



## European Technical Assessment

**ETA 17/0236**  
of 23.06.2017



### General part

<b>Technical Assessment Body issuing the ETA: ITeC</b>	
ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment)	
<b>Trade name of the construction product</b>	<b>webertherm ceramic optima</b> <b>webertherm ceramic plus</b>
<b>Product family to which the construction product belongs</b>	Kits for external thermal insulation composite system (ETICS) with panels as thermal insulation product and discontinuous claddings as exterior skin
<b>Manufacturer</b>	<b>SAINT-GOBAIN WEBER CEMARKSA SA</b> Ctra. C-17, km 2 ES-08110 Montcada i Reixac (Barcelona) Spain
<b>Manufacturing plant(s)</b>	According to Annex N kept by ITeC
<b>This European Technical Assessment contains</b>	18 pages including 4 annexes which form an integral part of this assessment.
<b>This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of</b>	EAD 040287-00-0404 <i>Kits for external thermal insulation composite system (ETICS) with panels as thermal insulation product and discontinuous claddings as exterior skin</i>

**General comments**

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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## Specific parts of the European Technical Assessment

### 1 Technical description of the product

This ETA refers to **webertherm ceramic kits**<sup>1</sup> for ETICS applied in-situ in which the exterior skin<sup>2</sup> is composed by ceramic cladding elements and the thermal insulation panel is bonded with 40% minimum bonded surface area<sup>3</sup> and with supplementary mechanical fixings.

**webertherm ceramic** kit components are given in table 1.1 related with ETICS components.

Detailed information and data of all the components are given in the annexes of this ETA.

**Table 1.1:** ETICS components.

Layer num.	ETICS components	webertherm ceramic optima	webertherm ceramic plus	Technical description
1	Base adhesive (between the substrate wall and the thermal insulation panel)		webertherm base	Table A1.1 of Annex 1
2	Thermal insulation panel		webertherm placa EPS	Table A1.2 of Annex 1
	Supplementary mechanical fixings		webertherm espiga H1 webertherm espiga universal STR U 2G	Table A1.6 of Annex 1
3	Base coat	webertherm base (2 layers)	webertherm base (3 layers)	Table A1.1 of Annex 1
	Glass fibre reinforcement mesh	webertherm malla 320 (1 layer)	webertherm malla 160 (2 layers)	Table A1.3 of Annex 1
4	Cladding adhesive (between the base coat and the skin)		webertherm ceramo weberxerm 859F	Table A1.4 of Annex 1
5	Discontinuous cladding element	Brick slip and small tile (*)	Large tile (*)	Table A2.1 of Annex 2
	Grout		webercolor hydroflex webercolor premium	Table A1.5 of Annex 1
---	Ancillary components		webertherm junta dilatación webertherm perfil arranque webertherm perfil esquinero	Table A1.7 of Annex 1

(\*) These components are not part of the kit. They are not supplied by the manufacturer but they are available on the market and they have to meet the specifications indicated in this ETA (see Annex 2).

<sup>1</sup> "Kit" means a construction product placed on the market by a single manufacturer as a set of at least two separate components that need to be put together to be incorporated in the construction works (Art. 2 n° 2 CPR).

<sup>2</sup> Set of components comprised of cladding element, cladding adhesive and grout that act as external covering which contributes to the protection against weathering and provide a decorative finish.

<sup>3</sup> Higher minimum bonded surface area may be required by national regulations. Bonded surface area calculated according to section H.5 of Annex H of EAD 040287-00-0404.

## 2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

**webertherm ceramic** kits are intended for use as external insulation of buildings' walls. The walls are made of masonry (e.g. bricks, blocks, stones ...) or concrete (cast on site or as prefabricated panels).

The characteristics of the walls shall be verified prior to use of **webertherm ceramic**, especially regarding conditions for reaction to fire classification and for fixing of **webertherm ceramic**.

**webertherm ceramic** kits are intended to be used with the ceramic cladding elements for the exterior skin specified in table A2.1 of Annex 2 and CE marked according to EN 14411:

- **webertherm ceramic optima** to be used with small ceramic pieces (brick slips or tiles).
- **webertherm ceramic plus** to be used with large ceramic pieces (tiles).

**webertherm ceramic** kits are designed to give the wall to which it is applied a satisfactory thermal insulation.

The provisions made in this European Technical Assessment are based on an assumed working life of at least 25 years for **webertherm ceramic**. 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.

