Deutsches Institut für Bautechnik
DIBt

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-17/0484 of 28 May 2019

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)
Product family to which the construction product belongs	Self supporting translucent roof kits
Manufacturer	Kingspan Light + Air ESSMANN Gebäudetechnik GmbH Im Weingarten 2 32107 Bad Salzuflen DEUTSCHLAND
Manufacturing plant	Kingspan Light + Air ESSMANN Gebäudetechnik GmbH Im Weingarten 2 32107 Bad Salzuflen DEUTSCHLAND
This European Technical Assessment contains	100 pages including 90 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	ETAG 010, Edition September 2002, used as EAD according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific Part

1 Technical description of the product

1.1 Kit description and setup

The "Essmann Continuous rooflight system flat" is available in the following types:

"LB classic", "LB basic", "LB classic plus" and "LB plus" for single covering and:

"LB classic double", "LB basic double", "LB classic plus double" and "LB plus double" for double covering. (If the differentiation between single and double covering is not decisive, only the type for single covering is mentioned below).

They are made up of components which are factory-made and assembled on site as a self-supporting translucent roof kit.

The static system of the Essmann roof kits complies with complies with the category "Plane roof systems with additional bearing profiles parallel to the span" as listed in Section 5.1.1.1.1 b) of the ETAG 010[1].

The roof kit comprises 1.2 m- or 2.1 m-wide translucent PC multi-wall sheets which are positioned on bearing profiles and protected from wind loads with covering profiles. The sheets are mounted on the eaves side and ridge side. The multi-wall sheets are abutted along their longitudinal edges via a bearing profile. For the 2.10m-wide sheets, one (for double-span systems), two (for triple-span systems) or three (for four-span systems) additional bearing profiles are arranged as intermediate supports parallel to the end load bearing profiles.

The following components may be part of the flat self-supporting translucent roof kit; the combinations of the components are stated in Table 2.

- translucent polycarbonate (PC) multi-wall sheets of thickness 10 mm (PC 10), 16 mm (PC 16) or 20 mm (PC 20); for the "double"- systems multi-wall sheets can also be used in stacks of two skins (PC 10+10, PC 16+16, PC 16+10, PC 16+6 PETG)
- 6 mm solid sheets made from Copolyester "HIPEX G" (may be arranged as the lower layer in the "double" systems with multi-wall sheets of thickness 16 mm (PC 16) on top)
- 2 – 4 mm solid sheets made from polycarbonate (optionally arranged on top of a multi-wall sheet),
- textile glass mat (optionally arranged between the layers in the "double" systems),
- 1,2 mm GRP-sheet (optionally arranged inside and outside of the covering generally or between the layers in the "double" systems,
- 1,0 mm aluminium sheet (optionally arranged on top of a multi-wall sheet),
- bearing and covering profiles made of aluminium,
- aluminium impost profiles (one-piece or two-piece),
- PVC impost profiles,
- base isolation profiles made of PVC,
- tie brackets made of aluminium or stainless steel
- fixation brackets made of aluminium,
- clamping profile made of aluminium,
- sealing profiles,
- connecting devices.

[1] ETAG 010:2002-09 European Technical Approval Guideline - Self supporting translucent Roof Kits

The components and the system setup of the product are given in Annexes A 1 to A 4.

The material values, dimensions and tolerances of the roof kit not indicated in the annexes shall correspond to the values laid down in the technical documentation[2] of this European technical assessment.

1.1.1 Multi-wall sheets

The following multi-wall sheets made from polycarbonate (PC) in accordance with the harmonised European standard EN 16153[3] may be used.

Table 1: PC-sheets

Manufacturer	Trade name	Sheet height [mm]	Annex
Kingspan Ltd. IE – Kingscourt	Kingspan Multiwall 10-4	10	A 4.1
DS Smith Plastics France F – Kaysersberg	Akyver Sun Type 10/1700	10	A 4.2
DS Smith Plastics France F – Kaysersberg	Akyver Sun Type 10/4W-7	10	A 4.3
Covestro AG D – Leverkusen	Makrolon multi UV 4/10-6	10	A 4.4
Kingspan Ltd. IE – Kingscourt	Kingspan Multiwall 16-7	16	A 4.5
DS Smith Plastics France F – Kaysersberg	Akyver Sun Type 16/7W-12	16	A 4.6
Covestro AG D – Leverkusen	Makrolon multi UV 7/16-14	16	A 4.7
Covestro AG D – Leverkusen	Makrolon multi UV 6/16-20	16	A 4.8
Polycasa N.V. BE - Geel	IMPEX MULTIWALL 16/3w	16	A 4.9
Kingspan Ltd. IE – Kingscourt	Kingspan Multiwall 20-7	20	A 4.10
DS Smith Plastics France F – Kaysersberg	Akyver Sun Type 20/7W-12	20	A 4.11
Covestro AG D – Leverkusen	Makrolon multi UV 7/20-14	20	A 4.12
Covestro AG D – Leverkusen	Makrolon multi UV 6/20-20	20	A 4.13
Polycasa N.V. BE - Geel	IMPEX MULTIWALL 20/3w	20	A 4.14

The multi-wall sheets have unfilled hollow chambers and weatherproofing on the outer surfaces which are unmistakably identified.

[2] The technical documentation comprises all information of the holder of this ETA necessary for the production, installation and maintenance of the roof kit; these are in particular the structural analysis, design drawings and the manufacturer's installation instructions. The part to be treated confidentially is deposited with Deutsches Institut für Bautechnik

[3] EN 16153:2015-05 Light transmitting flat multiwall polycarbonate (PC) sheets for internal and external use in roofs, walls and ceilings - Requirements and test methods; German version EN 16153:2013+A1:201

The hollow chambers of the PC multiwall sheets in accordance with Annexes A 4.2; A 4.9 and A 4.14 may be filled with the Aerogel deposited at the DIBt, which does not influence the load-bearing capacity and the reaction to fire.

1.1.2 Solid sheets PETG

The 6mm-thick solid Polyethylenterephthalat Glycol (PETG) sheet 'HIPEX G' produced by Polycasa Nischwitz GmbH, D – Thallwitz-Nischwitz, and possessing a weight per unit area of 7.62 kg/m² in accordance with Annex A 4.15 of this ETA can be used.

1.1.3 Optional (full-surface) covering supplements

1.1.3.1 Solid sheet PC

The 2 – 4 mm-thick solid polycarbonate (PC) sheet 'IMPEX 2 mm' produced by Polycasa N.V., BE-2440 Geel, and possessing a weight per unit area of 2.4 – 4.8 kg/m² in accordance with the harmonised European standard EN 16240[4] can be used.

1.1.3.2 Textile glass mat

A layer of textile glass mat with a weight per unit area of 100 g/m² (± 8 g/m²) may be arranged between the multi-wall sheets or between multi-wall sheets and solid sheets. It corresponds to the specifications deposited with Deutsches Institut für Bautechnik.

1.1.3.3 GRP sheet

Sheet made from glass fibre-reinforced unsaturated polyester resin with a thickness of 1.2 mm and with a glass content of at least 20% by mass. It corresponds to the specifications deposited with Deutsches Institut für Bautechnik.

1.1.3.4 Aluminium sheet

The aluminium sheets are made from the aluminium alloy EN AW-5754 in accordance with EN 573-3[5] with a thickness of 1.0 mm and shall correspond with the multi-wall sheets in width and length.

1.1.4 Bearing profile, covering profile and marginal covering profile

The aluminium profiles (see Annex 2.1.1 to 2.1.4) are made from the aluminium alloy EN AW-6060 T66 or T64 in accordance with EN 755-2[6] and have the dimensions given in Annex A 3.1.1 and A 3.1.2 of the ETA.

1.1.5 Impost profiles, marginal profile and covering angle

1.1.5.1 The aluminium made impost profiles 1 to 7 (see Annex 2.2.1 to 2.2.5 and Annex 2.3.1 to 2.3.5) at the eaves as well as the marginal profile and the covering angle for the impost profiles 2 and 7 are made from the aluminium alloy EN AW-6060 T66 in accordance with EN 755-2 and have the dimensions given in Annex A 3.2.1 to A 3.2.4, A 3.2.6 and A 3.2.7 of the ETA.

