

Investigation and assessment of VOC emissions from joint sealants according to E DIN 15651-1 and E DIN 15651-2

As part of this project selected joint sealants were tested for their emission behaviour towards using thermal extraction and test chamber. The selection of joint sealants was made with reference of the systems mentioned in the draft versions of DIN EN 15651-1 and EN 15651-2, to record all interior-related product groups. The following systems were considered: polyurethane sealants, silicone sealants, silane-modified polymers and acrylat sealants.

For the selection of the products, the results of the "literature study on VOC emissions from sealants in accordance with E DIN 15651-1 and E DIN 15651-2" were taken as basis (Hofmann 2011).

9 of the 20 selected products for the thermal extraction were then analysed by test chamber. The test chamber analyses were carried out in accordance with DIN EN ISO 16000-9. For the implementation and evaluation, the DIBt principles for the health assessment of indoor construction products (October 2010) and the AgBB requirements (May 2010) were taken as basis.

The results of the studies of the joint sealants were very heterogeneous. Using thermal extraction, products with different emissions were identified within the different systems. Next to emissions of health relevant individual substances, such as benzaldehyde and 2-butanone oxime, emissions of substances outside the substance-specifically identified and quantified scale of compounds appeared in high mass. These were isoalkanes, olefins, alcohols and siloxanes. The tested products achieved by thermal extraction total emissions (TVOC values) between 28 mg/kg and 4.090 mg/kg. The lowest total emission was reached by a joint sealant based on an MS-polymer. The highest total emission by thermoextraction was reached by an oxime cross-linked silicone sealant.

For four products, based on this emission test by test chamber, the specifications for the emissions of VOC and SVOC by the „Prüf- und Bewertungsschema des Ausschusses zur gesundheitlichen Bewertung von Bauprodukten (AgBB)“ are not achieved. Four products exceed the SVOC value admissible after 28 days, one of the products also exceeds the TVOC value admissible after 28 days.

In summary, it should be noted, that by thermal extraction, findings of potential of emission of joint sealants can be recovered. The results, obtained by means of test chamber analysis, can be significantly different from the results of the thermal extraction, probably depending on the drying behaviour of the products. Differences were also found between the results of the test chamber analyses and practical cases. You can expect, that the application conditions, such as width-thickness ratio, temperature and ventilation can greatly affect the emission performance of the products.

The product group of the joint sealants is, in terms of systems and formulas, a very heterogeneous group with a technically sophisticated indoor use. Due to the high emission rates of the products and the emission of specific inside space relevant connections, indoor air pollution are forecasted and found in practice.