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Roadmap for Healthy Buildings – 1st step: Harmonisation of Health Criteria for Construction Products

Discussion Report

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Roadmap for Healthy Buildings – 1st step: Harmonisation of Health Criteria for Construction Products

Discussion Report

by

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On behalf of the German Environment Agency

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Abstract

Harmonised requirements for documenting emission test results of construction products in the declaration of performance have been an important discussion issue in the implementation of the Construction Products Regulation over a long time. The level of information details to be provided with the declaration of performance reflects conflicting interests of the various parties concerned. On the one hand, simple and harmonised conditions of trade should be implemented on the common single market. On the other hand, actors aiming to achieve high indoor air quality and hence, a high level of protection for human health request detailed product information.

This report presents a summary of the main arguments exchanged during a parliamentary lunch briefing in Brussels on the 19th of October 2017 on this issue. Representatives from the different stakeholder groups at Member State and European level participated in the meeting.

Kurzbeschreibung

Harmonisierte Anforderungen an die Dokumentation der Ergebnisse von Emissionsprüfungen von Bauprodukten in der Leistungserklärung sind ein langjähriges Diskussionsthema der Umsetzung der Bauproduktenverordnung. Umfang und Detailgrad der Dokumentationspflichten stellen dabei eine Schnittstelle zum Teil gegensätzlicher Interessen dar. Dies sind zum einen Bestrebungen einheitliche und einfach umsetzbare Vermarktungsbedingungen im EU-Binnenmarkt zu schaffen und zum anderen das Interesse unterschiedlichster Akteure in den Mitgliedsstaaten ein hohes Schutzniveau für die Gesundheit gerade im Bereich der Innenraumluft zu sichern.

In diesem Bericht werden zentrale Argumente zusammengefasst, die zu dieser Thematik im Verlauf eines Lunch Briefings für EU Parlamentarier am 19. Oktober 2017 in Brüssel ausgetauscht wurden. An diesem Treffen nahmen Vertreterinnen und Vertreter der unterschiedlichen Interessengruppen sowohl aus den Mitgliedsstaaten als auch der EU teil.

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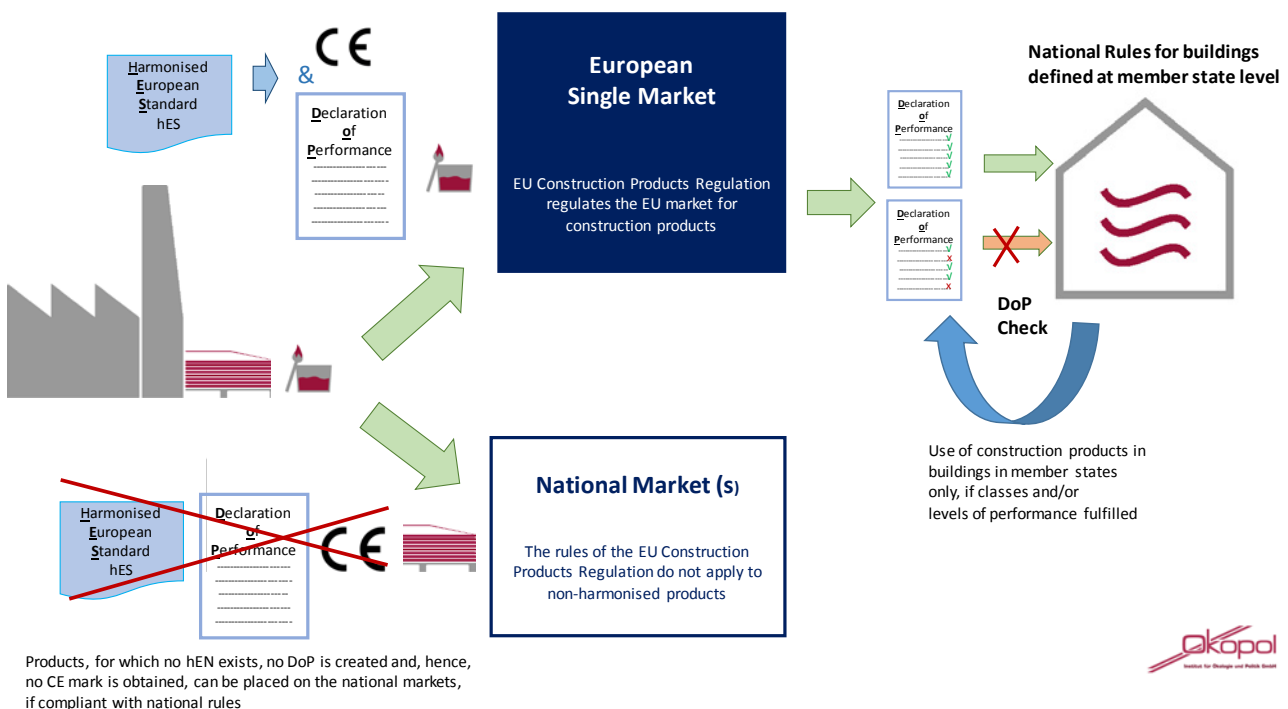
List of Abbreviations