1.1.5.2 The PVC made impost profiles PVC 1 to 3 (see Annex 2.3.6) at the eaves are made from polyvinylchloride PVC-U, EP, 078-25-23 in accordance with EN ISO 1163-1[7] and have the dimensions given in Annex A 3.2.8 to A 3.2.10 of the ETA.

1.1.6 Base profile isolation

The base profile isolation (see Annex 2.3.3) is made from polyvinylchloride PVC-U, EP, 078-25-23 in accordance with EN ISO 1163-1 and has the dimensions given in Annex A 3.2.5 of the ETA.

4	EN 16240:2014-03	Light transmitting flat solid polycarbonate (PC) sheets for internal and external use in roofs, walls and ceilings - Requirements and test methods
5	EN 573-3:2013-12	Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products
6	EN 755-2:2016-10	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties
7	EN ISO 1163-1:1999-10	Plastics - Unplasticized poly(vinyl chloride) (PVC-U) moulding and extrusion materials -Part 1: Designation system and basis for specifications (ISO 1163-1:1995)

1.1.7 Stiffening profiles

The stiffening profiles 1870, 1880 and 1890 (see Annex 2.3.6) for the impost profiles PVC 1 to 3 are made from the aluminium alloy EN AW-6060 T66 in accordance with EN 755-2 and have the dimensions given in Annex A 3.2.11 of the ETA.

1.1.8 Tie brackets

1.1.8.1 The tie brackets 1, 4 and 5 (see Annex A 2.3.3, A 2.3.5 and A 2.3.6) which are connected to the covering profiles and bearing profiles are made from stainless steel material no. 1.4016 according to EN 10088-2[8] and have the dimensions given in Annex A 3.3.1, A 3.3.4 and A 3.3.5 of the ETA.

1.1.8.2 The tie brackets 2, 3 and 6 (see Annex A 2.3.5 and A 2.3.6) which are connected to the covering profiles and bearing profiles are made from the aluminium alloy EN AW-6060 T66 in accordance with EN 755-2 and have the dimensions given in Annex A 3.3.2, A 3.3.3 and A 3.3.6 of the ETA.

1.1.9 Clamping profile

The aluminium clamping profile (see Annex A 2.2.3., A 2.2.5, 2.2.6, A 2.3.3., 2.3.5 and A 2.3.6) is made from the aluminium alloy EN AW-6060 T66 in accordance with EN 755-2 and have the dimensions given in Annex A 3.4.1 of the ETA

1.1.10 Fixation brackets

The fixation brackets 1 and 2 (see Annex A 2.2.3., A 2.2.5 and A 2.2.6) which are used for fixation between the bearing profiles are made from the aluminium alloy EN AW-6060 T66 in accordance with EN 755-2 and have the dimensions given in Annex A 3.4.2 to A 3.4.3 of the ETA.

1.1.11 Sealing profiles

The sealing profiles (see Annex A 2.1, A 2.3.7 and A 2.3.8) are made from Ethylen/Propylen-Terpolymer EPDM in accordance with DIN 7863[9] with Shore hardness of 60 ± 5 Shore A in accordance with DIN ISO 7619-1[10]. The sealing profiles have the dimensions given in Annex A 3.1.3.

1.1.12 Connecting devices

The connection between the covering profile and bearing profile is made at regular intervals with thread-forming screws and washers type Zebra Piasta 6.3 x L or screws and washers FABA type A 6.5 x L according to ETA-10/0184 in accordance with Annex A 2.1.1 and A 2.1.2.

To limit the horizontal displacement, nipple screws 4.8 x 13 are screwed into the bearing profiles at the joints of the sheets (section B-B) on both sides 300 mm from the end of the bearing profile.

The bearing profiles are screwed constructively to the impost profiles at the eaves with two screws each type BZ 6.3 x L according to ETA-10/0184 (Annex A 2.3.1 to A 2.3.6).

Pan head screws ZEBRA Pias 4.8 x L (Annex A 2.2.3, A 2.2.5 and A 2.2.6) are used to connect fixation brackets to the clamping profile or the impost profile or the stiffening profile (for variant "LB plus").

The ridge cover profile is connected with the last top chord screwing (Appendix A 2.3.7 and A 2.3.8).

8	EN 10088-2 :2014-12	Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes
9	DIN 7863-1:2011-10	Elastomor glazing and panel gaskets for windows and claddings - Technical delivery conditions - Part 1: Non celluar elastomer glazing and panel gaskets
10	DIN ISO 7619-1:2012-02	Rubber, vulcanized or thermoplastic - Determination of indentation hardness - Part 1: Durometer method (Shore hardness) (ISO 7619-1:2010)

1.1.13 Essmann "LB classic", "LB basic", "LB classic plus" and "LB plus" roof kit

The roof kit is made up of the components described in Sections 1.1.1, 1.1.2 and 1.1.4 to 1.1.12. The components according to section 1.1.3 may be used in addition

Depending on the type of the kit and the type of the covering (single or double), the following components in accordance with table 2 are used:

Table 2: Combinations of components

Type of kit	LB classic		LB basic		LB classic plus		LB plus	
Component \ Type of covering	single	double	single	double	single	double	single	double
Covering, bearing and marginal covering profile (Annex A 3.1.1)	X	X	X	X	X	X	X	X
Ridge cover profile (Annex A 3.1.3)	X	X	X	X	X	X	X	X
Ridge impost corner profile (Annex A 3.1.3)	X	X	X	X	X	X	X	X
Impost profile 1 (Annex A 3.2.1)	X	X	–	–	–	–	–	–
Impost profile 2 and 7,marginal pr., covering angle (Annex A 3.2.2)	X	X	–	–	–	–	–	–
Impost profile 3 (Annex A 3.2.3)	–	–	–	–	X	X	–	–
Impost profile 4 (Annex A 3.2.4)	–	–	–	–	X	X	–	–
Base prof.isolation (Annex A 3.2.5)	–	–	–	–	X	X	–	–
Impost profile 5 (Annex A 3.2.6)	–	–	X	X	–	–	–	–
Impost profile 6 (Annex A 3.2.7)	–	–	X	X	–	–	–	–
Imp. profile PVC 1 (Annex A 3.2.8)	–	–	–	–	X	X	–	–
Imp. profile PVC 2 (Annex A 3.2.9)	–	–	–	–	X	X	–	–
Imp.profile PVC 3 (Annex A 3.2.10)	–	–	–	–	–	–	X	X
Stiffening profiles (Annex A 3.2.11)	–	–	–	–	–	–	X	X
Tie bracket 1 (Annex A 3.3.1)	–	–	X	X	X	X	X	X
Tie bracket 2 (Annex A 3.3.2)	–	–	X	X	X	X	X	X
Tie bracket 3 (Annex A 3.3.3)	–	–	X	X	X	X	X	X
Tie bracket 4 (Annex A 3.3.4)	–	–	X	X	X	X	X	X
Tie bracket 5 (Annex A 3.3.5)	–	–	X	X	X	X	X	X
Tie bracket 6 (Annex A 3.3.6)	–	–	X	X	X	X	X	X
Clambing profile (Annex A 3.4.1)	–	–	X	X	X	X	X	X
Fixation bracket 1 (Annex A 3.4.2)	–	–	X	X	X	X	X	X
Fixation bracket 2 (Annex A 3.4.3)	–	–	X	X	X	X	X	X

Depending on the covering used, the roof kit may be used in the following support systems:

Table 3: Combinations of support system

Covering	Multi-wall sheet as per Annex	Support system			
		1-span	2-span	3-span	4-span
		$a_p \leq 1060$	$a_p \leq 1060$	$a_p \leq 703$	$a_p \leq 530$
PC 10	4.1 to 4.4	X	–	–	–
PC 10 + PC 10	4.1 to 4.4 (2x identical multi-wall sheets)	X	X	–	X
PC 16	4.5 to 4.9	X	X	X	X
PC 16 + PC 16	4.6 to 4.9 (2x identical multi-wall sheets)	X	X	X	X
PC 16 (outside) + PC 10	4.5 + 4.1	X	X	X	X
	(4.7 to 4.8) + 4.4				
	4.6 + 4.3				
PC 16 (outside) + 6 mm PETG	(4.5 to 4.9) + 4.15	X	X	X	X
PC 20	4.10 to 4.14	X	X	X	X

Table 4: Reaction to fire of the components

Component	Reaction to fire
Multi-wall sheets/ coverings	Class E in accordance with EN 13501-1[11]
Solid sheet PC	
Solid sheet PETG	
Textile glass mat	
GRP sheet	
Base profile isolation	
Impost profiles PVC	
Aluminium sheet	Class A1 as per EN 13501-1 (without further testing as per Commission Decision 96/603/EC, as amended by Commission Decisions 2000/605/EC and 2003/424/EC)
Bearing-, covering- and marginal covering profiles, ridge cover- and - impost corner profiles	
Impost profile Aluminium	
Tie bracket Aluminium/ stainless steel	
Clamping profile	
Fixation bracket	
Connecting devices	

[11] EN 13501-1:2010-02 Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

2 Specification of the intended use in accordance with the applicable European Assessment Document

The self-supporting translucent roof kit may be used in the roof area for open or closed structures. The multi-wall sheets may be combined to form continuous rooflights of any length with rectangular bases.

