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Quincaillerie pour le bâtiment - Exigences et méthodes d'essai des ferrures de fenêtres et portes-fenêtres - Partie 3: Poignées, ferrures d'oscillo-battant, de battant-oscillant et d'ouvrant pivotant

Baubeschläge - Beschläge für Fenster und Fenstertüren - Anforderungen und Prüfverfahren - Teil 3: Betätigungsgriffe, insbesondere für Drehkipp-, Kippdreh- und Drehbeschläge

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European foreword

This document (prEN 13126-3:2021) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 13126-3:2011.

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

— EN 13126-3 now is independent from EN 13126-1; all necessary information is included without the need of any further information from EN 13126-1;

— several editorial changings in the wording were made for a better understanding;

— terms 3.5 'locking mechanism', 3.5 'key operated locking mechanism', 3.15 'sample' and 3.16 'test rig' were added and term 3.6 'key operated locking mechanism' was modified for better understanding;

— in Clause 4.1, the classification system changed completely; former digits 1 (Category of use), 4 (Fire resistance), 5 (Safety in use) and 8 (Application) were deleted; former digit 2 changed into box 1 (Durability), former digit 3 changed into box 2 (Mass), former digit 6 changed into box 3 (Corrosion resistance), former digit 9 changed into box 4 (Test sizes); former digit 7 changed into box 5 (Security against burglar attack) and a new box 6 (Key related security) was added;

— in Clause 4.2, new Grades for the number of cycles are defined; H1 (5 000), H2 (10 000) and H3 (20 000), see also 5.4;

— in Clause 4.10, a new example was added for the new classification;

— in Clause 5.4, new Grades for the number of cycles are defined; H1 (5 000), H2 (10 000) and H3 (20 000) in accordance with 4.2 established;

— in Clause 5.4, the number of cycles were adapted to the newly defined Grades for the durability;

— in 5.10.6, the subclause 'Locking variations / key related security' was modified in accordance with 4.7 (requirement in grade 2 changed from ' ≤ 99' into ' ≥ 30 and ≤ 99');

— in Clause 6, the title has been modified to “…and preparation for the test”;

— in Clause 8, a new clause was added regarding marking with information from the current version of EN 13126-1.

EN 13126, *Building hardware — Hardware for windows and door height windows — Requirements and test methods* consists of the following parts:

— *Part 1: Requirements common to all types of hardware;*

— *Part 2: Window fastener handles;*

— *Part 3: Handles, primarily for Tilt and Turn, Tilt-First and Turn-Only hardware;*

— *Part 4: Espagnolettes;*

— *Part 5: Devices that restrict the opening of windows and door height windows;*

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— *Part 6: Variable geometry stay hinges (with or without a friction stay);*

— *Part 7: Finger catches;*

— *Part 8: Requirements and test methods for tilt and turn, Tilt-First and Turn-Only hardware;*

— *Part 9: Hardware for horizontal and vertical pivot windows;*

— *Part 10: Arm-balancing systems;*

— *Part 11: Top hung projecting reversible hardware;*

— *Part 12: Side hung projecting reversible hardware;*

— *Part 13: Sash balances;*

— *Part 14: Sash fasteners;*

— *Part 15: Rollers for sliding and hardware for sliding folding windows;*

— *Part 16: Hardware for Lift and Slide windows;*

— *Part 17: Hardware for Tilt and Slide windows;*

— *Part 19: Sliding Closing Devices*

A full contribution to the preparation of this European Standard series has been made by the European manufacturers' organization "ARGE" and national standards bodies.

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Introduction

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 States.

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1 Scope

This part of EN 13126 specifies the requirements and test procedures for durability, strength, security and functionality of handles.

This document is applicable to Tilt and Turn, Tilt-First and Turn-Only hardware for use on windows and door-height windows.

Handles can also be used on other opening types, e.g. on In-line Sliding, Tilt and Slide, Sliding Folding, horizontal and vertical-pivoting windows.

a) This document is not applicable to operation devices, door handles for door latches and door locks (for this, refer to EN 1906).

b) Handles with handle length > 170 mm (refer to Figure B.1).

