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Stavbno okovje - Mehatronski cilindri - Zahteve in preskusne metode

Building hardware - Mechatronic cylinders - Requirements and test methods

Schlösser und Baubeschläge - Mechatronische Schließzylinder - Anforderungen und Prüfverfahren

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Schlösser und Baubeschläge - Mechatronische Schließzylinder - Anforderungen und Prüfverfahren

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Foreword

This document (prEN 15684:2007) 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 document is currently submitted to the CEN Enquiry.

This CEN document was developed to support a new line of products not covered by existing standards. It will be presented, as a proposal to complement the existing European standards dedicated to building hardware products.

Normative and informative annexes to this CEN document are indicated in the contents.

Introduction

Mechanical cylinders have been used to provide security and control of locks. Increasing demand for higher security, flexibility of master key systems, flow control, copy control of keys, etc. have made it desirable to incorporate additional functions to such mechanical cylinders, and new technologies have made it possible to develop electronically controlled cylinders.

Increasingly, such mechatronic cylinders (MC) form a part of the security system of a building and may involve the use of electrical locking and controlling elements.

The performance tests incorporated in this CEN document are considered to be reproducible and as such will provide a consistent and objective assessment of the performance of these devices throughout CEN Member States.

1 Scope

This European Standard specifies requirements for performance and testing of mechatronic cylinders and their original keys and/or electronic keys.

It applies to cylinders for such locks designed to be used with cylinders as are normally used in buildings. It also applies to cylinders for use with other hardware products such as exit devices, door operators, etc. or access control systems and alarm systems.

It establishes categories of use based on performance tests and grades of security based on design requirements and on performance tests that simulate attack.

Corrosion resistance is specified by reference to the requirements of EN 1670 on the protection of corrosion for locks and building hardware.

On occasions there may be a need for additional functions within the design of the cylinder. Purchasers should satisfy themselves that the products are suitable for their intended use. This is particularly important when the operation of such additional functions is safety-related. Accordingly, this document includes obligatory assessment of such features when they are included in the cylinder design.

This CEN document does not cover any other element of a security system, other than those directly involved in the control of a cylinder.

It does not provide for any particular design of products and only such dimensions as are required to satisfy the Essential Requirements of the CPD are specified.

It is assumed that MCs will meet the legal EMC regulations concerning electronic apparatus.

The suitability of cylinders for use on fire or smoke-door assemblies is determined by fire performance tests conducted in addition to the performance testing required by this CEN document. Annex B indicates additional requirements for these products. Since suitability for use on fire doors is not essential in every situation, the manufacturer has the option to state if the cylinder conforms to these additional requirements or not. If so claimed, the requirements laid down in the relevant European Standard prEN 1634-1 apply, see Annex B.

2 Normative references

This CEN document incorporates by dated or undated reference, provision from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to, or revisions of, any of these publications apply to this document only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1303: 2005, *Building hardware — Cylinders for locks — Requirements and test methods*

EN 1634-1, *Fire resistance tests for door and shutter assemblies — Part 1: Fire doors and shutters*

prEN 1634-2, *Fire resistance tests for door and shutter assemblies — Part 2:Fire door hardware – Building hardware for fire resisting doorsets and openable windows*

EN 60068-2-1:1993, *Environmental testing — Part 2-1: Test methods — Tests A: Cold*

EN 60068-2-2:1993, *Environmental testing – Part 2-2: Test methods — Tests B: Dry heat*

EN 60068-2-30, *Environmental testing — Part 2: Test —test Db and guidance: Damp Heat, cyclic*

EN 60068-2-6:1995, *Environmental testing — Part 2-6: Test methods — Tests Fc: Vibration (sinusoidal)*

EN 60068-2-29, *Environmental testing — Part 2-29: Test methods — Test Eb and guidance: Bump*

EN 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

EN 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test*

EN 61000-6-2:2001, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments*

3 Terms and definitions

For the purpose of this document, the definitions in EN 1303 and the following definitions apply.

3.1
audit trail capability
degree of functionality intended to provide a record of MC events that will identify the individual credential used to operate the MC

3.2
mechatronic cylinder (MC)
device with an integrated or a remote electronic system, which is to be used with a lock for the purpose of operating the lock after verifying the authorization of a user, and which can be replaced by a mechanical cylinder conforming to EN 1303 without replacing any door furniture

3.3
key
separate device corresponding to the cylinder, which can mechanically operate the cylinder

NOTE For the explicit understanding of certain requirements and tests, a key can also be called an "electronic key" when it contains, in addition to its mechanical feature, information necessary to authorize operation of the MC.

3.4
electronic key/accrediting device
device containing information necessary to authorize operation of the (mechatronic) cylinder

NOTE 1 For simplification, an electronic key is sometimes called a key.

NOTE 2 An electronic key/accrediting device could be in the form of a credential, card, token, remote control, etc.

3.5
knob
integrated device within the cylinder which can mechanically operate the cylinder

NOTE A knob could also be a thumb turn.

