



CEN/TC 33 Secretariat

**"Doors, windows, shutters, building hardware and curtain walling"**

**CEN/TC 33 N 3949**

"Portes, fenêtres, fermetures, quincaillerie de bâtiment et façades rideaux"

"Türen, Tore, Fenster, Abschlüsse, Baubeschläge und Vorhangfassaden"

**2020-07-09**

**prEN 13126-13, Building hardware – Hardware for windows and door height windows – Requirements and test methods – Part 13: Sash balances  
WI 00033557**

**Action:** For information

**Source:** CEN/TC 33/WG 4

**Comments:** Draft sent to CCMC on 2020-07-03 for the CEN Enquiry.



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## **Building hardware — Hardware for windows and door height windows - Requirements and test methods — Part 13: Sash balances**

*Baubeschläge — Beschläge für Fenster und Fenstertüren - Anforderungen und Prüfverfahren — Teil 13: Ausgleichgewichte für Vertikal-Schiebefenster*

*Quincaillerie pour le bâtiment — Ferrures de fenêtres et portes-fenêtres - Exigences et méthodes d'essai — Partie 13 : Contrepoids pour mécanismes à guillotine*

ICS: 91.190

Descriptors:

Document type: European Standard

Document subtype:

Document stage: CEN Enquiry

Document language: E

STD Version 2.9p

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## European foreword

This document (prEN 13126-13:2020) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 13126-13:2012.

With regard to EN 13126-13:2012, the following significant changes were made:

- EN 13126-13 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 changes in the wording for a better understanding;
- new terms and definitions added under 3.3 (sash width) and 3.4 (sash height);
- under 4.1 classification system changed completely;
  - former digit 1 (Category of use) changed into box 1 (Durability)
  - former digit 2 (Durability) changed into box 2 (Mass)
  - former digits 3, 4 and 5 deleted
  - former digit 6 (Corrosion resistance) changed into box 3 (Corrosion resistance)
  - former digits 7 deleted
  - former digit 8 (Application) changed into box 4 (Test sizes)
  - former digit 9 (Test sizes) changed into box 5 (Rating)
- under 4.2 new grades for the number of cycles defined; H1 (5 000), H2 (10 000) and H3 (20 000);
- under 4.7 new example of classification added in accordance with the new classification system; 2 alternative ways (table or alphanumerical) to show the classification defined;
- under 5.4 information regarding new grades for durability added;
- under 5.5 headline an grades in Table 3 modified;
- under 5.6 the wording changed and information regarding corrosion resistance added;
- under Clause 6 headline modified”;
- under 6.2 wording modified; new sentence added at the beginning;
- under 7.1 wording modified;

- under 7.3 several changes in the structure and the wording;
- under 7.3.1 headline modified;
- under 7.3.2 new headline added for a new subclause with the acceptance criteria;
- under 7.5 new subclause added with information regarding corrosion resistance;
- under clause 8 new clause added regarding marking with information from the current version of EN 13126-1.

This European Standard is one of a series of European Standards for building hardware products for windows and door height windows. This European Standard is independent of EN 13126-1.

EN 13126 consists of the following parts:

- 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 13126-2, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 2: Window fastener handles*;
- EN 13126-3, *Building hardware — Hardware for windows and door-height windows — Requirements and test methods — Part 3: Handles, primarily for Tilt and Turn, Tilt-First and Turn-Only hardware*;
- EN 13126-4, *Building hardware — Requirements and test methods for windows and door height windows — Part 4: Espagnolettes*;
- EN 13126-5, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 5: Devices that restrict the opening of windows and door height windows*;
- EN 13126-6, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 6: Variable geometry stay hinges (with or without a friction stay)*;
- EN 13126-7, *Building hardware — Requirements and test methods for windows and door height windows — Part 7: Finger catches*;
- EN 13126-8, *Building hardware — Hardware for windows and door height windows — Part 8: Requirements and test methods for tilt and turn, Tilt-First and Turn-Only hardware*;
- EN 13126-9, *Building hardware — Requirements and test methods for windows and door height windows — Part 9: Hardware for horizontal and vertical pivot windows*;
- EN 13126-10, *Building hardware — Requirements and test methods for windows and door height windows — Part 10: Arm-balancing systems*;
- EN 13126-11, *Building hardware — Requirements and test methods for windows and door height windows — Part 11: Top hung projecting reversible hardware*;
- EN 13126-12, *Building hardware — Requirements and test methods for windows and door height windows — Part 12: Side hung projecting reversible hardware*;
- EN 13126-13, *Building hardware — Hardware for windows and balcony door — Requirements and test methods — Part 13: Sash balances*;