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, *Building hardware — Corrosion resistance — Requirements and test methods*

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

3.1
handle
operating device with or without click mechanism, and where applicable with locking mechanism, with which the window hardware can be mechanically operated

3.2
window handle
operating mechanism with which the window hardware can be mechanically operated and a spindle that serves as the connecting element

3.3
geared-handle
operating mechanism with which the window hardware can be mechanically operated and a connector or fork that serves as the connecting element (e.g. cremone handle)

3.4
click mechanism
assembly of components to position the handle in the defined click positions that correspond with the Tilt and Turn hardware's operation positions

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3.5
locking mechanism
assembly of components to ensure the locked position of the handle and to prevent the movement of the handle from the locked position

3.6
non-key-operated locking mechanism
assembly of components that enable the handle's locked position

Note 1 to entry: Some examples of non-key-operated locking mechanisms are push-to-open, button and thumb turn.

3.7
key operated locking mechanism
locking mechanism operated by appropriate means (e.g. a key)

3.8
operating torque
M
required torque to rotate a handle without click mechanism

3.9
click-out torque
$\boldsymbol{M_{\mathrm{a}}}$
required torque to rotate a handle out of a click position

3.10
between-clicks torque
$\boldsymbol{M_0}$
required torque to rotate a handle between the click positions

3.11
differential value
Md
difference between the minimum "click-out torque" and the maximum "between-clicks torque"

$M_{\mathrm{d}} = M_{\mathrm{a\ min}} - M_{0\ \mathrm{max}}$

3.12
rosette
<for windows>
screw-fixed base body located on the window profile that serves as a rotatable window handle mounting

3.13
spindle
connecting element to transfer the torque from the window handle to the rotatable part of the window espagnolette

Note 1 to entry: Square spindles are very common, but other shaped spindles are also permissible.

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3.14
connector / fork
connecting element to transfer the torque from the geared handle to the slideable part of the window espagnolette

Note 1 to entry: Otherwise known as engaging piece, tongue or slider.

3.15
sample
hardware component to be tested

3.16
test-rig
testing device onto which the sample is mounted

4 Classification

4.1 General

Window handles, primarily for Tilt and Turn, Tilt-First and Turn-Only hardware shall be classified with the eight-box classification system (see Table 1).

Table 1 — Classification system

Box	1	2	3	4	5	6	7	8
Characteristic	Dura bility	Mass	Corrosion resistance	Test sizes	Security against burglar attack	Key related security	Handle Type	Category of use

4.2 Durability (1 – first box)

The first box shall display the Grade applied to the durability test with an extension for the designated operational cycle. “90” for the Turn-Only cycle and “180” for the Tilt and Turn cycle in accordance with the following requirements:

— Grade H1/90 5 000 Turn-Only cycles
— Grade H2/90 10 000 Turn-Only cycles
— Grade H3/90 20 000 Turn-Only cycles
— Grade H1/180 5 000 Tilt and Turn cycles
— Grade H2/180 10 000 Tilt and Turn cycles
— Grade H3/180 20 000 Tilt and Turn cycles

4.3 Mass (2 – second box)

No requirements, the second box shall display the digit 0.

4.4 Corrosion resistance (3 – third box)

The third box shall display the Grade regarding corrosion resistance in accordance with 5.9.

4.5 Test sizes (4 – fourth box)

No requirements, the fourth box shall display the digit 0.

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4.6 Security against burglar attack (5 – fifth box)

The fifth box shall display the Grade of the security against burglar attack:

- Grade 0: without security against burglar attack
- Grade 1: 35 Nm resistance against twisting-off and forcing-off
- Grade 2: 100 Nm resistance against twisting-off and forcing-off
- Grade 3: 200 Nm resistance against twisting-off and forcing-off

4.7 Key related security (6 – sixth box)

The sixth box shall display the Grade of the key related security:

- Grade 0: no locking mechanism
- Grade 1: non-key operated locking mechanism (e.g. 'PTO': Push-to-open)
- Grade 2: key-operated locking mechanism with ≥ 30 and ≤ 99 locking variations
- Grade 3: key-operated locking mechanism with ≥ 100 locking variations

4.8 Handle type (7 –seventh box)

The seventh box shall display the handle type as described following and in Table 2.

