Specification of the installation set for window and door joinery

used in energy-efficient and passive buildings

on the basis of segment elements of Marbet Warm Mounting Beam (CBM)

/ Information on requirements for installation and installation methods /

"Warm mounting of woodwork joinery" is carried out as part of the Marbet CBM system; it includes settlement of wood joinery in a tight and thermo-insulated support frame that is provided around the current jamb.
CBM beams enable "building extended jambs" similarly to "building with bricks".
A new jamb including supplementary installation elements such as under-window beam (BP), bases for window sills: inner (PPW) and outer (PPZ) and other connecting elements that are available on the construction market, e.g. mounting couplings, adhesives, PU foams, and sealing strips ensure both airtight and simple installation of windows and doors.

1. <u>The standard elements of the installation set for window and door joinery are:</u>
   - 1.1 Warm Mounting Beam – **CBM**
     (CBM.Z… – with outer steel bracket, CBM.W… – with inner bracket)
   - 1.2 Under-window beam (various types depending on a shape of the window profile) – **BP**
   - 1.3 Inner basis of the window sill – **PPW**
   - 1.4 Outer basis of the window sill – **PPZ**
   - 1.5 Nib – **W**

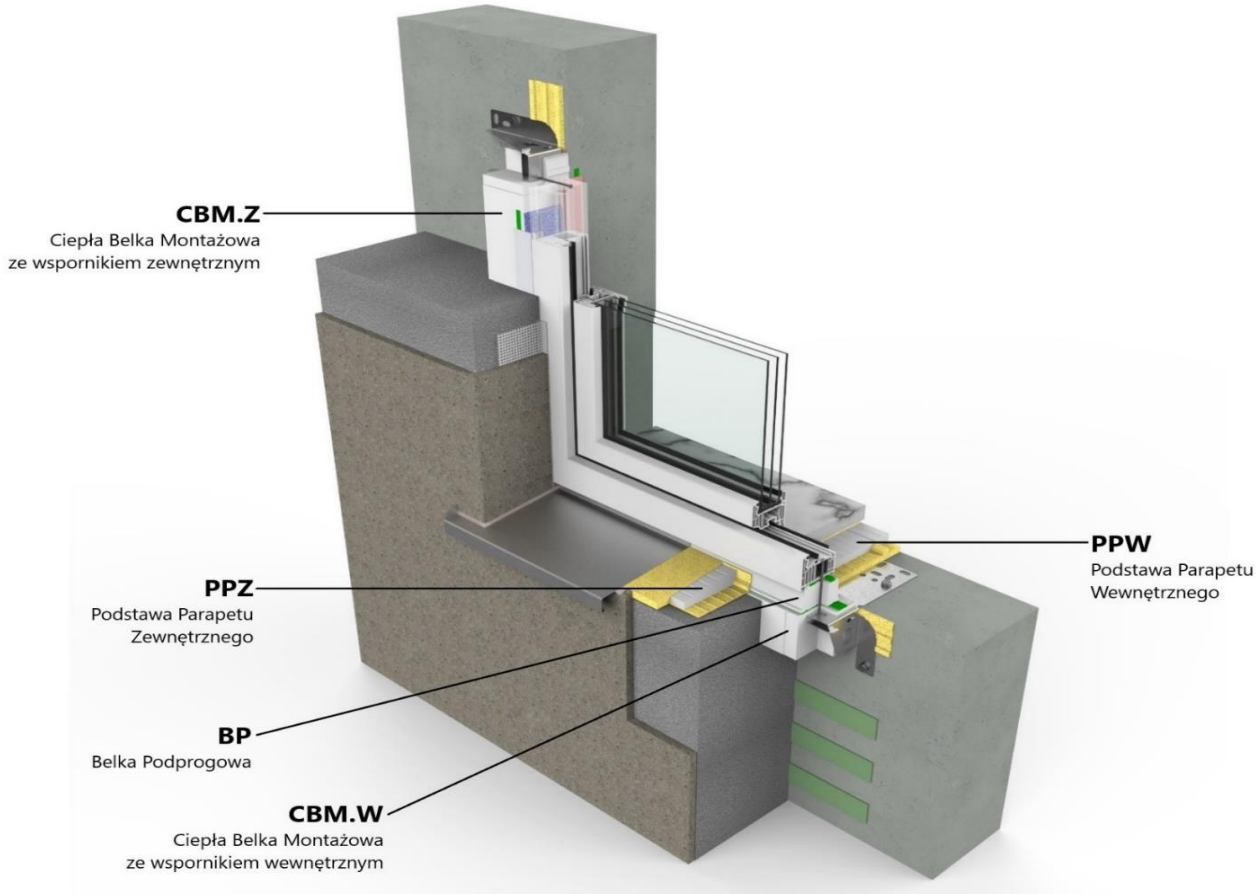


Fig. 1 – Specification of the installation set for window and door joinery

Full list of CBM elements is included in attachment 1 to this Specification… as of 10.10.2019; it is available on https://www.marbetbausystem.com/produkt/ciepla-belka-montazowa

An. 1.1 Warm Mounting Beam (**CBM**) – it is made of high-density hard EPS ≥ 40 kg/m^3 and lambda ≤ 0.032 W/mK:

a) as part of two types of width (depth): 10 cm and 20 cm, (symbols CBM.10…, CBM.20…),
b) as part of two available lengths: 25 cm and 70 cm, (Fig. 2).

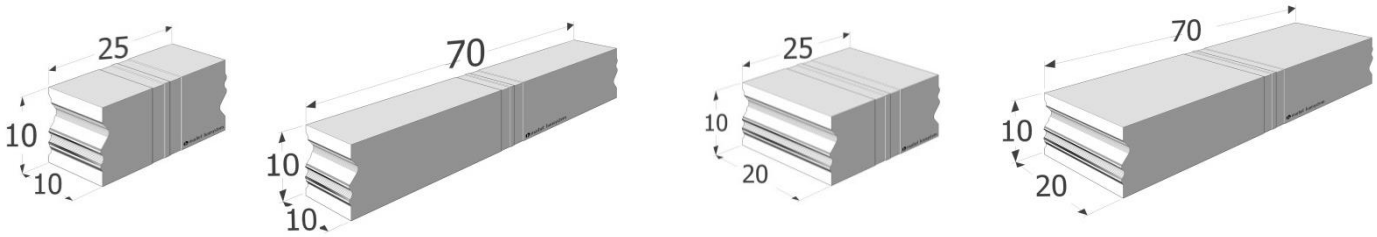
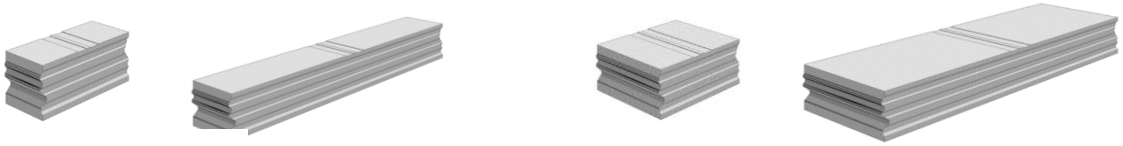


Fig. 2 – Types of Warm Mounting Beam (widening of jambs by: 10 cm or 20 cm)

c) as part of three standard models (due to type of a bracket or its non-application):

