



Building Research Institute

NATIONAL TECHNICAL ASSESSMENT

ITB-KOT-2019/0424 issue 1

**Product kit for ventilated facade cladding system
Cembrit**

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| PIONKI



BUILDING RESEARCH INSTITUTE

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NATIONAL TECHNICAL ASSESSMENT ITB-KOT-2019/0424 issue 1

This National Technical Assessment was issued in line with the ordinance of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Journal Of Laws 2016, item 1968) by Building Research Institute in Warsaw, following the request of:

**Cembrit Sp. z o.o.
ul. Taneczna 18, 02-829 Warszawa**

National Technical Assessment ITB-KOT-2019/0424 issue 1 is a confirmation of a positive assessment of performance of this construction product for the intended purpose:

**Product kit for ventilated facade cladding system
Cembrit**

Date of validity of the National Technical Assessment

27 March 2024



BUILDING RESEARCH INSTITUTE

DIRECTOR
authorised by
Assistant manager
for Technical Assessment
and European Harmonisation

mgr inż. Anna Panek

Warsaw, 27 March 2019

National Technical Assessment ITB-KOT-2019/0424 issue 1 contains 20 pages including 2 annexes. The text may be copied only in complete form. Publishing or distribution of passages from this National Technical Assessment in any other form requires written permission from Building Research Institute.

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1. TECHNICAL DESCRIPTION OF THE PRODUCT

This National Technical Assessment applies to a product kit for installing the ventilated facade cladding system Cembrit made by Cembrit Sp. z o.o., 02-829 Warszawa, ul. Taneczna 18, manufactured in plants in Hungary and Finland.

This National Technical Assessment applies to product types defined by the manufacturer and resulting from performance characteristics defined in item 3 and to combination of products included in the kit.

The kit for installing the ventilated facade cladding system Cembrit includes the following elements:

- a) cement fibre boards, category A in line with PN-EN 12467+A2:2018, made by Cembrit Holding A/S PO Box 750, Sohngaardholmsvej 2, DK 9100 Aalborg, Denmark:
 - Available under alternative trade names Cembrit Raw / Construction, 8 or 10 mm thick, max. width 1250 mm and maximum length of 3050 mm,
 - Available under alternative trade names Cembrit Cembonit / Patina, 8 or 12 mm thick, max. width 1250 mm and maximum length of 3050 mm,
 - Available under alternative trade names Cembrit Metro / Cover, 8 mm thick, max. width 1250 mm and maximum length of 3070 mm,
 - Available under alternative trade names Cembrit True / Transparent, 8 mm thick, max. width 1250 mm and maximum length of 3070 mm,
 - Available under alternative trade names Cembrit Zenit / Solid, 8 mm thick, max. width 1250 mm and maximum length of 3070 mm,
- b) elements of brackets and rails (supporting structure):
 - T-profile, with cross-section dimensions of 60 x 50 x 2 mm, 100 x 50 x 2 mm and 120 x 50 x 2 mm per figure B1, made of aluminium alloy EN AW-6060 or EN AW-6063 per PN-EN 573-3:2014, status T6 according to PN-EN 515:2017,
 - L-profile, with cross-section dimensions of 50 x 50 x 2 mm, per figure B2, made of aluminium alloy EN AW-6060 or EN AW-6063 per PN-EN 573-3:2014, status T6 according to PN-EN 515:2017,
 - Sliding wall brackets per figure B3, made of aluminium alloy EN AW-6060, EN AW-6063 or EN AW-5754 per PN-EN 573-3:2014, status T6 according to PN-EN 515:2017,
 - Fixed wall brackets per figure B4, made of aluminium alloy EN AW-6060, EN AW-6063 or EN AW-5754 per PN-EN 573-3:2014, status T6 according to PN-EN 515:2017,
- c) Cembrit rivets 4.0 x 20 K14 mm, per figure B5, with stainless steel 1.4541 pins per PN-EN 10263-1:2004 and bush made of aluminium alloy EN AW-5019 per PN-EN 573-3:2014, with EPDM seal under the flange,
- d) products for finishing special places: thermal insulation washers made of polyvinyl chloride (PVC) for insulating load-bearing structure of cladding from the base and tapes made of EPDM 3 mm thick and 30 or 90 mm wide.

Identification properties of the products included in the Cembrit ventilated facade cladding system are listed in Annex A.

2. INTENDED USE

A set of products to which this National Technical Assessment applies is intended for installing ventilated facade cladding (facade cladding) in already used buildings and in newly constructed buildings.

Cembrit facade cladding may be fixed to external walls made of concrete, masonry units and other mineral bases which form stable load-bearing structure for the cladding elements.

Recommended elements for installing Cembrit cladding:

- Mineral wool boards per PN-EN 13162+A1:2015, reaction to fire class A1 per PN-EN 13501-1+A1:2010, thickness according to detailed design developed for the specific facility,
- Mechanical fasteners for fixing the brackets to the base and for fixing mineral wall boards to the base marketed in line with the regulations in force; the fasteners should be defined in detailed design for the facade developed for the specific facility depending on the existing loads and condition and type of foundation.

Observe the following rules when installing Cembrit facade cladding:

- Width of ventilation gap no less than 25 mm,
- Distance between individual facade boards (open expansion gaps): 8 or 10 mm,
- Distance of rivets from horizontal edges of a board: 100 ÷ 150 mm,
- Distance of rivets from vertical edges of a board: 30 ÷ 150 mm,
- Spacing of rivets should not be greater than 600 mm
- Distance of fasteners from outside edge of aluminium profiles should not be smaller than 20 mm (fig. B10),
- Horizontal spacing of profiles: 400 ÷ 630 mm, depending on wind load,
- Vertical spacing of brackets should not be greater than 700 mm.
- Air inlet and outlet openings, min. cross-section of 200 cm² per meter of facade length, in bottom and top part.

