

# Döllken PP Edgebands Processing Information

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**DÖLKEN**

A SURTECO BRAND

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## 1. The special features of Döllken PP edgebands

Döllken PP edgebands are manufactured using the extrusion process, and are fully and uniformly imbued. The impact-resistant material constitution of the Döllken PP guarantees smooth processing on the fabricator system, and many years' usage as furniture. Döllken PP edgebands are coated on the back with a universal bonding agent which permits perfect bonding of the edgeband on the carrier material in conjunction with all popular and suitable hot-melt adhesives.

## 2. PP material characteristics

PP stands for polypropylene and is a semi-crystalline synthetic used mainly in pipe extrusion and the packaging industry. For more than 15 years now, this chlorine-free material has also been used in the furniture industry as an alternative to the proven PVC and ABS materials. Unproblematic disposal in particular is a standout feature of polypropylene, but it requires perfect machine set-up for the process steps.

## 3. Application areas of Döllken PP edgebands

Döllken PP edgebands can be used in a wide range of applications - in the kitchen, office and bathroom, for shop fittings and exhibition stand construction, and for a wide variety of fixtures and fittings. Their special resistance to solvents means Döllken PP edgebands are used in laboratory construction in particular. Döllken PP edgebands can be processed on all edge glueing machines with straight line stability and on machining centres on inner and outer radii. When not bonded, Döllken PP edgebands have very low "free shrinkage" values.

## 4. Machine processing

Döllken PP edgebands can be used on all edge glueing machines with hot-melt technology. Bonding, cutting, milling, working with the draw blade and subsequent processing with polishing wheels or ball indentation aggregates for high quality surfaces are possible without problem. A few central process parameters need to be observed for clean and permanent edge coating, which are currently dependent on the materials used (edgebands, adhesives, boards), the edge glueing machine and the ambient temperatures. Determining the best settings with trial and error is therefore recommended in each case. The guideline values specified by the manufacturers for the respective applications must be observed.

### Adhesives

All hot-melt adhesives available on the market (EVA, PA, APAO, PUR) can be used with Döllken PP edgebands. Adhesives highly resistant to heat, together with the low-shrinkage raw material formulation of the Döllken PP, guarantee reliable bonding even for thicker edgebands. Adhesives which are particularly resistant to heat are recommended for high application temperatures, such as in the cooking area in the kitchen, and in containers for furniture export.

The deformation resistance of PP edgebands is also positive here - material softening does not occur until 90°C (Vicat B 50). In the bonding process, it is important to always ensure there is a sufficient amount of adhesive in the container - to guarantee a constant temperature when the adhesive is applied. The viscosity and contact pressure must be set such that the glue is pressed uniformly on the bonding surface.

The working temperature of the hot-melt adhesive varies between 90 and 220°C depending on adhesive type. Please note that the thermostats in the melt container are often inaccurate, and can vary considerably from the actual temperature at the applicator roller. Measuring the temperature at the hot-melt adhesive applicator roller is therefore recommended. Using the edge glueing process to bond Döllken PP edgebands with PVAC glue is not possible.

### Adhesive amounts applied

Please follow the specifications from adhesive manufacturers. The application of adhesive should be uniform and liberal enough such that no small beads are pressed out at the edges of the freshly bonded edgeband, and that the cavity between wood splints is filled. The amount of glue applied is dependent on the chipboard density and adhesive type.

### Working temperature

To achieve best possible results in edge coating, boards and edgebands should be at room temperature (not below 18°C). When material is stored outside, it should be warmed up overnight. When temperatures are too low, the hot-melt adhesive applied sets before the edge strip is applied. Draughts should also be prevented for this reason.

## Wood moisture

The optimum wood moisture of the board material for processing is between 7 and 10%.

## Feed rate

The special raw material formulation of Döllken PP edgebands is aligned to the feed rate at the small-scale fabricator as well as to that standard in large-scale industry. Rates from 10 to 100 m/min are possible depending on the edge strip glueing machine. Rates of 30 m/min are possible on modern portal machine centres depending on geometry.

## Pressure rollers

To attain the best possible seam appearance, ensure that the correct number is present and that the pressure setting is correct - taking into consideration the machine conditions.

## Milling

On edge strip glueing machines, Döllken PP edgebands must be milled in the counter direction. Use if possible 3 to 6-blade milling cutters with speeds of 12,000 to 18,000 rpm. Incorrect speeds and blunt tools can damage the edgebands. If lubrication effects occur, the speed of the miller must be reduced, or the milling tools must be given a greater shaft angle. Increasing the feed rate also attains a better result.

