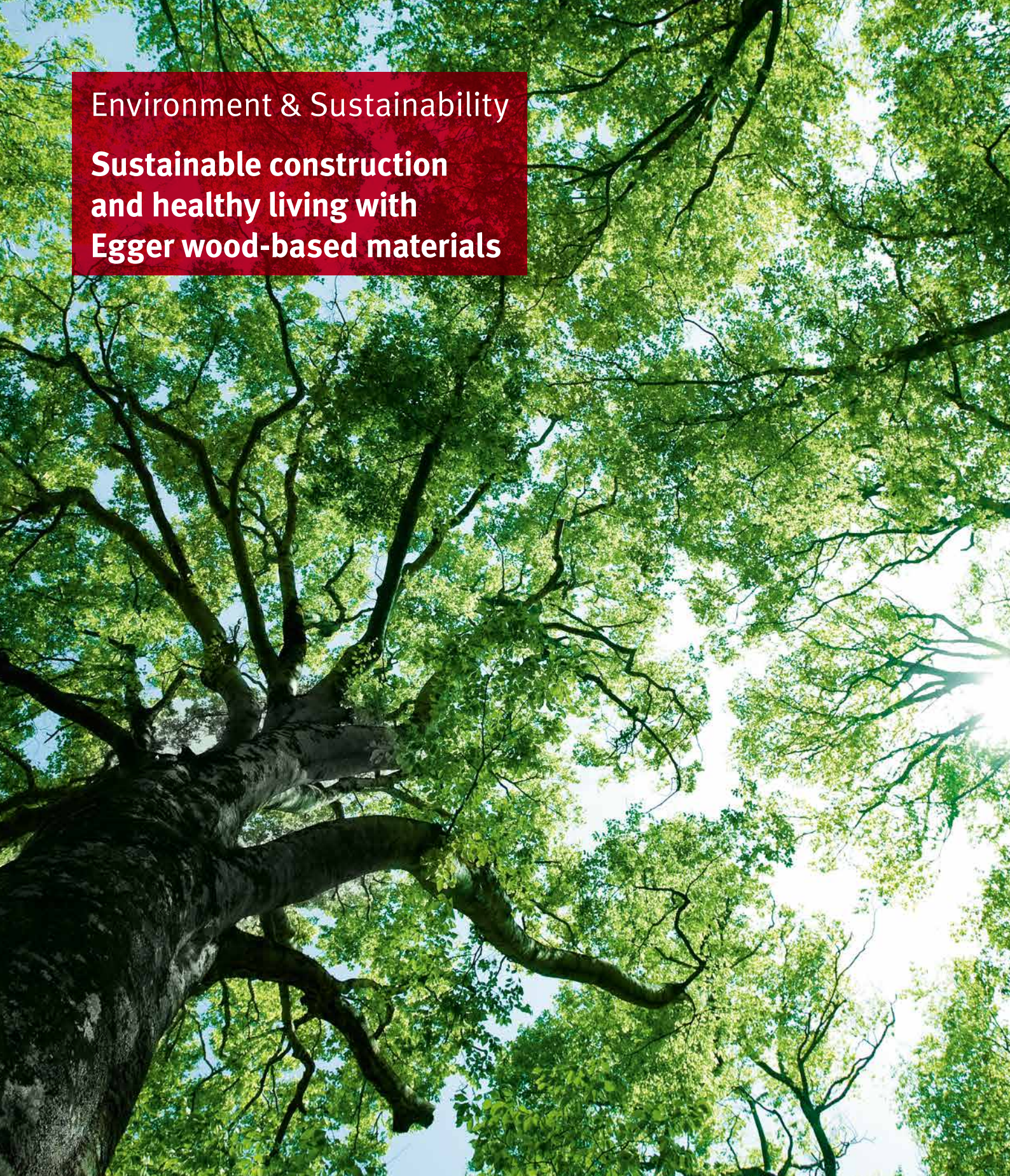


MORE FROM WOOD.



Environment & Sustainability

**Sustainable construction  
and healthy living with  
Egger wood-based materials**





*“Wood is far too  
valuable to just  
throw it away!”*

Fritz Egger Senior (1922 – 1982)

# CONTENTS

04

Our Milestones for a Healthy Environment

06

Sustainability is a Core Value

08

Climate Change and Resource Scarcity

10

Healthy Living Spaces

12

Making Things Clear

## JUST ASK! WE HAVE THE ANSWERS.

16

Storing CO<sub>2</sub>

18

Conserving Resources

20

Recycling

22

Controlling Formaldehyde

24

Safe Materials

26

Tested Indoor Air

28

Compatible Surfaces

30

Disclosing Performance

32

Environmental Performance Assessment Overview

34

Adding Value with Certificates

36

Continuous Improvement

## OVERVIEW OF FACTS

39

EGGER Glossary

51

Imprint

# Our Milestones for a Healthy Environment

EGGER produces its first chipboard. It blazes the trail for technology that makes 'More from Wood'.

1961

EGGER implements a new exhaust air purification process with the world's first wet electrostatic precipitator in the industry.

1992

EGGER establishes Timberpak Leeds: a wood waste recycling centre in Leeds (UK). The recycled wood is used in production. Today there are recycling companies in Germany, Romania and Turkey among others.

2000

Nomination of the Energy and Environmental Project in St. Johann (AT) for the European Environmental Innovation Prize (EEP).

EGGER is the first wood-based material manufacturer in Europe to prepare EPDs (Environmental Product Declarations) for all of its main products.

2008

1991

EGGER integrates the first biomass power plant in Brilon (DE) in order to replace fossil fuels. Today, nine plants obtain their heat energy from renewable biomass. Four large locations also produce eco-power.

1995

At the plant in Brilon (DE), EGGGER first uses recycled wood for the production of chipboard. Today, all EGGGER chipboard plants are able to make this important contribution to the conservation of resources.

2006

To conserve resources, EGGGER invests in lightweight boards with a honeycomb core made of recycled paper. The world's first industrial plant commences operation in St. Johann (AT).

EGGER is the first European manufacturer to sign a contract on behalf of the entire Group for the external monitoring of its plants and products by the Fraunhofer Institute WKL.



The plant in St. Johann (AT) feeds waste heat from the wood dryer into a new district heating network, which now provides 1,500 homes with environmentally friendly heating.

The plants in Hexham (UK) and Radauti (RO) are certified according to ISO 14001.

An energy management system in line with ISO 50001 is integrated in Brilon, Wismar and Bevern (all DE).

A central division for all product-related environmental matters is created.

The plants in Marienmünster and Bevern (DE) are certified according to ISO 14001. All locations in Germany receive the ISO 50001 laminate certification.

2010

2012

2014

2009

2011

2013

2015

Environmental Management at the plant in Unterradlberg (AT) participates in the Eco-Management and Audit Scheme (EMAS). It gains ISO 14001 certification.

EGGER obtains the PEFC and FSC® certificate Group-wide.

When constructing the office building in Radauti (RO), EGGER only uses its own wood-based materials and receives the DGNB ('Deutsche Gesellschaft für Nachhaltiges Bauen' – German Association for Sustainable Construction) certificate in gold for the new building.

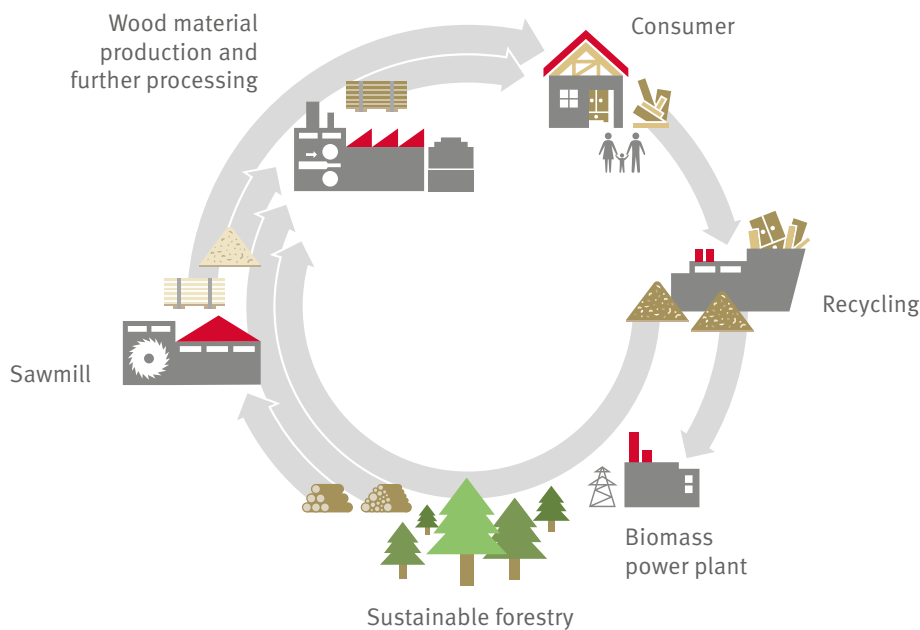
With the construction method certified in Radauti, EGGER builds the TechCenter in Unterradlberg (AT) and the Forum in Brilon (DE).

The plants in Rion (FR), Gifhorn (DE), Wörgl and St. Johann (AT) are certified according to ISO 14001.

The plants in Brilon and Bünde (DE) are certified according to ISO 14001. The plants in Hexham and Barony (UK) are certified according to ISO 50001. Rainwater is collected and used in production for the first time on a larger scale in the plants of Brilon (DE) and Rion des Landes (FR).

St. Johann in Tirol is located at the foot of the Wilder Kaiser – this is where the roots of our family company run deep.

# Sustainability is a Core Value



From the tree to the product – a closed cycle. EGGER emphasises the sustainable use of raw materials in its core values. Our actions focus on the closed material cycle. In doing so, we count on fully-integrated plants with short transport routes. Here wood is first used in materials: from timber production in the sawmill, to the production of wood-based materials. Waste and recycled wood that are not suitable for production are used to generate energy in our own biomass power plants.

*EGGER takes climate change seriously. This is demonstrated by the following:*

**1** Most of the sawmill co-products processed into wood-based materials by EGGER at the fully-integrated plant in Brilon (DE) come from the adjacent sawmill. This protects the environment by eliminating approximately 7,000 truck loads (nearly 660,000 kilometres or 410,000 miles) per year from sawmills in the region. We also run similar operations at the Wismar (DE) and Radauti (RO) plants.

**2** The use of recycled materials in EGGER products means that an

additional 1.73 million tonnes of CO<sub>2</sub> per year remain locked up in products, as compared to burning it.

**3** Biogenic fuels that cannot be used in products are transformed into heat and environmentally-friendly electricity by EGGER in its own biomass power plants. In doing so, we avoid approximately 1,487,001 tonnes of CO<sub>2</sub> emissions from fossil energy sources per year. In total, approximately three-quarters of our CO<sub>2</sub> emissions for energy generation come from renewable, CO<sub>2</sub>-neutral fuels.



