

Formica® Products

Technical Information



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Foreword

The guidelines are intended to provide general recommendations on the use of various High Pressure Laminate (HPL) products. Technical data sheets for HPL products are available from the manufacturer's technical website. Before use of HPL products, it is required to check for updated information from this website.

Reference is exclusively made to the technical information published on the manufacturer's technical website. Any liability in connection with any other technical information is explicitly disclaimed.

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Thin High Pressure Laminate HPL



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Contents

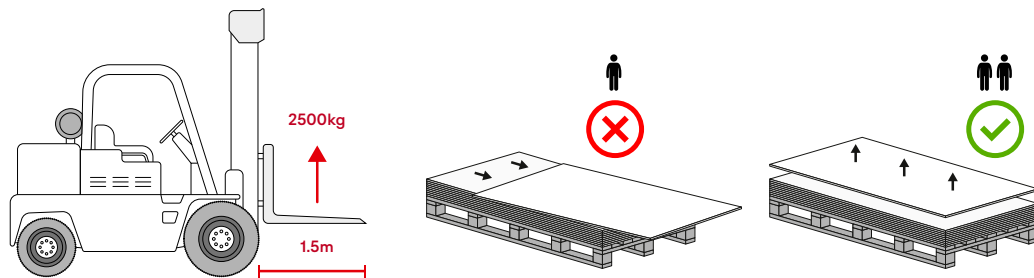
| | |
|----------|---|
| 1 | 1. Transportation, storage, packaging & handling |
| 1 | Transportation |
| 1 | Storage |
| 2 | Packaging |
| 2 | Handling |
| 3 | 2. HPL Thin Sheets – Processing |
| 3 | Conditioning |
| 3 | Cold Pre-Conditioning |
| 3 | Hot Pre-Conditioning |
| 4 | Balancing |
| 4 | Postforming |
| 4 | Cutting |
| 4 | Cutting by hand |
| 4 | Cutting with bench machinery |
| 5 | Recommended specification for circular saws |
| 5 | Milling and Routing |
| 5 | Milling/Routing with hand-held tools |
| 5 | Milling/Routing with fixed equipment |
| 5 | Smoothing by hand |
| 6 | Drilling |
| 6 | Drilling tools |
| 6 | How to make internal cuts |
| 6 | Edging |
| 7 | 3. Production of composite panels |
| 7 | Substates |
| 7 | Adaptability of substrates |
| 7 | How to bond HPL sheets to substrates |
| 7 | Adhesives |
| 9 | 4. Maintenance and aftercare |

Transportation, storage, packaging & handling

Transportation and Handling of sheet material should only be carried out using suitable equipment. Sheets must always be handled with care to prevent damage to the external surface.

Transportation

- HPL products should only be handled and transported by competent professionals with proper equipment, taking great care to avoid breakage and damage.
- If the products should be loaded or unloaded, they should be lifted and not slid.
- One product rubbing against another can cause surface scratches or abrasions.
- Single sheets of HPL should be carried with the decorative surface facing the carrier's body.
- Two people are needed to handle large HPL products.
- Prevent dust from depositing on and between HPL products.
- Use adhesive, easy to peel off stickers for marking / coding, however, these must be removed immediately after installation.
- When transporting stacks of HPL products, use a platform of suitable size and stability, securing the HPL products with straps or stretch film to avoid dangerous slipping and place corner protection under the straps.