**webertherm ceramic** kits are 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.

**webertherm ceramic** kits can be used on new or existing (retrofit) vertical walls.

**webertherm ceramic** kits are intended to be used with continuous areas (that means without expansion joints) up to 4 m x 3 m (length x height).

**webertherm ceramic** kits are not intended to ensure the airtightness of the building envelope.

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

The assessment of **webertherm ceramic optima & plus** kits for the intended use was performed following the EAD 040287-00-0404 *Kits for external thermal insulation composite system (ETICS) with panels as thermal insulation product and discontinuous claddings as exterior skin*.

**Table 3.1:** Summary of **webertherm ceramic optima & plus** performances.

Product: <b>webertherm ceramic</b>		Intended use: external wall insulation		
Basic Works Requirement	ETA section	Essential characteristic	Performance	
			optima	plus
BWR 2 Safety in case of fire	3.1	Reaction to fire	B,s1-d0	
BWR 3 Hygiene, health and the environment	3.2	Water absorption by capillarity	After 3 min (from initial immersion)	1,11 kg/m <sup>2</sup>
			After 1 h (from 3 min. immersion)	0,28 kg/m <sup>2</sup>
			After 24 h (from 3 min. immersion)	1,13 kg/m <sup>2</sup>
	3.3	Water vapour permeability (resistance to water vapour diffusion)	See section 3.3	
	3.4	Accelerated ageing behaviour	After hygrothermal cycles	No defects
After freeze-thaw cycles			No defects	

**Table 3.1:** Summary of **webertherm ceramic optima & plus** performances.

<b>Product: webertherm ceramic</b>		<b>Intended use: external wall insulation</b>			
<b>Basic Works Requirement</b>	<b>ETA section</b>	<b>Essential characteristic</b>	<b>Performance</b>		
			<b>optima</b>	<b>plus</b>	
BWR 4 Safety and accessibility in use	---	Wind suction load resistance	Not relevant		
	3.5	Impact resistance	To hard body impacts	0,5 kg, 3 J	1,0 kg, 10 J
			To soft body impacts	3,0 kg, 60 J	50,0 kg, 400 J
	3.6.1	Bond strength between the external layers and the insulation panel	0,08 MPa		
	3.6.2	Bond strength between the insulation panel and the adhesive	0,08 MPa		
	3.6.3	Bond strength between the adhesive and the substrate	0,25 MPa		
	3.7	Tensile strength of the thermal insulation panel	150 kPa		
	3.8	Shear strength of thermal insulation panel	20 kPa		
		Shear modulus of thermal insulation panel	1000 kPa		
	3.9	Dead load behaviour	See section 3.9		
	---	Pull-through resistance	Not relevant		
	---	Pull-out resistance (foam block test)	Not relevant		
	BWR 5 Protection against noise	---	Improvement of airborne sound insulation	Not assessed	
BWR 6 Energy economy and heat retention	3.10	Thermal conductivity and thermal resistance	See section 3.10		

**Complementary information:**

Requirements with respect to the mechanical resistance and stability of non-load bearing parts of the works are not included in the Basic Works Requirement *Mechanical resistance and stability* (BWR 1) but are treated under the Basic Works Requirement *Safety and accessibility in use* (BWR 4).

The fire resistance requirement is applicable to the wall itself (made of masonry, concrete) and not to the ETICS alone.

**3.1 Reaction to fire**

The reaction to fire of the ETICS **webertherm ceramic optima & plus** has been assessed according to section 2.2.1 of EAD 040287-00-0404.

Reaction to fire of the ETICS **webertherm ceramic optima & plus** according to EN 13501-1 is class B<sub>s1</sub>-d0.

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 Water absorption by capillarity

Water absorption by capillarity has been tested according to section 2.2.2 of EAD 040287-00-0404.

The worst case (components and pieces with maximum water absorption and specimen with maximum number of joints) has been tested.

Water absorption of the individual kit components and the cladding elements are described in Annex 1.

**Table 3.2:** Maximum values of water absorption by capillarity.

ETICS	Mean value (kg/m <sup>2</sup> )		
	after 3 min (*)	after 1 h (**)	after 24 h (**)
without skin	0,06	0,02	0,30
<b>webertherm ceramic optima &amp; plus</b>	1,11	0,28	1,13

(\*) Values from initial immersion.  
(\*\*) Values from 3 minutes immersion.

