BS EN 13126-3:2011

BSI Standards Publication

Building hardware — Hardware for windows and door-height windows — Requirements and test methods

Part 3: Handles, primarily for Tilt&Turn, Tilt-First and Turn-Only hardware

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National foreword

This British Standard is the UK implementation of EN 13126-3:2011. It supersedes DD CEN/TS 13126-3:2004 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/538/4, Building hardware.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Quincaillerie pour le bâtiment - Ferrures de fenêtres et portes-fenêtres - Exigences et méthodes d'essai - 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

This European Standard was approved by CEN on 15 October 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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Contents

Foreword

This document (EN 13126-3:2011) has been prepared by Technical Committee CEN/TC "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of an identical text or by endorsement, at the latest by May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.

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 supersedes CEN/TS 13126-3:2004.

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

This European Standard is one of a series of European Standards for building hardware products. It is divided into several parts incorporating all types of hardware for windows and door height windows.

The performance tests incorporated in this standard 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.

With the conversion of the CEN/TS into EN the classification, requirements and the test procedure have been revised completely.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

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

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

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

This European Standard is not applicable to the following hardware:

a) operation devices and door handles for door latches and door locks (refer to EN 1906);

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

c) electromechanical hardware.

2 Normative references

The following referenced documents are indispensable for the application 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*

EN 13126-1, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 1: Requirements common to all types of hardware*

EN 13126-8, *Building hardware — Requirements and test methods for windows and doors height windows — Part 8: Tilt&Turn, Tilt-First and Turn-Only hardware*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13126-1 and EN 13126-8 and the following apply.

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

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

3.5
non-key-operated locking mechanism
assembly of components that facilitate the handle's locked position

EXAMPLE Some examples of non-key-operated locking mechanisms are push-to-open, button and thumb turn.

3.6
locking mechanism
key-operated assembly of locking elements to achieve the handle's locked/opened status

EXAMPLE An example of a locking mechanism is a locking cylinder.

3.7
operating torque
M
required torque to rotate a handle without click mechanism

3.8
click-out torque
M_a
required torque to rotate a handle out of a click position

3.9
between-clicks torque
M_0
required torque to rotate a handle between the click positions

3.10
differential value
M_d
difference between the minimum "click-out torque" and the maximum "between-clicks torque"

$M_d = M_{a\ min} - M_{0\ max}$

3.11
rosette <for windows>
screw-fixed base body located on the window profile that serves as a rotatable window handle mounting

3.12
spindle
connecting element to transfer the torque from the window handle to the rotatable part of the window espagnolette

NOTE Square spindles are very common, but other shaped spindles are also permissible.

3.13
connector / fork
connecting element to transfer the torque from the geared handle to the slideable part of the window espagnolette

NOTE Otherwise known as engaging piece, tongue or slider.

4 Classification

4.1 General

The classification for handles, primarily for Tilt&Turn, Tilt-First and Turn-Only hardware shall be in accordance with the requirements of EN 13126-1.

4.2 Category of use (first digit)

The handle shall be graded 1 or 2 in accordance with Table 3

4.3 Durability (second digit)

Grades shall be in accordance with EN 13126-1 and shall receive an extension for the designated operational cycle. “90” for the Turn-Only cycle and “180” for the Tilt&Turn cycle in accordance with the following requirements:

— Grade 3/90 10.000 Turn-Only cycles

— Grade 4/90 15.000 Turn-Only cycles

— Grade 5/90 25.000 Turn-Only cycles

— Grade 3/180 10.000 Tilt&Turn cycles

— Grade 4/180 15.000 Tilt&Turn cycles

— Grade 5/180 25.000 Tilt&Turn cycles

4.4 Mass (third digit)

No requirement

4.5 Fire resistance (fourth digit)

Grades shall be in accordance with EN 13126-1.

4.6 Safety in use (fifth digit)

Grades shall be in accordance with EN 13126-1.

4.7 Corrosion resistance (sixth digit)

Grades shall be in accordance with EN 13126-1.