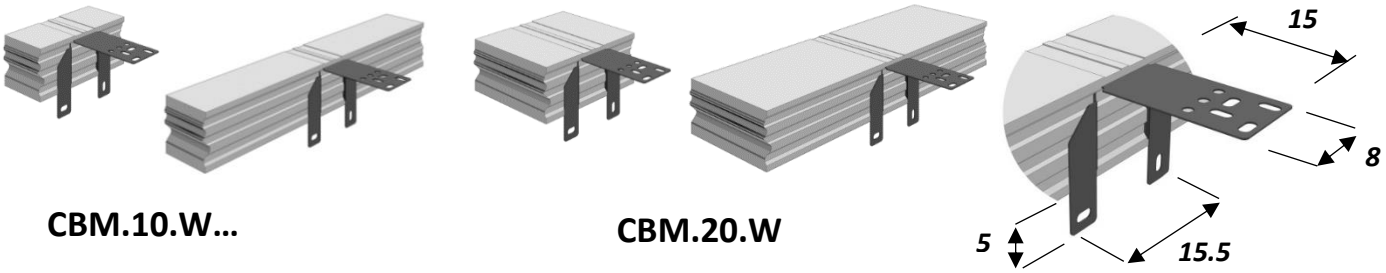
- without steel brackets - (symbols: CBM.10.25, CBM.10.70, CBM.20.25, CBM.20.70), (Fig. 3)



CBM.10… **CBM.20…**

Fig. 3 – CBM model – without steel bracket

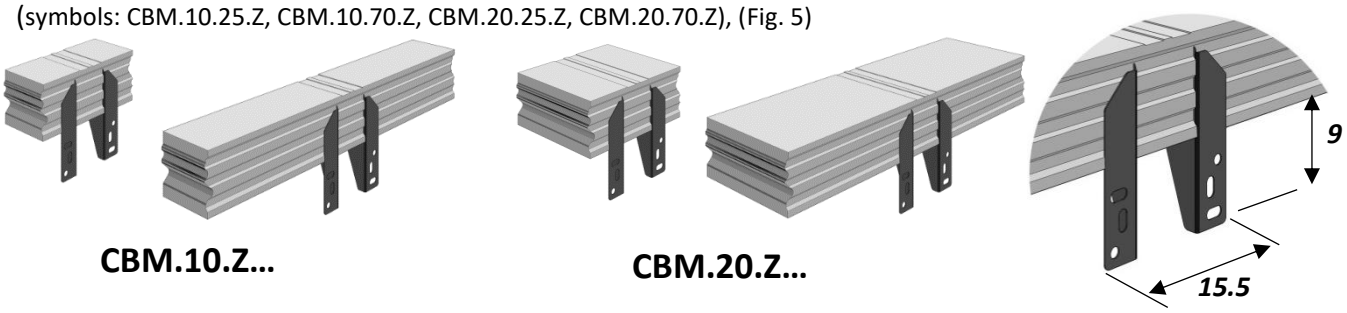
- with steel bracket fastened to structural wall jamb corner
(symbols: CBM.10.25.W, CBM.10.70.W, CBM.20.25.W, CBM.20.70.W), (Fig. 4)



CBM.10.W… **CBM.20.W**

Fig. 4 – CBM model – with inner bracket - installation to a jamb plane

- with steel bracket fastened to external face of the wall (within façade plane)
(symbols: CBM.10.25.Z, CBM.10.70.Z, CBM.20.25.Z, CBM.20.70.Z), (Fig. 5)



CBM.10.Z… **CBM.20.Z…**

Fig. 5 – CBM model – with outer bracket - installation to a façade plane

Load-carrying ability of CBM Warm Mounting Beam – falls into a range between 0.30 and 1.70kN (30 to 170kg) and depends on a model of a steel bracket, type of a foundation, manner of a bracket screwing down, and a static diagram for load coinciding with a beam (woodwork joinery protrusion depth).

(Att. 5 – Table of load-carrying ability of single CBM beam as part of various foundations - it is available on https://www.marbetbausystem.com/produkt/ciepla-belka-montazowa***)***

An. 1.2 The BP under-window beam is a universal and independent element applied as an alternative solution for profile system extensions: PVC, aluminium or wood (adjusted only to a specific type of woodwork joinery profiles within the under-window zone). The BP under-window beam enables for correct settlement of the frame in a new thermo-insulation jamb frame made of CBM beams.

BP under-window beam **(w x h**) with density ≥ 40kg/m^3 and compressive strength ≥ 300kPa and **BP.HARD under-window beam (w x h)** with elevated density ≥ 60kg/m^3 and compressive strength ≥ 600kPa are manufactured in eight standard shapes; all the shapes are adjusted to a specific profile of wood joinery to be installed. Under-window beams are manufactured as 100 to 200 cm long, 3 to 10 cm high and 5 to 30 cm wide. The upper surface may be smooth and have a 4mm layer of soft EPS featuring density up to 14kg/m^3 or have one or two profiled connecting outlets with maximum height up to 1 cm. A layer of soft EPS and connecting outlets are located on the upper surface of the BP beam; these ensure additional stabilisation of the frame during installation and enhancement of sealing hybrid distribution within the coupling. A lower surface may have profiled overlaps for an additional matching of PPW and PPZ window-sill elements along with notches - slideways for arrangement of adhesive doses - sealing hybrid.

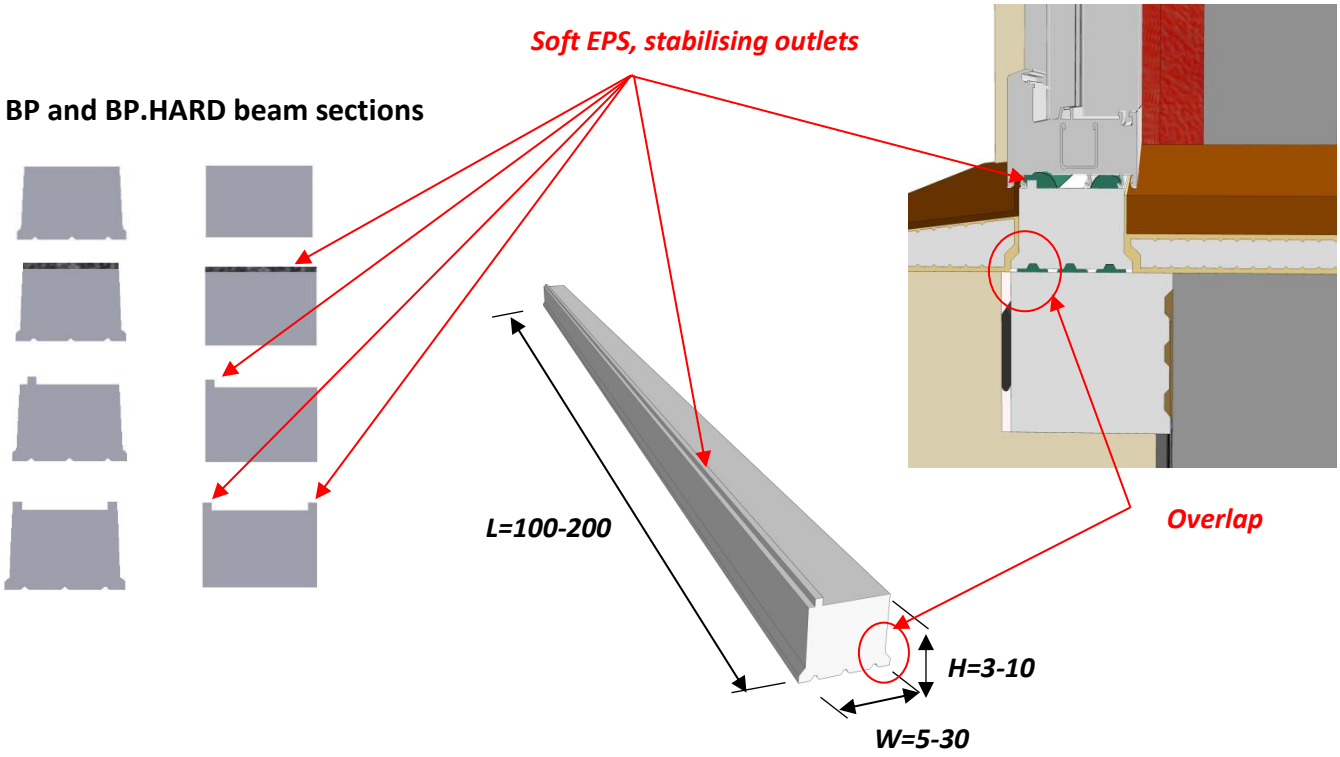


Fig. 6 – Under-window beam (BP)

