# SLOVENSKI STANDARD
# SIST EN 13171:2013+A1:2015

**01-april-2015**

**Nadomešča:**
**SIST EN 13171:2013**

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**Toplotnoizolacijski proizvodi za stavbe - Proizvodi iz lesnih vlaken (WF) - Specifikacija**

Thermal insulation products for buildings - Factory made wood fibre (WF) products - Specification

Wärmedämmstoffe für Gebäude - Werksmäßig hergestellte Produkte aus Holzfasern (WF) - Spezifikation



Produits isolants thermiques pour le bâtiment - Produits manufacturés en fibres de bois (WF) - Spécification



**Ta slovenski standard je istoveten z:** **EN 13171:2012+A1:2015**

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**ICS:**

| | | |
|---|---|---|
| 91.100.60 | Materiali za toplotno in zvočno izolacijo | Thermal and sound insulating materials |

**SIST EN 13171:2013+A1:2015** **en,fr,de**

EUROPEAN STANDARD

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# EN 13171:2012+A1

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ICS 91.100.60

Supersedes EN 13171:2012

English Version

# Thermal insulation products for buildings - Factory made wood fibre (WF) products - Specification

Produits isolants thermiques pour le bâtiment - Produits manufacturés en fibres de bois (WF) - Spécification

Wärmedämmstoffe für Gebäude - Werksmäßig hergestellte Produkte aus Holzfasern (WF) - Spezifikation

This European Standard was approved by CEN on 6 October 2012 and includes Amendment 1 approved by CEN on 15 December 2014.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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# Foreword

This document (EN 13171:2012+A1:2015) has been prepared by Technical Committee CEN/TC 88 “Thermal insulating materials and products”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2015, and conflicting national standards shall be withdrawn at the latest by November 2016.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

[A1] For relationship with EU Construction Products Regulation (CPR), see informative Annex ZA, which is an integral part of this standard. [A1]

This document supersedes [A1] EN 13171:2012 [A1].

This document includes Amendment 1 approved by CEN on 2014-12-15.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1].



Compared with EN 13171:2008, the main changes are:

a) better harmonisation between the individual standards of the package (EN 13162 to EN 13171) on definitions, requirements, classes and levels;



b) new normative annex on multi-layer products;

c) changes of some editorial and technical content and addition of information on some specific items such as for WF: determination of thermal conductivity in relation to moisture content, thickness, compressive stress or compressive strength, tensile strength perpendicular to faces;

d) addition of links to EN 15715, *Thermal insulation products – Instructions for mounting and fixing for reaction to fire testing – Factory made products*;

e) changes of Annex ZA.

[A1] Amendment 1 modifies EN 13171:2012 identifying those clauses of the standard which are needed for the compliance of the European Standard with the Construction Products Regulation (CPR).

This amendment introduces

f) an addition to the foreword;

g) an addition in 3.2;

h) a new subclause 4.3.15;

i) modification of Clause 7;

j) modification of Clause 8;

k) modification of Annex B;

l) a new Annex ZA. 〈A1〉

This European Standard is one of a series of standards for insulation products used in buildings, but this standard may be used in other areas where appropriate.

In pursuance of Resolution BT 20/1993 revised, CEN/TC 88 have proposed defining the standards listed below as a package of European Standards, setting 21 months after availability as the date of withdrawal (dow) of national standards which conflict with the European Standards of this package.

The package of standards comprises the following group of interrelated standards for the specifications of factory made thermal insulation products, all of which come within the scope of CEN/TC 88:

EN 13162, *Thermal insulation products for buildings — Factory made mineral wool (MW) products — Specification*

EN 13163, *Thermal insulation products for buildings — Factory made expanded polystyrene (EPS) products — Specification*

EN 13164, *Thermal insulation products for buildings — Factory made extruded polystyrene foam (XPS) products — Specification*

EN 13165, *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*



EN 13166, *Thermal insulation products for buildings — Factory made phenolic foam (PF) products — Specification*



EN 13167, *Thermal insulation products for buildings — Factory made cellular glass (CG) products — Specification*

EN 13168, *Thermal insulation products for buildings — Factory made wood wool (WW) products — Specification*

EN 13169, *Thermal insulation products for buildings — Factory made expanded perlite board (EPB) products — Specification*

EN 13170, *Thermal insulation products for buildings — Factory made products of expanded cork (ICB) — Specification*

EN 13171, *Thermal insulation products for buildings — Factory made wood fibre (WF) products — Specification*

The reduction in energy used and emissions produced during the installed life of insulation products exceeds by far the energy used and emissions made during the production and disposal processes.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This European Standard specifies the requirements for factory made wood fibre (WF) products, with or without facings or coatings, which are used for the thermal insulation of buildings[1)]. The products are manufactured in the form of rolls, batts, felts, boards or slabs.