- Application N: Non clickable
- Application C: Clickable
- Handle design 1: Window handle
- Handle design 2: Geared handle

Table 2 — Handle Type

Grade	Application C = Clickable / N = Non clickable	Handle design 1 = window handle / 2 = geared handle
N1	N	1
N_2	N	2
C1	C	1
C2	C	2

4.9 Category of use (8 – eighth box)

The eighth box shall display the Grade in accordance with Table 5

4.10 Example of classification for window handles (EN 13126-3)

a) Alternative 1: Table with boxes (see Table 3)

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Table 3 — Example of classification

Standard	Box							
	1	2	3	4	5	6	7	8
EN 13126-3:2021	H2/180	0	2	0	2	2	C1	2

In accordance with Clause 8 the information regarding classification by using a table with boxes shall always be shown together with the number of this standard EN 13126-3.

b) Alternative 2: Alphanumerical

EN 13126-3:2021 H2/180-0-2-0-2-2-C1-2

box 1	durability	Grade H2/180 (10 000 cycles / 180°)
box 2	mass	0 (no requirements)
box 3	corrosion resistance	Grade 2
box 4	test sizes	0 (no requirements)
box 5	security against burglar attack	Grade 2 (100 Nm resistance against twisting-off and forcing-off)
box 6	key related security	Grade 2 (locking mechanism with ≥ 30 and ≤ 99 locking variations)
box 7	handle type	C1 (clickable / window handle)
box 8	category of use	Grade 2

4.11 Transfer of the previous 7th digit into the new classification system

Table 4 shows how to transfer the 7th digit of the classification system in accordance with the previous EN 13126-3:2011 into the 5th and the 6th box of the new eight-box classification system.

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Table 4 — transfer of previous 7th digit into 5th and 6th box of the classification system

EN 13126-3:2011			EN 13126-3: 2021	
7th digit in the classification system with to parts			5th box	6th box
1st part		2nd part		
0	/	0	0	0
1	/	1	1	1
1	/	2	1	2
1	/	3	1	3
2	/	1	2	1
2	/	2	2	2
2	/	3	2	3
3	/	1	3	1
3	/	2	3	2
3	/	3	3	3

5 Requirements

5.1 Dangerous substances

Materials in products should not release any dangerous substances in excess of the maximum levels specified in the European material standards and any National regulations.

5.2 Category of use requirements

5.2.1 General

Table 5 contains the main test parameters for the category of use (eighth box of classification system).

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Table 5 — Main test parameters

Clause	Fig.	Requirement	Symbol	Grade 1	Grade 2
5.3 7.3 7.5	-	Operating torques and click torques			
		Handles without click mechanism	Application	N	N
		Operating torque (before and after durability test)	M	≤ 1,4 Nm	≤ 0,8 Nm
5.3 7.3 7.5	-	Handles with click mechanism	Application	C	C
		Between-clicks torque (before and after durability test)	M_{o}	≤ 1,4 Nm	≤ 0,8 Nm
		Click-out torque (before and after durability test)	M_{a}	≤ 6,0 Nm	≤ 4,0 Nm
		Differential value (before and after durability test)	M_{d}	≥ 0,4 Nm	≥ 0,8 Nm
5.4 7.4	B.2 B.3	Durability test			
		Grade H1: 5 000 cycles			
		Grade H2: 10 000 cycles			
		Grade H3: 20 000 cycles			
5.5 7.6	B.4	Fixed spindle connection			
		Window handles with spindle (after durability test)	F	≥ 100 N	≥ 100 N
5.6 7.7.2 7.7.3	B.5	Free play (after durability test)			
		F = 7,5 N / 100 mm			
		Handles with and without click mechanism	Application	N and C	N and C
		Perpendicular to the mounting plane	Δ_{PE}	≤ 6 mm	≤ 4 mm
		Handles with click mechanism	Application	C	C
		Parallel to the mounting plane in the click positions	Δ_{PA}	≤ 6 mm	≤ 4 mm
5.7 7.8	B.6 B.7	Torsional strength			
		Initial load = 50 N / F = 200 N / 85 mm / 30 s			
		Admissible deformation	Δ	≤ 5 mm	≤ 2 mm
5.8 7.9	B.8	Tensile strength - eccentric			
		50 mm / 30 s		600 N	1200 N
		No fracture during the hold time			
5.9 7.10	-	Corrosion resistance			
		Salt spray test (in compliance with EN 1670)		≥ Grade 2	≥ Grade 2

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5.3 Operating torques, between-clicks torques, click torques and differential values

On handles without click mechanisms (Application N), the operating torque M shall have a maximum value of 1,4 Nm in Grade 1 and 0,8 Nm in Grade 2, both before and after the durability test.

