



International Committee of the Decorative Laminates Industry

## **HPL in exterior application**

July, 2016



## Preface

Decorative laminates according to EN 438 are an excellent material for indoor and outdoor surfaces. They can be used either applied to suitable substrates or as self-supporting compact sheets. Decorative laminates meet the stringent requirements for hygiene, fire resistance, humidity resistance and mechanical properties. Decorative laminates are available in a variety of colours, patterns and surface textures, providing extensive options for architects and designers. Decorative laminate surfaces are hard and resistant to wear, impact and scratching, making them durable, easy to clean and largely resistant to vandalism.

In addition to their physical properties, decorative laminates offer other benefits including quick and easy installation of compact laminate panels, and in renovation applications using dry construction methods, elimination of the need to remove existing wall coverings such as wallpaper, textile coverings, or ceramic tiles. This technical leaflet contains general recommendations for the processing and handling of decorative laminates. In addition to this leaflet there are a number of other documents which provide detailed information about the topics described. This bulletin is intended as an overview for professionals working in the decorative laminates industry.

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

This leaflet provides recommendations for machining and application of Decorative High Pressure Laminates (HPL according to EN 438-6) in exterior use, where they are exposed to:

- Sun and UV
- high and low temperatures
- change of temperature
- rain, hail, snow, ice, wind
- mechanical stress
- pollution (exhausts, oil, smoke, soot, acid rain)

These parameters can affect the laminates fully or partly in the following outdoor areas:

- weather-protected area
- non-protected area with mobile or fixed equipment (e.g. furniture)
- claddings for walls and balconies subject to approval

## 2. Benefits of HPL

HPL, which are used in outdoor applications mainly as self-supporting HPL Compact, meet these requirements:

- mechanically robust
- resistant to scratch, impact and shock over a wide temperature range
- neither corroding nor corrosive
- not brittle
- providing an appealing look
- easy to machine
- easy to clean
- resistant to humidity
- resistant to termites
- hail resistant
- weather resistant
- environmental friendly

### 2.1 Mechanical strength and ageing behaviour

Due to their build-up, HPL provide a high elasticity modulus, bending strength and shock resistance combined with low weight per area and an excellent resistance against weathering.



## **2.2 Resistance to water**

HPL are resistant to rain, humidity and wet conditions. Permanent contact with water should be avoided.

## **2.3 Behaviour in climatic change**

HPL are not affected by quick temperature changes. They are frost resistant and will not lose their excellent properties even at low temperature. Within the range of -20 °C to +80 °C and 10 to 90 % relative humidity, dimensional change will not exceed 0,4 %.

## **2.4 Reaction to corrosive influence**

HPL are a non-metallic construction product and will not corrode. There is virtually no effect of exhausts and acid rain on HPL. There will be no delamination.

## **2.5 Reaction to fire**

Exterior HPL can be manufactured in standard and fire retardant quality. Standard quality can achieve at least Euroclass D-s2, d0.

Flame retardant compact laminates greater than 6 mm thick can typically achieve Euro class B – s2, d0 acc. to EN 13501-1.

In case of fire, HPL emit only small quantities of smoke. As they do not melt, no hot or even flaming droplets are formed. Moreover, they will not crack or splinter when coming into contact with extinguishing water. Please observe the national and local requirements regarding fire safety.

## **2.6 Colour choice and light fastness**

Under the influence of visual light and especially UV rays, colour pigments tend to fade. For HPL, the most stable and environmentally friendly pigments are in use. General purpose Compact laminates acc. to EN 438-6 Type EGF/EGS are usually offered in light colours. For exterior applications with colourful or dark colour heavy duty Compact laminates Type EDF/EDS with additional protection against UV and weathering are recommended.

## **2.7 Change of surface properties**

Heavy duty Compact laminates according to EN 438-6 Type EDF/EDS show almost no change in surface properties and appearance. Even after many years of outside exposure only a slight change in colour may occur.

General purpose Compact laminates according to EN 438-6 Type EGF/EGS have a surface that can be affected by (UV) light, water and temperature changes period, the brilliance of the surface can decrease over time giving the visual impression of graying, mainly visible on dark colors. As a consequence, the cleanability of the surface can be reduced. This has no negative impact on the mechanical strength and the usability of the boards.

### 3. Applications in outdoor areas

In different outdoor areas similar influences have an impact on HPL depending on exposure duration and geographic area for a shorter or longer period. According to time and intensity, several types of outdoor areas are differentiated.

#### 3.1 Weather-protected outdoor areas

These areas are commonly not exposed to sunlight or heavy rain, but the mechanical stress on the boards is high.

