

# Breathe easily WITH EMICODE®

THE QUALITY SEAL for low-emission products



Since 1997



GEV member

# Preface



**Dipl.-Ing. Gerhard Zach**  
President of the Association  
of German Architects (VDA)

**Climate change and an ever-changing work environment will result in more and more people spending the majority of their lives indoors.**

**Heating in winter, cooling in summer – ventilation systems are standard equipment today. Indoor air quality is therefore becoming increasingly important.**

Indoor air quality highly depends on the harmful emissions from building materials. With the implementation of the passive house standard for new builds, the principles of "green building" will become state of the art in offices and private homes.

For building materials, this means they have to meet very high demands regarding their emission behavior, sustainability, recyclability and durability. Moreover, they should offer ease of renovation and replacement and must be adaptable to different uses: office today, residential living space tomorrow.

In the future, the value of a property will be largely determined by the costs incurred: either the cost of demolition and disposal, or the cost of modernization, renovation or change of use. Every emission is a burden to our health and environment and leads to depreciation. Low-emission building is therefore the way into the future.

For architects, these requirements are hard to meet without neutral, easy-to-understand and legally sound guidance. This is where the EMICODE® comes in. It offers advice, ensures perfectly sustainable green building and provides reliable information on all building materials.

What has long been a minimum requirement in kindergartens and schools will also be the future standard for private homes and workplaces.

This makes a quality seal like the EMICODE® an indispensable tool for planners, helping them to ensure future-proof, standard-compliant and legally sound planning. ■

## Information for everyone from planners to end users

Information about the EMICODE® system can be found in several languages on our homepage – either brief and concise or in greater detail – to suit various interests.

## Added value in our online brochures

On many pages in this brochure, you will find direct links to more in-depth information on emissions and the EMICODE® system.

[www.emicode.com/en/home](http://www.emicode.com/en/home)

# Contents

## When is a building material "sustainable"?

When is it made from safe and eco-friendly raw materials? When is it produced in a resource-saving manner? When its service life exceeds that of comparable products? Or when it can be recycled and thus reintroduced into the value creation process?

To date, there have been many approaches to backing sustainable building by measurable targets. They range from building certification systems, for example LEED or DGNB, over Environmental Product Declarations (EPDs) to the German Assessment System for Sustainable Building (BNB). Up to now, it has been difficult to measure the

absolute sustainability value of a single product. The individual facets of sustainable action in the industry are too diverse. In addition, there is also the question of how a product's sustainability and quality relate to each other. Established rating systems tend to assign better sustainability scores to low-quality products because they contain larger quantities of fillers and thus require less energy and fewer raw materials.

Experts know, however, that the sustainability of a building product can only be determined in relation to its intended use. A flooring adhesive, for instance, significantly adds to the durability of a floor covering, thus making a valuable contribution to the building's sustainability. The same applies to

parquet flooring. But all labels and certifications in the market to date make use of a different sustainability criterion – regardless of the intended use: the amount of emissions released into indoor air. The EMICODE® is the leading classification system based on long years of experience in the measurement and evaluation of emissions. It divides building materials into three classes, depending on the amount of emitting organic substances. The system thus provides architects and planners, building clients and end users as well as craftsmen with reliable guidance when selecting suitable products for green and sustainable building. ■

## 05 What does the EMICODE® offer?

## 07 Three classes, one system

## 09 Controlled quality

## 11 EMICODE® – the most demanding VOC ecolabel

## 13 Product range

## 15 Added value

## 17 Committed to the EMICODE®

## 19 Reactions from the industry

## 21 A word or two in conclusion

## 23 Glossary and imprint



# What does the EMICODE® offer?

## Environmental certificates are becoming the key factor for making a buying decision.

If buildings are to be certified as sustainable after construction, it is of key importance to assess the environmental impact and emission behavior of the building products to be used – in fact, before they are installed.

Today, there are various evaluation standards for "green building". In most of them, emissions play a central role for assessing whether or not a building is sustainable and offers healthy living. The criteria established, for example, by the DGNB (German Sustainable Building Council) stipulate that buildings that do not meet certain minimum requirements cannot be certified.

An essential parameter for indoor air hygiene is the concentration of harmful volatile organic compounds (VOCs) emitted into the ambient air from a diverse range of materials.

It's a fact that people tend to spend more and more time indoors. For this reason, the type and quantity of emissions entering indoor air from materials used on walls and floors is becoming an increasingly pressing issue.

Modern facades are perfectly insulated and windows are tightly sealed. But the ventilation behavior of occupants has not kept pace with the technical advances in the area of building shells. Experts recommend a complete exchange of indoor air at a rate of approx. 0.8 air changes per hour. In reality, not even half of this rate is achieved (0.36 changes/hour).

In particular, emissions from freshly applied paints, adhesives, sealing systems and other building materials may cause the VOC concentration of indoor air to rise alarmingly – even days after installation.

Since 1997, the EMICODE® label has provided safe and reliable guidance for the selection of low-emission building products. Being a protected, vendor-

neutral quality seal, it not only classifies installation materials and building products but also certifies them based on their emission behavior – across product, technology and even national borders.

### In brief

- EMICODE® meets the requirements for sustainable building
- Vendor-neutral label
- Makes the highest demands with regard to VOC emissions
- Significant contribution to healthy living
- Covers a broad range of products
- Internationally established
- Provides reliable guidance

A 1990 study by the **Federal Environment Agency** stated the following facts:

**Adults** spend an average of **87 %** of their time **indoors** every day. About **70 %** of this time is spent in their own four walls.



In everyday life, this is most helpful. No need to compare national and international limit values and labels. Why? Because the EMICODE® premium class EC 1<sup>PLUS</sup> sets the highest standard in terms of VOC emissions. In addition, the EMICODE® classification system covers the broadest range of building products and auxiliaries. These are subjected to regular unannounced spot checks.

