

# Declaration of conformity for products with Model EPDs

The Association of the European Adhesive & Sealant Industry (FEICA), of which Sika is a member, has developed so-called Model Environmental Product Declarations (Model EPDs) and had them independently verified by the Institute Construction and Environment (IBU). These IBU verified Model EPDs have been made publicly available by FEICA and IBU. The Model EPDs depict the current production technology in Europe. Based on the product formulations it was checked if our products were covered by the Model EPDs.

This Declaration confirms that the products

**Sikasil® C • Sikasil® N Plus • Sikasil® E  
Sikasil® MP • Sikasil® AC • Sikasil® -670 Fire  
Sikasil® DW • Sikasil® Pool**

are covered by the attached Model EPD „*Silicone-based construction sealants*“ (Declaration number EPD-FEI-20150323-IBG1-EN). This means that the Life Cycle Assessment (LCA) data and the remaining content of the attached Model EPD apply to the above mentioned product and may thus be used for the evaluation of the sustainability of buildings where the product is applied.

Sika Services AG

A blue ink signature of Mark Schneider, written in a cursive style.

Mark Schneider

Head Global Product Sustainability

A blue ink signature of Uwe Bankwitz, written in a cursive style.

Uwe Bankwitz

Head Market Field Sealing and Bonding

Zurich, May 2016

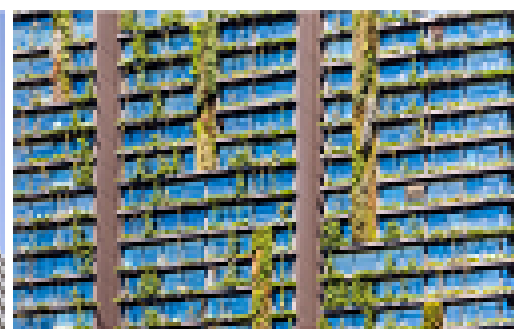
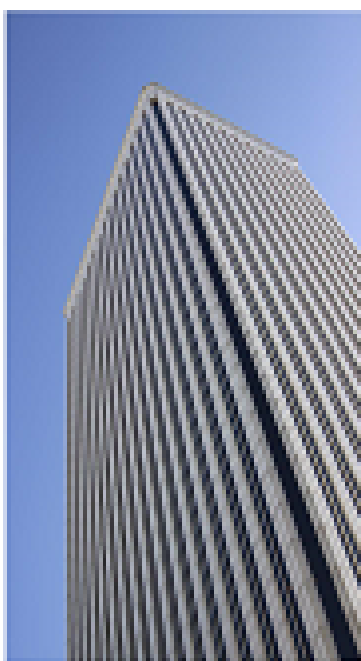
# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

|                          |   |
|--------------------------|---|
| Owner of the Declaration | FEICA - Association of the European Adhesive and Sealant Industry |
| Programme holder         | Institut Bauen und Umwelt e.V. (IBU)                              |
| Publisher                | Institut Bauen und Umwelt e.V. (IBU)                              |
| Declaration number       | EPD-FEI-20150323-IBG1-EN  |
| Issue date               | 02/02/2016  |
| Valid to                 | 01/02/2021  |

## Silicone-based construction sealants FEICA - Association of the European Adhesive and Sealant Industry

[www.bau-umwelt.com](http://www.bau-umwelt.com) / <https://epd-online.com>





## 1. General Information

### FEICA - Association of the European Adhesive and Sealant Industry

#### Programme holder

IBU - Institut Bauen und Umwelt e.V.  
Panoramastr. 1  
10178 Berlin  
Germany

#### Declaration number

EPD-FEI-20150323-IBG1-EN

#### This Declaration is based on the Product

##### Category Rules:

Building sealants, 07.2014  
(PCR tested and approved by the SVR)

#### Issue date

02/02/2016

#### Valid to

01/02/2021

Prof. Dr.-Ing. Horst J. Bossenmayer  
(President of Institut Bauen und Umwelt e.V.)

