The future European Standard to Determine Odour in Ambient Air by Using Field Inspection - Grid Method and Plume Methods -

*) Werner-Jürgen Kost (D), CMet, FRMetS, et al
**) Dr. Wolfgang Kunz (F, Plume)
Air Quality - Determination of odour in ambient air by using field inspection

Part 1: Grid-method

Luftbeschaffenheit - Bestimmung von Geruchsstoffimmissionen durch Begehungen; Teil 1: Rastermessung

Qualité de l'air - Determination de l'exposition aux odeurs par mesures de terrain

ICS:

Descriptors: odour, exposure, ambient air, field inspection

Air Quality - Determination of odour in ambient air by using field inspection

Part 2: Plume-method

Luftbeschaffenheit - Bestimmung der Geruchsstoffimmission mit Begehungen; Teil 2 Fahnenmessung

Qualité de l'air - Determination de l'exposition aux odeurs par mesures de terrain

ICS:

Descriptors: odour, exposure, ambient air, field inspection, odour plume
The Members of the working group

<table>
<thead>
<tr>
<th>Country</th>
<th>Members</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deutschland: 2</td>
<td>Kost, Werner-Jürgen</td>
<td>Convenor (D)</td>
</tr>
<tr>
<td></td>
<td>Franzen-Reuter, Isabelle</td>
<td>Secretary (D)</td>
</tr>
<tr>
<td></td>
<td>Berger, Jörn</td>
<td>Expert (D)</td>
</tr>
<tr>
<td></td>
<td>Bilsen, Ilse</td>
<td>Expert (B)</td>
</tr>
<tr>
<td></td>
<td>Bokaris, Tasso</td>
<td>Expert (Gr)</td>
</tr>
<tr>
<td></td>
<td>Bongers, Margarethe</td>
<td>Expert (NL)</td>
</tr>
<tr>
<td></td>
<td>Both, Ralf</td>
<td>Expert (D)</td>
</tr>
<tr>
<td></td>
<td>Guillot, Jean-Michel</td>
<td>Expert (F)</td>
</tr>
<tr>
<td></td>
<td>Hangartner, Markus</td>
<td>Expert (CH)</td>
</tr>
<tr>
<td></td>
<td>Jones, Nick</td>
<td>Expert (GB)</td>
</tr>
<tr>
<td></td>
<td>Kajolinna, Tuula</td>
<td>Expert (SF)</td>
</tr>
<tr>
<td></td>
<td>Kunz, Wolfgang</td>
<td>Expert (F)</td>
</tr>
<tr>
<td></td>
<td>Maasikmets, Marek</td>
<td>Expert (LT)</td>
</tr>
<tr>
<td></td>
<td>Merecka, Beata</td>
<td>Expert (P)</td>
</tr>
<tr>
<td></td>
<td>Milan, Bianca</td>
<td>Expert (NL)</td>
</tr>
<tr>
<td></td>
<td>Nicolas, Jacques</td>
<td>Expert (B)</td>
</tr>
<tr>
<td></td>
<td>Oxbol, Arne</td>
<td>Expert (DK)</td>
</tr>
<tr>
<td></td>
<td>Pottevin, Monique</td>
<td>Expert (F)</td>
</tr>
<tr>
<td></td>
<td>Ribeiro, Nicolas</td>
<td>Expert (F)</td>
</tr>
<tr>
<td></td>
<td>Rossi, Andrea Nicola</td>
<td>Expert (I)</td>
</tr>
<tr>
<td></td>
<td>Secanella, Jordi</td>
<td>Expert (E)</td>
</tr>
<tr>
<td></td>
<td>van Belois, Hugo</td>
<td>Expert (NL)</td>
</tr>
<tr>
<td></td>
<td>van Elst, Toon</td>
<td>Expert (B)</td>
</tr>
<tr>
<td></td>
<td>van Harreveld, Ton</td>
<td>Expert (NL)</td>
</tr>
<tr>
<td></td>
<td>Reurings, Inge</td>
<td>Observer (NL)</td>
</tr>
<tr>
<td></td>
<td>Skjerning, Lone</td>
<td>Observer (DK)</td>
</tr>
<tr>
<td></td>
<td>van Hoek, Caroline</td>
<td>Observer (NL)</td>
</tr>
<tr>
<td></td>
<td>Voerman, Johan</td>
<td>Observer (NL)</td>
</tr>
</tbody>
</table>

**Deutschland: 2, (o. Conv. + Sekr.)**

**Belgien: 3**

**Griechenland: 1**

**Niederlande: 6**

**Frankreich: 4**

**Schweiz: 1**

**Großbritannien: 1**

**Finnland: 1**

**Lettland: 1**

**Polen: 1**

**Dänemark: 2**

**Italien: 1**

**Spanien: 1**
Odour Assessments

CEN–Working Group TC 264 WG 27
Grid Method

- Based on the German VDI Guideline 3940 Page 1
- Improvements and detailed specification of the old German Method

