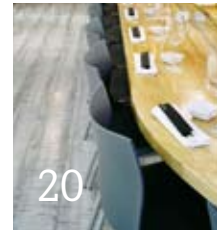
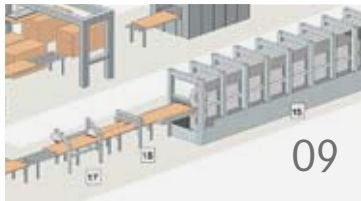


**PFLEIDERER**  
AKTIENGESELLSCHAFT

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# WELCOME TO THE WORLD OF PFLEIDERER!

**Feel free to take a look around: the shelf from which you pluck a book, the worktop on which your computer stands, the floor on which you walk. You can see our products everywhere you look.**

Pfleiderer is one of the worldwide leading manufacturers of engineered wood, surface finished products and laminate flooring. But what exactly do these terms mean? Accompany us on a journey through the world of Pfleiderer and meet our products closeup. We will show you, for example, the manufacturing processes involved in coatings and laminate flooring, and explain the difference between particleboard and medium-density fiberboard.

## **WORKING WITH A REGENERATIVE RAW MATERIAL**

For all the differences between our products, they still always have one thing in common:

we work with a regenerative raw material – and are always acutely aware of our responsibilities associated with this. In manufacturing our products, we use wood from sustained forestry sources or recycling in the form of sawmill by-products or natural used wood, for example. The suppliers of these types of wood are mainly owners of forest plantations and sawmills. We never use tropical woods.

We reduce the environmental effects of our work with wood that arise during the production process to a responsible and absolute minimum. Along with quality and safety, we regard the environment as a firm component of our corporate philosophy. For this reason, we have specified guiding principles for these areas which commit us to active involvement. In this way, we contribute towards preserving forests and achieving an improved ecological balance.

## HOW PARTICLEBOARD IS PRODUCED

Regardless of how our suppliers deliver wood to us – at the end of the manufacturing process, a versatile particleboard is ready for use in furniture construction or interior design.



### **CHIPPING**

Large, small, thick or thin: most of the wood used by the Pfleiderer Group for particleboard production comes from sawmill by-products. They arrive at our plants in variously sized lots (see picture). During the process of chipping, the first step involves a machine molding the wood into the desired shape. But even after this process, chips still display various sizes: smaller parts land in the top layer of the board while larger bits go into the core.



### **DRYING AND SORTING**

The chips must not be damp for the next steps involved in the manufacturing process. For this reason, drum-type dryers extract moisture from the wood (see picture). This is followed by the sifting process where rough and fine chips are separated; sorting plants then remove any sand or metal particles.

**WHAT IS PARTICLEBOARD?**

Particleboard comprises wood chips and glue. The areas of furniture design and interior design are now inconceivable without particleboard as a base and construction material. It can be used in a wide variety of applications – one important reason why particleboard has developed to become the most important wooden material in terms of volume.

**PARTICLEBOARD AT PFLEIDERER:**

- Business Unit Kunz
- Pfleiderer Grajewo
- Pfleiderer Industry
- Pfleiderer OOO Russia
- Uniboard
- wodogo

**PRESSING**

Glue is added to the chips. The materials are mixed and form a so-called “chip cake”. And like a real cake, the chip cake also needs to be heated well. At 250°C and under high pressure, a press ensures the required composition (see picture). The panels are then allowed to cool in large star coolers.

**CUTTING AND PACKING**

A machine smoothens the surfaces and sands them to the exact desired board thickness. The customer specifies the requisite size and a saw cuts them to the right length. All that remains is for the boards to be packaged and then they're ready for delivery and further processing – perhaps as shelves, as floor panels or as kitchen cabinet fronts.

## PARTICLEBOARD AS A UNIVERSAL TALENT

On the wall, floor or as shelving: hardly any other building material is as versatile and flexible as particleboard. In the world of Pfleiderer, we show you just how different the production and areas of application of particleboard can be.



### **RAW PARTICLEBOARD**

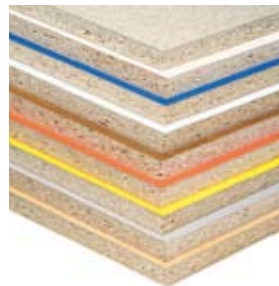
Raw particleboard is regarded as an all-round talent among base and construction materials and is therefore also used in the area of interior design (for example paneling walls and ceilings). The boards are easy to process and are also available in spe-

cial formats and thicknesses where required.