For details of the material cycle, visit [www.egger.com/environment](http://www.egger.com/environment)



→ Wood is the most important raw material for EGGER. If we were to allow the destructive exploitation of forests, we would endanger our own existence over the long term. Like nature, we organise our processes in cycles that conserve resources. Wood in our homeland stands for a tradition of healthy, comfortable living spaces. As a versatile, renewable raw material, it provides us with the answers to urgent global questions of our time.

EGGER Group Management

**Walter Schiegl**  
*(Production/Technical)*

**Ulrich Bühler**  
*(Marketing/Sales)*

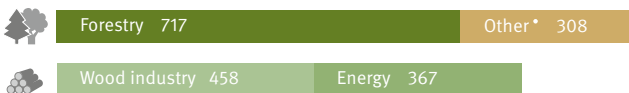
**Thomas Leissing**  
*(Finance/Administration/Logistics)*

# Climate Change and Resource Scarcity

**The situation:** Forests stabilise the Earth's climate because wood locks in the greenhouse gas CO<sub>2</sub>. But more and more branches of industry are discovering this renewable raw material as an alternative to fossil fuels. Demand for wood as a construction material, as raw material for paper, bioplastic and textiles, as well as a renewable energy source is growing steadily.

**The consequences:** Studies already predict a deficit of around 70 million cubic metres of wood in Europe by the year 2020 if management of the resource continues as it is today.\* Furthermore, the remaining forests and oceans are no longer able to adequately absorb the CO<sub>2</sub> emissions that are warming the earth. Depending on the scenario, the UN Global Climate Council expects an average temperature rise from 0.3 to 4.8 degrees by the year 2100\*\*.

2010



2020



2030



All information in millions of m<sup>3</sup> Raw material potential Demand

\* Wood that does not come directly from harvesting, e.g. industrial waste and recycled wood.


For more on the topic of climate change, see the following pages:  
 16 Storing CO<sub>2</sub>  
 18 Conserving Resources  
 20 Recycling

Source: Udo Mantau et al., 2010, EUwood – Real potential for changes in growth and use of EU forests, Final report, Hamburg/Germany.

\* Udo Mantau et al., 2010, EUwood.

\*\* Fifth Assessment Report (AR5), 2013, IPCC.





→ EGGER supports the sustainability of wood as a resource. We follow the concept of cascading use: high-quality logs are used by us to produce sawn timber, while sawmill co-products, roundwood from the forest and recycled wood are turned into wood-based materials. We only burn wood for energy production if it cannot be used further in materials. Furthermore, EGGER develops technologies that permit the conservation of wood. For example, our Eurolight lightweight board requires less material than a comparable solid wood board of the same thickness.

**The situation:** Health is one of the major issues of our time. On the one hand, medical advancements are leading to higher life expectancy. On the other hand, people are exposed to other influences due to modern lifestyles and new materials. An average resident of Central Europe spends 90 percent of their time indoors.\*

**The consequences:** Allergies, sick building syndrome, and MCS (multiple chemical sensitivity) as well as the effects of stress are increasing. Thanks to reports and publications by various institutes, consumers are very much aware of issues such as formaldehyde and VOCs (volatile organic compounds).



For more on the topic of healthy living spaces, see the following pages:

- 22 Controlling Formaldehyde
- 24 Safe Materials
- 26 Tested Indoor Air
- 28 Compatible Surfaces

# Healthy *Living Spaces*

\*German Federal Environmental Agency, 'Guidelines for Indoor Air Quality'



→ EGGER supports the conservation of wood. EGGER recognises the special qualities of wood: the homely and natural warmth it conveys. We are also aware of the growing importance of air quality in rooms, as buildings are becoming more insulated and draught-free. This is why we intensively test the emissions of our products and also have them measured by independent institutes. Creating a pleasant atmosphere plays a major role in the further development of our materials and surfaces. This goes far beyond the chemical composition of the products. For example, our soft and silent flooring with Comfort+ technology helps to create a pleasant atmosphere, thus reducing stress.

# Making Things Clear

**The situation:** What is the difference between HQE, LEED, BREEAM and DGNB?

Building certification is a complex topic, just like the corresponding market for products and services.

Different standards and rules can apply depending on the country or region. You need to ensure a structure obtains a recognised certificate for sustainability, health and energy efficiency.

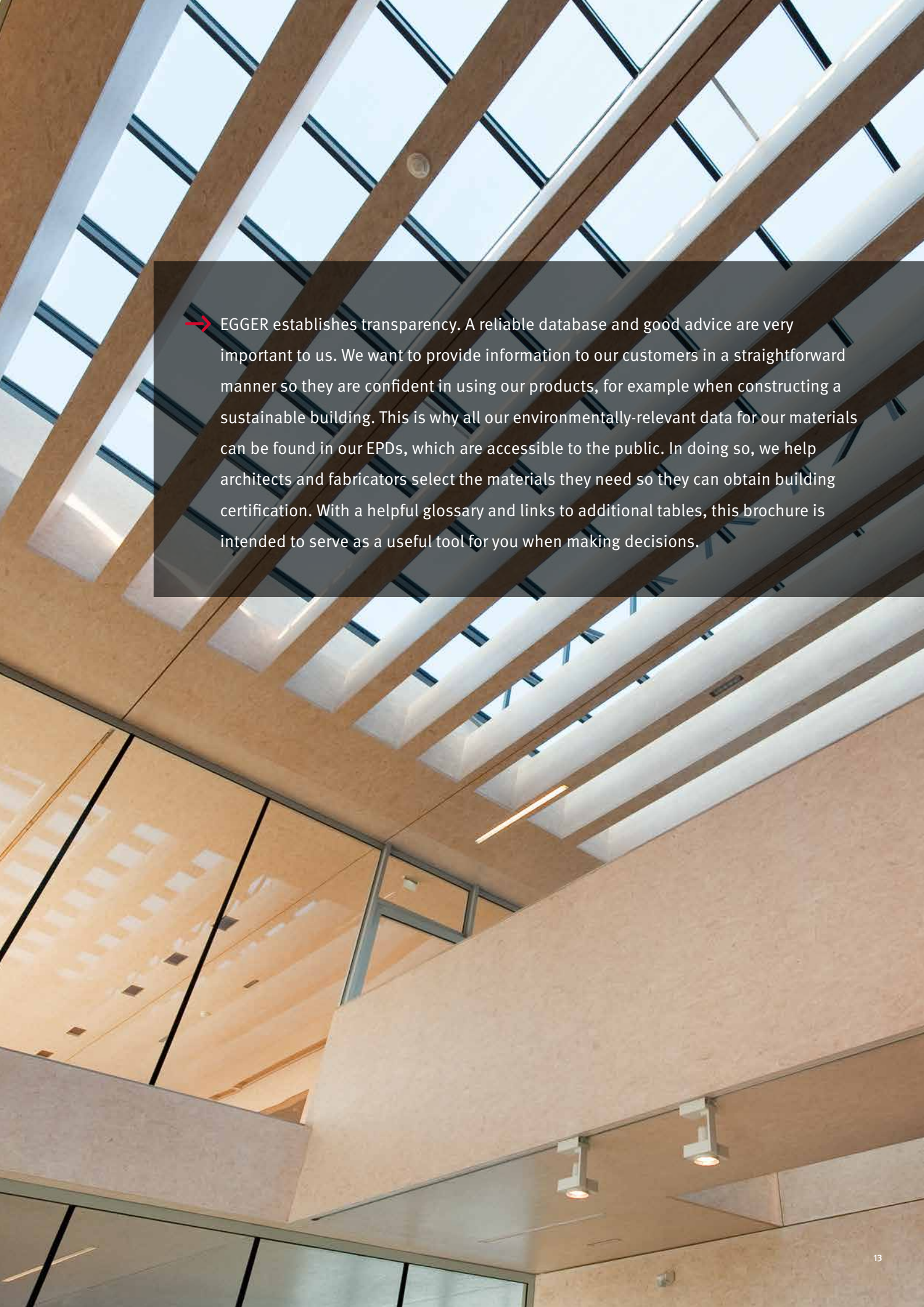
**The consequences:** Builders obtain a certificate as proof that a building meets the applicable quality requirements, including energy efficiency and sustainability. As such, when your property is evaluated, you receive, in addition to acquisition costs, important information regarding its sustainability - for example, the grey energy consumed during the manufacturing of the building materials and the environmental impact of the building during operation. Certification requires expert knowledge. Environmental Product Declarations (EPD) summarise this knowledge.



The EGGER office building in Radauti (RO) was awarded the DGNB certificate in gold for sustainability and energy efficiency. The TechCenter in Unterradlberg (AT), the Forum in Brilon (DE), and the new administrative buildings in St. Johann (AT) and Wismar (DE) were built following this example.

For more on the topic of certification, see the following pages:


- 30 Disclosing Performance
- 32 Environmental Performance Assessment Overview
- 34 Adding Value with Certificates
- 36 Continuous Improvement
- 38 Glossary



→ EGGER establishes transparency. A reliable database and good advice are very important to us. We want to provide information to our customers in a straightforward manner so they are confident in using our products, for example when constructing a sustainable building. This is why all our environmentally-relevant data for our materials can be found in our EPDs, which are accessible to the public. In doing so, we help architects and fabricators select the materials they need so they can obtain building certification. With a helpful glossary and links to additional tables, this brochure is intended to serve as a useful tool for you when making decisions.

Just ask!

We have  
the answers.



*Sustainability and health are central topics at EGGER. An interview with Manfred Riepertinger, who is responsible for environmental issues and sustainability in product management.*

**Mr. Riepertinger, why is environmental management so important for a company like EGGER?**

General environmental awareness is on the rise. End users want to know which products they can buy with a good conscience. This is what our distribution partners and customers in the furniture industry, wood construction and retail are demanding from us. And it is in our own interest to implement sustainable production. Based on its awareness of the renewable raw material wood, EGGER has been dealing with the topic of sustainability since the company was founded.

**The forest is an air filter, an animal habitat and a recreational area for people. At the same time, it functions as a supplier of the renewable resource wood. What is EGGER's contribution to make sure that the productivity of our forests is not overburdened?**

EGGER operates in material cycles, beginning with sustainable forestry and extending through to the production of timber and chipboard, all the way to recycling and utilising wood waste in biomass power plants. We use wood to its full extent in our products. We therefore make a significant contribution to the conservation of resources.

**How would you describe your job in product management, basic materials and environment?**

It is primarily about bringing the knowledge and expertise on environmental matters together. This includes the ingredients we use and emissions from our products, environmental certificates and energy-efficient construction. To do this we network with our suppliers and our technicians and use the know-how from science. The relationship between sustainability and environmental compatibility plays a key role in the continuous improvement of our products as well.

