


# 加工指南

## Processing instructions

### 爱格防火板 EGGER Laminates



#### Get there faster

Simply click on the headings in the table of contents or the underlined internet addresses and you will be taken directly to the desired information. The  symbol at the bottom of the page will take you back to the table of contents.



#### Contents

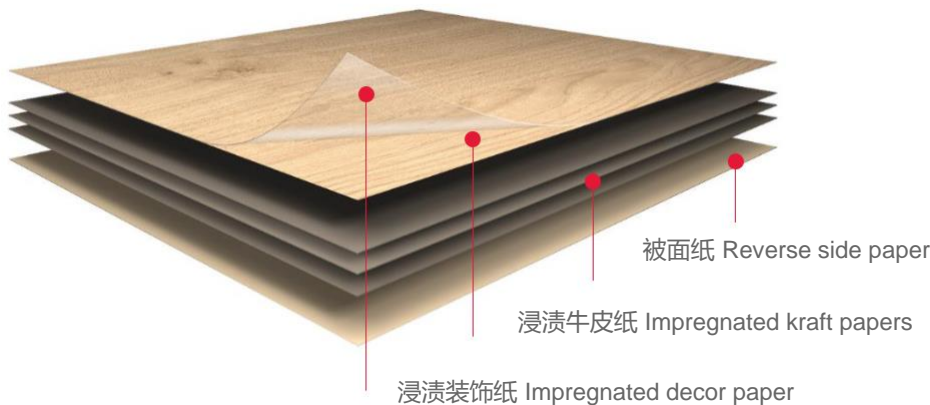
产品描述 Product description .....	2
环境与健康 Environment and health .....	5
» 释放物 Emissions .....	5
» 胶黏剂 Resins .....	5
» 粉尘的形成引起的健康风险 Health hazard due to dust generation .....	5
» 火灾和爆炸风险 Fire and explosion hazard .....	5
» 循环使用/废弃处理 Recycling / disposal .....	6
防火板操作处理 Working with laminates .....	6
» 运输 Transport .....	6
» 储存和调节 Storage and conditioning .....	7
» 操作 Handling .....	9
防火板加工 Processing laminates .....	11
» 切割 Cutting .....	11
» 粘贴/压贴 Bonding / pressing .....	12
防火板贴面板加工 Processing laminate bonded boards .....	18
» 转孔 Drilling .....	18
» 铣削 Milling .....	19
» 切口 Cut-out .....	21
» 封边 Edging .....	23
» 后成型/热成型 Postforming / hot-forming .....	25
» 成形胶合/冷成型 Shape gluing / cold-forming .....	31
» 上漆 Lacquering .....	34
» 防火涂层 Flame retardant coating .....	34
» 护墙板 Wall cladding .....	35
护理和清洁指南 Care and cleaning recommendation .....	38
补充文件/产品信息 Additional documents / product information .....	38

## 产品描述

### Product description

爱格防火板是一种基于可固化树脂的装饰层压板。它们具有多层结构，由浸渍装饰纸和一层或多层浸渍牛皮纸组成，在高压和高温下层压。防火板的构成、树脂和纸张的质量、表面纹理、特殊耐磨层的使用和生产过程中的压机参数决定了防火板的质量，从而决定了后续的使用或应用领域。

EGGER Laminates are decorative laminates based on curable resins. They have a multi-layer construction and consist of impregnated decorative paper and one or more impregnated kraft papers that are pressed together under high pressure and heat. The laminate construction, resin and paper quality, surface texture, use of special overlays and the press parameters during production determine the laminate quality and therefore the subsequent use or area of application.



耐磨层 Overlay – 针对木质花色及材质花色 for wood and material reproductions

图 1：防火板构成，以标称厚度为 0.8mm 爱格防火板作为展示示例

Figure 1: Laminate composition, using EGGER Laminates – 0.80 mm nominal thickness

爱格防火板根据欧洲标准 EN 438 进行测试，并符合所有相关质量要求。为了描述各自对应的防火板等级，在欧洲标准 EN 438-3 部分中使用了两种不同的分类系统：字母分类系统使用三个字母来描述防火板的类型及关联的应用 – 见表 1。另外，标准中还定义了与防火板相关的三个重要的指标要求的数字分类系统 – 见表 2。

EGGER Laminates are tested according to standard EN 438 with respect to all relevant quality requirements. To describe the respective laminate grade, two different systems of classification are used in the EN 438-3 part of the standard: The alphabetic system uses three letters to describe the laminate type and the associated application – see Table 1. Alternatively, a numerical system is also defined in the standard which is related to the three most important requirements to the laminate characteristics – see Table 2.

标准部分 Standard part	首字母 First letter	第二个字母 Second letter	第三个字母 Third letter
欧洲标准 EN 438 : 3 – 防火板 EN 438 part 3 - Laminates	H – 水平方向应用 Horizontal application	G – 一般用途 General purposes	S – 标准等级 (冷压成型) Standard quality (cold-formable)
	V – 垂直方向应用 Vertical application	D – 高承重 Heavy duty	P – 可后成型 (热成型) Postformable (hot forming)
			F – 防火级 (冷压成型) Flame-retardant (cold-formable)
欧洲标准 EN 438 : 9 – 其它 类芯层防火板 EN 438 part 9 – Laminates with alternative core	B – 面芯同色 Coloured core	C – 复合防火板 Compact Laminate	S – 标准型 Standard quality
	R – 金属增强型芯层 Metal reinforced core	T – 防火板 Laminate	F – 阻燃型 Flame - retardant

表 1：根据防火板欧洲标准 EN 438 的字母分类

Table 1: Alphabetic classification according to laminate standard EN 438

力学特性 Mechanical stress	主要指标 Key figures		
初始磨损点 (转) Initial abrasion point (revolutions)	首个数字 – 表面耐磨性 First digit – resistance to surface wear		
	2	3	4
	≥ 50	≥ 150	≥ 350
表面抗小球冲击 (牛) Impact resistance by small diameter ball (Newton)	第二个数字 – 表面抗冲击 Second digit – resistance to impact		
	2	3	4
	≥ 15	≥ 20	≥ 25
耐划痕 (等级) Scratch resistance (rating)	第三个数字 – 表面耐划痕 Third digit – resistance to scratch		
	2	3	4
	2	3	4

表 2: 根据防火板欧洲标准 EN 438 的数字分类

Table 2: Numeric classification according to laminate standard EN 438

对于应用/使用领域，质量要求以及相应防火板等级的技术数据和交付选择，请参考对应的数据表。根据标称厚度和我们的生产技术，可提供片状/或卷状的不同等级防火板。对于标称厚度 ≥ 0.40 mm 的片状防火板材料可定制不同规格的长度。卷状材料适合于厚度 ≥ 0.15 ≤ 0.60 mm 的防火板。

For applications/areas of use, quality requirements as well as technical data and delivery options of the respective laminate grades, please refer to the corresponding data sheets. The laminate grades are available in formats and/or rolls depending on the nominal thickness and thanks to our production technology. Flexible lengths for format materials are possible for nominal thicknesses ≥ 0.40 mm. Roll materials are possible for nominal thicknesses ≥ 0.15 to ≤ 0.60 mm.

爱格防火板组合见下表:

You will find an overview of the EGGER laminate portfolio below:

防火板等级 Laminate grades	根据欧洲标准 EN 438 的防火板类型 Laminate type according to EN 438		标称厚度 [mm] Nominal thickness [mm]	材料类型 Length version
	字母 alphabetic	数字 numeric		
防火板 Laminates	HGP	3/2/3	0.40 / 0.50 / 0.60	卷材 & 片材 Roll & format material
		3/3/3	0.80 / 1.00 / 1.20	片材 Format material
面芯同色防火板 Laminates Coloured Core	BTS	3/-1/3	0.80	片材 Format material
门尺寸防火板 Laminates in Door Sizes	HGP	3/3/3	0.80	片材 Format material
不同长度类型防火板 Laminates in Variable Length	HGP	3/2/3	0.60	片材 Format material
超大规格 XL 防火板 Laminates XL	HGS	3/3/3	0.80	片材 Format material
极致奢华哑光防火板 <sup>2)</sup> PerfectSense Premium Laminates Matt	HGS	3/2/4	0.60	卷材 & 片材 Roll & format material
		3/3/4	0.80	片材 Format material

防火板等级 Laminate grades	根据欧洲标准 EN 438 的防火板类型 Laminate type according to EN 438		标称厚度 [mm] Nominal thickness [mm]	材料类型 Length version
	字母 alphabetic	[mm]		
极致奢华哑光面芯同色防火板 <sup>2)</sup> PerfectSense Premium Laminates Matt Coloured Core <sup>2)</sup>	BTS	3/-1/4	0.80	片材 Format material
极致奢华高光防火板 <sup>2)</sup> PerfectSense Premium Laminates Gloss	HGS	3/3/4	0.80	片材 Format material
极致奢华高光面芯同色防火板 <sup>2)</sup> PerfectSense Premium Laminates Gloss Coloured Core	BTS	3/-1/4	0.80	片材 Format material
极致哑光防火板 PerfectSense Laminates Matt	VGS	3/2/3	0.60	卷材 & 片材 Roll & format material
		3/3/3	0.80	片材 Format material
阻燃级防火板 Laminates Flammex Flame Retardant	HGF	3/2/3	0.60	卷材 & 片材 Roll & format material
		3/3/3	0.80	片材 Format material
超薄防火板 <sup>3)</sup> Laminates Micro	基于欧洲标准 EN 438 可以进行后成型 Postformable based on EN 438		0.15	卷材 Roll material
上漆级/可贴合级防火板 Laminates Painting grade / Bonding Grade	基于欧洲标准 EN 438 可以进行后成型 Postformable based on EN 438		0.15	卷材 Roll material
			0.30 / 0.40 / 0.60	卷材 & 片材 Roll & format material
AC4 级防火板 Laminates AC4	VGS	4/2/3	0.15	卷材 Roll material
			0.40 / 0.50 / 0.60	卷材 & 片材 Roll & format material
	HGS	4/3/3	0.80 / 1.00 / 1.20	片材 Format material
			0.40 / 0.50 / 0.60	卷材 & 片材 Roll & format material
平衡纸防火板 Laminates Balancer	HGS	3/2/3	0.40 / 0.50 / 0.60	卷材 & 片材 Roll & format material
			3/3/3	0.80 / 1.00 / 1.20

- 1) 面芯同色结构的防火板性能在标准中没有被定义  
Property is not defined in the standard for laminates with coloured core construction.
- 2) 基于欧洲标准 EN 438  
Based on the EN 438 standard, as lacquer-based laminates are not currently described in the standard.
- 3) 加工说明见爱格官网: [www.egger.com](http://www.egger.com)  
Separate processing instructions on [www.egger.com](http://www.egger.com).

表 3: 爱格防火板等级分类  
Table 3: Classification of EGGER laminate grades

## 环境与健康

### Environment and health

操作和加工防火板时，请始终使用个人防护装备 (PPE)。以下环境和健康信息与操作和加工防火板有关。  
Please always use personal protective equipment (PPE) when handling and processing laminates. The following environmental and health information relates to machining and processing laminates.

#### 释放物

##### Emissions

在防火板技术性能和标准分类要求外进行加工和应用可能会增加有害物质释放量并因此产生健康方面的风险。请遵守产品标注的有害物质释放等级。

Processing and use outside the technical properties and standard classification of the laminates can increase emissions and thus lead to health hazards. Please observe the marked emission class for the product.

#### 胶黏剂

##### Resins

对于爱格防火板的生产，我们仅使用在产品表面固化后不会显示任何有害特征且产品预期用途对人体无害的聚合树脂。具体来说，爱格防火板中含有的游离三聚氰胺浓度不足以触发如按照欧盟法规 (EC) No. 1907/2006 (REACH) 的额外信息披露义务。此外，爱格防火板自然符合欧盟法规 (EU) No. 10/2011 中关于塑料材料和用品可能与食物接触的现有迁移阈值。

For the production of laminates, we only use polymerised resins which do not exhibit any hazardous properties after curing the product and are harmless for the intended use of the product. In particular, free melamine is not contained in Laminates in a concentration that would trigger additional information obligations, for example under Regulation (EC) No. 1907/2006 (REACH). Furthermore, laminates naturally comply with the existing migration thresholds according to Regulation (EU) No. 10/2011 on plastic materials and articles intended to come into contact with food.

#### 粉尘的形成引起的健康风险

##### Health hazard due to dust generation

在加工期间可能会产生粉尘。有皮肤致敏和对呼吸道产生影响的风险。根据加工工艺和颗粒大小，尤其当吸入粉尘后，会产生进一步的健康风险。在评估车间风险时必须将粉尘的形成考虑在内。

尤其在机械加工过程中 (如锯切、刨平、铣削)，必须使用满足适用的健康和安全法则的有效除尘系统。如果没有足够的吸尘系统，必须穿戴合适的呼吸保护设备。

Dust may be generated during machining and processing. There is a risk of sensitising the skin and respiratory tract. Depending on the processing and the particle size, especially in the case of inhalation of dust, there may be further health hazards. The generation of dust must be taken into account when assessing the risks at the workplace.

Particularly in the case of machining processes (e.g. sawing, planing, milling), effective extraction must be used in accordance with the applicable occupational health and safety regulations. Suitable breathing protection has to be worn if no adequate extraction system is in place.

#### 火灾和爆炸风险

##### Fire and explosion hazard

在加工过程中粉尘的产生会导致火灾和爆炸的风险。必须遵守安全和防火法规。

Dust generated during machining and processing can lead to fire and explosion hazards. Applicable safety and fire protection regulations must be observed.

## 循环使用/废弃处理 Recycling / disposal

由于其较高的热值，防火板适合在适当的燃烧厂进行热处理

Due to their very high calorific value, laminates are very suitable for thermal/energetic disposal in appropriate combustion plants.

废物代码根据欧洲废物目录为：17 02 01 / 03

The waste code according to the European waste catalogue is: 17 02 01/03.

必须遵守关于一般废弃处理的具体国家法律和条款

Specific national laws and ordinances on disposal must be observed in general.

防火板用保护膜可以进行回收。如无法回收，可将保护膜弃置于适当的生活废物堆填区或获批准的生活废物焚烧厂。

The protective films used for the laminate are recyclable. If recycling is not possible, the protective film may be disposed of in suitable domestic waste landfill or in a domestic waste incineration plant approved for this purpose.

更多环保与健康信息，请参考[环境与健康数据表 \(EHD\) – 防火板。](#)

For further environmental and health information, please refer to the [Environmental and Health Data Sheet \(EHD\) – Laminate.](#)

## 防火板操作处理 Working with laminates

以下版块描述防火板的运输、储存和操作。对产品的不当操作可导致影响安全的损坏。这可能导致功能性障碍和健康风险。因此，必须遵循制造商的使用说明。

The following section describes transporting, storing and handling laminates. Improper handling can lead to safety-relevant damage. This can lead to functional impairments and health risks. It is therefore imperative to follow the manufacturer's instructions for use.

### 运输

#### Transport

防火板通常 - 如图 2 以托盘的形式运输。托盘适合防火板长期储存。

Laminates are generally transported on pallets – see Figure 2. The pallet is suitable for the long-term storage of laminates.

