

## SLOVENSKI STANDARD SIST-TP CEN/TR 17292:2019

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Technical report regarding precision data for standards EN 12720, EN 12721, EN 12722, EN 15185 and EN 15186

Technischer Bericht über Präzisionsdaten der Normen EN 12720, EN 12721, EN 12722, EN 15185 und EN 15186 eh STANDARD PREVIEW

Rapport technique sur les données de fidélité concernant les normes EN 12720, EN 12721, EN 12722, EN 15185 et EN 15186 EN/TR 17292:2019

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## TECHNICAL REPORT RAPPORT TECHNIQUE TECHNISCHER BERICHT

## **CEN/TR 17292**

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**English Version** 

# Technical report regarding precision data for standards EN 12720, EN 12721, EN 12722, EN 15185 and EN 15186

Rapport technique sur les données de fidélité concernant les normes EN 12720, EN 12721, EN 12722, EN 15185 et EN 15186 Technischer Bericht über Präzisionsdaten der Normen EN 12720, EN 12721, EN 12722, EN 15185 und EN 15186

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EUROPEAN COMMITTEE FOR STANDARDIZATION COMITÉ EUROPÉEN DE NORMALISATION EUROPÄISCHES KOMITEE FÜR NORMUNG

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#### SIST-TP CEN/TR 17292:2019

#### CEN/TR 17292:2018 (E)

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#### **European foreword**

This document (CEN/TR 17292:2018) has been prepared by Technical Committee CEN/TC 207 "Furniture", the secretariat of which is held by UNI.

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#### 1 Scope

This document specifies repeatability standard deviation and reproducibility standard deviation for results obtained from test methods carried out according to the following standards:

- EN 12720:2009+A1:2013, Furniture Assessment of surface resistance to cold liquids,
- EN 12721:2009+A1:2013, Furniture Assessment of surface resistance to wet heat,
- EN 12722:2009+A1:2013, Furniture Assessment of surface resistance to dry heat,
- EN 15185:2011, Furniture Assessment of the surface resistance to abrasion,
- EN 15186:2012, Furniture Assessment of the surface resistance to scratching,

in order to provide the accuracy of results.

The above standards deal with all rigid furniture surfaces regardless of materials and they do not apply to leather and textile surfaces.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 5725-1:1994, Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions<sup>1</sup>)

ISO 5725-2:1994, Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method<sup>2</sup>)

#### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

IEC Electropedia. available at <u>http://www.electropedia.org/</u>

ISO Online browsing platform: available at <u>http://www.iso.org/obp</u>

#### 3.1

#### precision

closeness of agreement between independent test results obtained under stipulated conditions

Note 1 to entry: Precision depends only on the distribution of random errors and does not relate to the true value or the specified value.

<sup>1)</sup> This document is impacted by the corrigendum ISO 5725-1:1994/COR 1:1998, Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions Technical corrigendum 1.

<sup>2)</sup>This document is impacted by the corrigendum ISO 5725-2:1994/COR 1:2002, Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method Technical corrigendum 1.

The measure of precision is usually expressed in terms of imprecision and computed as a Note 2 to entry: standard deviation of the test results. Less precision is reflected by a larger standard deviation.

"Independent test results" means results obtained in a manner not influenced by any previous Note 3 to entry: result on the same or similar test object. Quantitative measures of precision depend critically on the stipulated conditions. Repeatability and reproducibility conditions are particular sets of extreme conditions.

#### 3.2

#### accuracy

closeness of agreement between a test result and the accepted reference value

The term accuracy, when applied to a set of test results, involves a combination of random Note 1 to entry: components and a common systematic error or bias component.

#### 3.3

#### repeatability limit

value less than or equal to which the absolute difference between two test results obtained under repeatability conditions may be expected to be with a probability of 95 %

Note 1 to entry: The symbol used is r.

A rough estimation of the repeatability limit can be obtained by multiplying the repeatability Note 2 to entry: standard deviation by 2,8.

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Two test results obtained within one laboratory shall be judged not equivalent if they differ by Note 3 to entry: more than the "r" value; "r" is the interval representing the critical difference between two test results for the same material, obtained by the same operator using the same equipment on the same day in the same laboratory.

SIST-TP CEN/TR 17292:2019 3.4 https://standards.iteh.ai/catalog/standards/sist/91b2f4d2-d8d9-4876-8f0breproducibility limit 669bfa6c4f3d/sist-tp-cen-tr-17292-2019 R

value less than or equal to which the absolute difference between two test results obtained under reproducibility conditions may be expected to be with a probability of 95 %

The symbol used is R. Note 1 to entry:

Note 2 to entry: A rough estimation of the reproducibility limit can be obtained by multiplying the reproducibility standard deviation by 2,8.