An. 1.3 The inner basis for the window-sill (**PPW**) – manufactured as 200 cm long, 1.8 cm high and approx. 18 cm wide. On its entire length, it has a profiled overlap used for coupling with the under-window beam (BP). Lower and upper surfaces have profiled indentations that facilitate measuring and cutting PPW to required dimensions – width of a wall; a new network of notches facilitates adherence of PU foam.

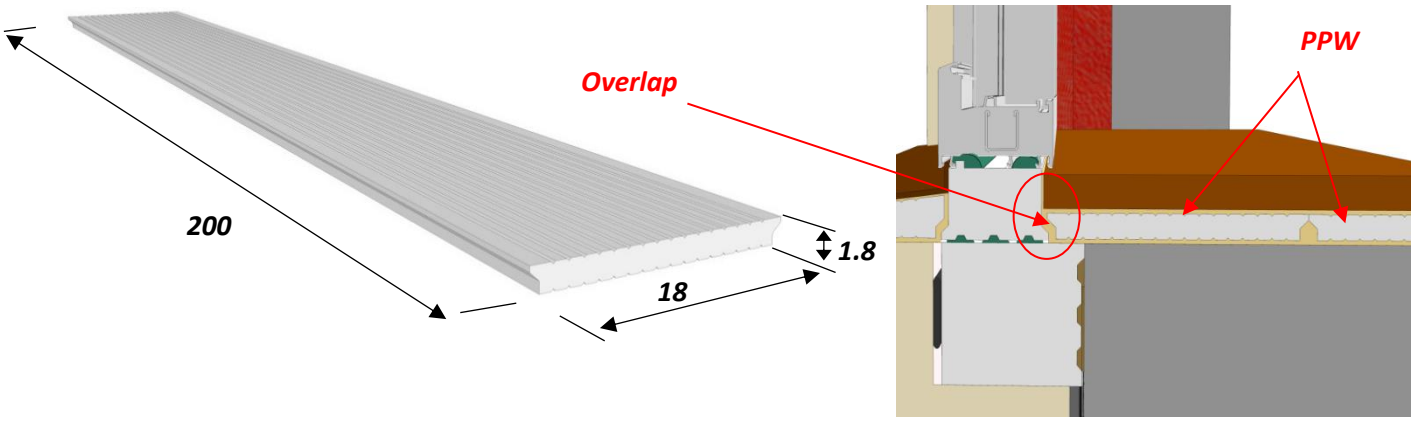
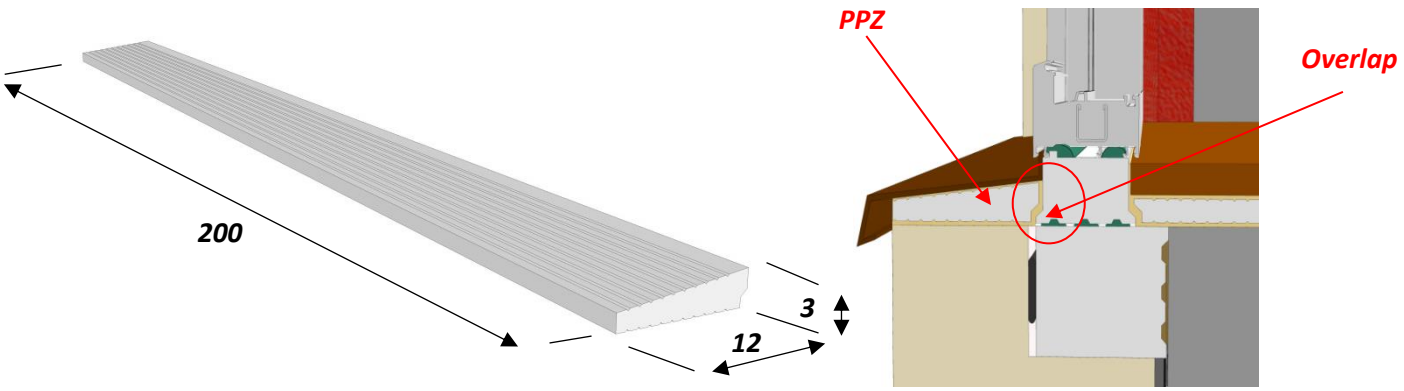


Fig. 7 – Inner basis of the window sill (PPW)

An. 1.4 The outer basis for the window-sill (**PPZ**) – manufactured as 200 cm long and approx. 12 cm wide. The upper surface of the basis of a window sill is inclined at an angle of 7 degrees. The upper edge has a profiled overlap used for coupling with the under-window beam (BP). Lower and upper surfaces have profiled indentations that facilitate measuring and cutting PPZ to the required dimensions; a new network of notches facilitates adherence of PU foam.



Figs. 8 – Outer basis of the window sill (PPZ)

Ad. 1.5 The nib (W) with overall 200x15x2 cm dimensions is an additional supplemental element for a CBM set. It may be installed permanently or temporarily (until provision of re-insulation works - the final façade). The nib constitutes an additional protection of the final and sealed - in compliance with the requirements - coupling between a window and a jamb that is made of the CBM system; it prevents against permeation of rain water, non-controlled air infiltration and UV radiation.

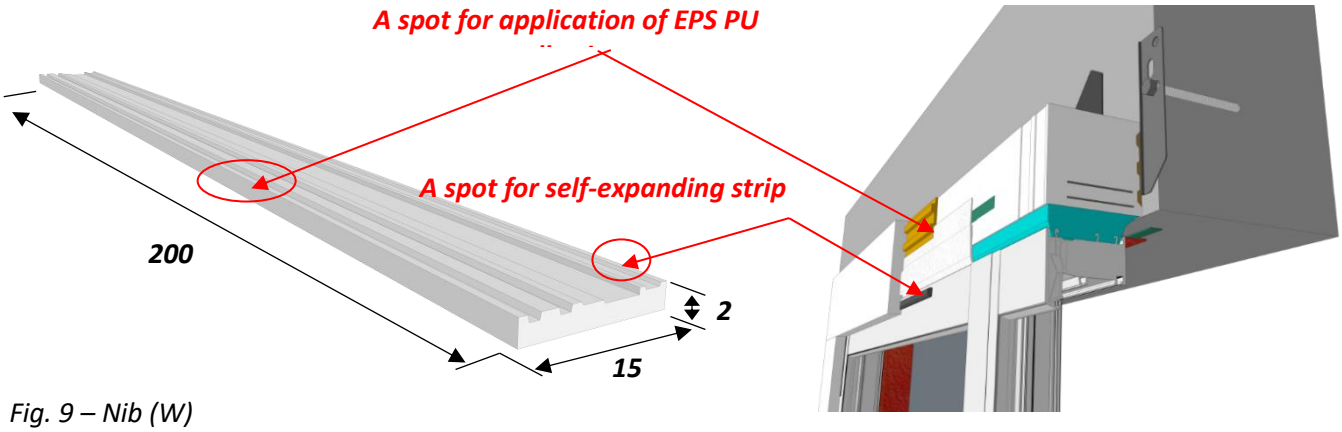


Fig. 9 – Nib (W)