BBRI	Belgian Building Research Institute (BBRI)
CEPE	European Council of the Paint, Printing Ink and Artists' Colours Industry
CMR	Carcinogenic, Mutagenic and Reprotoxic Substances
CPR	Construction Products Regulation
DoP	Declaration of Performance
ECA	European Collaborative Action
ECHA	European Chemicals Agency
EFCC	European Federation for Construction Chemicals
EU	European Union
FEICA	Association of the European Adhesive & Sealant Industry
LCI	Lowest Concentration of Interest
SVOC	Semi-Volatile Organic Compound
UBA	Umweltbundesamt – German Environment Agency
TVOC	Total Volatile Organic Compounds
VOC	Volatile Organic Compound
VVOC	Very Volatile Organic Compound

1 Introduction

The Construction Products Regulation (CPR) harmonises the requirements and conditions for placing construction products on the EU market (Regulation (EU) No 305/2011). Among others, the CPR defines the basic requirements for construction works (Annex I) that are the foundation for mandating the development of harmonised European standards. Harmonised product standards apply to particular construction product types and include a list of essential characteristics that are relevant for the basic requirements of a construction work. Harmonised test standards define the methods for determining and quantifying the performance of a construction product with regard to an essential characteristic.

Figure 1: Regulation of construction products at EU and national level



The indoor air quality is covered in Section 3 of the basic requirements concerning human health and the environment:

“The construction works must be designed and built in such a way that they will, throughout their life cycle, not be a threat to the hygiene or health and safety of workers, occupants or neighbours, [...] during their construction, use and demolition, in particular as a result of any of the following:

(a) [...];

(b) the emissions of dangerous substances, volatile organic compounds (VOC), greenhouse gases or dangerous particles into indoor or outdoor air;

(c) [...]”

Consequently and where relevant, emissions of hazardous substances/VOCs from construction products are an essential characteristic that needs to be determined and declared for construction products intended to be used in building interiors. In 2017, a harmonised standard to measure VOC emissions (chamber test EN 16516) has been published. The member states are eagerly waiting for VOC declarations based on the new test standard.

The required performance level of a particular construction product in a specific use is not defined in EU legislation. The product performance needs to be declared, when a member state needs the information to plan buildings that comply with its safety levels for the basic requirements for construction

works. Hence, the CPR does not include any performance levels or cut-off criteria¹ for the essential characteristics. However, the CPR provides instruments to generate and communicate information with the declaration of performance (DoP) and the CE marking that allows the manufacturer and/or the national authorities to assess compliance with existing national provisions or product safety in general, respectively. Therefore, mandates for product standards take existing national legislation into account when defining the essential characteristics for the declaration of performance.

According to Article 27 of the CPR, the European Commission may adopt delegated acts to define classes of performance for particular essential characteristics. In May 2017, the EU commission presented a first draft proposal for such a delegated act defining VOC emission classes. As German experts expressed their concerns related to the content of this proposal, the German Environment Agency (UBA) organised a Lunch briefing in Brussels. The aim of the meeting was to initiate a discussion on the draft delegated act among different stakeholders, to inform members of EU Parliament of that proposal and to collect feedback and input on the UBA's, more far-reaching proposal, for VOC emission classes. The presentations and discussions of that meeting are summarised in this report. The agenda, presentations and a scientific opinion paper are available at <https://www.umweltbundesamt.de/en/service/dates/briefing-evaluation-of-construction-product>.

