List of technical parameters for a set of CBM products according to ITB_KOT_ 2018_0199

This list was generated based on National Technical Assessment ITB-KOT-2018_0199 1st edition from 12.03.2018 "Set of CBM MARBET items for installation of thermoinsulating frames for windows and balcony doors" points:

- 3.1. Performance properties of the items
- 3.2. Methods used for assessment of performance properties
- 7.1. Reports, testing reports, assessments, classifications

The performance properties were obtained and confirmed by testing in conjunction with complementary materials indicated in the Description of the System, Attachment no. 2 – Materials which complement the Marbet CBM system, thus being products manufactured by the companies SOUDAL and Wkręt-Met.

MARBET SP. z o.o. is not responsible for incorrect selection of equivalent products and, in the case of substitution of base materials, the company is not responsible for the effects in terms of the obtained load bearing capacity and airtightness of connections.

1. Parameters for "Performance properties for set of CBM MARBET items for installation of thermoinsulating frames for windows and balcony doors" obtained in certification testing.

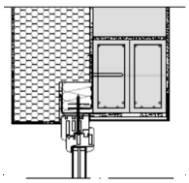
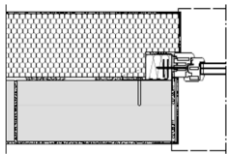
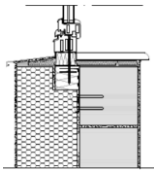
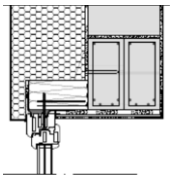
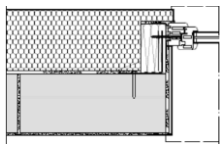
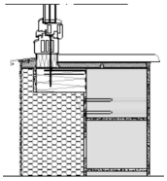
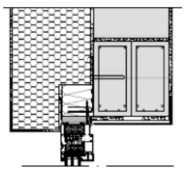
Table 1

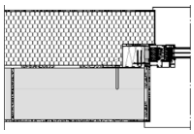
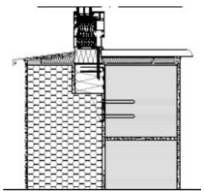
Item	Basic characteristics	Performance properties	Method of assessment
1	2	3	4
1	Air permeability	a < 0.1 $m^3/(m \cdot h \cdot daPa^{2/3})$	PN-EN 12114:2003 i p. 3.2.1
2	Water tightness: - PVC or aluminium door and windows	class 9A (no leaks at 600 Pa)	PN-EN 1027:2001 i p. 3.2.2
	- wooden doors and windows	class 8A (no leaks at 450 Pa)	
3	Resistance to wind load	class C5 (pressure ± 2000 Pa)	PN-EN 12211:2001
4	Resistance to gust of wind (positive / negative) with pressure ± 3000 Pa – safety testing	no cracking or damage	PN-EN 12211:2001
5	Resistance to alternating cycles of wind load (positive / negative) with pressure ± 1000 Pa	no cracking or damage after 200 cycles	p. 3.2.3
6	Resistance to high temperatures from the exterior of the partition (+ 65 °C ± 5 °C, 10 cycles)	no cracking or damage	p. 3.2.4
7	Resistance to vertical forces **(Racking)**	class 4 (for loads of 800 N)	PN-EN 14608:2006
8	Resistance to lateral forces	no cracking or damage after forces of 100 daN/m	p. 3.2.5
9	Resistance to static torsion	class 4 for loads of 350 N)	PN-EN 14609:2006
10	Resistance to impact from soft bodies and heavy bodies	class 5 (no cracking or damage)	PN-EN 13049:2004
11	Linear thermal conductivity coefficient **Ψ**, W/(m·K)	according to Table 2	PN-EN ISO 10211:2008
12	Temperature coefficient $\mathbf{f}_{Rsi}$ of the interior surface of the partition		PN-EN ISO 13788:2013
13	Classification for fire resistance of styrofoam elements (EPS) of the MARBET CBM	E	PN-EN 13501- 1+A1:2010
14 *)	Classification for fire resistance of the interior wall from the exterior wall	fire-retardant class: NRO	PN-B-02867:2013
15	Durability – thickness of the anticorrosion coating of the steel brackets, µm	≥ 20	PN-EN ISO 3497:2004