Products covered by this standard are also used in prefabricated thermal insulation systems and composite panels; the performance of systems incorporating these products is not covered.

This standard describes product characteristics and includes procedures for testing, evaluation of conformity, marking and labelling.

This standard does not specify the required level of a given property to be achieved by a product to demonstrate fitness for purpose in a particular application. The classes and levels required for a given application are to be found in regulations or non-conflicting standards.

Products with a declared thermal resistance lower than 0,20 $m^2$·K/W or a declared thermal conductivity greater than 0,070 W/(m·K) at 10 °C are not covered by this standard.

This standard does not cover in situ insulation products and products intended to be used for the insulation of building equipment and industrial installations.

## 2 Normative references



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



EN 822, *Thermal insulating products for building applications — Determination of length and width*

EN 823, *Thermal insulating products for building applications — Determination of thickness*

EN 824, *Thermal insulating products for building applications —Determination of squareness*

EN 825, *Thermal insulating products for building applications — Determination of flatness*

EN 826, *Thermal insulating products for building applications —Determination of compression behaviour*

EN 1602, *Thermal insulating products for building applications — Determination of the apparent density*

EN 1603, *Thermal insulating products for building applications — Determination of dimensional stability under constant normal laboratory conditions (23 °C/ 50 % relative humidity)*

EN 1604, *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions*

EN 1606, *Thermal insulating products for building applications — Determination of compressive creep*

EN 1607, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*

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1) Wood fibre products for applications other than thermal insulation are covered by EN 316.

EN 1608, *Thermal insulating products for building applications — Determination of tensile strength parallel to faces*

EN 1609, *Thermal insulating products for building applications — Determination of short term water absorption by partial immersion*

EN 12086:1997, *Thermal insulating products for building applications — Determination of water vapour transmission properties*

EN 12430, *Thermal insulating products for building applications — Determination of behaviour under point load*

EN 12431, *Thermal insulating products for building applications — Determination of thickness for floating floor insulation products*

EN 12667, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Products of high and medium thermal resistance*

EN 12939, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Thick products of high and medium thermal resistance*

EN 13172:2012, *Thermal insulation products — Evaluation of conformity*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*



EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*



EN 15715:2009, *Thermal insulation products - Instructions for mounting and fixing for reaction to fire testing - Factory made products*

EN 29052-1, *Acoustics — Determination of dynamic stiffness — Part 1: Materials used under floating floors in dwellings (ISO 9052-1)*

EN 29053, *Acoustics — Materials for acoustical applications — Determination of air flow resistance (ISO 9053)*

EN ISO 354, *Acoustics — Measurement of sound absorption in a reverberation room (ISO 354)*

EN ISO 9229:2007, *Thermal insulation — Vocabulary (ISO 9229:2007)*

EN ISO 10456:2007, *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values (ISO 10456:2007)*

EN ISO 11654, *Acoustics — Sound absorbers for use in buildings — Rating of sound absorption (ISO 11654)*

EN ISO 11925-2, *Reaction to fire tests — Ignitability of products subjected to direct impingement of flame — Part 2: Single-flame source test (ISO 11925-2)*

ISO 16269-6:2005, *Statistical interpretation of data — Part 6: Determination of statistical tolerance intervals*

# 3 Terms, definitions, symbols, units and abbreviated terms

## 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 9229:2007 apply with exception or in addition of the following:

**3.1.1**
**wood fibre products**
insulation product including bonded products manufactured from wood fibres with or without the addition of bonding agents and/or additives consisting of at least 80 % wood fibres per mass

Note 1 to entry Wood fibre products are manufactured as mat, batt, felt, roll, lamella roll and board (slab).

**3.1.2**
**level**
value which is the upper or lower limit of a requirement and given by the declared value of the characteristic concerned

**3.1.3**
**class**
combination of two levels of the same property between which the performance shall fall

**3.1.4**
**board, slabs**
rigid or semi-rigid (insulation) product of rectangular shape and cross section in which the thickness is uniform and substantially smaller than the other dimensions



Note 1 to entry Boards are usually thinner than slabs. They may also be supplied in tapered form.