Due to the impact strength, the claddings made using Cembrit kit may be used in conditions which meet the conditions for use category III per EAD 090062-00-0404.

Permissible load distributed evenly (wind pressure / negative wind pressure) for Cembrit facade cladding is 2400 Pa.

Fibre cement board facade cladding Cembrit Zenit / Solid, Cembrit Metro / Cover, Cembrit True / Transparent, Cembrit Cembonit / Patina and Cembrit Raw / Construction, fixed with rivets to aluminium supporting structure, with mineral wool at least 50 mm thick and ventilation space between fibre cement cladding panels and mineral wool, on non-flammable bases (with fire reaction class at least A2 - s3, d0 per PN-EN 13501-1+A1:2010) have been classified as non-fire spreading "NRO" referring to PN-B-02867:2013 for flame spread rating through outside walls with fire acting from the outside.

Due to corrosion resistance, the elements of the Cembrit kit made of aluminium EN AW-6060 or EN AW-6063 referring to PN-EN 573-3:2014 have a durability of class B per PN-EN 1999-1-1:2011, and in case of elements made of aluminium EN AW-5754 or EN AW-5019 per PN-EN 573-3:2014 are characterise by durability class A per PN-EN 1999-1-1:2011. Cladding panels included in Cembrit with supporting structure (substructure) made of elements made of aluminium alloys EN AW-6060, EN AW-6063 or EN AW-5754 per PN-EN 573-3:2014, with rivets with cores made of corrosion-resistance steel

class 1.4541 per PN-EN 10088-1:2014, with bushing made of alloy EN AW-5019 per PN-EN 573-3:2014 and with an EPDM seal may be applied without protective coatings in normal weather conditions and in moderate industrial and municipal environments, with corrosion category C1, C2 and C3 per PN-EN ISO 9223:2012.

Corrosion resistance of mechanical fasteners must be adjusted to the corrosion category of the environment per PN-EN ISO 12944-2:2018 or PN-EN ISO 9223:2012.

Vertical and horizontal sections of Cembrit facade cladding are shown in Annex B.

The kit described in this National Technical Assessment must be used in accordance with the detailed design developed for the facility including:

- Polish standards and building code, in particular the regulation of the Minister Of Infrastructure of 12 April 2002 on the technical conditions to be fulfilled by buildings and their location (Journal of Laws 2015, item 1422 as amended).
- Assembly instruction developed by the manufacturer and supplied to the customers,
- decisions in this National Technical Assessment,
- Technical Conditions of Execution and Acceptance of Construction Work ITB. Part B. Sheet 14.

3. PERFORMANCE FEATURES OF THE PRODUCT AND METHODS USED FOR ASSESSMENT

3.1. Product performance features

Performance features for products included in the kit and Cembrit facade cladding are given in tables 1 ÷ 5.

Table 1. Cembrit rivets 4.0 x 20 K14 mm

Item	Essential characteristics	Features	Assessment methods
1	2	3	4
1	Average breaking force for rivet's pin breakage (core), kN	≥ 3.0	PN-EN ISO 14589:2003
2	Average breaking force defining "pushing out" for a rivet's pin (core), kN	≥ 0.5	
3	Average breaking force defining "holding ability" for a rivet's pin (core), kN	≥ 3.0	

Table 1 [cont'd.]

Item	Essential characteristics	Features	Assessment methods
1	2	3	4
4	Characteristic load bearing for stretching force N_{Rk} , kN for joints made using rivets: - joint: section thickness 3 mm ¹⁾ (base) + section thickness 2 mm ¹⁾ (element being fixed)	≥ 1.3	PN-EN ISO 14589:2003

	– joint: section thickness 3 mm ²⁾ (base) + section thickness 2 mm ²⁾ (element being fixed)	≥ 1.6	
5	Characteristic load bearing for shearing force N_{Rk} , kN for joints made using rivets – joint: section thickness 3 mm ¹⁾ (base) + section thickness 2 mm ¹⁾ (element being fixed)	≥ 2.1	
	– joint: section thickness 3 mm ²⁾ (base) + section thickness 2 mm ²⁾ (element being fixed)	≥ 2.4	
¹⁾ aluminium section made of EN AW-6060 aluminium alloy ref. PN-EN 573-3:2014 ²⁾ aluminium section made of EN AW-6063 aluminium alloy ref. PN-EN 573-3:2014			

Table 2. Cembrit facade cladding

Item	Essential characteristics	Features	Assessment methods
1	2	3	4
1	Up to 2400 Pa wind pressure and wind uplift resistance	No visible damages and significant permanent strains after removing load	EAD 090062-00-0404
2	Resistance of cladding to static action using horizontal force of 500 N	No visible permanent strain	
3	Shearing strength of the joint between the board and supporting structure under laboratory conditions, N: – Mean value F_{mean}	3536	
	– Specific value $F_{u,5}$	3335	
4	Shear resistance of joint between board and substructure after 30 days of conditioning in water at 20 ± 4 °C, N: – Mean value F_{mean}	3496	
	– Specific value $F_{u,5}$	3263	
5	Shearing strength of the joint between the board and supporting structure, after 30 days of subjecting to the following cycles: 3 hours of freezing at -20 ± 4 °C and 3 hours of defrosting at 20 ± 4 °C N: – Mean value F_{mean}	3561	
	– Specific value $F_{u,5}$	3419	
6	Tearing resistance of a joint between board and supporting structure	Per table 3	
7	Resistance of wall bracket and joints between the wall bracket with vertical profiles under horizontal and vertical force	Per tables 4 and 5	

Table 2 [cont'd.]