1. Fluctuation range per grid, respectively measurement point

2. Checking the representativity of meteorological data (space and time)
½ a year
13 times per sub-grid (coloured)
52 values/grid (08/01-01/02)
1. Fluctuation range per grid, respectively measurement point

Evaluation Grid Insp.   1

4% Frequency

Detected hours of odour at measurement point

Existing Load EL

\[ EL = \frac{n_v}{N} \]

- \( n_v \) = No. of detected hours
- \( N \) = No. of field inspection in the evaluation area per point e.g. 13/26 times per 0.5/1 year

Measurement technique: 60 times 10 sec = 10 min

1 hour of odour counts if 6 or more odour impression
Plausibility Check

- MP (Measurement Point)

wind direction

wind speed > 1 m/s

X = no positive odour signal possible
Industrial Area

Field inspection with 14 qualities of odour

Refuse and waste

Measuring agency in accordance with DIN EN ISO/IEC 17025
The accreditation is valid for the named chartered processes.
**Determination of the fluctuation range** $N(t_{10\,\text{min}})$

**Valid odour hour limit**

*Range of uncertainty; 3 to 8 intervals (5% - 15%)*

**Positive signal of odour**

**n(t_{10\,\text{sec}})**

*6 - 8*

*over-
under-
odour hour limit in %*

*3 - 5*
Fluctuation range per grid

Odour frequency in %

% (over hour limit, >5<9)
% (under hour limit, >2<6)

15 %

-2 %
+4 %

Grid cell
<table>
<thead>
<tr>
<th>Rasterfläche</th>
<th>Anzahl N</th>
<th>Anzahl N</th>
<th>Anzahl N</th>
<th>in % pro Jahr</th>
<th>in % pro Jahr</th>
<th>in % pro Jahr</th>
<th>in % pro Jahr</th>
<th>in % pro Jahr</th>
<th>in % pro Jahr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>16</td>
<td>10</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>24</td>
<td>20</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>18</td>
<td>16</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>39</td>
<td>33</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>37</td>
<td>29</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>16</td>
<td>14</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>15</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>29</td>
<td>24</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>2</td>
<td>33</td>
<td>24</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>24</td>
<td>20</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>10</td>
<td>6</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>6</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>10</td>
<td>4</td>
<td>20</td>
<td>10</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>16</td>
<td>10</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

*) Measuring agency in accordance with DIN EN ISO/IEC 17025

The accreditation is valid for the named chartered processes.
Exemplary result at investigation points

Quality of odour

„Solid waste“

in % per year

Max. limit

Point 1 2 8 2

Min. limit

150 m

Measuring agency in accordance with DIN EN ISO/IEC 17025
The accreditations is valid for the named chartered processes.
2. Representativity Check of Meteo Data

**Meteorology:**

- Temporal representativity
- Spatial representativity
Temporal representativity

The temporal representativity is independent of space.
Still necessary is a meteorological measurement station according to WMO Guideline (e.g. airports).

If met. data of $t_{e.g.1a-10a}$ (WMO – Station) and met. data of $t_{11a}$ (investigation time) are in between two times of s. Dev $x(t_{1a-10a}) \%$, than meteo-data of investigation area are valid (o.k.)

Meteo-data of investigation area are temporal representative.
Analysis

Wind direction

Example for a long time wind direction measurement and the variation by the 2 times s. dev.

- +/- 2 x s. Dev.
- Mean
- Measurement

not representative

not representative
Analysis

Wind speed

Wind speed classes in % and the variation
Spatial Representativity

These measurements should be valid for the investigation area itself. Including cold air drainage wind and thermal wind system like e.g. a sea breeze.
Accredited for dispersion analyses in compliance with the German Technical Instructions on Air Quality Control (TA Luft) and the German Ordinance of Odour in Ambient Air (GOO-AA)

Meas. direction frequency

German WS

Investigation area

Meas. direction frequency

investigation area

Barcelona 25.09.2012
„Special“ meteorological situations??

- Thermal Windsystems
- Mountain/Valley Winds
- Sea Breeze Cirkulations

If we measure in the investigation area according the way we should (WMO-standard or VDI Guideline), all special meteorological effects are included.
Conclusion

✓ Odour impact studies by field inspection lead to a suitable result
✓ You get the real hot spots of odour impression and sources
✓ Activities to solve problems can be successful, if you know it
✓ Field inspection along incoming CEN Guideline are objective
Thank you for your attention

(E-Mail: kost@ima-umwelt.de)