

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-15/0438  
19 June 2018

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Ventilated facade system with Royal Mosa ceramic  
facade cladding and stainless steel clip fixings

Product family  
to which the construction product belongs

Kit for external wall claddings

Manufacturer

Mosa Facades bv  
Meerssenerweg 358  
6224 AL MAASTRICHT  
NETHERLANDS

Manufacturing plant

Mosa Facades bv  
Meerssenerweg 358  
6224 AL MAASTRICHT  
NETHERLANDS

This European Technical Assessment  
contains

16 pages including 10 annexes which form an integral  
part of this assessment.

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

ETAG 034, ETAG 034-1,  
used as EAD according to Article 66 Paragraph 3 of  
Regulation (EU) No 305/2011

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

## Specific part

### 1 Technical description of the product

Mosa Façade kit for ventilated external wall claddings complies with the family F of ETAG 034-1. The cladding kit consisting of cladding elements mechanically fastened to the subframe by metal clips as listed in section 2 of this document.

Mosa Façade kit for ventilated external wall claddings consists of:

- Cladding element: three standard formats of ceramic tiles, Mosa ceramic tiles 75 x 75 x 1,2 cm, 120 x 60 x 1,3 cm and 100 x 100 x 1,3 cm (smaller tiles may be used).
- Cladding fixing: stainless steel clips ATK 100 KL BWM

The subframe, brackets and fixings between brackets and substrate are not part of the kit assessed in this ETA.

Detailed information and data of all the components are given in the annexes of this ETA and in the associated test reports to this ETA.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document

Mosa Façade kit is intended to be used as external wall claddings in ventilated façades (rainscreens). The walls are made of masonry (clay, concrete or stone), concrete (cast on site or as prefabricated panels), timber or metal frame in new or existing buildings (retrofit).

The subframe composed of

- Aluminium alloy vertical profiles ATK 100 BWM
- Fixings between clips and vertical profiles by stainless steel rivets BWM SNA 3,2 x 8
- Fixings between vertical profiles ATK 100 BWM and wall brackets by stainless steel rivets BWM SNA 5 x 12 K14

is described in Annex B.

The characteristics of the walls shall be verified prior to use of Mosa Façade kit, especially regarding conditions for reaction to fire classification and for mechanical fixing of Mosa Façade kit.

The fire-classification is valid if the insulation layer placed in the ventilated air space is made of non-combustible material (mineral wool) or if the layer behind the cladding elements is a mineral substrate like masonry or concrete (A or A2-s1, d0).

The provisions made in this European Technical Assessment are based on an assumed working life of at least 25 years for Mosa Façade kit. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

Mosa Façade kit is made of non-load bearing construction components. They do not contribute directly to the stability of the wall on which they are installed, but they can contribute to its durability by providing enhanced protection from the effect of weathering.

Mosa Façade kit is not intended to ensure the airtightness of the building envelope.

Detailed information and data regarding design, installation, maintenance and repair criteria are given in Annex B.

### 3 Performance of the product and references to the methods used for its assessment

#### 3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1 accord. to EN 13501-1
Reaction to fire on rear side	Not relevant
fire resistance	Not relevant

Reaction to fire of the components of Mosa Façade kit according to standard EN 13501-1:2007 +A1:2010, is Class A1 without need of testing in agreement to Commission Delegated Regulation (EU) 96/603/EEC as amended.

Note: A European reference fire scenario has not been laid down for façades. In some Member States, the classification of external wall claddings according to EN 13501-1 might not be sufficient for the use in façades. An additional assessment of external wall claddings according to national provisions (e.g. on the basis of a large-scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.

#### 3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Watertightness of joints	Not relevant
Waterpermeability	Not relevant
Water vapour permeability	Not relevant
Drainability	No performance assessed
Release of dangerous substances – ETAG 034-1, section 5.3.5.1 (declaration of the manufacturer)	No dangerous substances

#### 3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Wind load resistance	See Annex C 1 – C 2
Mechanical resistance Family F	See Annex C 3
Resistance to horizontal points load	No performance assessed
Impact resistance – shatter properties	No performance assessed
Resistance to seismic actions	No performance assessed
Hygrothermal behaviour	Not relevant

English translation prepared by DIBt

### 3.4 Protection against noise (BWR 5)

Essential characteristic	Performance
Protection against noise	Not relevant

### 3.5 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Energy economy and heat retention	Not relevant

### 3.6 Aspects of durability and serviceability

Essential characteristic	Performance
Pulsating load	No performance assessed
Dimensional stability of external cladding element	See Annex C3
Immersion in water	See Annex C3
Freeze-thaw	Pass
Chemical and biological attack	Class UA (against household chemicals and swimming pool salts) Class ULA and UHA (against acids and bases)
Corrosion	Not relevant
UV radiation	Not relevant

## 4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with guideline for European technical approval ETAG 034, April 2012, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011, the applicable European legal act is: [2003/640/EC].