Item	Essential characteristics	Features	Assessment methods
1	2	3	4
8	Impact resistance of cladding: – With a small soft object 3 kg (S2, impact energy 60 J)	No damage	EAD 090062-00-0404
	– With a hard object 0.5 kg (H1, impact energy 3 J)	No breakages or damages	
	– With a hard object 1 kg (H3, impact energy 10 J)	No breakages or damages	
9	Resistance of cladding to the following cycles: – Heating — rain – Heating — cooling	No cracks or signs of degradation	
10	Strength of elements of supporting structure to pulling of rivets, N – Mean value F_{mean}	5714	Section 3.2.1
	– Specific value $F_{u,5}$	5387	
11	Fire classification concerning degree of fire propagation through external walls from the outside	Degree of fire propagation (NRO)	PN-B-02867:2013
¹⁾ This classification applies to cladding panels installed on non-flammable bases (at least class A2 - s3, d0 reaction to fire per PN-EN 13501-1+A1:2010), according to description in item 2			

Table 3

Tearing resistance of a joint between board and supporting structure, N									
Conditions	Ring diameter	Mean value F_m				Specific value F_c			
		board corner ¹⁾	board edge ²⁾	board edge ³⁾	board centre ⁴⁾	board corner ¹⁾	board edge ²⁾	board edge ³⁾	board centre ⁴⁾
laboratory	Ø 200 mm	1421	1516	2563	2668	1190	1184	2462	1990
	Ø 265 mm	1526	1734	2324	2710	1221	1541	2220	2420
	Ø 355 mm	911	581	859	1438	645	498	512	826
After 30 days of conditioning in water	Ø 200 mm	1230	1094	1566	1687	1172	891	1345	1492
	Ø 265 mm	726	860	1227	1670	538	685	1065	1497
	Ø 355 mm	1989	239	351	1464	131	204	264	136
After 30 cycles of freezing and unfreezing	Ø 200 mm	1472	1260	1870	2197	1075	1153	1382	1863
	Ø 265 mm	1288	1195	2004	1946	1108	1131	1726	1878
	Ø 355 mm	548	509	1030	1840	324	442	965	1462
¹⁾ board dimensions 250 x 250 mm, rivet at the distance of 30 and 100 mm from side edges ²⁾ board dimensions 250 x 250 mm, rivet at the distance of 30 and 125 mm from side edges ³⁾ board dimensions 250 x 250 mm, rivet at the distance of 100 and 125 mm from side edges ⁴⁾ board dimensions 400 x 400 mm, rivet at the distance of 200 and 200 mm from side edges									

Table 4. Resistance of joint between fastening wall bracket and T profile 60 x 50 x 2 mm under

horizontal and vertical force

Vertical force, N, required for affecting the following movement:				
Δl	0.6 mm	$F_{1d} - 1 \text{ mm}$	$F_{3d} - 3 \text{ mm}$	$F_s - \text{force at failure}$
F_{mean}	16	25	67	265
$F_{u,5}$	10	16	56	192
Horizontal force, N, required for affecting the following movement:				
Δl	1 mm	$F_t - \text{force at failure}$		
F_{mean}	376	2718		
$F_{u,5}$	353	2453		
F_{mean} — mean value of force affecting movement Δl or failure $F_{u,5}$ — the specific force value F_{mean} with 75% of confidence that 95% of the test results will exceed it.				

Table 5. Resistance of joint between fastening wall bracket and T profile 120 x 50 x 2 mm or 100 x 50 x 2 mm under horizontal and vertical force

Vertical force N, required for affecting the following movement:				
Δl	0.6 mm	$F_{1d} — 1 \text{ mm}$	$F_{3d} — 3 \text{ mm}$	$F_s — \text{force at failure}$
F_{mean}	14	22	53	176
$F_{u,5}$	11	17	37	135
Horizontal force, N, required for affecting the following movement:				
Δl	1 mm	$F_t — \text{force at failure}$		
F_{mean}	357	2599		
$F_{u,5}$	289	1872		
F_{mean} — mean value of force affecting movement Δl $F_{u,5}$ — the specific force value F_{mean} with 75% of confidence that 95% of the test results will exceed it.				

3.1. Methods used for assessment of performance

The assessment methods are defined in table 1 and in item 3.2.1.

3.2.1. Verification of strength of supporting structure to pulling of rivets The verification of strength of the supporting structure is made on a strength testing machine using systems composed of cladding elements of 250 x 250 mm, profile T joined with a rivet located at the board's corner at the distance of 30 mm and 100 mm from side edges. The test system must be laid horizontally with the outer side of the cladding component down and rested on a steel ring with an outer diameter of 30 mm and a wall thickness of 5 mm. Apply the radial compression force to the rivet with the speed of 5 mm/min until the destruction of rivet / pulling of rivet through the substructure.

4. PACKAGING, TRANSPORT, STORAGE AND MARKING OF THE PRODUCT

The products included in the kit should be supplied in original manufacturer's packaging, kept and transported using methods which ensure their unchanged technical parameters.

The method for marking products with Polish building symbol B must follow the requirements of regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method for declaring performance of construction products and method for placement of construction symbol (Journal Of Laws 2016, item 1966 as amended).