3.6
time zoning capability
degree of functionality intended to provide security by limiting the time that a valid credential will operate the MC

4 Requirements

4.1 General

The structure of the specified requirements and test procedures reflects the classification in accordance with clause 7.

4.2 Category of use

4.2.1 Key strength

The MC shall meet the requirements of EN 1303:2005, subclause 4.2, with a torque of 2,5 Nm.

Compliance is checked by the test methods given in EN 1303:2005, subclause 5.2.

If an MC is equipped with a knob (or thumb-turn) on the outside (replacing the key function) and this MC is protected by a clutch to prevent damage in case of excessive torque being applied to the knob, the clutch shall be able to transmit a minimum torque of 1,5 Nm after having been released 100 times within 20 min.

4.2.2 Stability of electronic key

The electronic keys shall be able to withstand a freefall from 1,5 m height, without loss of function and without the need to reassemble. Compliance is checked by the test method given in 6.2.1.2.

4.2.3 Wrong electronic code

When using the right mechanical code the MC shall be capable of resisting a torque on the key of 3,5 Nm (or the maximum torque that can be transmitted with the normal manufacturers key if less than 3,5 Nm) without loss of function.

Compliance is checked by the test method given in 6.2.1.3.

If an MC is equipped with a knob (or thumb-turn) on the outside (replacing the key function) and this MC is not protected by a clutch to prevent damage in case of excessive torque being applied to the knob, the MC shall be capable of resisting a torque of 5 Nm (+5 %), without loss of function.

4.2.4 Bump and vibration requirements

The MC and its keys shall be able to withstand bumps and vibration during lifetime. The MC shall meet the requirements given in Table 1. Mechanical influences.

The MC and the key may have temporary degradation or loss of function and/or data, but the MC shall remain in locked position. The loss of function and/or data shall be self-recoverable within 5 s.

Compliance is checked by the test methods given in 6.2.1.4.1 and 6.2.1.4.3.

4.2.5 Electrostatic discharge requirement

The MC and its keys shall be able to withstand high voltage and static electricity.

It shall conform to the requirements given in EN 61000-6-2 and meet the following grades:

Contact	Air discharge	Performance criteria
8 kV	15 kV	C

The MC and the key may have temporary degradation or loss of function and/or data, but the electric blocking of the MC shall remain in locked position. The loss of function and/or data shall be self-recoverable within 5 s.

Compliance is checked by the test method given in 6.2.8.5.

4.3 Durability requirements

The MC shall meet the requirements of EN 1303:2005, subclause 4.3. Table 1. Number of cycles.

Compliance is checked by the test method given in 6.2.2.

4.4 Door mass

Not applicable.

4.5 Fire resistance

The MC shall meet the requirements of EN 1303 paragraph 4.5 and Annex B.

4.6 Safety requirements

Not applicable.

4.7 Environmental resistance

4.7.1 Corrosion resistance requirements

See EN 1303:2005, subclause 4.7.1.

Compliance is checked by the test method given in EN 1303:2005, subclause 5.7.

4.7.2 Resistance of electronic key against water

If an electronic key belonging to an MC is graded 1, it shall be exposed to water according the test described in paragraph 6.2.6.2 and shall be able to operate the cylinder after the test with all its electronic functions.

4.7.3 Dry Heat

The MC and its electronic keys shall be able to function correctly at different temperatures. It shall also be able to function correctly after being exposed to thermal shocks. See Tables 2 and 3. for environmental resistance MC and MC key.

Compliance is checked by the test methods of 6.2.6.3.

4.7.4 Cold

The MC and its electronic keys shall be able to function correctly at different low temperatures. It shall also be able to function correctly after being exposed to thermal shocks. See Tables 2 and 3. for environmental resistance MC and MC key.

Compliance is checked by the test methods of 6.2.6.4.

4.7.5 Damp heat cyclic

The MC and its electronic keys shall be able to function correctly in an environment of high relative humidity. See Tables 2 and 3. for environmental resistance MC and MC key.

Compliance is checked by the test method of 6.2.6.5.

4.7.6 Protection of MC against intrusion of water

The manufacturer shall declare IP classification for the MC.

4.8 Key related security

4.8.1 Minimum number of mechanical code variations

The minimum number of mechanical code variations of the MC shall be:

Grade A:	0
Grade B:	100
Grade C:	300
Grade D:	15 000
Grade E:	30 000
Grade F:	100 000

4.8.2 Torque resistance of plug/cylinder

See EN 1303:2005, subclause 4.8.7 (Table 5).

If the torque required cannot be applied, the cylinder shall be deemed to have passed the test.

Compliance is checked with EN 1303:2005, subclause 5.8.6.

4.8.3 Minimum number of electronic code variations

The minimum number of electronic code variations (different keys) of the MC shall be:

Grade A:	10 000
Grade B:	100 000
Grade C:	1 000 000
Grade D:	10 000 000
Grade E:	100 000 000
Grade F:	1 000 000 000