The EMICODE® label thus makes an important contribution to environmental protection, healthy living and indoor air hygiene.

# How low is the EC 1<sup>PLUS</sup> concentration?



Imagine dissolving one cube of sugar in ...

- ... a cup of coffee
- ... a tanker
- ... a reservoir

After a test period of 28 days, the amount of emissions from an EMICODE® EC 1<sup>PLUS</sup> certified product is comparable to the sugar concentration reached after dissolving one cube of sugar in a reservoir.

≤ 750 µg/m<sup>3</sup> after 3 days  
 ≤ 60 µg/m<sup>3</sup> after 28 days

1 µg/m<sup>3</sup> = 0.001 mg/m<sup>3</sup> = 0.000001 g/m<sup>3</sup>

# Three classes, one system

**EMICODE® is a three-class system that classifies low-emission building products based on a strictly defined, standardized test method.**

The EMICODE® classification system and its test method were developed by experts from different sectors of the construction industry in close cooperation with environmental laboratories. The main criterion for each EMICODE® class is the emitted amount of volatile organic compounds (VOCs). Test method and classification criteria are continuously adapted to reflect the state of the art.

If a manufacturer applies for certification of one of his products, the emission behavior of this product is tested by an independent laboratory according to a standardized test method.

Based on the scientifically established measurement data, the manufacturer is granted a license that assigns the respective EMICODE® class to the product. This license entitles him to label and advertise his product with the trademark-protected EMICODE® seal.

## In brief

- Objective three-class evaluation system for low-emission building products
- No certificate for products containing solvents (exception: surface treatment agents, e.g. parquet varnishes) and for those containing SVHCs\*. Strict limits for products containing CMR\* substances.
- Testing done by independent, internationally recognized institutes
- EMICODE® EC 1<sup>PLUS</sup> – currently the most stringent label for low-emission products

\* SVHC: Substance of Very High Concern  
 \* CMR: Carcinogenic, Mutagenic and Reprotoxic

Manufacturers whose products carry the EMICODE® seal undertake to manufacture these products under quality-controlled conditions so that they comply with the predefined standards at all times.

Products are tested for volatile and semi-volatile organic compounds (VOCs and SVOCs). Products containing substances that have been proven to be carcinogenic, mutagenic or toxic to reproduction (CMR substances) never receive EMICODE® certification.

Also excluded are products emitting carcinogenic substances of categories 1A and 1B; they must not exceed strict limit values. Also solvent-containing products (boiling point < 200 °C) are never certified (exception: surface treatment agents up to 5 or 8 % by weight of solvents).



µg/m <sup>3</sup>		EC1 <sup>PLUS</sup> Very Low Emission	EC1 Very Low Emission	EC2 Low Emission
TVOC after 3 days	≤	750	1,000	3,000
TVOC after 28 days	≤	60	100	300
Formaldehyde after 3 days	≤	50	50	50
Acetaldehyde after 3 days	≤	50	50	50
Sum total form- + acetaldehyde after 3 days	≤	0.05 ppm	0.05 ppm	0.05 ppm

1 µg (microgram) = 0.001 mg = 0.000001 g  
 TVOC = Total Amount of Volatile Organic Compounds  
 For surface treatment agents see www.emicode.com.

# Controlled quality

**Better safe than sorry!  
True to this motto,  
EMICODE®-certified products  
are subjected to regular spot  
checks.**

Without the manufacturers' knowledge, EMICODE®-certified products are selected by lot, purchased in the free market and tested for their emission behavior by internationally established testing institutes using the test method described in the Glossary (see page 23).

Any non-compliance with the pre-defined limit values is severely punished. From a technical point of view, it would also not be justifiable. The minimization of emissions must not lead to compromises – neither in the functionality nor in the quality of EMICODE®-certified products.

Manufacturers whose products do not comply with the advertised EMICODE® claim must pay the cost of testing. In addition, they are obliged to remedy deficiencies in production and submit new product batches for retesting with the same test method. Repeated non-compliance can lead to withdrawal of the license and, in the worst case, loss of all EMICODE® certification rights. The effect of this sanction should not be underestimated since products with the EC 1<sup>PLUS</sup> or EC 1 label play an important role in the market.

The compliance checks of the last few years show that regular retesting is the only way to maintain the discipline necessary to produce optimum quality. EMICODE®-certified products are subject to strict and regular quality

## In brief

- Advertised EMICODE® claims undergo regular spot checks.
- EMICODE® is the only VOC ecolabel subject to regular controls.
- Non-compliance is severely punished, including the loss of certification rights.

controls and thus able to offer the highest possible consumer protection with respect to indoor air hygiene and healthy living conditions. ■

Photo: Eurofins



Product-related license



**Video of the test method**  
[www.emicode.com/en/test-method](http://www.emicode.com/en/test-method)

**Detailed description of the test method**  
[www.emicode.com/en/test-method](http://www.emicode.com/en/test-method)

**List of testing laboratories**  
[www.emicode.com/en/laboratories](http://www.emicode.com/en/laboratories)

**Round robin tests**  
[www.emicode.com/en/round-robin-test](http://www.emicode.com/en/round-robin-test)

**Honesty is the best policy**  
[www.emicode.com/wp-content/uploads/pdfs/The\\_illusion\\_of\\_precision\\_01.03.2019.pdf](http://www.emicode.com/wp-content/uploads/pdfs/The_illusion_of_precision_01.03.2019.pdf)



Photo: MAPEI, Bernd Schwabedissen

# EMICODE® – the most demanding VOC ecolabel

**In comparison to other environmental labels, EMICODE® classes EC 1 and EC 1<sup>PLUS</sup> currently set the most stringent emission limits in the market.**

This was the result of a comparative study carried out by the independent testing institute Eurofins Product Testing A/S.