Dr. Burkhard Lehmann  
(Managing Director IBU)

### Silicone-based construction sealants

#### Owner of the Declaration

FEICA - Association of the European Adhesive and Sealant Industry  
Avenue E. van Nieuwenhuysse 4  
1160 Brussels  
Belgium

#### Declared product / Declared unit

1 kg silicone-based construction sealant; density 1.0 - 1.5 g/cm<sup>3</sup>

#### Scope:

This validated Declaration entitles the holder to bear the symbol of the *Institut Bauen und Umwelt e.V.* It exclusively applies for products produced in Europe and for a period of five years from the date of issue. This EPD may be used by FEICA members and their members provided it has been proven that the respective product can be represented by this EPD. For this purpose a guideline is available at the FEICA secretariat. The members of FEICA are listed on its website. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

#### Verification

The CEN Norm /EN 15804/ serves as the core PCR

Independent verification of the declaration according to /ISO 14025/

internally  externally

Mr Olivier Muller  
(Independent verifier appointed by SVR)

## 2. Product

### 2.1 Product description

*Silicone-based construction sealant, filled or unfilled, transparent or pigmented.*

Silicone-based construction sealants are manufactured from reactive siloxane and so-called silicone oil, sometimes using fillers, extenders, colour pigments, cross-linkers, bonding agents and catalysts. They permanently and elastically seal joints planned for the building. Silicone-based construction sealants fulfill key functions. Ingress of moisture into the structure via the joints is prevented by joint sealants. By using silicone-based sealants the fitness for use of the building and the service life are decisively extended.

The product displaying the highest environmental impacts was used as a representative product for calculating the Life Cycle Assessment results (worst case-approach).

### 2.2 Application

#### Module 1: Façade sealants

Silicone-based construction sealants are used for the elastic sealing of joints. The areas of application for

façade sealants include expansion joints (movement joints) and/or connection joints already existing in exterior walls and on window and door frames (including the inside section). All these sealants fulfill key functions of the building.

#### Module 2: Sealants for glazing

Silicone-based construction sealants are used for the elastic sealing of joints which may be subject to movement. Sealants for glazing are used in the following areas:

Glass to glass  
Glass to frame  
Glass to porous substrates

#### Module 3: Sanitary sealants

The areas of application for silicone-based sanitary sealants are joints in sanitary areas and kitchens. Joints sealed using sanitary sealants comprise connection joints between sanitary furnishings and the wall, connection joints between the floor and wall or movement joints across surfaces, for example.



## 2.3 Technical Data

### Module 1: Façade sealants

The minimum requirements on water and airtightness as per Table ZA.1 of /EN 15651-1:2012/ apply: see table

### Module 2: Sealants for glazing

The minimum requirements on water and airtightness as per Table ZA.1 of /EN 15651- 2:2012/ apply: see table

### Module 3: Sanitary sealants

The minimum requirements on water and airtightness as per Table ZA.1 of /EN 15651-3:2012/ apply: see table

| Name  | Value                                    | Unit              |
|---|--|-------------------|
| Density   | 1 - 1.5                                  | kg/m <sup>3</sup> |
| Elastic recovery /EN ISO 7389/  | only for module 2:<br>>/=25 or >/=100    | %                 |
| Loss of volume /EN ISO 10563/   | value to be declared by the manufacturer | %                 |
| Resistance to flow /EN ISO 7390/  | value to be declared by the manufacturer | mm                |
| Tensile properties /EN ISO 8339/  | only for module 1 and 3: </=0,9          |                   |
| Adhesion/cohesion properties at maintained extension after immersion in water /EN ISO 10590/  | only for module 1:<br>NF*                |                   |
| Adhesion/cohesion properties at maintained extension after immersion in water for sealants in class XS and/or adhesion/cohesion properties after immersion in water for sealants in class S /EN ISO 10590:2005/, /EN ISO 10590/ | only for module 3:<br>NF*                |                   |
| Adhesion/cohesion properties after immersion in water plastic sealants /EN ISO 10591/   | only for module 1:<br>>/=25 or >/=100    | %                 |
| Adhesion/cohesion properties after exposure to heat, water and artificial light /EN ISO 11431/  | only for module 2:NF*                    |                   |

\* NF: Passed-Failed criteria.

The sealant class must also be indicated for the declared product.