2 Background Information on VOCs

Lilian Busse (German Environment Agency, UBA) provided background information on VOCs to the audience. She stressed that the average European spends approximately 90 % of his or her lifetime indoors. Therefore, indoor air has a significant influence on human health. Among the various emission sources, construction products are relevant as they cover large surfaces, stay in the living environment for a long time and are frequently difficult to change. For the indoor air quality, the so-called volatile organic compounds (VOCs) are the most relevant. Three groups are differentiated by the degree of volatility, boiling point and the carbon chain length, respectively: very volatile (VVOCs), volatile (VOCs) and semi-volatile organic compounds (SVOCs).

Lilian Busse explained that Germany operates a holistic approach called AgBB-scheme² to evaluate emissions from construction products. It includes the assessments of single substances

- ▶ VOCs for which a "Lowest Concentration of Interest (LCI)³ is defined,
- ▶ Substances that may cause or promote the development of cancer (carcinogens) and
- ▶ "other substances", such as VOC that have no LCI value but may be of concern

and an assessment of sum parameters

- ▶ Risk-value (R-value)⁴,
- ▶ total VOC (sum of all VOC = TVOC),
- ▶ total semi-volatile VOC (sum of all semi-volatile VOCs = TSVOC) and
- ▶ the sum of substances without LCI values.

Lilian Busse stated that the proposed delegated act would reduce Germany's level of protection and criticised it being less ambitious than the proposal by the European Collaborative Action Urban Air, Indoor Environment and Human Exposure (ECA; c.f. below). UBA suggests that five parameters should

¹ Article 27 of the CPR allows the EU Commission to define performance levels (as well as classes of performance) via delegated acts. This option has not been applied up to now.

² AgBB is a German working group that evaluates construction products regarding human health. It has developed the mentioned scheme on how to identify and evaluate VOC emissions from construction products (<https://www.umweltbundesamt.de/en/topics/health/commissions-working-groups/committee-for-health-related-evaluation-of-building>).

³ LCI-values describe a substance's air concentration below which no adverse human health effects are expected. The AgBB LCIs are derived by an expert group based on a substance's toxicological data. Currently, LCIs exist for app. 180 substances.

⁴ The R-value expresses the level of risk from all substances assessed in a product that have an LCI. It is formed by adding the risk ratios (quotient of the measured exposure concentration and the LCI) for each assessed VOC in the chamber test. If the R-value exceeds the value of 1, a risk is identified.

define the VOC-classes to ensure “good” and “very good” products can be distinguished and recognised on the market. The parameters and their threshold values are shown in Table 1.

Table 1: UBA proposal to define five VOC classes; (Source: Presentation Lilian Busse, Brussels, 19.10.2017)

VOC-classes	Declared value (example)	Emission class	Threshold
R-value	0.4	A	< 1.0
TVOC	700 µg/m ³	A	< 1000 µg/m ³
ΣVOC without LCI	50 µg/m ³	A	< 100 µg/m ³
TSVOC	90 µg/m ³	A	< 100 µg/m ³
Carcinogens	Not detectable	A	< 1 µg/m ³

3 Impulse Statements from Different Perspectives

3.1 Harmonisation at EU Level

Derrick Crump (Indoor Air Quality (IAQ) Consulting Limited & Associate) highlighted that construction products are one of the relevant sources of pollutants in indoor air that regulators can control. The ECA, a working group of experts in the field, analysed the (various) regulatory and voluntary assessment schemes regarding indoor air quality in the EU and found out that all of them use the environmental chamber test to identify VOC concentrations. They differ in the type and number of performance criteria. Derrick Crump introduced several actions at EU level to harmonise the assessment of emissions from construction products:

- ▶ The ECA proposed assessment criteria for VOC emissions: The so-called *core criteria* (R-value, TVOC, carcinogens) are agreed among the experts, while for the so-called *transitional criteria* (sensory evaluation, SVOC and “other substances”) no consensus was reached, yet.
- ▶ The EU standardisation body CEN harmonised the chamber testing method and published it as testing standard to determine VOC emissions.
- ▶ The EU-LCI working group agreed so far on 111 LCI values for VOCs emitted from construction products.

Derrick Crump reminded that the EU-LCIs do not cover combined effects of VOCs. Therefore, the R-value has been established to reflect risks from simultaneous exposure to several VOCs, for which an LCI is defined.