**3.1.5**
**facings**
functional or decorative surface layer with a thickness of less than 3 mm, e.g. paper, plastics film, fabric or metal foil, which is not considered as separate thermal insulation layer to be added to the thermal resistance of the product

**3.1.6**
**coating**
functional or decorative surface layer with a thickness of less than 3 mm usually applied by painting, spraying, pouring or trowelling

**3.1.7**
**composite insulation product**
product which can be faced or coated made from two or more layers bonded together by chemical or physical adhesion consisting of at least one factory made thermal insulation material layer

**3.1.8**
**multi-layered insulation product**
product which can be faced or coated made from two or more layers of a thermal insulation material from the same European Standard, which are bonded together horizontally by chemical or physical adhesion

## 3.2 Symbols, units and abbreviated terms

For the purposes of this document, the following symbols and units apply.

| | | |
|---|---|---|
| $\alpha_p$ | is the practical sound absorption coefficient | – |

| | | |
|---|---|---|
| $a_w$ | is the weighted sound absorption coefficient | – |
| $b$ | is the width | mm |
| $c$ | is the compressibility | mm |
| $d$ | is the thickness | mm |
| $F_p$ | is the compressive force at critical point | kN |
| $d_N$ | is the nominal thickness | mm |
| $d_B$ | is the thickness under a load of 2 kPa, after a short time load of 48 kPa | mm |
| $d_L$ | is the thickness under a load of 250 kPa | mm |
| $\Delta\varepsilon_l$ | is the relative change in length | % |
| $\Delta\varepsilon_b$ | is the relative change in width | % |
| $K$i | is a factor related to the number of test results available | – |
| $l$ | is the length | *mm* |
| $\lambda$ | is the thermal conductivity | W/(m K) |
| $\lambda_{90/90}$ | is the 90 % fractile with a confidence level of 90 % for the thermal conductivity | W/(m·K) |
| $\lambda_D$ | is the declared thermal conductivity | W/(m·K) |
| $\lambda_i$ | is one test result of thermal conductivity | W/(m·K) |
| $\lambda_{mean}$ | is the mean thermal conductivity | W/(m·K) |
| $\lambda_U$ | is the design thermal conductivity | W/(m·K) |
| $\mu$ | is the water vapour diffusion resistance factor | – |
| $n$ | is the number of test results | – |
| $R_{90/90}$ | is the 90 % fractile with a confidence level of 90 % for the thermal resistance | $m^2$·K/W |
| $R_D$ | is the declared thermal resistance | $m^2$·K/W |
| $R_i$ | is one test result of thermal resistance | $m^2$·K/W |
| $R_{mean}$ | is the mean thermal resistance | $m^2$·K/W |
| $R_U$ | is the design thermal resistance | $m^2$·K/W |
| $\rho_a$ | is the apparent density | kg/$m^3$ |
| $S_b$ | is the deviation from squareness on length and width | mm/m |
| $S_{max}$ | is the deviation from flatness | mm |
| $s_R$ | is the estimate of the standard deviation of the thermal resistance | $m^2$·K/W |
| $s_\lambda$ | is the estimate of the standard deviation of the thermal conductivity | W/(m·K) |
| $s'$ | is the dynamic stiffness | MN/$m^3$ |
| $\sigma_c$ | is the declared compressive stress | kpa |
| $\sigma_{10}$ | is the compressive stress at 10 % deformation | kPa |
| $\sigma_m$ | is the compressive strength | kPa |
| $\sigma_{mt}$ | is the tensile strength perpendicular to faces | kPa |

| | | |
|---|---|---|
| $\sigma_t$ | is the tensile strength parallel to faces | kPa |
| $\tau$ | Is the shear strength | kPa |
| $W_p$ | is the short-term water absorption | kg/m$^2$ |
| $X_0$ | is the initial deformation after 60 s from the beginning of loading | mm |
| $X_{ct}$ | is the compressive creep | mm |
| $X_t$ | is the deformation at time $t$ (total thickness reduction) | mm |
| $Z$ | is the water vapour resistance | m$^2$·h·Pa/mg |