## 2.4 Placing on the market / Application rules

For the placing on the market in the EU/EFTA (with the exception of Switzerland) products falling under the Regulation (EU) No 305/2011 need a Declaration of Performance taking into consideration either the relevant harmonised European standard as cited in chapter 2.3 or the European Technical Assessment and the CE-marking.

For the application and use of the products the respective national provisions apply.

## 2.5 Delivery status

Pasty in containers made of plastic, foil or metal.

Typical container sizes contain 50 ml to 1000 ml of product.

A combination of HDPE (high-density polyethylene) cartridges, cardboard and pallets was modelled for the LCA.

## 2.6 Base materials / Ancillary materials

Silicone-based construction sealants are manufactured from reactive siloxane and silanes, sometimes using fillers. The cross-linking reaction occurs through the effects of humidity in air when installed.

On average, the products covered by this EPD contain the following ranges of base materials and ancillary materials referred to:

Siloxanes: 45-90 wt. %

Silanes: 2-10 wt. %

Silicone plasticizers: 0-30 wt. %

Mineral fillers: 0-40 wt. %

Fumed silica: 2 wt. %

Mineral oil: 0-30 wt. %

Pigments: 0-20 wt. %

Water: 0-20 wt. %

Additives: <5 wt. %

These ranges are average values and the composition of products complying with the EPD can deviate from these concentration levels in individual cases.

More detailed information is available in the respective manufacturer's documentation (e.g. product data sheets).

In individual cases, it is possible that substances on the list of materials of particularly high concern for inclusion in /Annex XIV of the REACH regulation 2011/ are contained in concentrations exceeding 0.1%. If this is the case, this information can be found on the respective safety data sheet.

## 2.7 Manufacture

Silicone-based sealants are generally manufactured by mixing the ingredients and then filling them into the delivery containers. The quality of the products and safe handling thereof is ensured by the corresponding regulations such as /EN ISO 9001:2008-12/ and the provisions outlined in the relevant regulations such as the Industrial Safety Regulation and Federal Pollution Control Act.

## 2.8 Environment and health during manufacturing

As a general rule, no other environmental or health protection measures other than those specified by law are necessary.

## 2.9 Product processing/Installation

Silicone-based construction sealants are usually processed manually on site using suitable tools. In most cases, the products are inserted into joints using cartridge guns, whereby health and safety measures (gloves and goggles, ventilation) are to be taken and consistently adhered to in accordance with the information on the safety data sheet and conditions on site. VOC-emissions may occur.

## 2.10 Packaging

A detailed description of packaging is provided in section 2.5. Empty containers and clean foils can be recycled.

## 2.11 Condition of use

During the use phase, silicone-based sealants are fully cross-linked and hardened.

They are durable products which protect buildings and



significantly contribute towards their appearance, function and sustainability.

**2.12 Environment and health during use**  
**Option 1 – Products for applications outside indoor areas with permanent stays by people**

During use, silicone-based construction sealants lose their reactive capacity and are inert. No risks are known for water, air and soil if the products are used as designated.

**Option 2 – Products for applications inside indoor areas with permanent stays by people**

When used in indoor areas with permanent stays by people, evidence of the emission performance of construction products in contact with indoor air must be submitted according to national requirements. No further influences on the environment and health by emanating substances are known.

**2.13 Reference service life**

Sealants fulfill key functions in buildings. They decisively improve the usability of building structures and significantly extend their original service lives. Information supplied by the manufacturer on maintenance and care must be observed.

**2.14 Extraordinary effects**

**Fire**

Even without any special fire safety features, joint sealants comply with at least the requirements of /EN 13501-1:2009/ for fire class E.

In terms of volumes used, sealants generally have no or only a minor influence on the fire characteristics (e.g. smoke gas development) of the building in which they are applied.

**Water**

Silicone-based construction sealants are insoluble in water. They are often used to protect building

structures from damaging water ingress / the effects of flooding.

**Mechanical destruction**

The mechanical destruction of silicone sealants does not lead to any decomposition products which are harmful for the environment or health.

**2.15 Re-use phase**

According to present knowledge, no environmentally-hazardous effects in terms of landfilling are to be generally anticipated through dismantling and recycling of components to which hardened silicone sealants adhere.