- EN 13126-14, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 14: Sash fasteners*;
- EN 13126-15, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 15: Rollers for sliding and hardware for sliding folding windows*;
- EN 13126-16, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 16: Hardware for Lift and Slide windows*;
- EN 13126-17, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 17: Hardware for Tilt and Slide windows*;
- EN 13126-19, *Building hardware — Requirements and test methods for windows and door height windows — Part 19: Sliding Closing Devices*

## 1 Scope

This European Standard specifies requirements and test methods for durability, strength, security and function of sash balances.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 13126-5, *Building hardware — Hardware for windows and door height windows — Requirements and test methods — Part 5: Devices that restrict the opening of windows and door height windows*

## 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 <http://www.iso.org/obp>

### 3.1

#### **sash balance**

device, generally fitted in a pair and used to counter-balance the mass of a vertically moving sash throughout its full travel

### 3.2

#### **manually applied force**

externally applied vertical force required to cause movement of the sliding sash when the sash balances are mounted in the test specimen

### 3.3

#### **sash width**

the total horizontal outer dimension of the sash

### 3.4

#### **sash height**

the total vertical outer dimension of the sash

## **4 Classification**

### **4.1 General**

Sash balances shall be classified in accordance with the five box classification system (see Table 1).

**Table 1 — Classification system of hardware**

| <b>box</b>            | <b>1</b>   | <b>2</b> | <b>3</b>             | <b>4</b>   | <b>5</b> |
|-----------------------|------------|----------|----------------------|------------|----------|
| <b>characteristic</b> | Durability | Mass     | Corrosion resistance | Test sizes | Rating   |

### **4.2 Durability (1 – first box)**

The first box shall display the grade applied to the durability test in accordance with 5.4:

- grade H1: 5 000
- grade H2: 10 000
- grade H3: 20 000

### **4.3 Mass (2 – second box)**

The second box shall display the maximum tested sash-mass (weight) in accordance with Table 2.

The mass of the test sash shall be determined in accordance with the claims made by the hardware manufacturer.

### **4.4 Corrosion resistance (3 – third box)**

The third box shall display the grade regarding corrosion resistance in accordance with 5.6.

### **4.5 Test Sizes (4 – fourth box)**

The fourth box shall display the test sizes which were used for testing the sash balances in accordance with Table 2:

SW = Sash Width in mm / SH = Sash height in mm

EXAMPLE 1 100 SW x 1 200 SH

**Table 2 — Test sash size and mass**

| Test size A | Test size B   | Test size C   |
|-------------|---------------|---------------|
| 800 x 1 100 | 1 100 x 1 200 | 1 500 x 1 000 |
| 20 kg       | 30 kg         | 35 kg         |

#### 4.6 Rating (5 – fifth box)

The fifth box shall display the grade representing the rating in accordance with Table 3 under 5.5.

#### 4.7 Example of classification for sash balances

a) Alternative 1: Table with boxes:

| Standard         | Box |     |   |             |   |
|------------------|-----|-----|---|-------------|---|
|                  | 1   | 2   | 3 | 4           | 5 |
| EN 13126-13:YYYY | H3  | 030 | 3 | 1 100/1 200 | 5 |

In accordance with Clause 8 the information regarding the classification by using a table with boxes shall always be shown together with the number of this standard, EN 13126-13.

b) Alternative 2: Alphanumeric:

**EN 13126-13:YYYY H3-030-3-1 100/ 200**

This denotes sash balances, which have:

- box 1    durability                      grade H3 (20 000 cycles)
- box 2    mass                              30 kg
- box3    corrosion resistance              grade 3
- box 4    test sizes                              SW = 1 100 mm, SH = 1 200 mm
- box 5    rating                                      grade 5 (> 30 %) in accordance with Table 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 Integrated maximum opening stop

Where sash balances are fitted with an integrated maximum opening stop, the opening stop shall also be tested in accordance with EN 13126-5.

## 5.3 Free movement test

The test specified in 7.2 shall be used to ensure the sash balances may support the mass of the sash.

Upon completion of the free movement test in accordance with 7.2, the maximum travel distance shall not exceed 25 mm.

## 5.4 Durability

The test specified in 7.3 shall be used to ensure the sash balances are capable of continued operation after cycling in accordance with one of the 3 grades specified following, and with regard given to normal maintenance.

The manufacturer specifies one of the following 3 grades for the number of cycles, with which the durability test shall be carried out:

- grade H1: 5 000 (+1 %) cycles
- grade H2: 10 000 (+1 %) cycles
- grade H3: 20 000 (+1 %) cycles

Upon completion of the durability test in accordance with 7.3, the sash balances shall continue to function normally.

