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**Senzorična analiza - Metodologija - Splošno navodilo za izvajanje hedoničnih preskusov s pomočjo potrošnikov v nadzorovanem območju - Dopolnilo A1 (ISO 11136:2014/Amd 1:2020)**

Sensory analysis - Methodology - General guidance for conducting hedonic tests with consumers in a controlled area - Amendment 1 (ISO 11136:2014/Amd 1:2020)

Sensorische Analyse - Methodologie - Allgemeiner Leitfaden für die Durchführung hedonischer Prüfungen (Verbrauchertests) in einem kontrollierten Umfeld - Änderung 1 (ISO 11136:2014/Amd 1:2020)

Analyse sensorielle - Méthodologie - Lignes directrices générales pour la réalisation d'épreuves hédoniques effectuées avec des consommateurs dans un espace contrôlé - Amendement 1 (ISO 11136:2014/Amd 1:2020)

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# INTERNATIONAL STANDARD

# ISO 11136

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2014-12-01  
**AMENDMENT 1**  
2020-01

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## Sensory analysis — Methodology — General guidance for conducting hedonic tests with consumers in a controlled area

### AMENDMENT 1

*Analyse sensorielle — Méthodologie — Lignes directrices générales  
pour la réalisation d'épreuves hédoniques effectuées avec des  
consommateurs dans un espace contrôlé*

### AMENDEMENT 1

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## ISO 11136:2014/Amd.1:2020(E)

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This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 12, *Sensory analysis*.

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# Sensory analysis — Methodology — General guidance for conducting hedonic tests with consumers in a controlled area

## AMENDMENT 1

### Annex F, F.2, NOTE 2

Replace the note with the following:

NOTE 2 In this document, the value of  $\delta$  is equal to the difference between the preference proportions of the two samples (e.g. if  $p_a = 0,60$  and  $p_b = 0,40$ , then  $\delta = 0,60 - 0,40 = 0,20$ ). Some authors express the value of  $\delta$  as the magnitude of the difference between the observed preference proportion and the preference proportion assumed in the null hypothesis (e.g.  $p_a = 0,60$ ,  $p_b = 0,40$  and  $p_0 = 0,50$ , then  $\delta = |0,60 - 0,50| = |0,40 - 0,50| = 0,10$ ). The reader is expected to be careful not to confuse the two ways of defining  $\delta$ .

### Annex F, F.2, EXAMPLE

Replace the example with the following:

EXAMPLE For the following conditions:

$p_0$	$\delta$	$p_a$	$\alpha$	$u_{\alpha/2}$	$\beta$	Power	$u_\beta$
0,5	0,2	0,6	0,05	1,960	0,1	0,90	1,282

Formula (F.1) leads to  $n = 258,6$ , i.e. 259 consumers.

If the laboratory questions 259 consumers and there is a difference in proportion of preference equal to 0,2 between products A and B, it is certain to conclude a difference of preference on average in 9 out of 10 tests.

### Annex F, F.2, NOTE 3

Replace the note with the following:

NOTE 3 In the case of a unilateral hypothesis with  $A > B$ , Formula (F.1) leads to  $n = 211$ .

### Annex F, F.3, EXAMPLE

Replace the example with the following:

EXAMPLE For the following conditions:

$\Delta =  p_a - (1 - p_a) $	$p_a$	$p_0$	$\alpha$	$u_\alpha$	$\beta$	Power	$u_\beta$
0,1	0,45	0,5	0,05	1,645	0,1	0,90	1,282

Formula (F.2) leads to  $n = 853$  consumers.

## ISO 11136:2014/Amd.1:2020(E)

## Annex G, G.1

Replace the subclause with the following:

**G.1 General**

This annex uses the examples of Annex E. The first two examples concern a difference test where the null hypothesis,  $H_0$ , may be defined as:

- the two products, A and B, are extracted from two populations that have the same mean.

