SLOVENSKI STANDARD
SIST EN 16867:2020

01-maj-2020

Stavbno okovje - Mehatronsko okovje za vrata - Zahteve in preskusne metode

Building hardware - Mechatronic door furniture - Requirements and test methods

Schlösser und Baubeschläge - Mechatronische Türbeschläge - Anforderungen und Prüfverfahren

Quincaillerie pour le bâtiment - Ensemble plaques béquilles mécatroniques - Exigences et méthodes d'essai

Ta slovenski standard je istoveten z: EN 16867:2020

ICS:

91.190	Stavbna oprema	Building accessories

SIST EN 16867:2020 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16867

March 2020

ICS 91.190

English Version

Building hardware - Mechatronic door furniture - Requirements and test methods

Quincaillerie pour le bâtiment - Poignée de porte mécatronique - Exigences et méthodes d'essai

Schlösser und Baubeschläge - Mechatronische Türbeschläge - Anforderungen und Prüfverfahren

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Ref. No. EN 16867:2020 E

Contents

Page

European foreword **3**
Introduction **4**
1 Scope **5**
2 Normative references **5**
3 Terms and definitions **7**
4 Requirements **10**
5 Test — general and test apparatus **27**
6 Test methods — procedures **27**
7 Classification system **54**
8 Marking **56**
Annex A (normative) MDF suitable for use on fire resistant / smoke control doors **57**
Annex B (normative) Tool sets for attack resistance tests **58**
Annex C (informative) **Table of test procedures** **60**
Annex D (informative) **Manufacturer's declaration of compliance** **62**
Annex E (informative) **Examples of calculation of effective code variations for ICC** **64**
Bibliography **66**

European foreword

This document (EN 16867:2020) 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of an identical text or by endorsement, at the latest by September 2020, and conflicting national standards shall be withdrawn at the latest by September 2020.

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

European standards for mechanically operated lever handles and knob furniture (EN 1906) are also available.

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

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.

Introduction

The development of building hardware to include electrically and electronic operations and control has introduced a large number of products on the market.

For locks and door furniture, the range of electrical or electronic components to be fitted to existing mechanical locks or door furniture to a complete Mechatronic Door Furniture (MDF) has increased.

Also, complete units with lock and door furniture in unique combination to MDF occur frequently. Typically, MDF is installed directly on the door leaf and includes all functions like operating the follower of the lock, reading and decoding the credential and power.

Following components and units are covered by this document.

Type A: Handle or knob operated door furniture with electrically operated actuator, reading unit for credential and power supply to be combined with a mechanical operated lock where the lock meets EN 12209 or EN 15685.

Type B: Handle or knob operated door furniture with reading unit for credential and power supply to be combined with electrically operated locks where the lock meets EN 14846.

This document does not cover electrically operated locks or striking plates in combination with an access control system not fitted on the door.

This document provides the MDF with requirements for:

— category of use to ensure the performance during its normal use;

— durability to ensure good performance during lifetime;

— specification for system management;

— suitability for use on fire resistant/smoke controlled doors;

— environmental resistance for good performance during lifetime in different environmental conditions;

— security for different types of credentials;

— attack resistance to ensure use on Burglary resistant doors;

— product information to give summary of the performance.

The performance tests incorporated in this 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.

It is assumed that MDF will conform to the legal regulations i.e. RED – Radio Equipment Directive 2014/53/EU.

On occasion, there could be a need for additional functions within the design of the MDF. Purchasers should convince 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 assessment of such features when they are included in the MDF design.

1 Scope

1.1 General

This document applies to Mechatronic door furniture (MDF) fitted on the door set which gives the possibility to control the locking and/or release part through an electronic authorization means. This can be operable by credentials (i.e. card, code, biometric).

The MDF, according to this document, is combined with locks according to EN 12209, EN 14846, EN 15685 or can be a part of an emergency exit device according to EN 179, EN 1125 or EN 13637.