**2.16 Disposal**

Silicone sealants which cannot be recycled can be hardened. Empty containers are directed to the recycling process. Only a low volume of silicone sealants is incurred in the disposal of components in which they are used. Low levels of adhesion do not play any role in terms of disposal. They do not impair the disposal/ recycling of other components / building materials.

Hardened residual product mechanically removed from substrates must be disposed of as commercial/site waste.

The following European Waste Codes waste (EWC) codes can apply:

Product residue:

/EWC 2000/532/EC 080409/

/EWC 2000/532/EC 080410/ with the exception of those covered by /EWC 2000/532/EC 08 04 09/

**2.17 Further information**

More information is available in the manufacturer's product or safety data sheets and is available on the manufacturer's Web sites or on request. Valuable technical information is also available on the associations' Web sites.

**3. LCA: Calculation rules**

**3.1 Declared Unit**

This EPD refers to the declared unit of 1 kg silicone-based construction sealant with a density of 1 - 1.5 kg/l in the mixing ratio required for processing the components in accordance with the PCR Part B for Reactive resin products.

The results of the Life Cycle Assessment provided in this declaration have been calculated from the product with the highest environmental impact (worst-case scenario).

With the information about the consumption per running meter together with width and depth of the joint, the results can be calculated into a declared unit of l/m.

**Declared unit**

| Name                      | Value | Unit |
|---------------------------|-------|------|
| Declared unit             | 1     | kg   |
| Conversion factor to 1 kg | 1     | -    |

**3.2 System boundary**

Modules A1-A3, A4, A5 and D are taken into consideration in the LCA:

- A1 Production of preliminary products
- A2 Transport to plant

- A3 Production incl. provision of energy, production of packaging as well as auxiliaries and consumables, waste treatment)
- A4 Transport to site
- A5 Installation (disposal of packaging & installation losses and emissions during installation)
- D Credits from incineration of packaging materials & installation losses and recycling the metal container

The declaration is therefore from "cradle to gate - with options".

**3.3 Estimates and assumptions**

Where no specific /GaBi/ processes were available, the individual recipe ingredients of formulation were estimated on the basis of information provided by the manufacturer or literary sources.

**3.4 Cut-off criteria**

All raw materials submitted for the formulations and production data were taken into consideration.



The manufacture of machinery, plants and other infrastructure required for production of the products under review was not taken into consideration in the LCA.

Transport of packaging materials is also excluded.

### 3.5 Background data

Data from the /GaBi/ 6 database was used as background data. Where no background data was available, it was complemented by manufacturer information and literary research.

### 3.6 Data quality

Representative products were applied for this EPD and the product in a group displaying the highest environmental impact was selected for calculating the LCA results. The datasets are less than 5 years old. Production data and packaging are based on details provided by the manufacturer. The formulation used for evaluation refers to a specific product.

### 3.7 Period under review

Representative formulations were accepted by FEICA Ltd and collected in 2011.

### 3.8 Allocation

No allocations were applied for production. A multi-input allocation with a credit for electricity and thermal energy was used for incineration of production residues and packaging materials. The credits achieved through packaging disposal are declared in Module D.

### 3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account. In this case, 1 kg construction sealant was selected as the declared unit. Depending on the application, a corresponding conversion factor such as the specific use per running meter must be taken into consideration.

## 4. LCA: Scenarios and additional technical information

The following technical information forms the basis for the declared modules or can be used for developing specific scenarios in the context of a building evaluation if modules are not declared (MND).

### Transport to the building site (A4)

| Name  | Value       | Unit              |
|---|-------------|-------------------|
| Litres of fuel                              | 0.0016      | l/100km           |
| Transport distance                          | 1000        | km                |
| Capacity utilisation (including empty runs) | 85          | %                 |
| Gross density of products transported       | 1000 - 1500 | kg/m <sup>3</sup> |
| Capacity utilisation volume factor          | 1           | -                 |

### Installation into the building (A5)

| Name                   | Value | Unit |
|------------------------|-------|------|
| Material loss          | 0.01  | kg   |
| VOC in the air (NMVOC) | 0.05  | kg   |