The scientists at the Galten site in Denmark specialize in emission measurements. They carefully examined the evaluation criteria of

various environmental labels, including those of EMICODE® classes EC 1 and EC 1<sup>PLUS</sup>.

After both measuring times (3 and 28 days), the EMICODE® guarantees the lowest TVOC readings.

The comparison clearly shows that class EC 1<sup>PLUS</sup> and the Blue Angel have the most exacting emission claims – those of EC 1<sup>PLUS</sup> being even a bit more ambitious. In addition, the claims made by EMICODE®-certified products are continuously monitored by unannounced spot checks.

## In brief

- Comparative study shows: EMICODE® sets the most stringent emission limits.
- EMICODE® claims are the most ambitious and are also monitored through regular spot checks.

For this reason, EMICODE®-certified products offer the highest possible protection from indoor air pollution. ■



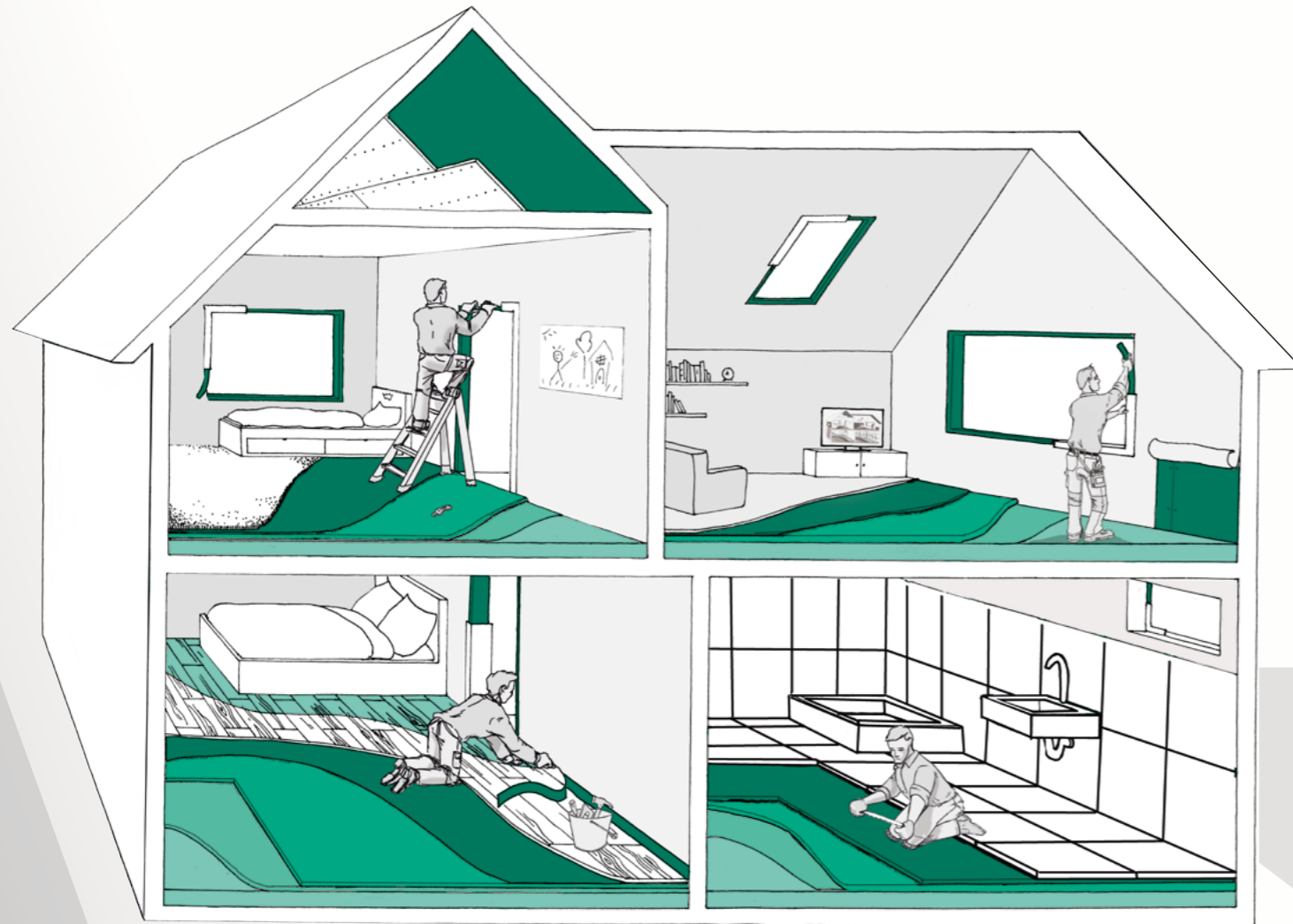
Directive in Belgium

Here, you can compare the EMICODE® limits for TVOC and other parameters with those of other labels in an interactive table: [www.emicode.com/en/emicode-compared-to-other-labels](http://www.emicode.com/en/emicode-compared-to-other-labels)

Interviews:  
The EMICODE®  
system from  
the experts'  
point of view



GEV YouTube channel:  
[www.youtube.com/channel/UC8CD-W5hIGORijD98LG9B9Kq/videos](https://www.youtube.com/channel/UC8CD-W5hIGORijD98LG9B9Kq/videos)



### Product index: list of products from A-Z

From "Additives" to "Wood glues". Click here to download the latest list of EMICODE® licensable products.

[www.emicode.com/en/en-downloads](http://www.emicode.com/en/en-downloads)

### GEV product matrix

Further technical details such as application method and required quantity can be found in the product matrix, which is updated on a regular basis.

