



International Committee of the Decorative Laminates Industry

Technical Leaflet

Multifunctional surfaces with HPL

May 2017



## Preface

High-pressure laminate (HPL) in accordance with EN 438 has been used in the construction and furniture sector for decades. The European standard EN 438 defines the material, requirements and properties of HPL.

HPL is a resin and paper-based thermosetting composite material and features a unique, extremely robust, resistant, modern and very decorative surface. HPL is omnipresent in our day-to-day lives and is self-supporting or used in conjunction with substrates. The application and usage areas of HPL are extremely diverse and are constantly evolving. This requires knowledge management which provides regularly updated information and assistance with regard to different applications and processing, in the form of technical bulletins.

The technical bulletin "Multifunctional surfaces with HPL" illustrates the possible applications of HPL in rooms used for presentations or events which require the use of projectors, flipcharts etc. This offers useful advice with regard to its areas of application.

This document makes no claim of completion regarding listing the full details of any standards referred to in the text.

All information is based on the current state of technical knowledge, but it does not constitute any form of liability. It is the personal responsibility of the user of the products described in this information leaflet to comply with the appropriate laws and regulations.

For more than 50 years the ICDLI has been the international representative of the interests of European laminate manufacturers. Further information about the ICDLI and the data sheets published up to now can be found at [www.icdli.com](http://www.icdli.com).

This application was compiled by the International Committee of the Decorative Laminates Industry.

It considers the conditions of application technology in the European countries. If you have further questions, please contact us:

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## 1. General information

Multifunctional surfaces with HPL are ideal for use as projection screens and write-on surfaces. They can also be equipped with magnetic layers. Moreover, they feature a unique combination of properties with respect to surface wear, chemical resistance, colours and designs and also surface textures.

## 2. Marking

In principle, HPL surfaces can be written on. However, since there are a wide range of marking pens and different HPL surface textures available and new variants are always coming onto the market, the coverage rate of the colour pigments varies depending on the combination. This also applies to the effort involved in cleaning a surface that has been written on, which can vary significantly depending on the combination.

The smoother, and thus the shinier a surface, the easier it is to clean off the markings. In the simplest scenario, this can be achieved using a dry, absorbent cloth - possibly a damp cloth – with relatively little effort. With frequent use, textured surfaces, long-dried inks and certain types of marking pens, you will find that a dry, absorbent cloth is often no longer sufficient for achieving a clean surface.

For marking pens with water-soluble inks, we recommend an absorbent cloth and window cleaning product (i.e. non-moisturising soapy water with 5 – 10 % alcohol content). Textured surfaces require more effort to clean.

Clean non-water-soluble writing inks using an absorbent cloth and alcohol or acetone (some plastic edges are not resistant to acetone) and wash off with non-moisturising soapy water. Cellulose thinners, nail polish remover and other solvents may leave residues on the surfaces. Textured surfaces require more effort to clean.

However, if blackboard chalk is going to be used to write on HPL, it is advisable to use a finely textured, matt surface. Some abrasion of the chalk on the board is required to achieve a beautiful, high-contrast typeface. On a smooth or less textured surface, this is not the case. Clean using water and an absorbent cloth. When using liquid chalks, select a surface that is as smooth as possible because finely textured surfaces require more effort to clean, particularly when it comes to dried-on markings.

To prevent streaking, we generally recommend drying the surfaces subsequently with a clean cloth.

## 3. Whiteboards

Whiteboards are frequently made of HPL. As the name suggests, white boards are generally used for this. However, they can also be manufactured using any other available HPL design. HPL surfaces can be written on using special felt-tipped pens (whiteboard markers) and wiped clean with a cloth, for example. In practice, lots of different - sometimes less suitable - felt-tipped pens are used, whose ink remains on the surface for a long time in some cases and can dry out excessively.

The surface should be as smooth as possible in order to ensure easy cleaning over the long term, and we recommend occasionally cleaning with a window cleaning product and an absorbent cloth, e.g. a microfibre cloth.

#### 4. Magnetic surfaces

HPL surfaces equipped with magnetic properties generally have a layer of ferritic steel sheet or ferrite particles which are bonded with resin on paper. To ensure the processing of HPL elements in timber-processing operations (no flying sparks), steel sheets are only a few micrometres thick. For ferrite particles, the layer thickness is approx. 100 – 200 µm. These layers are locally magnetised via the applied permanent magnets, so that there is adhesion. This magnetisation diminishes over time once the permanent magnet is removed.