2. The supplementary elements of the installation set for window and door joinery are:

2.1. Frame expansion anchors, head concrete screws, e.g. supplied by KLIMAS Wkręt – Met
2.2. EPS PU polyurethane adhesive e.g. supplied by Soudal – SOUDATHERM type
2.3. PU structural foam, e.g. supplied by Soudal – SOUDAFOAM type
2.4. Adhesive–hybrid sealant, e.g. supplied by Soudal – SOUDALFOIL 360 H type
2.5. Vapour permeable strips, e.g. supplied by Soudal – SWS UNIVERSAL OUTSIDE
2.6. Vapour barrier strips, e.g. supplied by Soudal – SWS UNIVERSAL INSIDE
2.7. Optionally, during installation of a W nib - self-expansion sealing strip, e.g. supplied by Soudal – SOUDABAND type

(specific requirements related to supplemental products and basic documents – standards and ITB approvals are indicated in *Att. 2 – Supplementary materials for CBM system* are available on **https://www.marbetbausystem.com/produkt/ciepla-belka-montazowa**

MARBET shall not bear any responsibility for erroneous selection of "product substitutes"

3. Specification of the CBM beam structure:

3.1. provision of a contact surface (including subsequent mounting beam – along its length) in the form of guiding notches that facilitate levelling of surfaces and enhance tightness of joints glued with EPS PU adhesive. To facilitate application of adhesive, some holes to insert a gun lance have been shaped in the contact surface (Fig. 10).

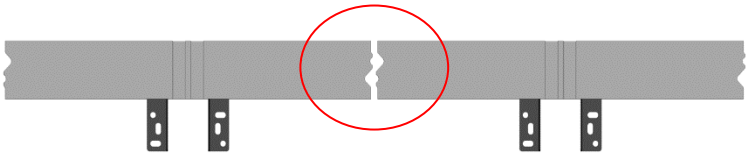


Fig. 10 – Shaped contact of CBM beams

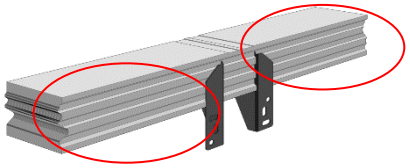


Fig. 11– Shaped back side of CBM beams

3.2. shaped surface texture of notches that enhance adhesion of adhesives to PU EPSs in the surface of contact with the wall (Fig. 11).

3.3. 20mm (for CBM.10…) and 30mm (for CBM.20…) wide neutral zones from the external side of a façade; it can be cut down (on site) without prejudice to load-carrying ability and tightness of the system. Such a zone will enable equalising the façade plane within the window and door joinery (Fig. 12).

It is necessary to keep in mind that:

- in non-cut beams, head concrete screws of window and door joinery may approximate the external face of beams up to the distance of:
  - **3 cm** – in 10 cm-wide beams
  - **4 cm** – in 20 cm-wide beams

(this condition shall be met at maximum protrusion of BP-CBM under-window system beams – facing window frame with CBM beam (Fig. 21).

- head concrete screws may be installed min. **2 cm** from the external face of the beams

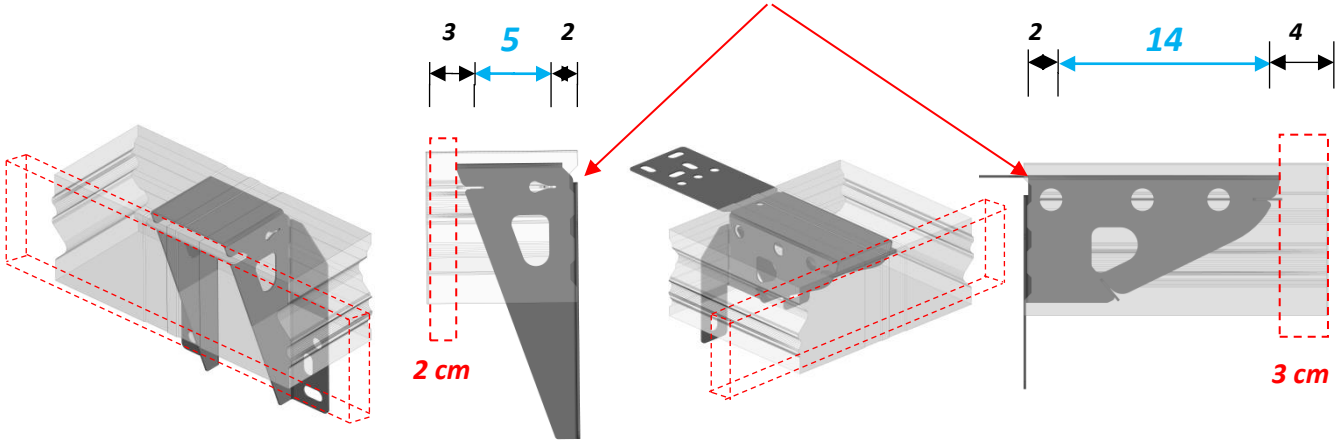


*Fig. 12 – **CBM beam neutral zone***

– 2 cm for CBM.10… and – 3 cm for CBM.20…

3.4. determined (with an indentation of a beam surface) zone for installation of head concrete screws that shorten the window frame with the CBM beam (approx. 6 cm wide) (Fig. 13).

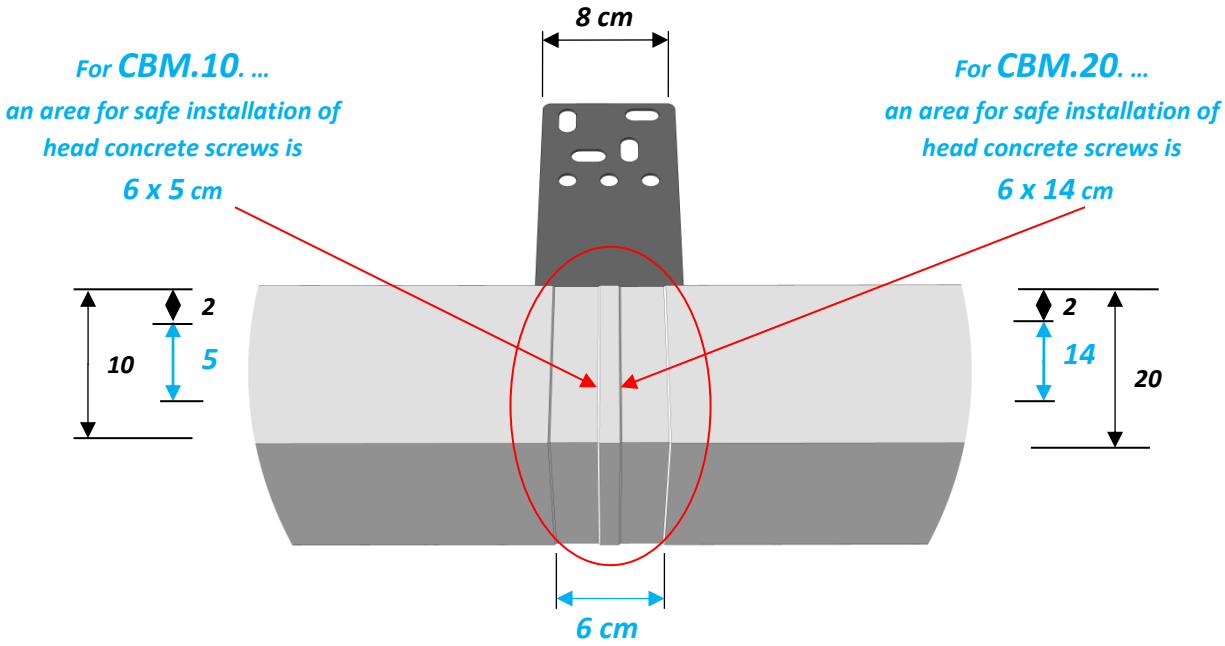


*Fig. 13 – **Area for safe installation of head concrete screws in steel brackets "encased" in CBM beams***

