

PROCESSING RECOMMENDATIONS*

Duropal HPL Compact
Duropal Compact Worktop



* These processing recommendations apply in principle to all Pfleiderer / Duropal Compact panels; differentiated instructions are always associated with the individual product name for the product groups Duropal HPL Compact (half-format) or Duropal Compact worktop (ready-made).

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1. SAFETY

- Before beginning work employees should be familiar with the available tools, the processing recommendations and the safety requirements.
- Personal protective equipment such as gloves, goggles, ear protection, dust / respiratory protection and safety shoes must be worn.



(<https://downloadcenter.bgrci.de/shop/symbib>)

- Only authorised individuals may enter the work area.
- All tools must be grounded to protect against electrical shocks and static electricity.
- All adjusting spanners and other spanners must be removed from the machine.
- The work area must always be kept clean and orderly.
- The workpiece must be secured and fixed in place with screw clamps if necessary.
- Only undamaged tools and the recommended accessories may be used.
- Tools must be reviewed before each use to ensure they are intact and may never run unsupervised.
- Duropal Compact worktops are heavy. They should always be carried by two workers with handling aids such as vacuum lifters or similar. Be careful on steps and around corners during transportation.
- Hazardous materials, glues and other toxic or flammable materials must be stored according to the manufacturer's instructions for the specific material.
- Dust production should be reduced by using tools equipped with a vacuum or suction device.
- When working with materials that emit vapours, work areas must always be well-ventilated for health and safety reasons.

2. TRANSPORTATION

Duropal HPL Compact boards have a high dead weight and a high material value. Therefore, special requirements apply with regard to transport and storage (see also point 4).

Sufficiently large, flat and stable pallets must be used for transporting Duropal HPL Compact boards. It is also recommended to use one melamine-coated wood-based panel as a base and one as a cover sheet per stack. The boards must be secured against slipping in the stack. Rubbing dirt particles in the panel stack can cause indentations or damage to the panel surface.

Useful instructions for transporting prefabricated Duropal HPL Compact panels/elements to the place of installation:

- Pre-assembled boards must be packed safely and protected from damage and, if possible, transported lying down. The boards must not bump against each other - risk of damage and injury!
- The floor of the transport vehicle must be padded. Access and transportability to the installation site must be ensured.

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- Cut-outs for later installations (sinks, hobs, washbasins, etc.) must be reinforced for transport.
- Manual transport should be carried out by two people. Ideally, the panels should be carried upright on the longitudinal edge using vacuum lifting equipment. Horizontal carrying increases the risk of breakage.

3. TRANSPORT PACKAGING

Duropal HPL Compact are always delivered stacked in stretch film packaging to avoid dirt and climatic influences during transport and storage.

Duropal Compact worktops are delivered in individual cardboard packaging. The carton and the product itself are marked on the top of the product at the factory. Ideally, this marking remains on the product until assembly. The top of the worktop must always be specially protected during packing and installation.

4. STORAGE, HANDLING AND CONDITIONING

All Duropal HPL Compact boards should be stored in closed storage rooms, not near doors/gates, under normal room climate conditions with temperatures between 18 - 25°C and a relative humidity of 50 - 65%, protected from moisture, humidity, direct sunlight and the influence of draughts/heating fans and air conditioning outlets.

Ideally, the product should be stored in the stretch film packaging supplied by the factory (the film wrapping and the use of the top cover board should, if possible, be retained or restored even after individual panels have been removed) or in the individual cardboard packaging, always lying fully flat on a suitable, level base (pallet with coated cover and base plate). These storage conditions should protect the product as far as possible from corresponding dimensional changes over the storage period.

It is also recommended to use one melamine-coated wood-based panel as a base and one as a cover sheet per stack.

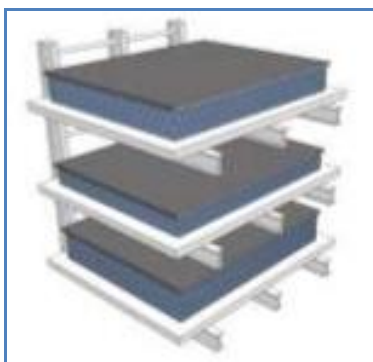


Figure 1: Storage rack (proHPL)

When handling unpacked Duropal HPL Compact worktops, they must always be lifted and never pushed against each other or pulled over each other. Even small particles of dirt or machining residues can damage the decorative top of the boards.

