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Stavbno okovje - Obešanke in dodatki za obešanke - Zahteve in preskusne metode

Building hardware - Padlocks and padlock fittings - Requirements and test methods

Baubeschläge - Hangschlösser und Hangschlossbeschläge - Anforderungen und Prüfverfahren

Quincaillerie pour le bâtiment - Cadenas et porte-cadenas - Prescriptions et méthodes d'essai

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EUROPEAN STANDARD

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Building hardware - Padlocks and padlock fittings - Requirements and test methods

Quincaillerie pour le bâtiment - Cadenas et porte-
cadenas - Prescriptions et méthodes d'essai

Baubeschläge - Hangschlösser und
Hangschlossbeschläge - Anforderungen und
Prüfverfahren

This European Standard was approved by CEN on 21 September 2021.

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

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European foreword

This document (EN 12320:2021) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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

This document supersedes EN 12320:2012.

This document is one of a series of European Standards dedicated to building hardware products.

Annexes A and B are normative.

In comparison with the previous edition, the following significant technical modifications have been made:

— Annex C, Manufacturer’s declaration of compliance.

Test methods are specified in detail to ensure reproducibility at any testing establishment within Europe, and acceptance criteria are defined objectively to ensure consistency of assessment.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

EN 12320:2021 (E)**1 Scope**

This document applies to mechanical padlocks and padlock fittings used on buildings and general use and specifies the test methods to be used.

This document specifies performance and other requirements for strength, security, durability, performance, and corrosion resistance of padlocks. It establishes one category of use, two categories of durability, six categories for corrosion resistance and six grades for security based on performance tests that simulate attack.

Limited manual attack testing is included in this document because the machine testing does not replicate all known manual attacks.

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.

EN 1670:2007, *Building hardware - Corrosion resistance - Requirements and test methods*

EN 10025-2:2019, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 1303:2015, *Building hardware - Cylinders for locks - Requirements and test methods*

EN ISO 10666, *Drilling screws with tapping screw thread - Mechanical and functional properties (ISO 10666)*

EN ISO 15480, *Fasteners - Hexagon washer head drilling screws with tapping screw thread (ISO 15480)*

EN ISO 15481, *Cross recessed pan head drilling screws with tapping screw thread (ISO 15481)*

EN ISO 15482, *Cross recessed countersunk head drilling screws with tapping screw thread (ISO 15482)*

EN ISO 15483, *Cross recessed raised countersunk head drilling screws with tapping screw thread (ISO 15483)*

3 Terms, definitions and symbols**3.1 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 <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1.1**cam**

part of the key and cylinder mechanism which operates the locking mechanism

3.1.2**effective key differ**

difference between key mechanism of similar design, achieved only by the movable detainer, which allows each key mechanism to be operated only by its own key

Note 1 to entry: The number of effective differs is equal to the number of theoretical differs after deduction of the differs suppressed by the manufacturer due to technical constraints and those differs suppressed in accordance with the restraints of 4.5.1.

3.1.3**hasp**

part of the padlock fitting which goes over the staple

3.1.4**key mechanism**

part of the mechanism which recognises a correct key

3.1.5**locking mechanism**

part of the mechanism which is operated by the key mechanism to lock/unlock the padlock

3.1.6**padlock**

independent locking device comprising a body, a key mechanism, a locking mechanism and a shackle

3.1.7**padlock fitting**

device fitted to the object which is to be locked with a padlock excluding cables and chains

3.1.8**shackle**

part of the padlock which passes through and secures the padlock fitting

3.1.9**staple**

part of the padlock fitting through which the padlock shackle is passed

3.2 Symbols

For the purposes of this document, the symbols described in Table 1 apply.

Table 1

Symbol	Unit	Definition
d	mm	Diameter of shackle
F1	kN	Push/pull force on cylinder plug/locking mechanism
F2	kN	Pull force on shackle or staple
F3	kN	Cutting force on shackle or staple
F4	kN	Maximum possible push/pull force on cylinder plug/locking mechanism
h	mm	Height through which weight is dropped (impact test)

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Symbol	Unit	Definition
M1	Nm	Torque on key to test for interpassing
M2	Nm	Torque on cylinder plug/locking mechanism
M3	Nm	Twisting torque on shackle or staple
n		Minimum number of effective key differs
t	min	Drilling/sawing resistance time
T	°C	Temperature of product for impact testing
m	g	Drop mass for impact test

4 Requirements

4.1 General

The structure of this clause reflects the classification as given in Clause 6.