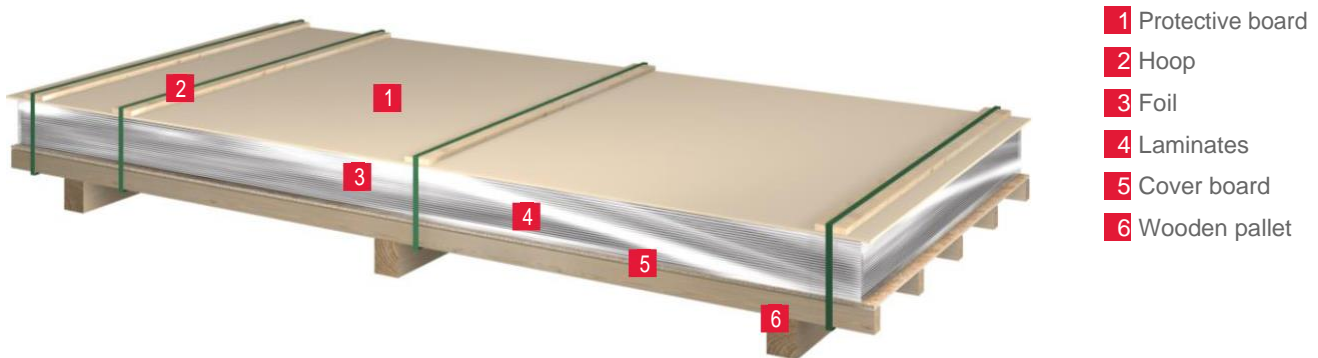


图 2: 防火板通过托盘水平运输 (超大规格防火板 XL 运输中不加保护膜)

Figure 2: Horizontal transport of laminates on a pallet (Laminates XL are transported without foil).



硬纸板包装用于最低数量和通过快递服务的交付 - 见图 3。我们建议在交货后拆箱，并根据章节[储存及调节](#)进行储存。只有在这种情况下，才能保证防火板后续加工的最佳条件。

Cardboard packaging is used for minimum quantities and for deliveries via courier service – see Figure 3. We recommend unpacking the laminates after delivery and storing them according to the chapter [Storage and conditioning](#). Optimal conditions for the further processing of the laminates are only guaranteed under these circumstances.



- 1 警告提示“小心易碎” Warning notice "Caution fragile!"
- 2 用于搬运的凹槽 Recesses for carrying

图 3：硬纸板包装进行垂直放置运输的防火板  
Figure 3: Vertical transport of laminates in cardboard packaging

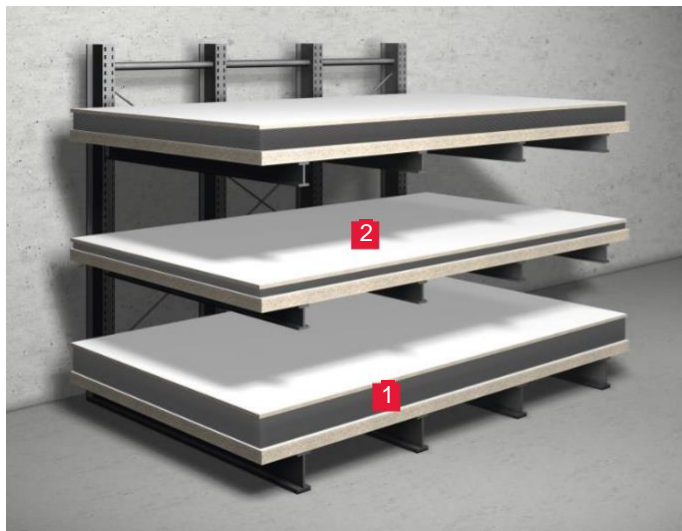
## 储存及调节 Storage and conditioning

防火板必须储存在一个具有正常温度环境的封闭和干燥的房间内。用硬纸板包装的防火板在加工前必须平放。在加工之前，基材板和爱格防火板应在正常的大气条件下调节至少 24 小时，如果可能的话，应将两种材料放在后期将要使用的环境下进行调节以使两种材料的水分含量达到平衡。特别要注意的是，如果材料在加工过程中过于潮湿，不仅会导致粘合性差且还会收缩，从而导致翘曲和开裂。

Laminates must be stored in an enclosed and dry room, protected from moisture, in normal, temperate environments. Laminates that are delivered in cardboard packaging must be stored flat before processing. Before processing, the substrate and the laminate must be conditioned for at least 24 hours if possible under the climate conditions of later use to balance the moisture content of the two materials. In particular, material that is too moist when it is processed leads to faulty bonding and shrinkage, which can result in cracking and warpage.

当原始包装被拆除后，防火板必须储存在水平护板的整个板面上。避免直接接触地面和/或暴露在阳光下。最上面的片材应将装饰面朝下并应覆盖至少相同大小的护板 - 见图 4。

When the original packaging is removed, the laminate must be stored on full-surface, horizontal cover boards. Direct floor contact and/or exposure to the sun must be avoided. The uppermost laminate should be laid with its decor side facing down and should be covered with a cover board of at least the same format – see Figure 4.



- 1 防火板堆栈 Laminates stack
- 2 护板 Laminated protective board

图 4: 防火板水平储存  
Figure 4: Horizontal storage of laminates

如果无法水平储存，防火板片材应以大约 80° 的角度储存在一个倾斜的架子上，为表面和两端提供支撑 - 见图 5。同样需要使用至少相同尺寸大小的护板。

Where horizontal storage is not possible, the laminates should be stored at an angle of approximately 80°, in an inclined rack, providing support to the surface area and ends – see Figure 5. Using a cover board of at least the same format is required for this storage as well.

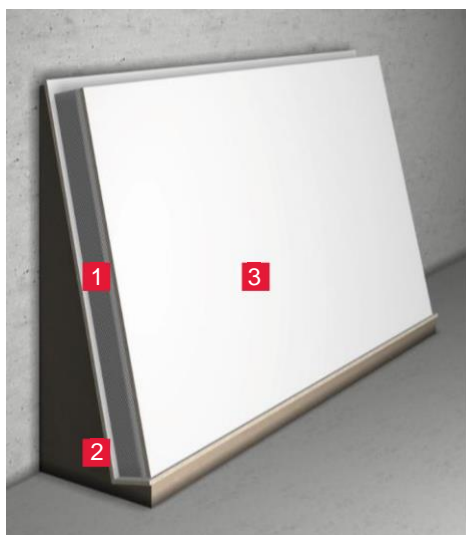


图 5: 防火板正确储存方式  
Figure 5: Correctly stored laminates



图 6: 防火板错误储存方式  
Figure 6: Incorrectly stored laminates

- 1 Laminates stack
- 2 Counter-bearing with support at 80°
- 3 Laminated protective board



总之，如果爱格防火板储存得当，则可以储存较长的时间。

In general, EGGER Laminates can be stored and processed for a very long time if stored correctly.

随着存放时间的延长，防火板变硬，即变脆，后成型性能随存放时间的增加而降低。根据储存条件的不同，最佳后成型特性的保存时间约为 6 个月。一般来说，防火板的加工没有时间限制。

With increasing storage time, laminates harden, i.e. they become more brittle and the postforming properties decrease with increasing age. Depending on the storage conditions, the period for optimal postforming properties is approximately 6 months. In general, laminate can be processed without a time limit.

时间段可以通过喷码在防火板背面的生产日期来去决定 – 见图 7。

The time period can be determined by the date of manufacture, which is shown on the reverse side of the laminate through injection print – see Figure 7.



图 7: 防火板背面喷码

Figure 7: Injection printing on the laminate reverse side

对于表面带有自粘保护膜的防火板 (极致系列防火板标配)，应在产品交货发出后 6 个月内移除产品表面的保护膜。否则，胶残留可能会遗留在产品表面。

For laminate surfaces coated with a self-adhesive protective film (standard for PerfectSense laminate grades), this must be removed no later than 6 months after the delivery date. Otherwise, adhesive residues may remain on the surface.

关于带有保护膜的防火板的详细信息，请参考技术数据表 [“爱格防火板 – 含保护膜”](#)。

For detailed information on laminates with protective film, please refer to the technical data sheet [EGGER Laminates with protective film](#).

## 操作

### Handling

在去除包装后和加工前，必须检查爱格防火板是否有可见的损伤。

The laminate must be inspected for visible damage after removing the packaging and prior to processing. Laminates with protective film should be checked for visible film damage.

原则上，所有运输和/或处理防火板的人员应穿戴个人防护装备 (PPE)，如手套、安全靴及合适的工作服。

In principle, all persons transporting and/or handling laminates should wear personal protective equipment (PPE) such as gloves, safety footwear and suitable work clothing.

避免防火板间互相推挤或互相拖拽。防火板要么被直接抬起，要么通过一张板的背面拉过另一张板的背面 – 见图 9。

It is to be avoided that the laminates are pushed against one another or dragged over one another. The laminates should be either raised, or the reverse side can be pulled over the reverse – see Figure 9.

当防火板被运输或搬运时，已被证实最令人满意的方法是将防火板卷起来且装饰层朝内，这样可以避免任何的摩擦运动。必须使用足够大、平坦且稳定的托盘来运输堆叠的防火板。必须固定堆叠的防火板，防止打滑。

When transporting or carrying laminates, rolling up the laminate has proven successful. When doing so, the decor side should be on the inside, the surface clean and dust-free and abrasive movements should be avoided. A sufficient number of large, flat and stable pallets must be used for transporting laminate stacks. The stacked laminates must be secured against slipping.



图 8: 通过托盘运输的防火板  
Figure 8: Delivery of the laminates on a pallet

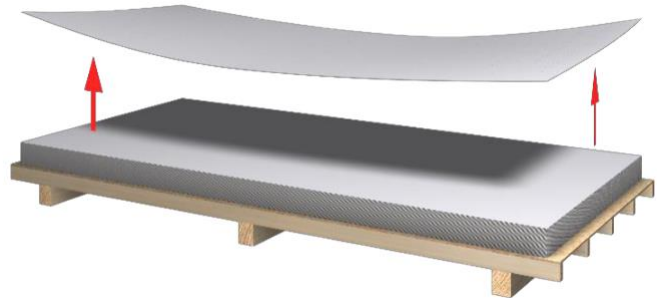


图 9: 抬起防火板  
Figure 9: Lifting the laminate

对于通过硬纸盒运输的防火板，推荐水平方向打开盒子，然后垂直方向拿出防火板，从而避免损坏 – 见图 11。  
For laminates delivered in a cardboard box, it is recommended to open the box horizontally and then remove the laminates to avoid damage – see Figure 11.



图 10: 通过硬纸盒运输防火板  
Figure 10: Delivery of the laminates in a cardboard box



图 11: 从硬纸盒中取出防火板  
Figure 11: Final packing of the laminates from the cardboard box

由于保护膜的自粘作用，使用真空集料处理带有保护膜的防火板需要您自行承担风险，并且只能在有限的范围内 (特别是对于自重较高的防火板)。理想情况下，保护膜应保留在防火板上，直到安装完成。

Due to the self-adhesive effect of the protective film, handling laminates with protective film by means of vacuum aggregates is at your own risk and is only possible to a limited extent (especially for laminates with a higher deadweight). Ideally, the protective film should remain on the laminate until after installation.

之后，应将保护膜以轻微的角度均匀地 (例如用手) 从表面移除。

Afterwards, the protective film should be removed by pulling evenly (e.g. by hand) at a slight angle to the surface.

如果薄膜粘接力很强，可以通过小心加热 (例如使用吹风机) 软化粘层，使胶黏剂失去附着力。请注意薄膜的最高耐温性。

If the film is highly adhesive, the adhesive layer can be softened by careful heating, e.g. using a hair dryer, causing the adhesive to lose adhesion. Please note the maximum temperature resistance.

详细信息，请参考技术数据表 [“爱格防火板 – 含保护膜”](#)。

For detailed information, please refer to the technical data sheet [EGGER Laminates with protective film.](#)

## 防火板加工

### Processing laminates

如储存与调节章节所述，在加工防火板之前，必须保证足够的调节条件。在加工前，防火板必须在常温气候条件下进行至少24小时的养生。

As described in the chapter Storage and conditioning, care must be taken to ensure adequate conditioning before processing laminates. The laminates must be conditioned for at least 24 hours under normal climatic conditions before processing.

当加工爱格防火板时，应使用合适的机械设备和刀具。应选择刀具生产商推荐的切割刀具、转孔刀具以及铣削刀具。另外，需确保仅用锋利的刀具，因为这将决定最终的加工结果。

Only use suitable machines and tools for processing. Cutting, drilling and milling tools should always be selected in coordination with the tool manufacturer. Furthermore, it must be ensured that only sharp tools are used, as this is decisive for the processing result.

### 切割

#### Cutting

防火板可以使用标准的木工设备（如板锯、台式圆锯、手持圆锯、线锯以及也可以使用 CNC 铣削）来切割成型。板锯或台式圆锯一般用于将防火板切割成一定尺寸。好的切割效果取决于不同的因素，这些因素包括刀片设计、进给速度、刀齿形状、刀齿间距、马达速度和切割速度。

Laminates can be cut to size using standard woodworking equipment, e.g. panel saws, bench circular saws or hand-held circular saws, and CNC milling machines. Panel saws or bench circular saws are generally used to cut to size. Various factors such as correct saw blade projection, feed rate, tooth shape, tooth pitch, RPM and cutting speed must be considered for good cutting results.

#### 示例 – 台式圆锯

**Example** – cutting with a bench circular saw:

- » 切割速度: 约 40 – 60 米 / 秒  
Cutting speed: approximately 40 to 60 m/s
- » 旋转速度: 约 3,000 – 4,000 转 / 分钟  
RPM: approximately 3,000 to 4,000 rpm.
- » 进给速率: 约 10 – 20 米 / 分钟  
Feed: approximately 10 to 20 m/min.

另外，防火板的表面也必须压住，如果让它“四处移动”会导致微小的裂纹，这些裂纹随后会变成缺口或应力开裂。除了板锯和 CNC 刨铣，所有的切割都需要手工送料。由于爱格防火板表面使用了优质的三聚氰胺树脂，刀具磨损相比传统的木质材料要更明显。我们建议您使用硬质合金刀或者甚至金刚石锯片或铣刀。

In addition, it is important to ensure that the laminate is pressed against the surface, as "fluttering" can cause very fine cracks that can later lead to notch or stress cracks. With the exception of panel saws and CNC routers, cutting is carried out by hand feed. Use a cutting guide if using a hand-held circular saw or jigsaw. Cutting must be from the underside of the board.

Due to the high-quality resins and UV paints used for the surface of laminates, the tool stress is significantly higher than for conventional wood-based materials. We recommend that you use carbide metal-tipped or even diamond-tipped saws or router bits.