# Storing CO<sub>2</sub>

## Where are greenhouse gases released when wood is used?



- 1 m<sup>3</sup> spruce wood locks **825 kg** CO<sub>2</sub>
- 1 m<sup>3</sup> OSB boards locks **931 kg** CO<sub>2</sub>
- 1 m<sup>3</sup> raw chipboard locks **812 kg** CO<sub>2</sub>
- 1 m<sup>3</sup> MDF boards locks **669 kg** CO<sub>2</sub>

Relative to GWP 100 cradle-to-gate, source:  
current EGGER EPDs ([www.egger.com/environment](http://www.egger.com/environment))

\* Determined from the greenhouse potential of selected EGGER EPDs (GWP 100 in kg CO<sub>2</sub> equivalent, cradle-to-gate) 2015/2016

\*\*Source: EUROSTAT 2012, 'Carbon dioxide emissions from final use of products'

\*\*\* Calculation: Recycled wood used across the Group x CO<sub>2</sub> factor chipboard (from EPD)

\*\*\*\* Calculated after EU emissions trading (EU ETS)

CO<sub>2</sub> is generated at several stages in the wood utilisation chain. The production of wood-based materials creates greenhouse gases, as does the natural decomposition and degradation of unused wood. When wood is burned, CO<sub>2</sub> is released, which would remain locked in if the wood was used to make materials and products.

EGGER optimises the use of wood. The wood in our products locks 5.3 million tonnes of CO<sub>2</sub>\* every year. This corresponds to the emissions of 3.2 million EU citizens\*\*. We process the best quality log wood into sawn timber and upgrade the sawmill co-products into wood-based materials. EGGER also uses recycled wood in the production of chipboard, thereby locking 1.73 million tonnes of CO<sub>2</sub> per year\*\*\*. Wood that is not suitable for upgrading is transformed into environmentally-friendly electricity and heat for production in our biomass power plants, eliminating another 1,487,001 tonnes of CO<sub>2</sub> from the environment, as compared to energy generation using natural gas.



## “ What does sustainability mean for chipboard production?

Industrial roundwood, sawmill co-products and carefully selected and pre-sorted recycled wood are all suitable for the production of chipboard. Wood that cannot be used in materials contributes to the production process as a renewable energy source.

### ENVIRONMENTAL CYCLES



**Hexham (UK)** reflects the EGGER culture of sustainable cycles on a small scale: our reed purification pond cleans up to 2,100 m<sup>3</sup> of waste water per day, in addition to providing a habitat for plants and animals, including frogs.

All processes at EGGER are linked in the environmental cycle. It extends from timber production in the sawmill to the production of wood-based materials, for example laminate flooring. Recycling returns the material that was used back into the cycle. Greenhouse gases are only released when wood that cannot be used in materials goes to our biomass plants to be transformed into heat and electricity. In order to link all our processes to each other via short transport routes, we are developing our plants to become fully-integrated sites.

## “ What is the timber industry doing to combat climate change?

The use of wood in construction materials or processing into wood-based materials binds CO<sub>2</sub>, which is responsible for climate change, while burning wood releases this CO<sub>2</sub>.



EGGER is convinced that the cascading use of wood is the method of choice. This involves using wood within products, then recycling and using it again until it has no further use other than as a source of energy. We support the demand to establish this principle and are participating in campaigns such as the 'Wood Action Day' of the European Panel Federation (EPF) and the 'Stop burning our trees' campaign of the timber industry in England. The goal is to boost awareness of the sustainable use of our resources among politicians and the general public.

# Conserving Resources

“What forests can be considered for raw materials?”

## CERTIFIED FOREST AREAS 2016 IN HECTARES

Country	Total forest area	PEFC	FSC®
Germany	11,076,000	7,324,507	1,055,073
France	17,572,000	8,138,965	149,700
Great Britain	2,901,000	1,410,288	1,588,471
Austria	4,006,000	2,946,102	587
Ukraine	1,255,274	0	3,023,986
Romania	6,733,000	0	717,056
Russia	780,000,000	1,327,774	40,914,097
<b>Worldwide</b>		<b>275,282,060</b>	<b>190,475,824</b>

Sources: [www.fsc.org](http://www.fsc.org), [www.pefc.org](http://www.pefc.org), 'Jahrbuch Wald und Holz' (Forest and Wood Yearbook) Federal Ministry for the Environment BAFU (2011), Eurostat press release 85/2011, pro Holz ([www.zukunftregion.org](http://www.zukunftregion.org))

Wood is sustainable as it is generally a renewable raw material. But to achieve this, sustainable forestry management is essential. This needs to accommodate economic, ecological and social aspects. FSC® (Forest Stewardship Council®) and PEFC (Programme for the Endorsement of Forest Certification Schemes) certify forests that are sustainably managed and monitor the delivery chains for certified products.

EGGER prefers to process wood from certified forests. With a strict control process (due diligence system), we monitor all wood purchases within the scope of the European Timber Regulation (EUTR) and other forest certification systems. In the case of certified wood sources, strict requirements are imposed by the respective certification system. In the case of uncertified wood sources, EGGER also undertakes to not use wood:

1. from illegal harvesting
2. originating from regions where traditional or fundamental civil rights are violated
3. from uncertified forests which have a high protection value
4. originating from forests that will be converted into plantations or for non-forestry uses
5. from genetically-manipulated trees
6. whose harvesting does not comply with the core conventions of the International Labour Organisation (ILO).



“ *What controls are applied to wood that is delivered?* ”

Forests offer relaxation and fulfil cultural, social and economic roles. Nature-friendly management ensures the preservation of these areas. Thinnings improve site-specific composition.

CHAIN OF CUSTODY CERTIFICATION



FSC® C017963

The mark of responsible forestry



Promoting Sustainable Forest Management  
www.pefc.org

EGGER sources wood from the regional surroundings of its plants. The strict legal requirements in Europe ensure sustainable forestry practice. All EGGER locations are also certified as part of the Chain of Custody according to the standards of the FSC® (certificate SGSCH-COC-110039 and SGSCH-CW-110039) and PEFC (certificate CH17/0386). Depending on the availability of FSC® or PEFC certified wood in the proximity of the production facilities, our products may be declared accordingly upon request and labelled with the FSC® or PEFC logo.

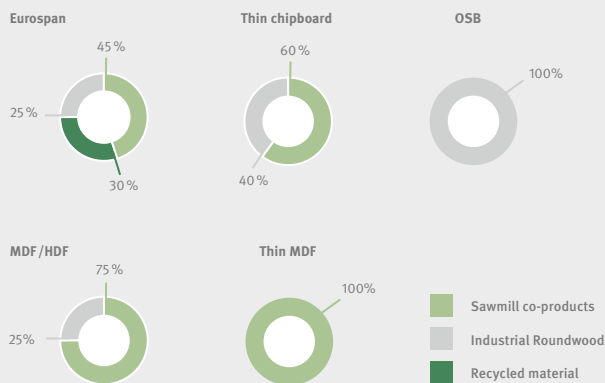




# Recycling

## What are the recycling options for wood-based materials?

Three material components are used for the production of wood-based materials: sawmill co-products, industrial roundwood and recycled material. Sawmill co-products include woodchips, cross-cuts, sawdust and wood shavings. Recycled material comes from waste wood recovered from discarded goods such as furniture, pallets or packaging materials, as well as non-saleable products (rejects) from in-house production. Industrial roundwood is small diameter roundwood produced from sustainably-managed forests.



EGGER ensures that recycled material is only purchased from qualified disposal specialists. In the UK, Germany and Romania, the EGGER Group runs its own recycling enterprises under the name Timberpak. Auxiliary products and waste generated in the course of production are recycled. Even board cuts from some customers are taken back and serve as raw material in the production cycle. Nine of the total of eleven chipboard plants in the Group process waste wood.

## “ Can contaminated recycled wood be processed into wood-based materials as well?



Due to impregnation and coatings, recycled wood may contain heavy metals or the organic chlorine compound PCP, which is prohibited today. Manufacturers have to implement careful sorting practices in order to ensure that only recycled wood which is not contaminated is used in materials.

EGGER processes waste wood from furniture, pallets, wood and suitable parts of construction and demolition timber. Recycling companies separate contaminated wood during collection. The material is also inspected visually at our plants, freed from contaminants such as metal, sand, and plastic, and is then processed into clean woodchips in several steps.

## “ How can 100 per cent of a tree be utilised?

A closed raw material cycle maximises the use of wood in materials and as an energy source. All parts of the tree – log wood, branches and bark – can be fully utilised by a manufacturer of wood-based materials. Only the roots are not used and remain in the ground.

AS STURDY AS SOLID WOOD



EGGER invests in resource conservation technology and includes recycling in the process. For example, a honeycomb core made of recycled paper between thin layers of chipboard or MDF board stabilises the Eurolight lightweight board.

EGGER uses the potential of wood to its best possible advantage. Using wood in materials takes precedence: sawmill co-products, wood from forest thinning, clearfelling and recycled wood can be upgraded into wood-based materials. Waste that cannot be materially recycled is used to produce drying power, process heat and eco-power. 10 board plants of the EGGGER Group have their own biomass boiler. Thanks to district heat networks, neighbouring municipalities of the St. Johann (AT) plant and industrial operations near the Unterradlberg (AT) plant are supplied with renewable heat energy from EGGGER.

## “How much formaldehyde is there in wood-based materials?”

Formaldehyde is released naturally by wood and is also contained in the usual binding agents of wood-based materials, e.g. in glues and resins based on urea, melamine, or phenol. A wood-based material today may only contain a maximum of 0.007% formaldehyde in order to meet the criteria of the emission class E1.



EGGER works against trivialising the risks of formaldehyde, supporting and shaping both national and international processes that deal with the topic of formaldehyde and air quality in buildings. All EGGER products fall below the limits for the European formaldehyde class E1. Some also meet the stricter requirements of voluntary guidelines or national laws, such as those in the USA and Japan.

# Controlling Formaldehyde

### OVERVIEW OF THE LIMIT VALUES FOR RAW CHIPBOARD

Emission classes	E1		EPF-S	CARB 2		IOS-MAT 0003		F****	
Test method	European Chamber test according to EN 717 (ppm)	Perforator according to EN 120 (mg HCHO/100g ATRO board)***	Perforator according to EN 120 (mg HCHO/100g ATRO board)	American chamber test according to ASTM 13333 E (ppm)*	Comparative value, European chamber test according to EN 717 (ppm)**	ASTM 1333 E (ppm)	Perforator according to EN 120 (mg HCHO/100g ATRO board)***	Desiccator according to JIS A 1460 (mg/l)	Comparative value, European chamber test according to EN 717 (ppm)
Chipboard	0.1	max. 8	max. 4	0.09	0.065	0.09	max. 4	0.3	0.03–0.04
Thin MDF	0.1	max. 8	max. 5	0.13	0.14	0.13	max. 5	0.3	–
MDF	0.1	max. 8	max. 5	0.11	0.12	0.11	max. 5	0.3	–
OSB	0.1	max. 8	–	–	–	0.09	max. 4	0.3	–

\* Chamber method: min. 23 m<sup>3</sup>, tests with various degrees of loading, temperature: 23 °C, relative humidity: 50%, air exchange rate: 0.5/hour

\*\* European chamber method: uniform degree of loading, temperature: 23 °C, relative humidity: 45%, air exchange rate: 1/hour

\*\*\* For production control at the plant

## “ How much formaldehyde in wood-based materials is hazardous?

Formaldehyde is a chemical compound that occurs in wood, smoked fish and fruit, among others. In a certain concentration in the air, it can be carcinogenic for humans. If the ambient air concentration remains under 0.08 ppm formaldehyde, it is considered not to be a health hazard by the World Health Organisation.