The pitch of the covering is between 3° and 90°.

The roof kit is not a walk-on system; it may not be used for bracing of the roof support structure.

The performance data given in Section 3 are only valid if the roof kit is used in compliance with the specifications and the conditions given in Annex A, B and C.

The verifications and assessment methods on which this European Technical Assessment (hereinafter referred to as 'ETA') is based lead to the assumption of a working life of the roof kit of at least ten years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as means for choosing the right products in relation to the expected economically reasonable working life of the structure.

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic structural resistance of the multi-wall sheets to forces (actions) resulting from downward loads and uplift loads [kN/m²] provided that the bearing conditions as described in Annexes A 2.1 to A 2.3 are respected	See Annex B 1.3
Limitation of deflection	See Annex B 1.4
Consideration of the effect of load duration	See Annex B 1.2
Consideration of ageing and environmental effects	See Annex B 1.3
Consideration of thermal effects	See Annex B 1.3
Values for characteristic structural resistance of aluminium bearing and covering profiles	In accordance with structural calculation.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Fire performance in case of external fire exposure	No performance assessed
Reaction to fire	Class E
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Watertightness and condensation	Length of the sheets ≤ 4.20 m : Category 1 (no leaks with no differential air pressure) up to an inclination (pitch) of the substructure from the horizontal: 5% Length of the sheets ≥ 4.20 m : No performance assessed Design details as per information deposited with Deutsches Institut für Bautechnik

3.4 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Resistance to damage by impact loads with a soft object (50 kg)	SB 0 (no requirement)
Resistance to impact loads from a hard object (250 g)	Passed (declaration of performance in accordance with EN 16153)
Resistance to horizontal live loads	No performance assessed

3.5 Protection against noise (BWR 5)

No performance assessed

3.6 Energy economy and heat retention (BWR 6)

No performance assessed

3.7 Sustainable use of natural resources (BWR 7)

No performance assessed

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

In accordance with ETAG 010 used as EAD the applicable European legal act is: 98/600/EC
The system to be applied is:

Product	Intended use	Levels or classes (reaction to fire)	Systems
Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	For general use in roofs and roof structures	E	3

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

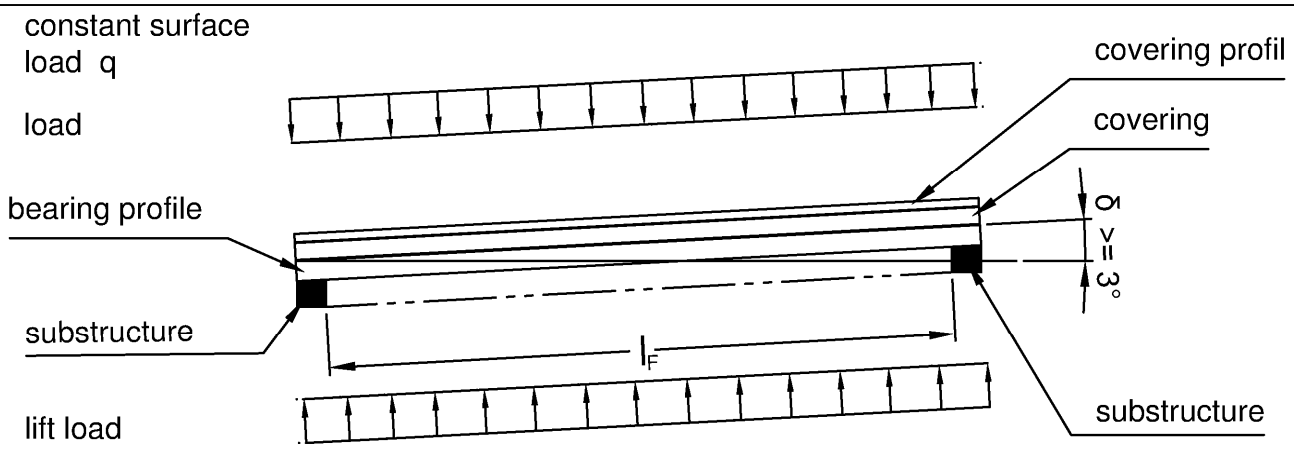
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

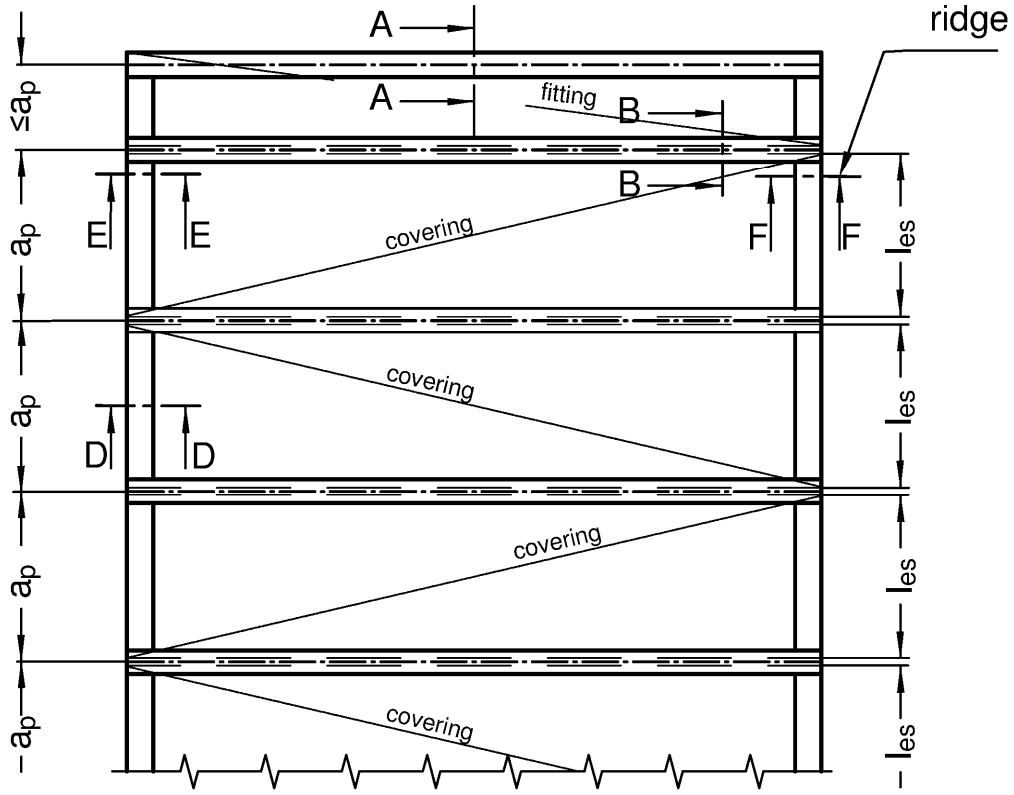
Issued in Berlin on 28 May 2019 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Wachner