根据所使用的基材及所要达到的修饰标准，选择以下不同的齿状（粗切或细切）：  
Use the following tooth shapes depending on the standard of finish you require (coarse or fine cut) and the substrate used:

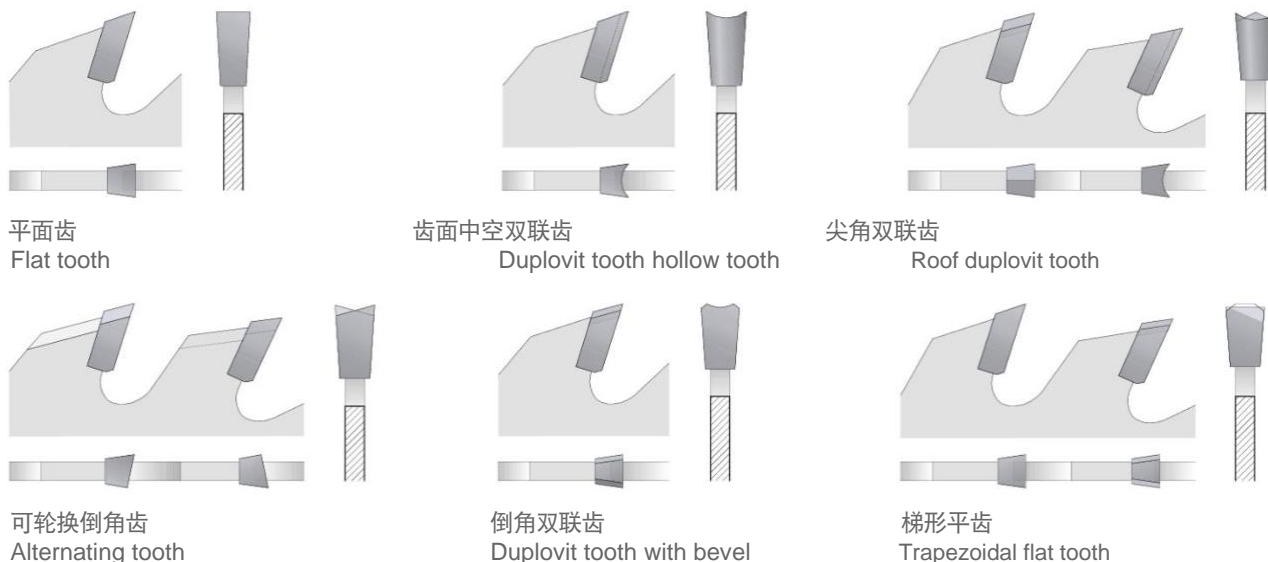


图 12: 常见刀片刀齿形状示例  
Figure 12: Examples for common tooth forms of saw blades

## 粘合/压贴 Bonding / pressing

### 芯材及制备 Core material and preparation

根据要求和后期的应用，防火板可以用不同类型的粘合剂粘合到不同的芯材上。传统的人造板材料就非常适合——见图 13。  
Depending on the requirements and later application, the laminate can be bonded to different core materials with different types of adhesives. Classic wood-based materials are particularly suitable – see Figure 13.



图 13: 用于防火板饰面的爱格芯材 (刨花板、中密度板、高密度板及超轻板)  
Figure 13: EGGER core materials for coating with laminates (chipboard, MDF, HDF and lightweight boards)

在进行系列生产前应自行进行压贴测试。请注意，细木工板和胶合板由于使用木皮和 / 或实木而不能获得与刨花板相同的一致结构。木皮和 / 或实木等成分在波动的气候条件下无法达到像用刨花板那样可以保证实现尺寸变化的均匀性。因此，当使用实木板、胶合板或多层板作为芯材时，这可能会导致变形。

Prior to series production, own pressing tests should be carried out. It should be noted that blockboards and plywood boards do not achieve the homogeneity of, for example, chipboards in their structure since veneer and/or solid wood is used. Veneers or solid wood have components that do not achieve the uniformity of dimensional change under alternating climates as is ensured by chips. Therefore, when solid wood, plywood or multiplex panels are used as core boards, an increased risk of warping must be expected.



然而，一个平整且无张力的芯板是实现光滑表面的先决条件，因此，必须实施芯板校准（砂光校准）与木材含水率的测试（室内应用≤8%），过于潮湿的材料往往会随着时间的推移而收缩，这可能会导致开裂和变形。

However, a flat and tension-free core board is a prerequisite for a smooth surface, therefore core board calibration (calibration sanding) and a wood moisture content test (indoor applications ≤ 8%) must be carried out. Materials that are processed in an excessively humid state tend to shrink and crack over time and can result in warping.

当使用多层板时，用软木制成的胶合板（如杨树、桦树）是最合适的。当使用细木工板时，应使用短条和软木面层的层压单板来避免表面不平整。芯板须在无应力条件下具有光滑、平整的表面。不推荐将爱格防火板与实木粘合在一起。

When using multiplex boards, veneer boards made of soft woods (e.g. poplar, birch) should preferably be chosen. Also with blockboards, primarily strip boards with softwood top layers and narrow strips should be used to avoid surface unevenness.

The core material has to be under no stress with a smooth, level surface. Gluing laminates to solid wood is not recommended. In glueing, it is necessary to thoroughly clean the fire board and core board. Even before the adhesive is applied to the core material, the core material surface must be free of dust, grease, oil or spots of sweat. It is important to achieve this purpose, recommend sanding the core surface, this can ensure a clean and optimal adhesive surface and at the same time achieve the necessary surface calm.

The laminate and core material must always be cleaned thoroughly before gluing. Even before the adhesive is applied the materials must be free from dust, grease, oil or spots of sweat. Calibration sanding of the core material is recommended for this purpose, as this ensures a clean and optimal adhesive surface and at the same time achieves the necessary surface calm.

**胶黏剂类型及粘合**

**Adhesive type and bonding**

一般来说，爱格防火板是最适合与它们打磨的背面进行粘合的。防火板的背面颜色对加工没有影响且颜色不同是由于防火板类型不同呈现的。在相同的生产方向将防火板粘合在正面和反面是很重要的。生产方向可以通过背面的打磨方向来识别且相应地，防火板在两面压贴必须保持一致 – 见图 14。

In general, EGGER Laminates are optimally prepared for bonding with their reverse side sanding. The reverse side colours of the laminates have no influence on the processing and are due to the different laminate types. It is important to bond the laminate on the front and reverse side in the same production direction. The production direction can be recognised by the reverse side sanding and accordingly the laminate must be aligned the same on both sides – see Figure 14.

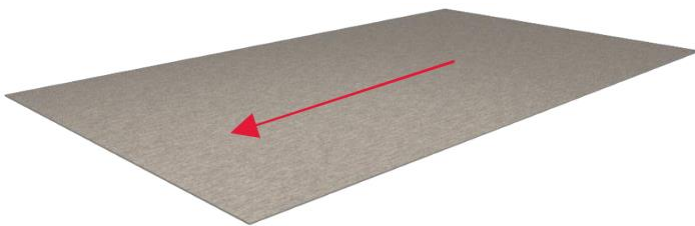


图 14：背面砂光展示生产方向  
Figure 14: Reverse side sanding shows the production direction

除了防火板在复合元素两面保持一致且对称外（见版块[对称结构及压贴](#)），在正反面均匀施胶也很重要，否则可能会出现弯曲的问题。In addition to the laminate alignment and a symmetrical construction of the composite element (see section [symmetrical construction and pressing](#)), an even application of adhesive on both the front and the reverse side is important, otherwise warpage problems may occur.

基本上，所使用胶黏剂系统的最终强度需在几小时到几天后达到（需考虑制造商关于固化时间的信息）。因此，特别大的部件在粘合后应立即小心处理，因为弯曲或扭曲可能会损坏粘合接头。

Basically, the final strength of the adhesive systems used is only reached after a few hours to a few days (take into account the manufacturer's information on curing times). For this reason, particularly large components should be handled with care immediately following bonding, given that bending or twisting may damage the adhesive joint.

表面紧实的刨花板经过 80-120 粒度砂光校准，再使用分散胶黏剂（PVAc/白胶）进行粘合，可实现更好的附着力。Surface-compacted chipboard achieves improved adhesion when glued with dispersion adhesives (PVAc/white glue) after calibration with an 80-120 graining.

具有防水性能的 P3 刨花板及高密度表面结构 (如: 中密度板), 可能甚至通过酚醛树脂粘合的材料, 其将 PVAc (聚醋酸乙烯酯) 粘合剂中水分排除的性能较差。这就会导致压贴的时间间隔较长且粘接接头的最终强度需要几个小时到几天的时间才能达到 (遵守胶黏剂生产方的说明)。

In the case of P3 chipboard and higher-density surfaces (e.g. MDF), as well as more moisture-resistant and possibly phenolic resin-bonded materials, it is more difficult to dissipate water from dispersion adhesives. Therefore, a longer pressing time must be taken into account and the final strength of the adhesive joint is only reached after a few hours to a few days (follow the manufacturer's instructions).

接触型粘合剂常用于生产弯曲部件和用来将防火板和非吸收性材料 (如金属) 粘合在一起。接触型粘合剂一般由氯丁橡胶和溶剂组成。在装配之前, 必须让溶剂蒸发, 胶膜必须干燥 (手指测试: 胶膜必须感觉到干燥)。

Contact adhesives are often used for producing bent elements and to glue laminates with non-absorbent materials, such as metals. The contact adhesive usually consists of polychloroprene and a solvent. Prior to assembly, these solvents must be ventilated and the adhesive film must dry (finger test: the adhesive film must feel dry).

胶黏剂的强度是由压力作用产生的, 因为氯丁橡胶在高压下结晶。最终, 粘合稳定性取决于在那个部位施加压力。这意味着为了获得良好的粘合力, 有必要将粘合的面层置于短时间的高压之下。

The adhesive strength is created by the action of pressure, as the polychloroprene crystallises under high pressure. Consequently, the stability of the bond depends on the pressure with which the parts are pressed. This means that in order to achieve a good bond, it is necessary to press the bonding surfaces under the highest possible pressure in a short period of time.

当使用接触型胶黏剂时, 可能出现带有瑕疵的粘合风险 (例如: 气泡和裂纹的形成) 会增加。因此, 我们推荐这种粘合剂系统仅用于小型部件和短期应用 (例如贸易展会建筑结构)。

The risk of possible faulty bonding (e.g. bubble and crack formation) is increased when using contact adhesives. Therefore, we recommend this adhesive system only in connection with small components and short-term applications (e.g. trade fair construction).

始终建议在当地条件下进行试验粘合, 并且必须严格遵守胶黏剂制造商的说明书。

Trial bonding under local conditions is always recommended and the adhesive manufacturer's specifications must be strictly observed.

下表包含的数据指的是使用木质芯材的情况, 这些参考值受以下因素影响:

The information in the following table refers to the use of wood-based material core boards. These are guide values that are influenced by:

- » 芯板的类型和质量  
The type and quality of core material
- » 加工条件  
Processing conditions
- » 粘合剂类型与后面的暴露程度 D1, D2, D3 或者 D4<sup>1)</sup> 相对应  
The type of adhesive corresponding to the later degree of exposure D1, D2, D3 or D4<sup>1)</sup>

胶黏剂类型 Adhesive types	分类 <sup>1)</sup> Class	耐温性 Temperature resistance	施胶量 Adhesive application rate	固化时间 Setting time	压力 Press pressure	热压温度和时间/min Pressing temperature/time [min.]							
						20°C	40°C	60°C	70°C	80°C	90°C	100°C	120°C
<b>分散型胶黏剂</b> Dispersion adhesives													
聚醋酸乙烯酯 PVAc	D2/D3	<50°C	90-150 g/m <sup>2</sup> 在防火板或基材上	最多 10 分钟 max. 10 min.	> 3 bar	8 to 30	4 to 12	3 to 5					
双组分聚醋酸乙烯酯 2k PVAc	D3/D4	< 100 °C	90-150 g/m <sup>2</sup> on CPL or core material			遵守制造商说明书 Observe manufacturer's instructions							





缩合树脂 Condensation resins																			
脲醛树脂 UF resin	D2	-	50-150 g/m <sup>2</sup>	反应时间: Pot life: < 7 h.	> 2 bar	-	-	-	5	3	2	1	0.5						
三聚氰胺/脲醛树脂改性胶黏剂 MUF resin	-	-	120-180 g/m <sup>2</sup>	反应时间: Pot life: < 4 h.	3-10 bar	-	-	16	7	2	1.75	1.25	-						
接触型胶黏剂 Contact adhesives																			
无硬化剂 without curing agent	-	<50°C	需应用于芯材两面 application on both sides necessary	对溶剂表面通风 after ventilation of the solvent	> 5 bar	单触点压力 single contact pressure (遵守制造商说明书) (follow manufacturer's instructions)													
有硬化剂 with curing agent	-	< 100 °C																	
热熔胶黏剂 Hot-melt adhesives																			
EVA	-	<50°C	80 g/m <sup>2</sup>	< 40 sec.	辊压 Roller / calender pressure	监视温度和热粘着力 Observe temperature & heat tack													
PA/PO	-	<70°C	80 g/m <sup>2</sup>	< 40 sec.															
PUR	-	< 120 °C	80 g/m <sup>2</sup>	5 to 800 sec.									监视加工温度 Observe processing temperature						
MR PUR	-	< 120 °C	80 g/m <sup>2</sup>	5 to 800 sec.															

<sup>1)</sup> D1, D2, D3 和 D4 是根据 EN 204 中按照最小剪切强度和暴露在空气和水当中的导电性能对粘合剂进行的划分。  
Groups D1, D2, D3 and D4 according to EN 204 classify glue according to minimum shear strength values and conduct upon exposure to moisture and water.

图 4: 胶黏剂类型概览 – 与 Jowat Klebstoffe 胶王公司一起编制  
Table 4: Adhesive types at a glance – created in cooperation with Jowat Klebstoffe

至于其他参数，如固化时间、初始稳定性、密度或粘度，很难对一种胶粘剂类型作出总体的陈述，因为有时差异很大。为此，请联系相应的胶黏剂制造商并参考他们的文件。

With regard to other parameters, such as setting time, initial stability, density or viscosity, it is difficult to make general statements about an adhesive type, as the differences are sometimes very large. For this, please contact the respective adhesive manufacturer and refer to their documentation.

以下列出了一些胶黏剂制造商：  
Some manufacturers of adhesives are listed below:

- » 胶王 Jowat Klebstoffe [www.jowat.com](http://www.jowat.com)
- » 汉高 Henkel [www.henkel-adhesives.com](http://www.henkel-adhesives.com)
- » 克力宝 Kleiberit Klebstoffe [www.kleiberit.com](http://www.kleiberit.com)
- » 富乐 H.B. Fuller [www.hbfuller.de](http://www.hbfuller.de)
- » 福漫 Follmann [www.follmann.com](http://www.follmann.com)

**对称结构和压贴  
Symmetrical construction and pressing**

一般来说，当制造防火板贴面元件时，必须使用合适的防火板来确保张力均衡。正面和反面使用相同的防火板（厚度/花色/纹理）或反面使用匹配的中性防火板平衡纸。

In general, when manufacturing laminate bonded elements, tension equalisation must be ensured with a suitable laminate. The same laminate (thickness/decor/texture) is used on the front and reverse side or matching neutral laminate balancer on the reverse side.



使用具有相同标称厚度的防火板平衡纸通常是合适的。然而，建议在生产元件之前通过预测试来验证防火板平衡纸选择的合适性。不对称复合材料元件的生产是制造商自身的责任。

Using a laminate balancer with the same nominal thickness is generally appropriate. It is, however, recommended to verify the selection of a suitable laminate balancer through pre-testing prior to producing the element. The production of asymmetrical composite elements is the responsibility of the fabricator.

更多信息，请参考技术数据表“[爱格防火板平衡纸](#)”。

For more detailed information, please refer to the technical data sheet [EGGER Laminates Balancer](#).

如果选择爱格面芯同色防火板作为复合元件，这需要特殊选择的粘合剂。这样做的原因是基于防火板的刚度以及需要在胶黏剂连接处不显示胶接缝。因此，建议与胶黏剂供应商讨论具体应用情况。

If EGGER Laminates coloured core are selected for the composite element, this requires a special selection of adhesives. The reason for this is the stiffness of these laminates, as well as the need for the adhesive joint to not show for visual reasons. It is therefore advisable to discuss the specific application with the adhesive supplier.

一般来说，在热压或冷压的过程中，压制是在贴面机、短周期压机和双带压机的条件下进行的。

In general, compression takes place with the aid of veneer, short-cycle and double-belt presses in a hot or cold process.

压制参数，如压力、热压温度和时间等，由胶黏剂生产厂家在产品数据表中说明。例如，对于单板压机，压力的推荐值由制造商在压机的信息标签上进行标识 – 见图 15 和表 5。

The pressing parameters, such as the pressing pressure, the pressing temperature and the pressing time, are described by the adhesive manufacturer in the product data sheet. For veneer presses, for example, further recommended values for the pressing pressure are indicated by the manufacturers on the information label on the presses – see Figure 15 and Table 5.