System of attestation of conformity applicable to cladding kit is: 2+

System of attestation of conformity applicable to this cladding kit with ceramic tiles with respect to reaction to fire is: 4

English translation prepared by DIBt

**5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

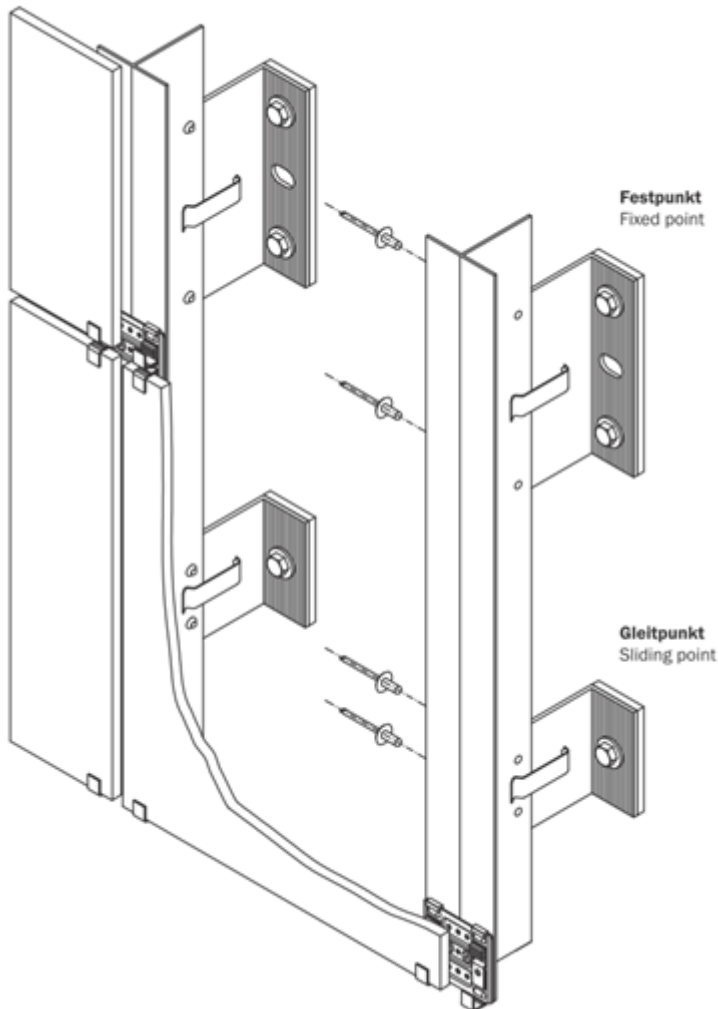
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 19 June 2018 by Deutsches Institut für Bautechnik

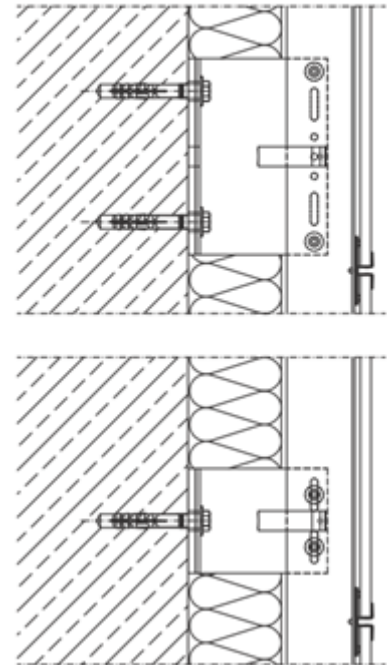
BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Beckmann

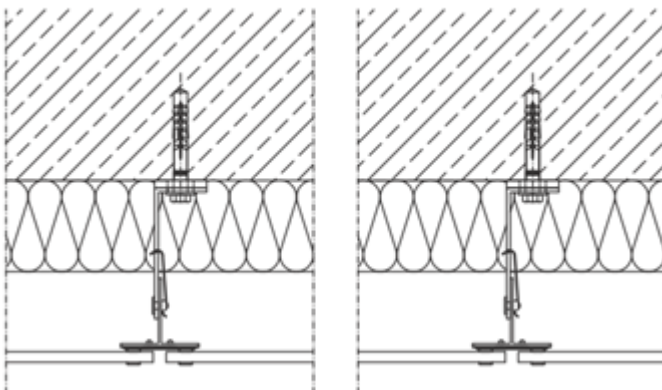
Plane panels/ceramic tiles, clamp fixing



Vertical section



Horizontal section



electronic copy of the eta by dibt: eta-15/0438

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings

**Product description**  
Installed Mosa ceramic façade cladding

Annex A 1

The assessment of this kit were carried out based on the following characteristics of the cladding elements, metal clips and the associated components

