



Döllken PVC Edgebands Processing Information

DÖLKEN
A SURTECO BRAND

Contents

| | |
|--|---|
| 1. The special features of Döllken PVC edgebands | 3 |
| 2. PVC material characteristics | 3 |
| 3. Application areas of Döllken PVC edgebands | 3 |
| 4. Machine processing | 3 |
| Adhesives | 3 |
| Adhesive amounts applied | 3 |
| Working temperature | 3 |
| Wood moisture | 3 |
| Feed rate | 3 |
| Pressure rollers | 3 |
| Milling | 3 |
| Scraping | 4 |
| Buffing | 4 |
| Extraction | 4 |
| 5. Manual processing | 4 |
| 6. Stationary working | 4 |
| 7. Seam appearance | 4 |
| 8. Mechanical properties | 4 |
| Wear resistance | 4 |
| Ball indentation hardness/Shore hardness D | 4 |
| 9. Thermal properties | 4 |
| Heat distortion resistance | 4 |
| 10. Chemical properties | 5 |
| Paint | 5 |
| 11. Resistance to fading | 5 |
| 12. Surface quality | 5 |
| 13. Cleaning | 5 |
| 14. Storage | 5 |
| 15. Disposal | 5 |
| 16. Quality/tolerances | 5 |
| 17. Overview of technical details | 6 |
| 18. Problem diagnostics | 7 |

1. The special features of Döllken PVC edgebands

Döllken PVC edgebands are manufactured using the extrusion process and are fully imbued. Uniform imbuing of the material permits clean and straightforward edgeband rounding. The impact-resistant material constitution of the Döllken PVC guarantees smooth processing on the fabricator system, and many years' usage as furniture. A special formulation has been developed by Döllken for PVC edgebands which guarantees long service lives for milling and other cutting tools. Döllken PVC edgebands are coated on the back with a universal bonding agent which permits perfect bonding of the edge on the carrier material in conjunction with all suitable hot-melt adhesives, and all solvent-based adhesives.

2. PVC material characteristics

PVC (polyvinyl chloride) is one of the most widely known and used synthetics. Edge strips for the furniture industry have also been made of this material for more than 45 years, and have proven themselves given their excellent material properties. It has been the very good application processing properties of PVC in particular which have contributed to its market penetration in furniture production.

3. Application areas of Döllken PVC edgebands

The spectrum of applications for Döllken PVC edgebands is virtually unlimited - for the office, bathroom and kitchen, for shop fittings and exhibition stand construction, for residential areas and for any types of fixtures and fittings. The particularly application-friendly raw material formulation of the Döllken PVC enables straight working as well as smooth deployment on all curved furniture geometries, irrespective of whether inner or outer radii are required.

4. Machine processing

Döllken PVC 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 and hot-air apparatus 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 PVC edgebands. Adhesives highly resistant to heat, together with the low-shrinkage raw

material formulation of the Döllken PVC, guarantee reliable bonding even for edges thicker than 3 mm. 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.

When not bonded, Döllken PVC edgebands have very low "free shrinkage" values. The deformation resistance of PVC edgebands is also positive here - material softening does not occur until 80 (± 2) °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 working temperature of the 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 applicator roller is recommended. Using the edge glueing process to bond Döllken PVC 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 edge, 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 boards or edgebands are too cold, the hot-melt adhesive applied sets before the edge strip is applied. Draughts should therefore be avoided 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 PVC 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 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

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 milling must be in the counter direction (increase feed rate as required).

Scraping

Because the PVC 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. Hot-air units which simply coat any stress whitening occurring as required can be used for optimisation of scraping, especially for critical colours.

Buffing

Döllken PVC edgebands can be worked very well with the polishing wheel within the radius. Any light spots arising from scraping can simply be polished away with polishing wheels, and the colour of the radius corresponds to the edge strip surface. Glue residue can also be removed using a polishing wheel on edge strip glueing machines working in passthrough mode. 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.

Extraction

Thermoplastic edgebands require stronger extraction than thermoset edgebands. The lower static charging compared to other thermoplastic raw materials is a benefit of Döllken PVC edgebands.

5. Manual processing

Döllken PVC edgebands can also be worked manually without problem, such as by using a glueing press or edge press. 2-component dispersion adhesives based on acrylic, and suitable contact adhesives, are recommended as adhesives here. Please contact your adhesive supplier for information. Bonding using 1-component wood PVAC glue is not possible. Special lacquer glues, solvent-based adhesives and rubber adhesives (PU) can be used when bonding by hand. We will be glad to provide you a list of types on request.

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.