Deutsches Institut für Bautechnik DIBt



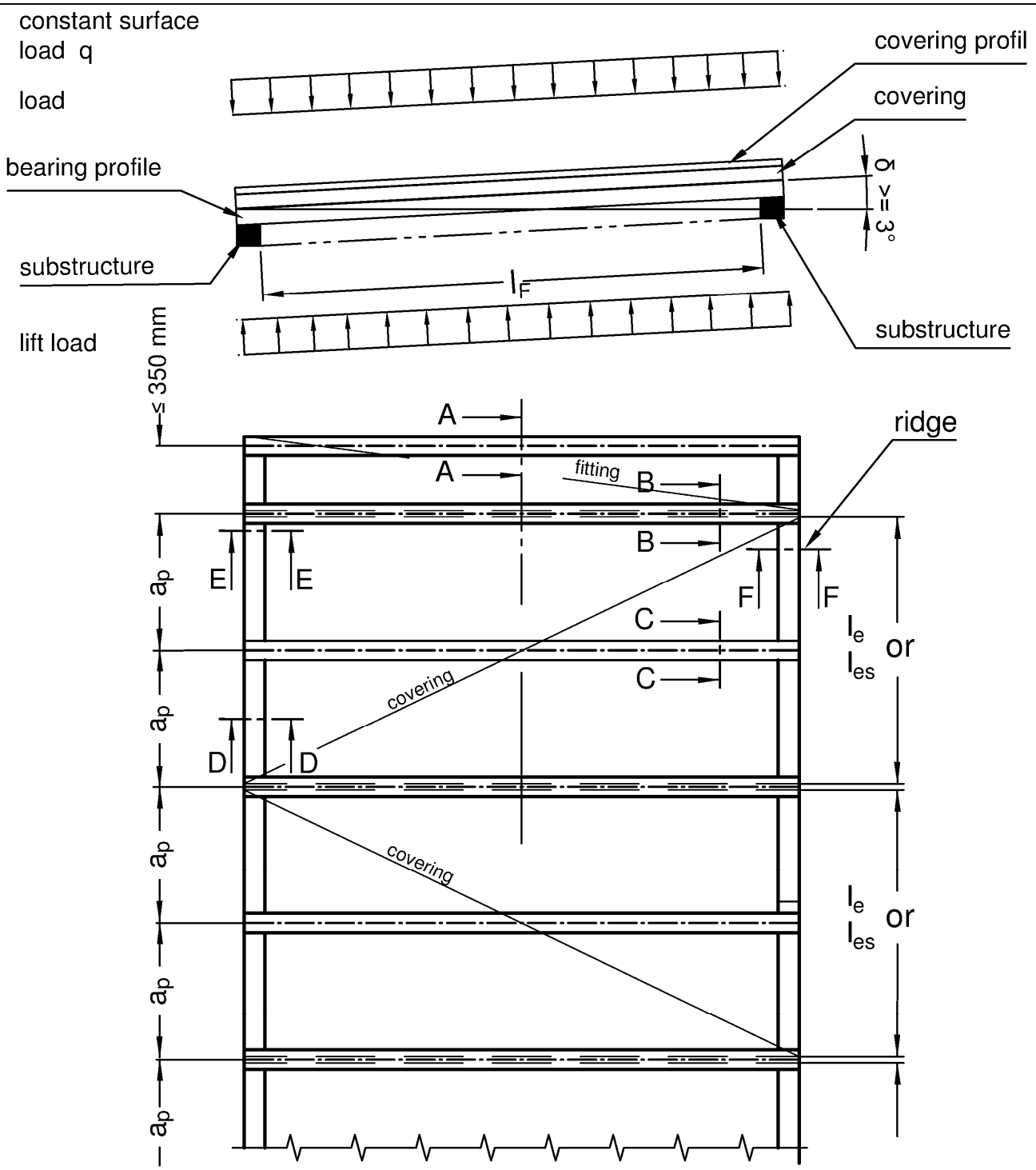


a_p: spacing of bearing profiles :max. 1060 mm

l_{es} : width of covering
cut from production width l_e

schematic view

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 1.1
System overiew 1-span-system	



a_p spacing of bearing profiles :max. 1060/530 mm

l_e : width of covering

l_{es} : width of cut from production width l_e

schematic view

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 1.2
System overiew 2-span-system	

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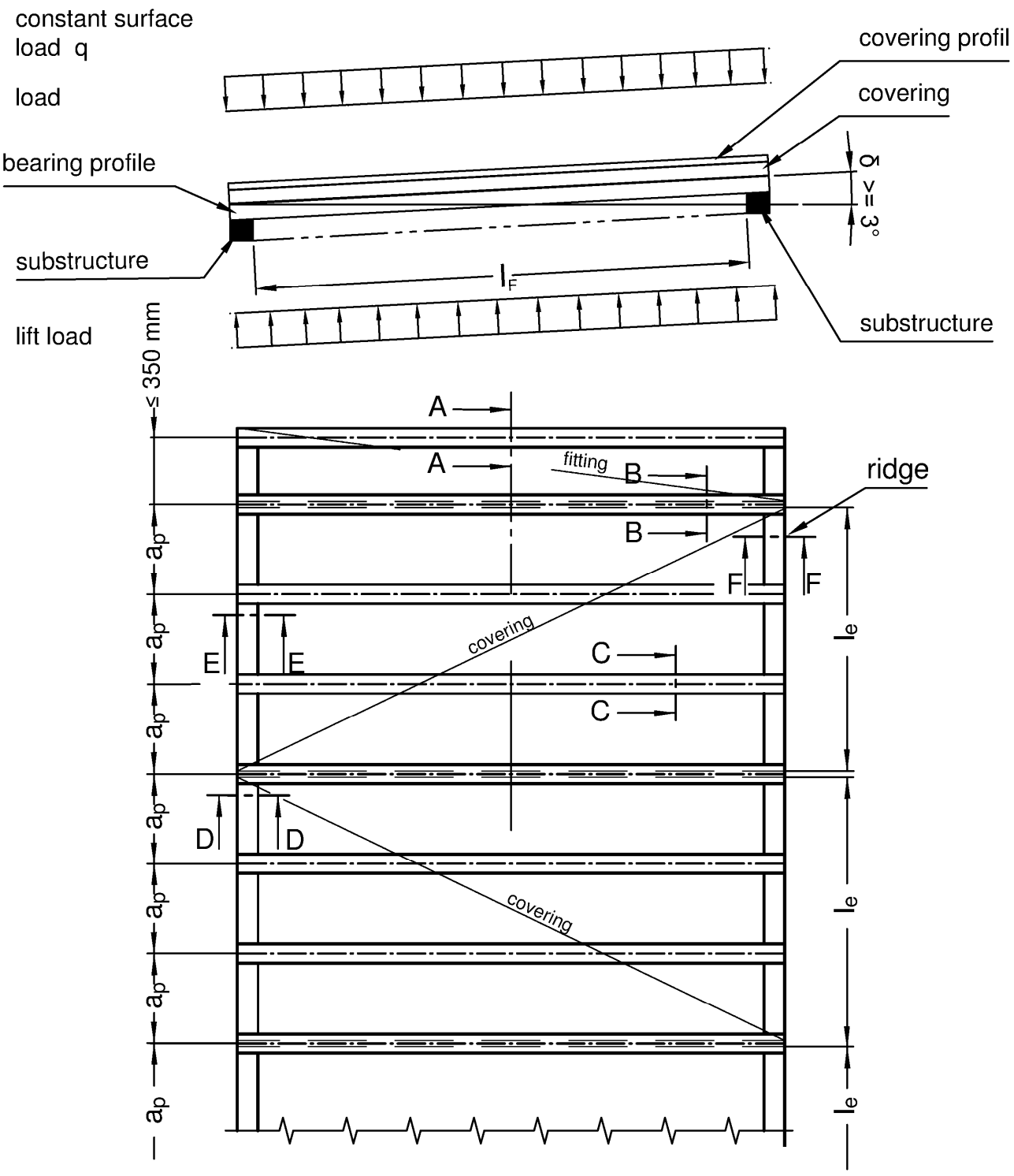

schematic view

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 1.3
System overiew 3-span-system	