The last two examples concern a non-inferiority test where the null hypothesis,  $H_0$ , may be defined as:

- the product A is inferior to the product B by a quantity at least equal to  $\Delta$ .

For the difference tests, the examples are considered in the bilateral hypothesis. In cases of a unilateral hypothesis, a statistician shall be consulted. Non-inferiority tests are always unilateral.

## Annex G, G.2, Formula (G.2)

Replace Formula (G.2) and subsequent formulae with the following:

$$s_{\text{within products}}^2 = \frac{s_A^2 \times (n_A - 1) + s_B^2 \times (n_B - 1)}{n_A + n_B - 2} \quad (\text{G.2})$$

Hence in this example:

$$s_{\text{within products}}^2 = \frac{1,85^2 \times (110 - 1) + 1,65^2 \times (120 - 1)}{110 + 120 - 2}$$

and

$$\sqrt{s_{\text{within products}}^2} = \sqrt{3,057} = 1,748$$

The  $t_{\text{cal}}$  value is:

$$t_{\text{cal}} = \frac{7,23 - 6,87}{1,748 \times \sqrt{\left(\frac{1}{110} + \frac{1}{120}\right)}} = \frac{0,36}{0,231} = 1,558$$

## Annex G, G.2, second bullet point

After the penultimate paragraph of the second bullet point, add the following note with a footnote:

NOTE 1 This  $t_{\text{the}}$  value can be calculated using the Excel<sup>1)</sup> function T.INV.2T( $\alpha$ ;df) = T.INV.2T(0.05;110+120-2) for the  $\alpha$ -risk = 5 %; in this example, it is equal to 1,970.

<sup>1)</sup> Excel is a product supplied by Microsoft. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.



*Annex G, G.2, third bullet point*

After the last paragraph of the third bullet point, add the following notes and renumber the pre-existing note as NOTE 3:

NOTE 2 The value of  $\beta$  can be calculated using the Excel<sup>1)</sup> function: T.DIST(x;deg\_freedom;TRUE), that is T.DIST(-0.195;228;TRUE) = 0,423.

NOTE 3 When  $t_\beta > 0$ , the value of the power is directly given by the distribution function of the t-distribution at  $(-1) \times t_\beta$ . For example, for  $\delta = 0,30$ ,  $t_\beta = 1,970 - (0,30/0,231) = +0,671$ ; the calculation of the t-distribution function leads to  $P = T.DIST(-0.671;228;TRUE) = 0,251 \approx 0,25$ .

NOTE 4 The  $t_{the}$  value for the chosen  $\alpha$ -risk (1,980) can be calculated using the Excel<sup>1)</sup> function: T.INV.2T(0.05;119), where  $df = (120 - 1) = 119$ .

*Annex G, G.3, last paragraph*

After the last paragraph of the subclause, add the following note:

NOTE The value of  $\beta$  can be calculated using the Excel<sup>1)</sup> function: T.DIST(-0.873;119;TRUE) = 0,192,  $P = 1 - 0,192 = 0,81$ .

*Annex G, G.4*

Replace the clause title with the following:

**G.4 Example 3 (case 3 of Annex E): To prove that the product A is not inferior to the product B by a quantity at least equal to  $\Delta$ ; each consumer only rates one product**

*Annex G, G.4, Formula (G.7)*

Replace Formula (G.7) and the subsequent formula with the following:

$$t_{cal} = \frac{m_A - m_B + \Delta}{s^2_{\text{within products}} \times \sqrt{\left(\frac{1}{n_A} + \frac{1}{n_B}\right)}} \quad (G.7)$$

where

$$s^2_{\text{within products}} = \frac{s_A^2 \times (n_A - 1) + s_B^2 \times (n_B - 1)}{n_A + n_B - 2}$$

In the example,

$$s^2_{\text{within products}} = \frac{1,95^2 \times (300 - 1) + 1,80^2 \times (316 - 1)}{300 + 316 - 2}$$