When dispersion adhesives are used, there must be no acceleration of the bonding process using temperature (with heating rails for example). Subsequent processing (see Section 4) can start after hardening has taken place (up to 6 hours depending on adhesive).

6. Stationary working

Döllken PVC 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 (edgeband pre-warming, pressure, type of glue applicator roller)
- Work step programming (feed rate, offset, pressure)

For imprinted edge strips, tighter radii than with UNI edgebands 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.

7. Seam appearance

Because Döllken PVC edgebands are supplied from the factory with defined pre-tension and plane parallelism, 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, and embedding of the adhesive in the chipboard.

8. Mechanical properties

Wear resistance

UV-hardened acrylic lacquer is used to seal the surfaces of imprinted Döllken PVC 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 PVC also attains very good results for surface hardness in line with DIN EN ISO 2039-1 and DIN EN ISO 868.

9. Thermal properties

Heat distortion resistance

With a value of 80 (± 2) °C to Vicat B 50, Döllken PVC edgebands are excellently suited for use in the furniture industry and for internal fittings. Döllken edgebands are inflammable, just like derived timber products. Pyrolysis does not start until about 300 °C.

10. Chemical properties

Döllken PVC edgebands in conjunction with a number of standard household cleaners have been tested successfully to DIN 68861. Contact with aggressive substances, such as alcohol and solvent additives, must be prevented in any form (refer to the cleaning instructions). Also, Döllken edgebands have been tested by the state trade agency (LGA) in Nuremberg. PVC edgebands exhibit good chemical resistance and are used in laboratory furniture for example.

Paint

Uni-colour Döllken PVC edgebands can be painted in the colour you require without problem and without pre-treatment. More information on the paint type best suited is available from the respective paint supplier.

11. Resistance to fading

Using a special process in the Döllken technical centre, PVC edgebands undergo continual testing as regards resistance to fading. With a light resistance figure of 7 to 8 on the wool colour scale, they are perfectly suited to use indoors (DIN EN 15187).

12. Surface quality

Döllken PVC 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 PVC edgebands. Substances with a high solvent content, and alcoholic substances, should not be used.

14. Storage

Döllken PVC 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

Residual PVC from subsequent processing should be separated from the rest of the waste. A return system is in place for the relevant residual materials.

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 PVC edgebands. The production tolerances for edge strips are tight and are checked regularly during every production run.

a. Width tolerances

| Width | PVC edgebands |
|-----------|---------------|
| 0 - 30 mm | ± 0.5 mm |
| > 30 mm | ± 0.5 mm |

b. Thickness tolerances

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

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 |
| 4.1 - 6.0 mm | 0 - 0.20 mm | 0 - 0.25 mm |
| > 6.0 mm | 0 - 0.10 mm | 0 - 0.15 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 PVC Edgebands |
|---|-----------------------------------|--|
| Usage properties | | |
| Light resistance for indoor use | DIN EN ISO 4892-3 DIN EN 15187 | 7 to 8 on wool colour scale Excellent suited to use indoors. |
| Ball indentation hardness | DIN EN ISO 2039-1 | 110 - 130 (N/mm ²) |
| Shore hardness D (sensitivity to mechanical factors) | DIN EN ISO 868 | 81 (± 3) Good surface hardness, good resistance to scratches. Mechanical damage can be polished. |
| Linear thermal expansion coefficient | DIN ISO 7991 | 80 (1/K x 10 ⁻⁶) Dimensional stability of glued edge is good (when appropriate bonding systems are used). |
| Heat distortion resistance Vicat B 50 | DIN EN ISO 306 | 80 (± 2) °C |
| Shrinkage (in %) | SURTECO factory standard | < 0.3 % Excellent 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 | Very good - Classification 1B. Resistant to all cleaners commonly found in households. Limited resistance to solvents. Tested at state trade agency (LGA) in Nuremberg. |
| Surface quality | | Super matt to high gloss |
| Static charge | | Low |
| Working properties ¹ | | |
| • Cutting | | Good |
| • Milling direction | | SD/CD ² |
| • Roughening | | Good |
| • Radius cutting | | Good |
| • Contour milling | | Good |
| • Scraping | | Good |
| • Buffing | | Good |
| • Radii bonding | | Good |
| • Bonding with hot-melt adhesive | | All standard edge hot-melt adhesives can be used (EVA, PA, APAO, PUR), depending on heat resistance of adhesive. |
| • Polishing capability ¹ | | Good ¹ |
| • Stress whitening tendency | | Low |
| • Painting capability | | Good (acrylic/PUR paints) |
| • Machining centre capability | | Very good |
| Disposal properties | | |
| Physiological properties | | |
| Return systems for milling and cutting waste. | | |
| No harm to general health. | | |

¹ Machine optimisation may be necessary.