[www.emicode.com/en/en-downloads](http://www.emicode.com/en/en-downloads)

### Licensable products

List of all EMICODE® licensable product categories which is also regularly updated.

[www.emicode.com/en/licensable-products](http://www.emicode.com/en/licensable-products)

Initially, the EMICODE® classification system was developed for flooring installation products (primers, fillers, adhesives) with the focus on indoor air hygiene. By now, the spectrum has been considerably expanded.

Meanwhile, the EMICODE® classification criteria have been adapted at the request of other industrial sectors. The special advantage of the system is that the methods of testing, certification and control are always tailored to the specific characteristics of the building materials and product categories. Compared to other ecolabels, the

EMICODE® now features the broadest scope of application for the assessment of chemical building products in building construction. Most recently, it was introduced for synthetic resin coatings.

# Product range

## Floor construction, substrate preparation, substrate repair

**Screeds:** cement and calcium-sulfate screed mortars and binders, screed admixtures, binders for reactive resin screeds, bonding courses for bonded screeds; **Fillers and levelling compounds:** levelling compounds of stiff consistency, self-levelling compounds, additives for levelling compounds; **Primers and undercoats:** dispersion-based and reaction-resin-based primers and undercoats; **Casting resins**

## Installation of tiles and natural stone

**Tile adhesives:** cement and reaction-resin-based tile adhesives, additives for tile adhesives, modifying agents; **Grouts:** cement- and reaction-resin-based grouts; **Bonded waterproofing under tiles:** liquid-applied waterproofing materials (AIV-F), waterproofing membranes (AIV-B), sealing panels (AIV-P), sealing tapes and collars

## Installation of floor coverings and parquet

**Flooring adhesives:** adhesives for resilient and textile floor coverings, parquet adhesives; **Tackifiers; Dry adhesives; self-adhesive tapes**

## Surface treatment of floors

**Surface treatment of wooden floors:** parquet primers, joint fillers for parquet, parquet lacquers and oils; **Surface treatment of mineral substrates:** lacquers, oils and impregnation agents for mineral floors; **Lacquers for resilient floor coverings**

## Insulation, sealing and decoupling materials

**Sealing:** joint sealants, precompressed sealing strips/joint sealing tapes made of precompressed foam, sealing membranes, vapor retarders for use under the roof, liquid-applied sealing materials / liquid membranes, self-adhesive sealing strips for windows and doors; **Insulation:** assembly and insulating foams, damping underlays, insulation sheets and panels; **Decoupling:** sheets and panels for decoupling and for substrate repair

## Wall construction

**Wall panels; mineral and gypsum-based base coats for indoor use; mineral and dispersion-based final renderings for indoor use; wall fillers for application in thin layers and partial areas**

## Other products

**Assembly adhesives; wood glues; synthetic resin coatings for floors; liquid plastics for indoor applications; chemical anchors; repair putties and mortars for concrete repairs**

## EMICODE® product finder

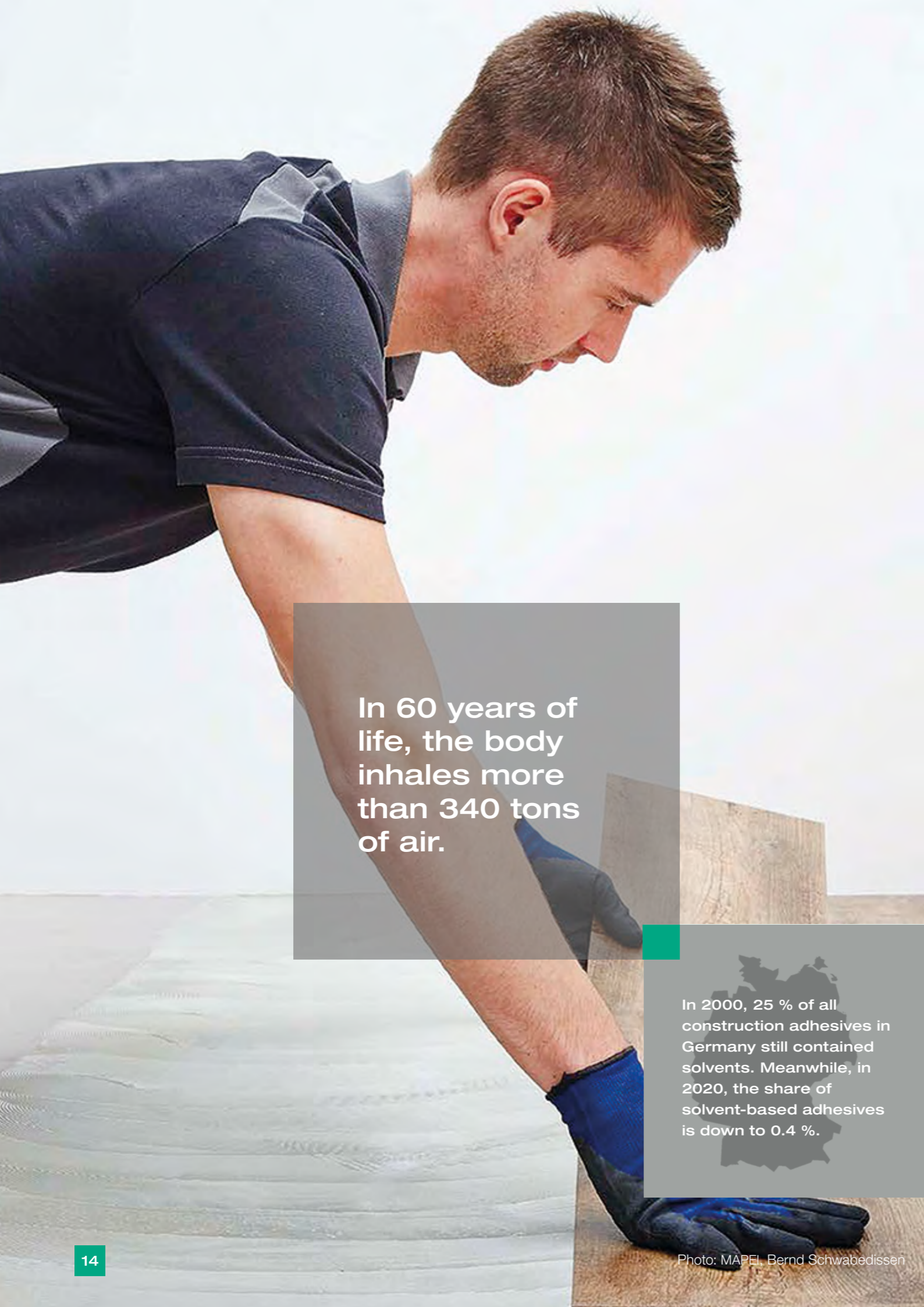
Category filters, linked to manufacturers, help you explore the range of EMICODE® licensed products. Search by country, manufacturer or category. Contact manufacturers who have joined the EMICODE® licensing system.