The following information should be provided together with the placement of a construction symbol:

- Two last digits of the year of initial placement of the construction symbol on the product;
- Name and address of the manufacturer or an identification symbol to enable clear identification of the manufacturer's name and address;
- Name and type designation of a construction product;
- number and year of issue for the National Technical Assessment used for declaring the product's performance (ITB-KOT-2019/0424 issue 1),
- the number of the national declaration of performance,

- Declared level or class of performance;
- Name of the certifying body which carried out assessment and verification of performance for the construction product;
- Manufacturer's website address if the national declaration of performance is made available at the website.

In specific cases, together with national declaration of performance, a data sheet and/or information on hazardous substances included in the construction product must be provided as defined in art. 31 or 33 of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Also, the marking of a construction product which constitutes a hazardous mixture as defined in Regulation REACH shall also be in line with regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

5. VERIFICATION OF CONSTANCY OF PERFORMANCE

5.1. The national system used for the assessment and verification of performance

According to the regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method for declaring performance of construction products and method for placement of construction symbol (Journal Of Laws 2016, item 1966 as amended), 2+ assessment and verification of constancy of performance should be applied.

5.2. Type testing

The performance, as assessed in item 3, constitutes the product's type testing until any changes to raw materials, ingredients, production line or manufacturing plant are made.

5.3. Factory production control

The manufacturer should implement a production control system in the manufacturing plant. All system elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic way, in the form of rules and procedures, including records from the research carried out. The production control system should be adjusted to the production technology and ensure the maintenance of the series production of the performance of the product.

The production control system shall apply to specification and checking of raw materials and ingredients and the control and research in the manufacturing process and control tests (according to item 5.4), carried out by the manufacturer in accordance with a prescribed test plan and according to the rules and procedures set out in the documentation works production control.

The results of the production control should be systematically recorded. The records shall confirm that the products meet the criteria for the evaluation and verification the constancy of performance. Individual products or batches of products and related manufacturing details must be fully possible to identify and recover.

5.4. Additional test

5.4.1. Test schedule The test schedule includes:

- a) current testing
- b) periodic testing

5.4.2. Current testing The current testing includes checking the following items:

- a) shape and dimensions of products in a kit,
- b) areal weight of boards

5.4.3. Periodic testing The periodic testing includes checking the following items:

- a) board's bending strength
- b) breaking force for rivet's pin (core) breakage;
- c) Shearing strength of the joint between the board and supporting structure (under laboratory conditions),
- d) the joint between the board and supporting structure (under laboratory conditions),
- e) Resistance of wall bracket and joints between the wall bracket with vertical profiles under horizontal and vertical force.

5.5. Frequency of testing

Current research should be carried out in accordance with an agreed schedule, but not less frequently than for each batch of products. The lot size of the products should be specified in the documentation of the production control system.

Periodic testing should be performed at least once every 3 years.

6. INSTRUCTION

6.1. National technical assessment ITB-CAT-2019/0424 issue 1 acts as the positive assessment of the performance of essential characteristics of the product kit for making Cembrit ventilated facade cladding, which in accordance with the intended use, resulting from the provisions of the Assessment, have an impact on the fulfilment of the essential requirements for building structures for which the product will be used.

6.2. National Technical Assessment ITB-CAT-2019/0424 issue 1 does not act as entitlement to place construction symbol on construction products.

In accordance with the law on construction products of 16 April 2004 (Journal Of Laws 2016, Item 1570, as amended) the kit which is the subject of this National Technical Assessment may be placed on the market or marketed on the domestic market if the manufacturer has made an assessment and verified the constancy of performance, drawn up a national declaration of commercial properties in accordance with National Technical Assessment ITB-CAT-2019/0424 issue 1 and placed the construction symbol on the products in accordance with the provisions in force.

6.3. National Technical Assessment ITB-CAT-2019/0424 issue 1 is without prejudice to the powers arising from the provisions for the protection of industrial property and in particular the law of 30 June 2000 — industrial property rights (consolidated text: Journal Of Laws 2017, item 776 as amended). Ensuring these powers shall be the responsibility of the users of this National Technical Assessment ITB.

6.4. By issuing the National Technical Assessment, ITB shall not be liable for any infringement of exclusive and acquired rights.

6.5. National Technical Assessment does not relieve the manufacturer from responsibility for their quality and building contractors from responsibility for their proper application.

6.6. The validity of the National Technical Assessment may be renewed for additional periods not longer than 5 years.

7. LIST OF DOCUMENTS USED DURING THE PROCEEDINGS

7.1. Reports, test reports, assessments, classifications

- 1) 00563/17/Z00NZE. Technical assessment and testing of a kit of products for construction of ventilated facade cladding with fibre cement boards under the trade names Zenit / Solid, Metro / Cover, True / Transparent, Cembonit / Patina, Raw / Construction for a National Technical Assessment. ITB Building Elements Engineering Department.
- 2) LZE00-00563/17/ZOONZE. Test reports for kit of products for construction of ventilated facade cladding with fibre cement boards under the trade names Zenit / Solid, Metro / Cover, True / Transparent, Cembonit / Patina, Raw / Construction for a National Technical Assessment ITB Building Elements Engineering Department.
- 3) LZK00-03052/16/Z00NZK. Test report for aluminium rivets used for fixing flat cement fibre boards. ITB Civil engineering structure, Geotechnical Engineering and Concrete Department.
- 4) 02944/16/Z00NKM. Technical Investigation Report on the corrosion resistance of framework components from the kit of products for construction of Cembrit ventilated facade cladding ITB Construction Materials Engineering Department.
- 5) 03098/16/Z00NZP. Fire classification for flame spread rating through walls with the fire acting from the facade side, complete with the reports LZP01-03098/16FAQS, LZP02-03098/16FAQS, LZP03-03098/16FAQS, LZP04-03098/16FAQS, LZP05-03098/16FAQS, LZP06-03098/16FAQS, LZP07- 03098/16FAQS AND LZP08-03098/16FAQ. ITB Fire Research Department
- 6) 03213/18/Z00NZP. Assessment of fibre cement facade cladding panels available under the following trade names: Solid / Zenit, Cover / Metro, Transparent / True, Patina / Cembonit for meeting the criteria for class NRO per PN-B-02867:2013-06. ITB Fire Research Department.

