Processing instructions

EGGER PerfectSense lacquered boards

Material description:
Decorative, UV-Paint coated wood based product.

Board type: EGGER MDF ST E1 CARB2/TSCA

Application:
Decorative wood based boards for indoor use.

Product description PerfectSense lacquered boards

With PerfectSense we offer for the first time a lacquered surface with a highly reflective and exceptionally smooth finish (Gloss), as well as a special look, feel and anti-fingerprint feature (Matt). The production of this premium product category involves finishing a melamine-resin-coated MDF coreboard with the help of an innovative lacquering process that is precisely adjusted for the surface. This product once again demonstrates that we are able to meet the demand for premium board surfaces. Distributors, fabricators, architects and the furniture industry are provided with a solution for high-quality furniture construction for contract projects involving kitchen and furniture frontals. Our EGGER MDF is used as coreboard, which meets both E1 and CARB2/TSCA requirements. ST2 is the standard for back panel textures.

Leitz GmbH & Co. KG
www.leitz.at

Processing instructions PerfectSense lacquered boards

The following processing instructions are based upon different series of tests and the best results gained from these tests in cooperation with our partner Leitz GmbH & Co. KG.

General processing guidelines

When working with PerfectSense lacquered boards, the following cutting speeds (vc) and feed per tooth (fz) values should be taken into account:

<table>
<thead>
<tr>
<th>Processing method</th>
<th>Cutting speed vc [m/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawing</td>
<td>60 - 90</td>
</tr>
<tr>
<td>Hoggging</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Milling</td>
<td>50 - 70</td>
</tr>
<tr>
<td>Drilling</td>
<td>0,5 – 2,0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Processing method</th>
<th>Feed speed per tooth fz [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawing</td>
<td>0,05 – 0,12</td>
</tr>
<tr>
<td>Hoggging</td>
<td>0,12 – 0,16</td>
</tr>
<tr>
<td>Milling</td>
<td>0,50 – 0,8</td>
</tr>
<tr>
<td>Drilling</td>
<td>0,10 – 0,15</td>
</tr>
</tbody>
</table>
These parameters are dependent upon the tool diameter (D), the number of teeth (Z), the rotational speed (n) and the feed rate (vf) of the machine in question. The correct calculation of these factors is the only way to achieve optimal results. The following formulas are to be used to calculate the cutting speed, feed per tooth and feed rate:

\[ \text{vc} = D \cdot n \cdot n / 60 \cdot 1000 \]
\[ \text{D} – \text{Tool diameter [mm]} \]
\[ \text{n} – \text{Tool speed [min-1]} \]

\[ \text{fz} = \text{vf} \cdot 1000 / n \cdot z \]
\[ \text{vf} – \text{feed rate [m/min]} \]
\[ \text{n} – \text{Tool speed [min-1]} \]
\[ \text{z} – \text{number of teeth} \]

\[ \text{vf} = \text{vf} \cdot n \cdot z / 1000 \]
\[ \text{fz} – \text{Feed rate [m/min]} \]
\[ \text{n} – \text{Tool speed [min-1]} \]
\[ \text{z} – \text{number of teeth} \]

**Tool material**

In principle, tools with Tungsten Carbide-cutting-edges (TC) and polycrystalline-diamond-cutting-edges (DP- diamond polycrystallin) can also be used. In order to preserve the quality of tools, we suggest the use of tools with diamond-cutting-edges (DP).

**Tool general**

For optimum edge quality of PerfectSense lacquered boards new or newly honed tools are recommended.

**Cutting boards with a circular saw blade**

**General**

Please be aware of the following:

- Visible side (side with foil) facing upwards
- Choose the correct saw blade projection (see table)
- Adjust RPM and number of teeth according to the required feed rate
- The use of a scoring- circular saw on the underside is recommended in order to achieve cleaner cuts

The degree of entry and exit changes according to the saw blade projection and thus the quality of the cut also changes. If the upper edge is unclean, the saw blade should be moved higher. If the lower edge is unclean, the saw blade should be moved down.

Dependent upon the diameter (D) of the saw blade, the following table shows the suggested saw blade projections (U) for table saws and panel-sizing saws:

<table>
<thead>
<tr>
<th>diameter (D) of circular saws [mm]</th>
<th>Projection U [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>approx. 5 – 10</td>
</tr>
<tr>
<td>300</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>450</td>
<td></td>
</tr>
</tbody>
</table>

Saw blades with a higher number of teeth are recommended for better cutting quality. The suggested blade speed for disk saws is 60 - 90m/s.
Recommended saw-tooth shape

FZ/TR (trapezoidal flat tooth)  HZ/DZ (hollow roof tooth)  TR/TR (trapezoidal tooth)

Table saws – final trimming saws
Cutting with the tooth shape ‘hollow-roof tooth’ gave the best results. The tooth shape ‘trapezoidal-flat tooth’ also delivered good results and a slightly longer tool life in comparison to ‘hollow-roof tooth’.

Panel-sizing saws
The saw-tooth combinations ‘trapezoidal-flat tooth’ and ‘trapezoidal tooth’ gave the best results in this category. The saw type Leitz RazorCut (TR/TR) was the best saw type in the 9s category.

<table>
<thead>
<tr>
<th>Dimensions DxBxBo</th>
<th>Tooth shape</th>
<th>Number of teeth Z</th>
<th>RPM n [min⁻¹]</th>
<th>feed rate vf (m/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300x3,2x30</td>
<td>FZ/TR</td>
<td>96</td>
<td>4000</td>
<td>by hand</td>
</tr>
<tr>
<td>303x3,2x30</td>
<td>HZ/DZ</td>
<td>68</td>
<td>4000</td>
<td>by hand</td>
</tr>
<tr>
<td>380x4,8x60</td>
<td>FZ/TR</td>
<td>72</td>
<td>4500</td>
<td>20 – 40</td>
</tr>
<tr>
<td>380x4,8x60</td>
<td>TR/TR</td>
<td>72</td>
<td>4500</td>
<td>20 – 40</td>
</tr>
</tbody>
</table>

Dimensions DxBxBo: diameter (D) / cutting width (SB) / bore diameter (Bo)

Scoring saw
In order to achieve a good cut quality on the underside of the board, the use of a scoring saw is recommended. The cut width of the scoring blade should be slightly wider than that of the cutting blade, so that the blade leaving the underside of the board no longer touches the edge. Divided scoring circular saw blades should be used on table and dimension saws.

Scoring saw blade = nominal SB scoring blade
SB is set by the scoring depth
Diagram of conical scoring circular saw blade. When repairing tools (always in sets) the tools must be matched to each other’s cutting widths.
Spindle moulders – cutting on continuous machines

In order to produce chip-free edges on the outer layer of the board, joining cutters with a mutual shaft angle should be used. Diamond-tipped tools like the Leitz WhisperCut with a shear angle of 30° up to 50° should be used to ensure a good quality cut. The cutting depth should be as low as possible and not exceed 2mm.

The use of tools with high concentricity and balance quality, achieved by the use of centering systems such as hydro-clamping systems, HSK tapers or shrink-wrap systems, are recommended for achieving the best milling results.

When working with spindle molders with a manual feed, only machines with an “MAN” or “BG-Test” quality label should be used. The speed range of the machine should not be exceeded or undercut either. All hand feed tools should be used in the opposing direction.

The operating parameters of the join cutter should be set so that the tooth feed lies (fz) between 0.4 and 0.7mm:

<table>
<thead>
<tr>
<th>Diameter D [mm]</th>
<th>RPM n [min-1]</th>
<th>Number of teeth Z</th>
<th>feed rate vf (m/min)</th>
<th>Leitz-ID, DP WhisperCut</th>
<th>machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>85x43x30</td>
<td>12000</td>
<td>3</td>
<td>15 – 20</td>
<td>192076</td>
<td>192077</td>
</tr>
<tr>
<td>100x43x30</td>
<td>2</td>
<td>10 – 15</td>
<td>192082</td>
<td>192083</td>
<td>Stefani, Holz Her</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>15 – 20</td>
<td>192080</td>
<td>192081</td>
<td>Hebrock, EBM</td>
</tr>
<tr>
<td>100x32x30</td>
<td>3</td>
<td>15 – 20</td>
<td>192088</td>
<td>192088</td>
<td>Biesse</td>
</tr>
<tr>
<td>125x32x30</td>
<td>9000</td>
<td>3</td>
<td>14 - 20</td>
<td>90885</td>
<td>90886</td>
</tr>
<tr>
<td>125x43x30</td>
<td></td>
<td></td>
<td></td>
<td>192090</td>
<td>192091</td>
</tr>
<tr>
<td>125x32x30</td>
<td></td>
<td></td>
<td></td>
<td>192092</td>
<td>192093</td>
</tr>
<tr>
<td>125x32x30</td>
<td></td>
<td></td>
<td></td>
<td>75627</td>
<td>75627</td>
</tr>
<tr>
<td>125x43x30</td>
<td></td>
<td></td>
<td></td>
<td>192094</td>
<td>192095</td>
</tr>
</tbody>
</table>

Hogger for continuous machines

The use of a diamond-tipped hogger that produces little friction and cutting pressure is recommended. The Leitz Diamentaster DT PLUS is particularly suitable mounted on hydro-clamping element for highest radial and axial runout and excellent machining quality and tool life. The cutting speed (vc) is 80 m/s at the usual speed (n) 6000 min-1 and diameter (D) 250.

Parameters of use and the number of teeth of the flakers should be chosen so that the tooth feed (fz) lies between 0.12 to 0.16 mm.

<table>
<thead>
<tr>
<th>Dimensions DxSBxBo</th>
<th>RPM n [min-1]</th>
<th>Number of teeth Z</th>
<th>feed rate vf (m/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250x10x60</td>
<td>6000</td>
<td>24</td>
<td>15 – 24</td>
</tr>
<tr>
<td>250x10x60</td>
<td>6000</td>
<td>36</td>
<td>25 – 35</td>
</tr>
<tr>
<td>250x10x60</td>
<td>6000</td>
<td>48</td>
<td>35 – 45</td>
</tr>
<tr>
<td>250x10x60</td>
<td>6000</td>
<td>60</td>
<td>45 – 55</td>
</tr>
</tbody>
</table>

Dimensions DxSBxBo: diameter (D) / cutting width (SB) / bore diameter (Bo)

Leitz Diamentaster DT Plus

Responsible: Product Management Furniture and Interior Design
Processing of edges with protection foil
For the processing of edging which has a protective foil, we recommend the use of commercially available splitting, cooling and cleaning agents. The splitting agent can be introduced on the first compression roll or directly sprayed onto the board and edging band surfaces after the edging band has been attached. If the protective foil should come away from the edging band during the processing, we recommend that you control and clean the detection heads and also the use of a lubricant, in order to minimize the friction between the protective foil and the detection heads. In order to protect the edging band from external influences for as long as possible, the protective foil should only be removed during the final assembly of the furniture.

Both PerfectSense Gloss and PerfectSense Matt edging bands are suited for processing on continuous feed machines as well as CNC-machining centers. Please refer to the general processing instructions for EGGER ABS edging.

Edge banding machines with scrapers
Scrapers on edge banding machines should be set so that no damage to the protective foil occurs.

Radii profile / Chamfer Cutter
Radii profiles should have a run-out from at least 10°. The settings of radii profiles and chamfer cutters must be selected in such away that there is no contact to the protective foil.

Profile Scrapers
Profile scrapers are commercially available with a profile run-out and can be used for the processing of PerfectSense lacquered boards if set exactly. If the protective foil is damaged whilst using a profile scraper, a profile scraper with a larger run-out of 6-15° should be used.

Flat Scrapers
It is recommended that flat scrapers should be set with a slant of 2-4° in order to avoid damage to the protective foil.
Grooving

In order to achieve an optimal edge quality when cutting slots, tools with a high number of teeth should be used. The tooth feed (fz) should move during processing with feed (gll) within the range of 0.03 - 0.06 mm.

<table>
<thead>
<tr>
<th>Diameter D [mm]</th>
<th>Rotation speed n [min⁻¹]</th>
<th>Number of teeth Z</th>
<th>Rate of feed vf (m/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>6000</td>
<td>36</td>
<td>7 – 14</td>
</tr>
<tr>
<td>200</td>
<td>6000</td>
<td>48</td>
<td>8 - 16</td>
</tr>
</tbody>
</table>

CNC stationary machines

For processing with moulding machines and machining centers, we recommend the use of solid carbide cutters (VHW) or diamond tipped router bits.

Proper clamping of the material which is being processed is essential. In order to support vacuum cleaners, extra mechanical clamps can be used. The use of stable and rigid clamping chucks like Thermo-Grip® from Leitz allow for top accuracy, balance and a perfect cut quality. A good result can only be produced when the machinery used is rigid enough. Gantry machines are an ideal option.

Recommended data:
RPM n = 20,000 – 24,000 min⁻¹

Rate of feed (vf) in Full cut:
- Z1 = 8m/min
- Z2 = 16m/min
- Z3 = 24m/min

<table>
<thead>
<tr>
<th>Dimensions DxNxLxS [mm]</th>
<th>Number of teeth Z</th>
<th>direction of rotation</th>
<th>Type</th>
<th>Leitz ID-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 x 28 x 20</td>
<td>2 + 2</td>
<td>RL</td>
<td>Diamaster Pro</td>
<td>191042</td>
</tr>
<tr>
<td>20 x 28 x 20</td>
<td>2 + 2</td>
<td>RL</td>
<td>Diamaster Quattro</td>
<td>91235</td>
</tr>
<tr>
<td>20 x 28 x 20</td>
<td>3 + 3</td>
<td>RL</td>
<td>Diamaster Plus³</td>
<td>191051</td>
</tr>
<tr>
<td>12 x 24 x 12</td>
<td>2 + 2</td>
<td>RL</td>
<td>Diamaster Pro, Nesting</td>
<td>191060</td>
</tr>
</tbody>
</table>

Dimensions DxNxLxS [mm]: diameter (D) / cutting length (NL) / shaft dimension (S)

Other dimensions available on request.

Drilling

Solid carbide, spiral, dowel hole or hinge boring drills should be used for drilling. On CNC machines for a high stability fitting drills should be used on the main spindle instead of the drilling beam. The drilling of dowel holes and fitting holes takes place from the back side.

Dowel drills
Rotation speed n [min⁻¹] 4000 – 6000
Rate of feed vf [m/min] 0,5 – 2

We recommend the use of solid carbide drill bits for drilling dowel holes. The drill used should have a low cutting pressure. The technical feasibility regarding to the application and the resulting edge quality has to be checked individually by the user.
Hinge boring bit
Rotation speed n [min⁻¹] 3000 – 4500
Rate of feed vF [m/min] 0,5 – 2

Holes can also be drilled with solid carbide hinge boring bits, as long as the angle geometry of the precutter has been modified accordingly. The following tools are recommended by Leitz:

<table>
<thead>
<tr>
<th>Dimensions DxNLxGL [mm]</th>
<th>Number of teeth Z</th>
<th>Type</th>
<th>Leitz ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 x 70</td>
<td>Z 2 / V2</td>
<td>HW- Carbide uncoated solid-fitting hole drill</td>
<td>37203</td>
</tr>
<tr>
<td>20 x 70</td>
<td>Z 2 / V2</td>
<td>HW- Carbide uncoated solid-fitting hole drill</td>
<td>37205</td>
</tr>
<tr>
<td>25 x 70</td>
<td>Z 2 / V2</td>
<td>HW- Carbide uncoated solid-fitting hole drill</td>
<td>37207</td>
</tr>
<tr>
<td>26 x 70</td>
<td>Z 2 / V2</td>
<td>HW- Carbide uncoated solid-fitting hole drill</td>
<td>37209</td>
</tr>
<tr>
<td>30 x 70</td>
<td>Z 2 / V2</td>
<td>HW- Carbide uncoated solid-fitting hole drill</td>
<td>37211</td>
</tr>
<tr>
<td>35 x 70</td>
<td>Z 2 / V2</td>
<td>HW- Carbide uncoated solid-fitting hole drill</td>
<td>37213</td>
</tr>
</tbody>
</table>

Dimensions DxNLxGL [mm]: diameter (D) / cutting length (NL) / total length (GL)

Tool life
The life of a tool can be influenced by a number of factors, which cannot and have not been considered in this set of processing instructions. These instructions are only advice and should not be seen as a statement with regards to tool life. Furthermore, no rights should be asserted based on these instructions. The recommendations made with regard to tools and parameters are our suggestions and also not legally binding. Parameters can differ according to machinery and processing. An optimal adjustment of machinery, tools and materials according to customer specifications can only be completed in the presence of a certified Leitz applications engineer.
Due to the high quality needs and the nature of the surface of PerfectSense lacquered boards, a shortening of tool life time is to be expected in comparison to other boards produced and delivered by EGGER.

Storage

Horizontal storage/stacking

- Stacking should take place on load-bearing and flat ground.
- Joists should have a uniform thickness and their length should correspond to the width of the board stack.
- The distance between the foundation joists depends on the thickness of the boards.
  - Board thickness ≥ 15 mm: The distance must be of at least 800 mm. In any case, at least 4 joists should be used for half-format boards (l=2800mm).
  - Board thickness < 15 mm: The distance should be smaller than 800mm. The rule of thumb is “Distance = 50 * board thickness (m)”
- In order to protect the board surface cover boards must be used.
- Ensure sufficient edge protections if board stacks are to be fastened subsequently with steel or plastic bands. This can be achieved with the help of special paperboard or by using protection boards.
• In the case of max. 4 stacks stored on top of each other, the joists must be placed in a vertical line underneath each other (Image: 2).
• Protruding boards in same-format stacks must be avoided (Image: 2).

Vertical storage
• Vertical storage should only take place with a very small number of PerfectSense lacquered boards, horizontal storage should always be preferred to the vertical one.
• Safe fastening of PerfectSense lacquered boards is particularly important in the case of vertical storage.
• Sufficient fastening can be achieved with closed storage locations, stacks, or shelves.
• The storage surface should not exceed a width of 500mm.
• If open storage locations are used, the contact surface should have a minimum slope of approximately 10° (Image: 3).
• In addition, only same-format PerfectSense lacquered boards should be stored in open storage locations.
Handling and transport

- Avoid negative humidity impact during transport (e.g., no direct weather exposure, by using cover film or a closed truck tarpaulin).
- During transport, the load should be secured against slipping and falling by using suitable fastening systems (tension belts, tensioning straps, etc.).
- For the protection of the lacquered surfaces, MDF boards are generally recommended.
- Anti-slip mats should be used in order to prevent the load from slipping.
- When large boards are transported manually, they should be carried edgewise, in order to avoid significant bowing. Using board carriers is recommended. In addition, protection gloves and safety shoes should be used in order to prevent injury.
- Pushing should be avoided or it should only take place on special textile surfaces.

The boards should be lifted so shifting the decorative sides against each other or pulling them across each other must be avoided (Image 4).

![Image 4](image4.png)

General notes

- PerfectSense material should be stored and processed in a closed storage/workshop space with stable climate (T=10°C at approx. 50-60% relative air humidity).
- Storage and processing conditions should correspond to the climate of later use.
- In order to ensure optimal flat storage, it is necessary to avoid the following negative impact on the product during transport, storage, and processing:
  - Storage in the immediate proximity of heating devices or other sources of heat
  - Direct exposure to heat and sunlight (outdoor UV light)
  - Unequal air-conditioning with increased air humidity.
- Individual boards, as well as the stack’s top and bottom boards react faster to changing environmental influences (climate) than boards inside the stacks.
- Prior to installation, PerfectSense lacquered boards should be conditioned for an adequate period of time in the respective rooms under the subsequent conditions of use.
- The protective foil is not used to label the workpieces and must remain on the entire surface during the processing process.
MORE FROM WOOD.

- The protective foil on PerfectSense lacquered boards should be removed as soon as possible after processing, at the latest 5 months after delivery in order to ensure a clean and problem free removal of the foil. Boards covered with a protective foil should not be left in direct sunlight (UV light).

- The given information does not free the processor/buyer from their responsibility to check the conditions of the object and or project upon which they are working and to decide whether to use PerfectSense lacquered boards.

- Because of the continuous development of Perfect Sense lacquered boards and changes in tool and machine technology results regarding the processing should be change. Please check the actual version on our website: http://www.egger.com/perfectsense

Further documents

Technical datasheet: PerfectSense Gloss / Matt lacquered boards
Processing instructions: Egger ABS Edging