## Scraping

Because the PP material tends to lighten slightly after scraping, the maximum draw blade size should be 0.1 - 0.2 mm. The milling required here, as free of chatter marks as possible, is guaranteed by milling tools with high levels of concentricity. The use of DIA tools is helpful. For critical colours, the use of post-processing aggregates may be necessary (such as ball indentation aggregates and special draw blades).

## Buffing/polishing

The material properties of PP edgebands mean they can only be polished up to a point. During the pass-through cycle, glue residue can be removed by the polishing wheel. Also, glue residue can be removed with electronically controlled separating spray units used as standard in the industry. This also improves draw blade chip removal at the same time. Reducing the rotation speed by about 50% to 1,400 rpm is recommended. Also, the contact pressure applied to the edge strip surface of the Döllken PP edgeband should not be selected too high. This prevents unnecessary lubrication and excessive heat build-up. The polishing wheel should be at a slight angle to the edge strip surface on both axes.

## Extraction

Thermoplast edgebands require a higher extraction rate (about 2,5 m<sup>3</sup>/s) than thermoset edgebands (depending on machine type and variant). PP chips tend to have a higher level of electrostatic charging during milling processes. In terms of improved chip removal, the use of tools with internal extraction is recommended in such cases.

## Basic recommendations for the process steps of PP

- Milling in counter direction
- Reduction of speed of polishing wheels
- Optimum draw blade setting

When all working parameters have been observed exactly, Döllken PP edgebands can be used in the furniture industry without any post-processing. All other alternative thermoplastic edge strip materials (such as Döllken PVC, Döllken ABS and Döllken 3D edgebands) can then also be processed without any machine correction.

## 5. Manual processing

Döllken PP edgebands can also be worked manually without problem, such as by using a glueing press or edge press. Special lacquer glues, contact adhesives and PU adhesives are recommended here. We will be glad to provide you a list of types on request. Please contact your adhesive supplier for information. Bonding using PVAC glue is not possible. Bonding should take place at room temperature. When contact adhesives are used, it is important to observe the ventilating time after adhesive is applied to the board and edgeband so as to guarantee optimal edge bonding. Then the edgeband is tapped.

No heating rails are required when dispersion adhesives are used. Subsequent processing can start after hardening has taken place (up to 6 hours depending on adhesive). For processing by hand, PP edgebands have a greater tendency towards smearing, and so have a limited window for the processing steps.

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## 6. Stationary working

Döllken PP edge strips can be worked excellently on machining centres. Even tight radii are possible in consideration of a few key factors.

The following exert a significant influence over the working process:

- Edgeband designs (dimension, base colour, etc.)
- Ambient and material conditions (temperature, moisture of material)
- Adhesive properties (type, temperature, viscosity)
- Machine equipment (edge pre-warming, pressure, type of glue applicator roller)
- Work step programming (feed rate, offset, pressure)

For imprinted edge strips, tighter radii than with UNI edges can generally be realised because potential stress whitening is, to a certain degree, covered by printing inks. We will be glad to provide more information on request.

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## 7. Seam appearance

Because Döllken PP edgebands are supplied from the factory with defined pre-tension, they are always given a compact, visually perfect seam appearance. The pre-tension also ensures best possible bonding with inclusion of excessive adhesive in the centre of the back of the edgeband.

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## 8. Mechanical properties

### Wear resistance

UV-hardened acrylic lacquer is used to seal the surfaces of imprinted Döllken PP edgebands so as to be scratch-resistant. The print patterns also exhibit excellent resistance to scratches and wear.

### Ball indentation hardness/Shore hardness D

Döllken PP edgebands attain good results for Shore hardness as per DIN EN ISO 868. The ball indentation hardness to DIN EN ISO 2039-1 is slightly below other thermoplastic edgeband materials. We recommend the use of stamped surfaces to prevent scratches and pressure strips on the edgeband surface. Final lacquering is also available at an extra charge.

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## 9. Thermal properties

### Heat distortion resistance

With a value of 90 ( $\pm$  5) °C, Döllken PP edgebands are excellently suited for use in the furniture industry. Measurements are in line with Vicat B 50. Also, the low shrinking capacity of Döllken PP edgebands has a positive effect on the piece of furniture when under the influence of temperature. Also, Döllken edgebands have been tested by the state trade agency (LGA) in Nuremberg. Döllken edgebands are inflammable, just like derived timber products. Pyrolysis does not start until about 300°C.

