



**Technical comments to the proposals of DG Growth
for a harmonized VOC-Class-Concept,
version 17 June 2016**

We in general welcome the commission initiative to a delegated act on the classification of performance of construction products in relation to their emissions of dangerous substances into indoor air. The actual situation in the EU is unsatisfied and disables a single market. Only a few member states have a system which is very different between these countries. Therefore a harmonized concept on the EU market is necessary.

However, in the present form the VOC-Class-Concept is not applicable. It is essential that besides technical requirements and values the methodology of measurement must be specified, see table 3. For CE-marked wood-based panels according EN 13986 as example it is for formaldehyde the EN 717-1 or the derived methods.

Furthermore the units are changing, see table 1 (TVOC after 3 days [mg/m^3] after 28 days [$\mu\text{g}/\text{m}^3$]). So the TVOC after 28 days are stricter than the other values.

Concerning Table 3 the Class 1 for formaldehyde cannot be reached safely for renewable natural construction material even without additives. Therefore Class 1 has to be deleted. Class 3 is too narrow to Class 4 and must therefore be eliminated. We suggest according to EN 717-1 the following three classes:

F_1	$\leq 60 \mu\text{g}/\text{m}^3$
F_2	$\leq 124 \mu\text{g}/\text{m}^3$
F_3	$> 124 \mu\text{g}/\text{m}^3$

The TVOC values as well as the EU-LCI values have to be considered very carefully. The TVOC value has doubtlessly no hygienic or toxicological significance. But concerning indoor air there is a risk that they will become sooner or later a threshold-like limit for indoor air. This must be avoided.

The complex differentiation of VOC-emission for renewable resources is not helpful and not relevant. Construction products from renewable resources are organic per se and emit basically organic substances. This circumstance must be taken into account. The toxicological or hygienic relevance of this aspect for renewable resources is not plausible, as scientific studies already demonstrated even in high concentration, VOC from wood or wood-based panels do not have any adverse health effects.¹⁾²⁾³⁾

The actual EU-LCI list contains until now 96 VOCs, the German NIK list (AgBB) 184 substances. There are a few substances (e.g. Pentenal, Heptenal, Octenal) with different values in the LCI list and the NIK list. We cannot find any explanation for



this. In contrast to the AgBB scheme, where the procedure for the derivation of such values is very clearly described, reference is made for the EU-LCI list only that the experts identify values and the Commission then accepted. Such a procedure is not transparent in any way and raises questions regarding the toxicological or hygienic meaning of these values.

Furthermore, the range of the LCI values is enormous for example from 1 µg/m³ for CIT until methyl cyclohexane with 8,100 µg/m³. Especially compounds with high LCI values have to be contrasted against the TVOC limits. In the actual list the subclass A⁺⁺⁺ should be ≤200 µg/m³ after 28 days. This does not fit.

Since the TVOC values as well as the R-value have no hygienic or toxicological background a classification can only be done by individual substance evaluation. Besides the LCI-value there must be worked out a toxicological based limit value for each individual substance, called in the following "tbl". As a compromise we suggest a new table 2 for the individual substances, see beyond.

CAS No	Substance	Class 1	Class 2	Class 3
		≤ LCI-Value	≤ tbl	> tbl

Taking all these considerations into account a complete system might be summarized as visualized in Annex Z

22 August 2016

Literature

- 1) Zytotoxizität und Gentoxizität von flüchtigen organischen Verbindungen (VOC) aus Kiefernholz und Grobspanplatten (OSB) im Biologischen Kammerexpositionssystem (BIKAS), Volker Mersch-Sundermann, Tao Tang und Richard Gminski, published in Umweltmedizin, Forschung und Praxis 16 (1) 2011.
- 2) Cytotoxicity and genotoxicity in human lung epithelial A549 cells caused by airborne volatile organic compounds emitted from pine wood and oriented strand boards, Richard Gminski, Tao Tang, Volker Mersch-Sundermann, published in Toxicology Letters 196 (2010) 33–41.
- 3) Sensorische und irritative Effekte durch Emissionen aus Holz und Holzwerkstoffen; eine kontrollierte Expositionsstudie. R. Gminski, S. Kevekordes, W. Ebner, R. Marutzky, F. Fuhrmann, W. Bürger, D. Hauschke, V. Mersch-Sundermann, published in Arbeitsmedizin Sozialmedizin Umweltmedizin 2011; 46: 459-468.

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ANNEX Z
Visualization of the possible concluded system

Table: VOC^A of health related assessment of specific substances

Substance <i>[all taken from EU-LCI-list]</i>	CAS No	Class 1 LCI-value <i>[$\leq LCI_{individual\ substance}$]</i>	Class 2 tbl value <i>[< toxicological base limit value_{individual substance}]</i>	Class 3 <i>[\geq toxicological based limit value_{individual substance}]</i>
name	e.g. 75-07-0	\leq value in $\mu\text{g}/\text{m}^3$	< value in $\mu\text{g}/\text{m}^3$	\geq value in $\mu\text{g}/\text{m}^3$
...				

Table: Formaldehyde Emissions

	Class F1	Class F2 (E1)	Class F3 (E2)
Formaldehyde	$\leq 0,060 \text{ mg}/\text{m}^3$	$\leq 0,12 \text{ mg}/\text{m}^3$	$> 0,12 \text{ mg}/\text{m}^3$

Table: Carcinogenic substances

		Class C1 <i>[\leq toxicological relevant]</i>	Class C2 <i>[> toxicological relevant]</i>
Carcinogenic substances 3d		$\leq 10 \mu\text{g}/\text{m}^3$	$> 10 \mu\text{g}/\text{m}^3$
Carcinogenic substances 28d		$\leq 1 \mu\text{g}/\text{m}^3$	$> 1 \mu\text{g}/\text{m}^3$

Example for declaration of a product

A1-F2-C1