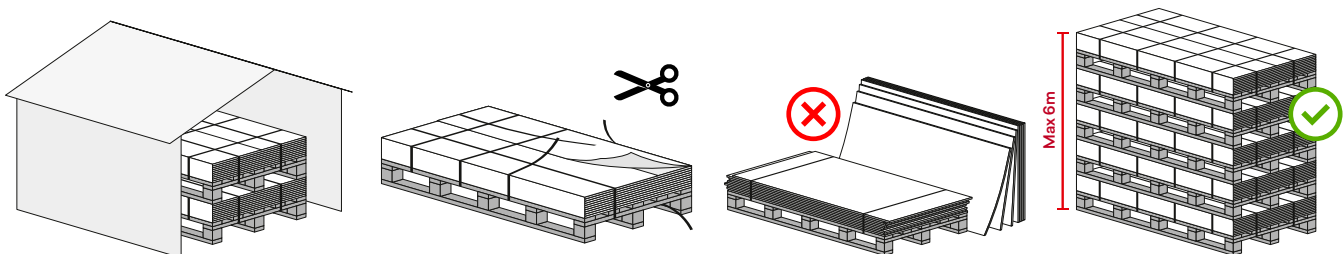


Storage

- HPL products covered with protective film should be stored in a clean, dry, frost free atmosphere at room temperature (ideally 20°C), avoiding exposure to atmospheric agents and UVA rays.
- Place pallets and HPL products on a flat surface that provides full support.
- Keep HPL products in the original packaging whenever possible.
- Remove straps if products are to be stored for a long period of time.
- Do not place moisture-sensitive (paper) layers between HPL products.

Prevent moisture forming between HPL products. Partial (on one side only) exposure to moisture or heat can be prevented by:

- Stacking HPL products one on top of the other.
- Avoiding gaps between HPL products, e.g. when HPL products have been machined.
- Removing protective films from both sides at the same time.



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Packaging

- The adhesive protective film on HPL products is designed to temporarily protect the surface from dust, scratches and marks left by handling equipment; it does not protect from corrosion, dampness, or chemical agents.
- The removal of the adhesive protective film should take place within 6 months from the date of shipping by the manufacturer.
- For HPL thin sheets the adhesive protective film should be removed from the sheet surface after initial application and before assembly of the final product.
- For HPL compact sheets the adhesive protective film should be removed from both sides of the compact sheet surface at the same time.
- Liability for improper use of HPL products covered with an adhesive protective film, including any consequences of an incorrect application, is rejected.

Handling

Individual HPL thin sheets less than 0.9 mm thickness may be rolled up for handling with the decor side facing inward, forming a cylinder about 600mm in diameter or at least large enough not to damage the HPL thin sheet.



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2. HPL Thin sheets - Processing

Please note that the information given is a general guide to good practice only and constitutes no form of warranty or representation as to fitness for purpose in respect of the process. The user is required to verify and test for specific suitability.

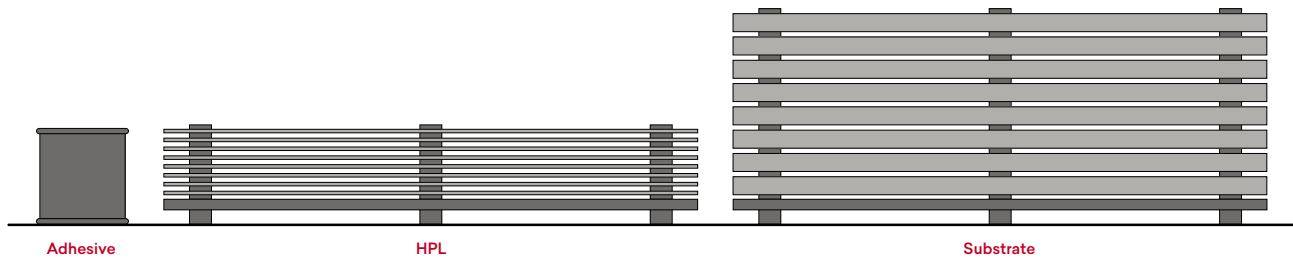
- Dimensional changes of HPL thin sheets can be different from those of the substrate and as such, before fabrication and before gluing, pre-conditioning of both substrate and HPL thin sheet is required.
- Balancing the composite panel so that both sides are made of HPL thin sheets with identical properties.
- Ventilation and humidity control of the room where the composite panel is installed.
- Fabrication of the HPL thin sheet to allow for dimensional changes, if any.

Conditioning

HPL products are composed of over 60% cellulose fiber. They are sensitive to temperature variations and, above all, to humidity variations, which can cause dimensional changes. It is recommended that, prior to fabricating or installing compact laminates, a process of pre-conditioning be carried out to ensure the panels reach an equilibrium with the site conditions.