4. Installation guidelines and installation steps:

4.1. Subject to type of material the external wall is made of and anticipated forces resulting from loads, a type of CBM beam is selected. Beams with a steel bracket are fixed to the face of the wall (in façade plane – outer CBMs) or beams with a steel bracket are fixed within window openings (in jamb plane – inner CBMs).

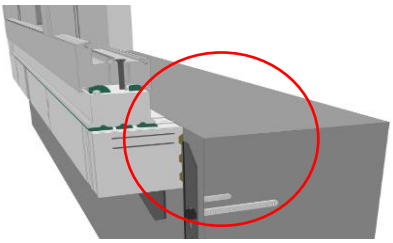


Fig. 14a – Outer CBM Beam

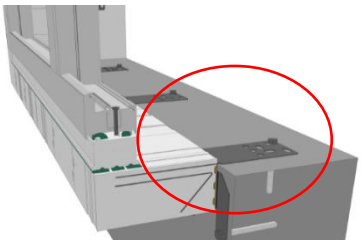


Fig. 14b – Inner CBM Beam

The quantity and location of steel brackets on CBM load-carrying beam should correspond to the anticipated location of the fastening and support points to ensure mechanical fastening of a window with a jamb. Such fastenings must be able to transfer forces from window-structure loads, such as wind load, and from dead load of wood joinery. In the case that the installation design does not specify design wind load on the window structure and the contractor for window installation is not obliged to determine such values analytically or exploratory, then the quantity and location of the brackets for the CBM load-carrying beam must be determined based on **recommendations of the manufacturer of the window and door joinery** specified in the technical specification for installation methods and other requirements. The wood joinery manufacturer's recommendations (**superior to up-keeping the manufacturer's guarantee for window and door joinery**) should consider provisions of the PN-EN 14351-1+A2:2016-10 standard along with general ITB guidelines, including the National Technical Assessment ITB-KOT-2018/0410. Currently, it is assumed that corner fastenings should be located 10 to 15 cm from the internal corner of a window, pole, or transom bar, and the distance between the steel brackets (fastening points) should not exceed 70 cm for PCV-U profile joinery and 80 cm for wood and aluminium joinery. In the case of HST structures, manufacturers recommend up to 50 cm, and even up to 30 cm density of bracket points and fastenings. Heavy and non-typical structures require individual technical advice from technical departments of the manufacturer of wood joinery and Marbet Sp. z o.o.

Photo 1 – Control measurement of the opening and arrangements of CBM beam axes

Photo 2 – anticipated location of installation axis

4.2. The first step of installation is a control measurement of the opening contour and angles, including a check if the supplied windows match the conditions within the site.

It is recommended to measure and mark all anticipated axes on the planned window frames that are to be fastened to a new protruded jamb with window frame tap screws (frame installation). **Such points will also determine the axes for the CBM beams around the window openings.**

During the inspection of window and door joinery dimensions, it is necessary to keep in mind that:

a. the under-window beam which makes a support for the window frame sill part narrows clearance of the window opening by 5 cm at its height,
b. application of CBM beams with inner steel brackets additionally narrow clearance of the window opening - protruded window frames by approx. 1 cm.

4.3. The surface of window frames within the installation zone must be cleaned and de-dusted, and in the case of absorptive foundations, it should be additionally grounded – Photo 3. For structural clay tiles (to increase the load-carrying ability of these foundations), it is recommended to pour cement mortars, such as Ceresit CX15, into the openings within the under-window zones.

Photo 3– Arrangements of the opening – grounding

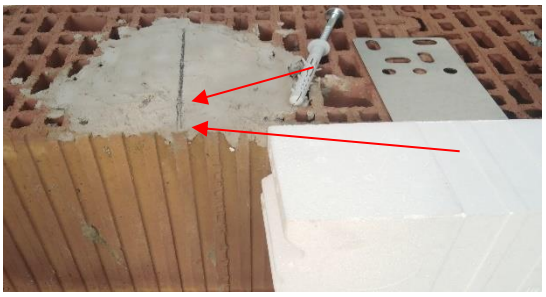


Photo 4 –Reinforcement of foundation load-carrying ability in CBM bracket plate locations through pouring mortar into structural clay tiles

4.4. **Within the under-window zone it is recommended to apply CBM.10(20).W beams with inner steel brackets (Fig. 15a),** which must be installed with three (at least two) mounting couplings; the first within a jamb plane – **as far as possible from the wall's edge**, while the second and third – within a wall external plane (under its beam). Distant from each other and from the edge of a wall, expansion anchors located in the beams with inner steel bracket and, additionally, in two perpendicular planes significantly enhance the load-carrying ability of a single beam with a wall "allowing" for minor installation errors and enhance "installation safety". This is why **CBM beams with inner steel bracket are recommended for installation within under-window zones where the principal weight of the wood joinery is borne and where unforeseeable overloads, such as loads from swinging persons, from rolled wheelbarrows for concrete, or from transport of other heavy materials may occur during later use of the facility** (e.g. bringing a piano or a snooker table to a house, etc.).

4.5. CBM steel brackets in side jambs and in window heads (exposed mainly to pressure force and wind suction) are recommended for installation with two mechanical fasteners (at least with a single fastener). CBM beams with inner brackets may be installed within under-window zones for light - non-exposed to unforeseeable overloads - windows and balcony doors. **Outer CBM beams within the under-window zone must be installed with at least two mounting couplings located at opening upper zone (immediately under the EPS beam) (Fig. 15b).**

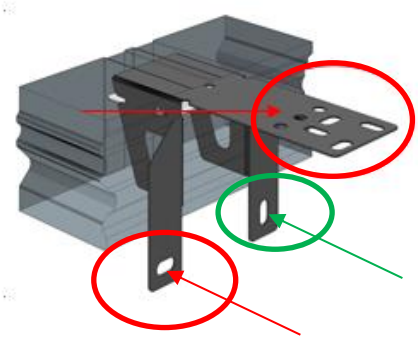


*Fig. 15a – Location of couplings **in beams with internal anchors** - min. one per sheet plate from above – stably and as far as possible from the edge of a wall.*
– min. one immediately under EPS - two couplings under EPS are recommended

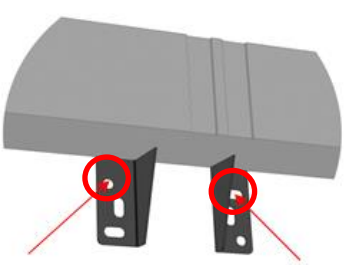


*Fig. 15b – Location of mechanical couplings **in beams with external anchors – at least two couplings within under-window are required under EPS lining.***
– it is admissible to install a single coupling within the opening middle line at a load up to 60 kg/anchor

