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European Assessment Document for

# Roof window with integrated balcony element



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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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# 1 SCOPE OF THE EAD

## 1.1 Description of the construction product

The product is a roof window for installation in a roof construction with an integrated balcony element consisting of the following main parts: a frame, a top-hung upper section with handle(s) on the sash and a lower bottom-hung section with integrated foldable banister railings and parallel balusters that allow the opening of the balcony. In the following it is referred to as roof window with integrated balcony element.

The roof window with integrated balcony element can be fitted with external shading e.g., awning blinds and internal shading e.g., venetian, blackout or pleated blinds.

See Figure 1.1.1 for examples of the roof window with integrated balcony element.

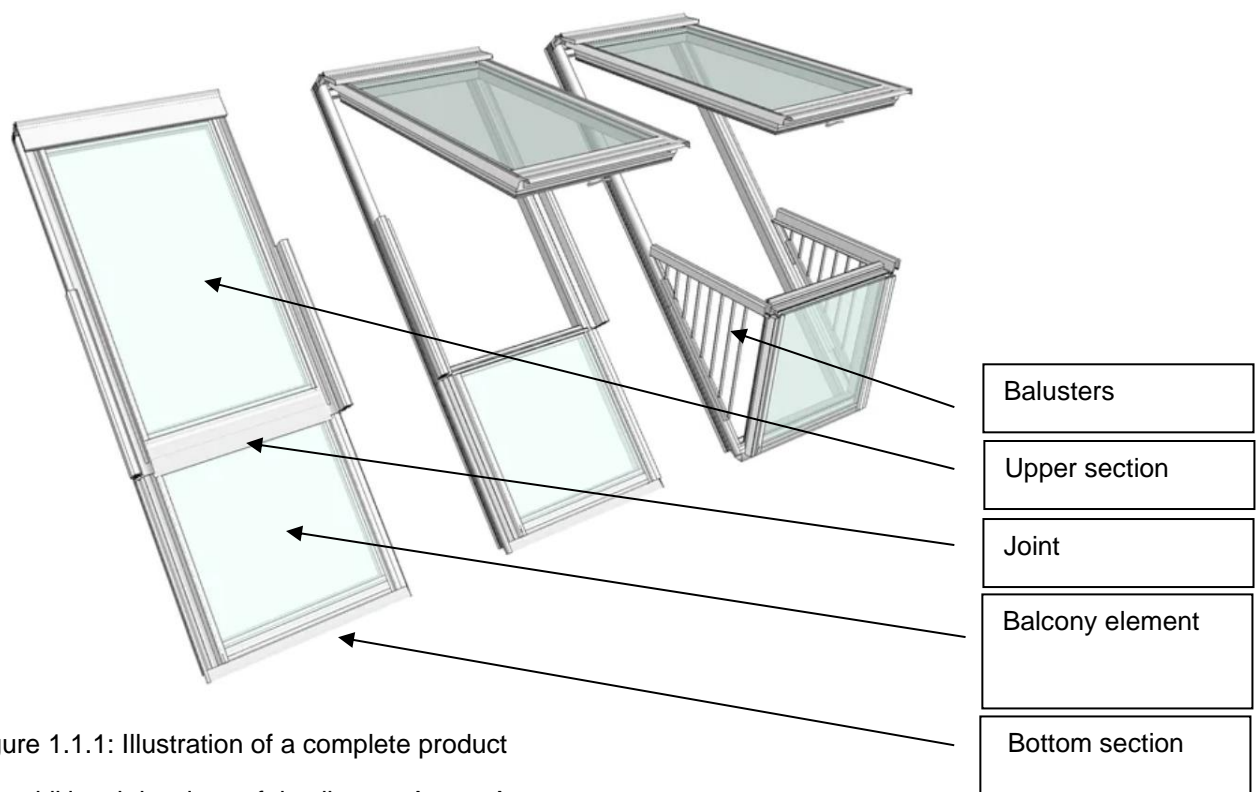


Figure 1.1.1: Illustration of a complete product

For additional drawings of details, see Annex A.

The roof window with integrated balcony element is not fully covered by a harmonized European standard, since EN 14351-1:2006+A2:2016<sup>1</sup> does not cover all needed mechanical properties for the balcony element, such as the resistance to static load and resistance to impact load of the balcony element, and the resistance to static load of the baluster.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise their clients on the transport, storage, maintenance, replacement and repair of the product, as the manufacturer considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document, shall be considered for the determination of the performance and detailed in the ETA.