4.8 Security (seventh digit)

The grade and extension shall be attributed in accordance with the following requirements.

— Grade 0: Without security

— 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

— Extension 0: No locking mechanism

— Extension 1: Non-key-operated-locking mechanism ("PTO": push-to-open)

— Extension 2: Key-operated locking mechanism with ≤ 99 locking variations

— Extension 3: Key-operated locking mechanism with ≥ 100 locking variations

NOTE Table 1 shows all the permutations of the three elements of the seventh digit.

Table 1 – Security

Grade	Description
0/0	Without security / without locking mechanism
1/1	35 Nm resistance against twisting-off and forcing-off / Non-key-operated locking mechanism ("PTO": push-to-open)
1/2	35 Nm resistance against twisting-off and forcing-off / Key-operated locking mechanism with ≤ 99 locking variations
1/3	35 Nm resistance against twisting-off and forcing-off / Key-operated locking mechanism with minimum 100 locking variations
2/1	100 Nm resistance against twisting-off and forcing-off / Non-key-operated locking mechanism ("PTO": push-to-open)
2/2	100 Nm resistance against twisting-off and forcing-off / Key-operated locking mechanism with ≤ 99 locking variations
2/3	100 Nm resistance against twisting-off and forcing-off / Key-operated locking mechanism with minimum 100 locking variations
3/1	200 Nm resistance against twisting-off and forcing-off / Non-key-operated locking mechanism ("PTO": push-to-open)
3/2	200 Nm resistance against twisting-off and forcing-off / Key-operated locking mechanism with ≤ 99 locking variations
3/3	200 Nm resistance against twisting-off and forcing-off / Key-operated locking mechanism with minimum 100 locking variations

4.9 Application (eighth digit)

The following grades / applications / types are identified and the hardware shall be attributed one of each.

— Applicable part of this European standard: Grade 3

— Application N: Non clickable

— Application C: Clickable

— Type 1: Window handle

— Type 2: Geared-handle

NOTE Table 2 shows all the permutations of the three elements of the eighth digit.

Table 2 – Application

Grade	Description
3/N1	Part 3 / Non clickable / Window handle
3/N2	Part 3 / Non clickable / Geared-handle
3/C1	Part 3 / Clickable / Window handle
3/C2	Part 3 / Clickable / Geared-handle

4.10 Test Sizes – Size limitations (ninth digit)

No requirement

4.11 Example of classification in accordance with 4.1 to 4.10 (informative)

1	2	3	4	5	6	7	8	9
2	4/180	-	0	1	2	2/2	3/C1	-

This denotes handles that have the following criteria:

Digit 1	Category of use	Grade 2
Digit 2	Durability	Grade 4/180 (15 000 Tilt&Turn cycles)
Digit 3	Mass	– No requirement
Digit 4	Fire resistance	Grade 0 (no requirement)
Digit 5	Safety in use	Grade 1
Digit 6	Corrosion resistance	Grade 2
Digit 7	Security	Grade 2/2
		(100 Nm resistance against twisting-off and forcing off / Key-operated locking mechanism with ≤ 99 locking variations)
Digit 8	Applicable part	Grade 3/C1 (clickable window handle)
Digit 9	Test size	– No requirement

5 Requirements

5.1 General

The requirements on handles for Tilt&Turn, Tilt-First and Turn-Only hardware shall be in accordance with EN 13126-1.

5.2 Category of use requirements

5.2.1 General

Table 3 contains the main test parameters for the category of use.

Table 3 – Main test parameters

Clause	Figure	**Requirement**	Symbol	**Grade 1**	**Grade 2**
5.2.2 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
5.2.2 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
5.3 7.4	B.2 + B.3	Durability test			
		Grade 3: 10.000 cycles (in compliance with EN13126-1)			
		Grade 4: 15.000 cycles (in compliance with EN13126-1)			
		Grade 5: 25.000 cycles (in compliance with EN13126-1)			
5.4 7.6	B.4	Fixed spindle connection			
		Window handles with spindle (after durability test)	F	≥ 100 N	≥ 100 N
5.5 7.7.1 7.7.2	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
5.6 7.8	B.6 + B.7	Torsional strength			
		Initial load = 50N / F = 200 N / 85 mm / 30 s			
		Admissible deformation	Δ	≤ 5 mm	≤ 2 mm
5.7 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 EN1670)		≥ Grade 2	≥ Grade 2

5.2.2 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.