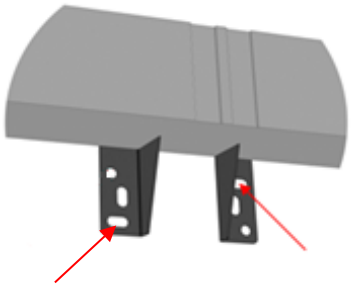


Fig. 15c – It is recommended to locate mechanical couplings in the beams with external anchors (side and head zones) – two couplings led diagonally are recommended

4.6. Each CBM metal bracket with jamb wall must be installed in a manner as to limit leverage effect or elasticity effect. For this purpose it is advised to apply plastic washers between the sheet plate and wall. The load-carrying ability of all mechanical couplings is additionally enhanced with a full polyurethane joint that links all glued wall planes, as part of jambs, with planes made of hard EPS as part of the Warm Mounting Beams. Such joints both link and seal a coupling of the protruded jamb with a wall. In non-standard cases featuring “unreliable load-carrying ability of walls”, e.g. “fresh wall-bases with numerous joints or cracks within bricks, etc.”, the selection of length of bolts, tap screws or expansion metal brackets must be every time adjusted to a type of wall in accordance with guidelines from the manufacturers of such elements – it is to be commissioned to certified designers.

4.7. In the case of erroneous or uneven levelling of the foundation prior to installation of CBM.10.(20).W inner under-window beams (an effect that is unfortunately common on sites), it is necessary to grind or even cut out inessential material in the under-window wall. Next, it is necessary to level the sheet plates on steel brackets until the required level is obtained and then screw in ⌀10 mm expansion bolts.
The application of pins featuring lesser diameters and countersunk heads **is inadmissible as such products will not ensure the required fit or load-carrying ability.** Even upon careful fit of the beams within the under-window zone during their settlement, some “2–3 millimetre irregularities as part of the EPS surface” may occur. Such irregularities, along with final levelling of the contact plane for the

under-window beam, can easily be done with an EPS washboard (which is widely used in lagging systems).

Photo 5 – Cutting and chambering of ferroconcrete sill. Embedding of CBM bracket sheet plate at a required level

Photo 6 – Flattening and levelling of EPS surface for under-window beams with "EPS washboard" or other grinding tools

4.8. Operations are to be commenced with cutting individual beams with a thermal string, saw, or any other cutting tools according to earlier CBM planning (during commissioning elements to be installed) acknowledged with actual measurement – lines on the jambs.

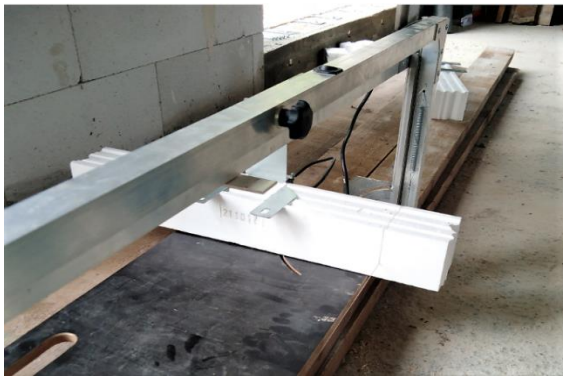


Photo 7 – Cutting CBM beams with a thermal string

Photo 8 – Cutting CBM beams with a saw

Photo 9 – Re-measurement "as is"

Photo 10 – Trial adjustment of re-cut beams

4.9. Principal installation is to be commenced with provision of lower - under-window line of Warm Mounting Beams. Prior to fastening of a beam – in order to ensure additional sealing – it is recommended to apply a gap filling adhesive (e.g. Titan Akryl) at locations where steel plates contact the wall. Then PU adhesive is applied and the first extreme CBM beams are fixed. A space arising between the extreme elements is to be filled in with system beams including 25 cm or 70 cm long CBM steel brackets. Such a space may

be supplemented with re-cut CBM beam with an anchor or without it; it is necessary to retain admissible distances between the brackets.

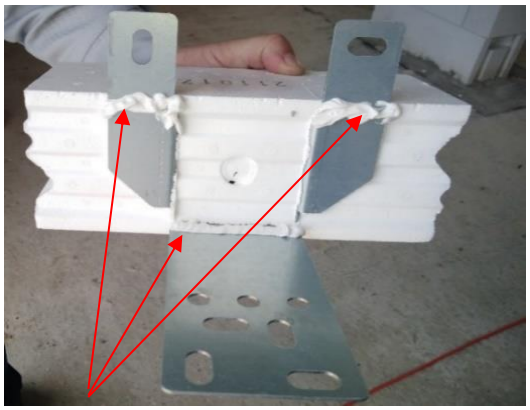


Photo 11 – Provision of additional beam sealing, e.g. made of Acryl

Photo 12 – Application of adhesive to PU EPS

Photo 13 – Installation of CBM lower line

Photo 14 – Installation of CBM side line

Installation of CBM beams within side jambs is to be commenced at lower corners and finished at head beam lower edge. Optimally, upper beam lines (CBM) are finished with head line that overlaps side jambs; due to it, the jamb that is created from above is to be closed and additionally sealed.

Photo 15 – Installation of CBM upper line

Photo 16 – Application of hand screws enhances and accelerates works

4.10. Prior to installation of the under-window beam (for heavy windows, such as HST, and in the case of partial support on a wall), it is necessary to level the current foundation in the corner, CBM beam, and under-window BP beam with a ground beam made of materials featuring the same resistance parameters (compressive strength). Strips with required thickness (ground beam at least 2 mm) may

be made of CBM beams – without brackets – cut with a thermal string (CBM.10… or CBM.20… photo 17 and 18)

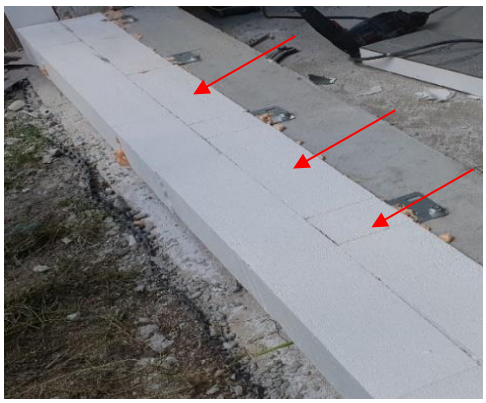


Photo 17 – Ground beams made of cut CBM beams with various thickness Photo 18 – Example of a ground beam for HST windows

4.11. Upon sticking the ground beam with PU adhesive (the sticking ground must be pressed to the CBM beam or sill's wall - joint thickness "0"), it is necessary to grind the entire surface in order to achieve an even structure in both directions: longitudinal along the frame and transverse (important in the case of wide HST sills).
The application of plastic washers between the EPS levelling layers is not allowed as these may locally indent themselves into the ground beam or into the CBM beam and fail to ensure the required dimensional stability (smooth transfer of loads from the BP beam).

Photo 19 – Grinding with an oscillating grinder or a washboard

Photo 20 – Non-recommended application of plastic washers

4.12. Upon provision of the entire new and protruded – beyond face of the wall – jamb, it is necessary to arrange a frame for the window and door joinery, including glued strips and under-window beam (BP) for the purpose of the final installation.