## 5. LCA: Results

### DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

| PRODUCT STAGE       |           |               | CONSTRUCTION PROCESS STAGE          |          | USE STAGE |             |        |             |               |                        |                       | END OF LIFE STAGE          |           |                  |          | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES |
|---------------------|-----------|---------------|-------------------------------------|----------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential              |
| A1                  | A2        | A3            | A4                                  | A5       | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                         | C2        | C3               | C4       | D   |
| X                   | X         | X             | X                                   | X        | MND       | MND         | MND    | MND         | MND           | MND                    | MND                   | MND                        | MND       | MND              | MND      | X   |

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg silicone-based construction sealant

| Parameter  | Unit                                       | A1-A3   | A4       | A5       | D         |
|--|--|---------|----------|----------|-----------|
| Global warming potential   | [kg CO <sub>2</sub> -Eq.]                  | 7.08E+0 | 5.61E-3  | 6.23E-1  | -3.14E-1  |
| Depletion potential of the stratospheric ozone layer             | [kg CFC11-Eq.]                             | 1.77E-9 | 2.31E-14 | 1.63E-12 | -1.09E-10 |
| Acidification potential of land and water                        | [kg SO <sub>2</sub> -Eq.]                  | 3.41E-2 | 1.44E-5  | 5.59E-5  | -8.46E-4  |
| Eutrophication potential   | [kg (PO <sub>4</sub> ) <sup>3-</sup> -Eq.] | 2.71E-3 | 3.56E-6  | 1.05E-5  | -5.70E-5  |
| Formation potential of tropospheric ozone photochemical oxidants | [kg ethene-Eq.]                            | 3.15E-3 | -3.90E-6 | 1.80E-2  | -6.89E-5  |
| Abiotic depletion potential for non-fossil resources             | [kg Sb-Eq.]                                | 4.74E-4 | 2.20E-10 | 4.00E-9  | -3.20E-8  |
| Abiotic depletion potential for fossil resources                 | [MJ]                                       | 1.19E+2 | 7.73E-2  | 8.00E-2  | -4.38E+0  |

### RESULTS OF THE LCA - RESOURCE USE: 1 kg silicone-based construction sealant

| Parameter  | Unit              | A1-A3   | A4      | A5      | D        |
|--|-------------------|---------|---------|---------|----------|
| Renewable primary energy as energy carrier                 | [MJ]              | 3.70E+1 | -       | -       | -        |
| Renewable primary energy resources as material utilization | [MJ]              | 0.00E+0 | -       | -       | -        |
| Total use of renewable primary energy resources            | [MJ]              | 3.70E+1 | 4.33E-3 | 9.25E-3 | -5.51E-1 |
| Non-renewable primary energy as energy carrier             | [MJ]              | 1.23E+2 | -       | -       | -        |
| Non-renewable primary energy as material utilization       | [MJ]              | 1.22E+1 | -       | -       | -        |
| Total use of non-renewable primary energy resources        | [MJ]              | 1.35E+2 | 7.76E-2 | 9.55E-2 | -5.37E+0 |
| Use of secondary material                                  | [kg]              | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0  |
| Use of renewable secondary fuels                           | [MJ]              | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0  |
| Use of non-renewable secondary fuels                       | [MJ]              | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0  |
| Use of net fresh water                                     | [m <sup>3</sup> ] | 7.46E-2 | 7.60E-6 | 1.40E-3 | -1.11E-3 |

### RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES:

#### 1 kg silicone-based construction sealant

| Parameter                     | Unit | A1-A3   | A4      | A5      | D        |
|-------------------------------|------|---------|---------|---------|----------|
| Hazardous waste disposed      | [kg] | 2.94E-5 | 3.68E-8 | 2.79E-8 | -1.56E-6 |
| Non-hazardous waste disposed  | [kg] | 1.31E+0 | 1.10E-5 | 2.50E-3 | -1.62E-3 |
| Radioactive waste disposed    | [kg] | 6.26E-3 | 1.06E-7 | 6.17E-6 | -3.92E-4 |
| Components for re-use         | [kg] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0  |
| Materials for recycling       | [kg] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0  |
| Materials for energy recovery | [kg] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0  |
| Exported electrical energy    | [MJ] | 0.00E+0 | 0.00E+0 | 1.09E+0 | 0.00E+0  |
| Exported thermal energy       | [MJ] | 0.00E+0 | 0.00E+0 | 2.48E+0 | 0.00E+0  |