The MDF can be standalone or linkable to an external control system.

The document would allow classifying the MDF upon several characteristics such as category of use, durability, environmental, security, and type of operating device.

The suitability of the MDF for use on fire or smoke-door assemblies is determined by fire resistance tests conducted in addition to the performance testing specified by this document.

1.2 Exclusions

This document does not cover:

— mechatronic cylinders according to EN 15684;

— electromechanical operated locks and striking plates according to EN 14846.

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 636:2012+A1:2015, *Plywood — Specifications*

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

EN 1634-1, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware — Part 1: Fire resistance test for door and shutter assemblies and openable windows*

EN 1634-2, *Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware — Part 2: Fire resistance characterisation test for elements of building hardware*

EN 1634-3, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware — Part 3: Smoke control test for door and shutter assemblies*

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

EN 1906:2012, *Building hardware — Lever handles and knob furniture — Requirements and test methods*

EN 14846, *Building hardware — Locks and latches — Electromechanically operated locks and striking plates - Requirements and test methods*

EN 15684, *Building hardware — Mechatronic cylinders — Requirements and test methods*

EN 15685, *Building hardware — Requirements and test methods — Multipoint locks, latches and locking plates — Characteristics and test methods*

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

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

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

EN 60068-2-27, *Environmental testing — Part 2-27: Tests — Test Ea and guidance: Shock*

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

EN 60529, *Degrees of protection provided by enclosures (IP Code)*

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

EN 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test*

EN 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test*

EN 61000-4-5, *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test*

EN 61000-4-11, *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests*

EN 61000-4-29, *Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests*

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)*

ISO/IEC 18033-3, *Information technology — Security techniques — Encryption algorithms — Part 3: Block ciphers*

ISO 10899, *High-speed steel two-flute twist drills - Technical specifications*

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 http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
access card
card or tag, read only or read write, without integrated circuit, does not provide encryption

Note 1 to entry: Can be used with contact or contactless

EXAMPLE magnetic stripe, barcode

3.2
actuator
electrically operated means to affect or enable operation of the MDF “at rest” position unforced condition of the lever handle or knob

3.3
attack
unauthorized attempt to operate a MDF by various techniques (destructive and or non-destructive techniques)

3.4
audit trail
functionality intended to provide a record of MDF and/or its credential events that will identify the individual credential used to operate the MDF

3.5
backplate
element whose purpose is, firstly, functional, providing a bearing for the rotation of a lever handle or knob and the means of attachment to the door; and, secondly, decorative, working as a trim plate to cover holes provided in the door for the passage of spindles, keys or lock cylinders

3.6
coupled
status of the actuator when the bolt and/or latch bolt can be operated by the handle, knob/ thumb turn or electrically

3.7
credential
identification means containing information necessary to authorize operation of the MDF

3.8
cylinder
device, usually distinct from its associated lock or latch, operated by a key, knob or thumb turn

3.9
door furniture
combination of lever handles or knobs on backplates or roses for the purpose of operating latches or locks

3.10
escutcheon
surround with a shaped hole to accommodate a key or a lock cylinder, with or without a pivoted cover plate, intended primarily to protect the door leaf from abrasion caused by keys

3.11
external plate
backplate or rose that is fitted on the external face of a door

3.12
False Acceptance Rate
FAR
probability that the system incorrectly authorizes a non-authorized person, due to incorrectly matching the biometric input with a template

Note 1 to entry: The FAR is normally expressed as a percentage, following the FAR definition this is the percentage of invalid inputs which are incorrectly accepted.

3.13
FAR-1
1/FAR
inverse of FAR

3.14
half set
single lever or knob attached to a plate or rose which enables operation of the lock or latch from one side of the door only

3.15
Integrated Circuit Card
ICC
card, tag or device with an integrated circuit

Note 1 to entry: Can be used with contact or contactless (RFID), active or passive.

EXAMPLE RFID, Smartcard.