Duropal HPL Compact boards must be sufficiently conditioned before processing and conditioned again on site prior to installation:

- Material that has been processed when too moist tends to shrink, which can lead to cracking and distortion.
- Materials that are too dry are difficult to process; they can expand due to moisture absorption, which in turn can lead to distortion.
- Any transport protection films applied should be removed on both sides at the same time.

In principle, the climatic conditions of later use should be taken into account during planning and construction. Good conditioning can only be achieved in a standard room climate (see above).

5. TOOLS AND MATERIALS

The following list contains tools and materials that may be required for the installation of Duropal HPL Compact panels:

- Gloves / safety glasses / hearing protection / dust / respiratory protection / safety shoes.
- Hoover / extraction system
- Carpenter's tools / 240 grit sandpaper
- Dust protection foil / cleaning cloths / clear denatured alcohol (ethanol also possible)
- Plastic adhesive tape (e.g. Tesa repair tape extra Power Universal)
- Masking tape (e.g. Tesa Robust Masking Tape)
- Panel connectors/ fittings
- Lamello flat dowel
- Assembly adhesive (e.g. BERNER Power Alleskleber Speed), sanitary silicone
- Varnish oil or silicone-free oil

Conditionally recommendable tools are:

- Hand-held circular saw
- Hand router
- Flat dowel router

6. PROCESSING RECOMMENDATIONS

These processing recommendations are independent of the decor or product core (black, grey, white) with regard to processing and processing results.

However, successful processing with a high-quality, professional finish is clearly dependent on suitable, new or "freshly" sharpened tools. The finishing is ideally done with workshop machines such as pressure beam saws and CNC machining. Assembly adjustments on site (construction site) are not or only slightly possible and can usually only be carried out inadequately with "hand tools".

Due to the hardness of the material and the thickness of the panel, tool wear is higher. Depending on the quantities to be produced, it is advisable to carry out a self-experiment to select suitable machines and tools.

For all machining processes, local overheating due to improper tool guidance, incorrect speed preselection and/or feed rate or tools that are not sharp must be avoided.

7. SAWING

Sawing should only ever be considered as a pre-machining step, as the first cut of the format. Final machining by sawing is not recommended for visible edges. In most cases, the final machining is done by milling. For a clean saw cut, the smallest possible allowance of 2-5 mm should be calculated for the milling process.

- Horizontal pressure beam saws are ideal for sawing Duropal HPL Compact boards: The workpiece is fixed and the feed is automated.
- The panels are to be sawn at a lower feed rate (max. 15 m/min). To avoid tearing out the underside of the panel, we recommend using a scoring unit.
- Circular table saws are recommended to a limited extent: The workpiece is not fixed (risk of kickback!), and the feed is manual.
- Machining with a hand-held circular saw is suitable to a certain extent.
- Cutting with jigsaws is definitely unsuitable!



Figure 2: Using a jigsaw to cut a Compact worktop

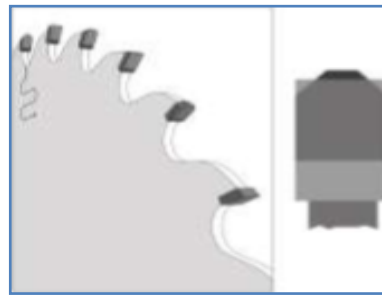


Figure 3: Saw blades with trapezoidal teeth / flat teeth (proHPL)

We recommend:

- Saw blades with trapezoidal tooth / flat tooth.
- Saw blade LEITZ premium 163408 - 350x4,4 / 3,2x30 Z72 / 15.27 HW FZ/TR

8. MILLING

The milling process is usually the final edge processing: If a suitable milling tool has been used, further processing such as grinding is often no longer necessary. The choice of tool depends on production quantities and quality requirements.