[www.emicode.com/en/produkte](http://www.emicode.com/en/produkte)



## In brief

- EMICODE® features the broadest scope of application in the construction industry.
- Upon request, new product groups can be added.
- Approval is granted only after careful consideration.



In 60 years of life, the body inhales more than 340 tons of air.

In 2000, 25 % of all construction adhesives in Germany still contained solvents. Meanwhile, in 2020, the share of solvent-based adhesives is down to 0.4 %.

Photo: MAPEI, Bernd Schwabedissen

## Added value

**The following comparison shows the enormous influence that the EMICODE® label has had on the quality of indoor air hygiene since its introduction in 1997.**

Previously, the total emission of volatile organic compounds (TVOCs), e.g. from commercially available solvent-free dispersion adhesives, was around 10,000 µg/m³. After introduction of EMICODE® class EC 1, the most stringent class at the time, VOC emissions from certified adhesives were not allowed to exceed ≤ 500 µg/m³. As a result, indoor air emissions dropped sharply by a factor of 20.

This development was accompanied by a significant drop in complaints, which trade and industry recorded shortly after introduction of the EMICODE®.

Up until 2020, in Germany alone approx 475 million square meters of textile and resilient floor coverings were installed with EC 1 certified primers, fillers and

adhesives – not including casting resins, underlays and many other products. Added to this are joint and surface sealants, mortars, window sealing systems and many more. In the meantime, the measuring methods have been enhanced and the emission limits have become more rigorous. Today, the TVOC of products certified as "very low-emission" is 100 to 500 times lower than before 1997, and thus clearly below the maximum levels permitted by law today.

Among craftsmen, EC 1 and EC 1<sup>PLUS</sup> are considered "the" quality labels for low-emission building products.

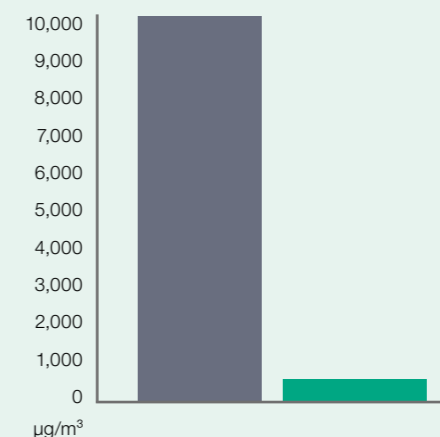
More and more often, invitations to tender now require the use of at least EC 1 certified installation materials. Also on an international scale, the EMICODE® label has become an established standard. Several programs for sustainable building – such as LEED, DGNB and BREEAM – now promote the use of EC 1 or EC 1<sup>PLUS</sup> certified products.

### In brief

- The GEV plays a leading role in the measurement of emissions.
- The EMICODE® system specializes in building products.
- Highest possible standard thanks to round robin tests and regular spot checks
- About 11,000 products are EMICODE®-certified.
- More and more manufacturers worldwide submit their products to EMICODE® testing.

By now, more than 170 manufacturers from Germany and abroad put their trust in EMICODE®. Currently, there are over 11,000 certified building products.

**From 1999 to 2020 alone, around 970,000 tons of solvent-free adhesives and primers were produced in Germany. This corresponds to more than 36,000 filled containers.**



**Before introduction of the EMICODE® system**

**TVOC emissions from commercially available dispersion adhesives**  
Survey carried out in 1995 by the Technical Committee of the IVK (German Adhesives Association)

**Maximum TVOC emissions from EC 1 certified products**

\*TVOCs = Total Volatile Organic Compounds



# Committed to the EMICODE®

In 1997, leading manufacturers initiated the development of the EMICODE® system with the aim of providing architects and planners, retailers and craftsmen as well as consumers and building clients with reliable guidance concerning the systems and technologies available in the market.

With the establishment of today's "Gemeinschaft Emissionskontrollierte Verlegetwerkstoffe, Klebstoffe Bauprodukte e. V." (GEV)\*, they founded the associated licensing and supervisory body.

The GEV has meanwhile become an internationally recognized institution which, thanks to its market-monitoring function, makes a key contribution to consumer and environmental protection as well as occupational safety. At the same time, EMICODE® developed into an international guidance and quality standard for low-emission products.

Due to the high credibility of the ecolabel and the wide range of participating companies and certified products, more and more companies from Germany and abroad are joining the GEV. Between 2007 and 2022, membership increased from 41 to more than 170 – with about half of the members coming from abroad.