A-Mosa ceramic façade cladding

Ceramic Tiles according to EN 14411, Group Bia

Characteristics	Cladding element type: Mosa ceramic tile unglazed		
	nominal dimensions * 75 x 75 x 1.2 [cm]	nominal dimensions* 120 x 60 x 1.3 [cm]	nominal dimensions * 100 x 100 x 1.3 [cm]
Water absorption; EN ISO 10545-3;	≤ 0.3 mass%		
Bulk density; EN ISO 10545-3; Mean value	2.38 g/cm <sup>3</sup>		
Minimum Thickness; EN ISO 10545-4; mean value	11.1 mm	11.8 mm	12.0 mm
Modulus of rupture (bending strength); EN ISO 10545-4; mean value	49.2** N/mm <sup>2</sup>	55.0** N/mm <sup>2</sup>	46.7** N/mm <sup>2</sup>
Frost resistance; EN ISO 10545-12	Pass (no damage indication)		
Thermal expansion coefficient $\alpha_T$ EN ISO 10545-8	$8 \cdot 10^{-6} \text{ K}^{-1}$		
* width and lengths tolerances $\pm 0,3 \text{ mm}$ ; thickness tolerances $\pm 0,3 \%$ **The minimum value for the bending strength of ceramic tiles $\sigma_{B,min} = 40 \text{ N/mm}^2$ (single value) according to the declaration of the manufacture Mosa Façade bv .			

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings

**Product description**  
Mosa ceramic façade cladding

Annex A2



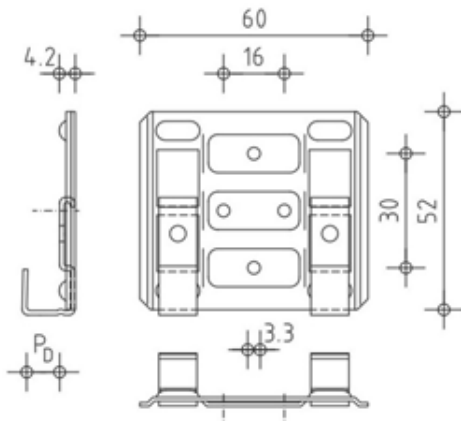
English translation prepared by DIBt

**B-Cladding fixings:**

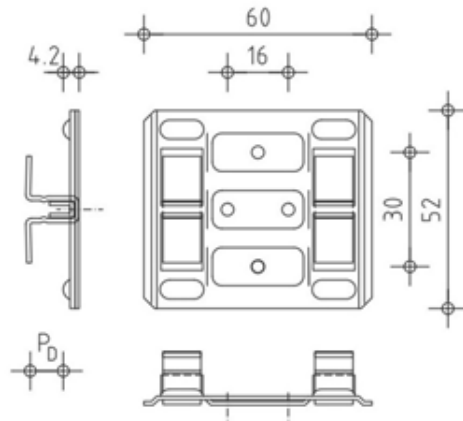
Metal clamps with clips (clamp-lips) ATK 100 KL BWM made of stainless steel 1.4541 / 1.4401 / 1.4404 acc. EN 10088-1

Test results: tensile strength  $R_m = 832 \text{ N/mm}^2$  (Min. required  $R_m$  value =  $810 \text{ N/mm}^2$ )