1. Diamond-tipped (CNC) routers (roughing cutters with offset cutting edges)
 - Advantage: Longer tool life
 - Disadvantage: Milling pattern appears slightly unclean, uneven. This is particularly noticeable with black product core
2. Diamond-tipped (CNC) router bits, Z2+2, (for clean formatting with offset cutting edges)
 - Advantage: Clean milling pattern with reduced feed rates
 - Disadvantage: Low tool life

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3. Milling cutter with carbide inserts

- Advantage: Exact, clean, smooth milling pattern. Reworking is usually not necessary
- Disadvantage: Further reduced feed rate, shorter tool life compared to slide tipped cutters.

Our machine recommendations:

- The high cutting pressure required for milling makes safe workpiece and tool guidance essential. Therefore, the machining of Duropal HPL Compact boards using CNC machining is ideal.
- Table milling machines are suitable for producing chamfers or grooves. It is important to ensure that the top of the Duropal HPL Compact board is never moved over the machine table without protection.
- Manual processing using a router is only suitable to a limited extent.

All edges and corners should always be smoothed after routing. This reduces the risk of injury (cuts) and the notching effect (risk of cracks).

9. MANUAL PROCESSING

Machining with hand machines (sawing, milling), of inlets & outlets, draining surfaces, etc.

- As described under point 6 "General processing recommendations", qualitatively satisfactory processing with hand machines is possible with practised handling.
- Due to the hardness of the material, we would like to refer again to our point 1. "Safety", as this requires even greater importance for hand machine processing.
- If hand machines are used for machining, it is absolutely necessary to carry out your own tests in advance in order to be able to define the suitable machine selection and tooling, as well as the definition of the machining allowances. The machining result is to be assessed and determined according to your own quality expectations.
- We recommend hand machines with the performance characteristics > 1,200 watts / > 5,000 rpm and equipped with carbide or diamond tools.
- Machining results are to be permanently controlled during the production process, as tool changes may have to be carried out in order to comply with the self-defined quality specifications. In addition, we recommend a surface protection such as a stable cardboard or a hard fibre board between the work piece and the hand machine in order to be able to exclude damage to the surface through machining.
- The specifications of the machine and tool manufacturers must be observed.

If necessary, manual reworking is only practical on edges that have already been milled.

- Sharp or non-smoothed edges can easily be smoothed using sandpaper with a 240 grit. Any abrasive grit must be removed carefully.
- Finishing with a file, plane, or scraper is not recommended

10. DRILLING

Ideally, holes ≥ 10 mm should be drilled in Duropal HPL Compact boards by means of milling. When using drills, special plastic drills with a point angle of approx. $60 - 80^\circ$ should be used.

Machining must be carried out on a flat, solid surface. All vibrations and any fluttering of the plate must be avoided. Sharp tool edges and smooth running of the tools are essential for good results. If unsuitable tools are used, this will lead to chipping, splintering and bulging of the borehole edges. The resulting notches can lead to the formation of cracks.

To prevent chipping on the underside when drilling through, the feed rate of the drill must be steadily reduced. For blind holes, the hole depth should be made so that at least 1.5 mm of panel thickness (a) remains. When drilling parallel to the panel plane, the remaining thickness (b) must be at least 3 mm.

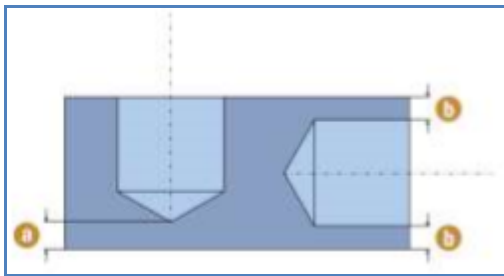


Figure 4: Drilling into Compact worktop, parallel and vertical to the worktop surface (proHPL)

11. OTHER PROCESSING EQUIPMENT

11.1. EDGE BANDING MACHINE / SINGLE SIDED PROFILE SHAPER

Duropal HPL Compact boards have a high-quality edge look in the finished state due to the coloured board core. It is not usually necessary to apply additional decorative furniture edges. However, machines for edge banding can be used ideally for applying and processing additional furniture edges on Compact panels, but also for profile milling of the panel edges:

- Elements pre-formed using a saw can be finished using milling, sanding, or buffing.
- The workpiece is fixed in place, and forward feed is automatic.
- Finishing is always completed on one side only.
- Edge banding machines are useful for single orders and small series.