## In brief

- GEV: licensing and supervisory body for the EMICODE® label
- High international recognition – widely used system
- Key contribution to consumer/environmental protection and industrial safety

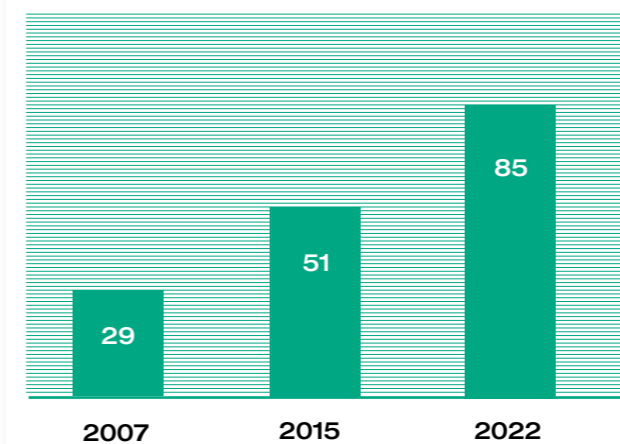
\*GEV = German Association for the Control of Emissions in Products for Flooring Installation, Adhesives and Building Materials

## GEV members & contacts

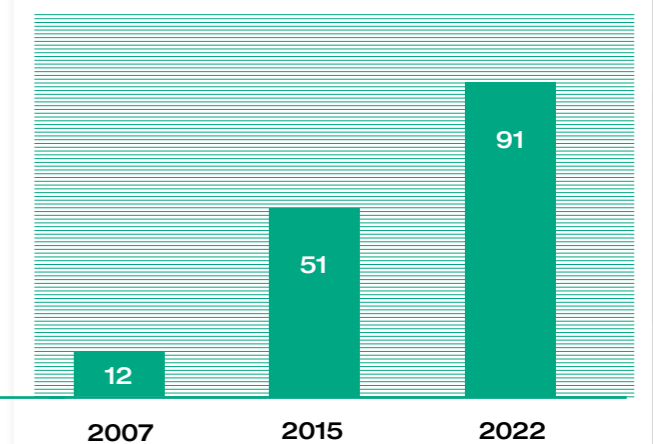
[www.emicode.com/en/en-members](http://www.emicode.com/en/en-members)

More than 170 nationally and internationally operating companies from over 20 countries have joined GEV and the EMICODE® system.

### German manufacturers using the EMICODE®



### International manufacturers using the EMICODE®



”

"In terms of harmful substances, adhesives carrying the **EMICODE® EC 1** or even better the new **EMICODE® EC 1<sup>PLUS</sup>** label cause the lowest emissions."



Edition 1 | 2013, page 124

## Reactions from the industry



### Raw material manufacturer

“The EMICODE® has contributed to the fact that all leading raw material manufacturers have meanwhile developed environmentally compatible dispersions. Thanks to this development, the installation materials have become much more ecological.”

Dr. Maximilian Rüllmann, Technical Marketing  
Polymer Dispersions for Building Chemicals at BASF



### BG BAU

“It's thanks to the EMICODE® in combination with the GISCODE that flooring adhesives no longer contain solvents. EMICODE® therefore also makes an important contribution to industrial safety.”

Dr. rer. nat. Kersting, BG BAU (Employer's Liability  
Insurance Association for the Construction Industry)



### General contractors

“We are increasingly confronted with the certification criteria of systems like DGNB\* or BNB\*\*. In our tenders, we are required to list information on the materials used, on the source materials and, in some cases, also on the manufacturing processes of these materials. For this reason, industry-specific seals such as the EMICODE® are becoming more and more important.”

Karl-Peter Arnolds, Managing Director of the  
medium-sized nessler grünzig gruppe based in  
Aachen, Germany



### Expert

“The reason why EC 1 and EC 1<sup>PLUS</sup> are so important and play a leading role is that the criteria come from the industry itself and refer specifically to installation materials. By contrast, statements that claim to be universally valid must inevitably compromise on quality. In this respect, the EMICODE® offers our industry not only the most credible and reliable eco statement, but also a feeling of safety which the contractor can pass on to his customers.”

Richard A. Kille, publicly appointed and sworn  
expert for the interior decorating and parquet laying  
trade as well as the screed and floor laying trade



### Carpet industry

“Today, the choice of a carpet is not primarily based on looks and personal taste but also on sustainability values. From our industry's point of view, the EMICODE® and its further development EMICODE® class EC 1<sup>PLUS</sup> is an indispensable benchmark for sustainable building.”

Peter Schwarzmann, Technical Director at Carpet  
Concept (carpet manufacturer)



### Building client

“Good, hospital-specific certifications are important references for us because they result in competitive edge. We, as a hospital, therefore exclusively use energy-saving materials, health-friendly wall paints and low-emission installation materials. Since the EMICODE® system offers the safest emission criteria, we opted for a floor construction with EMICODE®-certified products.”

Thomas Stein, Head of Technical Department at  
St. Marien-Hospital in Cologne, Germany



### Flooring contractor

“As an entrepreneur, I'm responsible to both my employees and customers. This also means that I always make sure to be up-to-date when it comes to environment and health issues. Here, the EMICODE® still sets the benchmark.”

Rüdiger Hagen, Managing Director of Cologne-  
based Fußbodentechnik Schmitz GmbH

\* DGNB: German Sustainable Building Council

\*\* BNB: BNB: Assessment System for Sustainable Building  
of the German Federal Ministry of Construction



**Hand in hand**  
 Certification systems for sustainable building prefer EMICODE®-certified products. The Dreischeibenhaus in Düsseldorf was certified according to LEED\*.