Permanent magnets are made from various materials and are available in a wide variety of shapes and designs. Their adhesive force is primarily determined by:

- The material of the magnets: neodymium-iron-boron > samarium-cobalt > aluminium-nickel-cobalt > hard ferrite.
- The adhesive surface: the larger the surface area of the magnetic bond, the greater its adhesive force.
- The thickness of the magnet: the thicker a magnet, the greater its adhesive force.
- The material of the counter-magnet or the material being attracted: the stronger the counter-magnet or the more strongly the counter-material can be magnetised, the greater the adhesive force of the magnetic bond.
- The distance to the material being attracted: the closer a magnet is to the material being attracted, the greater the adhesive force.
- The temperature: at higher temperatures (> 80 °C), permanent magnets may lose adhesive force.

Low-cost permanent magnets are usually made of hard ferrite and are relatively thin (approx. 2 – 3 mm). These are sufficient for securing a DIN-A4 page of standard paper with 1 – 2 magnets. Unlike more expensive neodymium magnets, these are less suitable for DIN-A1 layouts, for example, unless several are used. For each particular application you need to decide which and how many magnets to use for a specific task.

Generally speaking, HPL with magnetic adhesion poses no risk to human health, e.g. those with pacemakers.

#### 5. Projection screens

Projection screens normally feature a white, matt surface, so that the impinging light from projectors is scattered evenly and diffusely and no annoying reflections are created. These features fulfil the

requirements for projection screens in offices and classrooms. HPL surfaces can be manufactured with these features. The gloss level should be as low as possible (measurement at 60° angle). Good results in terms of reflections can be achieved with values below a gloss level of 10. Higher values < 20 can be used with some limitations (i.e. reflections may occur at certain viewing angles). Extremely matt HPL surfaces have gloss levels of approx. 2 – 5. They are finely textured.

Dimensional data for a projection screen in rooms up to approx. classroom size:

- The distance to the image source is between 1.5 to 6 times the projection width.
- For seminar rooms, a distance of 4.5 times the projection width is ideal.
- In order to ensure that the projected image is sufficiently recognisable in daylight conditions, the ratio of ambient light at the location of the projection screen (measured in Lux [lx]) and the light output of the projector must be 1:5.
- Daylight outdoors: 3000 – 10000 lx
- Minimum brightness for making notes: 20 – 30 lx
- Living rooms or offices: 50 – 750 lx
- The lower the ambient light, the lower the light output of the projector can be in order to achieve a bright, high-contrast image.
- The darker the background brightness of the room, the more high-contrast the image will be.
- Example: background brightness on the screen 100 lx; required brightness (light output) 500 lx; screen size 3 m<sup>2</sup> -> at least 1500 lumen (luminous flux from the projector) is required

## 6. Write-on, magnetic projection screens

Equipping HPL with magnetic properties has no impact on the HPL surface. So it can be combined with write-on or projection surfaces without a problem.

More difficult is the combination of marking and projection on the same surface, since the two requirements conflict with each other depending on the writing material used. To this end it is useful if, prior to using a multifunctional surface, you know what kind of writing material is to be used. When using blackboard chalk to inscribe, a slightly rough, i.e. matt, surface is required in order to achieve a good contrast. These conditions are ideal, since matt surfaces with gloss levels of less than 10 (60° measurement) are the most appropriate for projection screens too.

Most other marking pens – whiteboard markers, liquid chalks, wax and oil crayons, felt markers, fluorescent markers, etc. – can also be used on matt (rough) surfaces, but cleaning the surface properly can be extremely laborious. If you wish to simplify the cleaning process, smooth or glossy surfaces are more suitable for these pens. These surfaces feature gloss levels of approx. 80 (60° measurement) and more. For projection screens, however, such surfaces have excess reflection. A good compromise would be surfaces with a gloss level of approx. 10 – 20. These surfaces exhibit minor reflection during projections, yet can be cleaned with relatively little effort. Since various



textures are feasible at these gloss levels, we recommend opting for a certain type of marking pen, testing the effort that it takes to clean the surfaces available (gloss level < 20) and selecting the combination that involves the least effort.