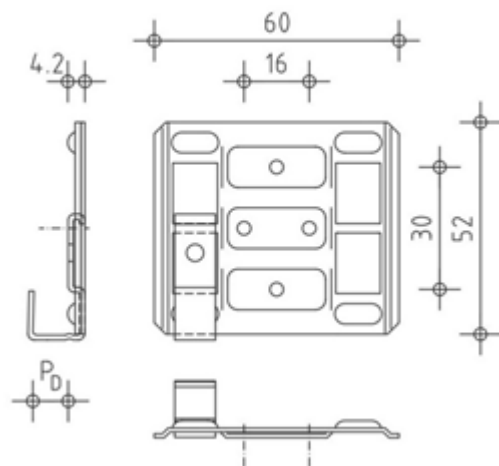
Initial clamp



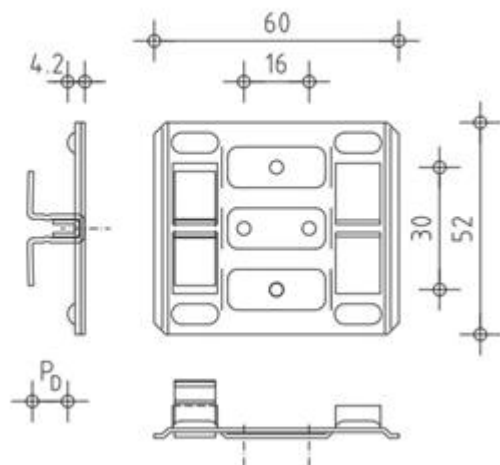
Grooved clamp



Initial clamp embrasure

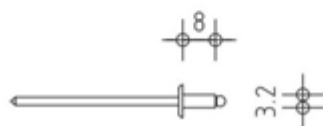


Grooved clamp embrasure

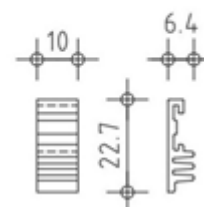


BWM Special rivet  
3,2x8 stainless steel with long spike

blank/blank: Art. 32800  
schwarz/black: Art. 3280S



EPDM gasket  
Art. 1158



electronic copy of the eta by dibt: eta-15/0438

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings

**Product description**  
Cladding fixings

Annex A 3

### Design

The design of the external wall cladding system for ventilated façade using Mosa ceramic façade cladding and the associated clip fixings should take into account:

- the mechanical characteristics values of the kit components in order to resist the actions applying on the specific work
- national safety factors may be used
- the substrate material to define the suitable anchorage
- the possible movements of the substrate and the position of the building extension joints
- the dilation of the kit components and the plates
- the category of corrosively of the atmosphere of the works
- the construction of the façade specific parts (e.g. base, top, corners windows etc.)
- the kit and the components must comply with the specific building regulations of the Member State where the work is to be built

In absence of other national regulations the following design values for the resistance against wind load may be considered for the kit. These are determined taking into account the test results (characteristics values) given in Annex C, appropriate reduction factors due to higher strength of the products used for the tests (see ETAG 034, 5.4) and a partial safety factor for the material of  $\gamma_m=2,0$

Mosa ceramic facade cladding (tiles) dimension [cm]	Number of clamp-lips per ceramic tile	Design values Resistance against wind loads
75 x 75 x 1,2 (see Annex B 2) or 60 x 60 x 1,2	4	$w_{R,d} = 2,00 \text{ kPa}$ ( $f_1 = 1,23; f_2 = 1,18$ )
60 x 120 x 1,3 (see Annex B 3)	8	$w_{R,d} = 2,86 \text{ kPa}$ ( $f_1 = 1,38; f_2 = 1,11$ )
100 x 100 x 1,3 (see Annex B 4) or 90 x 90 x 1,3	8	$w_{R,d} = 2,36 \text{ kPa}$ ( $f_1 = 1,17; f_2 = 1,15$ )
$w_{R,d} = \max w_u / (\gamma_M \times f_1 \times f_2)$ with: $w_{R,d}$ = design value; $\gamma_M$ = partial safety factor; $f_1$ = reduction factors = due to higher strength of the products used for the tests in relation to the minimum value for the bending strength of ceramic tiles $\sigma_{B,min} = 40 \text{ N/mm}^2$ $f_2$ = reduction factors - thickness of tiles used in the tests in relation to the minimum thickness of tiles		

### Installation of the kits in works

Installation should be carried out according to the ETA holder's specifications and using the specific kit components. Installation should be carried out by appropriately qualified staff and under the supervision of the technical responsible of the site.