EGGER offers rawboard in all the standards mentioned on the left. The independent monitoring institutes Fraunhofer WKI and FCBA supervise compliance with the threshold values. How much formaldehyde released by a product depends on its application area, for example in furniture, as coating or edging block emissions. Healthy ambient air quality can be achieved by regular ventilation, as well as low emissions of products.

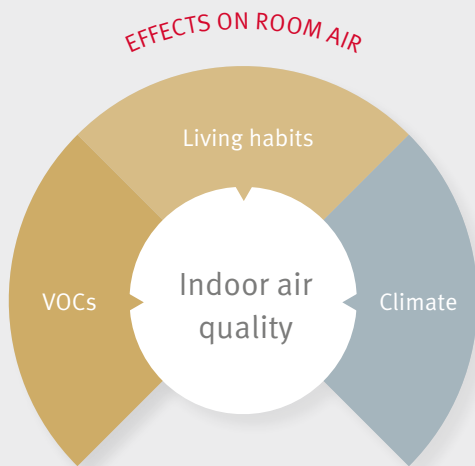
## “ Are there wood-based materials without formaldehyde?

According to estimates by the Fraunhofer Institute, 80 to 85 percent of all chipboard today contains glue with formaldehyde. Manufacturers have been able to reduce emissions tremendously over the past 20 years and experts expect a further decrease. Formaldehyde-free glues such as polymeric diphenylmethane diisocyanate (PMDI) are technically-accomplished, but require elaborate processing. This leads to higher consumer prices.



EGGER also produces glued formaldehyde-free rawboards which are usually classified under the E0 standard: EGGER OSB 4 Top as well as EGGER DHF board, which is made with polyurea. These are intended for areas of application where products with coatings that inhibit emissions are not suitable.

## “ What are VOCs?



In addition to VOCs from products and installed materials, room air quality is also affected by living habits and the climate.

\* Freiburg University and Fraunhofer Institute for Wood Research WKI, Braunschweig, 2009.  
\*\* 'Bauen und Leben mit Holz' (Building and Living with Wood), publisher: Informationsdienst Holz [Information Service Wood].

VOCs (volatile organic compounds) affect room air quality. They include natural substances in wood that are responsible for its characteristic odour. Various VOC sources affect room air quality in modern living spaces. Among them, wood and wood-based materials belong to positively perceived factors.\*\*

EGGER has the VOCs in its products tested regularly according to the latest standards, although they are not hazardous to health. Studies show that wood-based materials do not damage lung tissue, even at high VOC concentrations. The naturally occurring aldehydes and carboxylic acids in wood are harmless as well.\*\*

## Safe Materials

## “ How are VOCs in wood-based materials different from those in wood?

Wood and wood-based materials are largely similar in their VOC emission behaviour. Since wood-based materials are pressed at high temperatures of up to 200 °C, aldehydes and carboxylic acids that release non-volatile or not highly volatile components of wood can increase. Subsequently applied waxes, adhesives and coatings on treated wood can also be VOC sources.

EGGER is continuously reducing the use of chemical agents. As the bonding and pressing processes have been technically refined during the past 20 years, much lower volumes of glue are now used.



## “Do wood-based material manufacturers have to test for VOCs in their products?”



Test chambers with a volume of 1m<sup>3</sup> at Fraunhofer Institute WKI.

The testing and evaluation methods vary according to the product group (see the following page). In some countries, information on the release of VOCs is mandatory for flooring, construction products and decorative interior design products. Various methods apply for the qualitative and quantitative evaluation of different VOCs.

EGGER also has its products that are not subject to mandatory testing evaluated by independent institutes. We also invest in modern test chambers, both for internal monitoring and for product development and optimisation. In doing so, EGGER improves its knowledge in this field. We can use the test chambers to measure VOC as well as formaldehyde emissions.

## “What is the effect of VOCs from wood-based materials on humans?”

Scientists have collected reliable data proving that VOCs from wood-based materials do not represent a health hazard. Even with VOC concentrations 50 times higher than commonly accepted guidelines, test subjects in the test chambers neither exhibited impaired lung function or inflammatory reactions, nor did they experience symptoms such as irritation of the eyes and mucous membranes, headaches, nausea, dizziness or feeling ill.\*

EGGER traditionally relies on wood to create comfortable living spaces. In the company's home of Tirol, wood construction is part of a well-established lifestyle, slightly resinous components belonging to a natural living environment. The emissions from certain types of wood are considered revitalising, having a positive effect on health and general well-being.

\* Freiburg University and Fraunhofer WKI, Braunschweig, 2009.

“ Which laws refer to the authorisation of products made of wood-based materials with reference to VOCs?

VOCs are mentioned in the EU’s Construction Products Regulation. Debates are taking place whether VOC thresholds should be introduced for CE marking. Europe-wide uniform standards for construction products and interior fittings and VOC measurements in indoor air are currently under development (CEN/TS 16516). Until now, only France, Germany and Belgium have implemented binding evaluation systems for the VOC emissions of certain product groups. Voluntary testing is in place in Denmark, Finland and the USA, among others.

## Tested Indoor Air

Indoor air is a complex mix of many elements. Developing meaningful specifications for its quality is no easy task. EGGER is actively involved in the process, in bodies such as the CEN/TC 351 ‘Assessment of release of dangerous substances from construction products’, which is developing a Europe-wide harmonised testing method for VOC.

“ What do the abbreviations TVOC, SVOC, LCI and R value mean?

TVOC stands for Total Volatile Organic Compounds, the sum of all volatile organic compounds that are taken into account during a test. The ‘SV’ in SVOC stands for ‘semi-volatile,’ and designates medium to low volatility compounds.

The LCI value is the ‘lowest concentration of interest’. These values are determined by dividing toxicologically-founded thresholds by significant safety factors; depending on the substance, this factor can be 100 or 1000. In Germany and Belgium, the actually-measured concentration of a substance is divided by its LCI value. The result is summed up for all analysed substances and the result is the R value, which has to be below 1.



# How are VOC emissions regulated in Germany, Belgium and France?

## SELECTED VOC THRESHOLDS IN OVERVIEW

Countries	France	Belgium	Germany
<b>Regulations</b>	Décret n° 2011-321: Émissions dans l'air intérieur* (Emissions in indoor air)	Royal Decree laying down the limit for indoor emissions from construction products for certain intended applications	AgBB (Committee for the Health-related Evaluation of Building Products) February 2015
<b>Test method</b>	ISO16000	ISO 16000, 28 days	ISO 16000-9/10, 28 days
<b>Marking</b>	binding		Ü signs on packaging
<b>Compliance</b>	Placing the label for construction products for interior fittings is obligatory; no threshold for class C.	Binding for floor coverings, adhesives and surface coating for wooden floor coverings	Binding for floor and wall coverings (except wallpaper)
<b>Unit</b>	µg/m³	µg/m³	µg/m³
<b>Emissions class</b>	A+ A B C	–	–
<b>Threshold for substance*</b>			
Controlling	<10 <60 <120 >120	<100	100
Acetaldehyde	<200 <300 <400 >400	<200	not assessed
Toluene	<300 <450 <600 >600	<300	1900
Tetrachlorethylene	<250 <350 <500 >500		n. d.
Xylene	<200 <300 <400 >400		2200
1,2,4 trimethylbenzene	<1000 <1500 <2000 >2000		1000
1,4-dichlorobenzene	<60 <90 <120 >120		n. d.
Ethylbenzene	<750 <1000 <1500 >1500		4400
2-butoxyethanol	<1000 <1500 <2000 >2000		n. d.
Styrene	<250 <350 <500 >500		860
TVOC*	<1000 <1500 <2000 >2000	≤ 1000	≤ 1000
SVOC*		≤ 100	≤ 100
Carcinogenic substances cl. 1A and 1B		<1	≤1
R value		<1	≤1

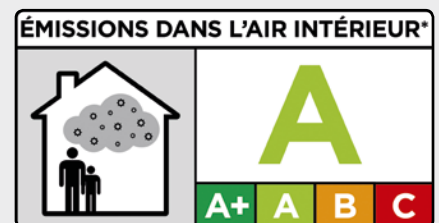
LCI values

\* Except only, this list is not exhaustive. Values are not comparable, see explanation on the left side and above - in Germany measurement values, in France values calculated from measurement values.

Germany has imposed binding upper limits for the VOC values of floor and wall coverings\*. During the authorisation of a product, the manufacturer must prove compliance with these values through a product emissions certificate. The certificate contains the values measured in a test chamber in which only that one product was tested. Manufacturers of floor coverings in Belgium must also submit an emissions certificate of this type upon request\*\*. In France, all construction products used for interior finishings must be fitted with a label\*\*\*. The measured VOC concentration of a product is calculated with a specific emissions rate. The calculation must simulate the indoor air of the real life situation based on an established charge scenario. Upper limits are defined for the VOC emission classes A+, A, and B; class C does not have a limit.

- \* The general technical authorisation of the DIBt applies the AgBB scheme (Committee for the Health-related Evaluation of Building Products).
- \*\* The Belgian VOC regulation is based on the German AgBB Scheme, but has different thresholds. It entered into force in August 2014.
- \*\*\* VOC label according to Decree 2011-321

Naturally, EGGER products comply with all current legal requirements. Nevertheless, EGGER insists that thresholds have a founded toxicological basis.



In the case of the following construction products, which come on the market in France, placing this VOC label is obligatory: walls, ceilings, floor coverings and coatings, room partition panels and suspended ceilings, insulation materials, doors and windows, as well as materials that are needed for their installation or assembly.

# Compatible Surfaces

“What surfaces are available on wood-based materials?”

## COMFORT\* TECHNOLOGY



**Cork** is a renewable and therefore environmentally-friendly raw material. Millions of air pockets make the flooring warm, soft and silent. EGGER applies the decor image for the Comfort\* series with direct print technology (DPR®) in environmentally-friendly, elastic coatings directly onto the cork layer. The flooring is sturdy and also easy to process.

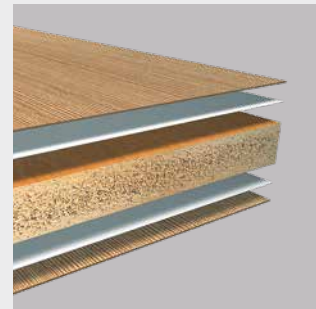
Composition of a coated Comfort\* floor.



