Product Data Sheet for

High Pressure Laminates (HPL)

Preface

High-pressure laminate (HPL) manufactured 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 (cellulose) thermosetting composite material and features a unique, extremely robust, resistant, modern decorative surface. HPL is found in all aspects of our day-to-day lives and can be self-supporting or used bonded to a substrate. The application and usage areas of HPL are extremely diverse and are constantly evolving. This requires regularly updated information about different applications and processing techniques. ICDLI technical bulletins are a valuable source for this knowledge.

This information describes the composition of HPL and gives advice for their handling, processing, use, and disposal. It covers all HPL grades as described in EN 438. HPL are not classified as hazardous substances and therefore they do not require a special marking nor a description by a safety data sheet.

The technical leaflet is prepared for manufacturers, processing companies and retailers of HPL.

This technical bulletin is an update and an expansion for the document issued in July 2014 covering the same topic.

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 Description

The materials referred to are high-pressure decorative laminates (HPL) according to the European Standard EN 438 and to ISO 4586.
HPL are sheets consisting of layers of cellulose fibrous material (normally paper) impregnated with thermosetting resins and bonded together in a high-pressure process. The process, defined as a simultaneous application of heat (≥ 120 °C) and high specific pressure (≥ 5 MPa), provides flowing and subsequent curing of the thermosetting resins to obtain a homogenous non-porous material (density ≥ 1,35 g/cm³) with the required surface finish. Basically, more than 60 % of the HPL consist of paper and the remaining 30 to 40 % consist of cured phenol-formaldehyde resin for core layers and melamine-formaldehyde resin for the surface layer. Both resins belonging to the group of thermosetting resins are irreversibly interreacted through cross-linked chemical bonds formed during the curing process producing an inert, stable material with characteristics which are totally different from those of its component parts. HPL are supplied in sheet form in a variety of sizes, thicknesses and surface finishes. Where improved fire retardance is required, the laminate core may be treated with an additive which does not contain halogens.

The properties of HPL are described in a Technical Data Sheet. The preparation of a safety data sheet according to 1907/2006/EC, Art 31 is not required.

2 Storage and Transportation

Storage and transportation should be carried out in accordance with the General Processing Recommendations for HPL:
HPL must be stored in a normal room climate, i.e., at approx. 18-25 °C and 50-65 % relative humidity, so that it is protected from moisture, humidity and direct sunlight. The boards should lie flat horizontally on a suitable level base, e.g., on a pallet with a shim. The stack must be weighted down with a cover plate. If HPL is delivered in a foil package, it is recommended to close the foil again after each removal and to cover it with the cover plate. In terms of transport regulations, HPL is not classified as a hazardous material; therefore, labelling is not necessary.

3 Handling and Machining of HPL

The usual safety requirements of fabrication and machining should be observed regarding dust extraction, dust collection, and fire precautions. Use gloves to protect from sharp edges and safety glasses to prevent eye injuries. The contact with dust from HPL does not present any special problems, however a small percentage of personnel may be sensitive or even allergic to machining dust in general.

4 Environmental and Health Aspects in Use

HPL are cured and therefore chemically inert. HPL are not considered to be dangerous for humans and animals. There is no evidence of HPL-induced toxicological effects and eco-toxicity.

HPL surfaces are physiologically safe and approved for use in direct contact with foodstuff. Test reports in accordance with EU regulation (EC) No. 1935/2004 and (EC) No.10/2011 confirm the suitability of HPL for food contact.
HPL formaldehyde emission level is far below the limit for wood-based materials. Due to their very low permeability HPL bonded to wood-based substrates act as a barrier against possible formaldehyde emissions coming from the substrates.
The decorative surfaces are resistant to common household solvents and chemicals and have therefore been used for many years in applications where cleanliness and hygiene are important.
HPL is an article and not a chemical substance and therefore the REACH regulation (EC) No. 1907/2006 does not apply.

5 Cleaning and care

HPL is a homogeneous, non-porous material and is resistant to most household chemicals. The HPL surface and edges are easy to disinfect with hot water, steam and common types of disinfectants used in hospitals and other commercial facilities.
Although liquids cannot penetrate into the material, any soiling or stains should be wiped off immediately. Prolonged contact, mainly with corrosive substances, e.g., descaler, aggressive household cleaners, toilet cleaners and oven cleaners, must be avoided and removed immediately.
The HPL surface is simply cleaned with warm water and then wiped dry with a paper or soft cloth. If impurities cannot be removed with this, common household cleaning agents, such as washing powder, liquid soap or hard soap, which do not have any abrasive ingredients or regreasing properties, will help. HPL are neither corrosive nor do they oxidize. They do not require any further surface treatment.

6 HPL in Fire Situations

HPL are difficult to ignite, do not melt nor drip and have properties that retard "spread of flame", thus prolonging evacuating time. The properties in case of fire depend on the thickness, construction and composition of the HPL. Due to incomplete burning, as with many organic materials, hazardous substances are to be found in the smoke. However, HPL can meet the best performance for organic surfacing materials specified in the French standard NFF 16101 (= at least class F2 for smoke density and toxicity). In dealing with fires involving laminates the same firefighting techniques should be employed as with other wood-based building materials. HPL are building material and can be tested as such. These results can be used in the evaluation of a building component.

7 Recovery

Due to their high calorific value (18-20 MJ/kg)[1] HPL are suitable for thermal recycling. Disposal must comply with the currently applicable national and/or regional regulations. Further information is available in the Environmental Product Declaration (EPD) for HPL.

[1] For comparison: Calorific value of fuel oil: 39 - 42 MJ/kg, of hard coal: 28 - 31 MJ/kg

8 Technical Data

8.1 Physical characteristics

Physical state	Solid sheets
Density	1,35 g/cm^3
Solubility	Insoluble in water, oil, methanol, ethanol, diethyl ether, n-octanol, acetone
Boiling point	None
Evaporation rate	None
Melting point	HPL do not melt
Calorific value	18 - 20 MJ/kg
Heavy Metals	HPL do not contain toxic compounds of antimony, heavy metals, barium, cadmium, chromium^{III}, chromium^{VI}, lead, mercury, selenium
Stability	HPL are stable; they are not considered to be reactive or corrosive.
Hazardous reactions	None
Material incompatibility	Strong acids (descaler) or alkaline solutions will stain the surface
Ignition temperature	Approx. 400 °C
Flash point	None
Thermal decomposition	Possible above 250 °C.
Smoke and Toxicity	HPL are classified as F2 or better when tested according to NF F 16101. Toxic gases such as mainly carbon monoxide, carbon dioxide, ammonia and nitrogen oxides can be produced depending on fire conditions (temperature, oxygen content, etc.)
Flammability	HPL are not considered to be flammable. They will burn only in a fire situation, in presence of open flames.
Extinguishing media	HPL are considered as class A material. Carbon dioxide, water spray, dry chemical foam can be used to extinguish flames. Persons in fire situations should wear self-breathing apparatus and fire protective clothing.
Explosion hazards	The machining, sawing, sanding and routing of HPL produce class ST-1 dust. Safety precautions and adequate ventilation must be observed to avoid airborne dust concentration.
Explosion limits	Dust levels should be kept below 60 mg/m^3
Protection against explosion and fire	In the case of fire HPL shall be treated as wood-based materials.
Fire classes acc. to EN 13501	Standard (HGS/CGS) and postforming (HGP): D-s2, d0 or better Flame-retardant (HGF/CGF): either B-s2, d0 or C-s2, d0 or better (classification depends on material thickness and substrate)

Working areas	The usual safety regulations for dust extraction are applicable
Formaldehyde emission	< 0.4 mg/h m^2 (tested according to EN 717-2) < 0.05 ppm (tested according to EN 717-1)
Pentachlorophenol / Lindan	HPL contain neither PCP (Pentachlorophenol) nor Lindane
Other	HPL are not a hazardous substance in the sense of the Hazardous Substance Ordinance

In addition, the values and specifications for HPL defined in EN 438 apply.

8.2 Chemical resistance

HPL is resistant to most chemicals. However, some chemicals can affect the surface. Special attention should be paid to this:

- the concentration of the chemical
- the pH value (acid / base ratio)
- the exposure time
- the temperature

Detailed information can be found in the leaflet "Chemical resistance of HPL".

8.3 Electrostatic behaviour

It minimises the generation of electrostatic charge by contact-separation or friction with other materials. It does not need to be earthed. The surface resistivity of HPL is 10^9 - 10^{12} Ohm and a chargeability of V ≤ 2 kV according to CEI IEC 61340-4-1 so that HPL are considered as antistatic material. HPL with improved properties are available on request. Detailed information can be found in the leaflet "Electrical properties of HPL".