
**Sensory analysis — General guidance for
the selection, training and monitoring of
assessors —**

Part 2:
Expert sensory assessors

*Analyse sensorielle — Lignes directrices générales pour la sélection,
l'entraînement et le contrôle des sujets —*

Partie 2: Sujets experts sensoriels



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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8586-2 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 12, *Sensory analysis*.

This second edition cancels and replaces the first edition (ISO 8586-2:1994), which has been technically revised.

ISO 8586 consists of the following parts, under the general title *Sensory analysis — General guidance for the selection, training and monitoring of assessors*:

- *Part 1: Selected assessors*
- *Part 2: Expert sensory assessors*

Introduction

Sensory assessment may be made by “assessors” (ISO 5492:2008, 1.5), “selected assessors” (ISO 5492:2008, 1.6) and “expert sensory assessors” (ISO 5492:2008, 1.8). ISO 8586-1 specifies requirements for the selection, training and monitoring of selected assessors. This part of ISO 8586 covers the principles linked to selection, training and monitoring performance of expert sensory assessors.

This part of ISO 8586 does not deal with product experts or product-specialized experts, because their specific know-how does not lie within sensory competence. However, a product expert or a product-specialized expert who is trained as an expert sensory assessor can be considered as an expert sensory assessor. This product-specialized expert can draw on additional knowledge gained in other fields, such as knowledge of the product to be assessed, and process or marketing experience, in order to interpret sensory data and make deductions.

An expert sensory assessor will have demonstrated particular acuity and reproducibility in panel work, and will have developed a good long-term sensory memory, allowing reliable comparative judgements, when necessary, in the absence of control samples.

Expert sensory assessors work as a panel which is managed by a panel leader. This panel leader is responsible for the general monitoring of the group of expert sensory assessors and for their training. The expert sensory assessors are not responsible for the choice of tests used, the presentation of the samples or for the interpretation of results. These matters are the responsibility of the panel leader who also decides how much information is given to the panel.

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Sensory analysis — General guidance for the selection, training and monitoring of assessors —

Part 2: Expert sensory assessors

1 Scope

This part of ISO 8586 specifies criteria for choosing people with particular sensory skills from selected assessors or from product, process or marketing specialists who themselves satisfy the selection criteria specified in ISO 8586-1. It specifies principles and procedures for choosing them and expanding their knowledge and abilities to the levels required of expert sensory assessors.

This part of ISO 8586 sets out requirements for expert sensory assessors to establish sensory profiles of products and materials through the use of descriptors. Specific knowledge of products or materials by expert sensory assessors is not necessary to fulfil these requirements.

This part of ISO 8586 supplements the information given in ISO 6658.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5492:2008, *Sensory analysis — Vocabulary*

ISO 5725 (all parts), *Accuracy (trueness and precision) of measurement methods and results*

ISO 8586-1, *Sensory analysis — General guidance for the selection, training and monitoring of assessors — Part 1: Selected assessors*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5492:2008 and the following apply.

3.1

sensory assessor

any person taking part in a sensory test

[ISO 5492:2008, 1.5]

3.2

selected assessor

assessor chosen for his/her ability to perform a sensory test

[ISO 5492:2008, 1.6]

3.3 expert sensory assessor
selected assessor with a demonstrated sensory sensitivity and with considerable training and experience in sensory testing, who is able to make consistent and repeatable sensory assessments of various products

[ISO 5492:2008, 1.8]

3.4 reproducibility
precision under reproducibility conditions

NOTE Reproducibility can be expressed quantitatively in terms of the dispersion characteristics of the results.

[ISO 3534-2:2006, 3.3.10]

3.5 reproducibility conditions
observation conditions where independent test/measurement results are obtained with the same method on identical test/measurement items in different test or measurement facilities with different operators using different equipment

[ISO 3534-2:2006, 3.3.11]

NOTE Reproducibility conditions may include different times (sessions), different environments, and different panels.

3.6 repeatability
precision under repeatability conditions

NOTE Repeatability can be expressed quantitatively in terms of the dispersion characteristics of the results.

[ISO 3534-2:2006, 3.3.5]

3.7 repeatability conditions
observation conditions where independent test/measurement results are obtained with the same method on identical test/measurement items in the same test or measuring facility by the same operator using the same equipment within short intervals of time

[ISO 3534-2:2006, 3.3.6]

NOTE Repeatability conditions mean same assessors (panel), same time (session), and same environment.