Note 3 to entry: Two test results shall be judged not equivalent if they differ by more than the "R" value; "R" is the interval representing the critical difference between two test results for the same material, obtained by different operators using different equipment in different laboratories.

#### 3.5

#### repeatability

precision under repeatability conditions

#### 3.6

#### repeatability conditions

conditions where independent test results are obtained with the same method on identical test items in the same laboratory by the same operator using the same equipment within short intervals of time

#### 3.7

#### reproducibility

precision under reproducibility conditions

#### 3.8

#### reproducibility conditions

conditions where test results are obtained with the same method on identical test items in different laboratories with different operators using different equipment

#### 3.9

#### repeatability standard deviation

standard deviation of test results obtained under repeatability conditions

Note 1 to entry: It is a measure of dispersion of the distribution of test results under repeatability conditions.

Note 2 to entry: Similarly "repeatability variance" and "repeatability coefficient of variation" could be defined and used as measures of the dispersion of test results under repeatability conditions.

Note 3 to entry: The symbol used is  $s_r$ .

#### 3.10

#### reproducibility standard deviation

standard deviation of test results obtained under reproducibility conditions

Note 1 to entry: It is a measure of the dispersion of the distribution of test results under reproducibility conditions.

Note 2 to entry: Similarly "reproducibility variance" and "reproducibility coefficient of variation" could be defined and used as measures of the dispersion of test results under reproducibility conditions.

Note 3 to entry: The symbol used is  $s_R$ .

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**3.11** <u>SIST-TP CEN/TR 17292:2019</u> surface https://standards.iteh.ai/catalog/standards/sist/91b2f4d2-d8d9-4876-8f0bcombination of a specified substrate and a specified icoating tr-17292-2019

#### **4** General principles

The accuracy is provided by repeatability standard deviation and reproducibility standard deviation.

On the basis of an inter-laboratory study for test methods involved, in which from one to three operators of participating's tested the samples prepared to cover the current range of surfaces, the repeatability and reproducibility standard deviations and limits were calculated.

The best available estimate of the true value of the characteristic under study is the overall mean of all results due to a lack of a reference material.

The number of participating laboratories was from 6 to 8, depending on test method.

ISO 5725-1:1994 assumes that the characteristic values are continuous and follow normal distribution. These assumptions do not hold for qualitative measurements. Therefore, recently, some methodological researches for qualitative and non-continuous data based on a variety of assumptions have been carried out, showing its usefulness.

NOTE The repeatability and reproducibility standard deviations are precision estimates, and therefore are subject to estimation errors. They can be used as guides to assess the validity or relevance of results produced by the measurement method and not as rigid numerical criteria to discard or validate results. Common sense can prevail in all cases.

#### 5 Repeatability standard deviation and reproducibility standard deviation

#### 5.1 Abrasion

On the basis of an interlaboratory study for this test method carried out by six laboratories, testing five surfaces, having a broad range of abrasion resistance and following the criteria stated on ISO 5725-2:1994 and its corrigendum, the repeatability standard deviation and reproducibility standard deviation were obtained:

—	Repeatability standard deviation (s <sub>r</sub> ):	IP $\leq$ 100 cycles, 10 cycles
		IP > 250 cycles, 50 cycles
_	Reproducibility standard deviation $(s_R)$ :	$IP \le 100$ cycles, 20 cycles
		IP > 250 cycles, 60 cycles

The given  $s_r$  and  $s_R$  are the highest results obtained for each test method, among all the samples tested following a conservative criterion.

#### 5.2 Scratching

#### 5.2.1 Lineal scratching

On the basis of an interlaboratory study for this test method carried out by five laboratories, testing four materials (combination of substrate and coating), having a broad range of scratching resistance, and following the criteria stated on ISO 5725-2:1994 and its corrigendum, the repeatability standard deviation and reproducibility standard deviation were obtained:

- Repeatability standard deviation (S) (standards/kist/91b2f4d2-d8d9-4876-8f0b-669bla6c4f3d/sist-tp-cen-tr-17292-2019
- Reproducibility standard deviation (s<sub>R</sub>): 2 N

The given  $s_r$  and  $s_R$  are the highest results obtained for each test method, among all the samples tested following a conservative criterion.

#### 5.2.2 Circular scratching

On the basis of an interlaboratory study for this test method carried out by five laboratories, testing five materials (combination of substrate and coating), having a broad range of scratching resistance, and following the criteria stated on ISO 5725-2:1994 and its corrigendum, the repeatability standard deviation and reproducibility standard deviation were obtained:

- Repeatability standard deviation (s<sub>r</sub>): 0,1 N
- Reproducibility standard deviation (s<sub>R</sub>): 0,5 N

The given  $s_r$  and  $s_R$  are the highest results obtained for each test method, among all the samples tested following a conservative criterion.