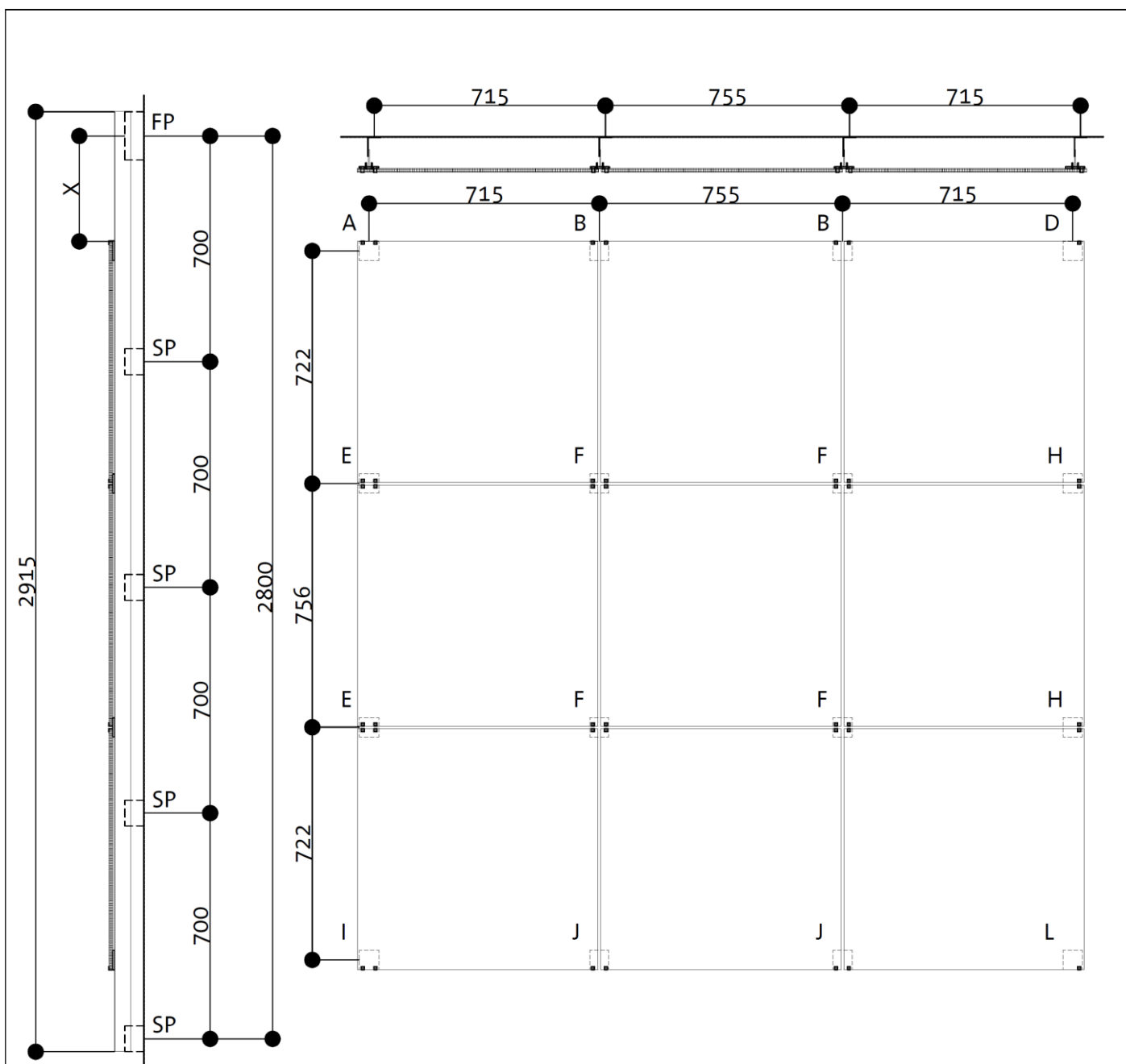
### Use, maintenance and repair of the works

Maintenance of the assembled systems or kits components includes inspections on site, taking into account the following aspects

- regarding the ceramic façade claddings: appearance of any damage such as cracking or detachment
- regarding the clip fixing: presence of corrosion or deformation

Necessary repairs should be done rapidly, using the same kit components and following the repair instructions given by ETA holder.

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings	Annex B 1
<b>Intended use</b> Specifications	