### 3.3 Water vapour permeability

Water vapour permeability (resistance to water vapour diffusion) of the ETICS **webertherm ceramic optima & plus** has been assessed according to section 2.2.3 of EAD 040287-00-0404.

The equivalent water vapour permeability (resistance to water vapour diffusion) of the ETICS **webertherm ceramic optima & plus** has been calculated from water vapour permeability of the individual kit components and cladding elements according to Annex D of EAD 040287-00-0404.

The worst case (components and pieces with maximum water vapour permeability and thickness) has been assessed. Maximum values are given in table 3.3.

Water vapour permeability of the individual kit components and cladding elements are given in Annexes 1 and 2 respectively.

**Table 3.3:** Maximum values of water vapour permeability.

ETICS	EPS thickness (mm)	Z <sub>ETICS</sub> [(m <sup>2</sup> ·s·Pa)/kg]	W <sub>ETICS</sub> [kg/(m <sup>2</sup> ·s·Pa)]	S <sub>d,ETICS,eq</sub> (m)	μ <sub>ETICS,eq</sub>
<b>webertherm ceramic optima &amp; plus</b>	40	2,79E+10	3,59E-11	6	79
	60	3,39E+10	2,95E-11	7	74
	80	3,99E+10	2,51E-11	8	72
	100	4,59E+10	2,18E-11	9	70
	120	5,19E+10	1,93E-11	10	69
	140	5,79E+10	1,73E-11	12	68
	160	6,39E+10	1,57E-11	13	67
	180	6,99E+10	1,43E-11	14	66
	200	7,59E+10	1,32E-11	15	66

Where:

Z<sub>ETICS</sub> = water vapour diffusion resistance of the ETICS;

W<sub>ETICS</sub> = water vapour diffusion permeance of the ETICS;

S<sub>d,ETICS,eq</sub> = water vapour diffusion-equivalent air layer thickness of the ETICS;

μ<sub>ETICS,eq</sub> = water vapour diffusion resistance-equivalent factor of the ETICS;

Results have been obtained with the value of water vapour permeability of the air: δ<sub>a</sub> = 2,0·10<sup>-10</sup> kg/(m·s·Pa).

Tests carried out on samples of three specific combinations of the ETICS **webertherm ceramic optima & plus**, according to EN ISO 12572, confirm the values given in table 3.3.

### 3.4 Accelerated ageing behaviour

#### 3.4.1 Hygrothermal behaviour

Hygrothermal behaviour of the ETICS **webertherm ceramic optima & plus** has been tested according to section 2.2.4.1 of EAD 040287-00-0404.

The following defects have not been observed:

- deterioration such as cracking or delamination of the skin that allows water penetration to the internal layers;
- deterioration or cracking of grout;
- detachment of the skin;
- irreversible deformation.

Mean values of the measured bond strength (according to section 2.2.7 of EAD 040287-00-0404) before and after hygrothermal cycles are given in table 3.5a.

#### 3.4.2 Freeze-thaw behaviour

Freeze-thaw behaviour of the ETICS **webertherm ceramic optima & plus** has been tested according to section 2.2.4.2 of EAD 040287-00-0404 on those specimens of ETICS (including the skin) for which the water absorption is greater or equal than 0,5 kg/m<sup>2</sup> after 24 hours.

The following defects have not been observed:

- deterioration such as cracking or delamination of the skin that allows water penetration to the internal layers;
- deterioration or cracking of grout;
- detachment of the skin;
- irreversible deformation.

Mean values of the measured bond strength (according to section 2.2.7 of EAD 040287-00-0404) before and after freeze-thaw cycles are given in table 3.5a.

### 3.5 Impact resistance

Impact resistance of the ETICS **webertherm ceramic optima & plus** has been tested according to section 2.2.6 of EAD 040287-00-0404.

**Table 3.4:** Impact resistance.

ETICS	Impact resistance passed	Degree of exposure in use (*)
<b>webertherm ceramic optima &amp; plus</b>	Hard body (0,5 kg) impacts of 3 joules	Category I
	Hard body (1,0 kg) impacts of 10 joules	
	Soft body (3,0 kg) impacts of 60 joules	
	Soft body (50,0 kg) impacts of 400 joules	

(\*) Category I: This category means that the degree of exposure in use should be a zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.