Composition of EGGER laminate.

Wood-based materials are usually upgraded with melamine resin surfaces, coatings or laminate. Melamine resin coatings on various coreboards dominate. They consist of one or more layers of impregnated decorative paper that is applied to the board. For laminates, several soda kraft papers impregnated with phenolic resins are added. An overlay also protects the surface of some products. The composition of the coatings determines their durability, appearance and feel.

Melamine-faced Eurodekor Chipboard.



The melamine-faced, decorative wood-based material Eurodekor is among EGGER's best-selling products. Similar to a laminate, this is a fully-cured coating system. This means that no excess free formaldehyde is left after production. As such, there are also no emissions from the coated surface.

## “ Are there emissions from coatings and resins?

Melamine resin surfaces, laminates and most coatings are fully-cured systems. Their own emissions are very low. They also block emissions from the coreboard, so that the laminated board exhibits far lower values for VOC and formaldehyde emissions compared to the rawboard. Some exceptions apply to coatings, for example with azoic dyes that may be harmful to health.

EGGER does not use any azoic dyes and neither do its suppliers of printed decorative papers. Only azoic pigments are used in the papers, for coatings and the direct printing of rawboard. Unlike azoic dyes, these are insoluble in the application medium. The pigments cannot be absorbed and are thus not poisonous. Today they are used in printing inks, synthetic materials, coatings and food packaging.

## “ Where does the paper for lamination come from?

A large quantity of paper is processed into laminates, the impregnated papers for melamine resin and flooring coatings. Wood is the raw material. As a result, the responsible use of resources and the paper procurement method are both important.



Rolls of paper for processing into decors at EGGER.

EGGER only processes paper with a certified or controlled origin. FSC® and PEFC certify exemplary and sustainable forestry. The FSC® Controlled Wood Standard applies to the controlled origin.

## “ What is an EPD?



EPD stands for environmental product declaration. In this document, the manufacturer lists all environmentally-relevant information regarding a certain material, including the description of the products and its manufacturing process. An independent committee of experts then verifies and confirms the data. EPDs can be used during the certification of the environmental performance of building projects.

EGGER was Europe's first wood-based material manufacturer to disclose the environmental performance of its wood-based materials in independently-verified EPDs. Today EPDs are available for all major EGGER products: MDF boards, Eurospan and Eurodekor products, timber, DHF, Eurolight, laminate and OSB as well as DPL and DPR flooring.

## Disclosing Performance

## “ What is the purpose of an EPD?

An Environmental Product Declaration allows builders, architects and processors to establish the environmental impact of materials and process steps. In this way, they obtain more clarity and control when comparing with other products and construction methods by ecological, economical and socio-cultural criteria.

The usual systems of sustainable building certification, such as LEED and DGNB, assess buildings according to social, ecological and economical criteria. Certain information about the construction materials used in the building is used for the assessment. They are gathered in the EPD.



**What performance figures are included in an EPD?**

The European standard EN 15804 has been in place since 2011. It establishes the framework conditions for construction product EPDs, such as the calculation method for the environmental performance assessment and the division of the product life cycle in individual modules. Modules are designated from the raw material extraction, to manufacturing, through to disposal of a product. Scenarios for the construction and utilisation phase are also defined, which can be taken into account in the EPD. The core element of every EPD is the environmental performance assessment, which quantifies key environmental effects on climate, soils and waterways (see also ‘potential impact’ on page 33).

EGGER always keeps its EPDs up-to-date. The programme sponsor for our EPDs is the renowned German Institut für Bauen und Umwelt (Institute for Construction and the Environment) (IBU). We make our EPDs accessible to the public via central databases and on the internet under [www.egger.com](http://www.egger.com).



# Environmental Performance Assessment Overview

“ *What is the purpose of the environmental performance assessment?* ”

The environmental performance assessment ('Life Cycle Assessment', LCA) determines the environmental impact of products. In principle, it can illustrate all stages of a life cycle, from the manufacturing of a product to recycling to disposal. The sum of necessary resources and emissions ('Life Cycle Inventory Analysis') can be converted to indicators for a comprehensive impact assessment. Standards ISO 14040 and ISO 14044 regulate the execution of an environmental performance assessment.

With EGGER wood-based materials, we establish the good environmental performance of the raw material wood. As such, a single-family house built with wood can store up to 80 tonnes of CO<sub>2</sub>. Added to this, there is also the substitution effect of wood for other raw materials. For instance, the manufacturing of aluminium requires a hundred times more energy than constructing with wood.



## “What environmental impacts are included in the LCA?”

GLOBAL WARMING POTENTIAL IN KG CO <sub>2</sub> EQUIVALENT*			
	Wood stud wall	Metal stud wall	Solid wall
Construction and maintenance	198	199	445
CO <sub>2</sub> caught in wood	-238	-9	-
Disposal (emitted)	250	7	43
Disposal (electricity & steam credit and/or recycling potential)	-114	-62	-
<b>Total potential</b>	<b>97</b>	<b>136</b>	<b>488</b>

\*Source: ÖkoPot-Projekt, UV Hamburg, 2008.

The environmental impact, that is the effect on climate, soil, and waterbodies, can be compared with the help of so-called impact indicators. One indicator is the ‘Global Warming Potential’ (GWP), which calculates the potential impact on climate change and places it in relation with carbon dioxide.

EGGER wood-based materials represent an environmentally-friendly alternative to many materials. As compared to concrete, brick and metals, wood does significantly better on key indicators, such as primary energy consumption and global warming potential. As visible from the example on the left, the carbon footprint of a wooden stud wall is five times better than the one of a solid interior wall.\*

## “What is the role of energy consumption in the environmental performance assessment?”

The environmental performance assessment of a product measures the primary energy consumption in megajoules (MJ). This, as opposed to secondary energy, is the energy that can be used without conversion. LCAs determine the primary energy needs from renewable energy sources from wind and water power, solar energy, and biomass and non-renewable energy sources, such as coal, natural gas and oil.

EGGER invests in renewable energy sources. For example, the amount of primary energy that originates from the renewable energy sources consumed in our biomass power plants is three times as high during the production of the EGGER OSB board than is the energy share from non-renewable energy sources.\*

\*Source: EPD EGGER OSB

“ *Why is it important to certify a sustainable construction method?* ”

A certificate which confirms the sustainability of a building’s construction method and operation contributes to its overall value. Both EPDs, according to EN 15804, and environmental performance assessments for buildings remain voluntary. However, invitations to tender are frequently requiring EPDs for building materials.



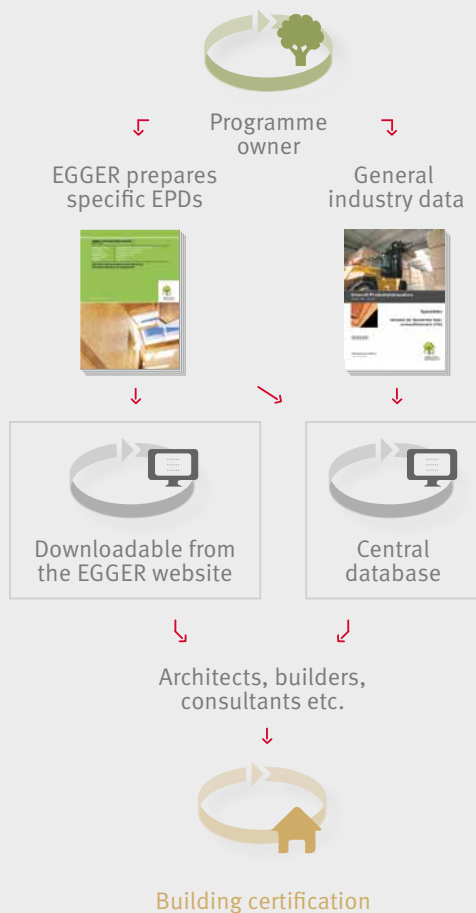
In its own building projects, EGGER also pays attention to certified sustainability. In constructing the new office building in Radauti (RO), we only used our own wood-based materials and received the DGNB (‘Deutsche Gesellschaft für Nachhaltiges Bauen’ – German Association for Sustainable Construction) certificate in gold for it. The EGGER TechCenter in Unterradlberg (AT), the new Forum in Brilon (DE) and the new administrative building in St. Johann (AT) were built in the same way.



**Adding Value  
with Certificates**

## “How do certified construction materials contribute to building certification?”

### BUILDING CERTIFICATION PROCESS



## “What certificates are available?”

Building certification requirements refer to many different aspects, including the environmental performance assessment of the building materials used. Architects and planners can research industry-wide averages in public databases such as Ökobau.dat and the ESUCO (European Sustainable Construction Database). Innovative manufacturers also enter their EPDs there. This enables more reliable assessments of a building’s sustainability.

EGGER takes the lead in providing straightforward answers. We deliver key indicators for building certification, based on a variety of systems. We take into account the fact that scientifically-based environmental performance assessments have now become standard. Our EPDs, issued by the Institut für Bauen und Umwelt (IBU), are available in public databases and via our internet page.

The certification systems differ by programme owner and region. Established certificates include those of the German Gesellschaft für Nachhaltiges Bauen (DGNB), the American Leadership in Energy and Environmental Design (LEED), the British Building Research Establishment Environmental Assessment Method (Breeam) and the French Haute Qualité Environnementale (HQE).

For its products, EGGGER has EPDs which contain indicators for the most important requirement catalogues of various certification systems.

## “What does ISO 14001 mean?”

### FROM THE EGGER MISSION STATEMENT

#### **Our values as family company**

→ The further development of the company is central to our decisions.

#### **Our environment**

→ The sustainable use of raw materials is a top priority for us.

→ We achieve this by generating energy in our own biomass power plants, by using the most up-to-date, sustainable processing technology and environmentally-friendly logistics systems.

ISO 14001 is the global standard for corporate environmental management. The certified environmental management system monitors compliance with legislation and helps diminish or avoid negative corporate environmental effects. An environmental management system includes a corporate environmental policy, environmental objectives and an environmental programme.

The environment and sustainability are central elements of the EGGER philosophy. In 2009, the plant in Unterradlberg (AT) became the first EGGER plant to obtain an ISO 14001 certificate. In the meantime, a large majority of the plants are certified. The goal is to obtain ISO 14001 certification for all EGGER plants.

## Continuous Improvement

## “How does an ISO 14001 certification work?”

The basis of the ISO 14001 is a PDCA cycle (‘Plan-Do-Check-Act’). Measures are planned, executed, controlled and checked in a systematic cycle. The basis of the inspection are environmental aspects, legal compliance, environmental risks and the entire system, which flow back into the new environmental objectives and the environmental programme. System inspections - the environmental audits - take place at regular intervals, performed by independent inspectors, who are the environmental auditors. The auditors provide valuable input for the further development of our environmental management.