| | |
|---|---|
| $AF_r$ | is the symbol of the declared level of airflow resistivity |
| AP | is the symbol of the declared level of practical sound absorption coefficient |
| AW | is the symbol of the declared level of weighted sound absorption coefficient |
| $CC(i_1/i_2/y)\sigma_c$ | is the symbol of the declared level for long term compressive creep |
| CP | is the symbol of the declared level for compressibility |
| CS(10\Y) | is the symbol of the declared level for compressive stress or strength |
| DS(N) | is the symbol of the declared value for dimensional stability at normal laboratory temperature and relative humidity conditions |
| DS(70,-) | is the symbol of the declared value for dimensional stability at 70 °C |
| DS(23/90) | is the symbol of the declared value for dimensional stability at 23 °C and 90 % relative humidity |
| DS(70/90) | is the symbol of the declared value for dimensional stability at 70 °C and 90 % relative humidity |
| MU | is the symbol of the declared value for water vapour diffusion resistance factor |
| PL(5) | is the symbol for the declared level of point load for 5 mm deformation |
| SD | is the symbol of the declared level of dynamic stiffness |
| T | is the symbol of the declared class for thickness tolerances |
| TRi | is the symbol of the declared level for tensile strength perpendicular to faces |
| WS | is the symbol of the declared level for short term water absorption |
| Z | is the symbol of the declared value for water vapour resistance |



**Abbreviated terms used in this standard:**

| | |
|---|---|
| WF | is **W**ood **F**ibre |
| [A1] PTD | is **P**roduct **T**ype **D**etermination (previously named ITT for Initial Type Test) [A1] |
| FPC | is **F**actory **P**roduction **C**ontrol |
| RtF | is **R**eaction **t**o **F**ire |
| [A1] AVCP | is **A**ssessment and **V**erification of **C**onstancy of **P**erformance (previously named attestation of conformity) |
| DoP | is **D**eclaration of **P**erformance |
| ThIB | is **T**hermal **I**nsulation for **B**uildings |
| VCP | is **V**erification of **C**onstancy of **P**erformance (previously named evaluation of conformity) [A1] |

# 4 Requirements

## 4.1 General

Product properties shall be assessed in accordance with Clause 5. To comply with this standard, products shall meet the requirements of 4.2, and the requirements of 4.3 as appropriate.

For multi-layered products, additional requirements are given in Annex C.

NOTE Information on additional properties is given in Annex E.

One test result for a product property is the average of the measured values on the number of test specimens given in Table 8.

## 4.2 For all applications

### 4.2.1 Thermal resistance and thermal conductivity

Thermal resistance and thermal conductivity shall be based upon measurements carried out in accordance with EN 12667 or EN 12939 for thick products and in accordance with 5.2, 5.3.2 and Annex D.

The thermal resistance and thermal conductivity shall be determined in accordance with Annex A and declared by the manufacturer according to the following:



— the reference mean temperature shall be 10 °C;

— the declared values are to be given for a moisture content equal to the one the material has when equilibrium with the air at 23 °C and relative humidity 50 %;



— the measured values shall be expressed with three significant figures;

— for products of uniform thickness, the declared thermal resistance, $R_D$, shall always be declared. The thermal conductivity, $\lambda_D$, shall be declared where possible. Where appropriate, for products of non uniform thickness (i.e. for sloped and tapered products) only the thermal conductivity, $\lambda_D$, shall be declared;

— the declared thermal resistance, $R_D$, and the declared thermal conductivity, $\lambda_D$, shall be given as limit values representing at least 90 % of the production, determined with a confidence level of 90 %;

— the statistical value of thermal conductivity, $\lambda_{90/90}$, shall be rounded upwards to the nearest 0,001 W/(m·K) and declared as $\lambda_D$ in levels with steps of 0,001 W/(m·K);

— the declared thermal resistance, $R_D$, shall be calculated from the nominal thickness, $d_N$, or $d_L$ in case of products with declared compressibility (see 4.3.11.3) and the corresponding thermal conductivity, $\lambda_{90/90}$, unless measured directly;

— the statistical value of thermal resistance, $R_{90/90}$, when calculated from the nominal thickness, $d_N$, and the corresponding declared thermal conductivity, $\lambda_{90/90}$, shall be rounded upwards to the nearest 0,05 $m^2$·K/W, and declared in levels with steps of 0,05 $m^2$·K/W;

— the statistical value of thermal resistance $R_{90/90}$, for those products for which only the thermal resistance is measured directly, shall be rounded downwards to the nearest 0,05 $m^2$·K/W and declared as $R_D$ in levels with steps of 0,05 $m^2$·K/W.

Examples of the determination of the declared values of thermal resistance, $R_D$, and the thermal conductivity, $\lambda_D$, are given in Annex E.

$\lambda_U$ and $R_U$ (design values) should be determined with reference to EN ISO 10456.

### 4.2.2 Length and width

Length, $l$, and width, $b$, shall be determined in accordance with EN 822. No test result shall deviate from the nominal values by more than the following:

± 2 % for length (for rolls, matts and felts no upper limit),

± 1,5 % for width.