11.2. DOUBLE END PROFILERS

Double-end profilers are recommended for processing the edges of Duropal HPL Compact panels in large series. In the classic sense, these consist of two aggregate units arranged in parallel and adjustable to each other by an adjustment system. Processing can be carried out simultaneously on two parallel edges.

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The following units can be used, for example: Cross-cut saws, milling or chipping units, vertical and horizontal drilling units, fixed and swivelling milling units for additional working steps (grooving, rebating), sanding units, etc.

11.3. DOUBLE END PROFILERS

Edge finishing can be completed using linseed oil or silicone-free oil. Finishing with oil will improve the visual appearance of the edge but will not affect its technical properties.

- In compact worktops with a black core and slightly uneven milling surface oil is a way to visually “fire” the piece making the edge appear intensively black when using the oil. If milled cleanly the edge appearance will also be ideal without using oil.
- Compact worktops with a grey or white core do not require oil treatment as the oil will give the edge surface a yellowish colour.

Our recommendations:

- Rubio MONOCOAT Oil Plus 2C (https://www.rubiomonocoat.com/uploads/downloadsfile/orig/aa/de/RMC%20General%20Product%20Catalogue_A4_DE_lowRes6.pdf?v=1540972513)
- OSO Top Oil 3058 (<https://www.osmo.de/opencms/de/navigation/suche.html>)

The top and bottom of the panel must be masked along the edges before oil is applied to the edges to protect them from contamination.

12. TONGUE AND GROOVE

If Duropal HPL Compact boards are connected by tongue and groove, the groove width (a) and groove side thickness (b) must be at least 3 mm. If the design permits, the groove cheek thickness (b) should be greater than the groove width (a). The groove depth should be as small as possible (max. 10 mm).

The inside edges of the rebate must be chamfered. Sharp-edged inside rebate edges increase the notch effect.

Groove width (a) = 3 mm

Groove cheek thickness (b) ≥ 3mm

Panel thickness (c) > 10 mm

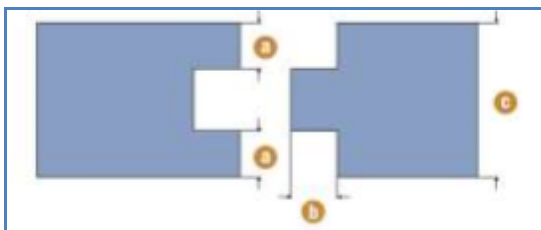


Figure 5: Connection by tongue and groove (proHPL)

Due to possible dimensional changes, Duropal HPL Compact boards must be installed with sufficient clearance between tongue and groove.

13. SCREW FITTINGS

It is often necessary to screw the Duropal HPL Compact boards to the furniture carcass or wall connection profiles, for example. All screws to be inserted must be pre-drilled.

Our recommendation:

When using assembly screws, the drilling dimension should be 0.5 mm smaller than the screw diameter. If the screws are not pre-drilled, there is a risk that the panel will splice and the screw will break off!



Figure 6: Risk of splicing when screwing without pre-drilling

14. GLUEING

Ideally connections between the body of the cabinets and the compact worktop should be bonded. On the one hand this is typically a more suitable mounting option in comparison to screwing, although on the other hand it makes removal more difficult. Adhesive dots are applied to the mounting strip on the base cabinet. The Compact worktop is positioned on top of these.

15. SUPPLEMENTARY INFORMATION ON DUROPAL COMPACT WORKTOPS

15.1. GENERAL INSTALLATION RECOMMENDATIONS

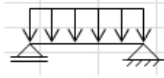
In general when building kitchens using Duropal Compact worktops please note that the height of cabinets in comparison to a Duropal worktop with a thickness of 39 mm will be reduced by 27 mm.

