KOMO®
Technical approval-with-product certificate
K99787-7

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Valid until	*Indefinitely*	**Date**	*2022-07-15*
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CERTIFICATE

Cemfort® B65/Swisspearl W177-6.5 corrugated sheets

SWISSPEARL GROUP AG

DECLARATION BY KIWA

This technical approval-with-product certificate is based on BRL 1103 'Roof covering and wall cladding of profiled fibre cement sheets' dated 26-09-2016, issued in accordance with the Kiwa Regulation for Certification.

The quality system and the product characteristics relating to Cemfort® B65/Swisspearl W177-6.5 corrugated sheets are checked periodically and the performance of Cemfort® B65/Swisspearl W177-6.5 corrugated sheets in their application as roof covering and wall cladding have been assessed in relation to the Buildings Decree and the points of departure for the assessment are checked periodically.

On the basis of that Kiwa declares that:

- there is legitimate confidence that, upon delivery, the Cemfort® B65/Swisspearl W177-6.5 corrugated sheets delivered by the certificate holder comply with:
  - the technical specifications laid down in this technical approval-with-product certificate.
  - the product requirements laid down in this technical approval-with-product certificate and in the BRL.

  provided the Cemfort® B65/Swisspearl W177-6.5 corrugated sheets bear the KOMO® mark in the way indicated in this technical approval-with-product certificate.
- The roofs and façades composed with these Cemfort® B65/Swisspearl W177-6.5 corrugated sheets deliver the performance as indicated in this technical approval-with-product certificate and roofs and façades comply with the Buildings Decree requirements included in this technical approval-with-product certificate, provided:
  - the technical specifications and conditions laid down in this technical approval-with-product certificate are fulfilled;
  - the manufacture takes place in accordance with the regulations and/or processing methods laid down in this technical approval-with-product certificate.

The essential characteristics, as stipulated in the applicable European standard, and the corresponding assessment of the quality system of these characteristics, are not part of this declaration.

Within the framework of this attestation with product certificate, no assessment takes place of the composition and/or assembly in roofs and façades, nor of the production of the other products used to put together roofs and façades

Ron Scheepers
Kiwa

The certificate is listed in the overview on the website of Stichting KOMO: www.komo.nl.

Advice: consult www.kiwa.nl in order to ensure that this certificate is still valid.

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BUILDING DECREE

Evaluated is:
Quality system
Product
Performance
in application
Periodic inspection

Cemfort® B65/Swisspearl W177-6.5 corrugated sheets

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1. TECHNICAL SPECIFICATIONS

1.1 SUBJECT

Profiled fibre cement sheets and accompanying fittings are intended to be used as roof covering for sloping roofs with a roof incline of 10º to 75º and/or wall cladding. The roof covering/wall cladding can be part of a roof covering, wall cladding system or a roof covering/façade construction. The Cemfort® B65/Swisspearl W177-6.5 corrugated sheets can be used in constructions which come into contact with rainwater, groundwater and/or surface water.

1.1.1 Form and composition

The Cemfort® B65/Swisspearl W177-6.5 corrugated sheets are composed of cement, supplemented with mineral additives and organic and synthetic fibres and fitted with a polypropylene band in each corrugation. Each Cemfort® B65/Swisspearl W177-6.5 corrugated sheet is de-watered and cut shorter to shorter formats. The profiled fibre cement sheets can overlap each other in length and width.

1.1.2 Surface treatment

The Cemfort® B65/Swisspearl W177-6.5 corrugated sheets are coated with an acrylic coating with a water basis and are available in various colours.

1.2 REQUIRED CHARACTERISTICS

The statements in chapter 3 of this technical approval-with-product certificate for Cemfort® B65/Swisspearl W177-6.5 corrugated sheets for use in roofs and/or façades apply if the product fulfils the conditions in table 1.