\*Leadership in Energy and Environmental Design

# A word or two in conclusion



**Stefan Neuberger**  
 Chairman of the GEV Board

**There are a lot of good ideas floating around, but not all of them are translated into action. Fortunately, the EMICODE® is one of those good ideas that was not only implemented but achieved far more than its founders initially had in mind.**

When technological advances in the 1990s made a radical reduction of volatile organic compounds not only possible but also necessary, the manufacturers of flooring installation materials reacted by trying to limit or even eliminate the use of solvents in order to improve the emission behavior of their products.

At the time, there was no benchmark for you as architects and planners or for contractors and consumers that would have provided orientation – let alone safety – in the jungle of products when looking for low-emission primers, fillers and flooring adhesives.

The EMICODE® therefore started out as a vision. It was intended to provide transparency, prevent the uncontrolled dissemination of non-comparable environmental claims at an early stage, and offer guidance for the selection process. The vision has long since become a reality. Today, the EMICODE® is a vendor-neutral quality and ecolabel that has established itself beyond national and continental borders. A sustainable label that is monitored by external testing institutes and has led to a reduction of complaints. A label in which industry and consumers can put their trust.

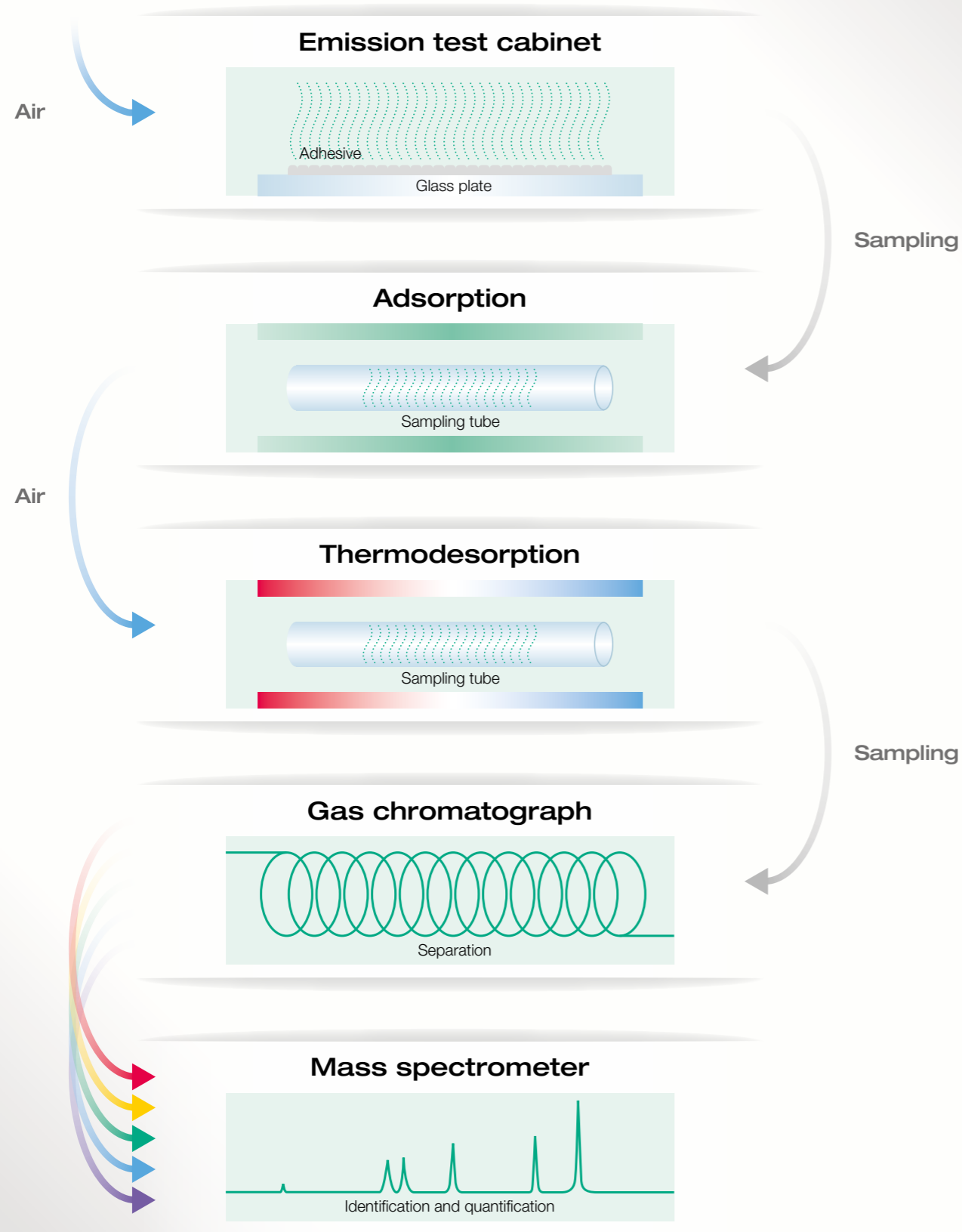
Very quickly, a trend emerged. It became clear that, if you wanted to be competitive as a manufacturer of chemical building products, you needed to adapt. This belief unites all parties involved in the value chain – raw material suppliers as well as manufacturers of flooring installation materials. In their joint effort to supply products optimally compatible with healthy living, all parties pull together.

The figures speak for themselves. The number of manufacturers relying on the EMICODE® is constantly growing. Also the range of covered product categories and technologies is expanding fast. Consequently, the number of international EMICODE®-certified products is steadily increasing. And there is no end in sight. Consumers and contractors, as well as you as planners and architects, benefit from the EMICODE®'s market significance.