EGGER has developed and achieved these environmental goals thanks to a systematic environmental management system (see right). Environmental management is also deeply rooted in administrative and planning decisions.

## “What is ISO 50001?”



The wood dryer at the St. Johann EGGER plant serves as a clean, renewable energy heating source for neighbouring communities, thanks to sophisticated air purification. The connection to the district heat network makes sure that even the energy content of unusable wood and production waste is fully exploited.

ISO 50001 was introduced in 2011 and concerns the management of energy flows. Energy sources, energy consumption and energy consumers are systematically considered and assessed with regard to their efficiency. In addition to technical measures, organisational aspects are also relevant. As in the case of the ISO 14001, a continuous PDCA cycle continuously refines the results.

All German and British EGGER locations are certified according to ISO 50001. In order to improve the energy balance, more efficient electric motors were purchased. Lighting was also switched to LEDs, and compressed air and power supply were optimised.

## “How does EGGER improve environmental performance during production?”

The ISO 14001 environmental policy defines goals for better environmental protection. These are implemented as part of the environmental programme.

In addition to the above mentioned energy efficiency measures, EGGER sets the pace for the future, for example with the acquisition of an electrical truck fleet for loading and production in Unterradlberg (AT). The development of a Group-wide IT-supported legal compliance system ensures compliance with legal and environmental requirements. Other examples of our environmental commitment are the programmes for reducing fossil fuel emissions, such as the optimised control of hot gas generators or the waste heat recovery for the district heat network in St. Johann (AT). The cycle concept is also implemented in Hexham (UK), where energy released by the glue facility is fed directly into the thermal oil circuit of the neighbouring production processes. Rainwater is collected, processed and used in production as well as for exhaust air purification in the plants of Brilon (DE) and Rion des Landes (FR).

### CERTIFIED MANAGEMENT SYSTEMS

Country	Location	Quality	Environmental issues	Energy
Austria	St. Johann in Tirol	ISO 9001	ISO 14001	
	Wörgl	ISO 9001	ISO 14001	
	Unterradlberg	ISO 9001	ISO 14001 + EMAS	
Germany	Brilon	ISO 9001	ISO 14001	ISO 50001
	Bevern	ISO 9001	ISO 14001	ISO 50001
	Gifhorn	ISO 9001	ISO 14001	ISO 50001
	Bünde	ISO 9001	ISO 14001	ISO 50001
	Marienmünster	ISO 9001	ISO 14001	ISO 50001
	Wismar	ISO 9001		ISO 50001
UK	Hexham	ISO 9001	ISO 14001	ISO 50001
	Barony	ISO 9001		ISO 50001
France	Rambervillers	ISO 9001	ISO 14001	
	Rion des Landes	ISO 9001	ISO 14001	
Russia	Shuya	ISO 9001		
	Gagarin	ISO 9001		
Romania	Radauti	ISO 9001	ISO 14001	
Turkey	Gebze	ISO 9001		



# EGGER Glossary

A – B

## A

**AGBB** → The Committee for the Health-related Evaluation of Building Products in Germany consists of representatives of regional health authorities, the Federal Ministry of Environment, the German Institute for Building Technology, the conference of Ministers of Construction, the Federal Institute for Materials Research and Testing, the Federal Institute for Risk Assessment, and the Coordination Committee 03 for Hygiene, Health, and Environmental Protection of the Construction Standards Committee. In 2001, it worked on a procedure for the health assessment of → **VOC** emissions from building products used indoors. ■

**ATCM** → Airborne Toxic Control Measure. See → **CARB-2**. ■

**AUSTRIAN ECOLOGICAL LABEL** → This ecological label has been awarded by the Austrian Ministry of Life since 1990. It is an ecological label for products, tourism businesses and educational facilities. There is a separate testing directive for the certification of each individual section and every type of product. Directives UZ 07 'Wood and Wood-based Materials' and UZ 56 'Floor Coverings' apply to wood-based materials. The objective of the quality seal is to publicise the environmental impact of consumer goods due to their manufacturing, utilisation and disposal. ■

Source and additional information: [www.umweltzeichen.at](http://www.umweltzeichen.at)

## B

**BAUBOOK** → The Austrian Baubook GmbH is a comprehensive information and communication hub for energy-efficient and ecological building, and supports sustainable building projects and healthy living. It is supported by the Vorarlberg Energy Institute and the IBO GmbH. Manufacturers can declare their products in the Baubook (Construction book). They specify physical and ecological indicators, as well as characteristics typical

of the product group, along with the product description, images and technical data and safety sheets. Following successful quality checks, the products are listed on all relevant Baubook platforms and exported to computation programmes for the energy performance certificate. This simplifies the handling of subsidised residential buildings. ■  
Source and additional information: [www.baubook.info](http://www.baubook.info)

**BIOMASS** → Mix of substances bound in living organisms and/or generated by them. Its scope is determined by its mass. Biomass is often only recorded for selected ecological systems. Or it is only determined for certain, individual populations. There is no uniform biomass term in ecology. However, it is differentiated along two points of view: ecological biomass (estimated mass of living organisms per area) and energy-related biomass. The latter includes exclusively animal and plant products that can be used to produce energy. ■

**DER BLAUE ENGEL (THE BLUE ANGEL)** → The 'Blue Angel' quality label in Germany has been designating environmentally-friendly products and services since 1978. The label is owned by the Federal Ministry of the Environment, Nature Protection and Nuclear Safety. Certain criteria must be fulfilled to be awarded the label. Directive RAL-UZ 76 applies to wood-based material boards, and RAL-UZ 38 for products made of wood-based materials. EGGER carries the Blue Angel label on *EGGER DPL laminate flooring*, *EGGER DPR® laminate flooring* and *EGGER DHF*. ■  
Source and additional information: [www.blauer-engel.de](http://www.blauer-engel.de)

**BREEM** → Building Research Establishment Environmental Assessment Method: a British building certification system founded in 1990, with more than 200,000 buildings certified according to its worldwide standard. The evaluation categories include construction, the use and design of materials, energy and water consumption, as well as transport, material, ecology and waste management. BREEM makes requirements catalogues available for a variety of building types, from school to office buildings, prisons and hospital facilities. The method summarises the gathered points in an overall

## B – C

assessment and evaluates it according to five performance levels, from ‘pass’ to ‘exceptional’. ■

Source and additional information: [www.breeam.com](http://www.breeam.com)

## C

**CARB-2** → In 2007, the California Air Resources Board (CARB) issued a measure for the control of airborne toxic substances (Airborne Toxic Control Measure: ATCM), which includes guidelines for formaldehyde emissions from wood-based materials. The regulations are binding for all manufacturers, importers, fabricators, retailers and certification bodies that work with wood-based material products for the Californian market. ■

**CARCINOGENICITY** → Describes the ability of chemical substances to cause cancer or to promote the development of cancer. ■

**CASBEE** → The CASBEE certificate was developed in 2001 by the Japan Sustainable Building Consortium (JSBC). It measures the environmental efficiency of a building and is tailored especially for the requirements placed on buildings in Japan and Asia. The CASBEE system consists of four different assessment criteria for every life cycle of a building: from design and construction, to operation and refurbishment, all the way to demolition. The assessment schema can be applied to a variety of uses - office buildings, schools and homes, etc. It is based on the principles of → **BREEAM** and → **LEED**. ■

**CASCADING USE** → Use of a raw material through several stages, striving for the most sustainable and effective use while reducing the consumption of raw materials. Raw materials or the products made from them are used for as long as possible. As a rule, a usage cascade permits the use of materials one or more times with decreasing added value, as well as a final energy use or composting of the raw material. Renewable raw materials (NAWAROS) are particularly well suited to multiple use thanks to their ‘hierarchical’ structure, as they have the unique advantage that the stored carbon dioxide remains in circulation for a long time before it is returned to the environment. ■

**CE CONFORMITY** → The CE mark documents the compliance (conformity) of a product with the requirements of standards or permits used in Europe. Wood-based materials intended for use in construction are regulated according to the harmonised European

norm EN 13986 with regards to key properties, testing procedures for determining these properties and labelling. It also describes the procedure for assessing conformity, which shows that the wood-based materials fulfil the requirements that apply to them. ■

**CHAIN-OF-CUSTODY** → The certification of the product chain makes sure that the raw material sources and the material flow from acquisition of the raw materials to the sale of the end product is continuously documented and monitored. This verification management has been in place for a long time for particularly sensitive products (e.g. medicine). Companies in the timber industry with their independent inspection and certification guarantee the verification of the wood flow. It provides the end user with the necessary security that the wood used within the product comes from sustainable forestry. ■

**CHAMBER TEST** → Method for determining formaldehyde emissions from wood-based materials and their products under certain defined conditions (temperature, air humidity, air exchange rate, air speed, and loading factor). The sample is introduced into the chamber surrounded by ambient air. The formaldehyde emitted during the test is absorbed by periodically distilled water and then analysed quantitatively. The test is regulated by the European standard DIN EN 717-1, as well as the American measurement standards ASTM E 1333 and D 6007. ■

**CHIPBOARD** → The most important product by volume among wood-based materials, chipboard is usually produced on continuous lines. It is made from wood chips and binding agents. Chipboard is usually composed of three layers. The core layer with somewhat larger chips provides strength, while the surface layers with finer chips form a smooth and cohesive surface. ■

**CO<sub>2</sub>** → Carbon dioxide is an acidic, non-flammable, colourless, odourless, chemically relatively-inert gas that is produced when burning organic substances and is involved in the greenhouse effect in the atmosphere. ■

**CO<sub>2</sub> FOOTPRINT** → The CO<sub>2</sub> footprint (also CO<sub>2</sub> balance) is a measure for the total amount of greenhouse emissions caused directly or indirectly by a certain activity, or which is produced throughout the life stages of a product. All → **EMISSIONS** which contribute to the greenhouse effect are converted into carbon dioxide equivalents. The computation of the carbon footprint was first defined at the beginning of 2012 in the preliminary draft of the ISO 14067. It is also identifiable from the product’s



environmental performance assessment. ■

**CO<sub>2</sub> RESERVOIR** → Substances that are able to temporarily or permanently absorb and store carbon. It is generally assumed that any biomass is capable of storing CO<sub>2</sub>. Forests are large carbon sinks, as trees absorb carbon from the air and store it in the wood. However, oceans are the largest CO<sub>2</sub> reservoirs by far. ■

**CONTROLLED WOOD** → Companies who produce → **FSC**<sup>®</sup> certified products are also allowed to process wood from non-certified forests to a limited degree. In order to prevent the mixing of wood from controversial sources with FSC<sup>®</sup> certified products, the FSC<sup>®</sup> require a certificate of origin with a thorough risk assessment for these non-FSC<sup>®</sup> certified elements. In the case of low risk, this wood can be integrated as controlled wood (Controlled Wood = CW) in the production of FSC<sup>®</sup> products. If the material comes from an area with uncertain risk, elaborate individual audits are necessary in the forest. A risk analysis developed by FSC<sup>®</sup> has been in place since 1 August 2011, and it must be applied in FSC<sup>®</sup> certified companies. ■