5.3 Durability

The following three grades are identified in accordance with 5.3 of this European standard and EN 13126-1, extended with the distinguishing mark “90” and “180”

— Grade 3/90: $10.000\ ^{+100}_{0}$ Turn-Only cycles

— Grade 4/90: $15.000\ ^{+150}_{0}$ Turn-Only cycles

— Grade 5/90: $25.000\ ^{+250}_{0}$ Turn-Only cycles

— Grade 3/180: $10.000\ ^{+100}_{0}$ Tilt&Turn cycles

— Grade 4/180: $15.000\ ^{+150}_{0}$ Tilt&Turn cycles

— Grade 5/180: $25.000\ ^{+250}_{0}$ Tilt&Turn cycles

5.4 Fixed spindle connection (after durability test)

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

5.5 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 (applications N and 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.

5.6 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.

5.7 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 N 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.

5.8 Safety in use

No requirements

5.9 Corrosion resistance

Handles shall comply with at least Grade 2 in accordance with EN 1670.

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 4 contains the additional test parameters for the Security.

Table 4 – 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 % *	25 % *	25 % *
5.10.3	-	Locking variations		1, 2, 3 **	1, 2, 3 **	1, 2, 3 **
5.10.4 7.12	B.9	Torque resistance of the locking mechanism / Solid fixing	M_L	2 Nm	2 Nm	2 Nm
5.10.5 7.13	B:10	Twist-off resistance		35 Nm	100 Nm ***	200 Nm ****
5.10.6 7.13	B.11	Forcing off resistance		35 Nm	100 Nm ***	200 Nm ****
		Window handles with spindle				
5.10.7 7.14	B.12	Spindle tensile strength		800 N	1000 N	1500 N

* Durability test; quantity of test cycles in %

** 1 = Non-key-operated locking mechanism (for example "PTO": push-to-open)
2 = Key-operated locking mechanism with ≤ 99 locking variations
3 = Key-operated locking mechanism with minimum 100 locking variations

*** = Alternatively ≥ 40 Nm with predetermined breaking point with full blocking function

**** = 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 5.3.

— 2500 $^{+100}_{0}$ for a durability grade 3 handle

— 3750 $^{+150}_{0}$ for a durability grade 4 handle

— 6250 $^{+250}_{0}$ for a durability grade 5 handle

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 5.3 shall be fulfilled. (i.e. “PTO”: push-to-open)

5.10.3 Locking variations

Handles locking mechanisms with the extension 2 in accordance with 4.8 shall enable up to 99 locking variations.

Handles locking mechanisms with the extension 3 in accordance with 4.8 shall enable at least 100 locking variations.

5.10.4 Torque resistance of the locking mechanism / Solid fixing

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

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

5.10.5 Twist-off resistance

Handles with locking mechanism shall withstand a torque of 35 Nm in Grade 1, 100 Nm in Grade 2 and 200 Nm in Grade 3 in the rotation direction.

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 1 This can be a predetermined breaking point.

NOTE 2 Grade 2 meets the requirements for burglary resistant window handles in accordance with ENV 1627.

5.10.6 Forcing off resistance

Handles with locking mechanism shall withstand a torque of 35 Nm in Grade 1, 100 Nm in Grade 2 and 200 Nm in Grade 3 perpendicular to the mounting plane.

NOTE 1 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 2 This can be a predetermined breaking point.

NOTE 3 Grade 2 meets the requirements for burglary resistant window handles in accordance with ENV 1627.

5.10.7 Spindle tensile strength

Security handles' spindles shall withstand a tensile load of 800 N in Grade 1, 1000 N in Grade 2 and 1500 N in Grade 3.