<sup>1</sup> All undated references to standards or to EADs in this EAD are to be understood as references to the dated versions listed in chapter 4

## **1.2 Information on the intended use(s) of the construction product**

### **1.2.1 Intended use(s)**

The roof window with integrated balcony element is intended to direct daylight through the roof structure and it further allows for opening of an integrated balcony element.

The product may be opened for ventilation and access to the outside or for cleaning and installation of accessories.

### **1.2.2 Working life/Durability**

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the roof window with integrated balcony element for the intended use of 25 years. These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product, the intended use and maintenance as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works<sup>2</sup>.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

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<sup>2</sup> The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than the assumed working life.

## 2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

### 2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of the roof window with integrated balcony element is established in relation to the essential characteristics.

**Table 2.1.1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics**

No.	Essential characteristic	Assessment method	Type of expression of product performance
<b>Basic Works Requirement 2: Safety in case of fire</b>			
1	Reaction to fire	2.2.1	Class
2	External fire performance	2.2.2	Class
<b>Basic Works Requirement 3: Hygiene, health and the environment</b>			
3	Watertightness	2.2.3	Class
<b>Basic Works Requirement 4: Safety in use</b>			
4	Resistance to wind load	2.2.4	Class
5	Resistance to snow and permanent load	2.2.5	Description
6	Impact resistance (closed)	2.2.6	Class
7	Load bearing capacity of safety devices	2.2.7	Level
8	Balcony element resistance to static load (open)	2.2.8	Level
9	Balcony element resistance to impact (open)	2.2.9.1 2.2.9.2	Level Description
10	Baluster resistance to static load (open)	2.2.10	Level
11	Balcony element distance between balusters (open)	2.2.11	Level
<b>Basic Works Requirement 5: Protection against noise</b>			
12	Acoustic performance	2.2.12	Level
<b>Basic Works Requirement 6: Energy economy and heat retention</b>			
13	Thermal transmittance	2.2.13	Level
14	Radiation properties	2.2.14	Level
15	Air permeability	2.2.15	Class
<b>Aspects of durability linked with the Basic Works Requirements</b>			
16	Durability	2.2.16	Description

## **2.2 Methods and criteria for assessing and classification of the performance of the product in relation to essential characteristics of the product**

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

For any components covered by harmonised standards or European Technical Assessments the manufacturer of the component has included the performance regarding the relevant characteristic in the Declaration of Performance, retesting of that component for issuing the ETA under the current EAD is not required.

### **2.2.1 Reaction to fire**

The roof window with integrated balcony element shall be tested using the relevant test method(s) for the corresponding reaction to fire classes according to EN 13501-1 together with the provisions of EN 14351-1, clause 7.2.3.1 for sampling and annex H of EN 14351-1 for selection, preparation, mounting and fixing of test specimen. The roof window with integrated balcony element shall be classified according to Delegated Regulation (EU) 2016/364.

If necessary and in order to follow the preparation, mounting and fixing rules in annex H of EN 14351-1, the upper section and balcony element (see Figure 1.1.1) shall be tested and classified separately. The overall classification of the product is the least favourable performance of the upper section and balcony element.

The class shall be stated in the ETA together with those conditions for which the classification is valid.

### **2.2.2 External fire performance**

The roof window with integrated balcony element shall be tested in closed position according to the relevant part(s) of CEN/TS 1187 for the various test method(s) and classified in accordance with EN 13501-5 and the applicable rules for direct and extended application described in CEN/TS 16459.

For CEN/TS 1187 test method 1 the position of the burning brands are placed in position a), b) and c) in the product centerline at:

- a) the upper edge of the upper section.
- b) on the joint between the upper section and the balcony element.
- c) the lower edge of the balcony element.

The class and the applicable field of application shall be stated in the ETA.

### **2.2.3 Watertightness**

The watertightness of the roof window with integrated balcony element shall be tested and classified according EN 14351-1 clause 4.5 using test method A of EN 1027 and classification method EN 12208. The class shall be stated in the ETA.

### **2.2.4 Resistance to wind load**

The resistance to wind load of the roof window with integrated balcony element shall be tested and classified according EN 14351-1 clause 4.2 using the test method in EN 12211 and classification method EN 12210. The class shall be stated in the ETA.

### 2.2.5 Resistance to snow and permanent load

The resistance to snow and permanent load of the roof window with integrated balcony element shall be expressed through description of thickness and type of glazing. The description of the glass (type and thickness) is with reference to the relevant product standard and the applicable tabulated values for the glazing unit/units shall be stated in the ETA.