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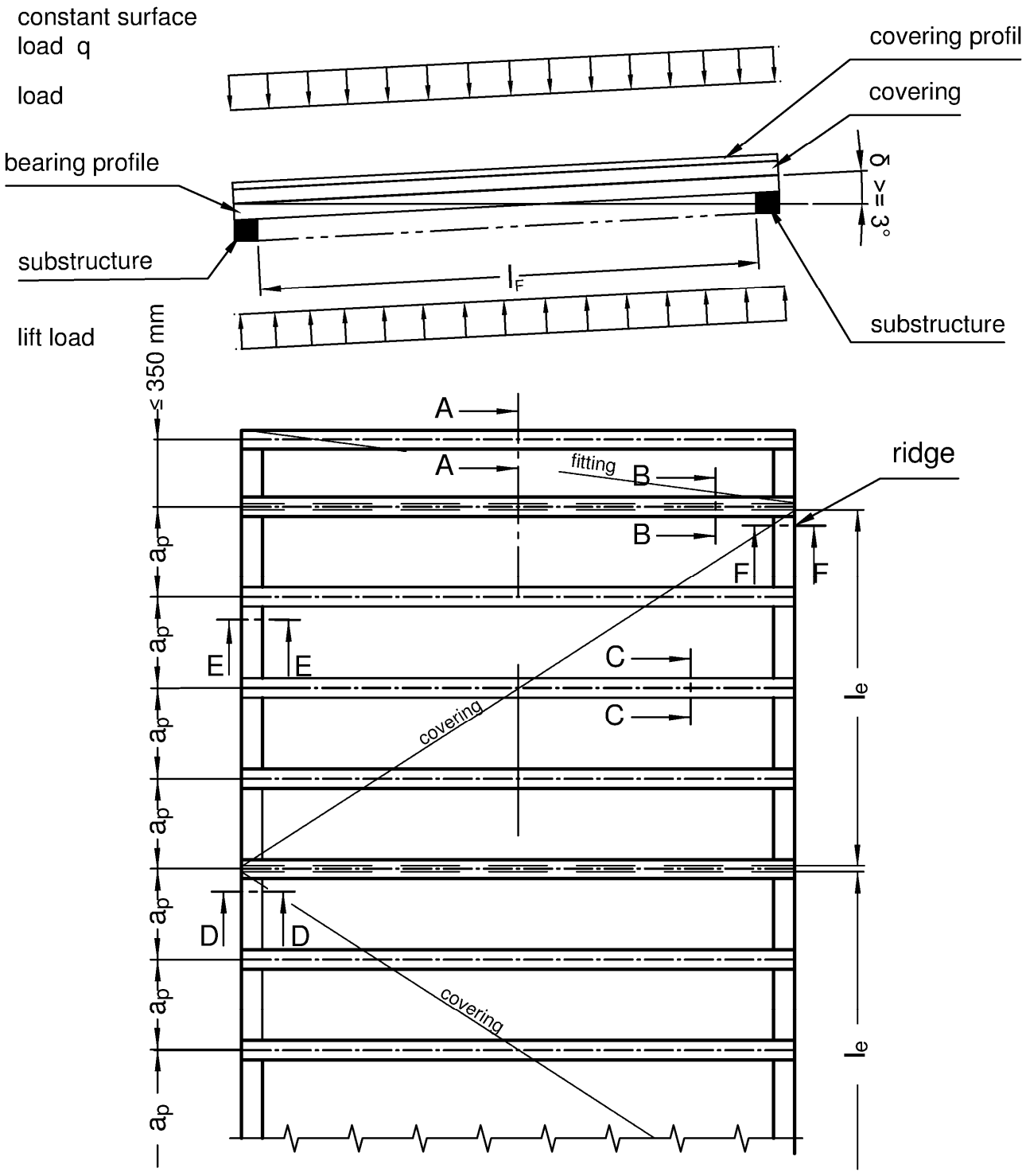


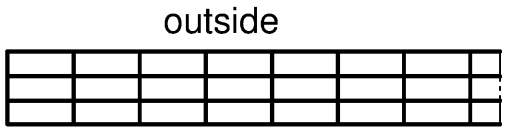
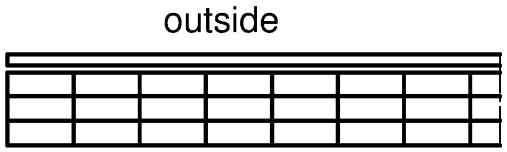
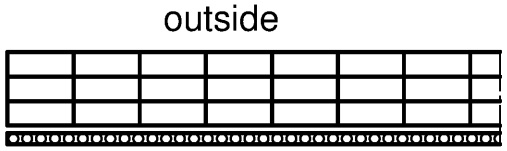
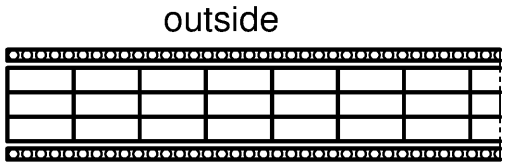
a_p : spacing of bearing profiles :max. 530 mm
l_e : width of covering

schematic view

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 1.4
System overiew 4-span-system	

Deutsches Institut für Bautechnik DIBt

type of covering

1		multi-wall-sheet
2		aluminium sheet multi-wall-sheet
3		multi-wall-sheet GRP-sheet
4		GRP-sheet multi-wall-sheet GRP-sheet
5		PC solid sheet 2 – 4 mm multi-wall-sheet

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 1.5.1
Type of covering (1) to (5) for all combinations for rooflight types: "LB classic","LB classic plus","LB basic","LB plus"	

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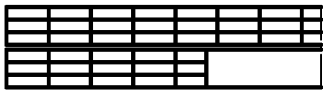
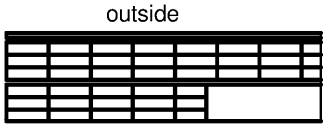
type of covering

(6)



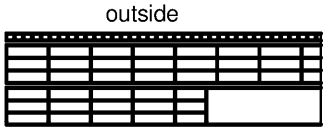
multi-wall-sheet
multi-wall-sheet or solid sheet PETG

(7)



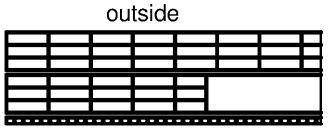
aluminium sheet
multi-wall-sheet
multi-wall-sheet or solid sheet PETG

(8)



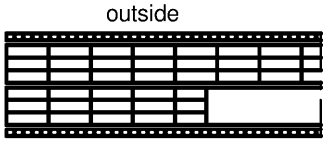
GRP-sheet
multi-wall-sheet
multi-wall-sheet or solid sheet PETG

(9)



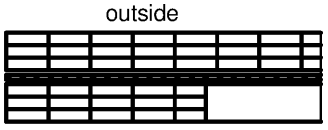
multi-wall-sheet
multi-wall-sheet or solid sheet PETG
GRP-sheet

(10)



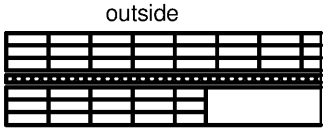
GRP-sheet
multi-wall-sheet
multi-wall-sheet or solid sheet PETG
GRP-sheet

(11)



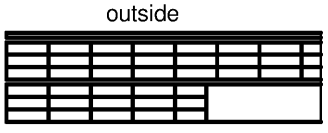
multi-wall-sheet
textile glas mat
multi-wall-sheet or solid sheet PETG

(12)



multi-wall-sheet
GRP-sheet
multi-wall-sheet or solid sheet PETG

(13)



PC solid sheet 2 – 4 mm
multi-wall-sheet
multi-wall-sheet or solid sheet PETG

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex 1.5.2
Type of covering (6) to (13) for all combinations for rooflight types: "LB classic double","LB classic plus double","LB basic double","LB plus double"	