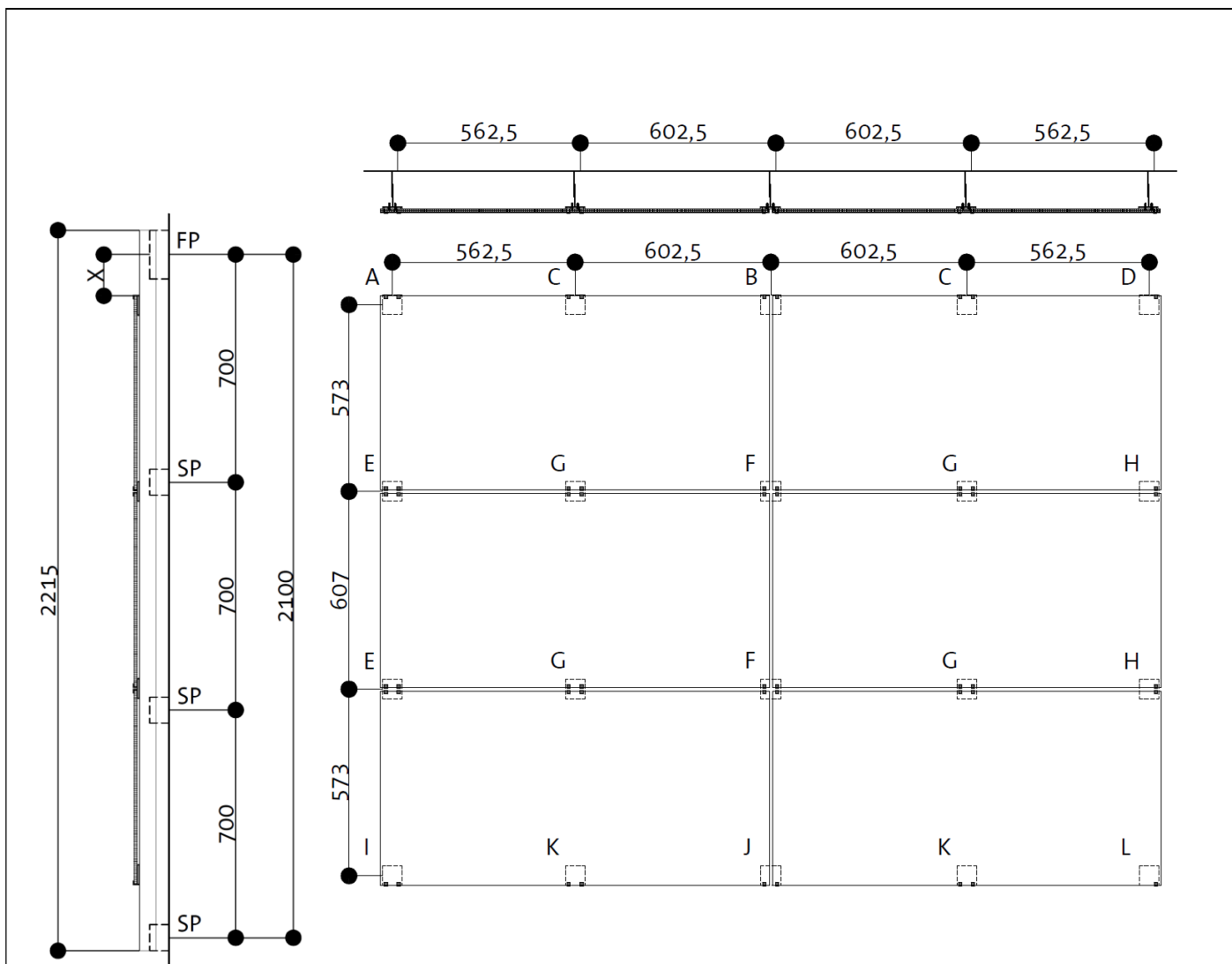


FP: fix-point; SP: sliding points

Intended use– Set-up of the Mosa Façade kit : see Ref.1, Annex C1

Mosa Ceramic façade cladding tiles (75 x 75 x 1,2 [cm]) fixed by 4 clamp-lips per tile

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings	Annex B 2
<b>Intended use</b> Specifications of the subframe / cladding and fixing	



FP: fix-point; SP: sliding points

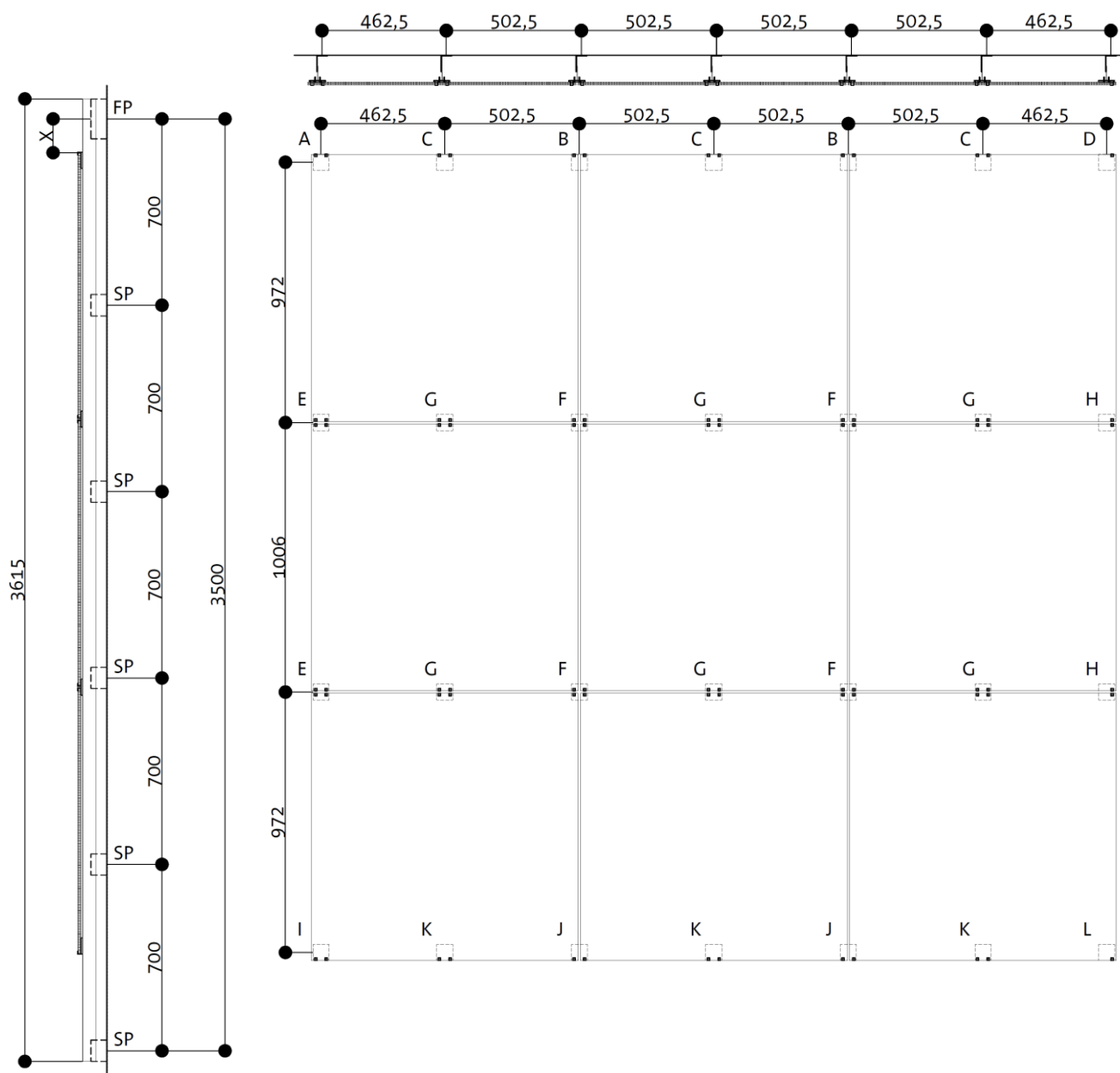
Intended use– Set-up of the Mosa Façade kit : see Ref.2, Annex C1

