

# DIN EN 16402:2019-08 (E)

## Paints and varnishes - Assessment of emissions of substances from coatings into indoor air - Sampling, conditioning and testing

---

Contents	Page
European foreword .....	4
Introduction .....	5
1 Scope .....	6
2 Normative references .....	6
3 Terms and definitions .....	7
3.1 Terms relating to sampling and product .....	7
3.2 Terms relating to emissions into indoor air and associated laboratory testing .....	8
3.3 Terms relating to determination of emitted substances .....	10
3.4 Abbreviations .....	12
4 Principle .....	12
5 Product categories .....	13
6 Relevant substances emitted from coatings .....	14
7 Intended conditions of use, Emission scenarios and European reference room .....	14
7.1 Intended conditions of use and emission scenario .....	14
7.2 Reference room and emission scenario .....	14
7.3 Ventilation in the reference room .....	16
7.4 Climate conditions of the reference room .....	16
7.5 Time schedule of emission determination .....	16
8 Product sampling and transport .....	16
8.1 Population of the product to be considered for testing .....	16
8.2 Sampling .....	16
8.3 Transport .....	17
8.4 Chain of custody .....	17
8.5 Dispatch of samples, time schedule .....	18
9 Handling of product samples in the laboratory .....	18
9.1 Storage .....	18
9.2 Preparation of test specimen: Coatings .....	18
9.3 Preparation of test specimen: coating systems .....	22
9.4 Preconditioning .....	22
10 Test chamber conditions .....	23
10.1 Principle .....	23
10.2 Dimensions of test specimen .....	23
10.3 Loading factor .....	23
10.4 Ventilation .....	24
10.5 Air velocity .....	24
10.6 Cleanliness of test chamber .....	24
10.7 Testing climate (temperature, relative humidity of supply air) .....	24
10.8 Storage of test specimen .....	24
10.9 Large products or inhomogeneous products .....	25
10.10 Volume of test chamber .....	25

<b>10.11</b>	<b>Placement of test specimen in test chamber .....</b>	<b>25</b>
<b>11</b>	<b>Determination of vapour-phase organic compounds in test chamber air .....</b>	<b>25</b>
11.1	Common requirements .....	25
11.2	Determination of VOCs and SVOCs in test chamber air .....	26
11.3	Determination of formaldehyde and some other volatile and very volatile carbonyl compounds in test chamber air .....	34
11.4	Other general aspects of quality control .....	35
<b>12</b>	<b>Calculation of specific emission rates and expression of results at the reference room ...</b>	<b>36</b>
<b>13</b>	<b>Test report .....</b>	<b>39</b>
13.1	General .....	39
13.2	Sampling .....	39
13.3	Handling of samples in the laboratory, preparation of test specimen .....	39
13.4	Test chamber conditions .....	40
13.5	Determination of vapour-phase organic compounds in test chamber air .....	40
13.6	Calculation of specific emission rates and expression of results in terms of air concentration in the reference room .....	40
<b>14</b>	<b>"Indirect" methods .....</b>	<b>41</b>
<b>Annex A (informative) Repeatability and reproducibility .....</b>		<b>42</b>
A.1	Repeatability .....	42
A.2	Reproducibility .....	42
<b>Annex B (informative) Examples of indirect methods (also called simplified, screening, secondary, derived or alternative methods) .....</b>		<b>44</b>
B.1	General .....	44
B.2	Indirect methods-emissions testing .....	44
B.3	Indirect methods specifying alternative procedures .....	45
B.4	Other secondary methods -- Prediction of results at specified time .....	45
<b>Annex C (informative) Information on very volatile organic compound (VVOC) testing .....</b>		<b>46</b>
<b>Annex D (informative) Example of a form for the sampling report .....</b>		<b>47</b>
<b>Annex E (informative) Example of a form for a chain of custody report .....</b>		<b>48</b>
<b>Annex F (informative) Benzene artefact generation on Tenax TA .....</b>		<b>49</b>
<b>Annex G (normative) List of non-carcinogenic VOCs .....</b>		<b>50</b>
<b>Annex H (informative) List of carcinogenic VOCs .....</b>		<b>58</b>
<b>Annex I (informative) Overview of test procedure .....</b>		<b>60</b>
<b>Bibliography .....</b>		<b>61</b>