 300 x 300 mm with a laser or milling cutter. The mirror is 60 mm wide. Cut a groove in the back of the piece and insert the LED modules. You can order an example at www.plexiplas-shop.com (search "LED Demonstrator").

- The reverse side is usually covered with white, highly reflective material (e.g. powder-coated aluminum sheet) or left open, or transparent to translucent, to create a corona effect (Fig. 3.4).
- LEDs can be embedded in routed cavities. The wall thickness should not be reduced to less than 40% of the original material thickness so that the light can be diffused to best effect. Walls should not be made thinner than 12 mm in 30mm-thick sheets.
- Routing automatically changes the light diffusion properties, i.e. the resulting workpiece has lower light diffusion and higher light transmission. If routing leaves 40% of the original thickness, as is usually the case, the lighting values stay within a very positive range.

The decision tree in Fig. 4 helps you to choose the correct material.

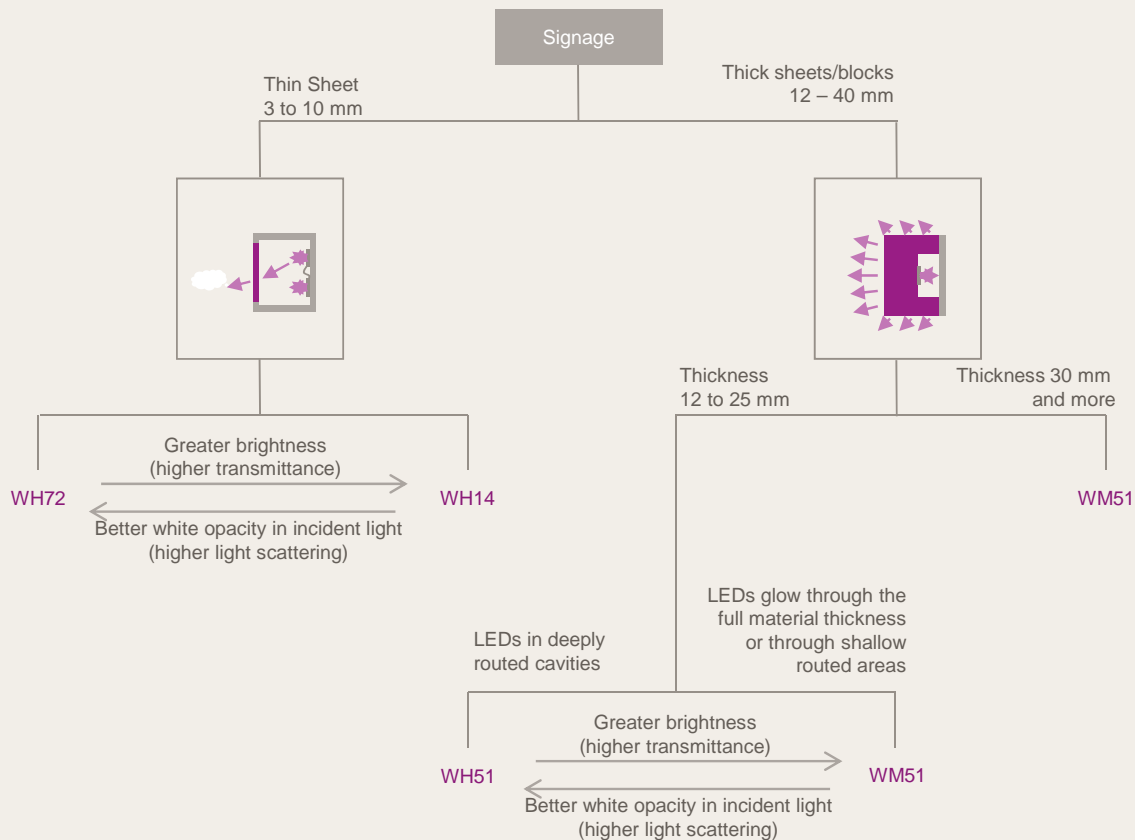


Fig. 4: Decision tree

Table 1: Brightness of a light box

LED grade (see grade)	τ_{D65}^* (τ_{D65}^*)	Color	Luminance (Luminance)
WH14 (WH02)	47 % (42 %)	White	1468 cd/m ² +22% (1208 cd/m ²)
WH72 (WH73) (WN070)	31 % (22 %) (28%)	White	1007 cd/m ² +41% (633 cd/m ²) (805 cd/m ²)

Measured with OSRAM BackLED BA01LA-W4F LED modules, with 115 modules/m² in the structure shown in Fig. 2.

PLEXIGLAS® LED, Backlighting white

	Thickness [mm]	τ_{D65}^*
PLEXIGLAS® LED WH14	3	47 %
PLEXIGLAS® LED WH72	3	31 %
PLEXIGLAS® LED WH51	15, 20, 25	22 %
PLEXIGLAS® LED WM51	15	45 %
	20	35 %
	25	28 %
	30	22 %

* Transmittance DIN 5033, ISO 13468-2.

Delivery forms

Size: 3,050 mm x 2,030 mm, from a thickness of 25 mm: 3,000 mm x 2,000 mm.

The complete product range can be found in the PLEXIGLAS® sales handbook.

Information for processing the WM51 and WH51 varieties for milled lettering:

The top side of the sheets / blocks (just like the front of the letter) is marked by inkjet printing.

This product belongs to the PLEXIGLAS® LED product family and was specially developed for the illuminated signage industry. You can find other interesting products developed for LED applications in the information sheet "PLEXIGLAS® LED Overview" (No. 212-6).

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