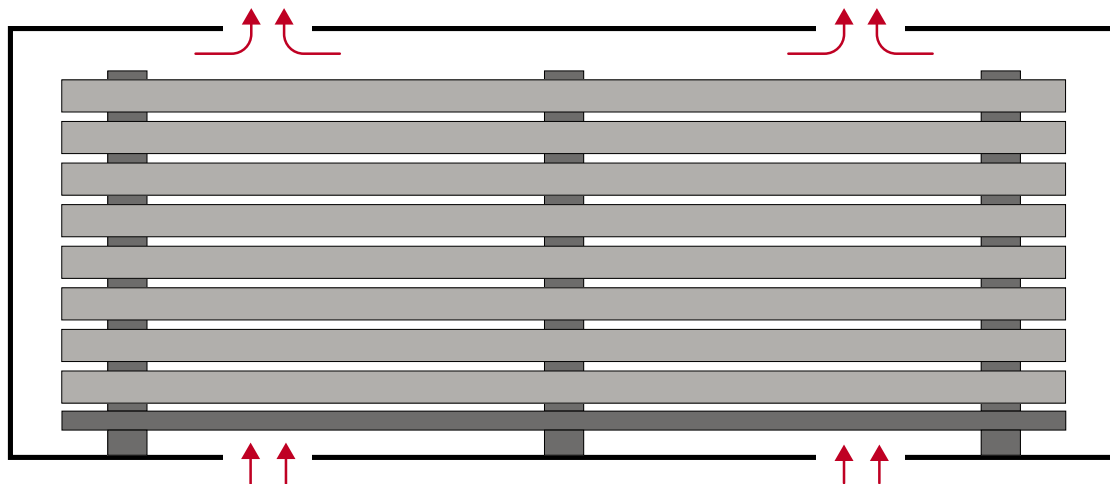
Cold Pre-Conditioning

HPL thin sheets, substrates and glue should be placed together for at least three days, in a humidity and temperature-controlled environment to enable the products to acclimatize. The conditioning parameters may vary depending on the specific environment.



Hot Pre-Conditioning

HPL thin sheets are arranged in a temperature-controlled room, in pairs, spaced apart, to allow hot air to circulate. Duration and temperature would vary, depending on the type of glue used, and the specific operating procedures of the fabricator.



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Balancing

The HPL thin sheets to be used for both sides of the substrate should be taken from the same HPL thin sheet or from HPL thin sheets from the same manufacturer and of the same type and thickness. It is important that the two sheet sides are cut in the same direction, i.e., in the direction of the paper, which is the same as the direction of sanding. The risk of warping cannot be totally ruled out if other materials are used on either side of a substrate.

Alternative balancing options which meet the standards of EN438, where there is no direct requirement for a matching colour on both sides.

These are as follows, HPL - F1130 Cabinet White / F6100 DC White / F1131 Grey Balancer / F0024 Grey Balancer / F8517 FR Balancer. ColorCore - F9935 ColorCore Balancer.

Processing HPL thin sheets should be done by a professional using proper equipment. The entire process is explained in more detail in the following chapters on post-forming, cutting, milling, drilling, edging, and gluing.

Postforming

- The term 'postforming' is used to describe the bending process applied to specially developed grades of laminate which, whilst possessing all the well-known properties of standard grade high pressure laminates, can also be formed into simple cylindrical concave or convex curves.
- There must be a reasonably wide forming temperature zone (i.e. between the lowest temperature at which the laminate will form without cracking, and the highest temperature which can be safely used without the risk of blistering). The recommended forming temperature range for HGP and VGP postforming laminates is 163°C to 177°C. The recommended range for flame-retardant postforming grade VFP is 170°C to 180°C. White/light-coloured laminates should always be formed at the upper end of the temperature range.
- The heating of the laminate must be meticulously controlled and monitored throughout the daily working period. Fluctuations in ambient temperature, heater voltage or machine speeds may upset critical heating conditions, resulting in cracking due to insufficient heat or blistering from too much heat.
- The application of heat sensitive liquids or waxes to the area to be heated is an effective way of checking the forming temperature. These liquids/waxes melt instantly at the temperature, giving an accurate visible indication when the laminate surface has reached the required temperature.

Below shows the recommended postforming conditions for certain HPL thin sheets.

- HGP: 163 - 177°C
- VFP: 170 - 180°C
- AR Plus®: 163 - 177°C

Cutting

HPL thin should preferably be cut with saws using blades with tungsten carbide tipped (TCT) inserts, or polycrystalline (PCD) inserts in case of metal surface.