4.2 Category of use (first classification digit)

Grade 1: according to requirements in 5.2.

4.3 Durability (second classification digit)

Grade 0: no requirements

Grade 1: 10 000 cycles

When tested in accordance with 5.3, it shall be possible to operate the padlock.

The padlock fittings are excluded from the durability test.

4.4 Corrosion resistance (third classification digit)

Products shall be classified in accordance with EN 1670.

- Grade 0: no defined corrosion resistance
- Grade 1: 24h ^{+1h/-0 h};
- Grade 2: 48h ^{+1h/-0 h};
- Grade 3: 96h ^{+1h/-0 h};
- Grade 4: 240h ^{+1h/-0 h};
- Grade 5: 480h ^{+1h/-0 h}.

When tested in accordance with 5.4, it shall be possible to operate the padlock.

This corrosion test shall apply to the functionality only (not appearance).

4.5 Security (fourth classification digit)

4.5.1 General

4.5.1.1 Some of the requirements can be confirmed with a certificate and test report according to EN 1303.

4.5.1.2 In grades 4, 5 and 6 it shall not be possible to remove the key until the shackle is deadlocked in the closed position, key retained in open position.

4.5.2 Minimum number of effective key differs

Padlocks shall have a minimum of n effective key differs (Table 2).

For a mechanical padlock the maximum number of steps on the same level shall be 60 %, maximum two adjacent and a minimum of three levels.

4.5.3 Non-interpassing of keys with just one interval effective differ

When tested in accordance with 5.5.3, it shall not be possible to operate the padlock with keys differing from the correct key by one interval, i.e. the next closest key. The next closest key shall be defined by the manufacturer according to its key coding system.

4.5.4 Resistance to force on cylinder plug or locking mechanism

When tested in accordance with 5.5.4, the cylinder plug or the locking mechanism shall resist a force F_1 (Table 2).

4.5.5 Resistance to torque on cylinder plug or locking mechanism

When tested in accordance with 5.5.5, the cylinder plug or the locking mechanism shall resist a torque M_2 (Table 2).

4.5.6 Resistance to pulling of shackle or staple

When tested in accordance with 5.5.6, the shackle and the staple shall each resist a force F_2 (Table 2).

4.5.7 Resistance to twisting of shackle or staple

When tested in accordance with 5.5.7, the shackle and the staple shall each resist a torque M_3 (Table 2).

4.5.8 Resistance to cutting of shackle or staple

When tested in accordance with 5.5.8, the shackle and the staple shall each resist a force F_3 (Table 2).

4.5.9 Resistance to impact on padlock body, shackle and staple at low temperature

When tested in accordance with 5.5.9, the padlock body, the shackle and the staple cooled to temperature T , shall each resist the blows from the steel pole with the mass m and from the height h (Table 2).

4.5.10 Resistance to drilling of padlock body, shackle and staple

When tested in accordance with 5.5.10, the padlock body, the shackle and the staple shall each resist drilling for a time t (Table 2).

4.5.11 Resistance to sawing of padlock body, shackle and staple

When tested in accordance with 5.5.11, the padlock body, the shackle and the staple shall each resist sawing for a time t (Table 2).

4.5.12 Manual attack resistance

When tested in accordance with 5.5.12, the padlock shall resist attacks with manual tools for a time t (see Table 2).

Table 2 — Security requirements

Requirement clause number	Requirement	Test method clause number	Test parameter	Grade						Unit
				1	2	3	4	5	6	
4.5.1.2	Key retained in open position	5.5.1	yes/no	-	-	-	yes	yes	yes	
4.5.2	Minimum number of effective key differs	5.5.2	n	300	1 000	2 500	5 000	10 000	20 000	-
4.5.3	Non-interpassing of keys with just one interval differ - Torque on key	5.5.3	M1	1	1	1,5	1,5	1,5	1,5	Nm
4.5.4	Resistance to force on cylinder plug or locking mechanism	5.5.4	F1	-	-	4	5	10	15	kN
4.5.5	Resistance to torque on cylinder plug or locking mechanism	5.5.5	M2	-	2,5	5	15	20	30	Nm
4.5.6	Resistance to pulling of shackle or staple	5.5.6	F2	3	5	15	30	70	100	kN
4.5.7	Resistance to twisting of shackle or staple	5.5.7	M3	40	100	200	600	1 200	2 500	Nm
4.5.8	Resistance to cutting of shackle or staple	5.5.8	F3	6	15	25	45	70	100	kN
4.5.9	Resistance to impact on padlock body, shackle and staple at low temperature	5.5.9	T m h	- - -	- - -	- 20 1 250 800	- 20 3 050 1 000	- 40 6 550 1 400	- 40 7 150 1 500	°C g mm
4.5.10	Resistance to drilling of padlock body, shackle and staple	5.5.10	t	-	-	-	2	4	8	min
4.5.11	Resistance to sawing of padlock body, shackle and staple	5.5.11	t	-	-	-	2	4	8	min
4.5.12	Manual attack resistance	5.5.12	t toolsets	-	-	-	3	5	10	min