### 4.2.3 Thickness

Thickness, $d$, for products not intended for floating floors shall be determined in accordance with EN 823 under a load of (250 ± 5) Pa except for products with a level of compressive stress or strength of ≤ 10 kPa, where the load shall be (50 ± 5) Pa. No test result shall deviate from the nominal thickness, $d_N$, by more than the tolerances given in Table 1 for the declared level or class.

**Table 1 — Level and classes for thickness tolerances**

| Level or class | Tolerances | |
|---|---|---|
| | Lower | Upper |
| T1 | −5 mm | Excess permitted |
| T2 | −5 mm | +15 % or +15 mm[a] |
| T3 | −4 mm | +10 % or +10 mm[a] |
| T4 | −3 mm | +5 % or +5 mm[a] |
| T5 | −1 mm | +3 mm |

[a] Whichever gives the smallest numerical tolerance.



This test shall not be performed when the tests described in 4.3.10 are used.

### 4.2.4 Squareness

Squareness shall be determined in accordance with EN 824. The deviation from squareness on length and width, $S_b$, of boards and slabs shall not exceed 5 mm/m.

### 4.2.5 Flatness

Flatness shall be determined in accordance with EN 825. The deviation from flatness, of boards and slabs, $S_{max}$, shall not exceed 6 mm.

### 4.2.6 Reaction to fire of the product as placed on the market

Reaction to fire classification of the product shall be determined in accordance with EN 13501-1 and the mounting and fixing rules given in EN 15715, even if the behaviour is determined under 4.3.

NOTE This classification is compulsory and always included in the CE Marking label.

Detailed information about the test conditions and the field of application of the classification as stated in the reaction to fire classification report shall be given in the manufacturer's literature.

#### 4.2.7 Durability characteristics

##### 4.2.7.1 General

The appropriate durability characteristics have been considered and are covered in 4.2.7.2, 4.2.7.3 and where appropriate in 4.3.7 on compressive creep.

##### 4.2.7.2 Durability of reaction to fire of the product as placed on the market against ageing/ degradation

The reaction to fire performance of WF products as declared by 4.2.6 does not change with time.

##### 4.2.7.3 Duability of thermal resistance and thermal conductivity against ageing/degradation

The thermal conductivity of wood fibre products does not change with time. This is covered by 4.2.1 thermal conductivity, 4.2.2 Length and width and at least one of the 4.3.2 dimensional stability tests, as relevant.

### 4.3 For specific applications

#### 4.3.1 General

If there is no requirement for a property, described in 4.3, for a product in use, then the property does not need to be determined and declared by the manufacturer.



#### 4.3.2 Dimensional stability

Dimensional stability under specified temperature or under specified temperature and humidity conditions shall be determined in accordance with EN 1604. The test shall be carried out for the conditions given in Table 2. The relative changes in length, $\Delta\varepsilon_l$, and width, $\Delta\varepsilon_b$, and the relative reduction in thickness, $\Delta\varepsilon_d$, shall not exceed the values given in Table 2 for the declared level.



**Table 2 — Dimensional stability under specified temperature and humidity conditions**

| Designation | Condition | Test Method | Requirement | |
|---|---|---|---|---|
| | | | Length $\Delta\varepsilon_l$ and width $\Delta\varepsilon_b$ | Thickness $\Delta\varepsilon_d$ |
| | | | % | % |
| DS(70,)1 | 48 h, 70 °C | EN 1604 | ≤ 1 | ≤ 1 |
| DS(70,-)2 | 48 h, 70 °C | EN 1604 | ≤ 2 | ≤ 2 |
| DS(70,-)3 | 48 h, 70 °C | EN 1604 | ≤ 3 | ≤ 3 |
| DS(23,90)1 | 48 h, 23 °C, 90 % R.H. | EN 1604 | ≤ 1 | ≤ 1 |
| DS(23,90)2 | 48 h, 23 °C, 90 % R.H. | EN 1604 | ≤ 2 | ≤ 2 |
| DS(23,90)3 | 48 h, 23 °C, 90 % R.H. | EN 1604 | ≤ 3 | ≤ 3 |
| DS(70,90)1 | 48 h, 70 °C, 90 % R.H. | EN 1604 | ≤ 1 | ≤ 1 |
| DS(70,90)2 | 48 h, 70 °C, 90 % R.H. | EN 1604 | ≤ 2 | ≤ 2 |
| DS(70,90)3 | 48 h, 70 °C, 90 % R.H. | EN 1604 | ≤ 3 | ≤ 3 |

The test DS(70,-) and DS(23,90) need not be performed when the test DS (70/90) is used.