



International Committee of the Decorative Laminates Industry

Characteristics and possibilities of use for decorative high pressure laminates (HPL)

December, 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 leaflet "Characteristics and Possibilities of Use for Decorative High Pressure Laminates (HPL)" gives information on the interior and exterior characteristics and use of HPL.

This document makes no claim of completeness 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.

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. Usage of HPL

The objective of this paper is to bring the collected experience of the European HPL industry in the use of high pressure laminates (HPL) to the attention of architects, designers, manufacturers and specifying authorities. This document covers the following areas:

Market segments

- Private and residential housing
- Hospitals and laboratories
- Public Buildings
- Railway station and airport terminals/infrastructure
- Transportation
- Hotels
- Education
- Retail and commercial buildings
- Sport & Recreation Centers
- Industrial buildings

Applications

Interior

- Walls and Partitions
- Ceilings
- Doors
- Flooring
- Stairs
- Furniture/chairs
- Trims
- Windows sills
- Tables
- Work tops, counter tops
- Vanity units
- Cubicles
- Display-/ Shop systems

Exterior

- Balconies
- Facades
- Facade parts/soffits

- Furniture and signs
- Urban elements
- Orientation systems

2. Properties and advantages of HPL

2.1 Description of HPL

HPL according to EN 438 are materials with outstanding characteristics e.g. durability, cleanability, wear resistance, combined with a wide range of technical and design possibilities. HPL are easy to process and to maintain and therefore can be used in many applications.

2.2 Manufacture and composition

The excellent characteristics exhibited in use arise from the manufacturing process and the raw materials used. HPL are sheet(s) consisting of decorative surface layer(s) and core layers bonded together by a high pressure process. Typical values for the high pressure process are a temperature of ≥ 120 °C and a pressure of ≥ 5 MPa.

The decorative layer consists of one or more sheets of fibrous material (usually paper) impregnated with aminoplastic thermosetting resins (usually melamine based resins) or other curable resins or other decorative design surfaces such as metal foils, wood-veneers and textiles, etc. which are not necessarily treated with thermosetting resin. The surface layers can appear on one or both side(s) of the laminate(s). HPL for exterior use can have an additional outer layer or coating to enhance weather and light resistance properties.

The core layer consists of fibrous materials (usually paper) impregnated with thermosetting resins (usually phenolic based resins) or other curable resins, eventually reinforced by metal layer(s) or metal mesh(es) and others which are not necessarily treated with thermosetting resin.

2.3 Decorative scope

HPL are available in a wide range of colours, patterns and abstracts combined with different textures and gloss levels. Excellent reproductions of natural materials such as textiles, fabrics, exotic wood veneers and stone can be achieved.

Different printing technologies e.g. digital, screen and offset printing can be used to produce customized designs. Alternative finishes such as metal, real wood veneer and pearlescent effects are available to widen the designers pallet.



2.3.1 Cleaning & maintenance

Because of their impervious surfaces, HPL are easy to clean and maintain. Offered in various sizes they allow large areas to be covered without seams. Postforming grades enable the continuation of the surface to cover edges and upstands. Construction with compact laminates has the benefit of avoiding vulnerable adhesive joints. The absence of joints and seams allow the most severe hygienic requirements to be met. For additional information refer to Technical Leaflet Cleaning for HPL surfaces.

2.4 Processing

HPL can be easily processed with wood working machines.

Compact laminates ≥ 6 mm thick are self supporting while thinner HPL, particularly those ≤ 2 mm thick require bonding to a supporting substrate. There is a wide choice of substrates of which wood based panels are the most common. A wide range of adhesives is available for glueing. HPL are available in various sizes to minimise cutting losses.

For further information on processing, please regard the product data sheets on the ICDLI website (www.icdli.com).

2.5 Characteristics in use

The characteristics of HPL in use are outstanding. Market requirements together with manufacturers response to these demands have produced exacting testing procedures, high levels of performance and of stringent quality control.

The special characteristics and properties of HPL are listed below.

2.6.1 Mechanical and physical properties

- Resistance to scratching
- Resistance to abrasion
- Impact strength
- Resistance to impact
- Resistance to heat
- Light fastness
- Antistatic up to electrical dissipation

2.6.2 Chemical properties

- Resistance to staining
- Resistance to chemical attack
- Resistance to organic solvents



- Resistance to steam
- Resistance to boiling water

2.6.3 Reaction to fire

HPL are difficult to ignite and have properties that retard spread of flame. In a fire situation they do not soften or release burning droplets.

Through the right selection of quality and thickness (standard or fire retardant grade) HPL can meet the highest fire performance achievable with organic materials.

2.6.4 Physiological characteristics of HPL surfaces

HPL are hygienic, harmless, non toxic and can be safely used in contact with food.

2.6.5 Diffusion barrier

When bonded to a substrate HPL act as a barrier preventing the emission of potential volatile substances.

2.6.6 Weather resistance requirements (exterior grades)

- Resistance to climatic shock
- Resistance to UV light
- Resistance to artificial weathering

2.6.7 Durability

Compared to other decorative materials like paints, thermoplastic foils, veneers etc., HPL offer a significantly longer life time. For indoor applications a minimum life time of 20 years can be expected without loss of appearance and performance.

2.7 HPL grades

The industry offers various grades of standardized HPL with specific characteristics for use in a wide variety of applications

- HPL-Standard
- HPL-Postforming
- HPL-Fire Retardant
- HPL-Compact

The above mentioned grades are further subdivided into several performance categories, e.g. horizontal and vertical applications as well as qualities which are suited for interior or exterior use. The choice of the correct HPL grade should be made according to the end use.

2.8 Standards and other endorsements

Relevant standards are:

2.8.1 Characteristics and properties:

- EN 438
- ISO 4586

2.8.2 Reaction to fire:

Construction

- EN13501-1
- DIN 4102
- AFNOR NFP 92.507
- BS 476 - parts 6, 7
- ÖNORM B 3800
- ASTM E 84

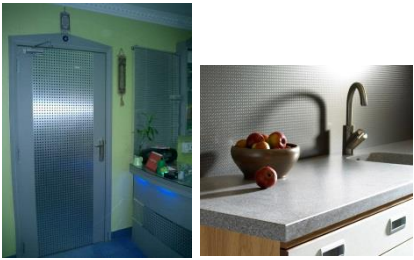




The guidelines for CE-marking for building products are to be considered

Transportation

- EN 45545-2
- DIN 5510-2
- ECE R 118 (95/28/EG)
- BS 476 part 7
- NFF 16101
- UNI 8465
- IMO FTPC annex 1 part 2 and 5

3. Application fields for HPL

Typical application fields and corresponding market areas are given in the following table:

<p>Applications</p> <p>Market segments</p>	<p>Interior</p> <p>Walls and partitions, ceilings, doors, flooring, stairs, furniture / chairs, trims, windows sills, tables, work tops, counter tops, vanity units, cubicles, display / shop systems</p>	<p>Exterior</p> <p>Balconies, facades, facade parts, soffits, furniture, signs, urban elements, orientation systems</p>
<p>Private and residential housing</p>		
<p>Hospitals and laboratories</p>		
<p>Public buildings and transportation</p>		

Hotels		
Education		
Retail and commercial		
Sports and recreation		
Industrial buildings		
		