### **MELAMINE-FACED PARTICLEBOARD**

Particleboard is also available in a variety of different colors: if a particleboard is coated using decorative paper previously dipped in melamine resin, it is referred to as melamine-faced particleboard. When subjected to pressure and heat, the melamine film is directly combined with the board in a short-cycle press, thus forming a load-bearing synthetic

surface. The furniture industry uses melamine-faced particleboard in applications that are not subject to excessively heavy loads such as kitchen cabinet fronts or shelving, for example.





### FLOOR PANELS

Floor panels usually let themselves be walked all over. Because raw particleboard featuring tongue and groove joints often serve as bases for carpets or other flooring materials. Gluing the tongue and groove connection provides a practically joint-free surface upon which flooring materials can be laid without further preparation. Floor panels are also suitable for paneling or reinforcing walls, ceilings and roof areas.

### MULTI-FUNCTIONAL PANELS

As the name suggests, multi-functional panels (MFP) are true all-rounders in the area of wooden construction. The panels comprise consistently long and slim-pressed chips which are scattered randomly and glued using high-quality melamine-reinforced urea resins. Thanks to high strength in longitudinal and horizontal directions as well as the high moisture resistance offered by these panels, they are extremely stable and capable of bearing high loads. They are therefore particularly suitable as construction materials in the field of trade-fair construction and interior design.



### PYROEX

Wood burns well. And this is exactly why the Pfleiderer Group has developed a type of particleboard which does not burn as fast. The Pyroex panels are low-flammable engineered wood products and combine all of the advantages of particleboard such as high strength and multiple decorative coating possibilities providing additional safety in the event of a fire. The primary area of application of Pyroex panels includes interior cladding of rooms in public buildings as well as rooms with a higher fire risk, e.g. laboratories, petrol station retail outlets or television studios.

## WOOD FROM THE PRESSURE COOKER

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Medium-density and high-density fiberboard differs from particleboard by its particularly smooth surface. The reason for this is easy to find by taking a look at the production process.

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The production of medium-density and high-density fiberboard essentially corresponds to that of particleboard – with one decisive difference: the wood is not milled to chips and then subjected to further processing but rather ground down to the wood fibers. Then chips are added in a type of oversized pressure cooker which softens the wood. This enables the refiner, which forms the next step of the manufacturing process, to easily separate the wooden chips down to the fibers.

