

Dynamic Olfactometry



With this method samples of odourous gas are collected at the source of the odour in specific bags. These samples are then diluted with 'fresh air' and connected to an "olfactometer". A panel of trained people sniff the diluted odour through the olfactometer. The level of dilution is gradually reduced until a panelist first perceives the odour and presses a button providing the signal for the odour concentration. This technique is applied at the sources of the odours i.e. surface of landfill, chimney, etc. but the method is not sufficient to measure the impact to the citizens living in the nearby area.

What is it?

Dynamic olfactometry is a standardised way of measuring odour concentrations using the human sense of smell. It therefore belongs to the so called "sensorial techniques", since the measurement of the odour concentration is related to the sensation caused by the sample directly on a panel of opportunely selected people.

Samples of odorous air are collected at the source of the odour in suitable bags, then they are analysed by diluting them with fresh, odourless or 'neutral' air in decreasing amounts.

The analysis is carried out by presenting the sample to the panel at increasing concentrations by means of a particular dilution device called olfactometer, until the panel members can detect an odour that is different from the reference neutral air. The outcome of this measurement is the odour concentration of the sample, which is expressed in European odour units per cubic meter (ouE/m³). This represents the number of times the sample has been diluted with neutral (odourless) air to reach its odour detection threshold concentration. Thus, if the sample needs to be diluted 100 times with clean air so that the panel cannot perceive the

odour anymore, this means that the sample has a concentration of 100 ouE/m³.

What can it be used for?

The most significant step towards standardisation of olfactometry in Europe was the introduction, in 2003, of the European standard EN 13725 “Air Quality - Determination of odour concentration by dynamic olfactometry”, which deals with several aspects of the measurement, such as sampling procedures and materials, sample presentation to assessors, data recording, calculation and reporting and performance quality requirement.

The scope of the EN 13725:2003 states that “This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow. The primary application is to provide a common basis for evaluation of odour emissions in the member states of the European Union.” Thus, dynamic

olfactometry can be used to measure the concentration of odours emitted at the source.

In some cases, odour regulations fix concentration limits at emissions (for instance in the Region of Puglia, Italy). In such cases dynamic olfactometry can be used to ascertain if regulations are being breached.

The EN 13725:2003 only refers to dynamic olfactometry intended for the measurement of odour concentration at emissions. However, there are other derivations of dynamic olfactometry, described in German guidelines VDI 3882 Part 1 and VDI 3882 Part 2, which describe how to apply olfactometric measurements for the determination of odour intensity and odour pleasantness/unpleasantness (hedonic tone). Odour intensity is expressed in a scale from 0 (not perceptible) to 6 (extremely strong), whereas hedonic tone is measured in a scale from -4 (extremely unpleasant) to +4 (extremely pleasant) (Figure 1).

One important advantage of dynamic olfactometry is that it provides information that can be used as input data for dispersion modelling in order to evaluate

citizens’ exposure odours. Indeed, the odour concentration, coupled with the information related to the emitted airflow, allows for the evaluation of the so called “odour emission rate”, which is basically the odour flux emitted to the atmosphere, and is the parameters that effectively accounts for the amount of odour that is emitted into the atmosphere by a given source. This datum can be used as input data for specific mathematical models, which combine this information together with meteorological and geographical data, and thus calculates how the emitted odour is transported through the atmosphere to the affected citizens.

This is currently the preferred way in most countries to evaluate odour impacts caused by different odour emitting activities on the surrounding communities.

What can it NOT be used for?

Dynamic olfactometry is a discontinuous measurement method, since samples are collected at the source in a precise moment and then transported and analysed in a lab. For this reason, it cannot be used to continuously monitor odour emissions.

Dynamic olfactometry cannot be used to gain information about odour quality, thus it cannot identify odours or distinguish between different odours.

Dynamic olfactometry provides information about odour emissions. Thus, it cannot give information about the presence of odours in ambient air (immissions). For this purpose, data from olfactometric analysis should be combined with meteorological and geographical information in a specific dispersion model.

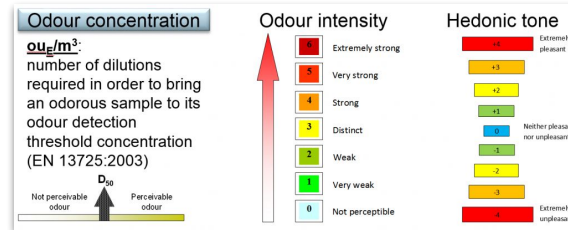


Figure #.