## 6. LCA: Interpretation

All impacts are associated with the production phase (A1-A3). The most significant contribution to the production phase impacts is the upstream production of raw materials as main driver. The majority of life cycle energy consumption takes place during the production phase (A1-A3). Significant contributions to Primary Energy Demand – Non-renewable (**PENRT**) derive from the energy resources used in the production of raw materials. The largest contributor to Primary Energy Demand – Renewable (**PERT**) is the consumption of renewable energy resources required for the generation and supply of electricity. During manufacturing (A1-A3) some influence also arises due to the wooden pallets and paper used as packaging that need solar energy for photosynthesis. It should be noted that Primary Energy Demand – Renewable (**PERT**) generally represents a small percentage of the

production phase primary energy demand with the bulk of the demand coming from non-renewable energy resources.

CO<sub>2</sub> is the most important contributor to Global Warming Potential (**GWP**). For the Acidification Potential (**AP**), NO<sub>x</sub> and SO<sub>2</sub> contribute to the largest share.

Transportation to the construction site (A4) and the installation process (A5) make a negligible contribution to almost all impacts. The only exception is the photochemical ozone creation potential (**POCP**) that is significantly influenced by the installation of the product due to emissions of volatile compounds of maximum 5%. This leads to a contribution of the installation phase of up to 85% on the overall life cycle of the product. Emissions associated with the manufacturing of product (A3) only have a minor influence on POCP.

In module A4, transport to construction site, values for POCP are negative due to emission profile modelled for the selected transportation process and of the characterisation method used in CML 2001 for the calculation of the POCP. Transportation processes are responsible for the emission of NO<sub>x</sub> in the ground layer atmosphere. NO in particular can have an ozone depleting effect that is reflected in CML 2001 by assigning a negative characterisation factor to this substance. However, although these negative values may appear unusual, it should be considered that

POCP is only one of the analysed environmental impact categories. All other potential impacts would increase with greater transportation distances, showing that transportation is a process leading to net environmental burdens. Furthermore, even for POCP, transportation processes needed for supply of materials and product distribution only have limited counterbalance effects on the overall LCA results. Energy credit from incineration of packaging material reported in module D show a negligible influence on the overall results.

## 7. Requisite evidence

### VOC

Special tests and evidence have not been carried out or provided within the framework of drawing up this Model EPD. Some EU member states require special documentation on VOC emissions into indoor air for specific areas of application. This documentation, as well as documentation for voluntary VOC labelling, has to be provided separately and is specific for products in question.

Evidence pertaining to VOC emissions shall show

- either an attestation of compliance with,
- or documentation of test data that are required in, any of the existing regulations or in any of the existing voluntary labeling programs for low-emitting products, as far as these

(1) include limits for the parameters TVOC, TSVOC, carcinogens, formaldehyde, acetaldehyde, LCI limits for individual substances (including but not limited to the European list of harmonized LCIs), and the R value;

(2) base their test methods on /CEN/TS 16516/ (or /EN 16516/, after the on-going revision of /CEN/TS 16516/);

(3) perform testing and apply the limits after 28 days storage in a ventilated test chamber, under the conditions specified in /CEN/TS 16516/; some regulations and programs also have limits after 3 days, on top of the 28 days limits;

(4) express the test results as air concentrations in the European Reference Room, as specified in /CEN/TS 16516/.

Examples of such regulations are the Belgian /Royal Decree C-2014/24239/, or the German /AgBB/. Examples of such voluntary labeling programs are EMICODE, Blue Angel or Indoor Air Comfort.

Relevant test results shall be produced either by an /ISO 17025/ accredited commercial test lab, or by a qualified internal test lab of the manufacturer. Examples for the applied limits after 28 days storage in a ventilated test chamber are:

- TVOC: 1000 µg/m<sup>3</sup>
- TSVOC: 100 µg/m<sup>3</sup>
- Each carcinogen: 1 µg/m<sup>3</sup>
- Formaldehyde: 100 µg/m<sup>3</sup>
- LCI: different per substance involved
- R value: 1 (meaning that, in total, 100% of the combined LCI values must not be exceeded).