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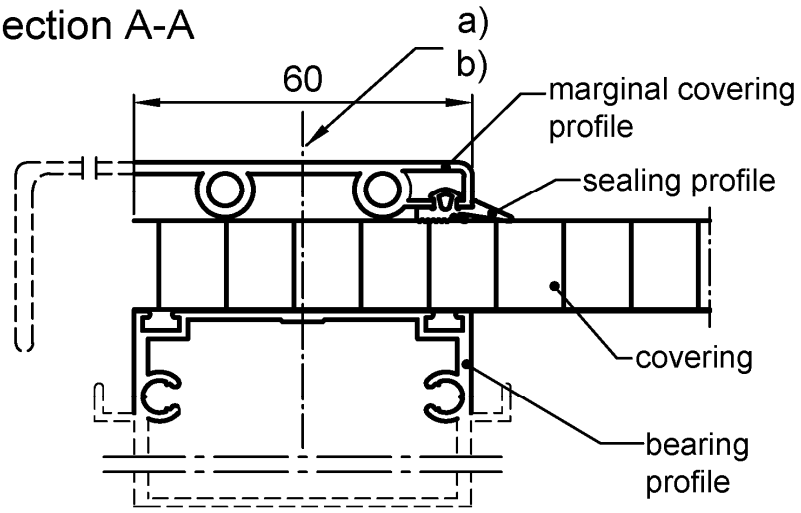
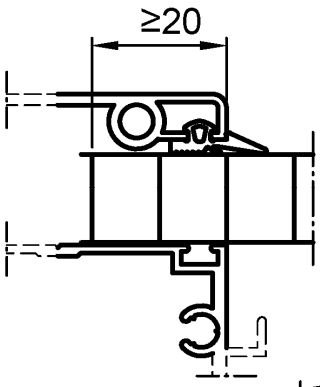
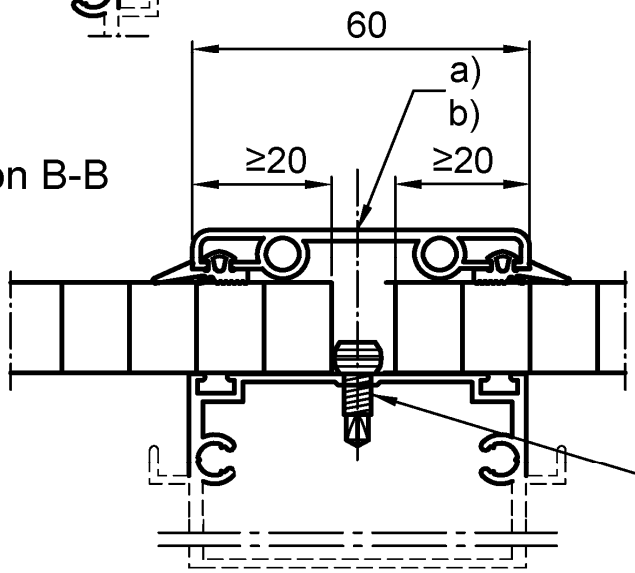
section A-A



section A-A (alternative)



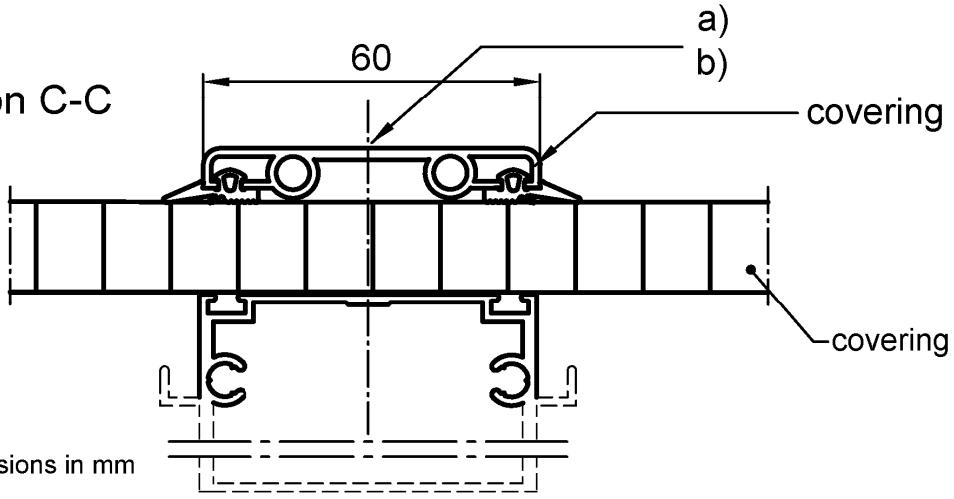
section B-B



connection covering profile:
screw distance e <= 320 mm
a) screws with sealing wahsers
Type Zebra Piasta 6,3 x L, ETA 10/0184
or
b) screws with sealing wahsers
Type A 6,5 x L, ETA 10/0184

schematic drawing covering
type of covering see Annex A 1.5.1

section C-C



All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.1.1
Combinations of arch profiles, 1-span and multiple-span-system section A-A, B-B and C-C for the rooflight types "LB classic"," LB classic plus"," LB basic" and "LB plus"	

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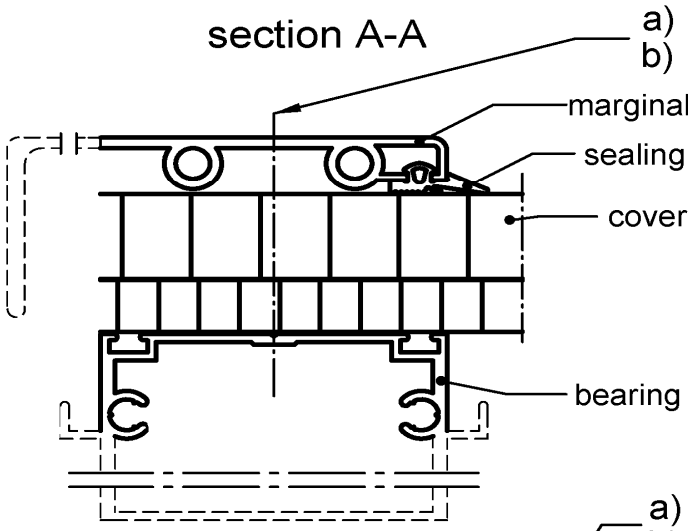
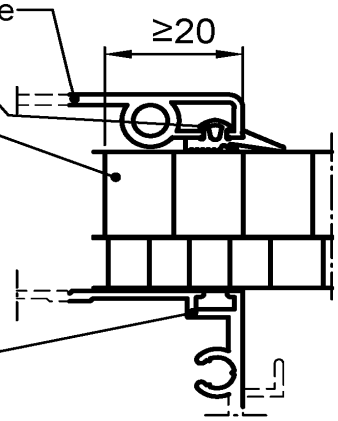
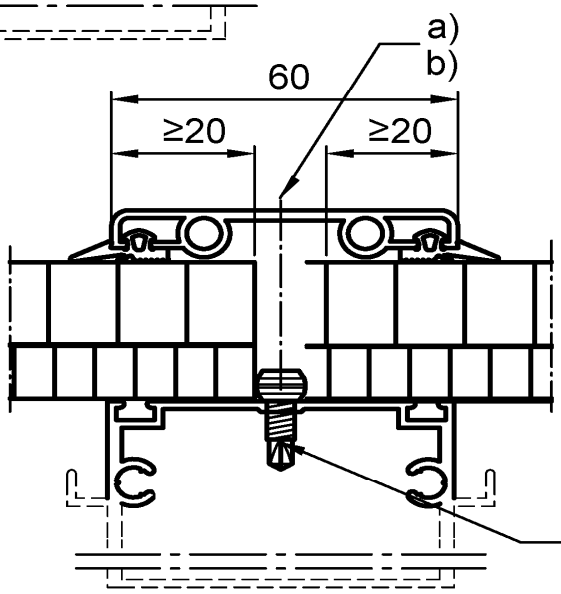
section A-A



section A-A (alternative)