4.13. Sealing strips: vapour barrier strip (from inside), vapour permeable strip (from outside) are glued to the side edges and the upper frame of the frame.
(Considering technological progress related to materials for wood joinery sealing, MARBET allows various methods for provision of such operation. The contractor for works provision is responsible for selection of product substitutes, reliability, durability and airtightness).

4.14. The under-window beam (BP), re-cut earlier to required dimension – width of a jamb – with three doses of an adhesive-hybrid sealing material is glued to the lower line of the CBM beams (perfectly levelled e.g. with an EPS washboard).

Photo19 – Three doses of a hybrid on the BP beam; joining the BP beam and CBM beams within the under-window zone

Photo 20 – Application of a hybrid to the BP beam; arrangements for joining the BP beam and the frame

4.15. On the upper surface of the BP under-window beam, which was glued earlier, two doses of an adhesive-hybrid sealant are to be applied.

4.16. The head frame, which was arranged earlier, is to be carefully and accurately inserted into the pre-arranged jamb with BP, CBM, and its stabilisation elements such as side and upper installation wedges.

The glue joint made of an adhesive-hybrid sealant ensures a durable and air-tight combination of the wood joinery frame, under-window beam **(BP)** and the EPS of CBM beams.

Photo 21 – Installation of the frame on the BP

Photo 22 – Stabilisation of the frame with wedges prior to drilling holes and screwing the head in

Next, it is necessary to screw the window frame in, including its steel brackets encased in CBM as part of the head screws installation zone - locations marked on the CBM beams. **Steel brackets encased in EPS have special-purpose shaped double-tier sheet plates which, upon fixing mounting screws to the jambs, ensure the stability of the frame.**

Additional angle sections or extended stiffening bars for the purpose of limitation of horizontal deformations to wood joinery frames are to be used within under-window zones (including high broadening exceeding 10 cm) and at extended heads including roller boxes. Such solutions should be designed individually for the purpose of the individual project.

4.17. Screwing frames in is normally preceded by drilling holes to the steel bracket sheet plates with a drill featuring a diameter equal to the internal diameter of the head screws. Such an operation is carried out through the holes which have been drilled earlier in the wood joinery frame. Force – torque moment for head screws – is an important element. Those screws are applied in a manner so as not to deform the frame and ensure – at the same time – rectilinearity without “surface

draws". **It is recommended to silicone the holes for the "head screws" prior to their final tightening to the frame.**

Photo 23 – Drilling holes in the brackets

Photo 24 – Screwing in the window frames

4.18. As part of the next step of installation, the window or door leaves are fixed and then the correctness of installation is checked prior to final sealing of the expansion gaps.

4.19. A space between the window frame and the jamb (side and upper parts) must be filled with flexible PU polyurethane foam.

4.20. As part of the subsequent steps with application of an adhesive-hybrid sealant, it is necessary to glue sealing strips to CBM beams and the jamb; at the same time it is necessary to carry out quality control on expansion gaps filling (the excess of PU foam must be cut out):

- Vapour barrier strip released from the window frame is glued from the inside,
- Vapour permeable strip released from the window frame is glued from the outside.

4.21. In the next step, a basis of the internal window sill (**(PPW)**) is settled on the wall (on the PU foam and wedges) to adjust the profiled overlaps to the under-window beam. To ensure coverage to the full width of the wall with EPS coat, it is necessary to cut a subsequent PPW system element. The remaining PPW element is to be used in other location or on another project.

Photo 25 – Installation of internal window sills (PPW)

Photo 26 – Installation location for the base of the external window sill (PPZ)

4.22. The basis for the external window sill (**PPZ**) must be settled during installation of external lining in a building.

4.23. In the lower and upper plane, PPW and PPZ have adhesive notches which may be – at the same time – used as a cutting line during shortening the width of the bases.

4.24. To ensure protection to the CBM frame (PU foam and sealing strips), it is recommended to additionally install a nib **(W)**. Two options may be provided:

4.24.1. final installation with an adhesive for PU EPS including, additionally, a self-expanding sealing strip.

4.24.2. final installation with an adhesive for PU EPS excluding an additional self-expanding strip, leaving a gap for later sticking (during final façade works) of an expansion strip to the window jambs including a mesh and PVC gasket.

4.24.3. temporary installation (until completion of façade works) – screwing the nib in with standard tap screws.

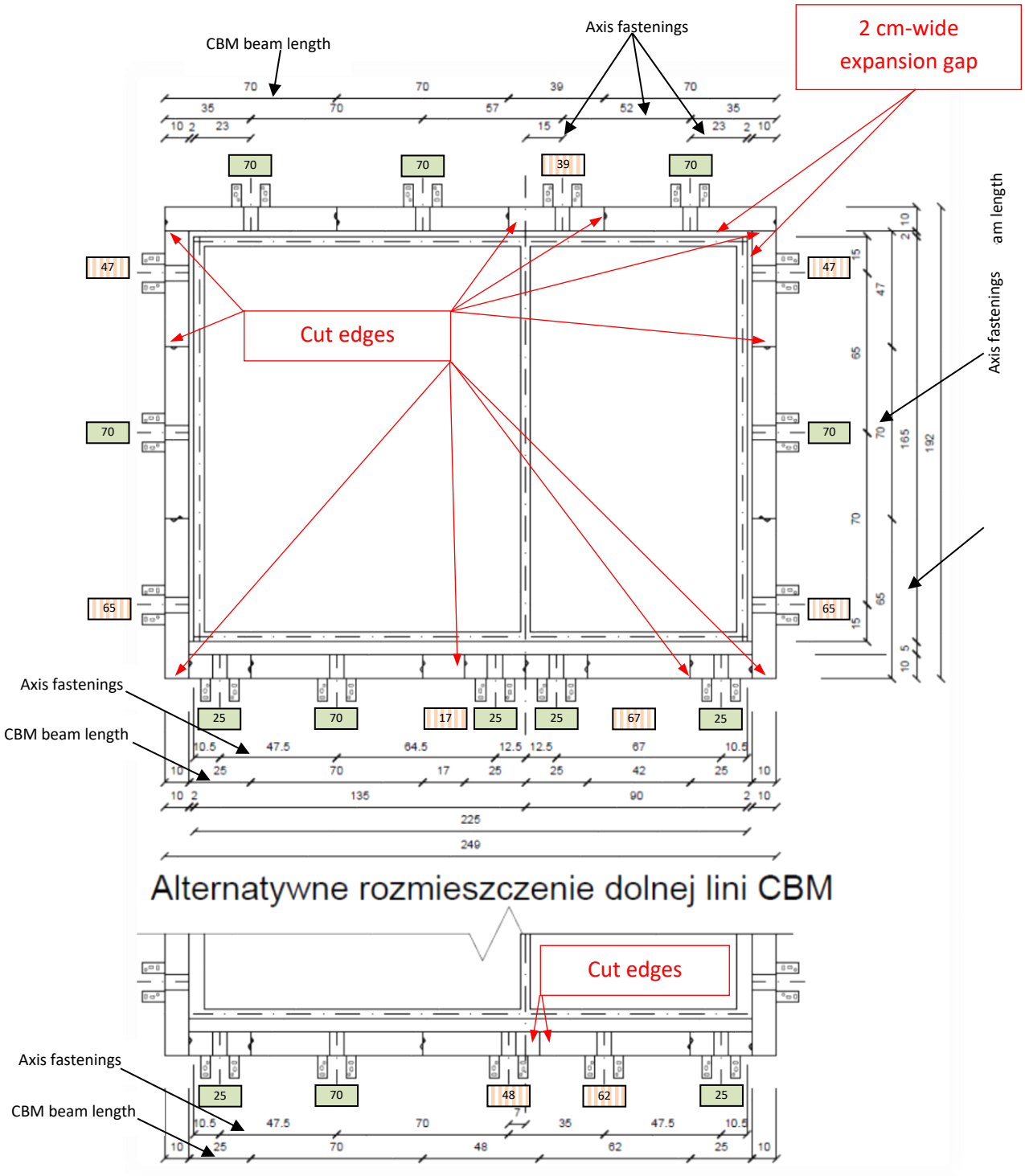
Photo 27- Installed nib (W)