Informative Annexes (2 tables):

The table shown below is an overview of the most relevant regulations and specifications as of April 2015, as regards requirements after 3 days storage in a ventilated test chamber.

|                             | TVOC<br>[µg/m <sup>3</sup> ] | Sum of<br>carcinogens.<br>C1A,CA2<br>[µg/m <sup>3</sup> ] | Formal-<br>dehyde<br>[µg/m <sup>3</sup> ] | Acet-<br>aldehyde<br>[µg/m <sup>3</sup> ] | Sum of<br>Form- and<br>Acet-<br>aldehyde |
|-----------------------------|------------------------------|---|---|---|--|
| German DIBt/AgBB regulation | 10 000                       | 10  | -/-                                       | -/-                                       | -/-                                      |
| draft Lithuanian regulation | 10 000                       | 10  | -/-                                       | -/-                                       | -/-                                      |
| EMICODE EC1                 | 1 000                        | 10  | 50  | 50  | 50 ppb                                   |
| EMICODE EC1 <sup>PLUS</sup> | 750                          | 10  | 50  | 50  | 50 ppb                                   |



|                             | TVOC<br>[µg/m <sup>3</sup> ] | TSVOC<br>[µg/m <sup>3</sup> ] | Each<br>carcinogen<br>C1A,CA2<br>[µg/m <sup>3</sup> ] | Formaldehyde<br>[µg/m <sup>3</sup> ] | Acetaldehyde<br>[µg/m <sup>3</sup> ] | LCI              | R value | Specials                         | Sum non-LCI<br>& non-<br>identified<br>[µg/m <sup>3</sup> ] |
|-----------------------------|------------------------------|-------------------------------|---|--------------------------------------|--------------------------------------|------------------|---------|----------------------------------|---|
| Belgian regulation          | 1000                         | 100                           | 1   | 100                                  | 200                                  | Belgian list     | 1       | Toluene<br>300 µg/m <sup>3</sup> | -/-   |
| French regulations class A+ | 1000                         | -/-                           | -/-   | 10                                   | 200                                  | -/-              | -/-     | List of 8<br>VOCs,<br>4 CMR      | -/-   |
| French regulations class A  | 1500                         | -/-                           | -/-   | 60                                   | 300                                  | -/-              | -/-     | List of 8<br>VOCs,<br>4 CMR      | -/-   |
| French regulations class B  | 2000                         | -/-                           | -/-   | 120                                  | 400                                  | -/-              | -/-     | List of 8<br>VOCs,<br>4 CMR      | -/-   |
| French regulations class C  | >2000                        | -/-                           | -/-   | >120                                 | >400                                 | -/-              | -/-     | List of 8<br>VOCs,<br>4 CMR      | -/-   |
| German DIBt/AgBB regulation | 1000                         | 100                           | 1   | 100                                  | 1200                                 | German AgBB list | 1       | -/-                              | 100   |
| draft Lithuanian regulation | 1000                         | 100                           | 1   | product type specific                | -/-                                  | Lithuanian list  | 1       | -/-                              | -/-   |
|                             |                              |                               |   |                                      |                                      |                  |         |                                  |   |
| EMICODE EC1                 | 100                          | 50                            | 1   | (after 3 days)                       | (after 3 days)                       | -/-              | -/-     | -/-                              | -/-   |
| EMICODE EC1 <sup>PLUS</sup> | 60                           | 40                            | 1   | (after 3 days)                       | (after 3 days)                       | German AgBB list | 1       | -/-                              | 40  |
| Finnish M1, sealants        | 20                           | -/-                           | 1   | 10                                   | -/-                                  | -/-              | -/-     | Ammonia, odour                   | -/-   |
| Finnish M1, adhesives       | 200 µg/m <sup>2</sup> h      | -/-                           | 5 µg/m <sup>2</sup> h                                 | 50 µg/m <sup>2</sup> h               | -/-                                  | -/-              | -/-     | Ammonia, odour                   | -/-   |

The table above provides an overview of the most relevant regulations and specifications as of April 2015, as regards requirements after 28 days storage in a ventilated test chamber. Some details may be

missing in the table due to lack of space. Values given represent maximum values/limits.

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