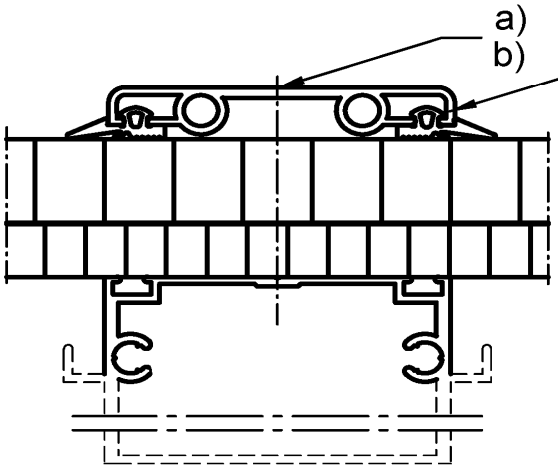
section B-B



connection covering profile:
screw distance e <= 320 mm
a) screws with sealing wahsers
Type Zebra Piasta 6,3 x L, ETA 10/0184
or
b) screws with sealing wahsers
Type A 6,5 x L, ETA 10/0184

schematic drawing covering
type of covering see Annex A 1.5.2

section C-C



All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.1.2
Combinations of arch profiles, 1-span and multiple-span-system section A-A, B-B and C-C for the rooflight types "LB classic double", "LB classic plus double", "LB basic double","LB plus double"	

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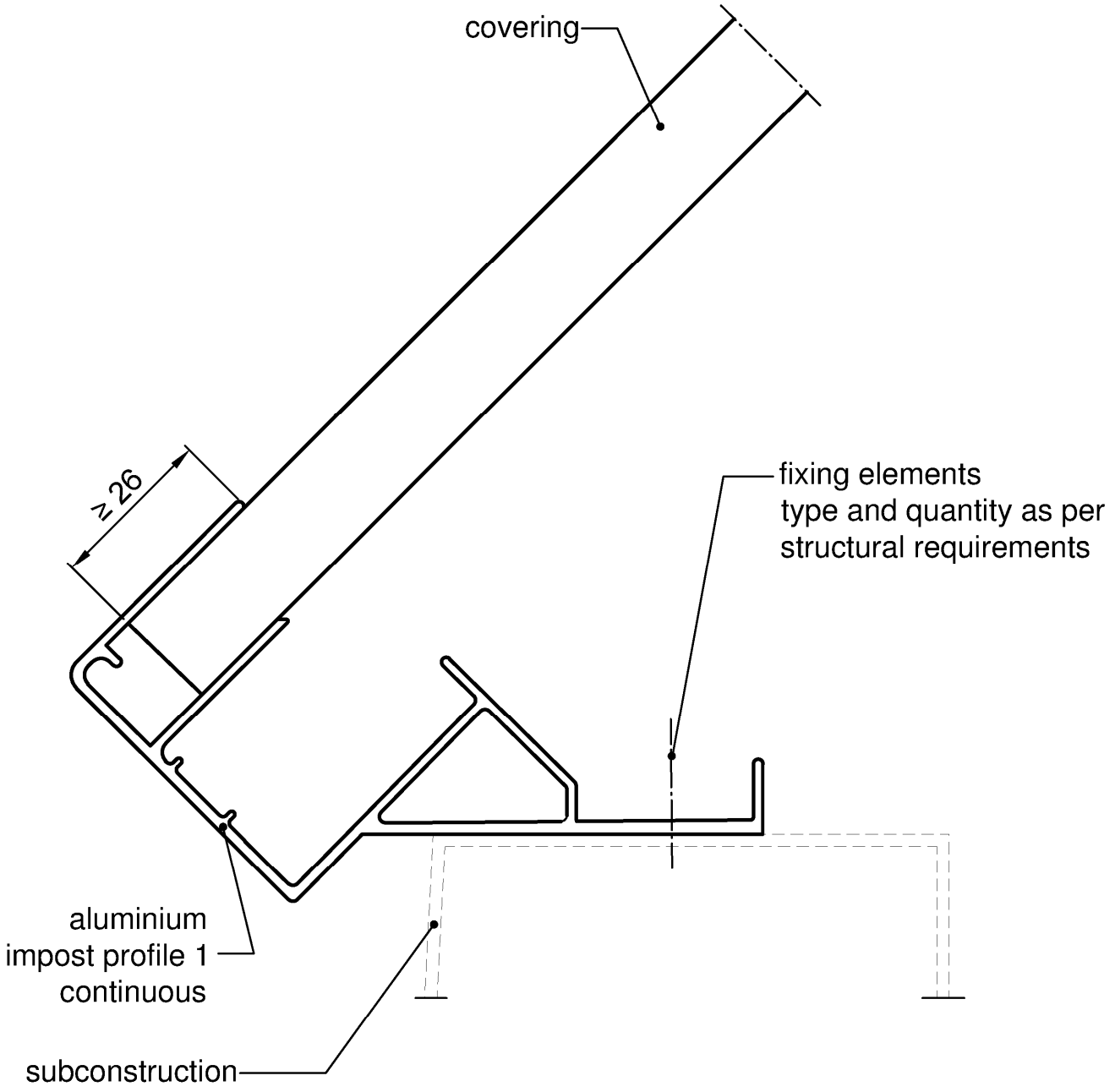

All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.2.1
Impost profile, section D-D for the rooflight types "LB classic", "LB classic double"	

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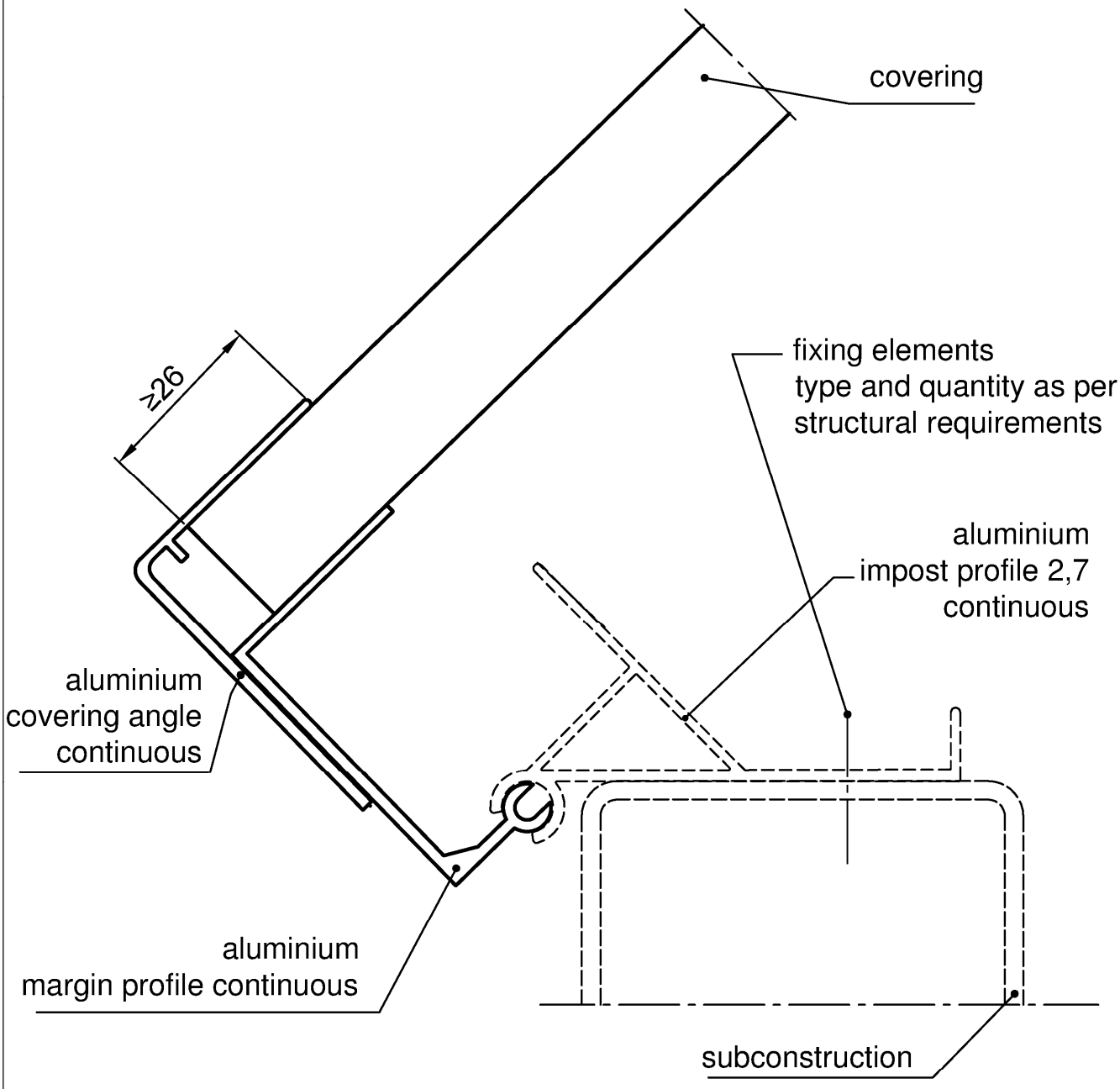