The design features of elements like hobs and sinks must be taken into consideration:

- Their height and attachment systems are frequently designed for worktops with a thickness of 39 mm. Therefore cladding and / or shadow gaps will often be necessary in designing furnishings or during installation.
- Cut-outs for hobs or sinks are always made in just one panel, never in two panels joined together.
- Heat sources like hobs must be installed at least 50 mm from the edge of the worktop.

Compact worktops can be subject to certain load requirements due to different installation situations. Please refer to the load tables for our recommendations.

15.2. LOAD TABLES



panel width: 640/950mm

Maximum permissible uniform load on Duropal Compact panel with different span widths and bending criteria [kg/m ²]									
panel thickness in mm	Support distance (centre distance) in mm Recommendation (max. load situation)								Deflection criteria*
	100	200	300	400	500	600	700	800	
12	56206	12683	3758	1585	812	470	296	198	l/100
12	56206	8455	2505	1057	541	313	197	132	l/150



panel width: 640/950mm

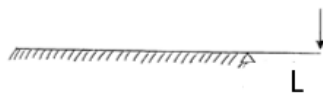
Maximum permissible point load on Duropal Compact panel with different span widths and bending criteria [kg]								
panel thickness in mm	Support distance (centre distance) in mm Recommendation (max. load situation)						Deflection criteria*	
	100	200	300	400	500	600		
12	1799	899	448	249	157	106	l/100	
12	1799	674	297	165	103	69	l/150	

cantilever arm



The distance between the supports is shown incorrectly, the plate lies flat between the supports!
The plate is fixed in the whole field!

Maximum permissible uniform load on Duropal Compact panel with different cantilever arm lengths and bending criteria [kg/m ²]				
panel thickness in mm	Cantilever overhang in mm Recommendation (max. load situation)			Deflection criteria*
	L	100	200	
12	10569	1321	391	l/100
12	7046	881	261	l/150



The distance between the supports is shown incorrectly, the plate lies flat between the supports!
The plate is fixed in the whole field!

Maximum permissible point load on Duropal Compact panel with different cantilever arm lengths and bending criteria [kg]			
panel thickness in mm	Cantilever overhang in mm Recommendation (max. load situation)		Deflection criteria*
	L	100	
12	253		l/100
12	168		l/150

* For long-lasting loads, the loads that can be applied are reduced by approx. $\frac{2}{3}$ in order to permanently maintain the deflection limitation.

15.3. CORNER CONNECTIONS AND SLAB JOINTS

Panel edges must be milled cleanly; edges must be smoothed to the panel top and bottom surface and panels must be fit together tightly. An exact, even transition between panels is created by creating tongue and groove joints (see above) or biscuit joiners (<http://www.lamello.com>). Panels are fixed in place using connecting fittings and glue.

Our recommendations:

- Duropal Compact worktop width 640 mm: 3 pc. Worktop connectors plus 4-6 pc. Lamello biscuit joiners
- Duropal Compact worktop width 950 mm: 4 pc. Worktop connectors plus 6-8 pc. Lamello biscuit joiners
- Unika jointing kit or ZIPBOLT™ 100 Mini worktop connectors (see image below). ZIP-BOLT™ 100 Mini worktop connector has a max. thickness of 13 mm, and will therefore overhang at least 4 mm. This must be taken into consideration in planning.
- Example adhesive: BERNER Power Adhesive All-Purpose Glue Speed – available in white and black https://shop.berner.eu/at-de/p/44197-klebstoff-kartusche-290-ml-ms-polymer.html?article_id=44197



Figure 8/9: Corner connection – top of panel



Figure 10: Worktop Connector



Figure 10: Corner connection – bottom of panel

Further recommendation:

- UNIKA Connection and Installation Set Compact Worktops (see Figure 9 – Set / Figure 10 – Worktop Connector) http://www.unikainnovation.co.uk/?page_id=12019
- UNIKA sealant TopSeal (see figure 11) http://www.unikainnovation.co.uk/?page_id=10789



Figure 9: Set



Figure 11: sealant TopSeal

15.4. INTERIOR OPENINGS AND CUT-OUTS FOR SINKS AND HOBS

When installing sinks and hobs and when creating drill holes for tap fittings, openings and cut-outs will need to be created in the Duropal Compact worktop. All corners must always be rounded off. The interior radius must be as large as possible. With cut-outs that have edge lengths of up to 250 mm, a minimum radius of 5 mm is required. With cut-outs > 250 mm the radius must be increased step by step according to the side length. In addition a chamfer to the top and bottom sides of the panel is required.