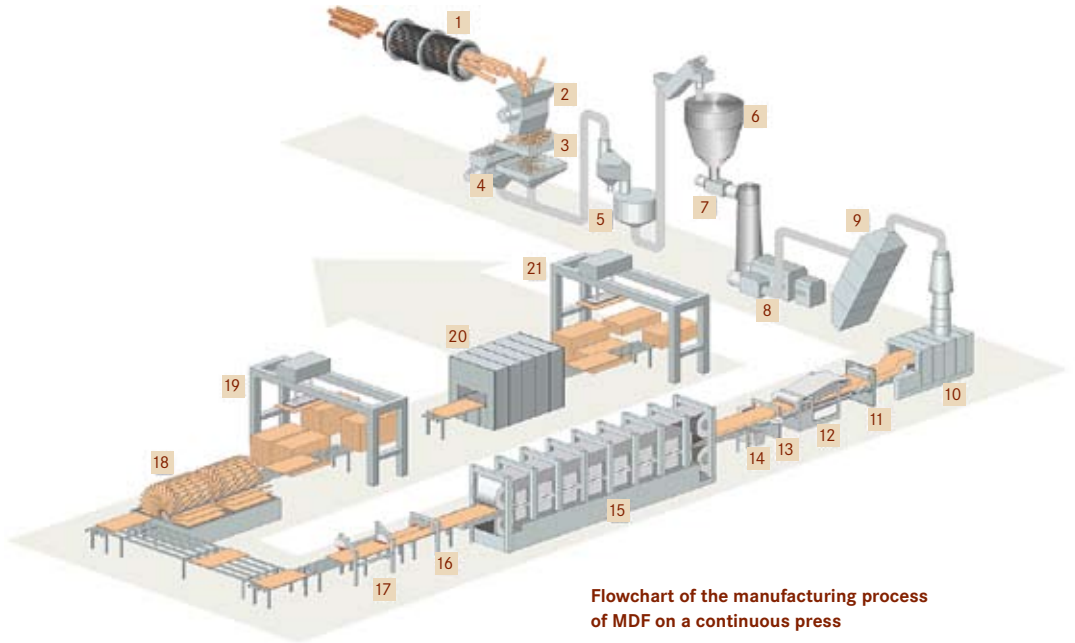
### **PREPARED FOR THE TWIN PRESSES**

Like in the manufacturing process for particleboard, the wood fibers are then dried and glued, sorted and spread. The mass is directed into a cold pre-press in order to be molded into the desired thickness. This step serves as

preparation for the twin presses which compress the wood-glue mixture at high temperatures. In the case of high-density fiberboard, more wood is used during the pressing process with the result that higher densities are achieved than for medium-density fiberboard.

### **COOL DOWN**

The boards can then be trimmed, after which they are fed into the star cooler to cool down followed by a period of one to three days in the conditioning store. A sanding machine provides the panels with their final smoothness before they are packaged and dispatched.



- 1 debarker
- 2 wood-hog
- 3 disk refiner
- 4 pulper for large chips
- 5 washer
- 6 chip silo

- 7 preheater
- 8 defibrator
- 9 screener
- 10 mat former
- 11 metal detector with upstream permanent magnets
- 12 cold prepress
- 13 exhaust
- 14 reject separation
- 15 double band press
- 16 edge trimming saw
- 17 crosscut saw
- 18 starcooler
- 19 conditioning store
- 20 sander
- 21 sorting stacker

## PLATFORM FOR CREATIVE IDEAS

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With its elegant appearance, optimum density distribution and smooth surface, medium-density fiberboard sets new trends in the area of interior design.

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An MDF board is the perfect toy for creative interior designers: the fine surface structure is ideal for a wide variety of design options and essentially makes MDF an attractive board. Thanks to the extremely fine surface, the coating appears consistent, of high quality and lends the decorative appearance even more expressive power.

But even without a decorative surface, a simple MDF board can come across as elegant and attractive. In the world of Pfleiderer, this future-oriented design element is also available in the variant MDF black. The black dyed-through material communicates an ele-

gant impression both in terms of feel and visual appearance. But their surface structure is not the only reason MDF boards have developed to become one of the most popular engineered wood around.

With the Pfleiderer MDF flex product variant, curved, circular and wave-shaped design constructions do not present a problem and require only minimum effort in terms of production and further processing. The decisive advantage of this extraordinary engineered wood product: thanks to the particularly small bending radius, even circular models have a graceful effect.



### **GLUE HOLDS THE WORLD OF PFLEIDERER TOGETHER.**

The quality of the resin essentially determines the stability and strength of the boards. Our Polish subsidiary Silekol supplies all of our Eastern European plants and some of our Western European ones with glue.

We usually use a mixture of urea, melamine and formaldehyde in our production. Formaldehyde is a chemical compound which is contained in natural wood and plays a key role as a binding agent in many industrial areas. There are limits for formaldehyde emissions which are monitored constantly by independent test institutes and to which the Pfleiderer Group is also strictly committed. In Germany, for example, the E1 standard (to DIN EN 13986) applies for all boards. E1 means that the value of formaldehyde emissions may not exceed 0.1 ppm\* (statutory-defined maximum value).

\*1 ppm means one "part per million". Accordingly, particleboard may emit a maximum of 1000th particle of formaldehyde per cubic meter of air.

#### **WHAT IS MDF?**

If you run your hand along the surface of particleboard and then over medium-density fiberboard (MDF), you will immediately notice the difference between the two wooden materials. The particleboard is somewhat rough to the touch while the MDF is completely smooth. Instead of wood chips as used in particleboard, wood fibers are used in the production of MDF. This makes the board very homogeneous, giving it a consistent structure and a very smooth surface. MDF is also heavier than particleboard as it has a higher density. As a result of these material properties, MDF is particularly suitable for three-dimensional furniture fronts as well as for painted or high-gloss surfaces.