7.2. Standards and associated documents

PN-EN ISO 62:2008	<i>Plastics — Determination of water absorption.</i>
PN-EN ISO 179:2010	<i>Plastics. Determination of Charpy impact properties — Part 1: Non-instrumented impact test.</i>
PN-EN ISO 9223:2012	<i>Corrosion of metals and alloys. Corrosivity of atmospheres. Classification, determination and estimation.</i>

- PN-EN ISO 1183-1:2013 *Plastics — Methods for determining the density of non-cellular plastics. Part 1: Immersion method, liquid pycnometer method and titration method.*
- PN-EN ISO 10211:2008 *Thermal bridges in building construction. Heat flows and surface temperatures — Detailed calculations.*
- PN-EN ISO 12944-2:2018 *Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments*
- PN-EN ISO 15978:2005 *Open end blind rivets with break pull mandrel and countersunk head — AIA/St*
- PN-EN 573-3:2014 *Aluminium and aluminium alloys. Chemical composition and form of wrought products. Part 3: Chemical composition and form of products.*
- PN-EN 755-9:2016 *Aluminium and aluminium alloys. Extruded rod/bar, tube and profiles. Part 9: Profiles, tolerance limits on dimensions and form.*
- PN-EN 2081:2011 *Metallic and other inorganic coatings. Electroplated coatings of zinc with supplementary treatments on iron or steel.*
- PN-EN 10025-2:2007 *Hot rolled products of structural steels. Part 2: Technical delivery conditions for non-alloy structural steels*
- PN-EN 10088-1:2014 *Stainless steels. Part 1: List of stainless steels.*
- PN-EN 10346:2015 *Continuously hot-dip coated steel flat products for cold forming. Technical delivery conditions.*
- PN-EN 10162:2005 *Cold-rolled steel sections. Technical delivery conditions. Dimensional and cross-sectional tolerances.*
- PN-EN 12467+A2:2018 *Fibre-cement flat sheets. Product specification and test methods.*
- PN-EN 14589:2003 *Blind rivets. Mechanical testing.*
- PN-EN 13501-1+A1:2010 *Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests.*
- PN-B-02867:2013 *Fire protection of buildings. Test method for verifying level of spreading fire through external walls from outside and rules for classification.*
- EAD 090062-00-0404 *Kits for external wall claddings with mechanical fasteners.*



ANNEXES

Annex A. Identification features of products included in a Cembrit kit14
Annex B. Figures15

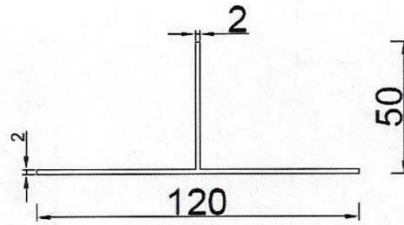
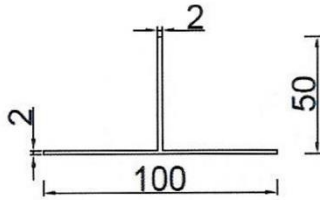
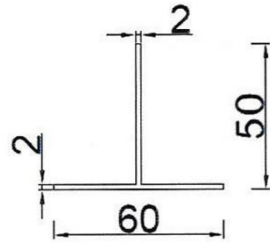
Annex A.
Table A1. Identification properties of the products included in the Cembrit ventilated facade cladding system.

Item	Identification properties	Requirements	Test methods
1	2	3	4
1	Tolerances for shapes and profile dimensions, in mm: <ul style="list-style-type: none"> – cross-sectional dimensions – Wall thickness – Length – Straightness – Convexity and concavity – Twist 	per PN-EN 755-9:2016	PN-EN 755-9:2016
2	Tolerances for shapes and bracket dimensions, in mm: <ul style="list-style-type: none"> – cross-sectional dimensions – Wall thickness – Convexity and concavity – Twist 	per PN-EN 755-9:2016 ≤ 0.2	
3	Tolerances for shape and cladding panel dimensions	level I per PN-EN 12467+A2:2018	PN-EN 12467+A2:2018
4	External appearance and finishing of cladding panels	PN-EN 12467+A2:2018	
5	Areal weight of cladding panels, kg/m ² : <ul style="list-style-type: none"> – Cembrit Raw / Construction: <ul style="list-style-type: none"> • thickness 8 mm • thickness 10 mm – Cembrit Cembonit / Patina: <ul style="list-style-type: none"> • thickness 8 mm • thickness 12 mm – Cembrit Metro / Cover – Cembrit True / Transparent – Cembrit Zenit / Solid 	$15.0 \pm 5\%$ $17.0 \pm 10\%$	Measurement using universal measuring tools which enable the following obtaining proper precision; calculating areal weight, dividing Sample weight by the sample area
		$14.3 \pm 10\%$ $22.0 \pm 10\%$	
		$15.4 \pm 5\%$	
		$15.4 \pm 5\%$	
		$15.4 \pm 5\%$	
6	Bending strength: <ul style="list-style-type: none"> – Cembrit Raw / Construction – Cembrit Metro / Cover, Cembrit Cembonit / Patina, Cembrit True / Transparent, Cembrit Zenit / Solid 	Category A, class 3 (≥ 13 MPa)	PN-EN 12467+A2:2018
		Category A, class 4 (≥ 18 MPa)	
7	Resistance to hot water action	$R_L \geq 0.75$	



8	Resistance to bath — drying	$R_L \geq 0.75$
9	Resistance to freezing — defrosting	$R_L \geq 0.75$
10	Resistance to heating — rain	per PN-EN 12467+A2:2018

Annex B



profile length < 3000 mm

Figure B1. T profiles

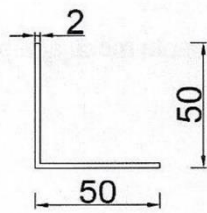
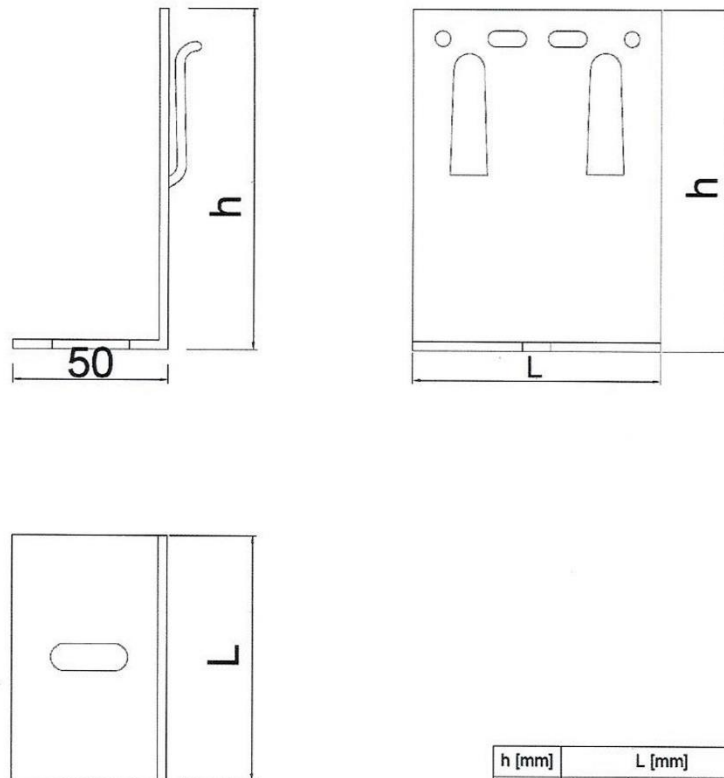


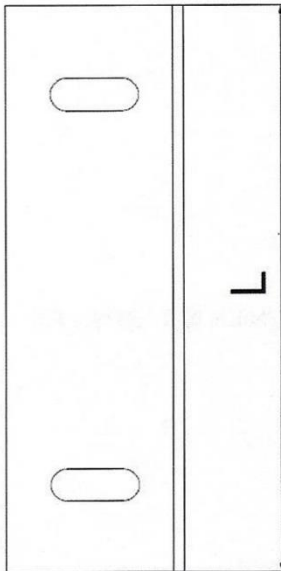
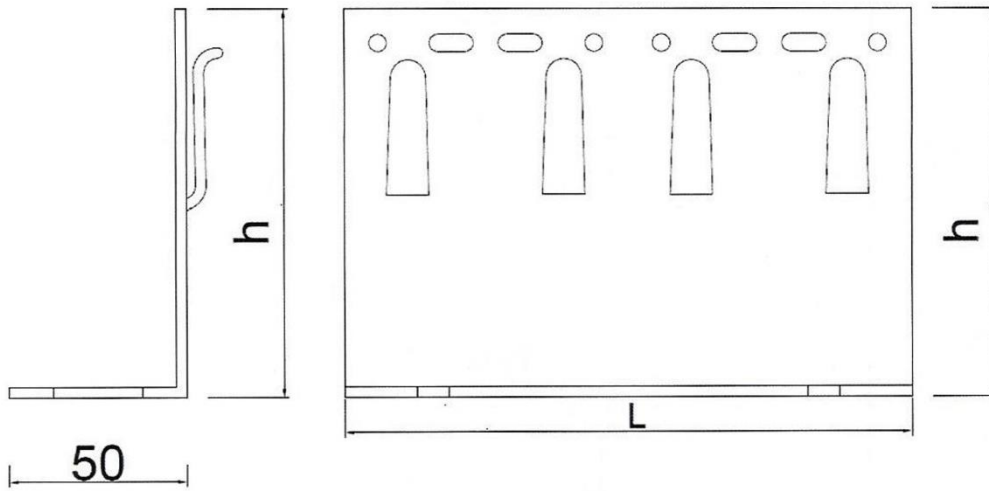
Figure B2. L profile



h [mm]	L [mm]		
60	80	120	160
80	80	120	160
100	80	120	160
120	80	120	160
140	80	120	160
160	80	120	160
180	80	120	160
200	80	120	160
220	80	120	160
240	80	120	160
260	80	120	160
280	80	120	160
300	80	120	160

Wall thickness 3 mm

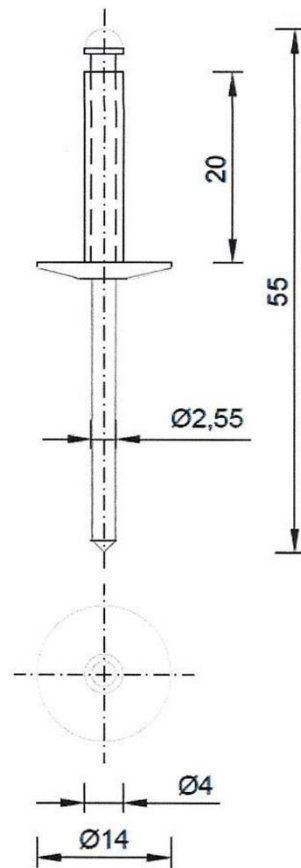
Figure B3. Sliding brackets



h [mm]	L [mm]		
60	80	120	160
80	80	120	160
100	80	120	160
120	80	120	160
140	80	120	160
160	80	120	160
180	80	120	160
200	80	120	160
220	80	120	160
240	80	120	160
260	80	120	160
280	80	120	160
300	80	120	160

Wall thickness 3 mm

Figure B4. Fixed brackets



Dimensional tolerances and quality of rivets per PN-EN ISO 15978:2005

Figure B5. Cembrit rivets

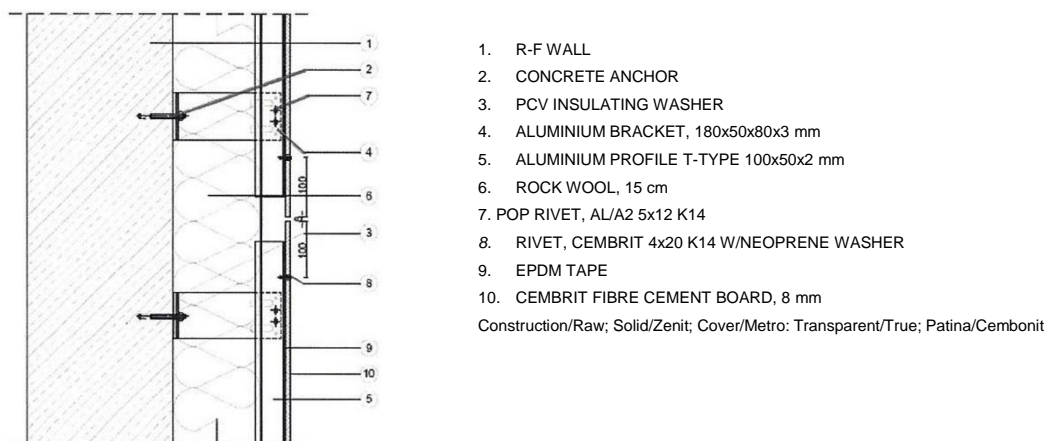


Figure B6. Fragment of a vertical section of Cembrit cladding – example

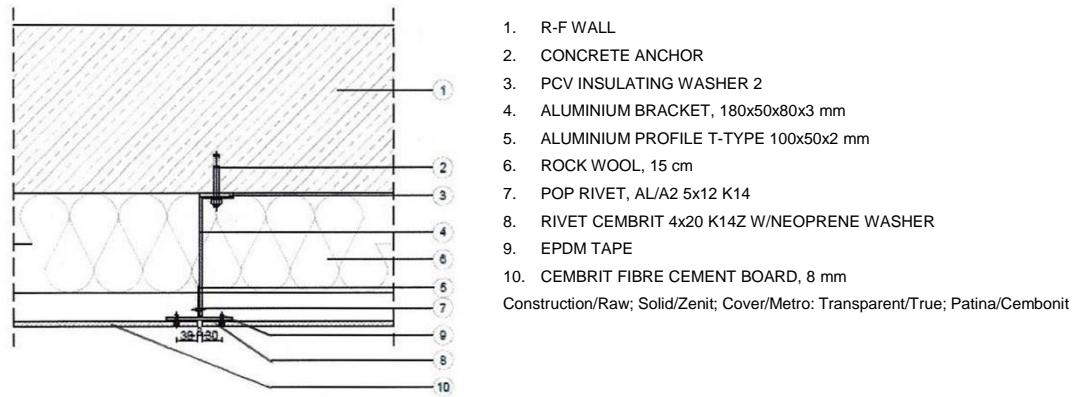


Figure B7. Fragment of a horizontal section of Cembrit cladding — example

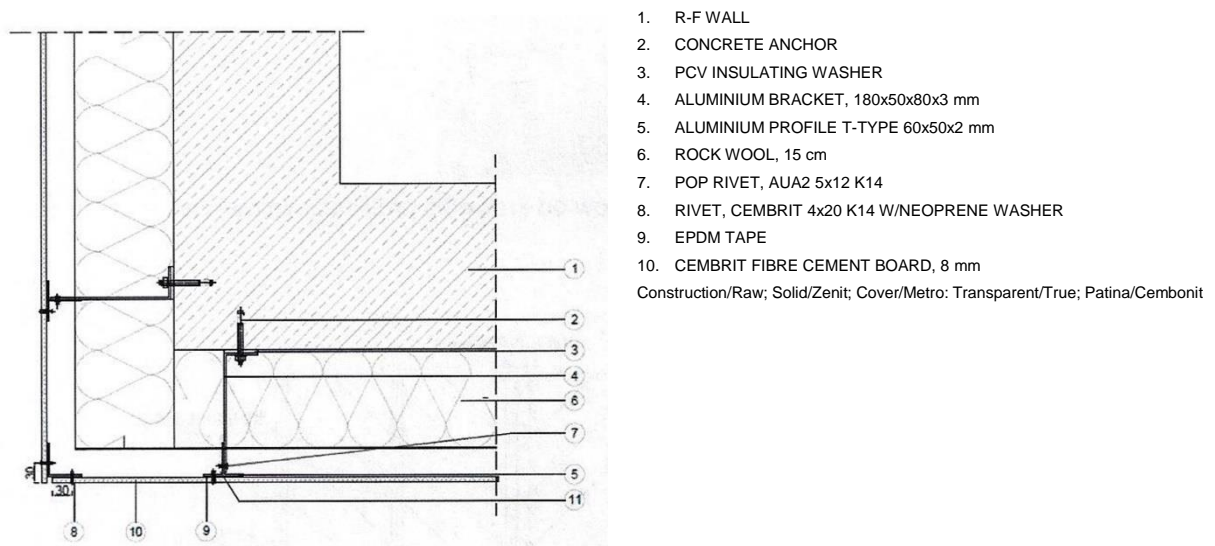


Figure B8. Section through external corner of Cembrit cladding – example

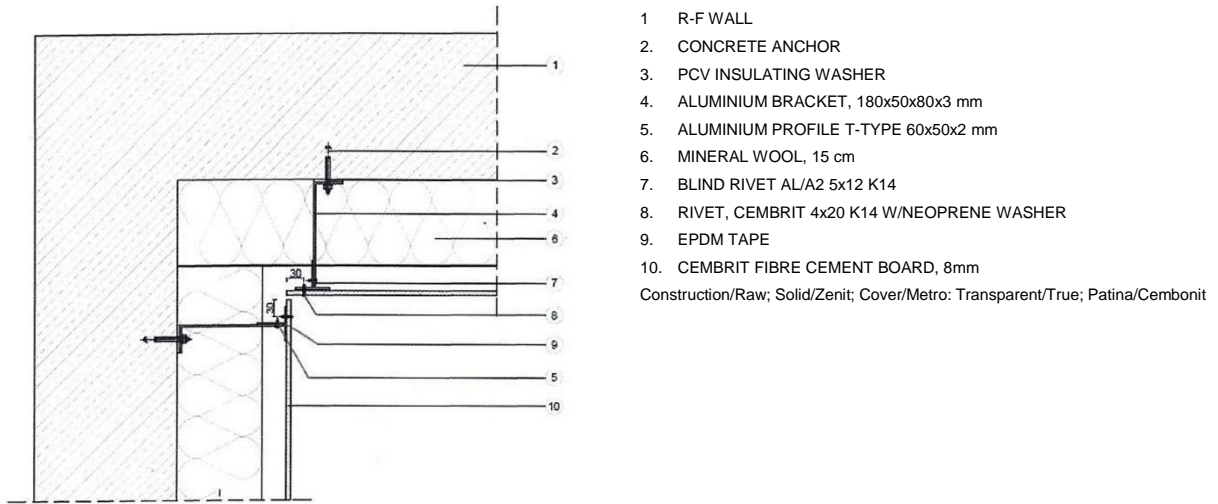


Figure B9. Section through internal corner of Cembrit cladding — example

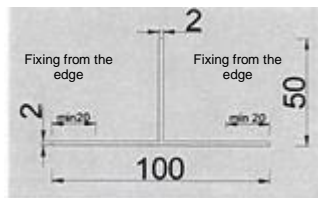


Figure B10. Distance of fasteners from edges of aluminium profiles

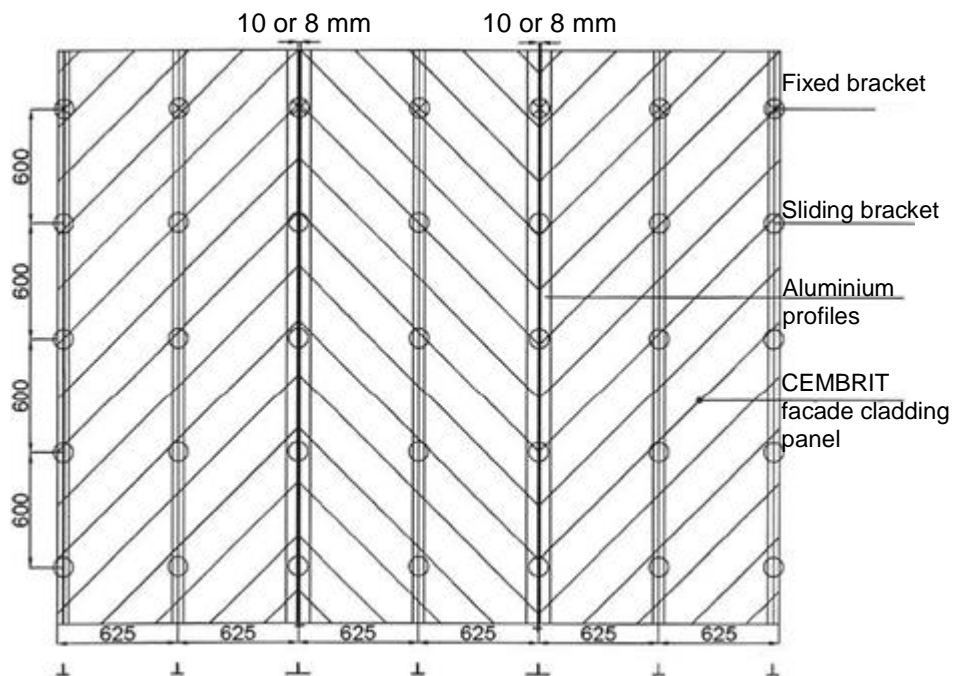


Figure B11. Facade cladding made using CEMBRIT system — example (Dimensions specified in mm)