Category II: This category means that the degree of exposure in use should be a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the kit will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care.

Category III: This category means that the degree of exposure in use should be a zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.

Category IV: This category means that the degree of exposure in use should be a zone out of reach from ground level.

### 3.6 Bond strength

Bond strength of the ETICS **webertherm ceramic optima & plus** has been tested according to section 2.2.7 of EAD 040287-00-0404.

#### 3.6.1 Bond strength between the external layers and the insulation panel

**Table 3.5a:** Bond strength between the external layers and the insulation panel.

ETICS	Ageing	Mean value (MPa)	Minimum value (MPa)	Rupture (*)	Ratio (**)
without skin	In dry conditions	0,16	0,13	100% CS	---
	After 2 days in H <sub>2</sub> O + 2h drying	0,08	0,07	50% CS 50% AS	89%
	After 2 days in H <sub>2</sub> O + 7 days drying	0,14	0,13	100% CS	91%
	After hygrothermal cycles	0,17	0,16	99% CS 1% AS	109%
<b>webertherm ceramic optima</b>	In dry conditions	0,15	0,10	99% CS 1% AS	---
	After 2 days in H <sub>2</sub> O + 2h drying	0,12	0,07	50% CS 50% CA	80%
	After 2 days in H <sub>2</sub> O + 7 days drying	0,10	0,07	100% CS	72%
	After hygrothermal cycles	0,16	0,13	100% CS	107%
	After freeze-thaw cycles	0,10	0,06	66% CS 34% CA	70%
<b>webertherm ceramic plus</b>	In dry conditions	0,14	0,10	98% CS 2% AS	---
	After 2 days in H <sub>2</sub> O + 2h drying	0,14	0,07	95% CS 5% CA	96%
	After 2 days in H <sub>2</sub> O + 7 days drying	0,14	0,13	100% CS	99%
	After hygrothermal cycles	0,17	0,14	99% CS 1% AS	118%
	After freeze-thaw cycles	0,10	0,06	66% CS 34% CA	72%

(\*) Rupture type: AS = adhesive rupture. CS = cohesive rupture in support. CA = cohesive rupture in adhesive.

(\*\*) Value after ageing vs value in dry conditions.

#### 3.6.2 Bond strength between the insulation panel and the base adhesive

**Table 3.5b:** Bond strength between the insulation panel and the base adhesive.

ETICS	Ageing	Mean value (MPa)	Minimum value (MPa)	Rupture (*)	Ratio (**)
<b>webertherm ceramic optima &amp; plus</b>	In dry conditions	0,12	0,11	100% CS	---
	After 2 days in H <sub>2</sub> O + 2h drying	0,08	0,08	80% AS 20% CS	67%
	After 2 days in H <sub>2</sub> O + 7 days drying	0,14	0,09	100% CS	100%

(\*) Rupture type: AS = adhesive rupture. CS = cohesive rupture in support. CA = cohesive rupture in adhesive.

(\*\*) Value after ageing vs value in dry conditions.



### 3.6.3 Bond strength between the base adhesive and the substrate

**Table 3.5c:** Bond strength between the base adhesive and the substrate.

ETICS	Ageing	Mean value (MPa)	Minimum value (MPa)	Rupture (*)	Ratio (**)
webertherm ceramic optima & plus	In dry conditions	0,53	0,48	100% CS	---
	After 2 days in H <sub>2</sub> O + 2h drying	0,26	0,24	100% CS	46%
	After 2 days in H <sub>2</sub> O + 7 days drying	0,56	0,51	100% CS	105%

(\*) Rupture type: AS = adhesive rupture. CS = cohesive rupture in support. CA = cohesive rupture in adhesive.

(\*\*) Value after ageing vs value in dry conditions.

### 3.7 Tensile strength of thermal insulation panel

Tensile strength of thermal insulation panel of **webertherm ceramic optima & plus** has been assessed according to section 2.2.8 of EAD 040287-00-0404.

**Table 3.6:** Tensile strength of thermal insulation panel.

Insulation panel	Ageing	Mean value (kPa)	Ratio (*)
webertherm placa EPS	In dry conditions	175	---
	After 70 °C & 95% RH for 7 days	165	94%
	After 70 °C & 90% RH for 28 days.	161	92%

(\*) Value after ageing vs value in dry conditions.