4 Selection of expert sensory assessors

4.1 General

Candidates for training shall:

- a) already have shown aptitude for sensory analysis, as confirmed by reference to ISO 8586-1 — the best first step is to choose selected assessors or to select people who are already selected assessors;
- b) be motivated by an interest in further developing their sensory skills, in both the sensory methodology and the sensory properties of one or several products;
- c) be available for training and regular practice — a preliminary condition for expert sensory assessors is the regular attendance at panel training programmes;
- d) be volunteers.

4.2 Specific skills

Panel leaders should evaluate the performance of the selected assessors, over a period of time and on the products concerned. Any selected assessors who show good repeatability, noteworthy acuity, or particular aptitude regarding specific attributes (e.g. a taint) of classes of materials, should be considered for use on panels of expert assessors.

Moreover desirable characteristics of candidates include:

- a) a memory for sensory attributes;
- b) an ability to communicate with other experts;
- c) an ability to verbalize descriptions of products.

The extent to which selected assessors possess these characteristics varies. So a complementary selection could be performed or the training programme adjusted accordingly.

5 Training

5.1 General

One of the aims is to optimize the technical knowledge of the expert sensory assessors by training and development of their sensory potential. Selected assessors should possess knowledge of the physiology of taste and smell.

To be considered as an expert sensory assessor, the sensory assessor shall already have acquired the knowledge required for a selected assessor by ISO 8586-1.

Training is aimed at optimizing the sensory knowledge of the assessors and especially at enabling them to memorize the descriptors of the sensory profile and their intensities, as well as acquiring the required qualities for producing sensory profiles (repeatability, trueness, discriminatory ability).

5.2 Sensory memory

Expert sensory assessors need an above-average ability to keep sensory impressions in mind. The tests used to train a selected assessor rely largely on short-term sensory memory, whereas long-term sensory memory is essential for the expert sensory assessor. Characteristics noted in a current assessment may need to be related to experience of earlier assessments.

NOTE The attributes assessed during a test are naturally related to the experiences acquired during training.

The tests used for training expert sensory assessors are aimed more at exploiting long-term memory.

5.3 Semantic and metric learning of sensory descriptors

Training normally comprises two phases:

- a) the generation, the definition and the recognition of each descriptor, the objective of which is to identify the words which enable the description of the product or the object (either by means of an existing list or via descriptors generated by the group) and to associate them with the corresponding sensory perceptions, to define each of the descriptors on the basis of these sensory perceptions and to learn to identify its presence or absence in the product or object;
- b) the assessment of the intensity and the memorization of the scale, the objective of which is to learn to evaluate the intensity of each descriptor and to memorize intensity levels for each of the selected descriptors.

NOTE 1 Training can call upon group facilitation techniques by alternating both individual and collective exercises. This approach requires assessors to make a great effort to concentrate and memorize under the guidance of the panel leader or facilitator.

Training may initially consist of assessing samples having as a descriptor more or less pronounced intensities and in producing a classification based on this descriptor. Subsequently, the assessors learn to express the intensities in the form of notes, by means of references or products or materials having different levels of intensity for a given descriptor.

NOTE 2 Discriminatory and matching tests may be used to highlight the different characteristics of the products and materials or to check whether the characteristics have been memorized.

5.4 Building up a thesaurus of descriptors

Trainees shall understand the role of sensory descriptors as an aid to developing long-term sensory memory, and also as a means of communicating with clients and other experts.

Trainees shall acquire knowledge and command of the specific terminology used.

5.5 Training on assessment conditions

The trainee shall learn to assess large numbers of samples on a single occasion. The trainee shall also learn to assess a wide range of samples of a product.

6 Monitoring and testing of performance

6.1 Objectives

The objectives of the monitoring of the assessors' performances are to check that their assessments are:

- a) repeatable;
- b) discriminatory;
- c) homogeneous;
- d) reproducible.

6.2 Principle

The principles of monitoring performance are based on:

- production of product or material profiles with one or more inter- or intra-session repetitions;
- participation in interlaboratory tests [in accordance with ISO 5725 (all parts)] within the same sector of activity (suppliers or subcontractors working on the profiles of the same products).

6.3 Analysis of the results

6.3.1 General

The analysis of the results obtained allows the assessment of the performance of the group as a whole as well as the individual performances of the assessors (see Annex A).