Cutting by hand

- Tools used on site must be well sharpened so that great pressure is not required, thus reducing the risk of chipping and/or cracking the material.
- The operation should always be carried out in compliance with codes of practice and safety regulations.

Cutting with bench machinery

The following general guidelines apply when using circular saws.

- Place the HPL sheet with the decorative side in the opposite direction to the rotation of the blade. In addition, the sheet must be well supported and secured with an adjustable height pressure tool to prevent movement and vibration.
- In the case of sheets with decor on one side only, all sheets should be placed with their decorative side facing upwards.
- The blades should not be too thin. If they are less than 2mm thick, they lose rigidity and vibrate, making the cut less precise.
- Band saws are not recommended.



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Recommended specification for circular saws

- Tooth pitch: 10 to 15 mm;
- Cutting speed: 3,000 to 4,000 rpm;
- Tip speed: 60 to 100 m/s;
- Forward speed: 15 to 30 m/min.

Best results are achieved by:

- Using fixed circular saws fitted with scribes and by carefully adjusting the blade height. The quality of the cut also depends on the profile and the number of teeth, the tip speed, the forward speed, and the blade's angle of entry and exit.
- Choosing the most suitable blade, using a low forward speed and not "attacking" the material.

Operations should be carried out in compliance with codes of practice and safety regulations.

Milling and Routing

Depending on the circumstances, routing can be carried out in various ways using hand-held tools or fixed equipment.

Milling/Routing with hand-held tools

It is always essential to use machining centers.

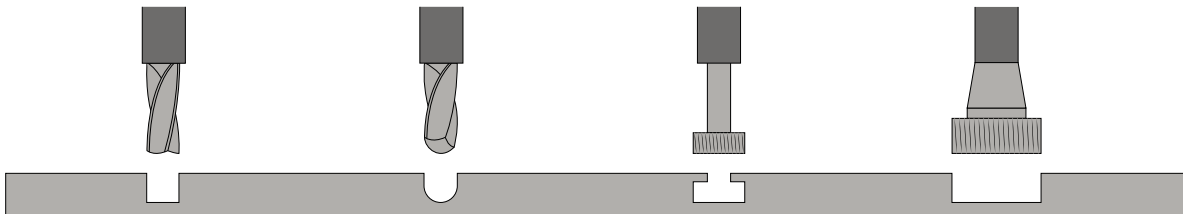
Hand-held cutters as well as belt sanders or grinding wheels are used specially to trim the projecting edges of sheets already glued onto a substrate.

In such cases, the base of the cutter must be covered with felt to protect the decorative side during the work. The laminate surface should be cleaned of any dust and grit. For detailed processing parameters, consult tooling suppliers.

Milling with fixed equipment

Milling machines or wood machining centers with spindles with interchangeable blades can be used.

The recommended tool attachments are cutters, discs or bits in solid tungsten carbide, or in steel with tungsten carbide or diamond inserts, and with one or more vertical or angled teeth. In the case of curved edges, it is better to cut out the rough shape required first, leaving a 1 mm surplus. The next step is then milling to the finished shape required.



Smoothing by hand

- Various tools such as files or sandpaper can be used to finish the edges or chamfer corners by hand.
- Square (rather than milled) files are used to trim edges or chamfer sharp corners, making sure to use files in a direction away from the decorative side towards the core.
- It is also possible to use fine files or abrasive paper and dual speed scrapers.
- To avoid scratching the surface, it is important to proceed gently and possibly in two stages: first with a coarser and then with a finer sandpaper.



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Drilling

The techniques shown apply both for drilling individual HPL sheets and for drilling sheets that are already adhered to a substrate. These operations should also be carried out in compliance with codes of practice and safety regulations.