Mosa Ceramic façade cladding tiles (60 x 120 x 1,3 [cm]) fixed by 8 clamp-lips per tile

electronic copy of the eta by dibt: eta-15/0438

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings	Annex B 3
<p><b>Intended use</b> Specifications of the subframe / cladding and fixing</p>	

English translation prepared by DIBt



FP: fix-point; SP: sliding points

Intended use– Set-up of the Mosa Façade kit : see Ref.3, Annex C2

Mosa Ceramic façade cladding tiles (100 x 100 x 1,2 [cm]) fixed by 8 clamp-lips per tile

electronic copy of the eta by dibt: eta-15/0438

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings	Annex B 4
<b>Intended use</b> Specifications of the subframe / cladding and fixing	

Ref.	Test specimen Test set-up <sup>1</sup>	max W <sub>u</sub> failure - load [kPa]	Type of failure	Deflection [mm] (a)	
				Permanent	Instantaneous
1	<ul style="list-style-type: none"> <li>- MOSA ceramic tiles <b>75 x 75 x 1.2</b> [cm]</li> <li>- Fixings: <b>4 single clips</b> per tile</li> <li>- Subframe: extruded aluminium profiles EN AW 6060, T 66 accord. to EN 755-2, Type ATK 100, section T60/52/2</li> <li>- fixation of basic clamp plate on the profile with 2 rivets</li> <li>- distance between vertical profiles ≤755 mm</li> <li>- distance between brackets ≤700 mm</li> <li>- width of the joints between the ceramic tiles: 10 mm</li> <li>- horizontal joint height: 10 mm (including tolerances of structure and tile – most disadvantageous)</li> </ul>	-	-	0.96 (b) Permanent deflection < 1 mm for loads ≤ 2,5 kPa	5.1 (b)
		5.73	Bending of metal clip and drop down of cladding element	-	17.5 (b)
2	<ul style="list-style-type: none"> <li>2 x 3 MOSA ceramic tiles 120 x 60 x 1.3 [cm], mounted in landscape format</li> <li>- cladding fixed with 2 x 4 single metal clips (at 3 of 6 cladding elements)</li> <li>- cladding fixed with 3 single metal clips + 2 double metal clips (at 3 of 6 cladding elements)</li> <li>- subframe: 5 extruded aluminium profiles, Type ATK 100, section T60/52/2, L = 2215 mm</li> <li>- distances between vertical profiles: 562.5 mm / 2 x 602.5 mm / 562.5 mm</li> <li>- distances between brackets: 700 mm</li> <li>- joint width: 10 mm (nominal width 8 mm)</li> <li>- horizontal joint height: 10 mm (including tolerances of structure and tile – most disadvantageous)</li> <li>- fixation of basic clamp plate on profile with 2 rivets (in case of the clamp plates at the upper end: vertical rivet positions, in all other cases: horizontal rivet positions).</li> </ul>	-	-	0.83 (c) Permanent deflection < 1 mm for loads ≤ 4,5 kPa	5.2 (c)
		8.76	Bending of metal clip and drop down of cladding elements	-	13.8 (c)

- (a) Deflection including displacements of all façade components  
 (b) Positions of measurement points in centre of cladding element  
 (c) Positions of measurement points at edge of cladding element (next to metal clip)

<sup>1</sup> The assessment of the kit were carried out under the described conditions and the information given in Annex A an Annex B