**CO-PRODUCT** → Secondary and by-products are designated as co-products. It is a material that is produced during the initial processing of log wood along with another (primary) product from the same raw material (e.g. hackchips, sawdust and trimmings). In the sawmill industry there is also the term of sawmill by-products. ■

**CRADLE-TO-GATE** → **LCA**. ■

## D

**DESICCATOR** → Also: Exsiccator. A testing device for determining the formaldehyde emissions for wood-based materials. Pre-conditioned test bodies are stored at a constant temperature in an exsiccator in which there is a dish with distilled water. The formaldehyde emitted by the test samples is absorbed into the water over a period of 24 hours and then analysed. The test is described in the Japanese standard JIS A 1460. ■

**DGNB** → Deutsche Gesellschaft für Nachhaltiges Bauen e.V., is a certification system for sustainable and economically efficient construction in Germany. It was founded in 2007 by 16 initiators from various fields within the construction and real estate sectors. A certification system was released just one year later and more than 750 projects have been certified. Approximately 50 criteria from

the fields of ecology, economy, sociocultural and functional aspects, technology, processes and location apply to the assessment of construction projects. Depending on the degree of compliance with the requirements, the programme owner DGNB issues certificates in gold, silver, or bronze. ■

Source and additional information: [www.dgnb.de](http://www.dgnb.de)

## E

**E 0.3** → Unofficial designation for wood-based materials classified as → **F\*\*\*\*** according to the Japanese standard JIS A 5908. It corresponds with approximately one third of the formaldehyde emissions of the → **E1** class.

**E 0.5** → Unofficial designation for wood-based materials classified according to the European → **EPF-S** standard and the Californian → **CARB -2** standard. These standards correspond to approximately half of the formaldehyde emissions of the → **E1** class.

**E1** → The harmonised standard EN 13986 regulates requirements for the use of wood-based materials in construction and the emissions class E1. In Annex B of the standard, the formaldehyde emissions class E1 defines a formaldehyde emissions threshold of 0.124 mg/m<sup>3</sup> air (0.1 ppm) in a chamber test according to EN 717-1. ■

**ECOLABEL** → In 1992, the European Commission introduced the European Ecolabel as an international quality seal. In the year 2000, the European Parliament and the European Council passed the related Directive 1980/2000/EC. It is managed by the European Union's Ecolabel Committee. However, a criteria catalogue is currently only available for flooring (basic award criteria 2010/18/EC). Building products and wood-based materials have not been labelled yet. ■

Source and additional information: [www.ecolabel.eu](http://www.ecolabel.eu)

**EMAS** → Eco Management and Audit Scheme, the European environmental management system. All public and private sector organisations may participate on a voluntary basis. The goal is the continuous improvement of a company's environmental protection through the respectful and efficient use of resources. With the help of EMAS, ecological and economic weak points within organisations can be removed, along with saving materials, energy and costs. ■

**EMISSIONS** → Discharge or output of pollutants into

## E – H

the environment. In the case of wood-based materials, it is particularly → **FORMALDEHYDE** from bonding media, but also volatile organic compounds (→ **VOCs**), which originate in the wood itself (e.g. terpenes). ■

**EPD** → An environmental product declaration provides quantified environmental information about the life cycle of a product or service. Independently-verified data of the respective product is represented in the form of a life cycle inventory analysis with input and output flows. An EPD represents a declaration according to Type III ISO 14025. This standard, targeting industry, trade and end users, specifies that an EPD must present quantitative information regarding environmental impact, without judging them based on a life cycle assessment. In addition, this standard stipulates that a valid Environmental Product Declaration must be made available publicly via a programme operator. ■

**EPF-S** → Formaldehyde emissions class of the ‘European Panel Federation’, corresponds to approximately half of → **E1** (EPF-S defines 4 mg HCHO / 100 g ATRO chipboard according to EN 120)

**EUTR** → EU Timber Regulation, an EU wood trade regulation (in detail: Commission Implementing Regulation (EU), No. 607/2012 of 6 July 2012), which regulates the control of wood sources in addition to FSC® and PEFC. The EUTR requires the market participant who trades in wood or wood products for the first time, to develop and apply a due diligence system. The purpose of the regulation is to ensure, subject to various evaluation principles, that the wood or wood products in question do not come from illegal harvesting or critical sources. ■

**EXSICCATOR** → **DESICCATOR**. ■

## F

**F\*\*\*\*** → A formaldehyde emissions class issued by the Japanese Ministry for Land, Infrastructure, Transport, and Tourism in 2003 as a new regulation for classifying building products according to their formaldehyde emissions. Products with formaldehyde emissions below 0.005 mg/m<sup>2</sup>h or 0.3 mg/l comply with F\*\*\*\* and their use in Japan is not limited in any way. ■

**FDES** → French term for → **EPD**, ‘Fiche de Déclaration

Environnementale et Sanitaire’, or ‘Data Sheet for Environmental and Health Declaration’.

**FORMALDEHYDE** → Colourless, pungent gas which may be emitted, for example, during the hydrolyse of urea-formaldehyde resins. Formaldehyde may cause allergies, skin, airway or eye irritation in humans. It may be carcinogenic over long-term exposure. ■

**FSC®** → The Forest Stewardship Council® was established in 1993 as an international organisation and is supported by environmental associations such as the WWF, forest owners, wood industry, trade unions and indigenous peoples in its efforts to curb the depletion of forests. FSC® is independent and does not pursue financial interests. Its goal is to label wood from socially and environmentally responsible forestry with a quality seal. In order to guarantee this, independent experts check wood on a yearly basis in the context of a certification. ■

## G

**GREENHOUSE GASES** → The complete reflection of energy from the sun is prevented from complete reflection by gaseous substances in the atmosphere (greenhouse gases), which produces a habitable climate on Earth’s surface. A disturbance of this natural greenhouse effect leads to global warming and is largely blamed on human activities. With the Kyoto Protocol, a binding accord under international law was concluded to reduce the man-made emission of major greenhouse gases. ■

**GREY ENERGY** → Energy quantity required for the manufacturing, transport, storage, sale and disposal of a product. This also includes the energy used for producing the equipment needed for manufacturing a product (machines, infrastructure, etc.). Thus, grey energy is the actual, total energy need for creating a consumption good. The energy use that occurs through its utilisation is not included in the grey energy. ■

## H

**HONEYCOMB BOARD** → Three-layer composite boards made of one honeycomb core and two cover layers. In the wood-based materials industry, the middle layer generally consists of cardboard honeycomb, the cover layers are made of various wood-based materials. Honeycomb boards offer very high strength relative to their

weight thanks to their sandwich structure and are used mainly in lightweight building. ■

**HQE** → The French system for the optimisation of the ecological quality of building projects – Haute Qualité Environnementale (HQE) – was first tested in 1994 and has been in use since 1997. The HQE certification covers three phases: order, design and execution. The audits are performed at the end of the three phases. The focus is on two aspects: the ecological management of building projects and sustainable building design. In order to obtain the HQE certificate, at least 30 points out of 110 must be reached in 14 categories. Obligatory categories are harmful substances, energy management and water efficiency. At least 19 points out of 45 must be reached in these. The builders may then choose from among the remaining categories those that are best suited to the profile of the building and the requirements of the user. ■

**IBU** → The Institut Bauen und Umwelt (IBU) is an initiative of construction building products manufacturers, who have decided to jointly respond to the requests for more sustainability in construction. IBU is a recognised programme operator in Germany, who creates and publishes → **EPD**s for the building sector according to ISO 14025. The goal is to promote interest in the topic and the idea of sustainability. It is important for IBU members to build new competencies in view of a growing market. Both the public and users can access this information first hand at [www.bau-umwelt.com](http://www.bau-umwelt.com). ■

**IMPREGNATE** → In the wood-based materials industry, impregnates are → **UF, MF** or **PF** resin impregnated and dried decorative, unicolour or white papers, which are subsequently used for the coating process or to manufacture laminates. ■

**INDOOR AIR QUALITY** → Also: Room air quality. National and international bodies in the 90s raised questions of the precise evaluation of → **VOC** emissions from building products for improving air quality in closed rooms. ■

**IOS MAT** → IKEA environmental standards. This is an IKEA certification method which is used among other things for monitoring coated and uncoated wood-based materials with regard to relevant hazardous substances (such as → **FORMALDEHYDE**, → **PCP** and → **LINDANE**)

as well as the manufacturing process. ■

**IWAY** → Also: The IKEA Way. The IKEA conduct codes excludes products that were manufactured using child and forced labour, and requires safe, healthy working conditions, compliance with local laws and the responsible handling of chemicals. ■

**LCA** → A Life Cycle Assessment, also Environmental Performance Assessment, is a systematic analysis of the environmental effects of products throughout their lifetime ('from cradle to grave') or up to a certain point in their processing ('from cradle to factory gate'). The analysis includes all environmental effects during production, utilisations and disposal of the product, as well as related processes (e.g. manufacturing the raw and auxiliary materials as well as fuel). All ecologically-relevant elements removed from the environment (e.g. ores and crude oil), as well as emissions into the environment (e.g. waste and carbon dioxide emissions) are recorded and converted into environmental impact potentials. The environmental performance assessment is a fixed element of EPDs. ■

**LCI VALUES** → Assessment in the → **AGBB** schema takes place according to the so-called LCI values (Lowest Concentrations of Interest). A list with the LCI values of individual substances can be found in the appendix to the AgBB schema. LCI values were derived from MAC values (Maximum Allowable Concentration). ■

**LEED** → Leadership in Energy and Environmental Design is a U.S. classification system. It was developed in 1998 by the U.S. Green Building Council and included a series of standards for environmentally-friendly, resource-efficient and sustainable building. LEED offers various regulations, for example in new constructions and comprehensive rehabilitation, structural work without interior fittings or commercial interior design. A certain number of points must be achieved per category in order to fulfil requirements. The sum obtained leads to the classification of silver, gold or platinum. LEED is currently established in 135 countries around the world, with approximately 50 percent of certificates being issued outside the USA. ■

Source and additional information: [www.usgbc.org/leed](http://www.usgbc.org/leed)

**LIFE CYCLE ASSESSMENT** → **LCA**. ■

**LIGNUM** → The 'Lignum, Wood Industry Switzerland' established in 1931 is the umbrella organisation of the

## L – P

Swiss forest and wood industry. It brings together several important associations and organisations of the wood utilisation chain, research and teaching organisations, public entities and companies, as well as a large number of architects and engineers. Among other things, Lignum focusses on the topic of formaldehyde and champions wood-based materials with emissions that are below strict thresholds. The organisation offers comprehensive information on this topic, including a list of wood-based materials that are suitable for interiors. ■