3.16
inside
side of the door that is facing the controlled area

3.17
internal plate
backplate or rose that is fitted on the internal face of a door

3.18
knob
element for mechanical hand operation of the MDF

3.19
latchplate
backplate adapted for use with a latch and having no keyhole or cylinder aperture

3.20
lever handle
rotatable operating element designed as a lever with a length from its axis of rotation to its free end that exceeds 75 mm

3.21
manufacturer
natural or legal person who manufactures a construction product or who has such a product designed or manufactured, or markets that product under his name or trademark and putting the product on the market

3.22
mechatronic door furniture
MDF
combination of lever handles or knobs on backplates or roses with an integrated or a remote electronic system, which is to be used with a mechanical or electromechanical lock for the purpose of operating the lock after verifying the authorization of a credential

3.22.1
mechatronic door furniture
MDF Type A
handle or knob operated door furniture with electrically operated actuator, reading unit for credential and power supply to be combined with a mechanically-operated lock

Note 1 to entry: The mechanically-operated lock shall meet EN 12209 or EN 15685

3.22.2
mechatronic door furniture
MDF Type B
handle or knob operated door furniture with reading unit for credential and power supply to be combined with electrically-operated locks

Note 1 to entry: The electrically-operated lock shall meet EN 14846

3.23
No Performance Determined
NPD
no requirement and no test required

3.24
outside
side of the door that is facing the uncontrolled area

3.25
rose
element generally circular, but which may have equi-axial or approximately equi-axial shapes such as square or octagonal, that otherwise has the same features as a backplate

3.26
security furniture
device which provides added resistance to the lock and/or cylinder against physical attack

3.27
spindle
bar, usually square in cross-section, that engages with a follower

3.28
spring-assisted handle / knob
MDF lever handle or knob furniture that incorporates a spring which assists the return of the handle or knob to its intended “at-rest” position

3.29
spring-loaded handle / knob
MDF lever handle or knob that incorporates a spring which returns of the handle or knob to its intended “at-rest” position without any assistance from the lock

3.30
tester
person who performs the test

3.31
time zone
degree of functionality intended to provide security or convenience by limiting the time that a valid credential will operate the mechatronic door furniture

3.32
thumb turn
element of the MDF for mechanical finger operation

3.33
uncoupled
status of the actuator when neither bolt or latch bolt can be operated by the handle, knob/ thumb turn or electrically

3.34
unsprung handle / knob
MDF handle or knob not fitted with a spring in the backplate or rose

4 Requirements

4.1 General

4.1.1 Classification principle

The structure of the following requirements and test procedures reflects the classification in accordance with Clause 7.

It is up to the tester together with the manufacturer to decide which requirements and test methods are relevant to the technical design.

4.1.2 Compatibility between cooperating parts

The manufacturer shall state which cooperating parts have been designed to be used in combination. For compatibility and functionality between cooperating parts (products) similar classification necessary.

Verified by 6.1.2.

4.1.3 Dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this document are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through https://ec.europa.eu/growth/tools-databases/cp-ds_en.

Verified by 6.1.3.

4.1.4 Operation time for change of status

Operation time for a change of status between uncoupled and coupled status or vice versa shall not exceed 3 s. Verified by 6.1.4.

4.1.5 Product information requirements

Products classified in accordance with this document shall have clear and detailed instructions for their installation and maintenance. These instructions shall at least contain:

a) the limitation of the products intended use, the limitation of the door mass and door dimensions, temperature range and the field of door application and centre distance between axes where applicable;

b) the spindle and fastening elements shall be specified by the manufacturer. The manufacturer should state clearly the door thickness or range of door thicknesses for which the furniture is suitable, and in the case of spring-assisted and spring-loaded furniture, the angle of rotation possible by the design;

c) information to ensure that the product can conform to the performance requirements of this document, including known restriction of use, for example conditions under which the product could be rendered inoperable;

d) an extended temperature range if applicable;

e) information about suitability for use on fire resistance and/or smoke control door set if applicable;

f) information of the risk of misuse, dangerous substances and explosion of heated parts;

g) if applicable information of IP classification according to EN 60529, for outside and/or inside;

h) the information of any override function if applicable (i.e. mechanical cylinder);

i) Optional information about the following product features:

1) time zone possibilities (like number of time profiles, special time functions);

2) the quality of time zones (for example recurring (daily, weekly or calendar);

3) authorization process for an access modification (code, master code);

4) audit trails: quantity, with or without time-stamp, authorized access, denied access also, access programming;

5) effect on the coupled and uncoupled status during and after the removal of main power;

6) battery change: duration of no data loss;

7) battery low or main power failure, deeper than the minimum of working voltage;

8) external power supply in case of main power failure (if applicable);

9) duration of storage of the audit trails;

10) max number of operation with new battery and theoretical operable time for the MDF in years without operation with new battery (battery recommended by the manufacturer) and mean stand-by power consumption in watt;

11) for devices with external power supply:

— allowable voltage range;

— maximum current in A;

— max. power consumption in operation in A / voltage;

— typical standby consumption in watt.

4.2 Category of use (1st character)

4.2.1 General

The grading 1 and 2 for category of use gives the performance aimed for product to the residential market and grades 3 and 4 focus more on commercial building application see also 7.2.

When the MDF is fitted to the door there shall be no sharp edges.

NOTE This requirement would typically be satisfied by edges that are broken by a chamfer of 0,5 mm maximum × 45° or by a radius of 0,5 mm minimum.

In the area of rotation of the lever handle or knob, the head of any visible fastening element shall be level with or below the surface of the backplate or rose after fitting. However, raised head screws may stand proud of the furniture plate by the domed height of the screw head.

Any fastening element that secures the lever handle or knob to the spindle shall not project above the surface by more than 1 mm after fitting.

The design of MDF shall ensure that, after fitting, it is not possible for the fingers of a user to be trapped between lever handle or knob and backplate or rose over the full range of rotation of the lever handle or knob.

Verify according to 6.2.1.

4.2.2 Axial strength of MDF and fixing

The MDF shall resist an axial force F1 indicated in Table 1 for the different grades without breaking any component.

The MDF shall be operable and have a maximum permanent deformation δ1 indicated in Table 1 at the reference point after de-loaded the force.

The test shall be done in accordance with 6.2.2.

4.2.3 Requirement for free play

The maximum total movement of all knobs, thumb turns or lever handles mechanically connected to the MDF shall not exceed the value specified in Table 1.

See Figure 2. (6.2.3)

The test shall be done in accordance with 6.2.3.

4.2.4 Free angular movement or misalignment

Where applicable the free angular movement or misalignment of the MDF shall not exceed the value specified in Table 1.

The test shall be done in accordance with 6.2.4.

4.2.5 Operating torque

4.2.5.1 Unsprung and spring assisted lever handles

The torque M1 required to return the unsprung or spring assisted lever handle back to its intended "at-rest" position shall be not greater than the value specified in Table 1.

After the durability test the spring-assisted lever handles only, the torque M2 required to rotate the lever handle to a minimum angle of 40° from its intended "at-rest" position shall not exceed the value specified in Table 1.

The test shall be done in accordance with 6.2.5.1.

4.2.5.2 Unsprung knobs

The return torque M3 value for unsprung knobs shall in either direction not be greater than the value specified in Table 1.

The test shall be done in accordance with 6.2.5.2.

4.2.5.3 Spring loaded lever handles or knobs

For spring loaded handles, knobs or thumb turns, the torque M4 required to rotate the lever handles, knobs or thumb turn through an angle α of 60° 0°/+5° or through the angle of rotation possible by the design shall not be more the value specified in Table 1.

After the durability test and after removal of the torque, the lever handle or knob shall return to its recorded "at-rest" position within angle φ according to the value specified in Table 1.

The test shall be done in accordance with 6.2.5.3.