Meanwhile, there is worldwide hardly any application in interior construction – whether new builds or refurbishment projects – for which there are no EMICODE®-certified products. Today, these products make their contribution to healthy living and green building everywhere. This enormous presence in the market offers benefits for planners and architects just as much as for consumers and contractors. And you can always be sure: When there's EMICODE® on the packaging, EMICODE® is what you get – today and in the future. ■



# VOC Test Method



# Glossary

## EC1<sup>PLUS</sup>

This is the EMICODE® premium class. Products carrying this label feature the lowest possible emissions in national and international comparison.

## EMICODE®

EMICODE® is a protected, vendor-neutral ecolabel that classifies installation materials and building products regarding their emission behavior and certifies them in compliance with DIN EN ISO 16000-1 (Indoor air – Part 1: General aspects of sampling strategy), test standard CEN/TS 16516 (Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air) developed by the European Committee for Standardization, and the specifications of the Technical Committee ISO/TC 146 "Air quality".

## Green building

If a building is to be certified as "green," the question of a suitable evaluation standard arises. Nationally, there is for example the German Sustainable Building Council (DGNB) with its criteria, or the Assessment System for Sustainable Building (BNB) issued by the German Federal Ministry of Transport, Building and Urban Development. Internationally, building classification systems such as LEED or BREEAM play an important role. All three (DGNB, LEED und BREEAM) promote the use of EMICODE® EC 1 or EC 1<sup>PLUS</sup> certified products.

## CMR substances

Carcinogenic, mutagenic and reprotoxic substances.

## Solvents

With the exception of the surface treatment product group, no products containing solvents receive EMICODE® certification. Surface treatment agents are subject to a special regulation because their production requires the

use of very hard and viscous base materials to protect the wood from scratches and other damage. However, the amount of solvents for an EC 1 rated product must not exceed 8 percent by weight. For an EC 1<sup>PLUS</sup> certification, the maximum limit is 5 percent by weight.

## Not certified

Generally, products containing carcinogenic, mutagenic or reprotoxic substances (CMR substances) do not receive EMICODE® certification. Likewise, carcinogenic substances of categories 1A and 1B must not be used, or only used in compliance with strict limit values. Also solvent-containing products (boiling point < 200 °C) are never certified (exception: surface treatment agents up to 5 or 8 % by weight of solvents).

## LCI values

For the individual evaluation of many substances, a "Lowest Concentration of Interest" has been defined. LCI values indicate the lowest concentrations of interest for indoor spaces from a toxicological point of view.

## TSVOC

This abbreviation stands for "Total Semi-Volatile Organic Compounds".

## TVOC

This abbreviation stands for "Total Volatile Organic Compounds".

## VOCs

This abbreviation stands for "Volatile Organic Compounds", i.e. compounds with a boiling range of 60 to 250 °C according to the WHO definition.

## VOC test method (see diagram on the left)

Today, laboratories are able to detect and

quantify even trace amounts of volatile organic compounds (VOCs) in the air by means of highly sensitive analytical methods and equipment. For this purpose, independent laboratories store material or product samples in test chambers of at least 100 liters volume under indoor room conditions. Typical low ventilation rates are simulated and, after predefined measuring times, air samples are taken. The emitted substances are identified by gas chromatography according to the established CEN/TS 16516 standard, while the emitted quantities are determined by mass spectrometry. The 1st air sample, taken after three days, is measured for the concentration of total emissions (TVOC), volatile aldehydes and carcinogenic substances. The 2nd air sample, taken after 28 days, is measured for TVOC and TSVOC, volatile aldehydes and carcinogens. Finally, the emissions are compared with the LIC values.

Assignment to one of the EMICODE® classes is based on the level of emissions. VOC concentrations are indicated in mg/m<sup>3</sup> or µg/m<sup>3</sup>. The test method is always based on state-of-the-art technology. In 2017, the provisions of the new DIN EN 16516 were integrated. The method is used for initial testing when a license application is received. It is also used as an evaluation basis for each subsequent quality check. Only ISO 17025 accredited testing institutes can be commissioned to perform the tests.

## µg/m<sup>3</sup>

1 µg/m<sup>3</sup> = 0.001 mg/m<sup>3</sup> = 0.000001 g/m<sup>3</sup>

## Get to know the GEV committees:

[www.emicode.com/en/board-overview](http://www.emicode.com/en/board-overview)  
[www.emicode.com/en/technical-council-2](http://www.emicode.com/en/technical-council-2)  
[www.emicode.com/en/public-relations-committee-overview](http://www.emicode.com/en/public-relations-committee-overview)

## Imprint

GEV – Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e. V.

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# Breathe easily WITH EMICODE®

## THE QUALITY SEAL for low-emission building products

Over a lifetime of 60 years, the average person inhales more than 340 tons of air. By far the largest part of this in their own four walls. Wherever you see the EMICODE® ecolabel of the GEV, the German "Association for the Control of Emissions in Products for Flooring Installation, Adhesives and Building Materials", you can be sure of one thing: This is a product that features the lowest possible emissions and ensures healthy living inside your home. Independent experts and laboratories regularly carry out unannounced spot checks to determine the concentration of harmful substances. If the product meets the world's lowest limit values, it is allowed to carry the EMICODE® label.

Building materials that have been awarded the EC 1 or EC 1<sup>PLUS</sup> seal fulfill the most stringent requirements for indoor air hygiene as laid down by the German Sustainable Building Council (DGNB).



**GEV – Gemeinschaft Emissions-  
kontrollierte Verlegewerkstoffe,  
Klebstoffe und Bauprodukte e.V.**

### 30 questions and answers

This GEV brochure answers the most frequently asked questions about emissions and the EMICODE® system.

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### GEV in brief

A concise summary on 2 pages: GEV and the EMICODE® system.

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Internet: [www.emicode.com/en/home](http://www.emicode.com/en/home)