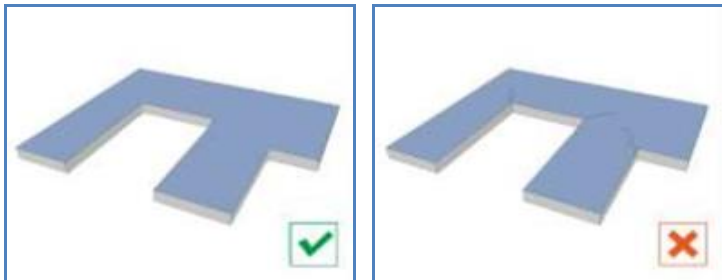


Figure 12/13: Designing interior cut-outs (proHPL)

Interior cut-outs must be rounded and sharp edges must be avoided in transitions to the surface, in particular when constructing the opening for the hob! Due to high heat levels these areas experience greater shrinkage stress.

Important note regarding cut-outs:

The waste cut piece must be supported during cutting to avoid the danger of breakage. The Duropal Compact worktop is weakened in the area of cut-outs. This must be taken into consideration in particular during transport and installation.

For recommendations regarding available sink models esp. for flush mounting please contact the manufacturer of the sink.

15.5. DRAINING GROOVES

Duropal Compact worktops are ideal for creating draining grooves which must be combined with undermount sinks.



Figure 14/15: View of Compact worktop with sink and draining board, view of round groove profile

These are created using a CNC machine. To avoid cracks due to notching, use a round groove profile with a maximum groove depth of 4 mm and a maximum groove width of 12 mm.

Using sharp ball cutters will reduce final machining work. Carefully sand the drainage grooves using 240 grit sandpaper. Ensure that the abrasive elements are always kept away from the decorative surface.

15.6. UPSTANDS

Enhance your Duropal Compact Worktop with a matching Duropal Compact Upstand. This accessory offers a cost-efficient and hygienic alternative to tiling. The upstand is used as a decorative element with a texture and core colour identical to the compact worktop. Upstands are available in every variation of the Duropal Compact worktop collection with a format of 4,100 x 120 x 12 mm.

- Cut upstand to length.
- One long edge is already milled and chamfered. This long edge is mounted with the exposed edge forward facing.
- A binding adhesive e.g. BERNER Power Adhesive All-Purpose Glue Speed is applied in dots on the back of the upstand and the element is positioned on the wall surface. A permanently elastic seal (silicone) is used to seal the compact worktop



Figure 16: Upstand identical to Compact worktop

16. ADDITIONAL INFORMATION - APPLICATION WASHROOM

In addition to a wide range of other applications, the product Duropal HPL Compact is also suitable for use in humid areas / as wall cladding / impact protection.

Due to the expected stress on the Duropal HPL Compact boards/surfaces caused by external climatic conditions/humidity and the associated impairment of distortion, further measures must be taken into account as follows.

- Processed elements must be stored flat on site in suitable packaging/ original packaging. Conditioning must be carried out prior to installation.
- If elements are used as wall cladding, suitable rear ventilation must be provided in order to be able to guarantee uniform air-conditioning on both sides with regard to temperature and moisture load of the Duropal HPL Compact boards/decorated surfaces. This applies in particular to so-called "IPS systems".
- Any mounting points for wall fastening must always be designed as fixed points and sliding points. Partial/full-surface bonding of Duropal HPL Compact panels is not recommended.
- In any case, the expected climatic conditions on site must be ascertained and taken into account both in the product selection and the processing/installation on site.
- Doors should always be fitted with an adequate number of hinges in relation to the length/height of the respective door, e.g.: 3 hinges for a door height of 1,500 mm, 4 hinges for a door height of 2,150 mm, 5 hinges for a door height of up to 2,600 mm.

PM HPL/elements

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