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# **RAUKANTEX PMMA**

Technical information



**REHAU**

### Materials for edgeband processing

REHAU uses the thermoplastic materials PVC (polyvinyl chloride), ABS (acrylonitrile-butadiene-styrene), PP (polypropylene) and PMMA (polymethylmethacrylate) in its extensive RAUKANTEX edgeband product range. Thermoplastic materials are polymer materials which can be melted and therefore thermoformed, processed and recycled.

### PMMA as an edgeband material

PMMA (polymethylmethacrylate) is one of the latest edgeband materials. RAUKANTEX PMMA edgebands create a particular, three-dimensional effect because of their highly-transparent character. Due to the printing on the reverse of the edgeband the decorative design also remains when the radius is milled and creates a closed appearance. The decorative printing on the reverse creates a jointless transition from the edgeband to the board and avoids a frame effect. Because of its highly-transparent nature the visual properties of real glass can be combined with the processing properties of thermoplastics.

### PMMA material (polymethylmethacrylate)

Acrylic (PMMA) is a high-quality, tried and tested thermoplastic material. PMMA has excellent light transmission and outstanding resistance to weathering and ageing. In addition to this, PMMA has a high surface hardness and scratch resistance, does not contain cadmium or lead. PMMA meets the fire protection class B2 to DIN4102.

### 1. Areas of application

The spectrum of applications for RAUKANTEX PMMA is almost limitless: From the office to the bathroom and kitchen, exhibition stand construction and shop fitting, the living area through to commercial construction. Due to its three-dimensional glass character it creates attractive highlights on furniture fronts. RAUKANTEX PMMA pure edgebands are coated on the reverse with a universal primer which guarantees clean adhesion of the edgeband to the substrate. This primer allows processing with all suitable hot melt adhesives.

### 2. Recycling/Disposal

Taking into account legal stipulations, RAUKANTEX PMMA edgeband can be burned in units approved to do so, without any problems. No by-products that are harmful to health are produced if it is burned in the correct way. Even wood based boards with PMMA edgeband applied can be disposed of easily.

### 3. Characteristics/Properties

The properties of the RAUKANTEX PMMA edgebands fulfil the requirements of the furniture industry. The PMMA edgeband possesses the following properties:

#### ▪ Shore hardness D

RAUKANTEX PMMA edgebands achieve good results with a Shore hardness D of 80 +/- 3 to EN ISO 7619-1.

#### ▪ Heat resistance/Vicat softening temperature

With a value of approx. 80°C to ISO 306 / B50 RAUKANTEX PMMA edgebands are especially suited for use in the furniture industry.

#### ▪ Abrasion resistance

The surface of RAUKANTEX PMMA edgebands is protected against scratches with a UV lacquer, whereby the decorative designs demonstrate excellent scratch and abrasion resistance.

#### ▪ Chemical resistance

RAUKANTEX PMMA edgebands are chemically resistant to all household cleaners to DIN 68861 Part 1 and fulfil stress group 1B.

#### ▪ Light fastness

RAUKANTEX PMMA edgebands are regularly tested in an accredited laboratory in line with EN ISO 4892-2 regarding light fastness. An analysis of the colour deviation is then carried out along the lines of EN ISO 105-A02 using the grey scale. With a light fastness of  $\geq 6$  on the blue scale these edgebands are ideally suited for interior application.

#### ▪ Cleaning

Special plastic cleaners are recommended for cleaning RAUKANTEX PMMA edgebands



The use of substances containing solvents and alcohol is strongly advised against. When using release and cleaning agents, check carefully that these substances do not contain alcohols and solvents as these must not come into contact with PMMA. In this respect, especially static inhibitors and or cooling agents are to be considered critical in particular. Risk of cracking!

	PVC	ABS	PP	PMMA
Light fastness In accordance with EN ISO 4892-2	≥ 6	≥ 6	≥ 6	≥ 6
Shrinkage Edgeband 3 mm 1h at 90°C	≤ 1,7 %	≤ 1,7 %	≤ 0,2 %	≤ 1,0 %
Vicat softening point to ISO 306, Method B/50	approx. 67 °C	approx. 90 °C	approx. 100 °C	<b>approx. 80 °C</b>
Hardness Shore D to ISO 7619-1	79 ± 4	70 ± 4	75 ± 4	<b>80 ± 3</b>
Chemical resistance to DIN 68861-1	Very good – 1B	Good – 1B	Very good – 1B	<b>Good – 1B*</b>
Thermal conductivity to DIN 52612	0,16 W/km	0,18 W/km	0,41 W/km	<b>0,18 W/km</b>

\* Limited resistance against solvents and alcohols.

#### 4. Storage

If stored properly, RAUKANTEX edgebands can be stored for min. 12 months. For edgebands older than 12 months, however, a processing trial should always be carried out prior to series processing.

Recommended storage conditions are:

- Room temperature (approx. 18 °C to 25 °C)
- Dry
- Clean
- No vapours containing solvents
- Protected from light

#### 5. Standard tolerances

RAUKANTEX pure PMMA edgebands are subjected to regular quality checks in order to guarantee the high quality of every production run. In addition to this we are constantly working to improve the raw material properties. The production tolerances for edgebands are defined exactly and are checked throughout every production run. The standard tolerances for RAUKANTEX edgebands can be obtained from your contact person on request or you can find them on the internet.

#### 6. Processing

##### Manual processing

It is possible to process RAUKANTEX pure PMMA edgebands manually e.g. using edge clamps. Special PVA adhesives, solvent-free adhesives and cartridge adhesives (e.g. Kantol) can be used for glueing by hand. Independent function tests should be carried out in order to determine the suitability of the technical application in each case.

##### Machine processing

RAUKANTEX PMMA edgebands can be processed on all edgebanders (straight line edgebander and BAZ (processing centres) using hot melt adhesive. The various processing steps such as glueing, capping, milling, scraping and also reworking with buffing wheels and hot air are possible without any problems.

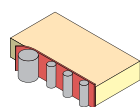
To achieve a high-quality and durable edgeband application several important processing parameters have to be considered. These include the components used (edgeband, glue and boards), the edgebander and the ambient temperature. In order to identify the ideal conditions it is recommended that trials are carried out and that the reference values specified by the relevant manufacturer are observed.

As the decorative design is applied to the reverse, ensure that normal processing does not cause damage, particularly during edgeband feeding. Rubber rollers should be used instead of steel rollers at the feed stage.

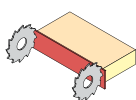


When using release and cleaning agents, check carefully that these substances do not contain alcohols and solvents as these must not come into contact with PMMA. In this respect, especially static inhibitors and or cooling agents are to be considered critical in particular as they create tension in the edgeband due to the cooling of the adhesive joint and may result in cracks forming.

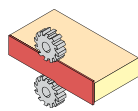
##### Process steps of machine processing:



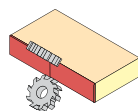
Gluing



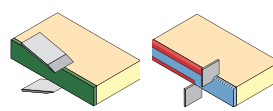
Capping



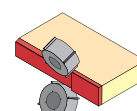
Pre-milling



Radius milling



Scraping



Buffing

In the case of applying edgeband to tight radii on processing centres ensure that the material is heated sufficiently. Due to the brittle nature of PMMA the application of heat using an external source (IR radiators or hot-air blowers) can reduce the size of the radius that can be achieved. To check whether the selected processing parameters are OK during radius processing, the outer radius should be cleaned on a sample board with a plastic cleaner. If no cracking or cloudiness occurs on the edgeband surface by doing this the parameters are OK.

#### **Adhesive**

RAUKANTEX PMMA edgebands can be processed with all commercially available hot melt adhesives (EVA, PA, APAO and PUR). These highly heat-stable adhesives together with the RAUKANTEX pure PMMA edgebands guarantee a secure bond. For products exposed to high ambient temperatures (e.g. containerised transportation) hot melt adhesives with a high softening temperature are recommended. During adhesion ensure that the adhesive is applied consistently, and that the glue spreading rollers do not extend too far into the line of the board. The processing temperature of the adhesive varies depending on the type of adhesive. Be aware that the thermostats in melt containers are often inaccurate and the temperature of the applicator roller can vary by up to 30 °C.

#### **Processing temperature**

To achieve the best possible results during edgeband application the boards and edgebands should be processed at a room temperature of > 18 °C otherwise the adhesive sets too quickly. Draughts should also be avoided for this reason.

#### **Wood humidity**

The optimum wood humidity of the board material is between 7 and 10%.

#### **Processing feed**

RAUKANTEX PMMA edgebands are suitable for the common processing rate of feed both in the commercial as well as industrial sector.

#### **Adhesive application**

To achieve ideal processing the information provided by the adhesive manufacturer should be observed. The adhesive application should be calculated in such a way that small beads of adhesive are pressed out from the edges of the freshly glued edgebands and the voids between the substrate particles are filled. The amount of adhesive in each case depends on the type of board, the substrate density, the edgeband material, the processing feed and the type of adhesive.

#### **Milling**

If possible use a 3 to 6 tooth milling tool with a diameter of 70 mm and 12.000 to 18.000 RPM counter to board travel (up-cutting). Inappropriate speeds or blunt tools can damage the edgebands. If a smear effect occurs the speed of the milling tool or the number of teeth should be reduced. The quality of the milled surface (e.g. chatter marks) can be improved by adjusting the feed, speed and number of blades.

#### **Scraping**

PMMA exhibits good quality during scraping, the chip produced by the scraper should be a maximum of 0.1 - 0.15 mm. To obtain a high-quality surface after scraping, aim for milling finish with as few chatter marks as possible. If scraping fails, we recommend the use of the REHAU "magic scraper".

#### **Buffing**

RAUKANTEX PMMA edgebands can be buffed to generate a high quality edge radius. Additionally, if release and cleaning agents are used during board processing, the buffing wheels will remove any unwanted glue residue.

#### **Processing with invisible joint technology**

RAUKANTEX pro/plus PMMA edgebands are designed to be processed on edgebanding machines working with CO<sub>2</sub> or diode laser, hot air or NIR processes. Please refer to the technical information for zero-joint edgebands regarding special information.

<b>Processing properties</b>		<b>PVC</b>	<b>ABS</b>	<b>PP</b>	<b>PMMA</b>
Capping		good	good	good	<b>good</b>
Milling direction	Straight line processing	Up-cutting	Up-cutting	Up-cutting	<b>Up-cutting</b>
	Processing centre	Down-cutting/ Up-cutting	Down-cutting/ Up-cutting	Up-cutting	<b>Down-cutting/ Up-cutting</b>
Pre-milling		good	good	good	<b>good</b>
Radius milling		good	good	good	<b>good</b>
Contour milling		good	good	good	<b>good</b>
Scraping		very good	good	good	<b>good</b>
Buffing		very good	good	good	<b>good</b>
Gluing		Standard market hotmelts	Standard market hotmelts	Standard market hotmelts	<b>Standard market hotmelts</b>
Polishability		good	good	average	<b>very good</b>
Stress whitening tendency		low	average	low	<b>low</b>
Processing centre capability		very good	good	very good	<b>superior</b>

## 7. Frequently asked questions

Problem	Diagnosis of the problem
<p>1 The edgeband can easily be removed by hand. The hot melt adhesive remains on the chipboard (straight line) or on the edgeband (processing centre). It is possible to see the marking made by the adhesive application roller.</p>	<ul style="list-style-type: none"> <li>▪ Adhesive application not sufficient</li> <li>▪ Room or edgeband temperature too low</li> <li>▪ Draughty environment</li> <li>▪ Processing feed too low</li> <li>▪ Contact pressure of the pressure roller too low</li> </ul>
<p>2 The edgeband can easily be removed by hand. Hot melt adhesive remains on the chipboard (straight line). The hot melt adhesive surface is completely smooth.</p>	<ul style="list-style-type: none"> <li>▪ Board and/or edgeband is too cold.</li> <li>▪ Check hot melt adhesive type</li> <li>▪ Check primer application</li> </ul>
<p>3a Glue joint is not sealed (straight line)</p>	<ul style="list-style-type: none"> <li>▪ Adhesive too cold</li> <li>▪ Adhesive application too low</li> <li>▪ Contact pressure too low</li> <li>▪ Edgeband pre-tension is incorrect</li> <li>▪ Scoring saw alignment is incorrect</li> <li>▪ Contact between the adhesive application roller and board</li> <li>▪ Debris not removed from board cross-section</li> </ul>
<p>3b Glue joint is not sealed (processing centre).</p>	<ul style="list-style-type: none"> <li>▪ Contact pressure too low</li> <li>▪ Curvature of the edgeband too high</li> </ul> <p><b>Measure/Proposal:</b> Application of external heat</p> <ul style="list-style-type: none"> <li>▪ Check hot melt adhesive type (insufficient heat tack)</li> <li>▪ Edgeband pre-tension is incorrect</li> <li>▪ Adhesive does not set in good time</li> </ul> <p><b>Measure/Proposal:</b> Reduce the adhesive temperature</p>
<p>4 The glued edgeband does not show sufficient adhesion at the start.</p>	<ul style="list-style-type: none"> <li>▪ Adhesive application roller is not positioned correctly</li> <li>▪ Increase the amount of adhesive</li> </ul>
<p>5 Milling lines are visible.</p>	<ul style="list-style-type: none"> <li>▪ Feed too high</li> <li>▪ Number of blades too low</li> <li>▪ Speed too low</li> </ul> <p><b>Measure/Proposal:</b> Rework with scraper and buffing station</p>
<p>6 Edgeband splits during the milling process.</p>	<ul style="list-style-type: none"> <li>▪ Edgeband vibrates during the milling process</li> <li>▪ Adhesion insufficient</li> <li>▪ Edgeband projection too large</li> </ul> <p><b>Measure/Proposal:</b> Check adhesion parameters</p> <p><b>Measure/Proposal:</b> Check adhesive type</p>
<p>7 Stress whitening of the edgeband in the milled area, principally after scraping.</p>	<ul style="list-style-type: none"> <li>▪ Chip of the scraper too thick</li> <li>▪ Scraper set up incorrectly</li> </ul> <p><b>Measure/Proposal:</b> Check for blunting of the scrapers edge</p> <p><b>Measure/Proposal:</b> Rework with buffing station</p>
<p>8 Stress whitening occurs during processing centre processing</p>	<ul style="list-style-type: none"> <li>▪ Micro-cracks occur in the radius area due to processing temperature being too cold</li> </ul> <p><b>Measure/Proposal:</b> Application of external heat in the radius area</p> <p><b>Measure/Proposal:</b> Use of larger radiuses or thinner edgebands</p>



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