On handles with click mechanisms (Application C), the between-clicks torque M_0 shall have a maximum value of 1,4 Nm in Grade 1 and 0,8 Nm in Grade 2, both before and after the durability test.

On handles with click mechanisms (Application C), the click-out torque M_a shall have a maximum value of 6,0 Nm in Grade 1 and 4,0 Nm in Grade 2, both before and after the durability test.

On handles with click mechanisms (Application C), the differential value M_d shall have a minimum value of 0,4 Nm in Grade 1 and 0,8 Nm in Grade 2 before and after the durability test.

5.4 Durability

The following three Grades are identified extended with the distinguishing mark “90” and “180” (first box of the classification system).

Grade H1/90:	5 000 (+1 %)	Turn-Only cycles
Grade H2/90:	10 000 (+1 %)	Turn-Only cycles
Grade H3/90:	20 000 (+1 %)	Turn-Only cycles
Grade H1/180:	5 000 (+1 %)	Tilt and Turn cycles
Grade H2/180:	10 000 (+1 %)	Tilt and Turn cycles
Grade H3/180:	20 000 (+1 %)	Tilt and Turn cycles

5.5 Fixed spindle connection (after durability test)

On window handles with spindles (handle design 1 – window handle), the mounted spindle shall not loosen of its own accord after the durability test, and shall withstand an axial tractive force of 100 N.

5.6 Free play (after durability test)

On handles with and without click mechanisms (applications N and C), the play perpendicular to the mounting plane after the durability test shall not exceed 6 mm in Grade 1 and 4 mm in Grade 2.

On handles with click mechanisms (application C), the play parallel to the mounting plane in the click positions after the durability test shall not exceed 6 mm in Grade 1 and 4 mm in Grade 2.

5.7 Torsional strength

Handles with or without click mechanism (Applications N and C) shall withstand a load of 200 N, applied at a distance of 85 mm measured from the rotation point. The permanent deformation at a distance of 85 mm shall not exceed 5 mm in Grade 1 and 2 mm in Grade 2.

5.8 Tensile strength - eccentric

Handles with or without click mechanism (applications N and C) shall withstand a load of 600 N in Grade 1 and 1 200 in Grade 2 for 30 s at the contact point 50 mm outside of the spindle centre in axial direction. The handle and its fixing shall withstand the load without breakage.

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5.9 Corrosion resistance

Handles shall comply with at least Grade 2 in accordance with EN 1670 (third box in the classification system).

NOTE The corrosion resistance appraisal is restricted to essential areas. In principle these are the visible surfaces of the hardware when properly installed.

5.10 Security

5.10.1 General

Lockable window handles shall not be unscrewable in the closed status.

Table 6 contains the additional test parameters for the Security.

Table 6 — Additional test parameters Security

Clause	Figure	Requirement	Symbol	Grade 1	Grade 2	Grade 3
5.10.2 7.11	-	Durability of the locking mechanism (% number of cycles of the durability test)		25 % [a]	25 % [a]	25 % [a]
5.10.6	-	Locking variations		1, 2, 3 [b]	1, 2, 3 [b]	1, 2, 3 [b]
5.10.3 7.12	B.9	Torque resistance of the locking mechanism / Solid fixing	M_L	2 Nm	2 Nm	2 Nm
5.10.4 7.13	B.10	Twist-off resistance		35 Nm	100 Nm [c]	200 Nm [c]
5.10.5 7.13	B.11	Forcing off resistance		35 Nm	100 Nm [d]	200 Nm [d]
		Window handles with spindle				
5.10.7 7.14	B.12	Spindle tensile strength		800 N	1000 N	1500 N

[a] Durability test; quantity of test cycles in %

[b] 1 = Non-key-operated locking mechanism (for example “PTO”: push-to-open)
2 = Key-operated locking mechanism with > 30 and ≤ 99 locking variations
3 = Key-operated locking mechanism with ≥ 100 locking variations

[c] Alternatively ≥ 40 Nm with predetermined breaking point with full blocking function

[d] Alternatively ≥ 50 Nm with predetermined breaking point with full blocking function

5.10.2 Durability of the locking mechanism

The locking mechanism shall in each case fulfil 25 % of the number of cycles in the designated durability test Grade in accordance with 5.4.