### 3.8 Shear strength and shear modulus of thermal insulation panel

Shear strength and shear modulus of thermal insulation panel of **webertherm ceramic optima & plus** have been assessed according to section 2.2.9 of EAD 040287-00-0404.

**Table 3.7:** Shear strength and shear modulus of thermal insulation panel.

Insulation panel	Ageing	Shear strength		Shear modulus	
		$f_{tk}$ (kPa)	Ratio (*)	$G_m$ (kPa)	Ratio (*)
webertherm placa EPS	In dry conditions	96	---	1172	---
	After 7 d. 70 °C & 90% RH + drying	91	95%	1078	92%
	After 28 d. 70 °C & 90% RH + drying	90	94%	983	84%

$f_{tk}$  = shear strength characteristic values, 5%-fractile.

$G_m$  = shear modulus mean value.

(\*) Value after ageing vs value in dry conditions.

### 3.9 Dead load behaviour

Dead load behaviour of the ETICS **webertherm ceramic optima & plus** has been assessed according to section 2.2.10 of EAD 040287-00-0404.

Dead load behaviour is compatible with the use of **webertherm ceramic optima & plus**.

For **webertherm ceramic optima** (specimen size 247 mm x 297 mm with EPS 200 mm thickness):

- the maximum dead load in the test has been 1080 N (1472 kg/m<sup>2</sup>);
- the maximum difference between two displacements after two successive measurements in 1 hour has been 0,07 mm.

For **webertherm ceramic plus** (specimen size 200 mm x 200 mm with EPS 200 mm thickness):

- the maximum dead load considered in the test has been 470 N (1175 kg/m<sup>2</sup>);
- the maximum difference between two displacements after two successive measurements in 1 hour has been 0,18 mm. In this case, after 3 hours the maximum difference between two displacements after two successive measurements in 1 hour has been 0,03 mm.

### 3.10 Thermal conductivity and thermal resistance

Thermal resistance (R-value) has been assessed according to section 2.2.14 of EAD 040287-00-0404.

Thermal resistance (R-value) of the ETICS **webertherm ceramic optima & plus** has been calculated from the thermal values and geometry of the components (see Annexes 1 and 2) according to section 6.2 of EN ISO 6946 and Annex K of EAD 040287-00-0404.

**Table 3.8:** Thermal resistance.

ETICS	EPS thickness (mm)	R <sub>ETICS</sub> [(m <sup>2</sup> ·K)/W] (*)	ΔU [W/(m <sup>2</sup> ·K)]
<b>webertherm ceramic optima &amp; plus</b>	40	1,11	ΔU = n <sub>fix</sub> ·X <sub>p</sub> (**)
	60	1,65	
	80	2,19	
	100	2,74	
	120	3,28	
	140	3,82	
	160	4,36	
	180	4,90	
	200	5,44	

(\*) Information regarding the thermal transmittance of the whole external wall (U) including the ETICS and the thermal bridges (ΔU) is given in Annex 3.

(\*\*) Where:

ΔU = correction term of the thermal transmittance for anchors;

n<sub>fix</sub> = number of anchors per unit area (usually 8, 10 or 12 fix/m<sup>2</sup>);

X<sub>p</sub> = point thermal transmittance value of one anchor (see table A1.6 of Annex 1).

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

According to the decision 1997/556/EC, as amended of the European Commission<sup>4</sup>, the systems of AVCP (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table applies.

**Table 4.1:** Applicable AVPC system.

Product	Intended use	Level or class	System
webertherm ceramic optima & plus	In external walls not subject to fire regulations	Any	2+
	In external walls subject to fire regulations	B,s1-d0	

#### 5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

All the necessary technical details for the implementation of the AVCP system are laid down in the *Control Plan* deposited with the ITeC<sup>5</sup>, with which the factory production control shall be in accordance.

Issued in Barcelona on 23 June 2017

by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart

Technical Director, ITeC

<sup>4</sup> 1997/556/EC – Commission Decision of date 14 July 1997, published in the Official Journal of the European Union (OJEU) L229/14 of 20/08/1997.