Source and additional information: [www.lignum.ch](http://www.lignum.ch)

**LINDANE → PCP.** ■

## M

**MATERIAL CYCLE** → The objective of a closed loop material cycle is, on the one hand, to reuse all waste and by-products as efficiently as possible, and on the other hand, to make substances used in the product available again for production at the end of the product life cycle, by implementing optimal recycling. The possibility of a closed material cycle should be taken into account even during the preliminary stage of product planning in conjunction with product design. ■

**MDF** → Medium Density Fibreboard: wood fibre materials manufactured with the dry procedure. Basic raw material are fibres from fresh wood and bonding materials. ■

**MFC** → Melamine Faced Chipboard: melamine-coated chipboard, manufactured in short cycle coating facilities from wood-based materials with support and impregnated paper. ■

**MINERGIE ECO** → The Swiss association for building certification Minergie brings together the economy, the cantons and the federal level. It has developed various quality standards for buildings: 'Minergie', 'Minergie-P' and 'Minergie-A.' The 'Eco' supplement may be certified along with each standard. It establishes the exclusive use of healthy and recyclable building materials. In addition, the grey energy must have a share that is as low as possible in all building materials. The criteria in the questionnaire for new buildings must be fulfilled in order to be authorised for Minergie Eco. Minergie issues its own questionnaire for small new developments intended as residences, with a total surface of up to 500 m<sup>2</sup>. ■

Source and additional information: [www.minergie.ch](http://www.minergie.ch)

## N

**NORDIC SWAN** → The environmental label 'Nordic Swan' was introduced in 1989 by the Nordic Council of Ministers. It is implemented by the governments of Sweden, Norway, Iceland, Denmark and Finland. The Nordic Swan is one of the most widespread ecological labels and is highly regarded, particularly in the Scandinavian territory. The ecological label established requirements catalogues for both floor coverings and board materials in the field of construction and furniture. ■

Source and additional information: [www.svanen.nu](http://www.svanen.nu)

## O

**OSB** → Oriented Strand Board, wood-based materials made of aligned long, slender chips (strands). OSB boards are preferred in the field of construction. ■

## P

**P1 TO P7 BOARDS** → Classification of the field of application of chipboards based on mechanical properties and moisture resistance. P1: for general applications in dry conditions, P2: for interior fixtures in dry conditions, P3: for non-load-bearing applications in humid conditions, P4: for load-bearing applications in dry conditions, P5: for load-bearing applications in humid conditions, P6 for high load-bearing applications in dry conditions and P7: for high load-bearing applications in humid conditions. ■

**PAH** → Polycyclic aromatic hydrocarbons, a collective name for aromatic compounds with condensed aromatic ring systems; some of these substances are carcinogenic. They are generated, among other contexts, during the incomplete combustion of organic materials, but are also natural components of coal and petroleum. During the distillation of petroleum, they accumulate in bitumen, which was used until the 90s for the impregnation of wood, for example railways sleepers or weatherproofing posts. ■

**PCP/LINDANE** → Pentachlorophenole/hexachlorocyclohexane were, until the 60s-80s, the most widespread wood preservatives, and were also used as insect repellents (in particular lindane). Those who are exposed to PC/lindane for a longer period of time

display symptoms such as headaches, nausea, breathing difficulties, disturbed sleep, fatigue, irritation of the skin and mucous membranes, liver dysfunction and a weakened immune system. These symptoms have also been called ‘wood preservative syndrome’. ■

**PEFC** → The Programme For The Endorsement of Forest Certification Schemes is an international forest certification system. It is the world’s largest independent organisation active in ensuring and continuously improving sustainable forest management while guaranteeing ecological, social and economic standards. To ensure that small family forestry operations could obtain certification, PEFC chose an approach based on local workgroups and forestry reports. The forestry operations of the respective region are audited on a sampling basis at regular intervals. New goals are set for the continuous improvement of sustainable forest management that guarantees ecological, social and economic standards. ■

**PERFORATOR** → Testing device for establishing the → **FORMALDEHYDE CONTENT** of wood-based boards through extraction with toluene and subsequent photometric determination. The test is described in the European standard EN 120. ■

**PMDI** → Polymeric diphenylmethane diisocyanate, synthetic bonding materials for the manufacturing of wood-based materials that are free of formaldehyde, in particular → **OSB**. ■

**POST-CONSUMER RECYCLING** → Re-use of materials that were already used in products and have passed through a usage phase. The great challenge is to separate materials so that they can be used again as source materials for new products. However, this recycling often represents down-cycling, given that materials obtained this way can only be used to a limited degree. ■

**POTENTIAL IMPACT** → When drafting an environmental performance assessment, all product-relevant inputs and outputs are recorded in the form of substance and emission flows. In order to establish the relation to the environment, these flows are calculated with factors regarding their potential environmental impact (e.g. global warming potential, ozone creation potential, etc.). The potential environmental impact can be differentiated according to the local, regional and global impact. ■

**PRE-CONSUMER RECYCLING** → Pre-Consumer Recycling includes all materials and substances

that are used during the production of a consumer good and which do not reach the required quality objectives. They are waste and thus do not reach the consumer. These substances are often handled as waste and stored or subjected to thermal treatment. With complete pre-consumer recycling, these products and substances are instead used directly in the production of a product. ■

## R

**RAL** → The RAL Deutsche Institut für Gütesicherung und Kennzeichnung e.V. (previously Reichs-Ausschuss für Lieferbedingungen) organises the expert hearings for the award of the → **BLUE ANGEL**. The Institute also awards the European Ecolabel in Germany. The award criteria for the Blue Angel for the individual product classes are summarised in the RAL-UZ directives. The award criteria for the Blue Angel for wood-based materials is based on the RAL-UZ 76 directive for wood-based boards and the RAL-UZ 38 for products made with wood-based materials. ■  
→ **INDOOR AIR QUALITY**. ■

**REACH** → EU chemicals directive which entered into force on 1 June 2007. REACH stands for Registration, Evaluation, Authorisation And Restriction of Chemicals. REACH fundamentally harmonises and simplifies chemical legislation. ■

## S

**SCRAP WOOD DIRECTIVE** → Regulates the utilisation and disposal or scrap wood in Germany. Scrap wood means industrial waste wood and consumption wood. The directive classifies scrap wood into various categories (AI – IV and PCB scrap wood). This is important for the decision to recycle or dispose of the wood. ■

**SHORT-CYCLE LAMINATION** → This is a process to glue decorative papers soaked with resin (→ **IMPREGNATED PAPER**) to wood-based material coreboards. ■

**STOCK ACQUISITION** → Acquiring standing timber. The wood buyer is responsible for the organisation of harvesting to marketing. ■

## S – V

**SUSTAINABILITY** → The use of a system is sustainable if its key properties are maintained throughout several generations. Utilisation is sustainable if the stock is able to regenerate naturally within a human lifetime. The term originates in forestry management, where the use of the forest must correspond to yearly growth. Today, sustainability is no longer limited to material sustainability. Ecological, economic and social aspects are incorporated in the processes. ■

## T

**TVOC** → The Committee for the Health-related Evaluation of Building Products (→ **AGBB** 2008) in Germany established in 2001 a procedure for the health assessment of → **VOC** emissions from building materials used indoors. It defines TVOC as the sum of all individual substances with a measured concentration above 5 µg/m<sup>3</sup>. ■

## U

**UF, MF, PF, MUF, MUPF** → Abbreviations for adhesive systems most frequently used in the wood industry, where the main components urea (U), melamine (M) and phenol (P) react in a condensation reaction with → **FORMALDEHYDE** (F). In addition to being used in manufacturing, UF, MF, and PF are also used as resin systems for manufacturing → **IMPREGNATED PAPER**. ■

## V

**VOC** → (Volatile Organic Compound) Volatile organic (carbonaceous) compounds can vaporise at normal pressure due to their relatively high vapour pressure. According to the WHO, VOCs are divided according to their boiling points into Very Volatile Organic Compound (VVOC, boiling interval above 0 to 50 °C), Volatile Organic Compound (VOC, boiling interval between 50 and 100 to 240 and 260 °C) and Semi Volatile Organic Compound (SVOC, boiling interval between 240 to 260 and 380 to 400 °C). ■







This brochure was prepared based on detailed reviews and in good conscience. Great care has been taken to ensure that the information contained is accurate and corresponds to the current state of knowledge at the time the brochure was published. However, the brochure and the information it contains do not constitute the object nor content of any contractual agreements

and must neither be construed as a warranty for products or services, nor can or should they serve as assurance of product characteristics, for example the suitability for certain applications. In particular, this brochure cannot serve as an instruction for the use of the products described. Any liability for erroneous, incorrect or obsolete information is excluded.

# THANK YOU

We would like to express our thanks to the Fraunhofer-Institute for Wood Research Wilhelm-Klauditz-Institute WKI in Braunschweig, as well as PE INTERNATIONAL in Vienna for the support they provided.



*Fraunhofer-Institut für Holzforschung*  
Wilhelm-Klauditz-Institut WKI  
Bienroder Weg 54 E  
38108 Braunschweig

The WKI in Braunschweig is involved in current and future projects related to the use of wood and other renewable raw materials. This includes processes for the manufacture of chipboard and fibre materials, surface technologies, measures for wood protection, for environmental research and recycling.



*PE CEE Nachhaltigkeitsberatung & Software*  
Vertriebs GmbH  
Hütteldorferstr. 63-65 Top 8  
1150 Vienna

PE INTERNATIONAL supports international corporations in developing consistent sustainable manufacturing since 1991. Today PE INTERNATIONAL is the market leader in strategic consulting, software solutions and comprehensive services in the topic area of sustainability.

**PUBLISHER** FRITZ EGGER GmbH & Co. OG  
Holzwerkstoffe  
Weiberndorf 20  
6380 St. Johann in Tirol  
Austria  
T +43 50 600 - 0  
F +43 50 600 - 10111  
info-sjo@egger.com

**PROJECT MANAGEMENT** 4. Issue:  
Moritz Bühner, Product Management Basic Materials & Environment

**DESIGN & LAYOUT** Raufeld Medien, [www.raufeld.de](http://www.raufeld.de)

**PHOTOGRAPHY** EGGER, Fotolia, Markus Mitterer,  
iStockphoto, Christian Vorhofer,  
Martin Rugner, Raufeld Medien

**PUBLICATION DATE** March 2019

**NOTES** Please submit your comments, suggestions  
and criticism to [environment@egger.com](mailto:environment@egger.com)

[www.egger.com/environment](http://www.egger.com/environment)



Would you like to know more?  
Simply scan here and get detailed information.

**FRITZ EGGER GmbH & Co. OG**

**Holzwerkstoffe**

Weiberndorf 20

6380 St. Johann in Tirol

Austria

**T** +43 50 600-0

**F** +43 50 600-10111

[info-sjo@egger.com](mailto:info-sjo@egger.com)