**示例 – 在芯板上压贴防火板**

**Example – Pressing laminates with a core board:**

- » 压机 Press: 带有压力表格的传统单板压机 conventional veneer press with pressure table
- » 胶黏剂 Adhesive 根据数据表具有以下参数的 PVAc 胶黏剂 (白乳胶) PVAc adhesive (white glue) with the following specifications according to the data sheet:

压力 Pressure: 0.3 N/mm<sup>2</sup> ≈ 3 kg/cm<sup>2</sup>

温度 Temperature: 室温 Room temperature 40 °C 60 °C

时间 Time: 约 15 分钟 approximately 15 min. 约 10 分钟 approximately 10 min. 约 5 分钟 approximately 5 min.

- » 芯材尺寸 Core board size: 200 x 100 cm
- » 压力 Press pressure: 220 ato ≈ 220 bar – 见图 5 see Table 5



L \ B	B						
	20	40	60	80	100	120	130
20	5	10	15	20	20	25	30
	5	15	20	30	35	40	45
40	10	20	25	35	45	55	60
	15	30	40	55	70	85	90
60	15	25	40	55	65	80	85
	20	40	65	85	105	125	140
80	20	35	55	70	90	105	115
	30	55	85	115	140	170	185
100	25	45	65	80	110	135	145
	35	70	105	140	175	210	230
120	25	55	80	105	135	160	175
	40	85	125	170	210	255	275
140	30	80	95	125	155	185	200
	50	100	150	200	250	295	320
160	35	70	105	140	175	215	230
	65	110	170	225	285	340	370
180	40	80	120	160	200	240	260
	65	125	190	255	320	—	—
200	45	90	135	175	220	265	290
	70	140	210	285	355	—	—
220	50	95	145	195	245	290	315
	80	155	235	310	—	—	—
240	55	105	160	215	265	320	345
	85	170	255	340	—	—	—
250	55	110	165	220	275	330	360
	90	175	265	355	—	—	—

1 = spez. Pressdruck 3.0 kg/cm<sup>2</sup>  
2 = spez. Pressdruck 4.0 kg/cm<sup>2</sup>

Die Ablesbaren Werte verstehen sich in situ und sind am Druckschalgerät einstellbar

图 15: 带有压力表的单板压机  
Figure 15: Veneer press with sample pressure table

表 5: 压力表 (每个尺寸的元件对应的压力值)  
Table 5: Pressure table (pressing pressure per component size)

以下列出了一些单板压机或压贴生产线制造商：

Some manufacturers of veneering presses or laminating lines are listed below:

- » Format-4 [www.felder-group.com](http://www.felder-group.com)
- » Höfer [www.hoefer-maschinen.com](http://www.hoefer-maschinen.com)
- » Italpresse [www.italpresse.com](http://www.italpresse.com)
- » Joos [www.joos.de](http://www.joos.de)
- » Langzauner [www.langzauner.at](http://www.langzauner.at)
- » Wieder [www.wieder-maschinenbau.at](http://www.wieder-maschinenbau.at)
- » Robert Bürkle [www.burkle.tech/de-de](http://www.burkle.tech/de-de)

防火板的生产可以通过如，在采用热熔胶的连续压贴系统中进行实现 – 见图 16。

The production of laminate bonded boards can be implemented, for example, in a continuous process with hot-melt adhesives and laminating systems – see Figure 16.

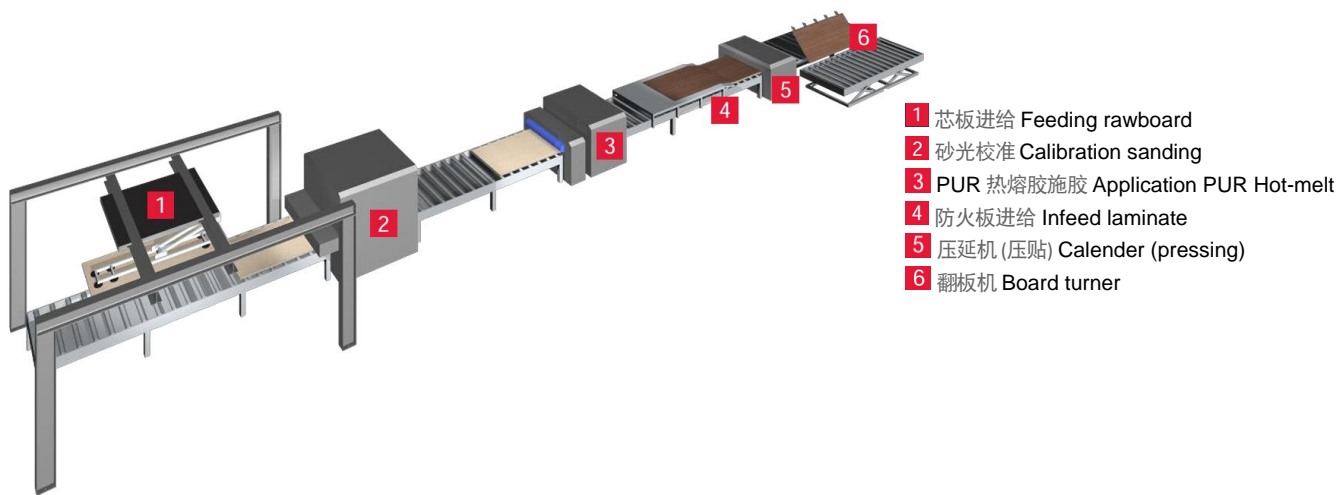


图 16: 来自卡塞尔 [W. & L. Jordan GmbH](http://www.w-l-jordan.com) 公司的热熔胶的连续压贴线示例  
Figure 16: Example of laminating line with PUR hot-melt from [W. & L. Jordan GmbH](http://www.w-l-jordan.com) in Kassel

在本生产示例中，首先对芯板进行打磨，并使用清洁刷清除可能的污垢。然后将 PUR 热熔胶涂在芯板上。在下一步中，防火板作为片材从上面输送到芯板上，最后通过压延机进行压制。然后将一面压贴的防火板进行翻转，并在相同的连续压贴线中压贴另一面。  
In this production example, the core board is first sanded and possible soiling is removed using cleaning brushes. Then the PUR hot-melt is applied to the core board. In the next step, the laminate is fed as sheets from above onto the core board and finally pressed by means of a calender. The laminated board coated on one side is then turned over and the reverse side is coated in the same continuous process.

## 防火板贴面板的加工 Processing laminate bonded boards

防火板贴面板的主要加工步骤如下。在加工过程中，必须遵守一般安全规定，并使用个人防护装备。  
The main processing steps for laminate bonded boards are described below. During processing, the general safety regulations must be observed and personal protective equipment (PPE) must be taken into account.

### 转孔 Drilling

塑料用钻孔刀具特别适合于防火板的钻孔。HSS 钻头 (高速钢) 适用于手持式机床，HM 钻头 (硬质合金) 适用于机械式进给的机床。  
Drilling tools for plastics are especially suitable for drilling laminates. HSS drills (High Speed Steel) are suitable for hand-held machines and HM drills (carbide) are recommended for machines with mechanical feed.

示例 – 使用麻花钻进行转孔

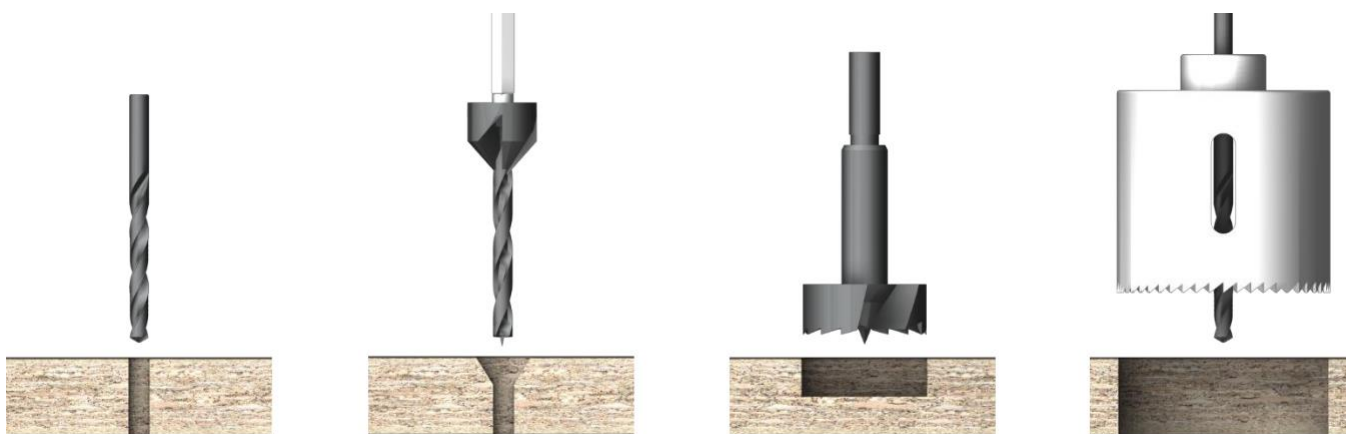
**Example** – drilling with a twist drill:

- » 切割速度: 对于高速钢钻头约 0.8 m/s; 对于硬质合金钻头约 1.6 m/s  
Cutting speed: approximately 0.8 m/s for HSS drill; 1.6 m/s for carbide drill
- » 刀具转速: 约 1,000 – 3,500 rpm  
RPM: approximately 1,000 to 3,500 rpm.
- » 进给速度: 约 0.02 – 0.07 mm/圈 [转速为 1,000 时, 进给速度 20-50mm/min]  
Feed: approximately 0.02 to 0.07 mm/rev [at 1,000 revolutions immerse from 20 to 50 mm per min].

钻孔时注意浸入速度 (进给)，否则会损坏防火板。当钻孔时，防火板必须固定在牢固的底座上。  
When drilling, pay attention to the immersion speed (feed), otherwise the laminate could be damaged. When drilling through-holes, the laminate must rest on a firm base.

根据需要的孔尺寸 (如导孔、杯带孔等)，使用以下类型的钻头:

Depending on the required size of the hole (e.g. pilot hole, cup band hole, etc.), the following drill types are used:



高速钢钻  
HSS twist drill

木质埋头钻  
Wood drill with countersink

平底钻  
Forstner drill

钻孔刀 (孔钻)  
Hole saw (hole drill)

图 17: 已被验证的钻类型示例  
Figure 17: Examples of proven drill types

如果金属配件、墙型材等固定在防火板表面(或复合元件)上,防火板必须在螺钉连接区域进行预钻。孔必须至少比螺杆直径大 0.5 mm,以避免在材料内部产生张力,参见图 18 和图 19。自攻螺钉也必须考虑到这一点,因为在接头处容易产生应力裂纹。  
If fittings, wall profiles, etc., are fixed to the laminate surface (or composite element), the laminate must be predrilled in the area of the screw joint. The holes must be at least 0.5 mm larger than the screw diameter in order to avoid tension in the material – see Figures 18 and 19. This must also be taken into account with self-tapping bolts, as stress cracks can also occur here.

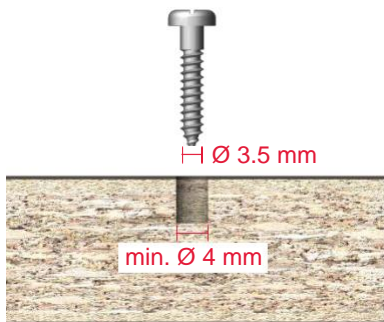


图 18: 直径为 3.5mm 螺钉示例  
Figure 18: Example of a 3.5 mm screw

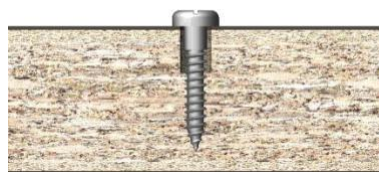


图 19: 预钻孔螺钉接头  
Figure 19: Screw joint with pre-drilling

一般建议对防火板上的孔进行去毛刺处理。例如,可以使用带有集成埋头钻的钻头 – 参见图 17。当用孔锯钻孔时,由于可能出现应力裂纹,去毛刺很有必要。对于较大的直径的孔,一般使用平面铣刀。  
It is generally recommended to deburr the holes in the laminate. For example, a drill with an integrated countersink can be used for this – see Figure 17. When drilling with a hole saw, deburring is always necessary due to possible stress cracks. For larger diameters, surface milling cutters are generally used.

## 铣削 Milling

铣削可以通过手持设备(如手动铣床)或固定机器设备(如台式铣床或 CNC 加工中心)进行。除了锋利的铣刀外,使用金刚石刀片(DIA)代替硬质合金刀片(HM)可以获得更好的结果,特别是对于大批次产品的生产(更长的刀具寿命)。

Milling can be carried out by means of a manual machine, such as a hand router, or by a stationary machine, such as a bench router or a CNC machining centre. In addition to sharp milling tools, an even better result can be achieved by using diamond-tipped tools (DIA) instead of carbide-tipped milling cutters (HM), especially for large series (longer tool life).

### 手持式机械设备 Hand machines

所有用于铣削的木工机械设备都适用于防火板贴面板或防火板。由于手持式机械设备和铣刀的可以应用的范围很广,因此很难给出详细的加工和刀具建议。因此,在使用铣刀时,请遵守机械设备和刀具制造商的建议。

All woodworking machines for milling are suitable for laminate bonded boards or laminates. Due to the wide variety of possible applications for hand machines and milling tools, it is difficult to give detailed processing and tool recommendations. Therefore, please observe the recommendations of the machine and tool manufacturers when using milling tools.

#### 示例 – 使用手持刨机刨平

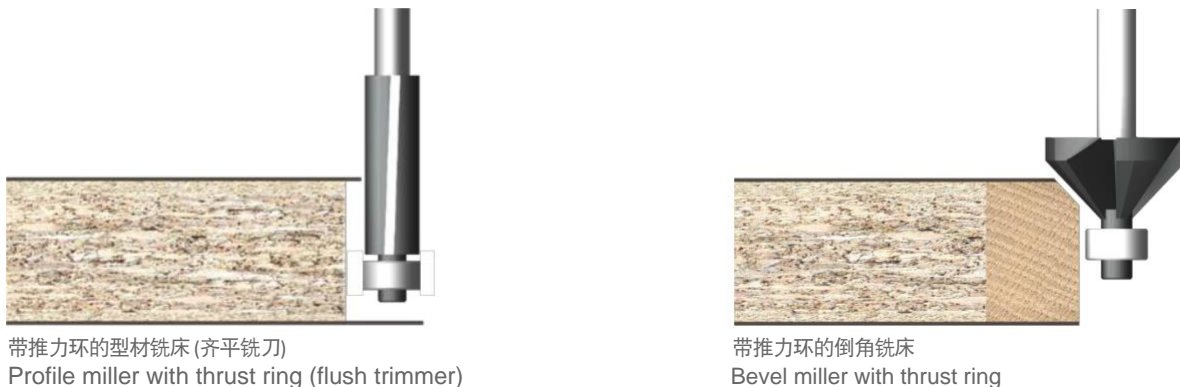
Example – Flush trimming with a hand router:

- » 切割速度: 约 10 - 15 m/s  
Cutting speed: approximately 10 to 25 m/s
- » 刀具转速: 约 20,000 rpm  
RPM: approximately 20,000 rpm.
- » 铣刀直径: 约 10 – 25 mm  
Ø - milling cutter: approximately 10 to 25 mm



根据要求，手持式机械设备可配备不同的铣刀，例如：

Depending on the requirements, hand machines can be equipped with different milling tools, for example:



带推力环的型材铣床 (齐平铣刀)  
Profile miller with thrust ring (flush trimmer)

带推力环的倒角铣床  
Bevel miller with thrust ring

图 20: 手持式机械设备铣刀示例  
Figure 20: Examples of milling cutters for hand machines

在压贴完防火板板后，防火板贴面板的边缘加工可以用手持式刨铣机 (也叫平修) 进行。凸出的防火板在侧板边缘用带推力环的造型铣床 (齐平铣刀) 进行修整 — 参见图 20。

The edge processing of a laminate bonded board after pressing the laminate can be done with a hand router (also called flush trimming). The protruding laminate is trimmed at the lateral board edges with the help of a profile miller with a thrust ring (flush trimmer) – see Figure 20.

**固定式机械设备  
Stationary machines**

固定式铣床 (如台式铣床或数控铣床) 为主轴配备铣刀或立铣刀。这些铣削钻头的可能应用范围甚至更加广泛，因此只能由各自的制造商提供详细的加工和刀具建议。

The stationary milling machines, such as the bench milling machine or the CNC milling machine, are equipped with milling bits or end mills for spindles. The possible applications of these milling bits are even more extensive and accordingly a detailed machining and tool recommendation can only be made by the respective manufacturer.

根据铣削要求，加工中心通常用于固定机床领域。下面是两种常用的铣刀：

Depending on the milling required, a machining centre is often used in the area of stationary machines. The following are two milling tools that are often used:



粗铣刀 Roughing cutter

半径铣刀 Radius milling cutter

图 21: 木质材料加工中心铣刀示例  
Figure 21: Examples of milling tools on woodworking centres



## 切口 Cut-out

一般来说，在处理之前必须确保防火板贴面板具有安全的支撑，因此锯切、铣削或钻孔作业时就不会产生任何破坏。尤其，切口周围的窄板区在加工过程中如果不恰当的操作处理，会产生断裂或裂纹。板在切口时也应固定并保证安全，这样它们就不会以一种不受控制的方式断裂或脱落并因此造成人员伤亡或财产损失。

In general, before processing, ensure that the composite elements are supported securely and that sawing, drilling or milling is not likely to cause any damage. In particular, narrow joining areas in the board can break or crack if the board is not fully supported during processing. The board cut-outs should also be secured to ensure that they do not suddenly fall out or break. This could injure persons or property.

切口应呈半径状的 (最小半径 > 5 mm) 因为尖锐的边缘对材料有不利的影响且会导致开裂变形 - 参见图 22 到图 25。这尤其适用于频繁暴露在高温条件下造成材料变干，因此，伸缩张力会更大的应用区域。

The cut-outs should always be rounded with a minimum radius of 5 mm, as square-edged corners are detrimental to the material and lead to cracking – see Figures 22 to 25. This applies particularly to applications where, due to frequent exposure to heat, the laminates dry out for example, and the shrinking tension is therefore much greater.

切口最好使用便携式手持式槽刨机或数控加工中心铣削设备 – 见 [铣削](#) 部分。

The cut-outs should preferably be made with a hand router or CNC milling bit – see section [Milling](#).

当使用线锯时，切口角落应采用合适的半径进行预钻孔且切口按从一个半径到另一个半径进行锯切。应从板的下部开始切割来避免防火板面层的撕裂。边缘应采用砂纸进行精修、锉削或手工铣削来减少由于毛刺导致的裂纹。在使用所谓的“环形切割器”来切割嵌入式灯槽或聚光灯槽时，必须考虑同样小心的后加工工艺 – 见 [钻孔](#) 部分。

If using a jigsaw, you need to pre-drill the corners to the correct radius and saw from radius to radius. You should cut from the underside of the board to prevent the laminate coating from ripping off. The edges must be finished – also known as "edge breaking" using sandpaper, files or hand milling – in order to avoid notch cracks. The same careful finishing should be considered when using "circular cutters" for e.g. recessed/spot lights – see section [Drilling](#).

请具体遵守各厂家提供的说明书和安装模板。

Always read through the instructions and use the assembly templates provided by the manufacturers.

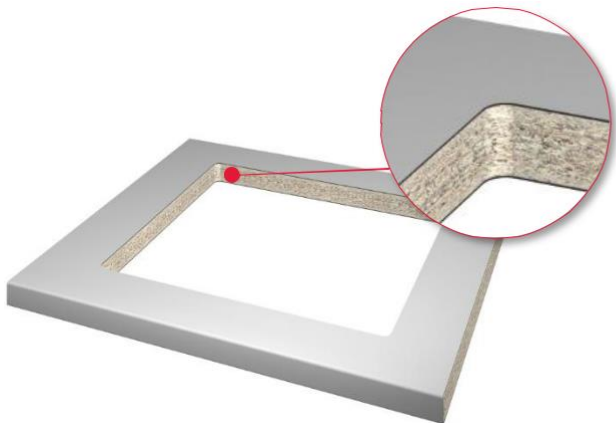


图 22: 带 5mm 半径的正确切口  
Figure 22: Cut-out with correct radius of 5 mm

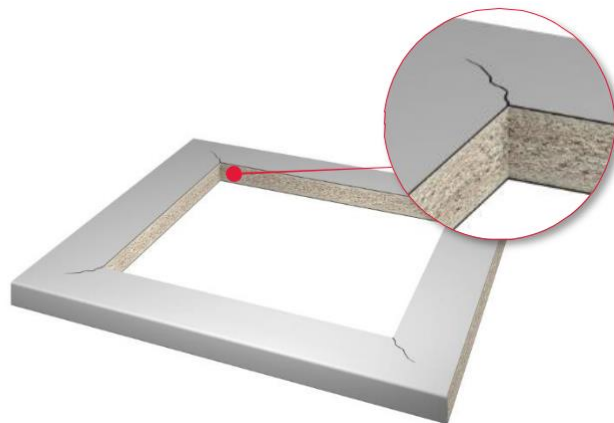


图 23: 太小半径的不正确切口  
Figure 23: Cut-out with incorrect, too small radius

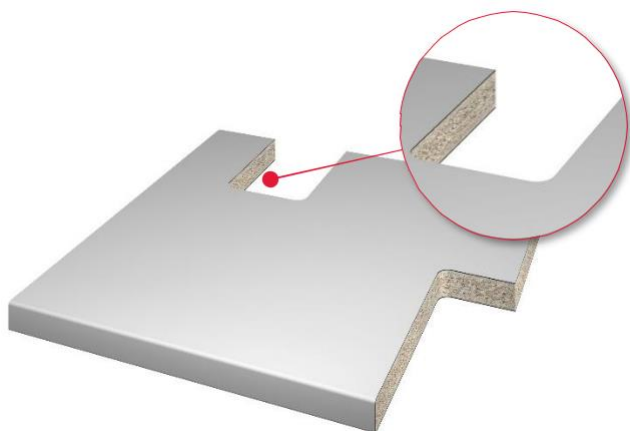


图 24: 带 5mm 半径的正确凹槽  
Figure 24: Recess with correct radius of 5 mm

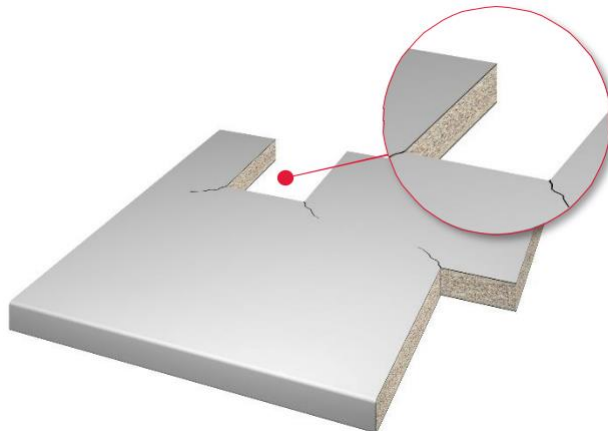


图 25: 太小半径的不正确凹槽  
Figure 25: Recess with incorrect, too small radius

通常，防火板元件（如台面、面板和门板等）都可以通过防火板贴面有效地保护着免受水分的浸入。然而，通过无保护措施边缘如切口、对接接头、斜接、背面边缘、钻孔、螺丝孔，水分和潮气依然可以浸入芯板。这意味着必要的密封工作必须在最后安装时进行实施，尤其是水平表面（台面）。

As a rule, laminate elements, such as worktops, fronts, etc., are effectively protected from moisture penetration by the laminate surface. Moisture and damp can still reach the core material, however, via unprotected edges such as cut-outs, butt joints, corner joints, rear edges, drill holes and screw holes. The necessary final sealing operations should always be carried out during the final assembly phase, especially with horizontal surfaces, such as worktops.

密封隐藏切割边缘的最佳产品是由硅橡胶、聚氨酯制成的密封条和交联密封化合物。使用密封剂时，必须也要同时使用底涂剂；或者基于材料本身可以形成薄膜或清洁底漆的一种。

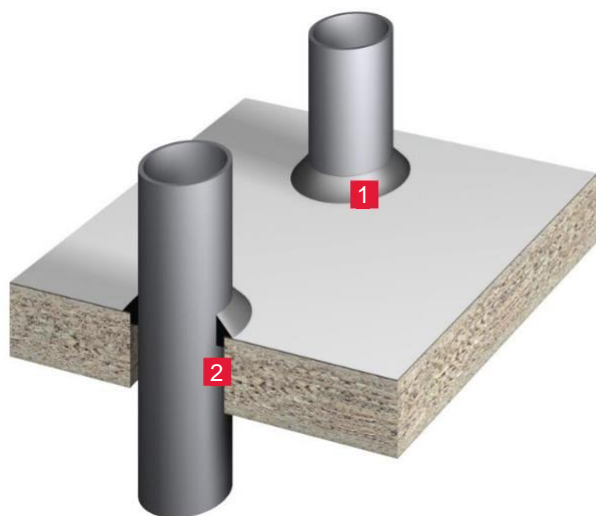
For concealed cut edges, sealing profiles and cross-linking sealing compounds made of silicone rubber or polyurethane have proven their suitability. When using sealants, a primer also has to be applied; either one that forms a film or a cleaning primer depending on the material.

当使用这些材料时，必须认真遵守制造商的使用说明书

You must follow the manufacturer's instructions carefully when using these materials.

涂抹密封剂，不留下任何间隙或孔洞，然后用水和洗涤剂抹平滑。应遮盖接头附近的区域，以防止表面变脏。任何通过该材料引出的管道或引线，应居中且距各边的最小距离为 2 到 3 毫米，并认真密封 – 见图 26。

Apply the sealant leaving no gaps or holes and then smooth over with water and detergent. Areas near joints should be masked off to prevent the surface from becoming dirty. Pipes or conduits must be centred so that a minimum clearance of 2 to 3 mm is maintained on all sides of the feed-through. Careful sealing is also required – see Figure 26.



- 1 顶部密封 Sealing top
- 2 内部密封 Sealing inside

图 26: 管道密封阻止水分浸入  
Figure 26: Sealing a pipe opening against moisture penetration

切割边缘也可以使用双组分油漆或双组分粘合剂进行密封。制造商提供密封环、型材或适用于诸如混合水龙头、水槽和铁架等附件上的套环。当安装这些项目时应按照制造商的说明去做。

Cut edges can also be sealed using a two-part lacquer or two-part adhesive. Manufacturers supply sealing rings, profiles or collars with attachments such as mixer taps, sinks and hobs. Always follow the manufacturer's instructions when fitting these items.

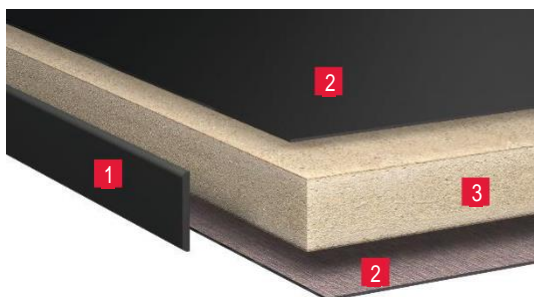
更多关于如齐平式或下沉式台盆的安装信息及必要的切口信息，请参考：[爱格台面加工指南](#)

For further details on e.g. flush-mounted or undermount sinks and the necessary cut-outs, please refer to the [Processing instructions EGGER Worktops](#).

## 封边 Edging

防火板贴面板四边窄面可采用不同的加工方法。我们建议使用相同花色的 EGGER ABS 或 PP 封边带来对可见的切割面进行封边 - 参见图 27。封边带为所有装饰层提供匹配的装饰面，除了设计装饰功能外还具有保护功能。作为装饰和材料组合的一部分，爱格还为装饰防火板提供匹配的封边带。

The narrow surfaces of the laminate bonded element can be processed in different ways. We recommend edging visible cut surfaces with EGGER ABS or PP edges in the same decor – see Figure 27. The edges provide a matching finish to all decorative coatings and have a protective function in addition to the design function. As part of the decor and material combination, EGGER also offers the matching edging for the decorative laminates.



- 1 ABS 封边带 ABS edging
- 2 防火板 Laminate
- 3 MDF 芯材 MDF core board

图 27: 带爱格 ABS 封边带的防火板贴面板结构  
Figure 27: Construction of a laminate bonded board with EGGER ABS edging

市售的封边机或加工中心通常用于封边。也可以用胶架或压机进行手工粘边。封边带背面覆有底涂剂，以确保完美的粘合。该涂层已使用 EVA, PA, APAO 和 PUR 热熔胶进行优化。防火板贴面元件和封边带材料必须事先在室内气候条件下进行调节。Commercially available edge bonding machines or processing centres are normally used for edging. Manual edge bonding by means of a gluing stand or edge press is also possible. The reverse side of the edge is coated with a primer, which ensures perfect bonding. This coating has been optimised for use with EVA, PA, APAO and PUR hot-melt adhesives. The laminate bonded elements and the edging material must be conditioned beforehand at room climate.

更多关于爱格封边带的信息，请参考公司网站 [www.egger.com/edging](http://www.egger.com/edging)。  
Further information on EGGER Edging can be found on our website [www.egger.com/edging](http://www.egger.com/edging).

ABS 或 PP 封边带的另外一种替代选择是实木板条，在压贴防火板之前，将此实木板条粘贴在芯板的窄边 – 见图 28。  
An alternative to ABS or PP edges are solid wood glues, which are usually glued to the narrow surface of the core material before gluing the laminate – see Figure 28.



带 ABS 封边带的刨花板  
Chipboard with ABS edging



带实木板条的刨花板  
Chipboard with solid wood glue

图 28: 实木板条与 ABS 封边带的比较  
Figure 28: Comparing ABS edging and solid wood glue

另一种封边方法是下面描述的后成型工艺，其中防火板在窄边的表面周围成型处理，并在芯板的背面处理结束。  
Another method of edging is the postforming process described below, in which the laminate is deformed around the narrow surface and finishes on the reverse side of the core board.

## 后成型 / 热成型

### Postforming / hot-forming

除了具有棱角边缘设计的平面防火板贴面板外，爱格防火板也用于后成型加工的目的。后成型工艺基础的特点是它们从平面到边缘的无缝连接过渡。防火板的后成型要求采用 P 型 (后成型) 防火板 – 见表 3。

In addition to the flat laminate bonded boards, with their angular edge designs, EGGER Laminates are also used for postforming purposes. Postforming elements are characterised by their seamless laminate transition from the surface across the edging. Postforming of laminate requires the use of a laminate type P (postformable) – see Table 3.

轮廓类型最好设计成外凸半径的形式并使用固定式后成型机械设备或连续操作的后成型机械进行加工。内凹型轮廓设计只能通过固定式设备来实现并且要求芯板以一种特定的方式进行准备。具有后成型和后续机械加工的经验也很必要。

Preferably, profiles are designed in the form of convex radii and produced using stationary or continuous postforming equipment. Concave profile designs can only be achieved with stationary equipment and require the core board to be prepared in a specific way. Experience of postforming and the subsequent processing is also necessary.