² Counter direction is recommended for all thermoplastic materials:

SD = Same direction, CD = Counter direction

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"> • Application of adhesive not sufficient • Room temperature too low • Edgeband material too cold (storage outdoors) • Hot-melt temperature too low • Feed rate too low • Contact pressure of applicator rollers too low |
| 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"> • Board and/or edgeband too cold <ul style="list-style-type: none"> - 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"> • Temperature of board material too high due to previous process step (e.g. veneering) |
| 3b. Glued joint is not closed (edge glueing machine). | <ul style="list-style-type: none"> • Contact pressure too low • Adhesive too cold <ul style="list-style-type: none"> - Raise application temperature, pre-warm board or increase feed rate • Edgebands have no, or inverse, pre-tension |
| 3c. Glued joint is not closed (machining centre). | <ul style="list-style-type: none"> • Contact pressure too low • Edgeband has become too cold and cannot be squeezed • Restoring forces of edgeband material too high <ul style="list-style-type: none"> - Increase heater power or reduce feed rate - Increase geometry or use thinner edgeband material • Adhesive not machining centre compatible, heat adhesiveness too low • Adhesive does not harden quickly enough <ul style="list-style-type: none"> - Reduce the glue application temperature • Edgebands have no, or inverse, pre-tension |
| 3d. Edgebands are only bonded in edge area. | <ul style="list-style-type: none"> • Contact pressure too low • Joint milling on board part hollow • Pre-tension of edgebands too high |
| 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"> • Application of adhesive not sufficient as a result of incorrectly positioned glue applicator roller <ul style="list-style-type: none"> - Increase the quantity applied |
| 5. Milling waves are visible. | <ul style="list-style-type: none"> • Feed rate too quick • Cut speed of milling cutters too low <ul style="list-style-type: none"> - Rework with draw blades and buffing station - Mill in counter direction - Increase number of blades on miller cutters - Increase speed |
| 6. For thick edge strips, the colour in the milling area lightens a little (stress whitening). | <ul style="list-style-type: none"> • Heat the milling area using a hot-air station (can be retrofitted) • Draw blade is too thick <ul style="list-style-type: none"> - Rework with buffing station - Reduce draw blade size (max. 0.1 - 0.2 mm) |
| 7. Stress whitening indications for machining centre processing within radius. | <ul style="list-style-type: none"> • Edgeband has become too cold <ul style="list-style-type: none"> - Increase heater power or reduce feed rate - Increase geometry or use thinner edgeband material |

| Problem | Problem diagnosis and suggestions |
|--|---|
| 8. Strong stringing of adhesive after application | <ul style="list-style-type: none"> • Lower application temperature - Clean glue part - Test other adhesive |
| 9. "Mouse teeth" in the joint | <ul style="list-style-type: none"> • Increase quantity applied - Increase application temperature - Pre-warm board |
| 10. Rupturing of the long edgebands after the cross-edging | <ul style="list-style-type: none"> • Only format and insert the MDF board - Check the miller cutter to see if the penetration depth is OK - Reduce the amount of material removed or use other chipboards |
| 11. Damage to the decorative finish of the 3D edgeband for machine centre processing | <ul style="list-style-type: none"> • Use special rubber rollers |
| 12. "Dents" or "scratches" in the edgeband | <ul style="list-style-type: none"> • Clean the edgeband feeder - Clean the contact rollers and spray them with separating agent - Clean the scan shoes; if not better, inspect the scan shoes for damage and renew them if necessary |
| 13. Rupturing or luting at ends of edgeband | <ul style="list-style-type: none"> • Have the mitre saw sharpened - Ask the tool supplier for a suitable tool |
| 14. Rupturing at the top and bottom of edgeband | <ul style="list-style-type: none"> • Lower edgeband projection - Adjust temperature (to above 18 °C) of boards and edgebands the day before - Increase the room temperature and prevent draughts |
| 15. Edgeband luted on copying | <ul style="list-style-type: none"> • Lower the number of blades - Regulate the speed - Mill edgebands in counter direction - Increase feed rate |
| 16. 3D 2-in-1 offset in corner area | <ul style="list-style-type: none"> • Precise adjustment of the edgeband holding down clamp - Set edgeband projections to the minimum - Check edgeband for sabre shape |

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.

SURTECO
GmbH

.....
we create.
we innovate.
.....

SURTECO GmbH
Am Brühl 6
86647 Buttenwiesen
Germany
T: +49 8274 51-0
F: +49 8274 51-512
info@surteco.com
www.surteco.com