

# DIN ISO 16000-33:2017-12 (E)

## Indoor air - Part 33: Determination of phthalates with gas chromatography/mass spectrometry (GC/MS) (ISO 16000-33:2017)

---

<b>Contents</b>	<b>Page</b>
<b>National foreword</b> .....	<b>4</b>
<b>National Annex NA (informative) Bibliography</b> .....	<b>7</b>
<b>Foreword</b> .....	<b>10</b>
<b>Introduction</b> .....	<b>11</b>
<b>1 Scope</b> .....	<b>12</b>
<b>2 Normative references</b> .....	<b>12</b>
<b>3 Terms and definitions</b> .....	<b>12</b>
<b>4 Sampling methods and analytical apparatus</b> .....	<b>13</b>
4.1 General .....	13
4.2 Sampling by adsorption with subsequent thermal desorption .....	13
4.2.1 Apparatus, operating materials and chemicals .....	13
4.2.2 Preparation of the thermal desorption tube .....	14
4.2.3 Sampling .....	14
4.3 Sampling by adsorption and subsequent solvent extraction .....	15
4.3.1 Apparatus, operating materials and chemicals .....	15
4.3.2 Preparation of Florisil® and the adsorption tubes .....	16
4.3.3 Hints to the application of Florisil® .....	17
4.3.4 Sampling .....	17
4.3.5 Sample conditioning .....	18
<b>5 Calibration</b> .....	<b>18</b>
5.1 General .....	18
5.2 Calibration of the thermal desorption method .....	19
5.3 Calibration of the solvent extraction method .....	19
<b>6 Identification and quantification</b> .....	<b>19</b>
6.1 Mass spectrometric analysis .....	19
<b>7 Establishment of calibration curves and calculation of the analyte mass</b> .....	<b>25</b>
7.1 Establishment of calibration curves .....	25
7.2 Calculation of the analyte mass .....	25
<b>8 Calculation of indoor air concentrations</b> .....	<b>26</b>
<b>9 Performance characteristics</b> .....	<b>27</b>
9.1 Detection limit .....	27
9.2 Quantification limit and problems related to the blank values .....	27
9.3 Reproducibility standard deviation and repeatability standard deviation .....	28
<b>10 Quality assurance</b> .....	<b>30</b>
10.1 Method verification and determination of blanks .....	30
10.1.1 Field blank value of the indoor air .....	30
10.1.2 Analytical laboratory blank value .....	30
10.2 Measures for blank value minimization .....	30
10.3 Documents .....	31
<b>11 Interferences</b> .....	<b>31</b>

<b>Annex A</b> (informative) <b>General information on phthalates</b> .....	<b>32</b>
<b>Annex B</b> (informative) <b>Screening phthalates in solvent wipe tests</b> .....	<b>35</b>
<b>Annex C</b> (informative) <b>Screening phthalates in house dust</b> .....	<b>38</b>
<b>Annex D</b> (informative) <b>Practical example for the calibration of the thermal desorption method</b> ...	<b>42</b>
<b>Annex E</b> (informative) <b>Practical example for the calibration of the solvent extraction method using Florisil®</b> .....	<b>44</b>
<b>Annex F</b> (informative) <b>Practical example for the gas chromatography with thermal desorption</b> ...	<b>46</b>
<b>Annex G</b> (informative) <b>Practical example for the gas chromatography following solvent extraction</b> .....	<b>47</b>
<b>Annex H</b> (informative) <b>Problems related to the blank values</b> .....	<b>48</b>
<b>Annex I</b> (informative) <b>Example of a sampling protocol</b> .....	<b>49</b>
<b>Bibliography</b> .....	<b>50</b>