— 1 250 (+1 %) cycles for a durability Grade H1 handle.

— 2 500 (+1 %) cycles for a durability Grade H2 handle.

— 5 000 (+1 %) cycles for a durability Grade H3 handle.

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In the case of handles with non-key-operated locking mechanisms that need to be operated together with the handle, the same number of cycles as stated in the durability test in accordance with 5.4 shall be fulfilled (i.e. “PTO”: push-to-open).

5.10.3 Torque resistance of the locking mechanism / Solid fixing

The closed locking mechanism shall withstand a torque of minimum 2 Nm.

Deformation of the locking cylinder as well as cylinder malfunctioning is permissible, if the handle remains locked.

5.10.4 Twist-off resistance

Handles with locking mechanism (fifth box in the classification system) shall withstand a torque in the rotation direction of:

— 35 Nm in Grade 1;

— 100 Nm in Grade 2;

— 200 Nm in Grade 3.

In the case of loads of ≥ 40 Nm in Grade 2 and ≥ 50 Nm in Grade 3, the handle’s lever may be damaged or destroyed, provided the blocking function still works after the test.

NOTE This can be a predetermined breaking point.

Grade 1 or 2 meets the requirements for burglary resistant window handles in accordance with EN 1627.

5.10.5 Forcing off resistance

Handles with locking mechanism (fifth box of classification system) shall withstand a torque perpendicular to the mounting plane of:

— 35 Nm in Grade 1;

— 100 Nm in Grade 2;

— 200 Nm in Grade 3.

In the case of loads of ≥ 40 Nm in Grade 2 and ≥ 50 Nm in Grade 3, it is permissible that the handle’s lever is damaged or destroyed, provided the blocking function still works after the test.

NOTE This can be a predetermined breaking point.

Grade 1 or 2 meets the requirements for burglary resistant window handles in accordance with EN 1627.

5.10.6 Locking variations / key related security

In the case of key related security (sixth box of the classification system) the handle shall enable:

— Grade 0: no locking mechanism;

— Grade 1: non-key operated locking mechanism (e.g. ‘PTO’: Push-to-open)

— Grade 2: key-operated locking mechanism with ≥ 30 and ≤ 99 locking variations

— Grade 3: key-operated locking mechanism with ≥ 100 locking variations

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5.10.7 Spindle tensile strength

Security handles' spindles shall withstand a tensile load of:

— 800 N in Grade 1;

— 1 000 N in Grade 2;

— 1 500 N in Grade 3.

Upon completion of the tensile test, the spindle shall not protrude more than 10 mm out of the handle.

Appropriate blocking of the spindle is permissible.

6 Test equipment and preparation of the test

The handles shall be mounted on retaining jigs and measuring equipment in accordance with the manufacturers' installation instructions.

The test room ambient temperature shall be from 15 °C to 30 °C.

7 Test procedure

7.1 General

The tests shall be carried out in accordance with the flow charts in Annex A.

Figure A.1 contains the main test parameters.

Figure A.2 contains the main and additional test parameters.

The forces and torques shall be applied with moderate velocity as can be expected in practise in a jerk- and jolt-free manner.

Window handles based on rosette assembly types with fixed spindle and removable handle shall be equipped with a representative handle from the series to be tested in accordance with Clause 5. The manufacturers' installation and maintenance instructions shall be observed.

7.2 Test specimens

Samples A1 to A3	Main test parameters
Samples A1 to A5	Main and additional test parameters
Sample B	Corrosion resistance test
Sample C	Reference sample

Sample B should only be necessary if no test report can be supplied by the manufacturer regarding the testing of the hardware component or set in accordance with EN 1670.

Sample C should be retained by the test institute for the duration of the validity of the test report. Alternatively, the test institute should substitute sample C by a comprehensive documentation (description, photos etc.) of all tested components.