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

NOTE Appropriate blocking of the spindle is permissible.

6 Test equipment

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

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

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 $(45_{-10})°/s$. 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 an apparatus in accordance with the Tilt&Turn or Turn-Only window sashes operational cycle.

Handles capable of rotating 180° shall be tested in accordance with the Tilt&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&Turn window depicted in Figure B.2 shall be simulated during the durability test. The following operation shall be equivalent to one cycle.

— $0° \rightarrow 90° \rightarrow 0° \rightarrow 90° \rightarrow 180° \rightarrow 90° \rightarrow 0°$

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.

— $0° \rightarrow 90° \rightarrow 0°$

The test apparatus shall be operated with a constant rotational speed of 250 ± 10 Tilt&Turn cycles/h and 550 ± 20 Turn-Only cycles/h, whereby a turn-resistance of 3 Nm +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 $(45_{-10})°/s$. The differential value M_d derived from these measured values shall be calculated.

7.6 Test of fixed spindle connection

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

NOTE Refer to Figure B.4.

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.

NOTE 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.

NOTE Refer to Figure B.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 s + 1 s. After the initial load release, 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.

NOTE 1 Refer to Figure B.6.

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

NOTE 2 Refer to Figure B.7.

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 s + 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.

NOTE Refer to Figure B.8.

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

7.10 Corrosion resistance test

Unless a test report has already been submitted by the manufacturer, the corrosion test shall be carried out in accordance with EN 1670 (with neutral salt spray).

7.11 Locking mechanism durability test

The locking mechanism testing shall be carried out on a test apparatus 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 5.3.

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.

NOTE Refer to Figure B.9.

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

The closed handle with supported spindle shall be fixed to an apparatus 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

NOTE 1 Refer to Figure B.10.

2.) Forcing off

NOTE 2 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.

7.14 Spindle tensile strength test

The predefined force in 5.10.6 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.

NOTE Refer to Figure B.12.

8 Test report

A test report in accordance with EN ISO/IEC 17025:2000, 5.10 shall be compiled by the test laboratory.

The test report is only intended for the applicant and shall not be published.

Annex A
(normative)