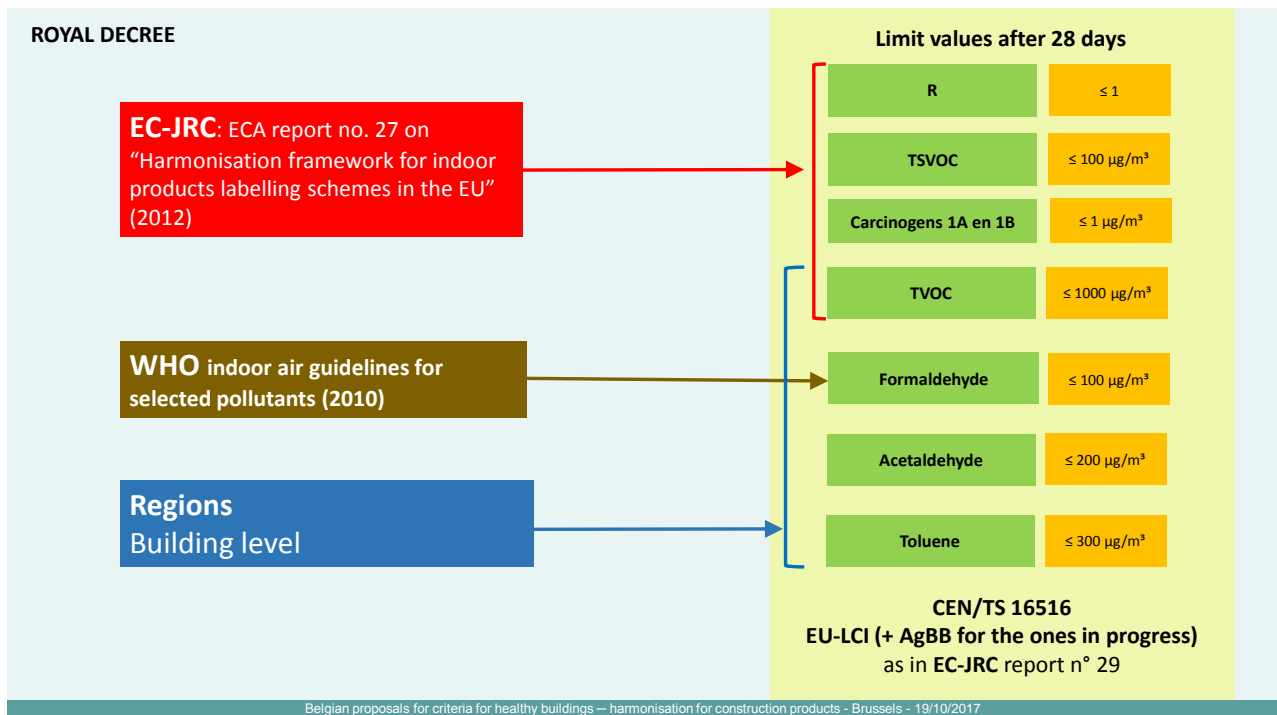
In contrast, the TVOC covers any VOC, including those formed in chemical reactions occurring during use of a construction product and those, for which no toxicological data exists. Hence, it would not express a potential risk but complement the evaluation basis as an indicator of a degree or level of uncertainty.

3.2 The Belgian Approach and Position towards the Commission Proposal

Tom Haerinck (Belgian Building Research Institute (BBRI)) explained that the Belgian national legislation on VOC emissions from construction products entered into force in 2015. It concerns floor coverings as well as adhesives and finishing products applied in conjunction with them. An extension of the scope is planned (wall coverings and ceiling materials).

Figure 2 shows the Belgian assessment criteria and the sources they are derived from. The system has a pass-or-fail approach, i.e. products that exceed the threshold values of any of the criteria may not be used in Belgian construction works.

Figure 2: Belgian VOC assessment criteria (Source: Presentation Tom Haerinck, Brussels 19.10.2017)



Tom Haerinck presented the Belgian authorities' position towards the Commission's proposal:

- ▶ The use of CMRs as criterion is acceptable as well as the use of EU-LCIs, which would replace the individual values for acetaldehyde and toluene.
- ▶ The lack of the R-value is likely to be accepted if a consensus can be reached on other main parameters.
- ▶ The lack of a category TSVOC is criticised but may be accepted.
- ▶ The category TVOC is very important to the Belgian authorities and it is unlikely that they will accept a proposal without this parameter.