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7.3 Operating torques and click torques test

7.3.1 Preparation of samples

Before determining the click torques, the new condition handles shall be rotated as follows:

— handles capable of rotating 360 °: 10-times 360 °

— handles capable of rotating 180 °: 20-times 180 °

— handles capable of rotating 90 °: 40-times 90 °

7.3.2 Test procedure

For application N-handles the operating torque and for application C-handles the click-out torque and the between-clicks torque shall be determined with torque measurement equipment in a retaining device with a rotational speed of (45^{+0}_{10})°/s. The differential value M_{d} derived from these measured values shall be calculated.

7.4 Durability test

The handles shall be operated by means of the test rig in accordance with the Tilt and Turn or Turn-Only window sashes operational cycle.

Handles capable of rotating 180 ° shall be tested in accordance with the Tilt and Turn cycle, whereas handles only capable of rotating 90 ° shall be tested in accordance with the Turn-Only cycle.

The handles shall always be tested in the same direction; commencing in the 0 ° position.

The operation of a Tilt and Turn window depicted in Figure B.2 shall be simulated during the durability test. The following operation shall be equivalent to one cycle.

— 0 ° → 90 ° → 0 ° → 90 ° → 180 ° → 90 ° → 0 °

The operation of a Turn-Only window depicted in Figure B.3 shall be simulated during the durability test. The following operation shall be equivalent to one cycle.

— 0 ° → 90 ° → 0 °

The test-rig shall be operated with a constant rotational speed of (250 ± 10) Tilt and Turn cycles/h and (550 ± 20) Turn-Only cycles/h, whereby a turn-resistance of (3 + 0,5) Nm created via a braking device shall be overcome. A rest time of approximately 3 s shall be adhered to after every complete cycle.

One shall not rotate beyond the design-related turn-stops.

The turn resistance shall be checked after carrying out 5 000 cycles and re-adjusted if necessary.

7.5 Operating torques and click torques repeat test

After the durability test and a rest time of 24 h, the handles shall be turned 360 ° three times manually. Subsequently the operating torque for application N handles and for the click-out torque for application C handles and the between-clicks torque shall be determined with torque measurement equipment in a retaining device with a rotational speed of (45^{+0}_{-10}) °/s. The differential value M_{d} derived from these measured values shall be calculated. The values shall be in accordance with the foreseen Grades as in Table 5.

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7.6 Test of fixed spindle connection

The handle shall be mounted in a test-rig (retaining device) and the handle's spindle shall be preferentially loaded with a tractive force of 100 N on a tensile testing machine.

Refer to Figure B.4.

The requirements shall be met in accordance with the foreseen Grades as in Table 5.

7.7 Free play test

7.7.1 General

In order to determine the spindle's free play, the handles shall be mounted on a retaining device with non-blocked spindle or connector.

7.7.2 Free play – Perpendicular to the mounting plane

After the durability test, a testing force of 7,5 N shall be applied perpendicular to the mounting plane to the handles for application N and C at a distance of 100 mm from the spindle centre.

The free play shall be measured at a distance of 100 mm from the spindle centre.

Refer to Figure B.5.

7.7.3 Free play – Parallel to the mounting plane

A testing force of 7,5 N shall be applied parallel to the mounting plane to the handles for application C at a distance of 100 mm from the spindle centre.

The free play shall be measured at a distance of 100 mm from the spindle centre.

Refer to Figure B.5.

The requirements shall be met in accordance with the foreseen Grades as in Table 5.

7.8 Torsional strength test

The handle with blocked spindle or connector shall be fixed with the accompanying screws in the retaining device. By means of the tensile testing machine and a round Ø 20 mm, an initial load of 50 N shall be exerted at a distance of 85 mm; followed by a 200 N load at a hold time of (30 + 1) s. After the load release to the initial load, the permanent deformation shall be determined.

The spindle blocking shall be carried out at a distance of 20 mm, measured from the rosette base, with an 8 mm thick and rigid counter bearing.

Refer to Figure B.6.

The connector shall be blocked preventing any free play or movements.

Refer to Figure B.7.

The requirements shall be met in accordance with the foreseen Grades as in Table 5.

7.9 Tensile strength test - eccentric

The handle with supported spindle or connector, shall be fixed in the retaining device with the accompanying screws. A tensile load of 1 200 N with a hold time of (30 + 1) s shall be applied in a tensile testing machine at a distance of 50 mm away from the spindle centre.