Examples:

- roofed stadiums (seats, benches, tables, wall claddings)
- facades, balconies (doors, wall coverings)
- elements in farming

#### 3.2 Non-protected outdoor areas with mobile equipment

The equipment in this area is fully exposed to weathering only for short periods of time. The life time depends on their purpose. Examples:

- cafe tables
- partition walls
- signs
- garden furniture
- sales booth

#### 3.3 Non-protected outdoor areas with fixed equipment

The equipment is attached to buildings where no approval is required

Examples:

- balconies
- roofs
- roof shingles
- small-sized facade parts
- vivariums
- spa and wellness facilities
- garage coverings
- facilities for sports and camping
- shelter (bus stops)
- play grounds

#### 3.4 Non-protected outdoor areas with fixed equipment subject to approval

The equipment in this area is fully exposed to weathering for long periods of time, therefore the impact of weathering on cladding elements is always intense. When used in high-rise buildings, the

requirements on (ventilated) facades are very strict concerning

- flame retardency
- mechanical strength
- safety
- noise reduction
- thermal insulation.

For this reason, facade- and balcony-claddings at certain heights have to meet legal requirements for buildings in many countries and approvals are necessary. Approvals are certified by the responsible building authorities after the necessary examinations.

#### **4. Cleaning and maintenance**

HPL do not require special maintenance. Slightly soiled boards can be cleaned just with warm / hot water. If the boards are fairly soiled after installation they can be cleaned with water and soap or a mild, non-abrasive detergent followed by water. If the surface cannot be cleaned with a detergent, do not scratch or scrape. For special stains such as graffiti please contact your supplier for the cleaning procedure.

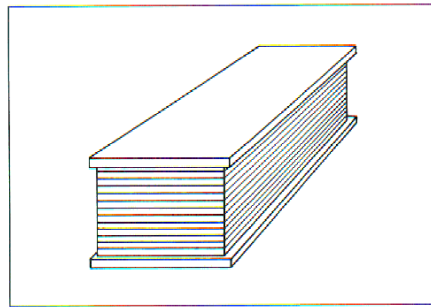
#### **5. Transport and storing**

##### **5.1 Transport**

When transporting stacks of laminates solid pallets of sufficient size shall be used. The laminates must be securely fixed to avoid sliding. Any particles between the panels may easily lead to surface damage. When stacking or unstacking laminates, the boards must not be pushed or drawn, but have to be lifted either by hand or a panel lifter.

##### **5.2 Storing**

HPL are to be kept in a closed warehouse with normal conditions 18 to 25 °C and 50 to 65 % relative humidity. HPL should be stored in stacks horizontally with all edges being in line on an even support which is covered with a plastic film. On top of the stack another plastic film is placed and the stack is to be covered with a protection board (Figure 1).



*Fig. 1 Storage in Stacks*

After opening the stack for use, it is recommended that the stack shall be covered again with protective film in order to protect the sheets.

If HPL are not stored flat, warpage can occur. If boards are equipped with an adhesive protection film, films must be removed from both sides at the same time to prevent warpage.

## **6. Processing and handling**

### **6.1 Sawing, milling, drilling**

HPL Compact can be processed with woodworking machines (see Technical Leaflet “General Recommendations of HPL”).

### **6.2 Machining**

When planning an application using HPL it should be considered that laminates react to climatic changes by minor expanding or shrinking (< 2,5 mm/m). The dimensional change in cross direction is approximately double of that in machine direction.

The jointing of Compact Laminates can be done by well-known methods like profiling, groove and tongue or screwing. The use of non-corrosive fastenings is highly recommended.

When jointing boards by gluing, it has to be taken care of that dimensional changes caused by climatic changes will not be hindered. The choice of glue is dependent on the expected stress on the element, contact the adhesive supplier for recommendations.

When fixing laminates to a substrate it has to be taken into account that the metal substrate will change their dimensions remarkably at different temperatures. Moreover, the dimensions of the laminate will change at different humidity. As these changes may contradict, some space at the fastenings is necessary to allow movement of the materials.

Important:

When the fastening is done by screws or rivets, the drilled holes have to be 2-3 mm wider in diameter than the diameter of screws or rivets.