## 5.5 Rating – Resistance to manually applied load test

The test specified in 7.4 shall be used to ensure the sash balances are graded in relation to the ease of sash movement.

Upon completion of the manually applied load test in accordance with 7.4, the manually applied force shall not exceed the value given in Table 3.

**Table 3 — Manually Applied Forces**

| <b>Grade</b> | <b>Manually Applied Force<br/>(% maximum test mass)</b> |
|--------------|---|
| 1            | > 70  |
| 2            | > 60  |
| 3            | > 50  |
| 4            | > 40  |
| 5            | > 30  |
| 6            | > 20  |
| 7            | > 10  |
| 8            | > 0   |

## 5.6 Corrosion resistance test

Unless already stated with a test report by the manufacturer, the sash fastener shall be tested in accordance with EN 1670.

NOTE The evaluation of the corrosion resistance is limited to the essential areas (as a rule, the visible surfaces of the installed hardware).

## 6 Test equipment and preparation for the test

### 6.1 Sash balances installed in the test specimen

The sash balances shall be installed in the test specimen for testing in accordance with the manufacturer's fixing instructions.

NOTE Please note the manufacturer's fixing instructions.

### 6.2 Test specimens from the sash balance manufacturer

The hardware manufacturer shall provide complete test specimens for the testing institute as far as possible. The tolerance for the specimen (test sizes) is  $\pm 10$  mm.

The test specimens shall be accompanied by a drawing of the profile cross-section. All relevant maintenance and operation information shall be enclosed with the test specimen; it shall also contain the necessary test specimen installation information for the windows.

### 6.3 Test rig

The test shall be conducted on a test rig which corresponds in function and shape to the window for which the sash balances is intended.

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

Test room ambient temperature from 15°C to 30°C.

### 6.4 Hardware

The tested sash balance shall conform to the manufacturer's recommendation for size and mass of the test specimen.

## 7 Test methods

### 7.1 Samples

Three samples shall be used for testing in accordance with this European Standard.

- Sample A - performance tests
- Sample B - corrosion test
- Sample C - retained for reference control

NOTE 1 Sample B should only be required if no test report can be supplied by the manufacturer regarding the testing of the hardware components in accordance with EN 1670.

NOTE 2 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.

See flowchart of test procedures in accordance with Figure B.1 in informative Annex B.

## **7.2 Free movement test procedure**

Use sample A for this test.

Position the sliding sash with the sash ( $50 \pm 1$ ) mm from the fully closed position (see Figure A.1 for top sliding sash; see Figure A.3 for bottom sliding sash).

Remove all external forces and record any movement of the sliding sash over a period of 60 s.

Position the sliding sash with the sash ( $50 \pm 1$ ) mm from the fully open position (see Figure A.2 for top sliding sash; see Figure A.4 for bottom sliding sash).

Remove all external forces and record any movement of the sliding sash over a period of 60 s.

NOTE The fully open position may be determined by maximum opening stops.

Acceptance criteria are in accordance with 5.3 of this standard; the maximum travel distance shall not exceed 25 mm.

## **7.3 Durability**

### **7.3.1 Durability test procedure**

Use sample A for this test.

The sash balances shall be cycled from a fully open position to a fully closed position.

Cycles shall be at a velocity between 0,12 m/s (7,3 m/min) and 0,15 m/s (9,2 m/min). Number of cycles shall be in accordance with one of the grades according 5.4.

NOTE 1 A rest time of not more than 30 s is permissible between cycles.

NOTE 2 All moving parts requiring lubrication should be lubricated in accordance with sash balance manufacturers' instructions.

NOTE 3 The fully open position may be determined by maximum opening stops.

### **7.3.2 Durability test – acceptance criteria**

Acceptance criteria are in accordance 5.4 of this standard the sash balances shall continue to function normally.

## **7.4 Resistance to manually applied load test procedure**

Use sample A for this test.

Position the sliding sash so that the sash is  $(50 \pm 1)$  mm from the fully closed position (see Figure A.1 for top sliding sash; see Figure A.3 for bottom sliding sash).

Apply a load, without shock, in the direction of opening on the sliding sash in increments of 1 N until the sliding sash moves.

Measure and record the load in N.

Position the sliding sash so that the sash is  $(50 \pm 1)$  mm from the fully open position (see Figure A.2 for top sliding sash; see Figure A.4 for bottom sliding sash).

Apply a load, without shock, in the direction of closing on the sliding sash in increments of 1 N until the sliding sash moves.

Measure and record the load in N.