Table 1: Required product characteristics

Reference	Calculation method EN 494	Requirement with regard to application
Mechanical properties:		
- breaking load	5.3.3.1	≥ Strength class 1
- bending moment	5.3.3.3	≥ Strength class X
Fire class	5.6.2	Uncoated sheets are not a fire risk Uncoated sheets ≥ A1 Coated sheets ≥ A2-s1, d0
Water impermeability	5.3.4	At least watertight and vapour permeable
Sustainability:		
- resistance to warm water	5.4.4	*R*L ≥ 0.70
- resistance to soak-dry	5.4.5	*R*L ≥ 0.70
- resistance to freeze-thaw	5.4.2	*R*L ≥ 0.70
- resistance to heat-rain	5.4.3	Complies at least with 5.4.3 NEN-EN 494
Resistance to shocks	5.3.3.4	Complies at least with EN 15057

1.3 PRODUCT CHARACTERISTICS

The Cemfort® B65/Swisspearl W177-6.5 corrugated sheets comply with the product requirements laid down in BRL 1103. Table 2 shows the values of the product characteristics which are part of this technical approval-with-product certificate. These comply with the values specified in the table. Detailed dimensions of the Cemfort® B65/Swisspearl W177-6.5 corrugated sheets are in accordance with figure 1, see chapter 6 of this technical approval-with-product certificate.

Table 2: Other product characteristics

Reference	BRL 1103 requirement	Value
Apparent density: - sheets	In accordance with producer's statement	≥ 1400 g/cm³
Corrugations: - number of (complete) corrugations - height of raised corrugation, h_{od} - height of descending corrugation, h_{om}	In accordance with producer's statement	 6 h_{od} 7 – 13 mm h_{om} 42 – 48 mm
Nominal dimensions: - pitch of corrugation (nominal) - ridge of corrugation - length - working length - width - working width - thickness - squareness	In accordance with producer's statement	 177 ± 2 mm 51 ± 3 mm 1220, 1525, 1830, 2135, 2440, 2750 or 3050 ± 10 mm Depending on the overlap (roof incline) 1093 +10 / -5mm 1050 mm 6,5 ± 0.6 mm ≤ 6.0 mm/m[1]

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1.4 MARKS

Cemfort® B65/Swisspearl W177-6.5 corrugated sheets bear the KOMO® word mark or logo.

The design of this mark is as follows: KOMO

Word mark *Logo*

The design of this mark is in relief. Place of the mark: on each sheet.
Obligatory details:
- certificate number **K99787**;
- factory name and/or mark;
- production location (code);
- production date;
- category and strength classes;
- NT.

The mark and the production date are placed on the product and/or packaging and/or delivery documents.

1.5 ROOFS

1.5.1 Form and composition

The roof construction can be built up of a bearing construction of wood or steel purlins to which the sheets are attached. The sheets overlap each other both lengthways and widthways. A thermal/acoustic insulation system can be fitted under the sheets.

1.5.2 Connections

See also the diagram pages in this technical-approval-with product certificate. When used as roof covering the overlap lengths referred to in table 3 apply as a function of the roof incline and the use of a sealant (sealant roll):

Table 3: Length of horizontal overlap

Roof incline	With sealant	Without sealant
≥ 14° and < 20°	200 mm	Not permitted
≥ 20° and < 90° (façade)	150 mm	150 mm

The vertical overlap of Cemfort® B65/Swisspearl W177-6.5 corrugated sheets is half a ridge (43 mm). The working width of the Cemfort® B65/ Swisspearl W177-6.5 corrugated sheets is 1050 mm in this case.

For roof inclines < 20° sealant roll must be used on both the horizontal and vertical overlaps and at places where the risk of rainwater ingress has to be avoided.

One should remember that wherever sealant roll is used, natural ventilation will be limited. It is then advisable to fit extra ventilation provisions.

1.5.3 Attachment

Each corrugated sheet must be sufficiently attached.
An indication is given below as to where the corrugated sheet fasteners must be located. In the case of buildings of 8 metres and higher, the corrugated sheets at the roof edges must have an extra fastener. The same applies to buildings which are regularly exposed to powerful wind (for example in coastal areas).

The corrugated sheets must be attached: - with insulation in the 1st and the 4th corrugation top;
- without insulation in the 2nd and the 5th corrugation top.

Figure: Fit corrugated sheet fasteners

1.5.4 Fastening materials

The fasteners and fittings supplied do not belong with this technical-approval-with product certificate.

The corrugated sheets can be attached using self-drilling fasteners. This bolt can be used to drill and drill out the drill hole and to tighten the fastener in a single action. The type of fastener to be used depends on the substructure.

1.6 FAÇADES

1.6.1 Form and composition

In addition to using Cemfort® B65/Swisspearl W177-6.5 corrugated sheets as roof covering, the sheets can also be used as wall cladding. The structure of the underlying substructure is, in principle, the same as that of a roof. This underlying substructure must comply with the applicable NEN standards.
The façade construction can be built up of a bearing construction of wood or steel beams to which the sheets are attached. The sheets overlap each other both lengthways and widthways.