Photos 28; 29 – Skimming joints and CBM beams with a hybrid sealant in locations where water may accumulate and with an acryl on joints where water will not accumulate (e.g. flushing rain during setting)

4.25. It is recommended to smooth down all surface contacts-joints (EPS-EPS, EPS-wall, and EPS-sheet plate), visible from the external side of a facility, with a bright adhesive-hybrid or acrylic sealant. **In locations exposed to accumulation of water, it is necessary to apply a hybrid sealant**, while in all remaining locations, an acrylic sealant is to be used. Due care is required within the head zone where CBM system elements along with wood joinery are exposed to UV radiation and rainfall until provision of the final façade. In the case of non-application of a sealant to the back side of the bracket plate during application of an adhesive and screwing CBM system, it is necessary to provide some additional sealing to all visible sheet plate elements.

***Fig. 16** – Demonstration **225x165 cm** window fixed with elements supplied by CBM MARBET*

17 elements were applied (alternatively, 15 elements)

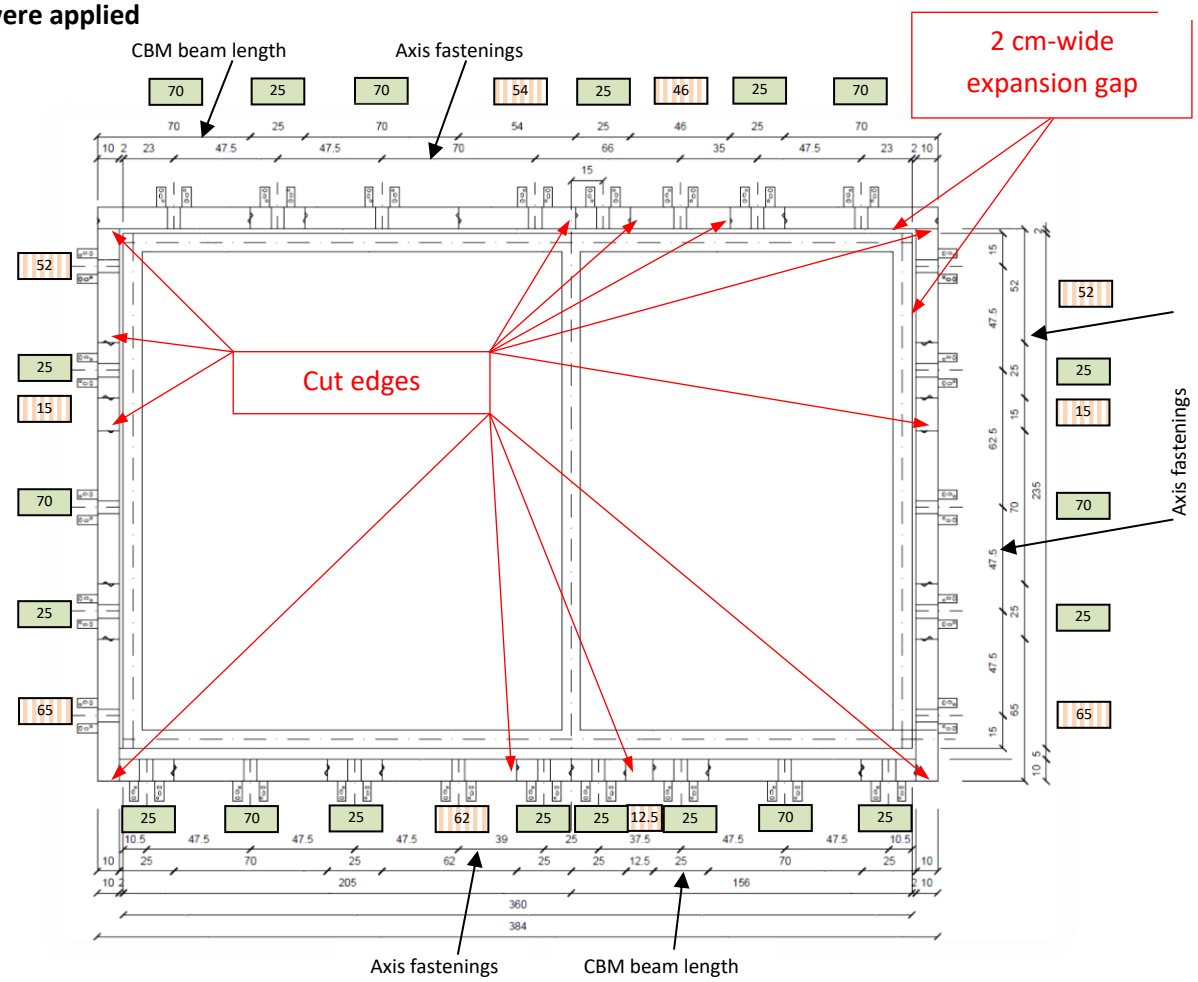


CBM – 25 or 70 cm, entire beam

CBM - dimensioned
- a beam with a steel bracket or without

*Fig. 17 – Model HST **360x235 cm** woodwork joinery fixed with elements supplied by CBM MARBET*

30 elements were applied



REMARKS

1) It is recommended to secure installed elements of the CBM system against direct exposure to UV radiation through the provision of a finishing layer on the façade (insulation with outer plaster or provision of a façade wall in a three-tier wall, etc.) within 1–2 months upon completion of installation works.
2) In the case of application of a nib (W) solution that secures strips and foams in expansion joints against direct exposure to UV radiation, the provision of final façade works may be prolonged up to approx. 12 months. It is necessary to "apply" BSO glue or gypsum mortar previously plastered over a hybrid or an acrylic coat in EPS element contact surfaces between all EPSs, as well as between the EPS and wall.
3) In the case of a two-tier wall, it is possible to acquire NRO class (fire retardant) provided that the façade works are carried out carefully and properly, and provided that it is ensured that double reinforcement mesh on the BSO system is located within the inner jamb zones.

Excerpt from the report "FIRE RATING for propagation of fire through walls in case of fire effect from outside" Building Research Institute no. 3033/16/Z00NZP as of 24.03.2017.
"CBM Marbet System may be installed on foundations made of concrete, ceramic bricks, silicate bricks, porous hollow bricks, structural clay tiles, concrete joinery blocks, blocks made of cellular concrete and other foundations featuring fire rating class at least A2-s3,d0. This classification is applicable for the CBM Marbet System fastened along with the thermal insulation system made of up to 500 mm-thick EPS or mineral wool. Spots such as head, window sill, and contact between the window and thermal insulation system along with

window corners should be secured with double-tier reinforcement (glue mortar and glass-fibre mesh).
CBM Marbet System may be applied along with thermal insulations, mineral, silicate and acrylic plasters, etc. that are classified as fire retardant in compliance with PN-90/B-02867:1990+Az1:2001."

4) This solution is protected by:
    a. patent application to UPRP no. P.414259 as of 4.10.2015
    b. application to EUIPO no. 003047554 as of 30.03.2016