Using the highest recorded value for the necessary load, calculate the percentage of the sash mass as shown.

Multiply the value for the load in N by 0,102 to determine the value of the load in kg and divide by the sash mass and multiply by 100 to achieve the manually applied force percentage.

Use the so calculated percentage for the manually applied force to define the grade regarding the rating in accordance with Table 3 of this standard.

NOTE The fully open position may be determined by maximum opening stops.

## 7.5 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 5.6.

## 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 European Standard (EN 13126-13) and the year of publishing;
- 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.

## Annex A (informative)

### Test procedures

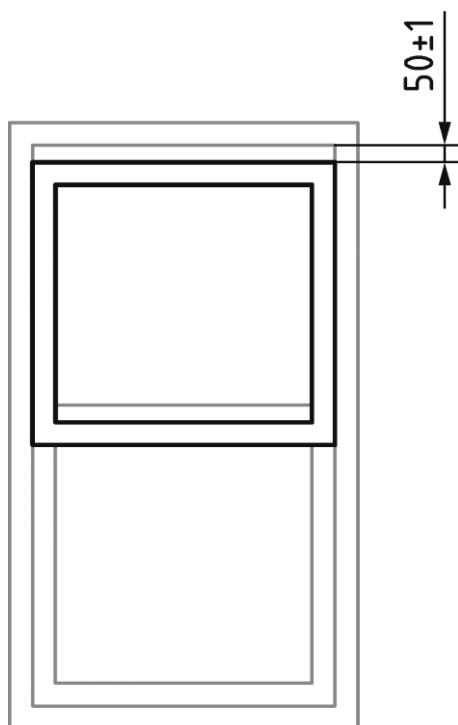
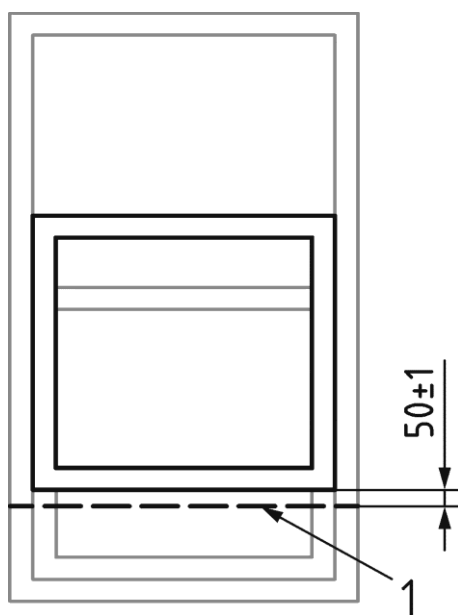
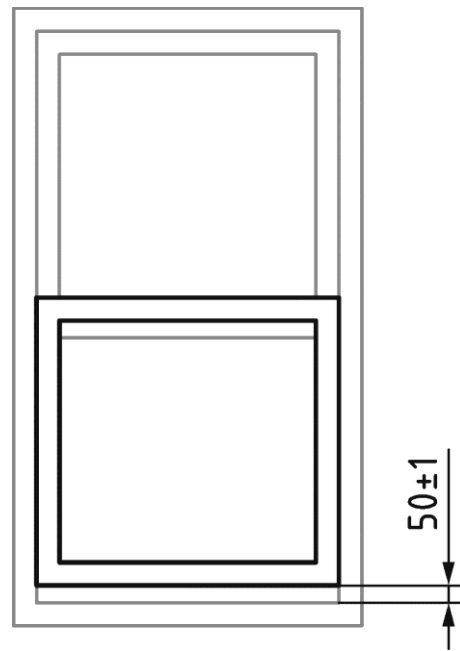


Figure A.1 — Test procedure 1 for top sliding sash

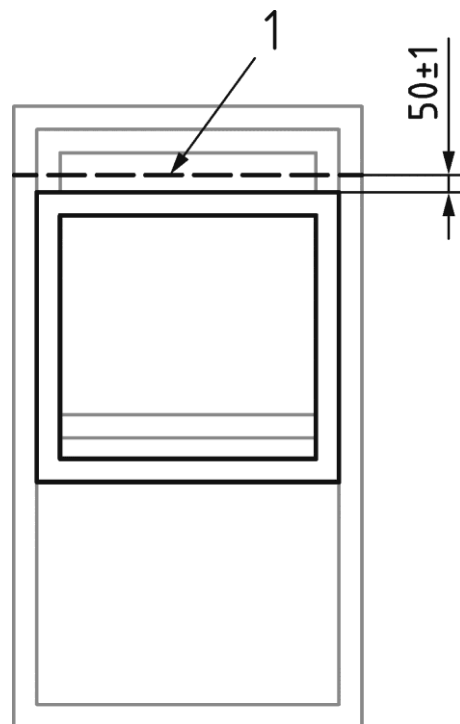


key: 1 = fully open positon (maximum)