<sup>5</sup> The *Control Plan* is a confidential part of the ETA and is only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

**ANNEX 1: Technical description of kit components****Table A1.1:** Base adhesive and base coat.

Characteristic		Reference	webertherm base
Generic type		EN 998-1	General purpose rendering mortar (GP) for exterior applications
Designation			GP
Colour		---	Grey or white
Thickness range (mm)	as adhesive	---	4 - 6
	as base coat	---	2 - 3 per layer
Coverage (kg/m <sup>2</sup> per 1 mm thickness)		---	1,5
As delivery (dry mortar)	Weight per bag (kg)	---	25 ± 1
Paste	Water-product ratio	---	21 - 25 % water 5,25 - 6,25 litres per bag (25 kg)
	Density (kg/m <sup>3</sup> )	EN 1015-10	1300 - 1500
	Water absorption (kg/m <sup>2</sup> ·min <sup>0,5</sup> )	EN 1015-18	W2 (≤ 0,2)
	Water vapour resistance factor, μ	EN 1015-19	≤ 10
Hardened mortar	Shrinkage (mm/m)	§L.6 of EAD 040287-00- 0404	< 2
	Static modulus of elasticity (MPa)	§L.5.2 of EAD 040287-00- 0404	< 7000
	Flexural strength (MPa)	EN 1015-11	≥ 2,0
	Compression strength (MPa)		≥ 3,5 (CSIII)
		Thermal conductivity, λ <sub>10,dry(p=50%)</sub> (W/m·K)	EN 1745
Ash content (450 °C) (%)		§L.4.1 of EAD 040287-00- 0404	90 ± 1
Heat of combustion (PCS-value) (MJ/kg)		EN ISO 1716	0,59

**Table A1.2:** Thermal insulation panel.

Characteristic	Reference	webertherm placa EPS
Designation	EN 13163	EPS-EN13163-T1-L2-W2-S2-P5-DS(70,-)1- DS(70,90)1-BS150-CS(10)60-DS(N)2- TR150-WL(T)5-MU60
Thickness (mm)	EN 823	37 - 200
Length (mm)	EN 822	1000 ± 3
Width (mm)		500 ± 2
Density (kg/m <sup>3</sup> )	EN 1602	15 - 20
Reaction to fire	EN 13501-1	E
Water absorption	EN 1609	≤ 5%

**Table A1.2:** Thermal insulation panel.

Characteristic	Reference	webertherm placa EPS
Water vapour resistance factor, $\mu$	EN ISO 10456 or EN 12524	60
Dimensional stability	normal conditions (70,-)	$\pm 0,2\%$
	specific conditions (70, 90)	< 1%
Tensile strength perpendicular to faces (kPa)	EN 1607	$\geq 150$
Bending strength (kPa)	EN 12089	$\geq 150$
Compressive stresses at 10% relative deformation (kPa)	EN 826	$\geq 60$
Shear strength (kPa)	EN 12090	$\geq 20$
Shear modulus (kPa)		$\geq 1000$
Thermal conductivity, $\lambda_D$ (W/m·K)	EN 13163	0,037

**Table A1.3:** Reinforcement mesh.

Characteristic	Reference	webertherm malla 320	webertherm malla 160
Designation		R275 A101	R 131 A101
Thickness (mm)	ETA 13/0392	$0,80 \pm 0,20$	$0,52 \pm 0,20$
Mass per unit area ( $\text{g/m}^2$ )		$330 \pm 5$	$160 \pm 5$
Ash content (625 °C) (%)	§L.4.2 of EAD 040287-00-0404	---	$82 \pm 1$
Organic content (%)	ETA 13/0392	$20 \pm 4$	$20 \pm 4$
Heat of combustion (PCS-value) (MJ/kg)	EN ISO 1716	---	4,49
Mesh size (mm)	§L.4.2 of EAD 040287-00-0404	6,0 x 6,0	3,5 x 3,8
Tensile strength (N/mm)	without ageing	$\geq 36$	$\geq 36$
	after conditioning	$\geq 20$	$\geq 20$
	residual (%)	$\geq 50$	$\geq 50$
Elongation (%) in standard conditions		4,0	3,8

**Table A1.4:** Cladding adhesive.

Characteristic	Reference	webertherm ceramo	weberxerm 859F
Generic type	EN 12004	Highly-deformable enhanced non-slip cementitious adhesive with extended open time	Deformable enhanced non-slip fast-setting cementitious adhesive with extended open time
Designation		C2TES2	C2FTES1
Colour	---	White	Grey
Thickness range (mm)	---	5 - 15	5 - 10

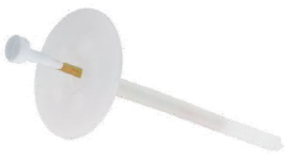

**Table A1.4:** Cladding adhesive.

Characteristic		Reference	webertherm ceramo	weberxerm 859F
Ash content (450 °C) (%)		§L.4.1 of EAD 040287-00-0404	91 ± 1	95 ± 1
Heat of combustion (PCS-value) (MJ/kg)		EN ISO 1716	1,51	0,78
Organic content (%)		---	< 12	< 6
As delivered (dry adhesive)	Weight per bag (kg)	---	25 ± 1	25 ± 1
Paste	Water-product ratio	---	7 - 9 litres per bag (25 kg)	6 litres per bag (25 kg)
Hardened adhesive	Density (kg/m <sup>3</sup> )	EN 1015-10	1290 ± 50	1330 ± 50
	Transverse deformation (mm)	EN 12004	≥ 5,0	≥ 2,5; < 5,0
	Slip (mm)		< 5,0	
	Water vapour resistance factor, μ	EN 1745	5 -20	
	Thermal conductivity, λ <sub>10,dry(p=50%)</sub> (W/m·K)		0,38	0,41

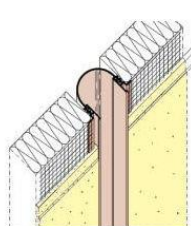
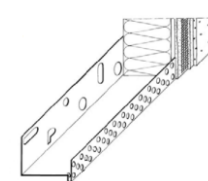
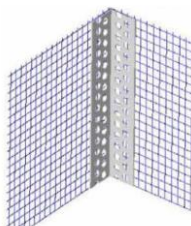
**Table A1.5:** Grout.

Characteristic		Reference	webercolor hydroflex	webercolor premium	
Generic type		EN 13888	Cementitious mortar for grouting with reduced water absorption and high resistance to abrasion		
Designation			CG2WA		
Joint thickness (mm)		---	3 - 30	≤ 15	
Organic content (%)		---	< 5	< 5	
As delivered (dry mortar)	Weight per bag (kg)	---	15	5	
Paste	Water-product ratio	---	3,0 litres per bag (15 kg)	1,10 – 1,25 litres per bag (5 kg)	
Hardened mortar	Density (kg/m <sup>3</sup> )	EN 1015-10	1600 ± 100	1600 ± 100	
	Resistance to abrasion (mm <sup>3</sup> )	EN 12808-2	≤ 1000		
	Flexural strength (MPa)	EN 12808-3	after air cured		
			after freeze- thaw cycles		
	Compressive strength (MPa)	after air cured		≥ 2,5	
		after freeze- thaw cycles		≥ 15,0	
	Shrinkage (mm/m)		EN 12808-5	< 3,0	
	Water absorption (g)	after 30 min.	EN 12808-5	< 2,0	
after 240 min.		< 5,0			
Water vapour resistance factor, μ		EN 1745	15 - 35		
Thermal conductivity, λ <sub>10,dry(p=50%)</sub> (W/m·K)			0,66		

**Table A1.6:** Supplementary mechanical fixings.

Characteristics	webertherm espiga H1	webertherm espiga universal STR U 2G
Reference document	ETA 11/0192	ETA 04/0023
Form		
Dimensions		
Material		Acc. to ETA
Mechanical characteristics		
Point thermal transmittance for one anchor, $X_p$ [W/K]	$\leq 0,003$	$\leq 0,002$

**Table A1.7:** Ancillary components.

Characteristics	webertherm junta dilatación	webertherm perfil arranque	webertherm perfil esquinero
Form			
Material	PVC	Aluminium alloy	PVC