#### **WHAT IS HDF?**

Like MDF, high-density fiberboard (HDF) also comprises compressed wood fibers and glue joined under pressure and heat. However, HDF is even denser than MDF, i.e. it is compressed under higher pressure: this makes it harder and therefore more durable. But the board itself is comparably thin. For this reason, HDF is used where the material is subject to high loads while material thickness should be as low as possible. HDF often serves as base panel for laminate flooring, for example.

#### **MDF AND HDF IN THE WORLD OF PFLEIDERER:**

- Business Unit Kunz
- Thermopal
- Pfleiderer Grajewo
- Uniboard
- Pfleiderer Industry
- wodego

# TASTE IS MANY-SIDED – LIKE OUR DECORATIVE SURFACES

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High pressure laminate is a real quick-change artist: First it presents itself in the appearance of cool stone then as an absolutely natural wood structure. How does that work?

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## **IMPREGNATION**

The core paper serves as the main core of the laminate, while the decor paper determines the design of the High Pressure Laminate (HPL) that will later be produced. In a continuous process, the paper is passed through a resin bath into the drying channel and then cut into individual sheets.

## **CORE AND DECOR LAYING ROOM**

Depending on the desired thickness of the laminate, the required number of core paper sheets is now laid up together. A transparent, impregnated paper sheet (overlay) is placed on top of the decor paper. Finally, a textured steel plate determines the feel and appearance of the HPL surface texture.

## **HPL PRESS**

Now the prepared core and decor impregnated papers come together for the first time, are laid up together and inserted into the press, where through a combination of pressure and temperature a laminate sheet is created. The actual HPL is now ready.

## **ELEMENT PRESS**

The laminate sheets are glued onto particleboard and inserted into the press. There, the glue quickly hardens under the effect of pressure and temperature. Beforehand the particleboard must be processed – i.e. sanded, hardened and profiled.



### PRODUCTION LINE

The overhanging laminate is plasticized by means of heat, bent around the profiled edge of the particleboard (post forming) and then glued. A special hot-melt adhesive seals the butt joint between the decor and the reverse foil – and thus the board is fully sealed against moisture and is finished.

#### WHAT IS HPL?

High-pressure laminate (HPL) is an extremely durable surface for applications of furniture and interior design. It is used wherever surfaces are subject to particular loads. One example of the use of HPL is the kitchen worktop. A wide selection of decorative finishes means HPL offers multiple possibilities to design living space in a very individual manner.

#### HPL IN THE WORLD OF PFEIDERER:

- Duropal
- Thermopal

## LOOKING GOOD IS NOT ENOUGH

In the area of decorative interior design, decisive roles are played by decorative variety and high product quality as well as by innovations and functions. This represents a creative playground where designers of Pfeleiderer high-pressure laminates can let their ideas run free. We open the door to the workshop of ideas.



### LAMINATE ORIGINALS

The horse's mane flows in the wind, the jockey's eyes are firmly set on the finishing line: scenes in the Atlantic Hotel at the racecourse in Bremen. The Pfeleiderer subsidiary Thermopal offers its customers the opportunity to have individual motifs pressed onto laminate, thus demonstrating the versatility of HPL. State-of-the-art printing technology is applied in the process for this special product called "Individual". And the process involved in producing this individual decor is extremely simple: all that is required is digital data of a reproducible photo or slide. This is used to generate motif templates which are printed onto special paper by means of data transfer, pressed as HPL and finally – if desired – the appropriate base material is glued on. This transforms every project into an unmistakable original.



#### **NO CHANCE FOR BACTERIA: DUROPAL MICROPLUS®**

Whether you grasp the bar, lean on the reception at your doctor's or rummage through a shop's shelves: bacteria lurk everywhere and are transmitted in no time at all. Chemical cleaning agents with aggressive substances are rarely successful even when applied repeatedly - not to mention the fact that they represent pollutants affecting both people and the environment. Our designers have solved this problem: the integrated hygiene protection feature displayed by the Duropal microPLUS® antibacterial

HPL surface combats bacteria actively. Duropal microPLUS® has been proven to reduce the formation of germs by more than 99 per cent within 24 hours and is therefore particularly suitable for use in kitchens, laboratories, hospitals and swimming pools. When germs encounter the HPL surface featuring microPLUS® technology, the protective film destroys key functions in the micro-organisms. Nor do scratches or wear have any impact on the antibacterial effect.