Figure A.2 — Test procedure 2 for top sliding sash



**Figure A.3 — Test procedure 3 for bottom sliding sash**

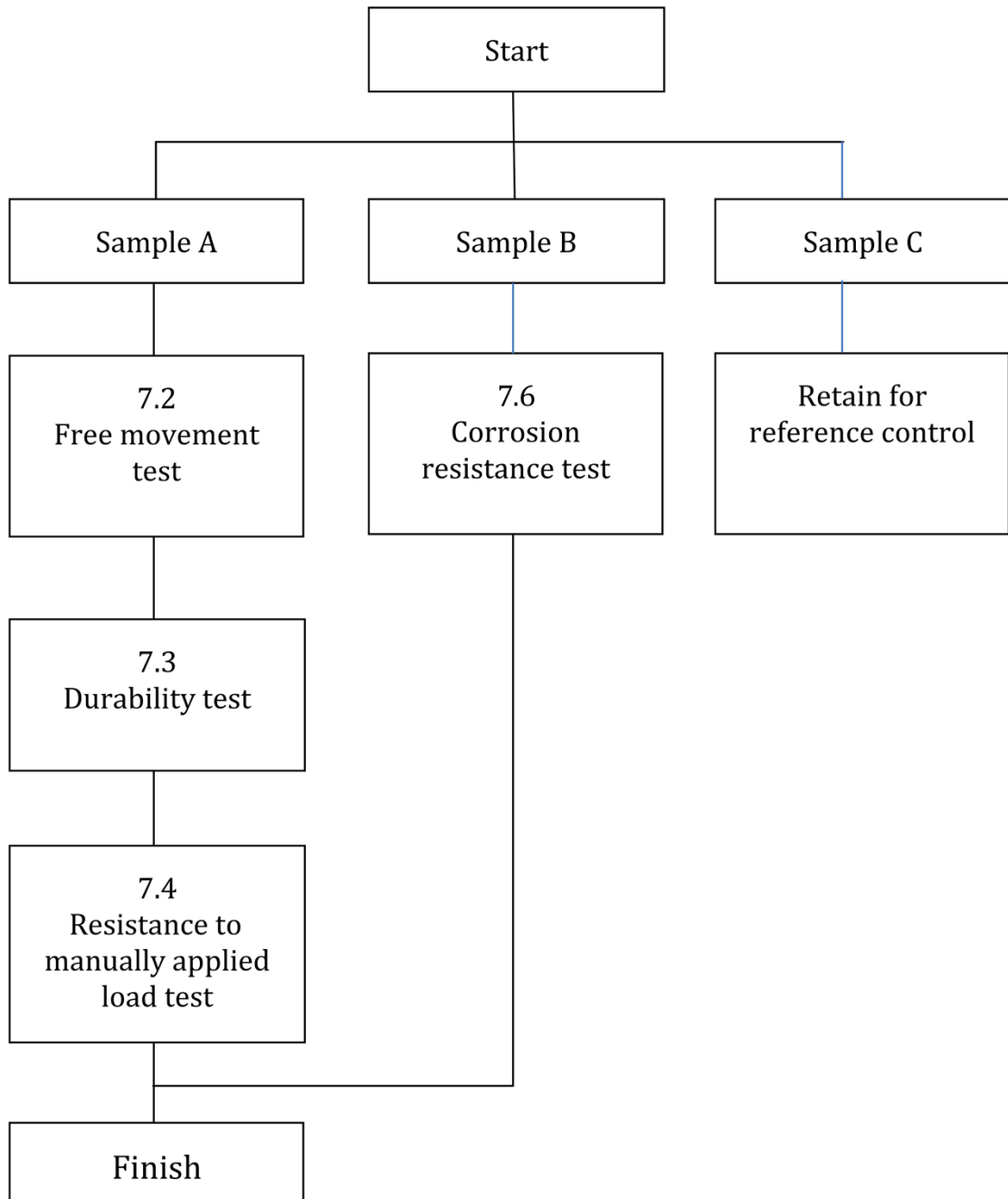


key: 1 = fully open position (maximum)

**Figure A.4 — Test procedure 4 for bottom sliding sash**

**Annex B**  
(informative)

**Flowchart of test procedure**





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- [1] EN 1191, *Windows and doors — Resistance to repeated opening and closing — Test method*
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