The spindle supporting shall be carried out at a distance of 20 mm, measured from the rosette base, with an 8 mm thick counter bearing.

Refer to Figure B.8.

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The connector shall be blocked preventing any free play ore movements.

The requirements shall be met in accordance with the foreseen Grades as in Table 5.

7.10 Corrosion resistance test

If no test report in accordance with EN 1670 can be supplied by the manufacturer, a test is necessary.

Use sample B. All corrosion tests shall be carried out on original new samples in accordance with 5.9.

The requirements shall be met in accordance with the foreseen Grades by the manufacturer. Minimum requirements are stated in Table 5.

7.11 Locking mechanism durability test

The locking mechanism testing shall be carried out on a test-rig with the quantity of locking and unlocking operations as defined in paragraph 5.10.1 with a maximum Force of 1,5 Nm.

On handles with locking mechanism, the key shall be removed from the locking mechanism and then re-inserted each time.

NOTE In the case of handles with non-key-operated locking mechanisms and the 'push to open' operating mode, the locking mechanism's durability test can be carried out in conjunction with the durability test in accordance with 5.4.

After this durability test the locking mechanism shall function as intended.

7.12 Torque resistance of the locking mechanism / Solid fixing test

The closed handle shall be fixed to an apparatus with the accompanying screws. A torque of 2 Nm shall be applied with a lock-channel adapted tool and torque measurement equipment.

Refer to Figure B.9.

The requirements shall be met in accordance with the foreseen Grades as in Table 6.

7.13 Test - Resistance against twisting-off and forcing-off

The closed handle with supported spindle shall be fixed to a test-rig with the accompanying screws. The predefined torques in 5.10.4 and 5.10.5 shall be applied by means of an adapter and torque wrench in the following order on the same window handle:

1) Twisting-off

Refer to Figure B.10.

If sample A.5 breaks during this test due to the use of the alternative of a predetermined breaking point, another new sample A.5 shall be used for the test in accordance with 2.).

2) Forcing off

Refer to Figure B.11.

The spindle supporting shall be carried out with an 8 mm thick, turnable counter bearing.

The adapter shall be fixed to the handle's lever in such a manner that the torque is applied axial to the spindle when twisting-off, vertical to the spindle when forcing off and parallel to the mounting plane.

The requirements shall be met in accordance with the foreseen Grades as in Table 6.

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7.14 Spindle tensile strength test

The predefined force in 5.10.7 shall be applied to the spindle on the handle mounted in the test apparatus in the tensile testing machine, whereby the spindle is pulled through a clamping device.

Refer to Figure B.12.

The requirements shall be met in accordance with the foreseen Grades as in Table 6.

8 Marking

The product and/or its literature, packaging etc., shall be marked with the following:

a) manufacturer's name or trademark, or other means of positive identification;

b) number of this document;

c) the classification in accordance with Clause 4;

d) year and calendar-week of production;

The information for d) may be in a coded form.

The marking shall be quoted using one or more of the following methods:

— hardware manufacturer's technical documentation (catalogue);

— accompanying documents;

— on the product label or packaging;

by marking the product itself.

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Annex A
(normative)

Test Flow Charts

Figure A.1 — Tests of handles without security (Main test parameters)

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Figure A.2 — Tests of handles with security (Main and additional test parameters)

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Annex B
(informative)

Figures

Dimensions in millimetres

Figure B.1 — Handle length

Figure B.2 — Tilt&Turn window operational cycle

Figure B.3 — Turn-Only window operational cycle

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Figure B.4 — Fixed spindle connection

Figure B.5 — Free play

Figure B.6 — Torsion / Window handle

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Figure B.7 — Torsion / Geared-handle

Figure B.8 — Tensile strength, eccentric

Figure B.9 — Locking mechanism torque

Figure B.10 — Resistance against twisting-off

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Figure B.11 — Resistance against forcing-off

Figure B.12 — Spindle tensile strength

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Bibliography

[1] EN 1627, *Pedestrian doorsets, windows, curtain walling, grilles and shutters — Burglar resistance — Requirements and classification*

[2] EN 13126-8, *Building hardware — Hardware for windows and doors height windows – Part 8: Requirements and test methods for Tilt and Turn, Tilt-First and Turn-Only hardware*

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