### 2.2.6 Impact resistance (closed)

The impact resistance of the closed roof window with integrated balcony element shall be tested and classified according EN 14351-1 clause 4.7 using the test method in EN 13049 and classification method in EN 13049. As default the specimen shall be tested in a vertical test rig with the impact direction being horizontal. Clause 6 of EN 13049 defines how the most critical impact point is determined. The direction of impact shall be from the inside.

The class and direction shall be stated in the ETA.

### 2.2.7 Load bearing capacity of safety devices

The load bearing capacity of safety devices shall be tested according to EN 14351-1 clause 4.8.

The time and the corresponding load at which the safety device shall be able to hold the sash applied at the most unfavourable position shall be stated in the ETA.

The level shall be stated in the ETA.

### 2.2.8 Balcony element resistance to static load (open)

The resistance to static load of the balcony element in open position show the products ability to prevent falling out by leaning the body to the balcony element. The verification is done with test of one specimen tested with applying load from inside with a non-sharp pressure pad. The function of the pressure pad is to simulate a body part (e.g., hip) leaning to the balcony element, see figure 2.2.8.1. and to assess the resistance of the balcony element against such an action

The roof window with balcony element is fixed into a test rig with the largest opening angle of the balcony element.

The test rig is made from a steel construction which supports the base frame representative of a section of a rafter roof with wooden rafters, see figure 2.2.8.1.



Figure 2.2.8.1 – Test rig with steel frame and section of wood rafter roof structure and the pressure pad



The balcony element is loaded perpendicular to the glass surface to ensure the load is increased without shock effect, at the top corner of the sash with a pneumatic cylinder, see figure 2.2.8.2. A preload of 500 N is applied (corresponding to zero deformation) and thereafter the load is raised continuously without shock at a speed of 5 mm/min until the load level requested by the manufacturer or breakage.

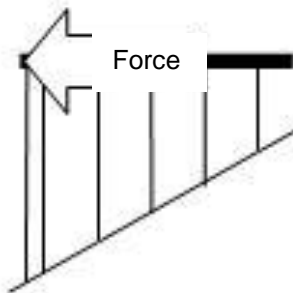


Figure 2.2.8.2 – Force applied to the balcony element.

The applied load or breakage load and the load-deformation curve in the direction of the load are noted and the applied load or breakage load – depending on what is requested by the manufacturer – and the corresponding deformation at that load shall be stated in the ETA.

## 2.2.9 Balcony element resistance to impact

### 2.2.9.1 Resistance to impact with pendulum tire impactor test (open)

The resistance to impact of the balcony element in open position shall be tested with a EN 12600 tire impactor from the inside using the test method in EN 13049 (centre of infill and top corner of infill) and classification method in EN 13049.

The drop height in mm at which the provisions in section 8 of EN 13049 are fulfilled shall be stated in the ETA.

### 2.2.9.2 Balcony element resistance to soft body impact with pendulum leather impactor test (open)

The resistance to impact of the balcony element in open position shall be tested from inside with a leather impactor (centre of the infill) of 50 kg (Shape described in EN 949) as a pendulum test using the test procedure in EN 13049.

Any defects observed or if no defects are observed shall be stated in the ETA.

## 2.2.10 Baluster resistance to static load (open)

The resistance to static load of the balusters of the balcony element shall be tested as from the inside as followed described. The load shall without any shock be applied to the middle of the longest baluster and the bottom of the second longest baluster. Load is applied perpendicular to the baluster and in the plane of the insulating glazing unit of the balcony element in load steps of 50 N. The loading (energy level) is increased over 10-20 seconds. The load is maintained for 10 seconds, during which it is observed if the baluster will detach or not.

The maximum load at which the baluster does not detach, shall be stated in the ETA.

## 2.2.11 Balcony element distance between balusters (open)

The widest horizontal distance (clear) between the balusters of the balcony element shall be measured and given as the maximum distance between two adjoining balusters.

The widest horizontal distance (clear) between balusters shall be stated in millimetres in the ETA.

### **2.2.12 Acoustic performance**

The direct airborne sound insulation performance of the roof window with integrated balcony element shall be assessed in accordance with EN 14351-1 annex B.

The level of performance is expressed according to EN ISO 717-1 and shall be stated in the ETA together with information on which method in EN 14351-1 annex B is used.

### **2.2.13 Thermal transmittance**

The thermal transmittance of the roof window with integrated balcony element shall be assessed and the level is expressed according to section 4.12 of EN 14351-1.

The level of thermal transmittance using minimum 2 significant figures for the reference sizes shall be stated in the ETA together with information on which method in EN 14351-1 is used.