Tom Haerinck provided several arguments for including TVOC into the proposed delegated act: The TVOC would compensate the decrease of protection level in the Belgian system that is caused by the loss of possibilities to use the LCI values of the AgBB. Although it is not directly used in risk assessments, the TVOC is an indicator of the possibility of combination effects and it is frequently applied in practice, e.g. in building certification schemes.

In addition, the Belgian authorities propose including a revision clause into the delegated act so that further LCIs can be added. They suggest adding a list of substances, for which it is planned to derive EU LCI values in an additional annex and to make a clear reference to the EU standard EN 16516 for the chamber test as method to measure the VOC emissions.

3.3 History and State-of-Play of the Commission proposal

Manfred Fuchs (EU Commission, DG Grow), explained that the Commission developed its draft proposal on VOC emission classes based on an assessment of national schemes and considering the work

of the ECA. He stressed that the member states and the regional authorities are responsible for defining the level of safety of construction products for a particular use and that therefore, the CPR focusses on the assessment (methods) of products and the communication of results.

He explained that the EU harmonised standard for the chamber test was subjected to a round robin testing to ensure it is robust and results from different laboratories are the same for the same construction product.

The Commission's draft delegated act mainly aims at providing a concise and easy-to-understand communication system on VOC emissions that reflects a level of risk of a construction product. As consumers would not understand long substance lists, the class system was chosen as a communication tool. Manfred Fuchs highlighted some critical aspects the Commission identified with the currently proposed criteria:

- ▶ The funding of the LCI-development work is not fully ensured in the future;
- ▶ In France, a lower limit value/stricter class is defined for formaldehyde emissions than the lowest of the Commission's thresholds, i.e. the current thresholds may be too high;
- ▶ Only some of the CMRs identified according to the classification and labelling regulation are volatile. Of the volatile CMRs only some are used in construction products. Hence, a specific list of relevant CMRs is needed to determine this class.

According to Manfred Fuchs, the Commission refrained from including TVOC as a criterion, because it was considered to be possibly misleading to the users: Construction products with a high content of harmless VOCs would be assigned to a "bad" class although it would not pose a risk. In turn, a construction product containing many hazardous VOCs slightly below the LCI would be evaluated as "good". Manfred Fuchs stated that this is difficult to communicate to consumers (who are more familiar with TVOC than with LCI) and he sees a risk that the entire class system could be discredited if one of the parameters (i.e. the TVOC) could lead to misunderstandings.

He ended his presentation with an invitation to all stakeholders to provide their input to the Commission's proposal of a delegated act.

3.4 The Consumer Perspective on VOC Classes

Michela Vuerich, (ANEC) introduced the participants of the meeting to the consumer perspective on VOC classes. She explained that ANEC pledges for regulating emissions from all products used indoors at EU level, and not only construction products. According to her, the current framework is insufficient, because the CPR and the General Product Safety Directive do not establish limit values for VOCs and the REACH risk management procedures are cumbersome, lack sum parameters and do restrict substance groups.

Consequently, ANEC proposes developing new legislation with harmonised performance requirements on VOCs. It should cover various products and could be based on the existing labelling schemes as a first step. It should allow easy and quick changes, e.g. via delegated acts, to enable further development of the requirements. She suggested the system to define several pass-or-fail criteria, among others an exclusion of CMRs, limit values for TVOCs (SVOC and VVOCs at a later stage) and the use of the EU-LCIs. She also requested a sensory evaluation of products. The EU Ecolabel as well as national labels should be adapted and define lower limit values to differentiate the "top products" from those "just complying with legislation".

3.5 The Industry Perspective on VOC Emission Classes

Helge Kramberger (Robert Murjahn Institute) spoke on behalf of the EU industry associations FEICA (adhesives), EFCC (construction products) and CEPE (paints) and introduced industry's views on the

EC proposal. He stressed that industry was very much in favour of passing a delegated act and setting a harmonised framework for declaring VOC emissions.