*) Regards two-tiered walls (with BSO insulation). Extract from Fire classification document … 3033/16/Z00NZP z 24.03.2017 **(item 4.21)** "The Marbet CBM may be mounted to wall substrates made of concrete, ceramic bricks, silica bricks, hollow bricks, ceramic bricks, solid

concrete blocks, hollow concrete blocks, and other substrates with a reaction to fire class of at least A2-s3,d0.
The following classification applies to the Marbet CBM System mounted together with thermoinsulation made of styrofoam or mineral wool of a thickness of up to 500 mm. Areas such as the sill, lintel and areas where the window comes into contact with the insulation system as well as corners should be provided with a reinforced layer (adhesive mortar with a fibreglass mesh).
The Marbet CBM System may be used with insulating systems using mineral silica, silicon, and acrylic plasters and other similar materials which are classified as fire-retardant according to the PN-90/B-02867:1990+Az1:2001 norm."

2. Linear thermal conductivity coefficient Ψ, W/(m·K),
Temperature coefficient f_{Rsi} for interior surface of the partition **Table 2**

Item	**Description of cutaway view**			**Ψ W/(m·K)**	**f_{Rsi}**
1	Juncture: wall – frame MARBET CBM with a width of **10 cm** (under-sill beam BP or BP.HARD; Interior window sill base – PPW; Exterior window sill base – PPZ) – **PVC** or **wooden** windows and balcony doors		lintel	0.012	0.87
			vertical element	0.011	0.87
			sill	0.020[1)] / 0.021[2)]	0.91
2	Juncture: wall – frame MARBET CBM with a width of **20 cm** (under-sill beam BP or BP.HARD; Interior window sill base – PPW; Exterior window sill base – PPZ) – **PVC** or **wooden** windows and balcony doors		lintel	0.011	0.86
			vertical element	0.010	0.86
			sill	0.018[1)] / 0.019[2)]	0.93
3	Juncture: wall – frame MARBET CBM with a width of **10 cm** (under-sill beam BP or BP.HARD;		lintel	0.017	0.87

Item	Description of cutaway view			Ψ W/(m·K)	f_{Rsi}
	Interior window sill base – PPW; Exterior window sill base – PPZ) – **Aluminium** windows and balcony doors		vertical element	0.013	0.86
			sill	0.021[1)] / 0.022[2)]	0.88
[1)] with Under-sill beam (BP) with a coefficient of λ_D = 0.032 W/(m·K) [2)] with Under-sill beam HARD (BP.HARD) with a coefficient of λ_D = 0.034 W/(m·K)					

3. Methods used to assess performance properties

Assessment methods are given in Table 1 and p. 3.1. ÷ 3.5.

3.1. Air permeability. Testing of air permeability was conducted in compliance with the PN-EN 12114:2003 norm. Testing was conducted before beginning testing on the set of items and after testing according to Table 1, items 3 ÷ 5 and 7 ÷9.

3.2. Watertightness. Testing of watertightness was conducted in compliance with the PN-EN 1027:2001 norm. Testing was conducted before beginning testing on the set of items and after testing according to Table 1, items 3 ÷ 5 and 7 ÷9.

3.3. Resistance to alternating cycles of wind (positive / negative pressure). The MARBET CBM window and frame were subjected to the action of alternating wind loads of positive and negative pressure. The connection of the MARBET CBM frame with the jamb was assessed as was the connection of the window to the frame.
After testing, the occurrence of damage, cracks and splitting was assessed.

3.4. Resistance to high temperatures from the exterior side of the partition. The MARBET CBM window and frame were subjected to high temperatures (temperature cycles). temperatury (cykle temperaturowe). The connection of the MARBET CBM frame with the jamb was assessed.
After testing, the occurrence of damage, cracks and splitting was assessed.

3.5. Resistance to lateral forces. Testing of resistance to lateral forces involves applying force to the window mounted in the MARBET CBM frame, with a concentrated static force. The connection of the MARBET CBM frame with the jamb was assessed as was the connection of the window to the frame. After testing, the occurrence of damage, cracks and splitting was assessed.