### **2.2.14 Radiation properties**

The total solar energy transmittance (solar factor, g-value) according to EN 410 clause 5.4.1 and light transmittance ( $\tau_v$ ) according to EN 410 clause 5.2 of the roof window with integrated balcony element shall be calculated or tested, and level expressed according EN 14351-1 using EN 410 clause 5.4 and 5.2 respectively and the levels shall be stated in the ETA.

### **2.2.15 Air permeability**

The air permeability of the roof window with integrated balcony element shall be tested and classified according EN 14351-1, clause 4.14 using test method EN 1026, and is classified according to the overall area and the length of the opening joint in accordance with EN 12207 clause 4.7. The class shall be stated in the ETA.

### **2.2.16 Durability**

The durability of watertightness, air permeability and thermal transmittance of the roof window with integrated balcony element shall be assessed in accordance with clause 4.15 on EN 14351-1 and as described below and shall be stated in the ETA as a description.

- Water tightness and air permeability: as described in section 4.15.2 of EN 14351-1
- Thermal transmittance: as described in 4.15.2 of EN 14351-1:2006+A2:2016 with the following addition; Insulating Glass Units fulfilling EN 1279-5 shall be deemed to meet the durability requirement.

The description for durability shall be stated in the ETA.

### 3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

#### 3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal acts for the AVCPs systems are the decision 98/436/EC as amended by 2001/596/EC.

The applicable AVCP system is 3 for any use except for uses subject to regulations on reaction to fire.

For uses subject to regulations on reaction to fire the applicable AVCP systems regarding reaction to fire are 1, or 3, or 4 depending on the conditions defined in the said Decision.

#### 3.2 Tasks of the manufacturer

The corner stones of the actions to be undertaken by the manufacturer of the roof window with integrated balcony element in the procedure of assessment and verification of constancy of performance are laid down in Table 3.2.1.

**Table 3.2.1 Control plan for the manufacturer; corner stones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	Incoming materials, e.g., - IGU - Profiles - Railing materials	According to relevant specification	To be specified in control plan	To be specified in control plan	Continuous
2	Reaction to fire	Main components as defined in EN 14351-1 and to be specified in control plan	To be specified in control plan	One sample	Once per two years
3	External fire performance	Direct tests	To be specified in control plan	One sample	Once every five years
4	Mechanical performance of railing (Balcony element and baluster)	Direct tests	To be specified in control plan	One sample	Once every five years
5	Watertightness Resistance to wind load Resistance to snow and permanent load Impact resistance Load bearing capacity of safety devices Acoustic performance Thermal Transmittance Radiation properties Air permeability	According to EN 14351-1 :2006+A2:2016	To be specified in control plan	According to EN 14351-1 :2006+A2:2016	According to EN 14351-1 :2006+A2:2016
6	Final inspection	According to relevant instruction	To be specified in control plan	To be specified in control plan	Continuous

### 3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for the roof window with integrated balcony element are laid down in Table 3.3.1.

The intervention of the notified body under AVCP system 1 is necessary for reaction to fire for products for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material).

In this case the cornerstones of the tasks to be undertaken by the notified body under AVCP system 1 are laid down in Table 3.3.1.

**Table 3.3.1 Control plan for the notified body; cornerstones**

Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>				
The Notified Body will ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing related to reaction to fire, taking into account productions stages limiting of organic material and/or the addition of fire retardants.	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	According to Control plan	According to Control plan	When starting the production or a new line
<b>Continuous surveillance, assessment and evaluation of factory production control</b>				
The Notified Body will ascertain that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan related to resistance to fire and reaction to fire, taking into account productions stages limiting of organic material and/or the addition of fire retardants.	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in table 3.2.1	According to Control plan	According to Control plan	1/year

#### 4 REFERENCE DOCUMENTS

EN 14351-1:2006+A2:2016	Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics
EN 13501-1:2018	Fire classification of construction products and building elements - Part 1: Classification using test data from fire reaction to fire tests
EN 13501-5:2016	Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests
CEN/TS 1187:2012	Test methods for external fire exposure to roofs
CEN/TS 16459:2014	External fire exposure of roofs and roof coverings – Extended application of test results from CEN/TS 1187
EN 1027:2016	Windows and doors - Watertightness - Test method
EN 12208:2001	Windows and doors - Watertightness – Classification
EN 12211:2012	Windows and doors – Resistance to wind load – Test method
EN 12210:2016	Windows and doors – Resistance to wind load – Classification
EN 1026:2016	Windows and doors – Air permeability – Test method
EN 12207:2016	Windows and doors – Air permeability – Classification
EN 410:2011	Glass in building – Determination of luminous and solar characteristics of glazing
EN 12600:2003	Glass in building – Pendulum test – Impact test method for flat glass
EN 949:1999	Windows and curtain walling, doors, blinds and shutters – Determination of the resistance to soft and heavy body impact for doors
EN ISO 717-1:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation - Amendment 1: Rounding rules related to single number ratings and single number quantities
EN 1279-5:2018	Glass in buildings – Insulating glass unit – Part 5: Product standard
EN 13049:2003	Windows – Soft and heavy body impact – Test method, safety requirements and classification