#### **CRYSTAL STONE**

If you run your fingers along the "Crystal Stone" decor on a Duropal HPL surface, you can feel little bumps and recesses which are reminiscent of a rock face. Unlike other HPL surfaces, this stone reproduction displays an intentionally irregular structure. The decor feels like a real stone slab while offering the advantages of a durable HPL product.



#### **WHAT IS LAMINATE?**

Wood, paper, glue: These are the primary components of a laminate floor. It sounds simple – but it isn't. In the world of Pfleiderer, a whole lot of technology is applied in manufacturing this popular flooring. The surface of laminate flooring is achieved using multi-layer technology applied under heat and high pressure and

ensuring durability and stability. The specially-developed, moisture-resistant HDF base material forms the middle layer. An insulating base as a third layer is directly linked to the underside of the panel to which the laminate panel is applied. Laminate flooring can be laid anywhere, including stairs but excluding bathrooms or rooms with a floor drain.

#### **LAMINATE AT PFLEIDERER:**

- Pergo
- Uniboard

## IMMUNE TO EVERYDAY CHAOS

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Everyday chaos can soon leave traces on conventional floors. A laminate floor from the Pfeleiderer Group is not that sensitive however. Pergo is regarded as the inventor of laminate floors and has continued to develop new product features.

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### **DURABILITY**

In the world of Pfeleiderer, laminate floors comprise a surface which is as resistant as titanium. The patented TitanX™ surface comprises several layers which ensure resistance to abrasion, impact and scratches. An additional useful layer featuring aluminum-oxide particles protects the floor from scratches while moisture-resistant base materials and the dense sealing system protect the floor from penetration by liquids.

### **SOUND ABSORPTION**

All Pergo floors have an insulation backside which is directly linked with the panel. This integrated technology called SoundBloc™ ensures higher sound-insulating features than with conventional loose underlayment materials. SoftTech™, new from 2008, also involves an additional sound-insulating layer applied in the laminate itself directly under the laminate surface.

### **HANDLING**

Laminate floors are easy to install. Thanks to the integrated insulation backside and glueless click connections, amateur handymen can easily lay Pergo floors, as neither glue nor an additional underlayment material is required. The strong connection means that no dirt particles can penetrate the joints making the floor easy to care for.

### **HYGIENE**

Some Pergo floors are antibacterial. But chemicals do not play a role here. Instead, a very small amount of silver is added in the floor surface with the result that bacteria are unable to grow as they do not find any nutrition in an entirely natural, fast and tried-and-tested manner. This feature is particularly attractive for high-traffic areas such as hotels and shops and for areas requiring high hygiene such as hospitals and laboratories.

## PAPER-AND-GLUE SANDWICH

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A laminate floor has to be able to cope with quite a lot of impact during its lifetime. And to make sure it keeps its good looks and isn't marked by scratches or discoloration, our production facilities take the greatest care and use state-of-the-art technology.  
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### LAYER FOR LAYER

Every single layer in a laminate floor has its own special task. The top layer, which consists of several resin-saturated papers is the decorative side or design – it gives the floor its unique appearance. The overlay, the outer layer, provides stability and protection. It is coated with wear-resistant melamine resin as it has to be extremely durable.



### UNDER PRESSURE

The core in the middle of the laminate floor sandwich is made of pressure-resistant engineered wood such as MDF, HDF or particleboard. The bottom layer provides noise insulation. A large machine presses the layers together under pressure and at an extremely high temperature.



#### **DPL AND HPL**

The laminate floor is compressed and ready for use. There are mainly two different production processes: DPL (direct pressure laminate) and HPL (high pressure laminate). With DPL, the layers are all pressed together at the same time. If HPL is required, the overlay and the decorative paper together with one or more core papers are pressed together – that is to say, the high pressure laminate. After that, the high pressure laminate and the core in the middle of the laminate floor with the bottom layer are all bonded together to the finished product, a HPL laminate floor.