如[储存和调节](#)章节所述，如果储存正确，爱格防火板通常可以处理很长时间。随着储存时间的增加，爱格防火板会逐渐变硬，即变得更脆，后成型性能会逐渐变差。根据储存条件，保质期大约为 6 个月 (从生产之日起)。

As described in the chapter [Storage and conditioning](#), EGGER Laminates can generally be processed for a very long time if stored correctly. With increasing storage time, laminates harden, i.e. they become more brittle and postforming properties deteriorate. Depending on the storage conditions, this period is approximately 6 months (from date of production).

#### 芯材的选择和加工

##### Selecting and processing core material

芯板的正确选择，附加因素包括板的温度、木材的含水率、表面特性、板的结构、轮廓类型的设计、粘合剂的体系和粘合剂的施胶量等因素，决定了后成型单元的最终质量。爱格刨花板 Eurospan 已被证明其具有光滑、均匀的表面及一致的板材结构。在使用具有密实中间层的刨花板时需要特别小心；否则可能会导致粘问题或所谓的“压过”中间层。

Correctly selecting the core material plus factors such as board temperature, timber moisture content, surface quality, board structure, profile design, gluing system, glue application quantity, etc., determine the subsequent quality of the postforming elements. EGGER Eurospan raw chipboards have proven themselves with their calm and even surface, as well as a homogeneous board structure. Particular care needs to be taken when using chipboards on a dense, solid middle layer; failure to do so may result in adhesion problems or "pressing through" of the middle layer.

根据轮廓执行情况，必须选择正确的芯板，也就是如果取决于轮廓的深度，可能需要使用中密度纤维板。使用胶合板和单板时必须特别小心。最重要的是板的含水率要低 (最大为 8%) 且不同的材料需要适当的养护 – 见 [储存与调节](#) 和 [切割](#)。由于胶层和木皮层间纤维排列的变化，这比刨花板或中密度纤维板更难铣削成型；铣削这些板材也会导致锯的不均匀磨损。切割时应顺着木皮表层纤维的方向进行。Correct core board selection must be observed already upon profile execution, i.e., depending on profile depth, the use of MDF boards may be necessary. Particular care must be taken when using plywood panels and veneer boards. A low timber moisture content of the boards ( $\leq 8\%$ ) as well as the conditioning of the different materials are particularly important – see chapters [Storage and conditioning](#) and [Cutting. Because](#) of the layers of glue and the changing arrangement of fibres between the layers of veneer, it is more difficult to mill a profile than it is with chipboards or MDF boards; milling these boards also results in uneven wear to the saws. Cutting should follow the direction of the fibres in the top layer of veneer.



## 铣削成型

### Profile milling

通常用于铣削芯板的刀具是硬质合金铣刀或金刚石铣刀。有多种因素决定了铣削的质量，包括进料速度、转速、切割次数和芯板的质量。通过使用金刚石砂磨盘或砂磨装置，可以提高铣削成型的质量（刀痕、突出的纤维毛刺等）。刀具的选择和设计应与刀具制造商讨论并达成一致。使用精度的刀具且分步铣削成型很重要且避免不完整的铣削；否则，在后成型阶段可能会很困难。加工小半径尤其需要极高的铣削精度。一旦铣削过程完成后，任何灰尘和松动的碎屑都应通过刷子、喷气或吸力装置去除也非常重要。

Carbide-tipped or diamond-tipped milling bits (for large series) are generally used for profiling the core boards. There are various factors that determine the milling quality, including feed rate, RPM, the number of cuts and the quality of the core board. The quality of profile milling (blade marks, protruding chips, etc.) can be improved by using diamond sanding disks or sanding units. The choice and design of tools should be discussed and agreed with a tool manufacturer. It is important for profiles to be milled with precision, and stepped cuts and incomplete milling should be avoided; there may otherwise be difficulties at the postforming stage. The creation of small radii in particular demands extreme milling precision. It is also important that any dust and loose chips are removed by brush, air jet or suction once the milling process is complete.

## 粘贴

### Bonding

除了[胶黏剂类型和粘贴](#)章节提到的针对表面粘贴给出的建议和胶黏剂类型外，对于后成型加工工艺仍然还有一定的限制。无论后成型过程如何，防火板的粘贴过程通常分两个阶段进行：

In addition to the recommendations and adhesives for surface bonding mentioned in the section [Adhesive type and bonding](#), certain restrictions apply to postforming. Irrespective of the postforming process, bonding of the laminate is generally carried out in two production stages:

- » 步骤 1: 将防火板粘贴到铣削成型的芯板层面上（正面和背面）  
Step 1: Bonding the surface of the laminate (front and back) on the profiled core board
- » 步骤 2: 在后成型加工过程中在铣削成型的轮廓区域（圆弧处）进行粘贴  
Step 2: Bonding in the profile area (rounding) within the postforming process

一般来说，粘贴表面的施胶量应不能渗出轮廓或表面，尤其是在使用缩合树脂胶黏剂（脲醛树脂）时。用于在铣削成型区域的胶黏剂是特殊的PVAc胶黏剂，具有快速的初始粘合力和凝固时间。这对调整防火板的回位力是必要的。

As a general rule the amount of adhesive applied for gluing a surface should be such that none oozes out into the profile or rounding, especially when using condensation resin (urea-formaldehyde resin). The adhesives used for gluing in the profile area are special PVAc adhesives with rapid initial adhesion and a quick setting time. This is necessary to "accommodate" the aligning forces of the laminate.

始终遵循相应胶黏剂制造商的说明。

Always follow the instructions of the respective adhesive manufacturer.

## 固定式后成型加工工艺

### Stationary postforming procedure

有相当多的固定式后成型方法，但在这里只对工业化生产中使用的接触式加热法作更详细的解释。它使前凸后成型部件能够以中小型批次生产。在正式的后成型（成形）开始之前，首先必须执行以下预准备生产步骤：

There is a considerable variety of stationary postforming procedures, but only the commercial process that uses contact heat is explained here in more detail. It allows the production of convex postforming elements in small and medium batch sizes. Before the actual postforming (forming) is started, first the following preparatory production steps must be performed:

- » 步骤 1: 将防火板粘贴到铣削成型的芯板层面上（正面和背面）  
Step 1: Bonding the surface of the laminate (front and back) on the profiled core board
- » 步骤 2: 铣平防火板背面和 / 或对芯板背面进行任何必要的铣削  
Step 2: Flush trimming the laminate on the rear and/or any necessary profiling on the rear of the core board
- » 步骤 3: 将特殊的PVAc（聚醋酸乙烯酯）粘合剂施加于突出的防火板面上和芯板的铣削成型区域  
Step 3: Applying special PVAc adhesive to protruding laminate and the profile area of the core board



在步骤 1 中，应注意确保根据芯板厚度和铣削成型设计，防火板必须突出芯板之外。这被称为一种防火板旗帜或防火板突出物 – 见图 29。后成型本身 – 防火板的重塑及与芯板的同步粘合 – 是通过使用平整的、加热的、加压的和可移动的金属板进行 – 见图 30-32。

During the first production step, it must be ensured that the laminate protrudes over the core material to the front in the necessary width according to the core board thickness and profile design. This is known as a laminate flag or laminate projection – see Figure 29. The postforming itself – the reshaping of the laminate and the simultaneous bonding with the core material – is carried out using a flat, heated, pressurised and movable metal bar – see Figures 30-32.



图 29: 防火板突出部分  
Figure 29: Laminate projection

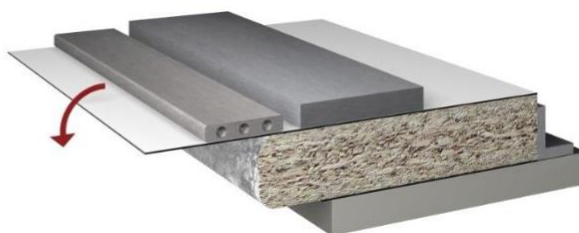


图 30: 拖过移动的金属板进行后成型  
Figure 30: Postforming by means of a movable metal rail



图 31: 防火板后成型  
Figure 31: Postforming the laminate



图 32: 防火板后成型  
Figure 32: Postforming the laminate



图 33: 后成型边部处理  
Figure 33: Finished postforming edge

加热金属板产生的接触热可将防火板加热到后成型所需的温度。爱格防火板所需的温度介于约 150°C 到 200°C 之间。温度可能受以下因素影响：

The contact heat from the heated metal bar has the effect of heating the laminate up to the required postforming temperature. The necessary temperature of EGGER Laminates lies in the range of approximately 150 °C to 200 °C. The temperature may be influenced by the following factors:

- » 防火板厚度和花色 Laminate thickness and decor
- » 在后成型区域内胶黏剂类型和质量 Adhesive type and quantity in the postforming area
- » 成型变化率 Deformation rate

因此，借助温度传感器，精确控制后成型区域的防火板温度非常重要。一旦达到后成型温度后，保持恒定压力的金属板会自动遵循后成型元件上的铣削轮廓，从而将防火板与芯板接合。可以控制后成型过程中运动序列的速度，从而可以调整温度。如果超过最佳温度，则结果可能会导致防火板的分层（起泡）；另一方面，如果温度过低，则可能的结果是形成裂纹（断裂）。

Precisely controlling the laminate temperature in the postforming area with the help of a temperature sensor is therefore very important. Once the postforming temperature has been achieved, the metal bar, remaining under constant pressure, automatically follows the outline of the profile on the postforming element, thus joining the laminate to the core board. The speed of the sequence of movements in the postforming process can be controlled, thus enabling the temperature to be adjusted. If the optimum temperature is exceeded, the result may be delamination of the laminate (blister formation); if, on the other hand, the temperature is too low, the likely result is that cracks (fractures) will form.

成型变化率主要取决于能量的多少和防火板厚度，但也取决于芯板的铣削轮廓。为了防止防火板变干和热量流失，防火板必须被尽快加热和后成型。爱格防火板最好在生产制造的方向上进行后成型；这可从背面砂磨痕迹的方向进行识别—[见胶黏剂类型及粘贴](#)。

The deformation rate essentially depends on the amount of energy and the laminate thickness, but also on the profiling of the core board. To prevent the laminate from drying out and heat from being lost, the laminate must be warmed through and postformed as quickly as possible. EGGER Laminates should preferably be postformed in the same direction as that in which they were fabricated, this can be recognised from the direction of the sanding marks on the reverse side – [see section Adhesive type and bonding](#).

### 连续操作式后成型工艺

#### Postforming in a continuous operation

连续操作式后成型工艺比上述描述的固定式的后成型工艺过程更经济。它要求大批量系列生产，不适合按件生产。此方法仅适用于生产凸形曲线。在这里，防火板成形的方向应该与其最初生产制造的方向相同。虽然原则上横向成形是可能的，但在后成型（最小半径）和零部件尺寸方面确实涉及到相当大的限制；此外，后成型加工工艺相当长且比较困难。取决于工厂的设计，必要的生产步骤通过分段和/或在线进行。这要求两个工厂的芯板的铣削成型（[参见铣削成型](#)）及防火板和芯板的粘合（[参见粘贴](#)）设计在实际后成型之前已完成。两中工艺都具有一定的优缺点。

Postforming in a continuous operation is more economical than the stationary postforming process described above. It requires the production of large series and is not suitable for item production/batch size 1. This method is only suitable for producing convex curves. Here, again, the laminate should be deformed in the same direction as that in which it was initially fabricated. Although transverse deformation is possible in principle, it does involve considerable limitations with regard to postformability (minimum radius) and the component dimensions; the postforming process is, moreover, considerably longer and more difficult. Depending on the design of the facility, the necessary production steps are carried out sectionally and/or continually. It is a requirement with both plant designs that the profile milling of the core material ([see section Profile milling](#)) and bonding of laminate and substrate ([see section Bonding](#)) take place before the actual postforming. Both concepts have their advantages and disadvantages.

以下是对爱格防火板模型系列 200 (也称为 L 构型) 采用连续操作式后成型加工工艺过程的示例：

In the following, the postforming process in a continuous operation using the EGGER model series 200 (also L-profile):

- » 芯板被铣削成型后，后成型元件 (也称被压贴件) 通过在上下两面施胶被压贴上放火板 – 见图 34。  
After the profile has been milled, the postforming element (also press part) is pressed by surface bonding of the laminate on the front and reverse side – [see Figure 34](#).
- » 在后成型系统的第一部分，被压件通过额外的铣削单元来达到其最终轮廓形状。通过所谓的 L 构型，只有防火板的背面被铣削的与芯板齐平，而防火板的正面被铣削以保留所需的突出部分 - 参见图 35。  
In the first section of the postforming system, the pressed part is progressed to its final profile shape by additional milling units. With the L-profiles, only the rear side of the laminate is milled flush with the core board and the front laminate is cut to the required projection – [see Figure 35](#).

- » 在第二部分，使用胶辊和/或喷嘴均匀地将特殊的 PVAc (聚醋酸乙烯酯) 胶黏剂施加到在芯板和防火板突出面处。为了确保现在和将来的良好粘合力，将胶水均匀地施加在两个表面是非常重要的 - 见图 36。  
In the second section, the special PVAc adhesive is applied evenly to the core board and the laminate flag using a glue roller and/or spray nozzles. To ensure an adhesion both now and in the future, it is extremely important the bond is applied evenly to both surfaces – see Figure 36.
- » 在第三部分中，已施加的特殊 PVAc (聚醋酸乙烯酯) 粘合剂被吹风，胶粘剂中所含的水分蒸发，从而激活它，使其成形。同时，防火板通过红外线加热器加热并为变形过程做好准备。这有时称之为"塑化" - 见图37。  
In the third section, the special PVAc adhesive that has been applied is aerated, the water contained in the adhesive evaporates, thus activating it for the deformation that is to follow. At the same time, the laminate is heated up by an infrared heater to prepare it for the deformation process. This is sometimes referred to as "plasticising" – see Figure 37.
- » 在第四部分中，变形过程发生。成型杆（又名折杆）被用于在轮廓的方向上轧制防火板。在杆后的压力区，使用成型辊和压力辊将防火板压制为最终形状，即成型辊和压力辊产生粘合所需的压缩力，并在短时间内将防火板与芯板粘合 - 参见图 38-41。  
In the fourth section, the deformation process itself takes place. The forming rod (also bending rod) is used to draw the laminate in the direction of the profile. In the pressure zone behind the rod, the laminate is changed to its final shape using profile and pressure rollers, i.e. the profile and pressure rollers generate the compression force required for adhesion and within a short time the laminate is bonded with the core board – see Figures 38-41.
- » 在第五部分中，对后成型元件进行最后重新加工。针对 L 构型加工，正面突出的防火板在元件的背面被磨平且根据需要进行纤维铣削。针对 U 型加工，应施加密封蜡和/或热熔性密封剂 - 参见图 42。  
In the fifth section, the final reworking of the postforming elements is carried out. With L-profiles, the projecting laminate on the front side is milled flush to the rear side of the element, and the fibre milling rebuffed as necessary. For U-profiles, a sealant and/or hot-melt sealant should be applied – see Figure 42.