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1.6.2 Connections
The standard lateral overlap is ½ pitch. The horizontal overlap is at least 100 mm.

1.6.3 Attachment
The fasteners are placed either in the corrugation valley, or in the corrugation top using a support anchor.

1.6.4 Fastening materials
The fasteners and fittings supplied do not belong with this technical-approval-with product certificate.

The corrugated sheets can be attached using self-drilling fasteners. This bolt can be used to drill the drill hole and to tighten the fastener in a single action. The type of fastener to be used depends on the substructure.

2. PROCESSING

2.1 TRANSPORT AND STORAGE
The corrugated sheets must be stored in a dry space on a flat and stable surface. A maximum of 2 pallets can be stacked on each other. In order to prevent damage and contamination it is advisable only to remove the packaging just before processing. During transport and storage sheets and fittings may not be slid over each other.

2.2 ASSEMBLY
The roof can be covered both horizontally and vertically. Vertical covering is the most practical and widely used method. This involves the sheets being laid in vertical rows from the gutter to the ridge, starting at the side of the roof against the prevailing wind direction. In the event of horizontal laying, the sheets must be laid horizontally from one side of the roof to the other side of the roof.
After that the next row above is laid.
Before laying the roof a check must be carried out to establish whether the roof is straight, in other words whether the purlins run parallel to the ridge purlin. The sides of the roof surface must be positioned at right angles to the ridge purlin. The sheets must always be positioned perpendicular to the ridge purlin.
If a water-retaining, vapour pervious substrate is required, a check must be carried out to see whether it is possible for moisture to be removed. If, for example, a water-retaining, vapour pervious membrane is used, this must continue into the gutter.

The substructure for the Cemfort® B65/Swisspearl W177-6.5 corrugated sheets of wood and/or steel, must be flat and provide sufficient stability to the sheets. For more specific requirements relating to the substructure and its constructional safety, please refer to the following standards:
- NEN-EN 1990
- NEN-EN 1991
- NPR 6708

The minimum (roof) incline on which corrugated sheets can be used is 14°.

The sheets must extend by at least 50 mm at the top compared to the purlin. The cantilever of the sheets must not exceed ¼ l (l = span).

The dimensions must be determined before attaching the sheets. Any fitting pieces must have a minimum width of 3 pitches.

The regulations from the paragraph 1.5.2 must be observed for the horizontal and vertical overlap.

The corners of 2 sheets must be mitred where 4 sheets come together to ensure a proper connection between the roof covering sheets. The dimension and place of the mitring depend on the overlap length and direction in which the corrugated sheets are laid. The corrugated sheets must be sawn, cut, ground etc. using material or tools that are suitable for processing stony materials.

For the assembly on façades the same guidelines should be observed as those that apply to use on roofs. The position of the fastening materials also stays the same. However, a stainless steel support clip must be used in connection with supporting the weight of each individual sheet.

2.3 ATTACHMENT
The corrugated sheets must be attached pursuant to 1.5.3 and 1.6.3 respectively.

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3. PERFORMANCE IN APPLICATION
3.1 PERFORMANCE ON THE BASIS OF THE BUILDINGS DECREE
3.1.1 Buildings decree input