6.3.2 Assessment of the performance of the group as a whole

Different methods can be used, e.g. analysis of variance (ANOVA, see Reference [3]):

- single-factor ANOVA (products) in order to assess the discriminatory ability;
- three-factor ANOVA (products, assessors + products*sessions¹⁾ interaction) as well as superposing of the profiles of the two or three sessions in order to check reproducibility;
- three-factor ANOVA (products, assessors + products*assessors¹⁾ interaction) in order to ensure homogeneity.

Other statistical techniques like principal component analysis, discriminant factor analysis, generalized Procrustes analysis, calculation of relative validity coefficients (which enable the assessment of the degree of similarity of two matrices) allow the examination of the agreement of the assessors with one another and with respect to the group conclusion.

6.3.3 Assessment of the individual performance

The data may be represented graphically, or statistical tests may be carried out. For example:

- comparison of the scorings of each individual with respect to the mean of the group;
- visual representation of the magnitude of the standard deviations;
- homogeneity of the scoring with respect to the group (overscoring, underscoring);
- assessment of the differentiation of the products;
- individual repeatability or reproducibility.

EXAMPLE The use of a descriptor by an assessor is considered repeatable or reproducible when its percentage of variation is less than or equal to 15 % over three assessments.

7 Management and follow-up of the group

7.1 Motivation

It is important to maintain the group's motivation:

- by providing information concerning the exploitation of the results;

CAUTION — Be careful not to bias future work.

- by providing feedback concerning the individual results;
- by a reward.

NOTE "All effort merits a reward."

1) Requires a certain number of products and repetitions.

7.2 Maintenance of skills

So that the group functions efficiently and does not lose the benefit of its training, it shall be called together on a regular basis. Weekly participation is desirable, and the frequency of meetings shall be at least monthly.

It is highly recommended to conduct selective verifications of the group's performances approximately twice a year.

Moreover, it may be necessary to retrain the assessors after long periods of interruption (more than 6 weeks).

Ideally, the group should be benchmarked with respect to other expert groups, to control products, or by participating in intercomparison studies:

- participation in interlaboratory tests;
- comparison with respect to suppliers or subcontractors working on profiles of the same products.

7.3 Renewal

Account being taken of the unavoidable departures of certain group members (moving house, illness, etc.), it may be necessary to recruit new people.

A specific training shall therefore be envisaged in order to bring the new assessors up to a satisfactory level of performance.

The process of integration into the group may be progressive, taking into account the ability of the new assessors to give reliable responses.

7.4 Retraining

If the nature of the products or materials changes, new training sessions shall be implemented in order to take account of possible new descriptors or of the modification of the intensity scales.

Annex A (informative)

Repeatability and reproducibility of assessors and panels

Characteristic	Definition	Determined by (see ANOVA principles in Reference [3])
Repeatability	<p>A measure of the agreement among assessments on the same sample under the same conditions, i.e.:</p> <ul style="list-style-type: none"> — same assessors (panel) — same time (session) — same environment 	<p>Assessor</p> <ul style="list-style-type: none"> — standard deviation of that assessor's scores on replicate samples within a session — error standard deviation from one-way ANOVA of that assessor's scores (pooled over sessions) <p>Panel</p> <ul style="list-style-type: none"> — standard deviation of panel means of replicate scores within a session — error standard deviation from one-way ANOVA of panel means (pooled over sessions)
Reproducibility	<p>A measure of the agreement among assessments on the same sample under different conditions, i.e.:</p> <p>For an assessor:</p> <ul style="list-style-type: none"> — same assessor — different times (sessions) — different environments <p>For a panel:</p> <ul style="list-style-type: none"> — same panel — different times (sessions) — different environments 	<p>Assessor</p> <p>Combination of within-session standard deviation and between-session standard deviation from ANOVA</p> <p>Panel</p> <p>Combination of within-session standard deviation and between-session standard deviation from ANOVA</p>
Reproducibility among panels (method) or among assessors	<p>Among panels</p> <p>A measure of the agreement among assessments on the same sample under different conditions, i.e.:</p> <ul style="list-style-type: none"> — different panels — different times (sessions) — different environments <p>Consistency of panel within sessions</p> <p>Agreement between assessments made by different assessors in a panel on the same sample</p>	<p>Consistency of between-session standard deviation and between-panel standard deviation</p> <p>Between-assessor standard deviation from two-way ANOVA of scores in one session</p>