

Testing odours of consumer products

An odour may be pleasant or unpleasant, weak or strong, and individual persons may have very different perceptions of the same odour

Identification of odour plays a significant role in many situations. A new car should only smell like a new car and nothing else. A bad odour in an apartment can make living there very uncomfortable. A puppet should have a smell different from that of a computer.

While these points may help to illustrate the complexity of product odours, no golden standard for assessing odour has so far been established, but some attempts have been made to test the quality and intensity of odours.

Some odour testing protocols, described overleaf, have been established for different purposes.

These methods are in use for:

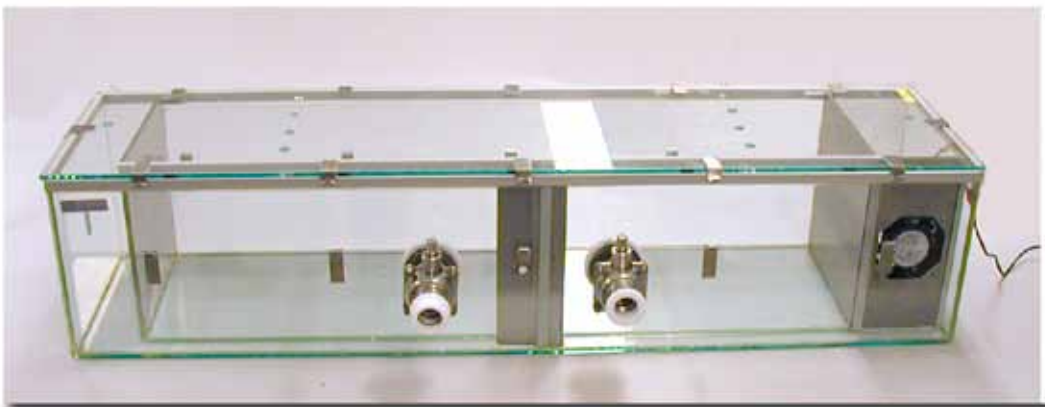
- Product design and production control
- Indoor air related quality labels
- Prediction of consumer perception of a product

Any perceived odour has several elements:

- Intensity
- Quality (hedonic note)
- Acceptance

These factors are not independent, as a weak odour can have a hedonic impression and acceptance very different from that of the same odour in strong intensity.

Eurofins can apply many different odour tests of which the pro's and con's should be compared before selection of a particular test.



CLIMPAQ chamber for odour testing

Testing the odour of consumer products

A number of testing methods are available for assessment of odours.

Static test in glass box

The test piece is placed in a glass box, e.g. a desiccator, at 37°C and defined humidity. Each of 3 to 8 odour panellists opens the box, assesses the odour, and closes it again, typically after 24 hours storage. The scale has 3, 5 or 6 units between non-detectable and unbearable. This test is used by GUT, Austrian UZ 56 (carpets), Natureplus label, and VDA 270.

Dynamic test in CLIMPAC chamber

The test piece is placed in a glass test chamber of e.g. 50 litres and flushed with clean moistened air. Odour is assessed at the outlet of the test chamber air by 5 or 15 panelists. Rating is acceptability (+1 to -1) and/or intensity (0 to 5). This test is used by Finnish M1 label and by Danish Indoor Climate Label.

Dynamic test, Olfactometer

Test chamber air is sampled in gas bags and then presented to circa 15 odour panellists in dilution steps. The selection of the panel is done each day such that the panel will give the expected response to a standard odour (n-butanol). Rating is odour found or not found. Mathematical handling of data leads to odour intensity, expressed as European Odour Units. This procedure was established for odour immission testing outdoors as described in EN 13725. In general, chamber air is

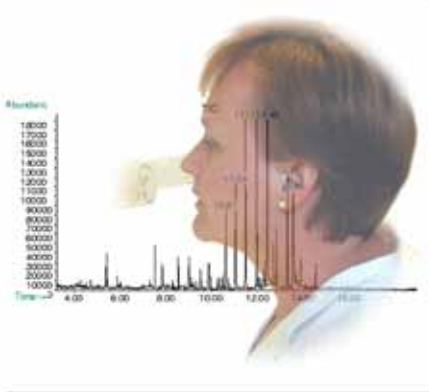
not sufficiently concentrated for applying enough dilution stages.

Static test, Olfactometer

A test piece, or test chamber air, is placed in a glass bottle. The odour strength is compared with several bottles containing standard odour dilutions. Rating is intensity. This test is described in French standard NF X 43-103.

Olf and decipol

A panel compares the chamber outlet air, or other sources of odour, with a standard odour, which is again normalised to the average odour tone of one normal person when diluted with 10 m³ fresh air per hour.



Consumer perception

Trained or untrained consumers are called into the laboratory for a qualitative assessment of acceptability and other sensory aspects of the tested product. This test is mainly used for benchmarking tests, comparing different products with each other, or during development of new products.

Chemical analysis, odour threshold

Advanced chemical analysis may identify many ingredients. These concentrations are then compared with a database on odour thresholds, e.g. with the Danish VOCBASE. Also sniffing-GC may help identify the most prominent odorous substances within a mixture. These approaches will only succeed if the dominating odours can be detected with the applied analytical technique, which is not always the case.

Electronic noses

Electronic noses based on sensor techniques may allow odour monitoring when the character of the odour remains the same. However, identification of new odours is still very difficult to achieve with these techniques.

Summary

In comparison of the different approaches to odour testing, no single method was identified as ideal. In fact the simplest technique (the static odour test in a glass box) showed a performance similar to that of more complicated techniques when applied to construction products.

The critical point is the subjective element of odour testing. Different laboratories will produce different results as long as the odour panel is not calibrated. Selection of the panel, or comparison with standard odours, may help to improve reliability and comparability of odour testing. Until progress is made on this issue, odour testing of products remains a highly subjective test, valid mainly for comparative testing, not always for absolute odour assessment.

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