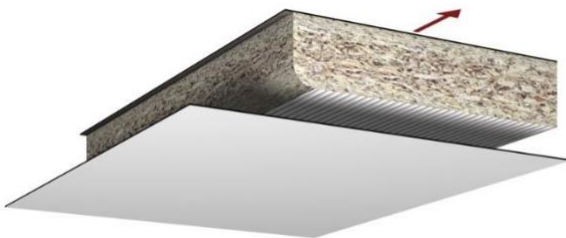


图 34: 将防火板粘贴到芯材上  
Figure 34: Bonding laminate to core material



图 35: 防火板突出部分  
Figure 35: Laminate projection

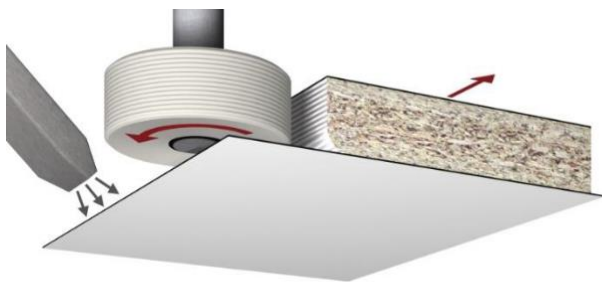


图 36: 边部施胶  
Figure 36: Gluing the edge

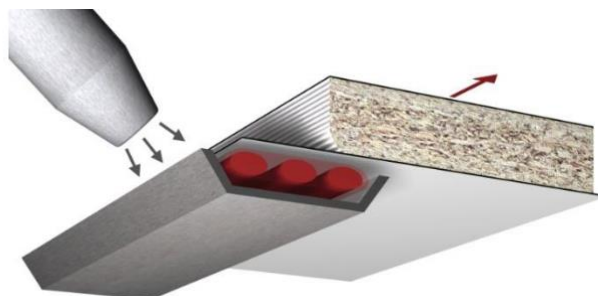


图 37: 加热防火板突出部分  
Figure 37: Heating the laminate projection

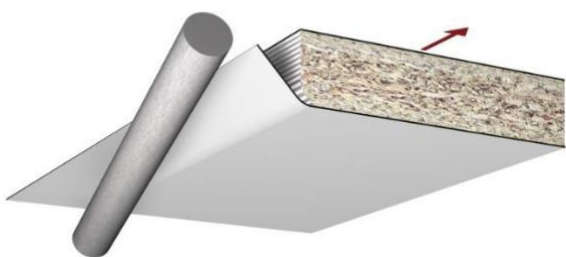


图 38: 防火板后成型  
Figure 38: Postforming the laminate

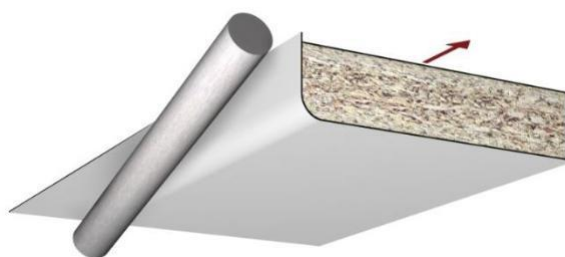


图 39: 防火板后成型  
Figure 39: Postforming the laminate

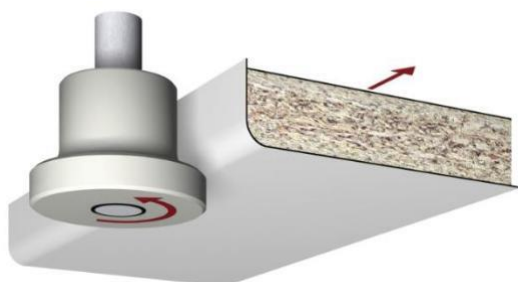


图 40: 压贴防火板到一定半径  
Figure 40: Pressing the laminate to the radius

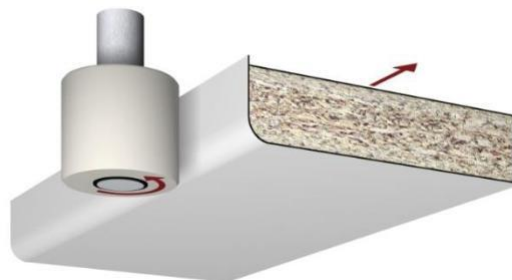


图 41: 压贴防火板到边部  
Figure 41: Pressing the laminate to the edge

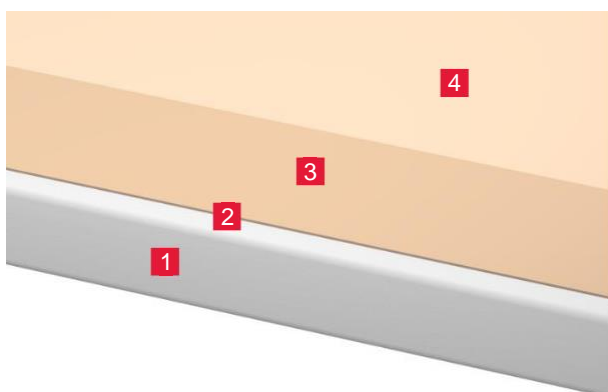


图 42: 爱格后成型台面底部  
Figure 42: Underside EGGER Postforming Worktops

- 1 后成型的边部 Postforming edge
- 2 模型 300/3 的密封胶 Model 300/3 sealing
- 3 UV 密封烤漆层 UV lacquer coating
- 4 平衡纸 Balancer



## 成形胶合 / 冷成型 Shape gluing / cold-forming

防火板的一个优点和加工选择是实现弯曲，即凹形或凸形的防火板贴面元件。防火板非常适合作为这些元素的装饰表层材料。爱格防火板的标称厚度为 0.80 mm；更薄的防火板，如 0.60 毫米，可以允许加工更小的半径。然而，这些异形零件需要特殊的芯材来满足这些要求。建议使用可弯曲的胶合板或开槽的中密度纤维板 - 见图 43 和图 44。可弯曲的胶合板是首选，因为与开槽的中密度纤维板相比，它们更容易封边，具有更高的握螺钉力。

One advantage and processing option of laminates is the implementation of curved, i.e. concave or convex, laminate bonded elements. EGGER Laminates are ideally suited as decorative coating material for these elements. Laminates with a nominal thickness of 0.80 mm are used as standard; thinner laminates, such as 0.60 mm, allow smaller radii. However, these shaped parts require special core materials that meet these requirements. The use of bendable plywood panels or alternatively slotted MDF boards is recommended – see Figures 43 and 44. Bendable plywood panels are preferred as they provide easier edging and higher screw pull-out strength compared to slotted MDF boards.

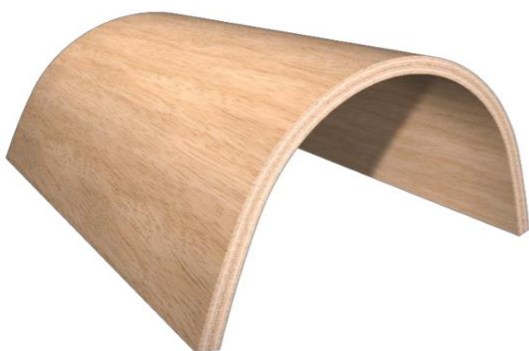


图 43: 可弯曲的胶合板  
Figure 43: Bendable plywood



图 44: 开槽的中密度板  
Figure 44: Slotted MDF core board

防火板的冷成型和完美粘合只能通过与模具结合来实现 — 见图 45。模具具有一定的形状且被用于常见的制造过程中，例如，人工夹具，卡箍，单板压机或通过特殊的真空压机。使用合适的模具，甚至可以制作更复杂的形状，如钢琴盖 — 参见图 46。

Cold-forming and perfect bonding of the laminate can only be achieved in combination with templates – see Figure 45. The templates are shaping and are used in the usual manufacturing processes, e.g. manually by clamps, ferrules, veneer presses or by means of special vacuum presses. With an appropriate template, even more complex shapes such as a piano lid are possible – see Figure 46.

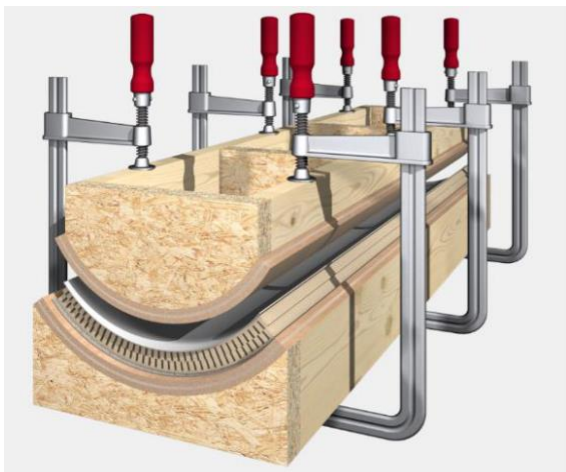


图 45: 使用模具粘贴具有一定形状的部件  
Figure 45: Gluing a shaped part using a template

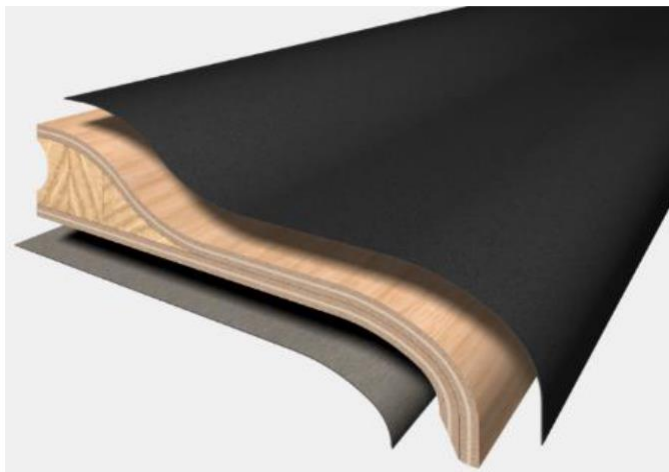


图 46: 带有防火板贴面的可弯曲胶合板  
Figure 46: Bendable plywood with laminate



胶黏剂和胶水的选择需要特别关注，即成型部件的尺寸以及必要的工艺步骤所需的时间必须考虑在内。例如，一个重要的标准是胶黏剂的固化时间必须要与单个胶合板层被粘合的时间相匹配。这些单独的胶合板层与在正面和反面放置的防火板一起被放置在模具中，然后施压。

The choice of adhesive and glue requires special consideration, i.e. the size of the shaped part as well as the time for the necessary process steps must be taken into account. An important criterion is, for example, the processing time of the adhesive, which must be matched to the individual plywood layers to be glued. These individual plywood layers are placed in the template together with the laminates for the front and reverse side and then pressed.

对于成型部件必须要考虑对称结构，即必须使用相同标称厚度的防火板平衡纸 - 见章节[对称结构和压贴](#)。

A symmetrical construction must also be ensured for shaped parts, i.e. a laminate balancer of the same nominal thickness must be used – see section [symmetrical construction and pressing](#).

在经典的后成型工艺中，防火板被暴露在高温下短暂加热。在此过程中，常见的是平行于制造方向的成形并且对 P 型防火板的可能半径进行了规范定义。在成型部件的生产中，防火板是使用模具和压力进行的冷成型。这种冷成型没有标准规范，即防火板的最小半径取决于各种标准：

In the classic postforming process, the laminate is briefly heated with exposure to high heat. In this process, deformation parallel to the direction of manufacture is common and the possible radii are normatively defined for type P laminates.

In the production of shaped parts, the laminate is cold-formed using a template and pressure. There are no normative specifications for this cold-forming, i.e. the minimum radius of the laminate depends on various criteria:

» **防火板类型 Laminate type**

P 型防火板有利于加工成小半径。S 型防火板等级 (例如面芯同色板) 需要加工成更大的半径。

A laminate type P is advantageous for small radii. Laminate grades of type S (e.g. laminates with coloured core) require larger radii.

» **防火板寿命 Age of the laminate**

防火板在生产后立即具有较高的柔韧性。防火板的硬化过程受储存条件的影响。经验法则: 生产后 6 个月内是最理想的后成型加工产品。生产日期印在防火板背面。

Laminates are more flexible immediately after manufacture. Laminates harden and the process is influenced by storage conditions. Rule of thumb: up to 6 months after manufacture is ideal. The date of manufacture is printed on the reverse side.

» **防火板贴合 Laminate insert**

冷成型的后成型加工在垂直于制造方向比平行于制造方向更容易 — 见图 48 和图 49。从背面打磨情况可以看出防火板的制造方向 — 见图 47。

Post-forming transverse to the direction of manufacture is easier with cold-forming than parallel to the manufacturing direction – see Figures 48 & 49. The manufacturing direction of the laminate can be seen from the reverse side sanding – see Figure 47.

» **部件尺寸 Size of component**

必要的工艺步骤使较小的部件更容易处理。

The necessary process steps make smaller components easier to handle.

» **生产能力和制造经验 Production possibilities and fabricator experience**

由于这些影响标准，建议在批量生产前进行适当的初步测试。

Due to these influencing criteria, it is recommended to carry out appropriate preliminary tests before series production.



图 47: 制造方向  
Figure 47: Manufacturing direction

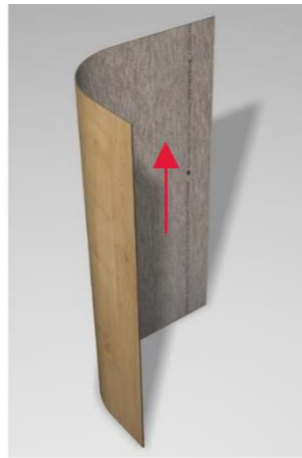


图 48: 平行于制造方向  
Figure 48: Parallel mfg. direction

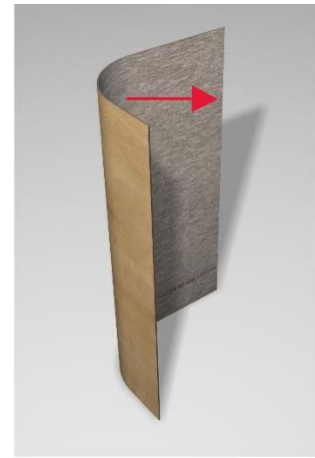


图 49: 垂直于制造方向  
Figure 49: Transverse mfg. direction

如果预制成型部件随后会与防火板粘合，例如借助接触型胶黏剂，则必须注意确保均匀的表面压力。重要的是要确保均匀的粘合，而不是选择性的施力，否则可能会在成型部件上发生错误的粘合。由于加工误差无法纠正，对于成型部件，只能在有限的范围内推荐使用接触型胶黏剂。

If prefabricated shaped parts are subsequently bonded with laminate, e.g. with the help of contact adhesives, then care must be taken to ensure uniform surface pressure. It is important to ensure uniform adhesion and not selective pressure, as otherwise faulty bonding could occur in the shaped part. The use of contact adhesives for shaped parts can only be recommended to a limited extent because processing errors cannot be corrected.

针对特殊的成型部件和/或批量型生产部件，有些公司专门生产曲面和圆形成型部件，可以实现几乎所有的应用。

For special shaped parts and/or series production, there are companies that specialise in curved and rounded shaped parts and can realise almost all applications.

以下是用于特殊成型元件和/或批量生产元件的联系公司示例:

The following is an example of a contact for special shaped elements and/or series production:

- » **Holz in Form Niedermeier GmbH**  
Schloßstraße 65  
D - 84163 Marklkofen / Warth  
  
Phone: +49 8734 937550  
E-mail: [info@holz-in-form.de](mailto:info@holz-in-form.de)  
Website: [www.holz-in-form.de](http://www.holz-in-form.de)

## 上漆 Lacquering

后续喷漆，建议使用上漆级/粘合级爱格防火板。有了此防火板等级，未经打磨的彩色正面(黑色或白色)可以上漆或粘合。背面砂光(作为标准)且可以用市售胶黏剂粘合。

For subsequent lacquering, it is recommended to use EGGER Laminates Painting Grade / Bonding Grade. With this laminate grade, the unsanded coloured front side (black or white) can be lacquered or also glued. The reverse side is sanded (as standard) and can be bonded with commercially available adhesives.