Dept.	Department	Limiting value/determination method	Performance in accordance with Technical-approval- with product certificate	Comments relating to use
2.1	General strength of the building construction	**Façades and roofs** Non-collapsing in accordance with NEN-EN 1990 and NEN-EN 1991	**Façades and roofs** Maximum overhangs whereby sheets comply	See tables 4 and 5
2.8	Limiting the possibility of a fire hazard situation	**Façades and roofs** Fire class A1 in accordance with NEN-EN 13501-1	**Façades and roofs** Uncoated Cemfort® B65/ Swisspearl W177-6.5 corrugated sheets comply with fire class A1.	
2.9	Limiting the development of fire and smoke	**Façades and roofs** Flame spread index at least fire class D in accordance with NEN-EN 13501-1. Smoke class at least s2 in accordance with NEN-EN 13501-1	**Façades and roofs** Uncoated Cemfort® B65/ Swisspearl W177-6.5 corrugated sheets comply with fire class A1. Coated Cemfort® B65/Swisspearl W177-6.5 corrugated sheets comply at least with fire class A2 on both the upper and lower side and the smoke density of the Cemfort® B65 corrugated sheets comply with class s1.	
		Roofs The roof is not a fire risk if the structure has a floor intended for people which is more than 5m above measurement level and the flammable parts of the roof are less than 15 m from the plot boundary.	**Roofs** A roof composed of profiled fibre cement sheets and fittings is not a fire risk. Uncoated and coated fibre cement sheets and fittings are non-flammable.	
2.10	Limiting the spread of a fire	**Façades and roofs** Resistance to fire movement at least 30 minutes in accordance with NEN 6068	**Façades and roofs** To be determined by, or on behalf of, the customer per project based on required fire resistance of the construction.	
3.5	Moisture resistance	**Roofs and façades** Water tightness determined in accordance with NEN 2778. Specific air volume flow ≤ $20 \cdot 10^{-6}$ m³/(m²·s), determined in accordance with NEN 2690. The factor of the temperature of the interior surface determined in accordance with NEN 2778 is not smaller than the value indicated in table 3.20 of the Buildings Decree.	**Façades and roofs** Not determined	When using the profiled fibre cement sheets as an external partition construction of an occupied space, toilet space, or bathroom space, the water tightness must be guaranteed by a water-resistant substructure.
3.10	Protection against rats and mice	**Façades and roofs** No openings > 0.01 m	**Façades and roofs** Not determined	No non-closable openings may be located in the external partition construction which are wider than 0.01 m.
5.1	Energy efficiency, new building	**Roofs** Heat resistance ≥ 6.0 m²K/W, determined in accordance with NEN 1068. Air volume flow of the total of occupied areas, toilet and bathroom spaces does not exceed 0.2 m³/s, determined in accordance with NEN 2686. **Façades** Heat resistance ≥ 4.5 m²K/W, determined in accordance with NEN 1068. Air volume flow of the total of occupied areas, toilet and bathroom spaces does not exceed 0.2 m³/s, determined in accordance with NEN 2686.	**Façades and roofs** Not determined	When using the profiled fibre cement sheets as an external partition construction of occupied space, toilet space, or bathroom space, the heat resistance must be guaranteed by an insulating substructure and the air permeability guaranteed by a substructure which is sufficiently airtight.

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3.1.2 That technical building regulations from the point of view of safety

3.1.2.1 General strength of the building construction, BD section 2.1

The support distances referred to below are based on the sheet length and overlap of the profiled fibre cement sheets and are determined in accordance with the equivalent determination method of BRL 1103.
Table 4 shows the maximum support distances for a roof or the roof covering respectively. The table applies for all wind regions in the Netherlands for buildings with a maximum height of 10 metres. These tables are based on a minimum strength class of ≥ 1X and a working life of at least 15 years.

Table 4: Maximum support distances roofs

Sheet length (mm)	Roof incline	Support distances		Intermediate purlin
		Overlap 150 mm	Overlap 200 mm	
1220	14° - 75°	1070	1020	No
1525	14° - 75°	1375	1325	No
1830	14° - 75°	840	815	Yes
2135	14° - 75°	993	968	Yes
2440	14° - 75°	1145	1120	Yes
2750	14° - 75°	1300	1275	Yes
3050	14° - 75°	1425	1400	Yes

Table 5 shows the maximum support distances for a façade or the wall cladding respectively. The table applies for all wind regions in the Netherlands. The façade or the wall cladding therefore complies with the Buildings Decree. These tables are based on a minimum strength class of ≥ 1X and a design life of at least 15 years.

Table 5: Maximum support distances for façades

	Building height			
Sheet length (mm)	≤ 10 m	≤ 20 m	≤ 30 m	≤ 40 m
	Support distance (mm)			
1220	1120	1120	1120	1120
1525	1425	1425	1425	1425
1830	1730	865	865	865
2135	1020	1020	1020	1020
2440	1170	1170	1170	1170
2750	1325	1325	1325	1325
3050	1475	1475	1475	1475

3.1.2.2 Limiting the possibility of a fire hazard situation, BD section 2.8

The flame spread index of the uncoated profiled fibre cement sheets complies on both sides with at least class A1, determined in accordance with NEN-EN 13501-1.
A roof composed of profiled fibre cement sheets is not a fire risk, determined in accordance with NEN 6063.

3.1.2.3 Limiting the development of fire and smoke, BD section 2.9

General

The fire class of the uncoated profiled fibre cement sheets as specified in this technical approval-with product certificate complies on both sides with at least class A1 and at least class A2-s1, d0 for coated sheets, determined in accordance with NEN-EN 13501-1.