4. List of reports, test reports, assessments and classifications and list of testing and certification units

List of reports, classifications, assessments

4.1 CBM-air-tightness testing– collective opinion ITB no. 01204/16/Z00NZE z 27.12.2017 , [1]
4.2 CBM-air-tightness testing– Aluminium windows and doors – testing report no. LZE04-01204/16/Z00NZE from 25.07.2017 , [1]
4.3 CBM-air-tightness testing– Aluminium windows and doors – testing certificate no. 04-1204/16/Z00NZE from 16.05.2017 , [1]
4.4 CBM-air-tightness testing– Wooden windows and doors – testing report no. LZE03-01204/16/Z00NZE from 25.07.2017 , [1]
4.5 CBM-air-tightness testing– Wooden windows and doors – testing report no. 03-01204/16/Z00NZE from 25.07.2017 , [1]
4.6 CBM-air-tightness testing– PCV windows and doors – testing report no. LZE05-01204/16/Z00NZE from 25.07.2017 , [1]
4.7 CBM-air-tightness testing– PCV windows and doors – testing certificate no. 05-01204/16/Z00NZE from 25.07.2017 , [1]
4.8 CBM-thermal conductivity testing, BP.HARD elements – testing report no. LZF00-02089/17/Z00NZF from 27.10.2017 , [2]
4.9 CBM- thermal conductivity testing, basic CBM elements – testing report no. LFS00-20693/15/Z00OSK from 31.12.2015 , [3]
4.10 CBM-compressive strength testing, BP.HARD elements – testing report no. LZM00-02125/17/Z00NZF from 17.11.2017 , [4]
4.11 CBM- compressive strength testing, basic CBM elements – testing report no. LZF00-2125/17/Z00NZF from 20.11.2017 , [4]
4.12 CBM-Assessment of thermal conductivity of CBM system – assessment no. NZF-03053/16/Z00NZF from 26.01.2017 + Isotherms, [2]
4.13 CBM- Assessment of thermal conductivity of CBM system from BP.HARD – assessment no. NZF-2269/17/Z00NZF from 10.11.2017 + Isotherms, [2]
4.14 CBM-Consoles – determination of console type – testing certificate no. 01-01204/16/Z00NZE from 26.09.2016 , [1]
4.15 CBM-Consoles – detailed load capacity testing – testing report no. LZE01-01204/16/Z00NZE from 26.09.2016 , [1]

4.16 CBM-Consoles – load capacity of WHO fasteners testing – testing report no. LZK00-01863/16/R32NZK from 22.08.2016 , [5]
4.17 CBM-Consoles – collective load capacity testing for CBM consoles – report no. LZK00-2252/16/Z00NZK from 02.09.2016 , [6]
4.18 CBM-Fire – determination of E class for EPS elements – classification no. 02427.1/16/Z00NZP from 18.12.2017 , [7]
4.19 CBM- Fire – EPS elements – testing report no. LZP01-02427/16/Z00NZP from 30.09.2016 , [7]
4.20 CBM- Fire – NRO – assessment of entire system – testing report no. LZP01-3033/16/Z00NZP from 24.03.2017 , [8]
4.21 CBM- Fire – NRO – fire resistance classification for entire system – classification no. 3033/16/Z00NZP z 24.03.2017 , [7]
4.22 CBM-Fire – NRO – fire safety assessment for NRO classification according to PN-B-02867:2013-06 – assessment no. 1052/18/Z00NZP from 02.03.2018 , [7]
4.23 CBM-SOUDAL – adhesion testing of hybrid to CBM elements– report no. LZM00-01406/16/Z00NZM z 07.06.2016 , [4]

List of testing and certification units

[1] – Building Elements Laboratory, ITB Building Research Institute, Warsaw, ul. Ksawerów 21
[2] – Thermal Physics, Acoustics, and Environment Laboratory, ITB Building Research Institute, Katowice, ul. Korfantego 191
[3] – Thermal Physics, Sanitary Installations, and Environment Laboratory, ITB Building Research Institute, Warsaw, ul. Ksawerów 21
[4] – Building Elements Laboratory, ITB Building Research Institute, Warsaw, ul. Ksawerów 21
[5] – Building Structures and Geotechnics Laboratory ITB Building Research Institute, Katowice, ul. Korfantego 191
[6] – Building Structures and Geotechnics Laboratory ITB Building Research Institute, Warsaw, ul. Filtrowa 1
[7] – Notified body no. 1488, Accredited Laboratory Group, ITB Building Research Institute, Warsaw, ul. Filtrowa 1
[8] – Fire testing Laboratory, ITB Building Research Institute, Pionki, ul. Przemysłowa 2