**ANNEX A: DETAILS OF THE CONSTRUCTION PRODUCT**

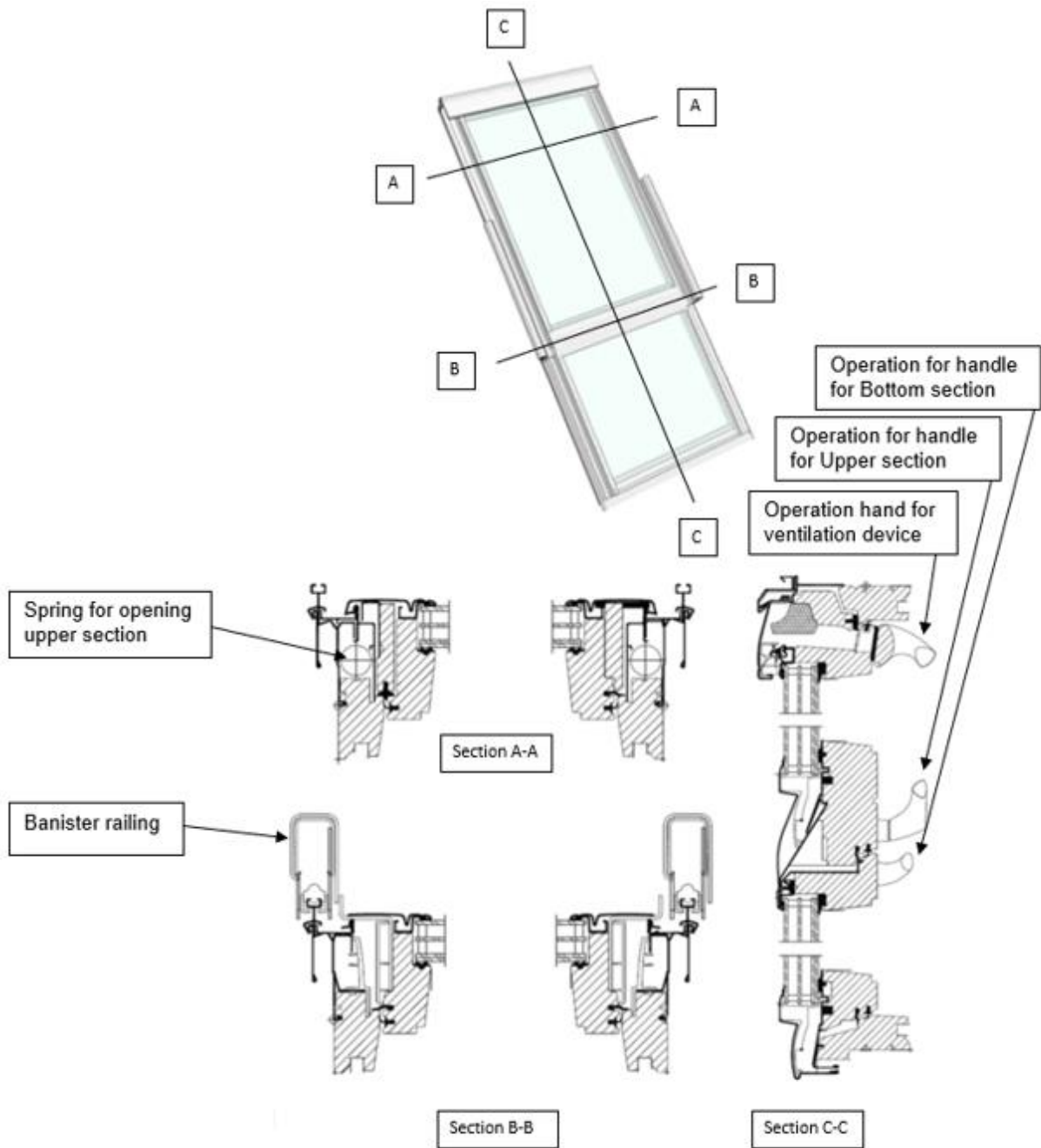


Figure A.1: Examples of sectional drawings