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## 10. Chemical properties

Döllken PP edgebands in conjunction with a number of standard household cleaners have been tested successfully to DIN 68861. PP edgebands exhibit good chemical resistance and are used in laboratory furniture for example.

### Paint

Döllken PP edgebands may only be coated with special lacquers, or after a special primer is applied to the edgeband beforehand. For good lacquer results, the board material must be masked accurately when the primer is applied (to prevent damage to the surface pattern). For best possible adhesion of the lacquer, the primer must also be applied uniformly within the milled radius. Lacquers for this purpose are available from your supplier. We can also provide you with a type list on request.

## 11. Resistance to fading

In the Döllken technical centre, PP edgebands undergo continual testing as regards resistance to fading. With a light resistance value of 7 to 8 on the wool colour scale, Döllken PP edgebands are excellently suited for indoor use.

## 12. Surface quality

Döllken PP edgebands are available on a gloss level from super matt to high gloss. Furthermore, a number of different surface imprints are available, which can be combined with the gloss level and the colour or decorative finish.

## 13. Cleaning

The use of special synthetic cleaners is recommended for Döllken PP edgebands. Substances with a high solvent content, and alcoholic substances, should not be used.

## 14. Storage

Döllken PP edgebands are resistant to rotting, and so can be stored virtually indefinitely in an environment protected from the weather and at room temperature.

## 15. Disposal

Left-over Döllken PP edgebands can be incinerated without problem, together with left-over chippings, at plants having the relevant permits. Döllken has also ensured that no chlorine compounds are used in coating materials. The thresholds of strict TA-Luft<sup>1</sup> are observed. Chipboards with worn Döllken PP edgebands can also be disposed of without problem by your chipboard manufacturer. There is no tedious sorting of waste or separation of edgeband and board.

## 16. Quality/tolerances

Comprehensive quality assurance measures, such as continual improvement of raw material properties in the technical centre, ensure the constantly high quality of Döllken PP edgebands. The production tolerances for edge strips are tight and are checked regularly during every production run.

### a. Width tolerances

Width	PP edgebands
0 - 30 mm	± 0.5 mm
> 30 mm	± 0.5 mm

### b. Thickness tolerances

Thickness	PP edgebands
0 - 1.0 mm	+ 0.10 mm - 0.15 mm
1.1 - 2.0 mm	+ 0.15 mm - 0.25 mm
2.1 - 4.0 mm	+ 0.20 mm - 0.30 mm

<sup>1</sup> TA-Luft (Technical Instructions on Air Quality Control) is the "first general administrative provision for the Federal Pollution Control Act" from the German government. It lays down nationally standard, binding requirements for installations requiring approval as specified in the 4th Federal Pollution Control Act.

## 16. Quality/tolerances

### c. Pre-tension tolerances

Thickness	Width To 30 mm	Width > 30 mm
0 - 1.0 mm	0.20 - 0.50 mm	0.30 - 0.70 mm
1.1 - 2.0 mm	0.10 - 0.30 mm	0.15 - 0.35 mm
2.1 - 4.0 mm	0.10 - 0.20 mm	0.10 - 0.30 mm

### d. Plane parallelism

Thickness	Maximum deviation
0 - 1.0 mm	Max. 0.10 mm
1.1 - 2.0 mm	Max. 0.10 mm
2.1 - 4.0 mm	Max. 0.15 mm
> 4.0 mm	Max. 0.20 mm

### e. Longitudinal distortion

Over 1 m length, max. 3 mm distortion.

Custom tolerances are possible on request.