Test flow charts

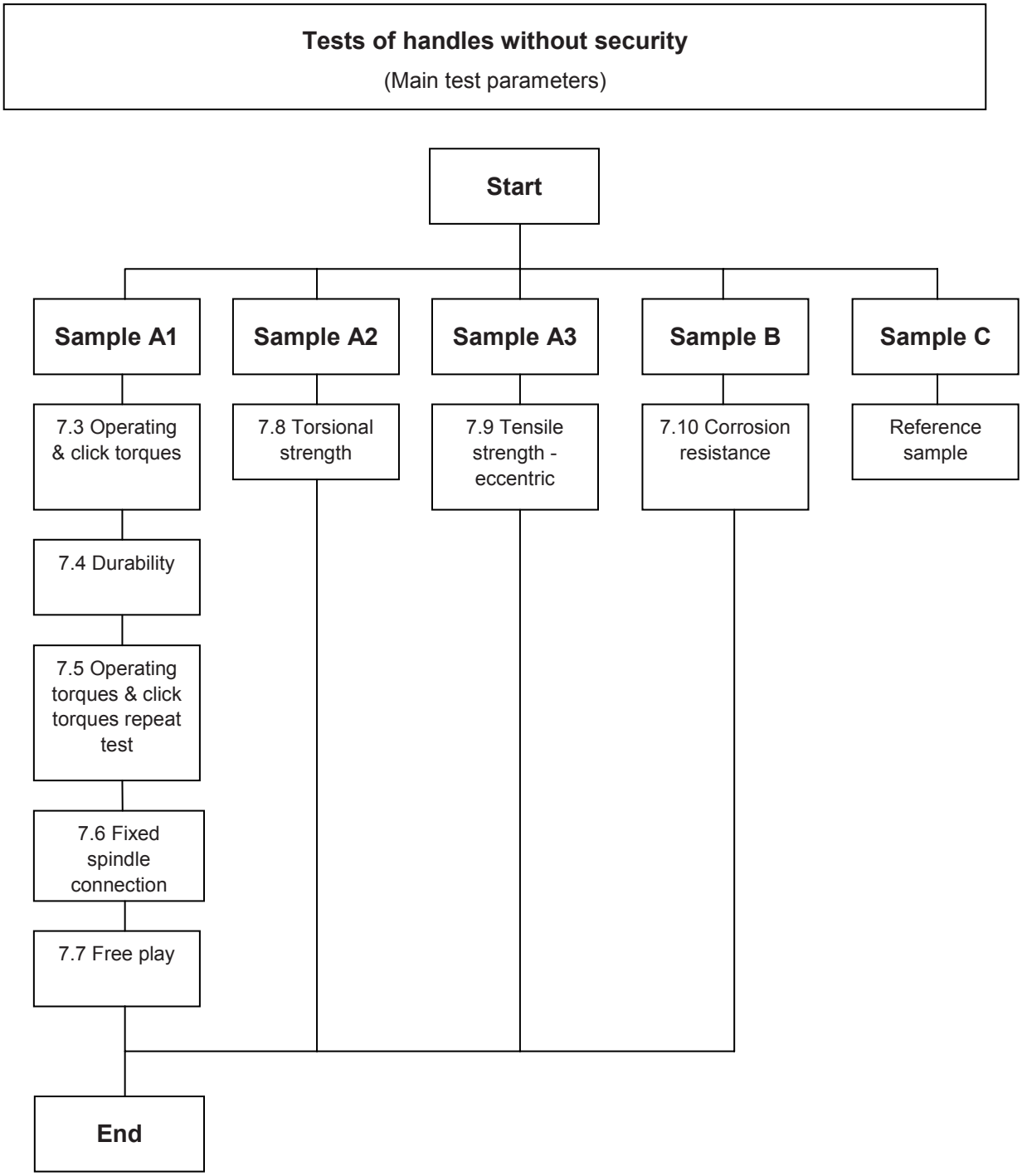

Figure A.1

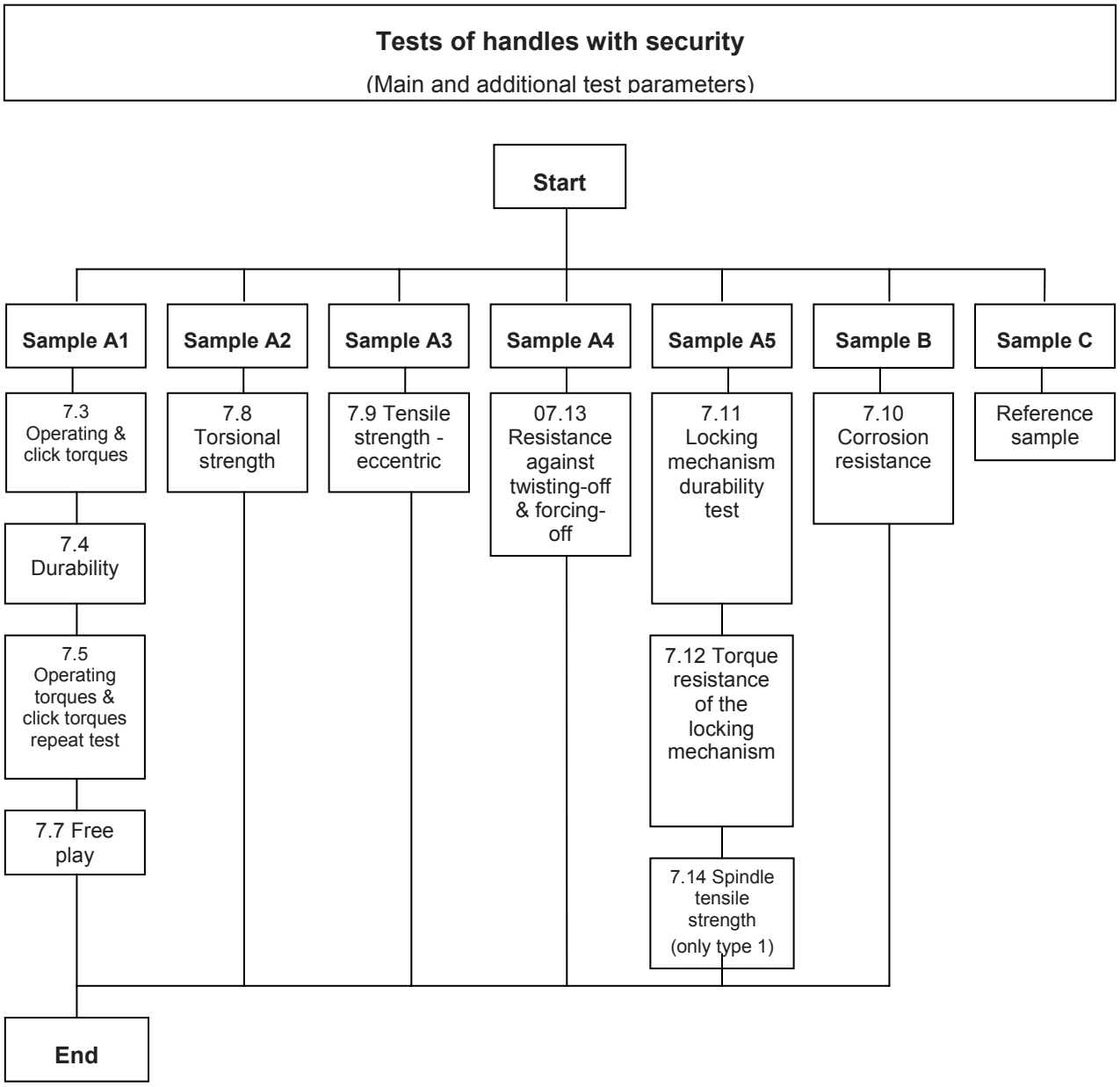
Tests of handles with security
(Main and additional test parameters)
Start
Sample A1
Sample A2
Sample A3
Sample A4
Sample A5
Sample B
Sample C
7.3 Operating & click torques
7.8 Torsional strength
7.9 Tensile strength - eccentric
07.13 Resistance against twisting-off & forcing-off
7.11 Locking mechanism durability test
7.10 Corrosion resistance
Reference sample
7.4 Durability
7.5 Operating torques & click torques repeat test
7.12 Torque resistance of the locking mechanism
7.7 Free play
7.14 Spindle tensile strength (only type 1)
End

Figure A.2

Annex B
(informative)