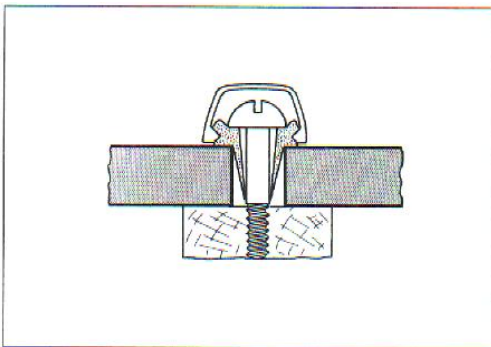


Fig 2: Fastening with protected Cape

## 7. Examples for application and construction

### 7.1 Vertical joints

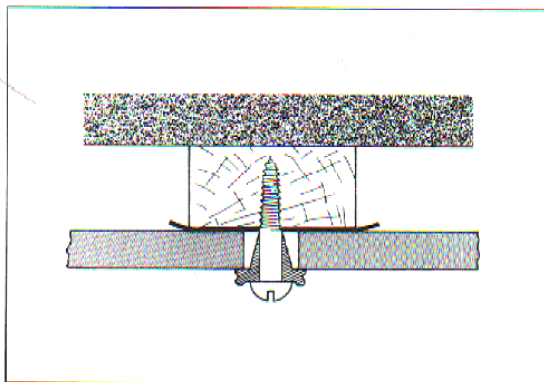


Fig.3: Central fastening with screws on timber construction using a water stop

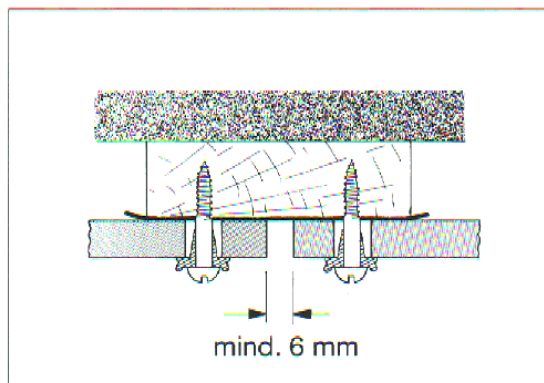


Fig. 4: Edge fastening of HPL with screws on timber construction. Be sure to use water stop in sufficient width for full protection of the timber construction

## 7.2 Horizontal joints

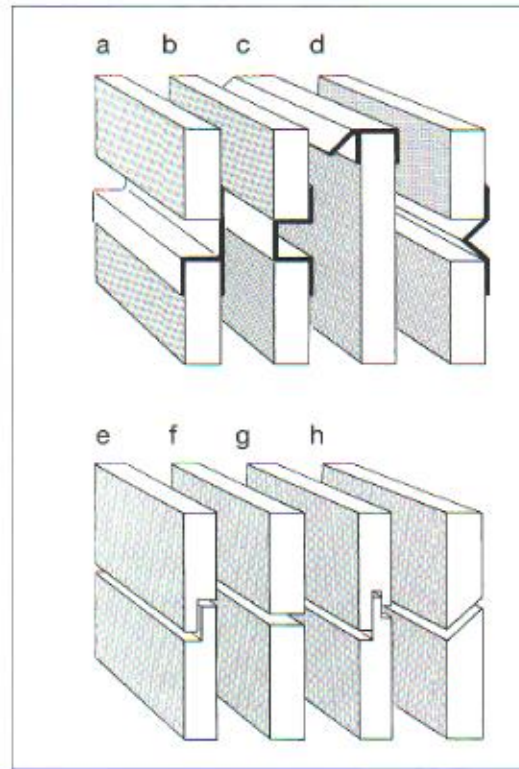


Fig. 5: horizontal joints

- a. rainproof horizontal joint for timber construction using PVC or metal profile; Observe the necessary gap for thermal movement
- b. rainproof horizontal joint without overlapping metal profile
- c. horizontal capping of the panel – e.g. underneath a window sill with rain drain profile for timber construction
- d. joint backing aluminium profile, reinforced by crimping
- e. rainproof horizontal joint by overlapping edges. Ensure a gap allowing panel movement
- f. open joint only applicable with aluminium construction and working ventilation
- g. joint with milled tongue on a 10mm HPL
- h. joint with diagonally milled dripping edge – possible with all thicknesses

### 7.3 Corners

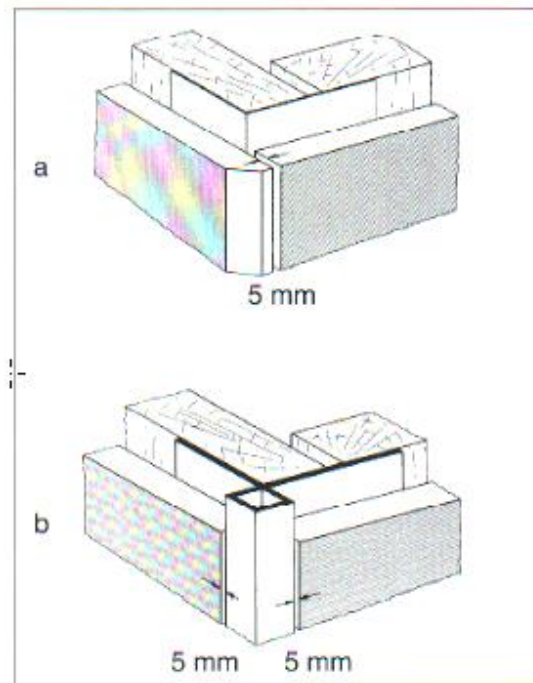


Fig. 6: outside corners

- a. outside corner for timber construction with PVC / aluminium water stop and chamfered edge
- b. outside corner with aluminium corner profile and HPL with thickness > 8 mm

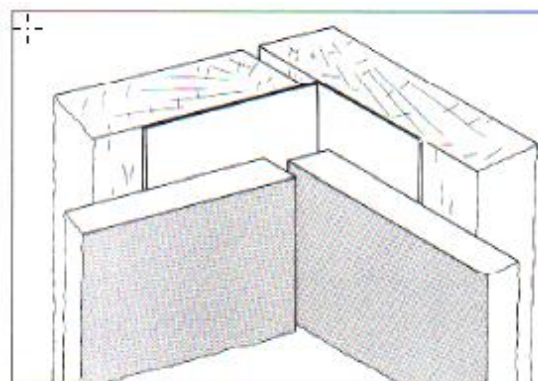


Fig. 7: inside corner with water stop

### 8. Application examples



Fig. 8: Façade cladding using compact laminates