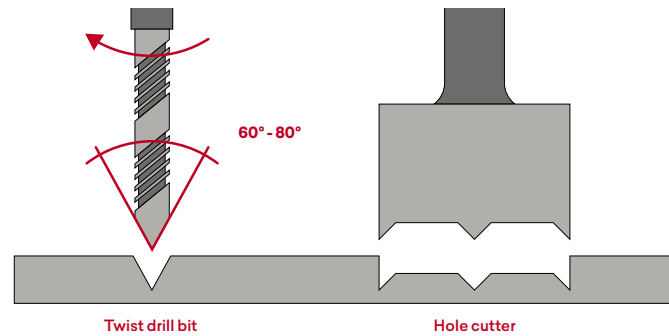
For best results and to avoid the risk of future splits or cracks, it is important to bear in mind the following:

- Holes used should have a clearance larger than the diameter of the screw.
- The drill speed should never be such as to overheat the surface of the decorative sheet and damage it.
- To avoid splintering the material around the drill bit exit hole, we recommend placing the sheet on a hardwood board.
- After drilling, it is advisable to check that the edge of the hole is clean and smooth. If this is not the case, carefully rectify it as any micro-spalling can lead to cracking in the future.

Drilling tools

Twist drill bits: the most suitable bits for drilling HPL thin sheets are special steel twist drill bits for plastics, with a tip angle of 60° to 80° (rather than the 120° of normal metal bits), a sharp helix angle, and a wide flute for rapid chip removal. The recommended rake angle is 7° with an 8° angle of attack.

Hole cutters are recommended for larger holes.



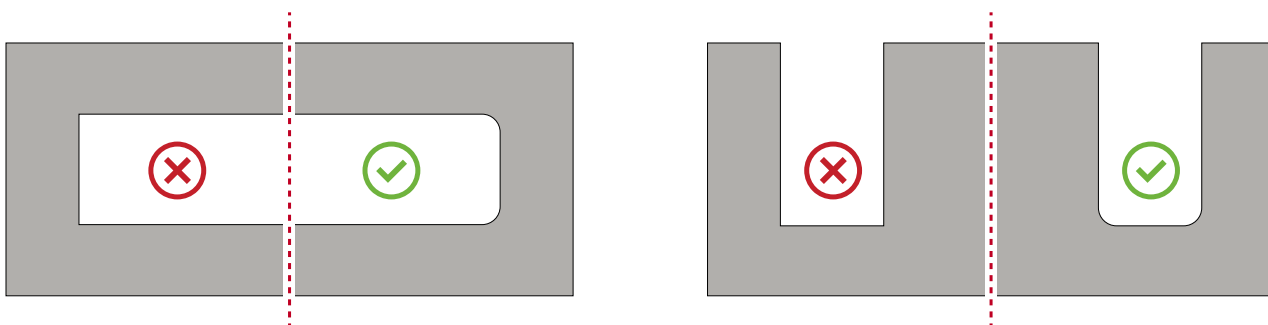
How to make internal cuts

The following refers both to HPL sheets and to composite sheets with HPL sheets applied to one or both sides. When carrying out internal fretwork, it is important to know that right-angled cuts may cause breakage or cracking of the material. In order to prevent this, all the corners of the internal cut-outs should be evenly rounded, polished, and brushed to remove any chips.

The inner radius of the rounded corner must be as large as possible. For internal cut-outs with side dimensions of up to 250mm, the rounding of the corners should create a radius of at least 5mm. If the length of the cut is greater, the radius of the corners should be greater too.

Before cutting the side of the opening, it is better to form the interior angles directly with the milling machine or drill, rounded to the required radius. If the design requires interior right angles, this should be achieved by assembling HPL sheets together at each corner with butt joints.

Right angle cut-outs can cause breaking or cracking in the panel. Interior trim corners should be rounded.



Edging

Bonded thin HPL sheets can be edge-banded using the same laminate cut into strips or using ABS (Acrylonitrile butadiene styrene) or PP (Polypropylene) edge-banding strip.



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3. Production of composite panels

HPL thin sheets are semi-finished products that require gluing onto a substrate in almost all of its applications. The design and fabrication of a composite panel, including the selection of its components, is the sole responsibility of the composite panel manufacturer. The information below is for general guidance only. The composite panel manufacturer should always independently assess the fabrication requirements in terms of raw materials and processes.

Substrates

The substrate supports the sheet and must resist distortion. The substrate should therefore be selected for its characteristics as well as the characteristics of the application, the intended use of the composite panel, and the installation environment.

