How to protect health against hazardous VOC emissions from construction products?

Sources of indoor air pollution

Most of us live, work and spend our free time mainly in buildings. The indoor air in buildings has a continuous impact on our health. We all have the experience that poor air quality can make us tired, unfocused and inefficient. Sometimes we also encounter hazardous emissions in indoor air that may make us seriously ill. Healthy buildings are important for all of us. To build them we need good tools for planners and builders. One of the necessary tools is an **informative declaration or label on construction products**.

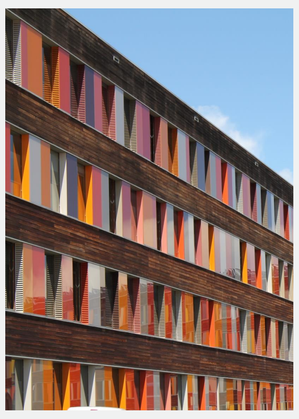
Why do we focus on construction products? They are not the only source of indoor air pollution, but the most important one. The user cannot change the construction products easily, they are in the room all the time and have large emitting surfaces. High product emissions bring high uncalculated costs for the user when people get unwell and a new renovation is needed.

When we talk about indoor air pollutants, we talk about VOC, volatile organic compounds. This term covers thousands of different compounds with differing properties. These can be measured and evaluated most easily with the methods we have today.

VVOC	VOC	SVOC
• Small molecule size (<6 C atoms) • Low boiling point • Very volatile: emit quickly	• Moderate molecule size (6-16 C atoms) • Moderate boiling point • Emission peak within one month of application	• Large molecule size (> 17-22 C atoms) • High boiling point • Semi-volatile: emit slowly over a long period of time

Importance of emission testing — our own experience

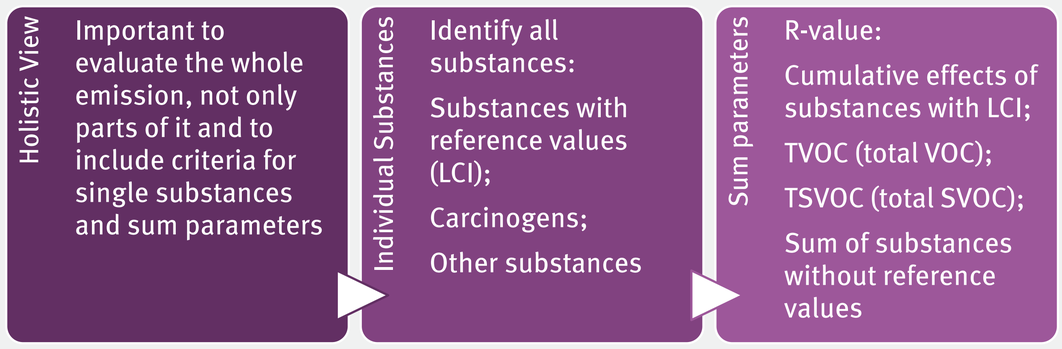
- Construction with high health and environment standards in 2004
- 18 600 m² rubber flooring
- Indoor air measurements reveal carcinogenic substances
- Flooring had to be changed
- From 2005 mandatory criteria prevent similar problems, our criteria are included in a protocol called the **AgBB evaluation scheme**



Health requirements for the marketing of construction products are weak

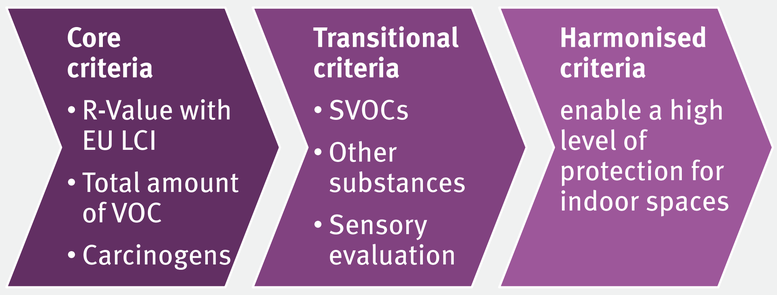
EU harmonised product standards within the Construction Products Regulation (CPR, 305/2011) define the parameters to be described in a so-called product performance declaration. This is a pre-condition for obtaining the CE label and placing construction products on the EU market. Currently, only very few product standards include human health parameters. VOC emissions, in particular, are not addressed with the exception of formaldehyde.

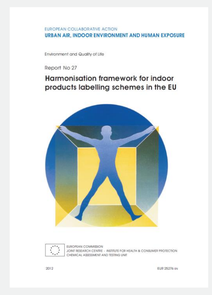
How can VOC emissions be assessed?



The challenge is the diversity of the emissions. Harmless and hazardous substances are mixed and emit at greatly differing levels. The AgBB approach is holistic. We evaluate the whole emission with different tools. We try to identify all substances in the emission measured in a test chamber. Identified substances are compared with reference values, if these are available. The reference values used are called LCI, lowest concentration of interest. Carcinogens are evaluated separately. After looking at each tree we also look at the forest. We build a cumulative risk index from all substances with LCI called the R-value. We look at total VOC, total SVOC and at the sum of other substances. Substances that cannot be identified in the test or do not have a reference value are associated with unknown risks and should not be favoured in the evaluation.

Call for harmonisation of criteria with the aim of a reliable emission declaration of construction products





We need a common approach in the EU to tackle construction products emissions. We are very much in favour of common **EU LCI values** and appreciate greatly the work of the EU LCI working group. The results of an important European initiative for harmonisation were published in 2012. Here the experts found core criteria and transitional criteria as a starting point for deriving harmonised criteria for both mandatory declarations and voluntary labels.

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https://www.umweltbundesamt.de/en/service/dates/briefing-evaluation-of-construction-product

German Environment Agency

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