## 17. Overview of technical details

Properties	Test standard	Döllken PP edgebands
<b>Usage properties</b>		
Light resistance for indoor use	DIN EN ISO 4892-3 DIN EN 15187	7 to 8 on wool colour scale The very good colour stability means it is excellently suited to use indoors.
Ball indentation hardness	DIN EN ISO 2039-1	80 - 90 (N/mm <sup>2</sup> )
Shore hardness D (sensitivity to mechanical factors)	DIN EN ISO 868	70 (± 3) Good scratch resistance and good surface hardness. Mechanical damage can be polished without problem.
Linear thermal expansion coefficient	DIN ISO 7991	140 ( 1/K x 10 <sup>-6</sup> ) Dimensional stability of glued edgeband is good (when appropriate bonding systems are used).
Heat distortion resistance Vicat B 50	DIN EN ISO 306	90 (± 5) °C
Shrinkage (in %)	Döllken factory standard	< 0.2% Excellently suited for use in the furniture industry. In critical temperature ranges, use of an adhesive highly resistant to heat is paramount for the dimensional and temperature resistance of the finished piece of furniture.
Chemical resistance	DIN 68 861 1-8	Good - Classification 1B. Resistant to all standard household cleaners. Good resistance to solvents. Tested at state trade agency (LGA) in Nuremberg.
Fire characteristics		Inflammable
Surface quality		Matt to gloss
Static charge		Medium

## 17. Overview of technical details

Properties	Test standard	Döllken PP Edgebands
<b>Working properties<sup>2</sup></b>		
• Cutting		Good
• Milling direction		Counter direction
• Roughening		Good
• Radius cutting		Good
• Contour milling		Good
• Scraping		Good
• Buffing		Satisfactory
• Radii bonding		Very good
• Bonding with hot-melt adhesive		All standard edgeband hot-melt adhesives can be used (EVA, PA, APAO, PUR).
• Polishing capability <sup>2</sup>		Moderate <sup>2</sup>
• Stress whitening tendency		Low
• Painting capability		Poor <sup>3</sup>
• Machining centre capability		Very good
<b>Disposal properties</b>		
Left-over edgebands can be incinerated with chippings at suitable plants. TA-Luft thresholds must be observed.		
<b>Physiological properties</b>		
Harmless in contact with food. No harm to general health.		

<sup>2</sup> Optimal machine setting required.

<sup>3</sup> Special lacquers and priming necessary.

If not explicitly specified otherwise, the values given were determined on standardised test specimens at room temperature. The figures are to be regarded as guideline values, not binding minimum values. Please note that properties can be influenced greatly by tool design, working processes and colouring (also refer to the previous page).

## 18. Problem diagnostics Tips and instructions for process step problems

Problem	Problem diagnosis and suggestions
1. The edgeband can easily be peeled off by hand. Hot-melt adhesive remains on the chipboard. The raster pattern of the glue applicator roller is visible.	<ul style="list-style-type: none"> <li>• Application of adhesive not sufficient</li> <li>• Room temperature too low</li> <li>• Edgeband material too cold (storage outdoors)</li> <li>• Hot-melt temperature too low</li> <li>• Feed rate too low</li> <li>• Contact pressure of applicator rollers too low</li> </ul>
2. The edgeband can easily be peeled off by hand. Hot-melt adhesive remains on the chipboard. The hot-melt adhesive surface is completely smooth (edgeband slides off).	<ul style="list-style-type: none"> <li>• Board and/or edgeband too cold</li> </ul> ⇨ Check hot-melt adhesive type ⇨ Check adhesive agent application
3a. The edgeband can be peeled off by hand. Most of the hot-melt adhesive remains on the edgeband.	<ul style="list-style-type: none"> <li>• Temperature of board material too high due to previous process step (e.g. veneering)</li> </ul>



## 18. Problem diagnostics Tips and instructions for process step problems

Problem	Problem diagnosis and suggestions
3b. Glued joint is not closed (edge glueing machine).	<ul style="list-style-type: none"> <li>• Contact pressure too low</li> <li>• Adhesive too cold</li> <li>⇒ Raise application temperature, pre-warm board or increase feed rate</li> <li>• Edgebands have no, or inverse, pre-tension</li> </ul>
3c. Glued joint is not closed (machining centre).	<ul style="list-style-type: none"> <li>• Contact pressure too low</li> <li>• Edgeband has become too cold and cannot be squeezed</li> <li>• Restoring forces of edgeband material too high</li> <li>⇒ Increase heater power or reduce feed rate</li> <li>⇒ Increase geometry or use thinner edgeband material</li> <li>• Adhesive not machining centre compatible, heat adhesiveness too low</li> <li>• Adhesive does not harden quickly enough</li> <li>⇒ Reduce the glue application temperature</li> <li>• Edgebands have no, or inverse, pre-tension</li> </ul>
3d. Edgebands are only bonded in edge area.	<ul style="list-style-type: none"> <li>• Contact pressure too low</li> <li>• Joint milling on board part hollow</li> <li>• Pre-tension of edgebands too high</li> </ul>
4. The edgeband bonded does not have enough glue on the front edge of the board / the board is splintered at the front as the result of an incorrectly positioned glue applicator roller.	<ul style="list-style-type: none"> <li>• Application of adhesive not sufficient as a result of incorrectly positioned glue applicator roller</li> <li>⇒ Increase the quantity applied</li> </ul>
5. Milling waves are visible.	<ul style="list-style-type: none"> <li>• Feed rate too quick</li> <li>• Cut speed of milling cutters too low</li> <li>⇒ Rework with draw blades and buffing station</li> <li>⇒ Mill in counter direction</li> <li>⇒ Increase number of blades on miller cutters</li> <li>⇒ Increase speed</li> </ul>
6. For thick edge strips, the colour in the milling area lightens a little (stress whitening).	<ul style="list-style-type: none"> <li>⇒ Heat the milling area using a hot-air station (can be retrofitted)</li> <li>• Draw blade is too thick</li> <li>⇒ Rework with buffing station</li> <li>⇒ Reduce draw blade size (max. 0.1 - 0.2 mm)</li> </ul>
7. Stress whitening indications for machining centre processing within radius.	<ul style="list-style-type: none"> <li>• Edgeband has become too cold</li> <li>⇒ Increase heater power or reduce feed rate</li> <li>⇒ Increase geometry or use thinner edgeband material</li> </ul>
8. Strong stringing of adhesive after application	<ul style="list-style-type: none"> <li>⇒ Lower application temperature</li> <li>⇒ Clean glue part</li> <li>⇒ Test other adhesive</li> </ul>
9. "Mouse teeth" in the joint	<ul style="list-style-type: none"> <li>⇒ Increase quantity applied</li> <li>⇒ Increase application temperature</li> <li>⇒ Pre-warm board</li> </ul>
10. Rupturing of the long edgebands after the cross-edging	<ul style="list-style-type: none"> <li>⇒ Only format and insert the MDF board</li> <li>⇒ Check the miller cutter to see if the penetration depth is OK</li> <li>⇒ Reduce the amount of material removed or use other chipboards</li> </ul>
11. Damage to the decorative finish of the 3D edgeband for machining centre processing	<ul style="list-style-type: none"> <li>⇒ Use special rubber rollers</li> </ul>
12. "Dents" or "scratches" in the edgeband	<ul style="list-style-type: none"> <li>⇒ Clean the edgeband feeder</li> <li>⇒ Clean the contact rollers and spray them with separating agent</li> <li>⇒ Clean the scan shoes; if not better, inspect the scan shoes for damage and renew them if necessary</li> </ul>

## 18. Problem diagnostics Tips and instructions for process step problems

13. Rupturing or luting at ends of edgeband	<ul style="list-style-type: none"><li>⇒ Have the mitre saw sharpened</li><li>⇒ Ask the tool supplier for a suitable tool</li></ul>
14. Rupturing at the top and bottom of edgeband	<ul style="list-style-type: none"><li>⇒ Lower edgeband projection</li><li>⇒ Adjust temperature (to above 18°C) of boards and edgebands the day before</li><li>⇒ Increase the room temperature and prevent draughts</li></ul>
15. Edgeband luted on copying	<ul style="list-style-type: none"><li>⇒ Lower the number of blades</li><li>⇒ Regulate the speed</li><li>⇒ Mill edgebands in counter direction</li><li>⇒ Increase feed rate</li></ul>
16. 3D 2-in-1 offset in corner area	<ul style="list-style-type: none"><li>⇒ Precise adjustment of the edgeband holding down clamp</li><li>⇒ Set edgeband projections to the minimum</li><li>⇒ Check edgeband for sabre shape</li></ul>

## 19. Other product variants of the PP edgeband

- FUSION-EDGE
- DIGITAL-EDGE

The information specified, as well as application-related advice in verbal and written form, and obtained through testing, are provided in good faith but are not applicable as binding instructions, neither in relation to any property rights claims on the part of third parties. The advice provided does not release you from checking our current advice, our safety data sheets and technical information in particular, nor from checking our products as regards suitability for the procedures and purposes intended. Application of, use of and working with our products, and the products made by yourself on the basis of our application-specific advice, are beyond our control and so exclusively within your area of responsibility. Our products are sold in line with our applicable general terms of delivery and payment.

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