5 Test methods

5.1 General

The manufacturer will provide assembly and component drawings to enable the tester to carry out a preliminary product assessment prior to testing.

The padlock shall be tested in the locked position with the key removed.

It is not necessary for the correct key to operate the padlock after testing.

Padlocks/padlock fittings and their original keys shall be taken at random and submitted for each test.

In the event of one of the original two samples failing the test, the padlocks/padlock fittings shall be deemed to have failed and a further two shall be tested, both of which shall pass the test.

If the parts to be tested are inaccessible when the product is correctly mounted in accordance with the manufacturer's instructions, the product shall be considered to have passed that test.

A padlock shall be deemed to have been opened when a bar, of equal cross-section to that of its shackle, can be released. Ability to open can be checked at any time during the test by manipulation with a screwdriver or similar implement (maximum length 200 mm) for a period of 5 s max.

5.1.1 Tolerances

Unless otherwise stated, the following tolerances shall apply:

— force ± 2 %;

— torque ± 2 %;

— mass/weight ± 2 %;

— distance ± 2 %; <https://standards.iteh.ai/catalog/standards/sist/607cd674-9136-4227-b3df-9a2a5408f58a/sist-en-12320-2022>

— time ± 5 s;

— temperature ± 2 °C.

Unless otherwise stated, the forces shall be applied progressively and without shock to the required load within 1 min.

5.1.2 Test environment

The ambient temperature of the test environment shall be controlled throughout the test from 15 °C to 30 °C unless otherwise stated.

5.1.3 Test tools

Specification of steel for cutting and impact tests as required in 5.5.8.1 and 5.5.9 shall be structural steel E335 defined in EN 10025-2:2019, heat treated to have a hardness of 60 HRC to 64 HRC.

5.1.4 Sampling

Test sampling and sequencing shall be in accordance with Annex A.

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EN 12320:2021 (E)**5.2 Category of use****5.2.1 Operational unlocking test**

Mount the padlock in a suitable holding fixture and apply a torque to a fully inserted correct key using a torquemeter, as shown in Figure B.1. At no point between locked and unlocked shall the torque exceed 1 Nm.

5.2.2 Key strength

Requirements for key strength shall meet the requirements of EN 1303:2015, 5.2.

5.3 Durability

The durability test shall be carried out using suitable apparatus that allows the full operational locking and unlocking sequence of the padlock to include the release of the shackle. (It is not necessary for the shackle to be turned). Repeat the sequence at a speed of five to twenty cycles per minute

During the operational cycle the key may remain partially inserted in the locking mechanism but shall have cleared all movable retainers.

The key used for the durability test can be cleaned and the padlock shall be lubricated in accordance with the manufacturer's instructions at the start of the test and after each 5000 cycles using the lubricant recommended by the manufacturer.

After completing the required number of cycles, the operation of the padlock shall be tested using a new original key. The rotation shall be achieved with a maximum torque of 1,5 Nm.

If the padlock should jam and cease to operate during the test, then provided the padlock continues to operate in the proper manner when released, the test shall be allowed to continue.

No durability requirements for padlock fittings.

5.4 Corrosion resistance

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5.4.1 Preparation

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The padlock is locked on a plastic bar and placed in the chamber for salt spray test. The padlock without a key is oriented in the manner that it would assume to be in use.

Padlock shall be exposed to a neutral salt spray test in accordance with EN 1670:2007.

- Grade 0: no defined corrosion resistance
- Grade 1: 24h ^{+1h/-0 h};
- Grade 2: 48h ^{+1h/-0 h};
- Grade 3: 96h ^{+1h/-0 h};
- Grade 4: 240h ^{+1h/-0 h};
- Grade 5: 480h ^{+1h/-0 h}.