**Performances**  
Characteristic values – wind load

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings

Annex C 1

Ref.	Test specimen Test set-up <sup>2</sup>	max W <sub>u</sub> failure load [kPa]	Type of failure	Deflection [mm] (a)	
				Permanent	Instantaneous
3	<ul style="list-style-type: none"> <li>- MOSA ceramic tiles <b>100 x 100 x 1.3 [cm]</b></li> <li>- Fixings: <b>8 single clips</b> per tile</li> <li>- Subframe: see above</li> <li>- fixation of basic clamp plate on profile with 2 rivets</li> <li>- distances between vertical profiles ≤ 502.5mm</li> <li>- distances between brackets ≤ 700 mm</li> <li>- joint width: 10 mm</li> <li>- horizontal joint height: 10 mm (including tolerances of structure and tile – most disadvantageous)</li> </ul>	-	-	0.92 (b) Permanent deflection < 1 mm for loads ≤ 4,0 kPa	7.8 (b)
		6,34	Bending failure and drop down of cladding element	-	16.5 (b)

- (a) Deflection including displacements of all façade components
- (b) Positions of measurement points in centre of cladding element
- (c) Positions of measurement points at edge of cladding element (next to metal clip)

Note 1: The results of the wind suction load tests on MOSA façade system with cladding elements are transferable to kits with smaller cladding elements having the same thickness and bending strength as well as the same number of metal fixing clips per tile and analogue set-up parameters.

Note 2: The resistance to wind pressure is expected to be higher than the resistance to wind suction load, therefore, no supplementary tests with a wind pressure load have to be performed. The above mentioned characteristic values apply also for wind pressure resistance (see ETAG 034-1, section 5.4.2.1)

Note 3: The ceramic tiles must be fixed in a configuration without technical restraint.

<sup>2</sup> The assessment of the kit were carried out under the described conditions and the information given in Annex A an Annex B

**Performances**  
Characteristic values

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings

Annex C 2

### Mechanical resistance of the clips

- **Resistance of the clip (under horizontal load)** - accord. to ETAG 034-1, section 5.4.2.6.1  
The most critical case was tested with regard to possible installation tolerances and dimensional variations due to temperature variations.

Table 1:

	Series Z1: clip and basic clamp plate for regular cross joints (grooved clamp, see Annex A3)	Series Z2: clip and basic clamp plate for the fixation of the upper edge of the cladding elements (initial clamp – see Annex A3)
Ultimate load - Mean value $F_{u,m}$ - coefficient of variation $V$ - Characteristic value $F_{u,c}$	$F_{u,m\_Z1} = 766 \text{ N}$ $V = 7.9\%$ $F_{u,c\_Z1} = 625 \text{ N}$	$F_{u,m\_Z2} = 625 \text{ N}$ $V = 5.9\%$ $F_{u,c\_Z2} = 558 \text{ N}$
Load for 1 mm irreversible deformation: - Mean value $F_{mcs}$ - coefficient of variation $V$ - Characteristic value $F_{mcs}^1$	$F_{mcs\_Z1} = 720 \text{ N}$ $V = 6.2\%$ $F_{mcsC\_Z1} = 616 \text{ N}$	$F_{mcs\_Z2} = 535 \text{ N}$ $V = 6.7\%$ $F_{mcsC\_Z2} = 452 \text{ N}$

- **Resistance of the clip to vertical load** - accord. to ETAG 034-1, section 5.4.2.6.2  
Basic clamp plate with 2 clips; applied constant load: 480 N  
The test was stopped after 1 h because the deflection was less than 0.1 mm for all test specimen (accord. to ETAG 034, section 5.4.2.6.2)

### Dimensional stability of external cladding element

Table 2:

Dimensional stability of external cladding element acc. to EN ISO 10545-2	
Length and width tolerances	$\pm 0.3 \text{ mm}$
Thickness tolerance	$\pm 3\%$ (for tile thickness $> 10 \text{ mm}$ )
Straightness of sides tolerance	$\pm 0.3 \text{ mm}$
Rectangularity tolerance	$\pm 0,5 \text{ mm}$
Edge curvature tolerance	$-1.2 \text{ mm} / +1.8 \text{ mm}$ (for tile length $> 60 \text{ cm}$ )
Centre curvature tolerance	$\pm 1.2 \text{ mm}$ (for tiles $60 \times 60 \text{ [cm]}$ and $75 \times 75 \text{ [cm]}$ ) $\pm 1.8 \text{ mm}$ (for tiles $60 \times 120 \text{ [cm]}$ , $90 \times 90 \text{ [cm]}$ and $100 \times 100 \text{ [cm]}$ )
Warpage	$\pm 1.4 \text{ mm}$

### Immersion to water of external cladding element

Water absorption (measured acc. to EN ISO 10545-3):  $\leq 0.3\%$

Ventilated facade system with Royal Mosa ceramic facade cladding and clip fixings	Annex C 3
<b>Performances</b> Characteristic values – mechanical resistance of metallic clip / dimensional stability of external cladding element / immersion to water	