For the surface of HPL thin sheets to appear smooth and uniform, the surface of the substrate should also be of similar characteristics. Imperfections on the substrate will, tend to be transferred to the sheet surface, especially if the HPL thin sheet is very thin. Commonly used substrates are chipboard, MDF and Plywood (BB grade).

Adaptability of substrates

The below contains a list of substrate materials:

- Particle board (chipboard)
- Medium or high density fibre
- Plywood (minimum BB grade)
- Laminboard panels
- Honeycomb structure supports
- Tempered glass
- Mineral-based supports
- Metal supports
- Foam plastics (polystyrene, PVC, polyurethane, phenol based, etc.)

How to bond HPL sheets to substrates

Reference is made to the recommendations of the adhesive manufacturer. Further reference is made to the procedures of composite panel manufacturers.

General recommendations are that, prior to bonding, the sheet surface and substrate should be thoroughly cleaned of any dust, grease or other particles that could cause defects or stains.

Adhesives

The choice and application of glue, from among the many types available, should be determined by the type of substrate and the purpose of the finished product and the glue manufacturer guidelines. Cut the HPL thin sheet in the same direction as the length of the sanding and apply the HPL thin sheet along the length of the grain of the substrate.



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Thermoplastic adhesives

| Supports | Neoprene chloroprene | PVAc | Silicone acrylic compounds | Hot melt acrylic compounds |
|---|-------------------------|--------------------|----------------------------|----------------------------|
| Wood based | ● Treatment cold | ● Treatment hot | | ● |
| Paper based with honeycomb structure | ● Treatment cold | ● Treatment hot | | |
| Plastic foam based or honeycomb materials polystyrene | | | ● | |
| PVC | ● | | ● | |
| Phenol-formaldehyde | ● | ● | | |
| Polyurethane | ● | | | |
| Metal absed sheet or honeycomb structure | ● | | | ● |
| Mineral supports in sheets or plaster based foams | | ● | | |
| Glass foam | ● | ● | | |

Thermosetting adhesives

| Supports | Urea glues UF | Melamine glues | Resorcinol and formaldehyde based glues | Phenolic glues | Polyurethane glues | Polyester | Epoxies |
|---|---------------|----------------|---|----------------|--------------------|-----------|---------|
| Wood based | ● | ● | ● | ● | ● | ● | ● |
| Paper based with honeycomb structure | ● | ● | ● | ● | ● | ● | ● |
| Plastic foam based or honeycomb materials polystyrene | | | | | ● | | ● |
| PVC | | | | | ● | | ● |
| Phenol-formaldehyde | ● | ● | ● | ● | ● | ● | ● |
| Polyurethane | | | | | ● | ● | ● |
| Metal absed sheet or honeycomb structure | | | ● | | ● | ● | ● |
| Mineral supports in sheets or plaster based foams | ● | | | | | | |
| Glass foam | | | | | ● | ● | ● |



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4. Maintenance and aftercare

- Formica decorative laminates do not easily scratch or chip and will withstand normal wear and tear, but should never be used as a cutting or chopping surface.
- Laminate surfaces are best kept clean using warm water and mild detergent. Non-abrasive liquids or creams are recommended for stubborn stains.
- More persistent marks and discolouration can usually be removed by light use of a mild abrasive cream. On no account should a highly abrasive scouring pad be used.
- Ink marks from felt-tip and ball-point pens can be removed with a suitable solvent (e.g. methylated spirits, acetone, etc.) on a clean cloth (see below for further details). Organic solvents such as white spirit and cellulose thinners can also be used to remove paint splashes and graffiti, as they will not affect the laminate surface.
- Acid based ceramic cleaners and limescale removers must not be used as they can cause permanent staining. Any spillage or splashes of these cleaners must be washed off the laminate surface immediately.
- After using a cleaner, the surface should be rinsed with clean water and polished dry with a soft cloth.
- Proprietary window-cleaning products can be used to avoid and remove drying marks and smears on the final finish. Furniture polishes should not be used, as this may result in the build-up of silicone wax on the surface, that may cause eventual discolouration and smear marks which can be very difficult to remove.
- Because of the nature of the surface, deep textured finishes are inevitably more difficult to clean than smooth surfaces and light textures. Removal of marks is still possible when using the above guidelines.



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