一个应用示例是门元件的涂层，随后涂成个性的颜色 - 参见图 50。

An application example is the coating of door elements that are subsequently painted in individual colours – see Figure 50.

对于例如门元件的涂层，门行业使用的防火板公称厚度为 0.15 mm。

For the coating of e.g. door elements, the door industry uses the laminate nominal thickness of 0.15 mm.



图 50: 使用上漆级/粘合级爱格防火板进行上漆的门

Figure 50: Painting a door with EGGER Laminates Painting Grade / Bonding Grade

对于正面上漆，建议使用 240-280 粒度的“清洁砂”砂磨表面以确保表面没有残留物。由于各种各样的底漆和清漆系统，需要进行初步预测试。

For lacquering the front side, a "cleaning sanding" with grain 240-280 is always recommended to ensure that there is no residue on the surface. Due to the wide variety of primer and varnish systems, preliminary tests are also urgently required here.

任何情况下，都应该遵守各油漆生产厂家的加工说明。

In any case, observe the processing instructions of the respective lacquer manufacturer.

## 阻燃层 Flame retardant coating

防火板是具有中等至高应力的水平和垂直表面以及弯曲或圆形元件的理想解决方案。爱格阻燃级防火板用于阻燃级复合防火板贴面板的生产。阻燃级防火板适合与阻燃芯板配合使用，作为装饰面料和阻燃层料。与相应复合元件的组合可满足对耐火方面有更高要求的应用区域。满足德国建材等级 B1 和法国耐火等级 M1 的要求。

Laminates are the ideal solution for horizontal and vertical surfaces with medium to high stress, as well as for curved or rounded elements. EGGER Laminates Flammex Flame Retardant are offered for the production of flame retardant laminate bonded boards. Laminates Flammex are suitable as decorative and flame retardant coating material in combination with flame retardant core boards. Combinations with corresponding composite elements enable applications with increased requirements for fire resistance. They meet the requirements of the German building material class B1 and the French fire resistance class M1.

“A2-s1, 10” 型不燃产品，可从以下制造商处购买具有爱格饰面产品系列的花色：  
Non-combustible products of the "A2-s1, d0" variant can be purchased in the decors of the EGGER Decorative Collection from the following manufacturers:

» **Eurodeco Wallsystem GmbH**  
Ramsried 20  
D - 93444 Bad Kötzing

Phone: +49 9941 908850  
E-mail: [info@eurodeco-wallsystem.de](mailto:info@eurodeco-wallsystem.de)  
Website: [www.eurodeco-wallsystem.de](http://www.eurodeco-wallsystem.de)

**Ed. Heckwerth Nachf. GmbH & CO. KG**  
Siemensstraße 13  
D - 32120 Hiddenhausen

Phone: +49 5223 987-0  
E-mail: [info@heckwerth.de](mailto:info@heckwerth.de)  
Website: [www.heckwerth.de](http://www.heckwerth.de)

## 护墙板 Wall cladding

由于其日常使用中的坚固性和适用性，爱格防火板贴面特别适合于室内墙板的应用。我们建议此种应用的板厚最小为 16 毫米。在附加复合元件之前，墙面应完全干燥。应确保墙板背面足够的空气流通且板能充分适应当前的环境。材料不应暴露在滞留的水分中。所有要连接在一起的板材必须遵循相同的生产方向。

Thanks to their robustness and suitability for everyday use, laminate bonded boards are particularly well suited for use as interior wall cladding. We recommend a minimum board thickness of 16 mm for such applications. The substrate (wall surface) should be completely dry before attaching the composite element. Always ensure sufficient rear ventilation or acclimatisation of the boards. The material may not be exposed to trapped moisture. All parts to be joined together must follow the same production direction.

### 底层结构和背面通风

#### Substructure and rear ventilation

防火板贴面板应固定在坚固、耐腐蚀和紧固连接的底层结构上，以安全地支撑墙板的重量并确保墙板后时刻通风 – 见图 51。在干式施工应用中，底层结构的附件和防火板贴面板必须固定到木钉框架上。

Laminate bonded boards must be attached to a stable, corrosion-resistant and force-fit substructure that securely supports the weight of the wall cladding and ensures ventilation behind the elements – see Figure 51. In dry construction applications, the attachment of the substructure and the laminate bonded board must be anchored to the stud framing.

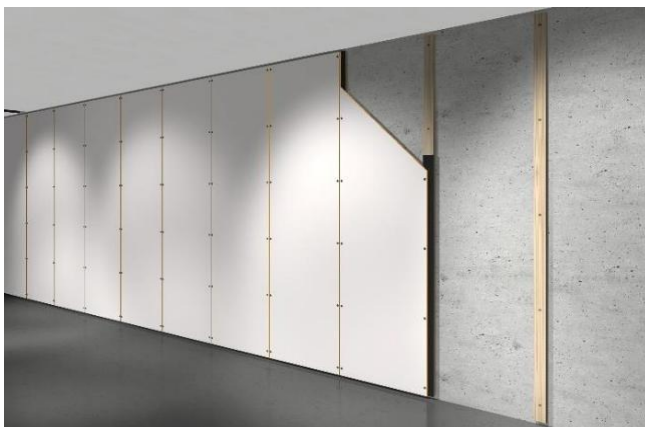


图 51: 防火板贴面板作为护墙板基层结构  
Figure 51: Substructure for wall cladding with laminate bonded boards

紧固件的选择必须根据底层结构和墙板的重量进行调整。元件前后不同的环境条件会导致翘曲。因此，防火板贴面板墙板的安装必须始终为板后部提供足够的通风，从而使温度和湿度平衡。通风装置必须朝向房间一侧。

The selection of the fasteners has to be tailored to the substructure and the weight of the wall cladding. Different climate conditions in front of and behind the elements can lead to warpage. It is therefore essential that wall cladding with laminate bonded boards always makes provision for adequate ventilation to the rear of the boards, which allows temperature and humidity to equalise. Ventilation must be towards the room side.

如果无背面通风或背面通风间隙小于 2cm，墙体或灰泥等吸水性矿物基材必须通过防水涂料、弹性阻隔面料进行预处理。这些隔层通常是被上漆的，可以防止水渗透到砖石中，在潮湿的房间中应用该过程是必不可少的。

If there is no rear ventilation or a rear ventilation gap < 2 cm, absorbent mineral substrates, such as walls or plaster, must be pre-treated with waterproof, elastic barriers. These barriers are generally painted on and prevent water from penetrating into the masonry, which is essential for an application in humid conditions.

垂直框架通常允许空气流通。当底层结构水平布置时，应采用适当的结构确保提供足够的通风。底层结构应尽量垂直以使整个面板表面无应力。

Vertical battens generally permit air circulation. Where substructures are arranged horizontally, an appropriate construction must ensure that adequate ventilation is provided. The substructure should be vertically plumb to allow tension-free mounting across the entire surface.

合适的底层结构包括垂直的木条，铝架或人造板材料。

Suitable substructures include vertical strips of wood, aluminium or wood-based materials.

板条或底层结构的最大间距取决于所选的复合元件的厚度。重要的是要确保进风口和出风口畅通无阻，以免空气流通受到阻碍。还要确保底部结构板表面的含水率与待装饰墙板的含水率没有显著差异。将防火板贴面板安装到底层结构上可以采用机械或胶合两种方式。

The maximum spacing of the battens or the substructure depends on the composite element thickness used. It is important to ensure that air inlet and outlet areas remain unobstructed so that air circulation is not impeded. Also ensure that the moisture of the surface to be panelled does not differ significantly from the moisture of the finished component. The mount of the laminate bonded boards to the substructure can be mechanical or glued.

### 机械式安装

#### Mechanical mount

固定是通过螺钉或铆钉在底层结构上完成的。必须充分考虑足够的膨胀间隙和浮点和定点的正确定位。当使用木材作为基层结构时，必须使用 EPDM（三元乙丙橡胶）带进行解耦。

Mounting is done via screws or rivets on the substructure. A sufficient expansion play and the right positioning of floating and fixed points must be taken into account. An EPDM tape (ethylene propylene diene rubber) must be used for decoupling when using wood as substructure.

通过悬浮式隐形固定的防火板贴面板可以直接拆卸，比可见的固定方法更美观。拆卸这些板子既快捷又简单。很容易在安装部件后面安装电缆和管道。根据所选择的固定系统，另一个优点是元件可以在以后进行调整。可实现部件的无应力安装。对于所有涉及悬挂的安装方法，必须留有足够的空间来升高和降低部件。这个间距或“悬挂间隙”将作为阴影缝隙保持可见。

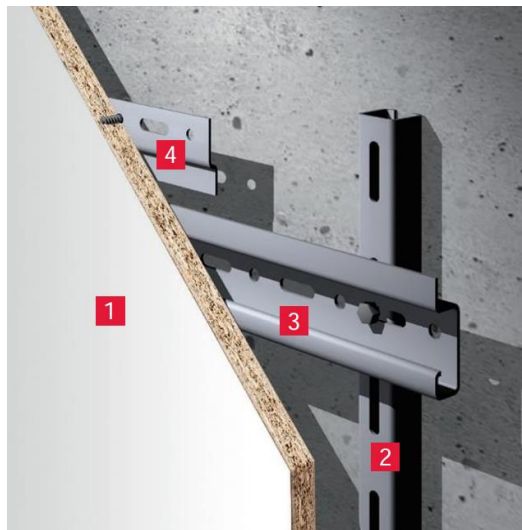
The concealed mount of laminate bonded boards by hanging permits straightforward disassembly and appears more visually appealing in comparison to visible mounting methods. Removing the boards is quick and simple. Cables and pipework installed behind the elements are easy to reach. Depending on the chosen mounting system, another advantage is that the elements can be adjusted later on. Tension-free mounting of the elements is also possible. For all mounting methods that involve hanging, sufficient space must be allowed to raise and lower the elements. This air space or "hanging space" remains visible as a shadow gap.

如果采用扣条进行安装，在水平底层结构中切割槽以扣住附着在防火板贴面板上的缩缘导轨。为了便于安装，缩缘导轨上的榫舌应比槽薄。防火板贴面板元件上的缩缘导轨不应超过槽元件的整个宽度，缩缘导轨应是间歇性的，以允许垂直方向空气流通。可以使用现成的胶合板或金属 z 型型材制成的缩缘导轨。如果薄型复合板不能通过螺钉实现安全安装连接，也可以额外施胶固定。

If profile strips are used, the horizontal substructure is grooved to accommodate the rebate rail attached to the laminate bonded board. For ease of fitting, the tongue of the rebate rail should be thinner than the groove. The rebate rails on the composite elements should not extend across the full width of the elements, they should be intermittent to permit vertical air circulation. Rebate rails made of plywood or metal Z-profiles can be readily used. If a secure screw joint cannot be achieved with thin composite boards, additional gluing is also possible.



还可以使用金属五金件系统作为隐形机械安装系统来安装墙板部件 - 见图 52。选择的系统必须根据制造商的建议来使用，以确保安全安装。  
Alternatively, systems with metal mountings are also offered for non-visible mechanical mounting – see Figure 52. The chosen system must be used according to the manufacturer's recommendations to ensure secure installation.



- 1 防火板贴面板 laminate bonded board
- 2 垂直底层结构 vertical substructure
- 3 可悬挂安装的水平底层结构 horizontal substructure with mounting for suspension
- 4 具有隐形螺钉连接的金属连接件 non-visible screw connection of the metal fitting

图 52: 带金属配件的底层结构系统  
Figure 52: Substructure system with metal fittings

**Glued mount**

防火板贴面板也可以通过使用胶黏剂系统粘贴到坚固的底层结构上 – 见图 53。当使用木板作为底层结构时，有必要使用底涂剂作为第一步，以确保牢固的附着力和隔离潮气。

Laminate bonded boards can also be fixed by bonding using an adhesive system on a force-fitted substructure – see Figure 53. When using wood as a substructure, it is necessary to apply a primer as a preliminary step to ensure secure adhesion and moisture decoupling.

任何情况下，都应该遵守各胶黏剂生产厂家的加工说明。  
In any case, observe the processing instructions of the respective adhesive manufacturer.



- 1 防火板贴面板 laminate bonded board
- 2 底层结构 substructure
- 3 胶黏剂 adhesive
- 4 双面胶带 double-sided adhesive tape

图 53: 粘贴在复合防火板的底层结构上  
Figure 53: Bonding to a substructure made of compact laminate

## 护理与清洁指南

### Care and cleaning recommendation

由于爱格防火板表面具有耐受性，卫生以及致密特性，所以不需要任何特殊的护理。一般来说，防火板表面很容易进行清洁。这同样适用于带有表面纹理的防火板产品。不能使用含有任何研磨性成分的清洗剂，因为此种清洁剂会对产品表面的光泽度产生不利的影响和/或划伤产品表面。

Due to their resistant, hygienic and dense surface, EGGER Laminates do not require any special form of care. Generally, the surfaces are easy to clean. This also applies to textured surfaces. Do not use sanitary cleaners or detergents with abrasive components, as using such cleaners may lead to changes in the degree of gloss and/or scratch the material.

详细信息，请参考技术信息单页[爱格产品表面清洁和使用指南](#)。

For detailed information, please refer to the technical data sheet [Cleaning and usage recommendations for EGGER product surfaces](#).

## 补充文件 / 产品信息

### Additional documents / product information

如果有更多关于加工方面的问题，请联系以下人员：

If you have any questions regarding processing, please get in touch with our contact persons:

- |                                |   |
|--------------------------------|---|
| » 防火板<br>Laminates:            | 应用技术 - 吉夫霍恩工厂<br>Application technology Gifhorn plant   |
| » 超大规模 XL 防火板<br>Laminates XL: | 应用技术 - 圣约翰工厂<br>Application technology St. Johann plant |

请从以下文件中获取更多信息：

You will find further information in the following documents:

- » 加工指南 “爱格超薄防火板”  
Processing instructions “EGGER Laminates Micro”
- » 技术数据表 “爱格防火板平衡纸”  
Technical data sheet “EGGER Laminates Balancer”
- » 技术数据表 “爱格防火板 – 含保护膜”  
Technical data sheet “EGGER Laminates with protective film”
- » 技术数据表 “爱格防火板 – 白板用”  
Technical data sheet “EGGER Laminates for whiteboard use”
- » 技术数据表 “爱格防火板 – 耐化学试剂”  
Technical data sheet “EGGER Laminate resistance to chemicals”
- » 技术数据表 “爱格防火板清洁与护理建议”  
Technical data sheet “Cleaning and usage recommendations for EGGER product surfaces”
- » 技术数据表 “爱格防火板”  
Technical data sheet “EGGER Laminates”

#### 临时说明

#### Provisional note:

本技术数据表为我们最大所知精心编写。数据依据实践经验和室内测试并符合我们目前的知识水平。该文件仅供参考，不作为产品特性或特殊用途适用性的担保。我们对任何错误、标准中的错误或印刷错误概不承担任何责任。另外，由于爱格防火板产品的持续开发、相关产品标准以及法律文件的变更更可能会产生技术层面的修改。因此，该文件内容不应被视为使用说明或法律约束文件。适用于我们的一般条款和条件。

These processing instructions were prepared based on the best available information and with due diligence. The information provided is based on practical experience and in-house testing and reflects our current level of knowledge. It is intended for information only and does not constitute a guarantee in terms of product properties or suitability for specific applications. We accept no liability for any mistakes, errors in standards, or printing errors. In addition, technical changes may result from the further development of EGGER Laminates, as well as changes to standards and public law documents. Therefore, the content of these processing instructions cannot serve as instructions for use nor as a legally binding agreement. Our General Terms and Conditions of Sale and Delivery apply.