Figures

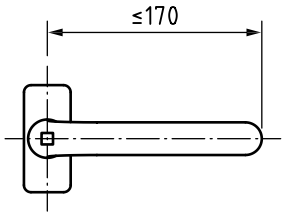

Figure B.1 – Handle length

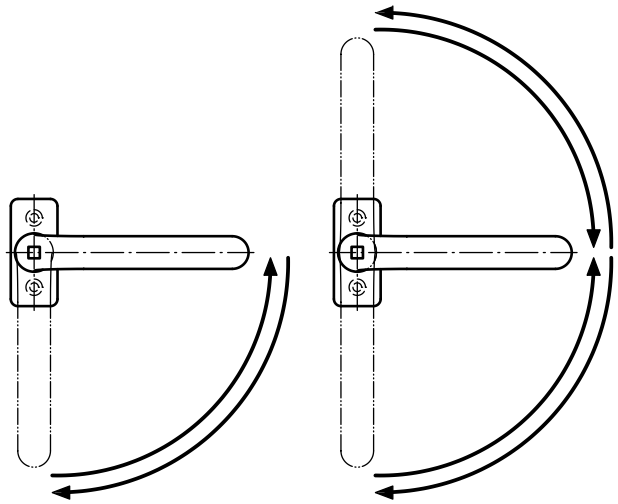

Figure B.2 – Tilt&Turn window operational cycle

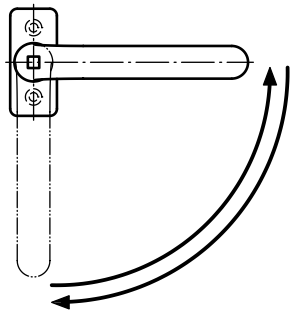

Figure B.3 – Turn-Only window operational cycle

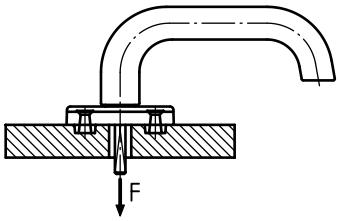

Figure B.4 – Fixed spindle connection

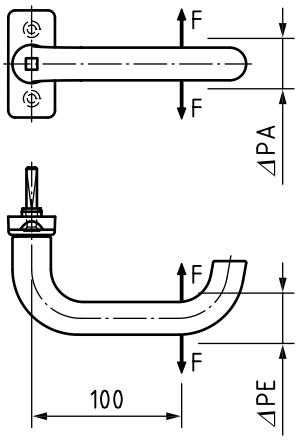

Figure B.5 – Free play

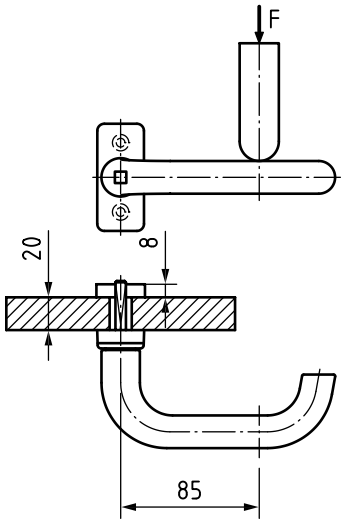

Figure B.6 – Torsion / Window handle

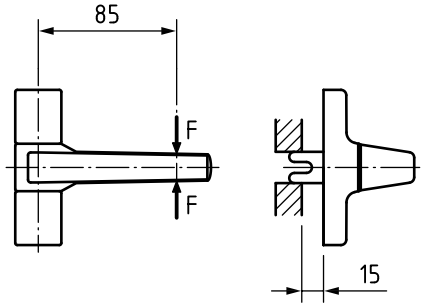

Figure B.7 – Torsion / Geared-handle

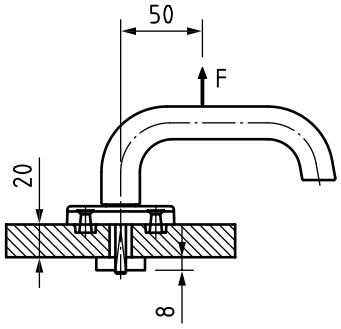

Figure B.8 – Tensile strength, eccentric

Figure B.9 – Locking mechanism torque

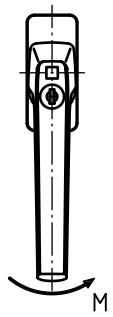

Figure B.10 – Resistance against twisting-off

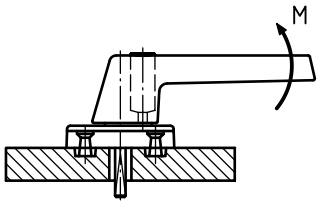

Figure B.11 – Resistance against forcing-off

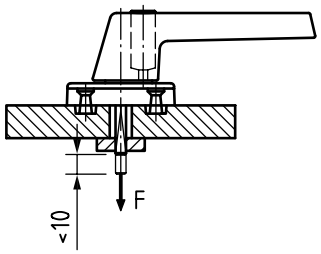

Figure B.12 – Spindle tensile strength

Bibliography

[1] ENV 1627, *Windows, doors, shutters — Burglar resistance — Requirements and classification*

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