**ANNEX 2: Technical description of cladding elements****Table A2.1:** Cladding element.

Characteristic	Reference	Brick slip	Small tile	Large tile
Type		Extruded or dry-pressed ceramic tile CE marked acc. to EN 14411		
Designation (groups)	EN 14411	Ala; Alb; Bla; Blb; Alla; Allb; Blla; Bl lb	Ala; Alb; Bla; Blb	Ala; Bla
Thickness (mm)		8 - 15	8 - 15	8 - 15
Length (mm)	EN ISO 10545-2	≤ 260	≤ 300	≤ 600
Width (mm)		≤ 60	≤ 300	≤ 600
Water absorption (% weight)		(*) Eb ≤ 10%	(*) Eb ≤ 3,0%	(*) Eb ≤ 0,5%
Apparent relative density (kg/m <sup>3</sup> )		≤ 2900	≤ 2900	≤ 2900
Weight per square metre (kg/m <sup>2</sup> )	EN ISO 10545-3	≤ 20,0	≤ 20,0	≤ 25,0
Weight per piece (kg)		≤ 1,8	≤ 1,8	≤ 9,0
Apparent porosity (%)		≤ 15,0	≤ 9,0	≤ 9,0
Breaking strength (N)	EN ISO 10545-4	Acc. to EN 14411		
Bending strength (MPa)		No defects		
Frost resistance	EN ISO 10545-12	No defects		
Reaction to fire	Decision 96/603/EC as amended	A1		
Water vapour resistance factor, μ	EN ISO 12572	≤ 200		
Thermal conductivity (W/m·K)	EN ISO 10456	1,3		
Moisture expansion (mm/m)	EN ISO 10545-10	≤ 0,2		
Linear thermal expansion (μm/(m·°C))	EN ISO 10545-8	≤ 8		
(*) Depending on the group (acc. to EN 14411) to which the cladding element to be used belongs.				

**Table A2.2:** Exterior skin.

Characteristic	Reference	Brick slip	Small tile	Large tile
Weight per unit area (kg/m <sup>2</sup> ) (*)	---	≤ 20,0	≤ 20,0	≤ 25,0
Joints thickness (mm)	---	4 - 10	4 - 10	4 - 10
Percentage of joints (% surface)	---	9 - 20	3 - 6	1 - 3
(*) Value in final use conditions (including the grout and the cladding elements).				



### ANNEX 3: Thermal transmittance

The thermal bridges caused by the anchors influence the thermal transmittance of the whole external wall and shall be taken into account using the following calculation:

$$U_c = U + \Delta U \quad [W/(m^2 \cdot K)]$$

Where:

$U_c$  : corrected thermal transmittance of the whole external wall, including thermal bridges;

$U$  : thermal transmittance of the whole external wall without thermal bridges;

$\Delta U$  : correction term of the thermal transmittance for anchors

$$U = \frac{1}{R_{si} + R_{substrate} + R_{ETICS} + R_{se}}$$

$R_{ETICS}$  : thermal resistance of the ETICS [W/(m<sup>2</sup>·K)] (see table 3.8 in section 3.10).

$R_{substrate}$  : thermal resistance of the substrate wall [W/(m<sup>2</sup>·K)]

$R_{si}$  : internal surface thermal resistance [W/(m<sup>2</sup>·K)]

$R_{se}$  : external surface thermal resistance [W/(m<sup>2</sup>·K)]

$$\Delta U = X_p \cdot n_{fix}$$

$X_p$  : point thermal transmittance value of one anchor [W/K] (see table A1.6 of Annex 1)

$n_{fix}$  : number of anchors per unit area [1/m<sup>2</sup>].

## **ANNEX 4: Design, installation, maintenance and repair criteria**

### **A4.1 Design**

The design of the external thermal insulation composite system using **webertherm ceramic** kits should consider:

- It is assumed that the substrate wall meets the necessary requirements regarding the mechanical strength and the airtightness, as well as the relevant resistance regarding watertightness and water vapour.
- The accommodation of the designed system movements to the substrate or structural movements.
- The execution of singular parts of the façade according to the manufacturer's specifications.

### **A4.2 Installation**

Installation of the external thermal insulation composite system using **webertherm ceramic** kits should be carried out:

- According to the specifications of the manufacturer and using the components specified in this ETA.
- In accordance with the design and drawings prepared for the specific works. The manufacturer should ensure that the information on these provisions is given to those concerned.
- By appropriately qualified staff and under the supervision of the technical responsible of the specific works.

### **A4.3 Maintenance and repair**

Maintenance of the external thermal insulation composite system using **webertherm ceramic** kits includes inspections on site, taking into account the following aspects:

- the appearance of any damage such as cracking, detachment, delamination, and mould presence due to permanent moisture or permanent irreversible deformation;
- the presence of water accumulation;

When necessary, any repair to localised damaged areas must be carried out with the same components and following the repair instructions given by the manufacturer.