#### **PRECISE CUT**

Once pressed or bonded, the laminate floor is taken to a milling machine (see picture above), where the boards are cut to panels as required for installation. The latest technology guarantees maximum precision (see picture below). The more accurate the machine is, the more precisely and easily the floor will be to install - and there will be no irritating gaps.



#### **READY FOR USE**

After the milling procedures the laminate floor panels are packed and stapled on pallets, ready for shipment and installation. Depending on individual designs, tastes and areas of use, our laminate floors can be found in shops, public buildings, offices – or in your home.

## THE MANY SIDES OF LAMINATE FLOORS

The Spanish automobile manufacturer, Seat, uses zigzag rally stripes in some of its exhibition areas. The Pfleiderer subsidiary Pergo designed this pattern especially for Seat.



The Pergo floor in this sushi bar looks like real wood, but it can be swiftly and easily cleaned thanks to its material properties.

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In fact, it's not really fair that people can simply walk all over them, because floor designs can give rooms their very own personality. The Pfleiderer Group develops new patterns and formats on an on-going basis and meanwhile offers the largest selection of floor designs available on the market – for a cozy sitting-room, a sporty car showroom or an elegant sushi bar.

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Laminate floors has become a popular type of flooring in residential applications. Warm, reddish wood tones radiate a cozy atmosphere ...



... darker color nuances come across as stylish and trendy. Laminate flooring offers plenty of freedom of design.

# THE WORLD OF PFLEIDERER AT A GLANCE

## **CARRIER (BASE BOARD)**

Engineered wood which serves as the base for decorative surface facings (e.g. HPL).

> **Pages 5, 6, 11, 14, 16 and 18**

## **FLOOR PANELS**

Particleboard glued in layers with tongue and groove joints which can be used in interior design and roofing applications (e.g. as base floors).

> **Page 7**

## **HDF –**

### **HIGH-DENSITY FIBERBOARD**

Engineered wood board consisting of wood fibers soaked in glue, which are then pressed together under heat with very high compression. The preferred base material where high load-bearing properties and thin material thickness are required.

> **Pages 8-11**

## **HPL –**

### **HIGH-PRESSURE LAMINATE**

High-pressure laminate consists of several layers of core and decorative paper. This surface material is extremely durable and is ideal for furniture and interior surfaces subject to heavy wear.

> **Pages 12-15**

## **LAMINATE**

Flooring made of several different layers. The base layer comprises pressure-resistant engineered wood. The top surface is coated with melamine resin, protecting the decor layer comprising a printed paper film.

> **Pages 16-21**

## **MDF –**

### **MEDIUM-DENSITY FIBERBOARD**

Engineered wood board comprising wood fibers soaked in glue and compressed under

heat. It is especially used for three-dimensional furniture fronts as well as for varnished or high-gloss surfaces.

> **Pages 8-11**

## **MELAMINE-FACED**

### **PARTICLEBOARD**

Particleboard with a finished surface, faced with melamine (decorative paper soaked in melamine resin).

> **Page 6**

## **MFP –**

### **MULTI-FUNCTION PANEL**

Engineered wood board with facing and middle layers made of slender random-direction chips. MFP has high cross and longitudinal tensile strength, making it particularly suitable as a construction material for trade fair stands or interior fixings.

> **Page 7**

**OVERLAY**

Transparent melamine film used in laminates to give added protection to the decor layer against damage and wear.

> Pages 12 and 18

**PARTICLEBOARD**

Particleboard comprises wood chips and glue.

> Pages 4-7

**POSTFORMING ELEMENTS**

Particleboard or MDF, faced with a layer of HPL. The seamless facing is milled around the edges of the base board at a predefined radius. This is done by heating the HPL board and then molding it mechanically.

> Page 13

**ABOUT US:**

## PFLEIDERER AG – THE FASCINATION OF WOOD

The MDAX-listed Pfleiderer Group (ISIN DE 0006764749), with headquarters in Neumarkt, Germany, is one of the world's leading manufacturers of engineered wood.

The company has approximately 6,000 employees and operates 22 plants in North America, Western and Eastern Europe producing engineered wood, surface-finished products and laminate flooring. Pfleiderer is the preferred partner of the furniture industry, specialist and home improvement stores, and interior design suppliers.

The company delivers a comprehensive range of core materials and surface-finished products to customers in over 80 countries.



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