Harmonising legislation is needed because manufacturing companies act on different EU markets and would appreciate the removal of the trade barriers caused by the different national requirements for documenting the safety/suitability of construction products for their use. Helge Kramberger emphasised that differences in the content and emissions of construction products were necessary to supply adequate products for different applications (and quality requirements). An easy system to convey product information necessary to make an informed choice on the “most suitable” products is needed. The class system is preferred over listing substances, as only the former would be understandable to the product users.

Helge Kramberger regarded the proposed delegated act as a good discussion basis but saw a need to further modify it. As it is essential that the member states can accept the delegated act, he recommended that existing national provisions, e.g. on TVOCs or on the R-value, be respected in the negotiations. He expressed a wish that the class system would also be used for those products covered by national legislation which are not in the scope of the CPR, such as decorative paints.

Helge Kramberger concluded that the industry associations FEICA, EFCC and CEPE would support a more ambitious VOC class concept in a further modified delegated act because for them, the harmonisation of the DoP requirements of construction products is of very high importance. Similar to the previous speakers, he also stressed that a clear reference to the EU standard on chamber testing needs to be included in the delegated act.

4 Panel Discussion

The speakers were invited for a panel discussion that was opened for comments and questions from the audience. The discussion focussed on the needed content and form of communication, the suitability of the “TVOC” as criterion in the delegated act and some miscellaneous additional input to the Commission’s proposal.

4.1 Clarification of Communication Needs on VOC Emissions

In the panel discussion, the variety of information users and the related communication challenges became evident. Tom Haerinck stated that regulators would need information fitting to the national requirements and saw this only partly implemented with the current proposal. Michela Vuerich expected the classes to be informative also to consumers; however, as these are most interested in that products are safe, she considers the lack of cut-off criteria as crucial. Mr. Kramberger mentioned professionals as important information users and recommended the use of eco-labels for consumer information. However, also professional users would lack detailed knowledge and would need easy communication systems, as foreseen by the VOC classes. Professionals would include the direct users of construction products as well as planners or architects etc.

4.2 Suitability of TVOC as an Indicator

All debaters on the panel evaluate the TVOC not as a toxicological indicator but as additional indicator on the overall VOC emissions. It is a means to deal with “the unknown” or “unassessed”. However, the panel members as well as several representatives from member state authorities agreed that it is a very useful and needed parameter because of its application in certification and labelling schemes of buildings; i.e. there are information users. Additionally, the parameter is well known and established and some core actors have experience with it, e.g. laboratories. Finally, the TVOC would incentivise product improvements regarding VOCs. In the long run, and as knowledge on VOC increases, the indicator may either not be needed anymore or a better parameter may replace it.

From the audience a possible discrepancy between the use of low emission construction products and the occurrence of VOC in indoor air samples, e.g. taken in to obtain building certifications, was pointed out. Currently, builders would not always manage to construct low-emission buildings. The final building and the measured indoor air quality would be relevant and the VOC emissions from construction products would only be part of the problem. The indicator TVOC would support the selection of low emission products and hence increase the chances of meeting certification standards or procurement notices.

4.3 Additional Issues regarding the Delegated Act

The urgency of passing a delegated act was highlighted by some of the meeting participants, as some product standards already include VOC emissions as essential characteristics and the first product declarations are expected. Without a class system, DoPs would contain long lists of substances.

The delegated act and the implementation of performance declarations should be complemented by guidance and tools for the various actors as the general understanding of the meaning of EU LCIs is regarded as low. More expertise would be needed to decide if a product is fit for purpose and how to interpret information conveyed with a construction product. This includes understanding the gap between single product assessments and measuring indoor air.

The need for a stricter class for formaldehyde was voiced but the inclusion of SVOC as a criterion was viewed critical and proposed for possible implementation at a later stage.

Manfred Fuchs stated that the Commission invites all stakeholders to comment on its proposal and present their arguments on the definition of the VOC classes until the end of the year.

5 Conclusion from the Meeting

It was concluded that harmonisation is a common goal to all stakeholders. It was welcomed that there is room for negotiating the current EU proposal and the positions of the different interested groups became clearer. It was reiterated that member states would like to keep their (higher than currently proposed) level of protection and therefore see improvement needs in the delegated acts.

6 Literature

AgBB (Committee for health-related evaluation of building products) (2015): Health-related evaluation procedure for VOC emissions from building products. <https://www.umweltbundesamt.de/en/topics/health/commissions-working-groups/committee-for-health-related-evaluation-of-building>

Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC