STANDARD HIGH PRESSURE LAMINATE
TECHNICAL DATA SHEET

Preface

The information describes the composition of High Pressure Laminates (HPL) and give advice for the handling, processing and use. High Pressure Laminates are not classified as hazardous substances and therefore they do not require a special marking nor a description by a safety data sheet.

Should you require additional information with regards to more detailed fabrication, please contact us at Surface Studio (Pty) Ltd.

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1. Description

High Pressure Laminates (HPL) are available in a variety of different surface textures and finishes. Some finishes are available over several ranges, whilst others are integral to a particular design or pattern. More detail ion this regard can be found in our Availability List.
Choice of surface finish is important from a functional as well as an aesthetic point of view. In general, textured surfaces and light colours have a better scuff and scratch resistance than plane surfaces and dark colours. For this reason, glossy laminate and dark plain colours are not recommended for heavy duty working surfaces. On the other hand, plane and lightly textured surfaces are more easily cleaned than deeply textured finishes.

The materials referred to are high pressure decorative laminates according to the European Standard EN 438 and to ISO 4586.

High Pressure Laminates (HPL) are sheets consisting 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 (≥ 1,35 b/cm³) with the required surface finish.

Basically, more than 60% of the HPL consists or paper and the remaining 30 to 40% consists of cured phenol-formaldehyde resin for core layers and melamine-formaldehyde resin for the surface layers.

Both resins belonging to the group of thermosetting resins are irreversibly interreacted through cross linked chemical bonds formed during the curing process producing a non-reactive, stable material with characteristics which are totally different from those of its component parts.

Where improved fire retardant is required, the laminate core would be treated with an additive which does not contain halogens. For further information in this regard, please contact us.

HPL is supplied in sheet form in variety of sizes, thicknesses and surface finishes. As a general guide HPL weighs 1.4 kilograms per square metre per millimetre of thickness of the sheet.

2. Storage, Handling, Transportation, Conditioning and Use

Material that is stored in the wrong position may be cause permanent bowing or warping. Store the sheets in a closed place where normal climatic conditions are guaranteed (temperature between 10° and 30° C and 40 – 65 % Relative Humidity). Stack the sheets on top of each in horizontal racks. The use of a caul board for covering the top sheet and keeping it flat is recommended. If this is impractical, the top sheet should be turned decorative face downwards, to prevent surface damage and warping.

Care should be taken when handling decorative laminates to avoid breakages and damage. Because of the sharp edges, protective gloves should always be worn when handling laminates.

For transportation, HPL is classified as a non-hazardous product; no labelling required.
Always transport the sheets on flat, stable pallets and secure the panels so that they do not slip. Should the laminates be transported in a box, it is suggested that once rolled, they should be effectively protected with a bubble wrap or cardboard box. Make sure that the laminate sheets do not slide over each other during loading and unloading operations. Dirt and foreign bodies and sharp edges rubbing against the surfaces cause damage.

The most important factor in achieving stability in bonded panels is the pre-conditioning of core materials, surfacing and backing laminates prior to bonding. Pre-conditioning ensures that the effects of different movement, caused by the materials' reaction to changes in relative humidity, are minimised.

3. Machining of High Pressure Laminate

Decorative high pressure laminates have a relatively hard surface. Therefore, tool wear will be greater than with most wood based products. For longer life and better performance tungsten tipped (TCT) saws and cutters should be used.

Circular Saws (Fixed)

The diameter of the saw blade should be as large as the machine will allow (preferably not less than 150mm) to give the highest available tip speed. For example, 1 300mm diameter saw blade with a spindle speed of 3000 rpm will give a tip peripheral speed of 45 m/s. The sheet should be cut face up and held firmly down on the machine bed to prevent fluttering. Generally, saws should be fine toothed close pitched, with alternative teeth top bevelled. There are also several special saws

which are ideal for cutting both unbonded and boned laminates e.g. trapezoid tooth (triple chip) saws.

Circular saws (portable)

Portable circular saws are particularly useful for on-site work. The direction of rotation of these saws requires the sheets to be cut face down to avoid chipping. A fine toothed saw blade is essential to reduce the need for subsequent finishing.

Travelling Saws

The most convenient method of converting large sheets into smaller size panels is to clamp the sheets and pass a travelling saw across. These saws range from simple manually operated machines to the more sophisticated power operated clamped beam saws and wall mounted saws.

Band Saws

The band saw is ideal for rough cutting of shaped work. Manganese steel blades having hacksaw teeth are recommended.

Spindle moulders

All normal cutting tools can be used in the machining of laminates, but they must be tungsten carbide tipped. High speeds in the order of 5000 – 8000 rpm give the best results. Milling heads and cutter blocks with disposable TCT cutters (both straight and profiled) provide a convenient and relatively inexpensive method of machining the edges of boards. Solid tipped cutter blocks with 4 – 10 blades, although expensive, soon pay for themselves in operations such as edge shooting, profiling an edge rebating of panels. They can be use for a considerable time before re-sharpening is necessary and their weight gives then an inertia that minimises chatter. When working with laminates face down on the spindle table, it is advisable to clamp the workpiece to a moving pad to minimise the risk of scratching.

Portable jig saws

Used to produce cut-outs of any size or shape. Like the portable saw the cutting action is upwards, and therefore chip-free cuts are difficult to achieve. Cuts should be made with a fine toothed blade, and with the face side down. Where this is not possible due to allowance should be made for the extra finishing necessary to remove the edge chipping.

High-speed fixed head routers

Bench high speed fixed routers may be used with single or double flute TCT cutters having an optimum peripheral speed of 10-15 m/s. Concentric cutters used in eccentric chucks give greater clearance and therefore cool, clean cutting and longer intervals between sharpening. Although primarily intended for cut-outs, these machines can be use for a variety of operations such as profiling, edge trimming and grooving. It is not usually necessary for high speed routers to be used at speeds in excess of 18,000 – 20,000 rpm, if only to avoid the exact balancing requirements at speeds higher than these. For curved work it is advisable to rough cut the shape first on a band saw 2-3mm all round for subsequent trimming on the router.

Portable hand-held routers

Invaluable for clean hole cutting, edge trimming and trimming on site, they are also very useful in the workshop for dealing with bulky assemblies. These routers can be fitted with small saws for on-site edge grooving of panels.

Portable hand-held trimmers

These compact hand-held electrical trimmers which operate at speeds of 18,000-20,000 rpm are designed principally for trimming decorative laminates. They are lightweight and easily operated

with one hand. Depth of cut is usually controlled by an adjustable guide wheel, and TCT cutters are available for edge trimming at angles ranging from 30° - 90°.

Edge trimming

There are several machines on the market for volume edge trimming. These machines will remove excess material from two edges and bevel one or both edges, all in one operation.

Drilling and hole cutting

HSS steep spiral drills with a point angle of 60° - 80° instead of the normal 120° are most suitable for smaller diameter holes. For larger holes (which are best cut from both sides), hole saws, cylinder cutters, fly cutters with a centre locating point, are all suitable.

Hand Tools

Cutting

Laminates should be cut with a sharp, fine toothed tenon or dovetail saw held at a low angle. The sheet should be supported on both sides of the cut as close as possible and over the entire length. The saw must be sharp, otherwise excessive pressure will have to applied and this could result in the sheet splitting. Alternatively, laminates can be cut using a scoring tool e.g. a Stanley knife with a hooked blade, a hooked scriber or the corner of a chisel. The sheet should be laid flat on a firm base, decorative side up. It should be scored with the scoring tool drawn along a straight-edge using form pressure and taking care not to scratch the surrounding decorative surface. This operation is repeated until the decorative surface is cut completely though, revealing the dark brown core. The sheet should then be broken upwards against the edge of a rigid straight-edge. Cutting round mouldings, pipes etc. should be done with a coping saw.

Planing

Trimming off surplus edges is best done with a small black plane with a low angle blade, which is more easily controlled with one hand than a smoothing plane.

Hand Finishing

Final finishing of edges should be carried out using a fine file and a cabinet maker's scraper.

4. Environmental and health aspects in use

The manufacturing process of a high pressure laminate involves curing and therefore chemically inert. The formaldehyde emission level is far below the limit for wood based materials. Due to their very low permeability, laminates bonded to a wood based substrate acts as a barrier against possible formaldehyde emissions coming from the substrates. There is no migration affecting food and, consequently, laminates are approved for contact with food. 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.

5. Maintenance and cleaning

Daily maintenance is easy using a soapy sponge or a soft cloth. For stubborn stains, use an appropriate organic solvent, rinse with a warm water and wipe with an all-purpose paper towel. Never use abrasive products (scouring powder, steel wool, bleaching agents, cleaning agents containing strong acids).

The longevity of laminate panels can be improved by following by following certain rules:

- Always use a chopping board and trivet.
- Wipe up spilled liquids immediately, avoid leaving water or liquids on surface.
- Avoid sliding abrasive objects on surface.

6. Technical Data Sheet

Dimensional Tolerances

Based on Standard	Based on Standard EN 438-2	Property or Attribute	Unit (max or min)		HGS
Thickness	EN 438-2:5	Thickness	mm (max)	0,5 ≤ t ≤ 1,0	± 0,10
				1,0 < t < 2,0	± 0,15
Flatness	EN 438-2:9	Flatness	mm (max)		≤ 60
Length and Width	EN 438-2:6	Length / Width	mm		+ 10 / - 0
Straightness of edges	EN 438-2:7	Straightness of edges	mm (max)		≤ 1,5
Squareness	EN 438-2:8	Squareness	mm (max)		≤ 1,5

General Requirements

Based on Standard	Based on Standard EN 438-2	Property or Attribute	Unit (max or min)		20
Resistance to impact by small diameter ball	EN 438-2:20	Spring Force	N (min)		≥ 20
Resistance to impact by large diameter ball	EN 438-2:21	Drop Height	mm (min)		≥ 800
		Indent Diameter	mm (max)		≤ 10
Dimensional stability elevated temperature	EN 438-2:17	Cumulative dimensional change	% (max)	Longitudinal	≤ 0,55
				Cross - longitudinal	≤ 1,05
Density	ISO 1183:1987	Density	g/cm³		≥ 1,350

Surface Requirements

Based on Standard	Based on Standard EN 438-2	Property or Attribute	Unit (max or min)		20
Resistance to surface wear	EN 438-2:10	Wear resistance	Revolutions (min)	Initial wear	150
				Wear Value	350
Resistance to scratching	EN 438-2:25	Force	Rating (min)		3
Resistance to immersion in boiling water	EN 438-2:12	Visual Appearance	Rating (min)		4
Resistance to wet heat (100 ° C)	EN 12721 : 1997	Visual Appearance	Rating (min)		4
Resistance to water vapour	EN 438-2:14	Contrast	Rating (min)		4
Light Fastness (xenon arc light)	EN 438-2:27	Visual Appearance	Grey scale rating		Min 4
Resistance to cigarette burns	EN 438-2:30	Visual Appearance	Rating (min)		3