Roofs

A roof composed of profiled fibre cement sheets is not a fire risk, determined in accordance with NEN 6063.

Façades

Conditions of use of façades

1. *A façade of a building must consist, on the outside up to a height of 13 m, of building material combinations which at least comply with class D of the flame spread index, on the understanding that the side facing the escape route must belong to at least class C.*
2. *The outside of a façade of residential buildings of more than two stories must consist, up to 2.5 m above the adjoining land, of building material combinations which at least comply with class B of the flame spread index.*
3. *The outside of a building façade which is not intended for residential purposes must consist, as from a height of 13 m above the adjoining land, of building material combinations which at least comply with class B of the flame spread index.*
4. *Material (combinations) of parapet lower than 1.5 m from the floor area must belong at least to class C of the flame spread index.*
5. *If the wall cladding is in contact with the indoor air (for example, an atrium or screened off gallery), smoke class s2 is required.*
6. *Wherever requirements are imposed in terms of incombustibility, such as near hearths and flues, uncoated and/or coated profiled fibre cement sheets may not be used as such.*
7. *The fire safety of (wooden) base constructions and any insulation material must be assessed on a case-by-case basis.*

3.1.2.4 Limiting the spread of a fire, BD section 2.10

The resistance to spread of a fire to Article 5.3 of NEN 6068 has not been assessed.

3.1.3 That technical building regulations from the point of view of health

3.1.3.1 Resistance to moisture, BD section 3.5

Cemfort® B65/Swisspearl W177-6.5 corrugated sheets are at least water-repellent. When using roofs and façades with profiled fibre cement sheets as an external partition construction of an occupied space, a toilet space, or a bathroom space, a watertight base construction must

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therefore be used. For roofs and façades other than described above, the requirement with regard to resistance to moisture from outside is not applicable.

3.1.3.2 Protection against rats and mice, BD section 3.10
The external construction does not contain any non-closable openings which are wider than 0.01 m.

3.1.4 Technical building regulations from the point of view of energy efficiency

3.1.4.1 ***Thermal insulation, new building. BD section 5.1***
When using roofs and façades with profiled fibre cement sheets as an external partition construction of an occupied space, a toilet space or a bathroom space, a base construction must be used which provides heat resistance and which is sufficiently airtight.
For roofs and façades other than described above, the requirements with regard to limiting heat loss and restricting air permeability are not applicable.

4. TIPS FOR USERS

When the products referred to under 'technical specifications' are delivered, check whether:
- the delivery consignment is correct and complete;
- the marking and the marking method are correct;
- the products do not show any visible defects due to transport or similar causes.

Upon delivery of the products referred to under 'processing', inspect whether these comply with the specification referred to.

If the products are rejected on the basis of the above, please contact:
- Swisspearl Group AG

and as necessary:
- Kiwa Nederland B.V.

Storage, transport and processing must be carried out in accordance with the provisions referred to under 'processing'.

The conditions of use referred to under 'Performance in the application' must be observed.

Within the framework of this technical approval-with-product certificate, no check will take place of the accuracy of the performance of the essential characteristics.

The statements in this attestation with product certificate may not be used to replace the CE marking and/or the corresponding obligatory Declaration of Performance.

5. LIST OF DOCUMENTS REFERRED TO*

NEN 1068	Thermal insulation of buildings - Calculation methods
NEN 2686	Air permeability of buildings - Measurement method
NEN 2778	Moisture resistance in buildings
NEN 6063	Determination of the fire behaviour of roofs
NEN 6068	Determination of resistance to fire movement between spaces
NEN-EN 494	Fibre-cement profiled sheets and fittings - Product specification and test methods
NEN-EN 1990	Eurocode: Basis of structural design, including national annex NB:2011
NEN-EN 1991-1-1	Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings, including national annex NB:2011
NEN-EN 1991-1-3	Eurocode 1: Actions on structures – Part 1-3: General actions - Snow loads, including national annex NB:2011
NEN-EN 1991-1-4	Eurocode 1: Actions on structures – Part 1-4: General actions - Wind actions, including national annex NB:2011
NEN-EN 1991-1-5	Eurocode 1: Actions on structures – Part 1-5: General actions - Thermal actions, including national annex NB:2011
NEN-EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
Buildings Decree	The Buildings Decree 2012

* For the correct version of the documents referred to, please refer to the latest version/amendment sheet of BRL 1103.

6. DETAILED DRAWING