All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.2.2
Impost profile, section D-D for the rooflight types "LB classic", "LB classic double"	

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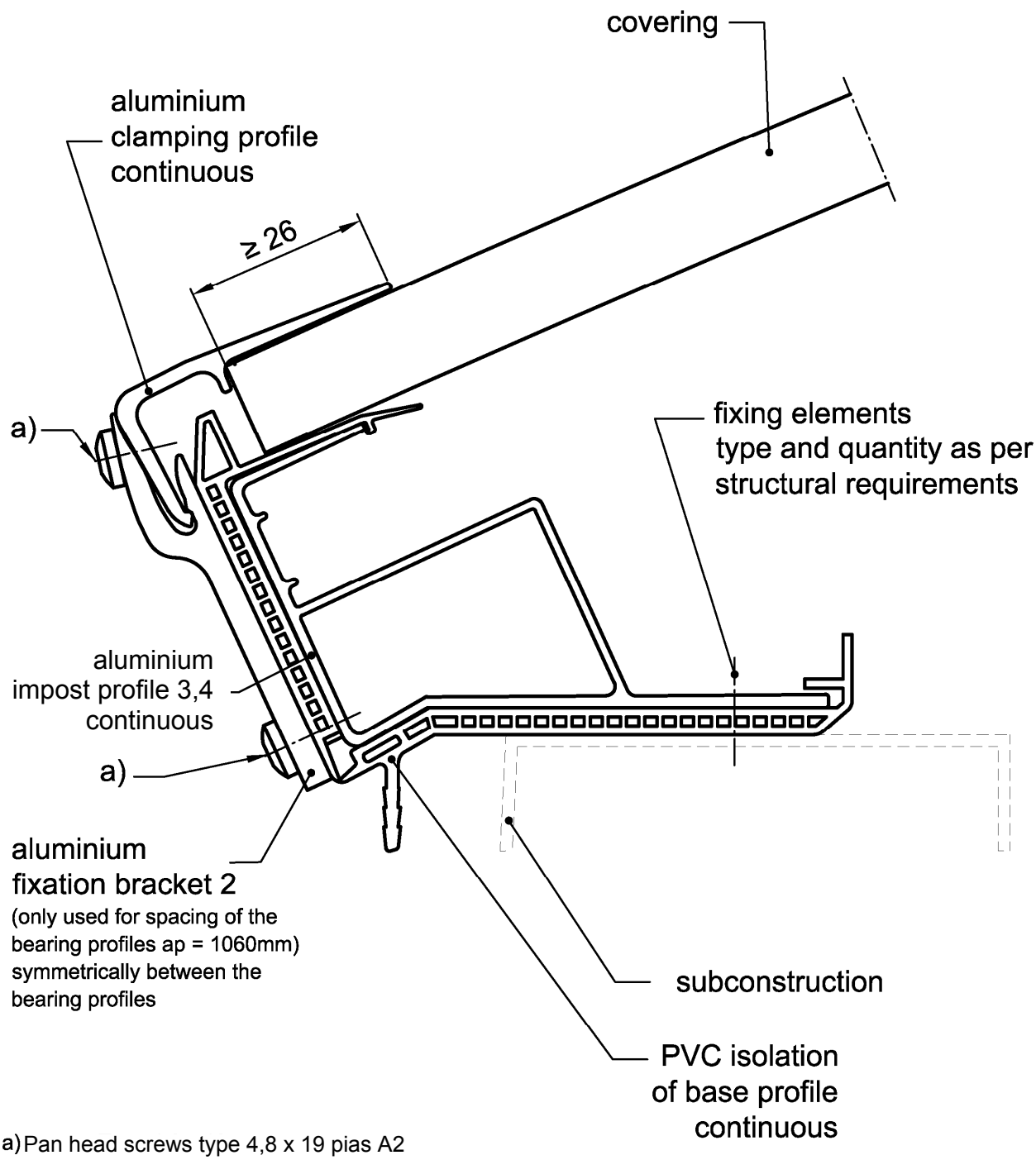

a) Pan head screws type 4,8 x 19 pias A2

All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.2.3
Impost profile, section D-D for 1-span and 2-span-systems for the rooflight types "LB classic plus", "LB classic plus double"	

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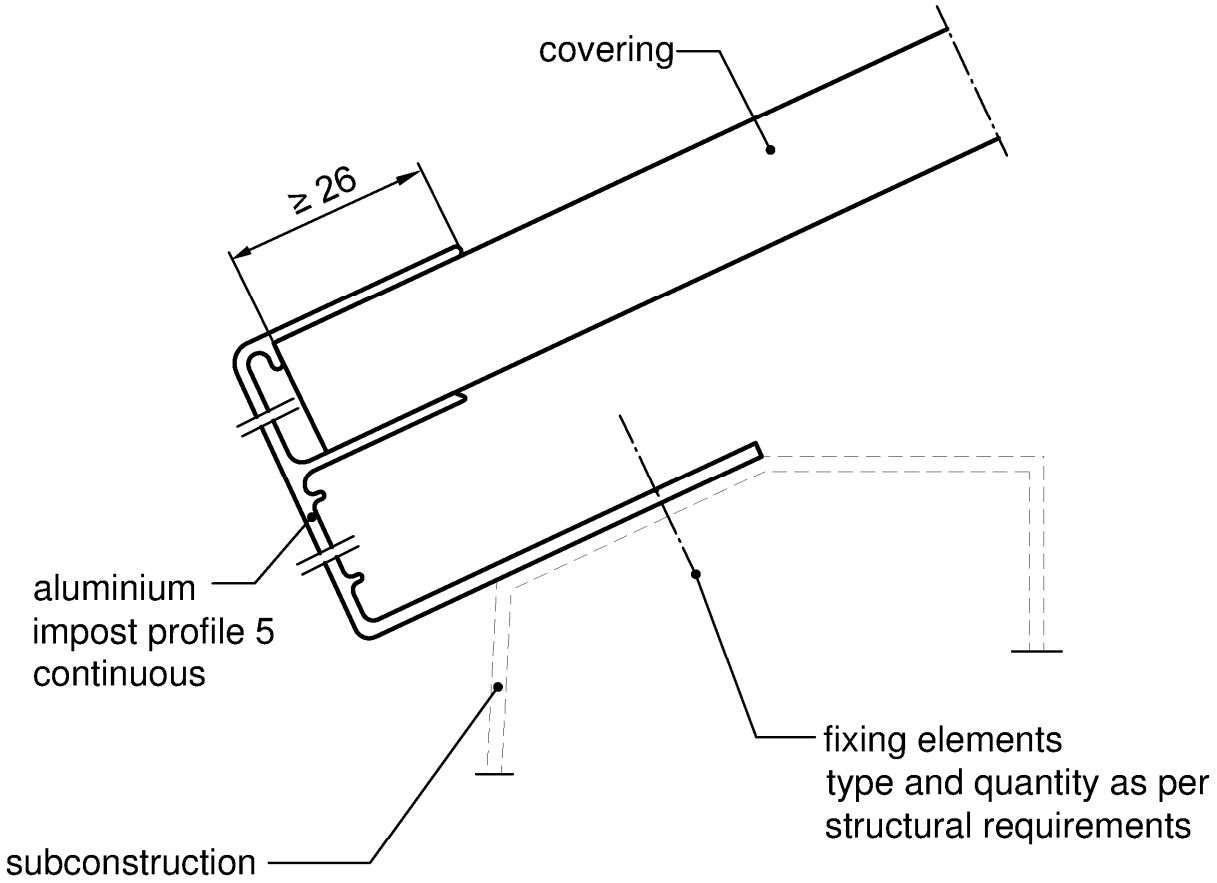

All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.2.4
Impost profile, section D-D for the rooflight types "LB basic"	

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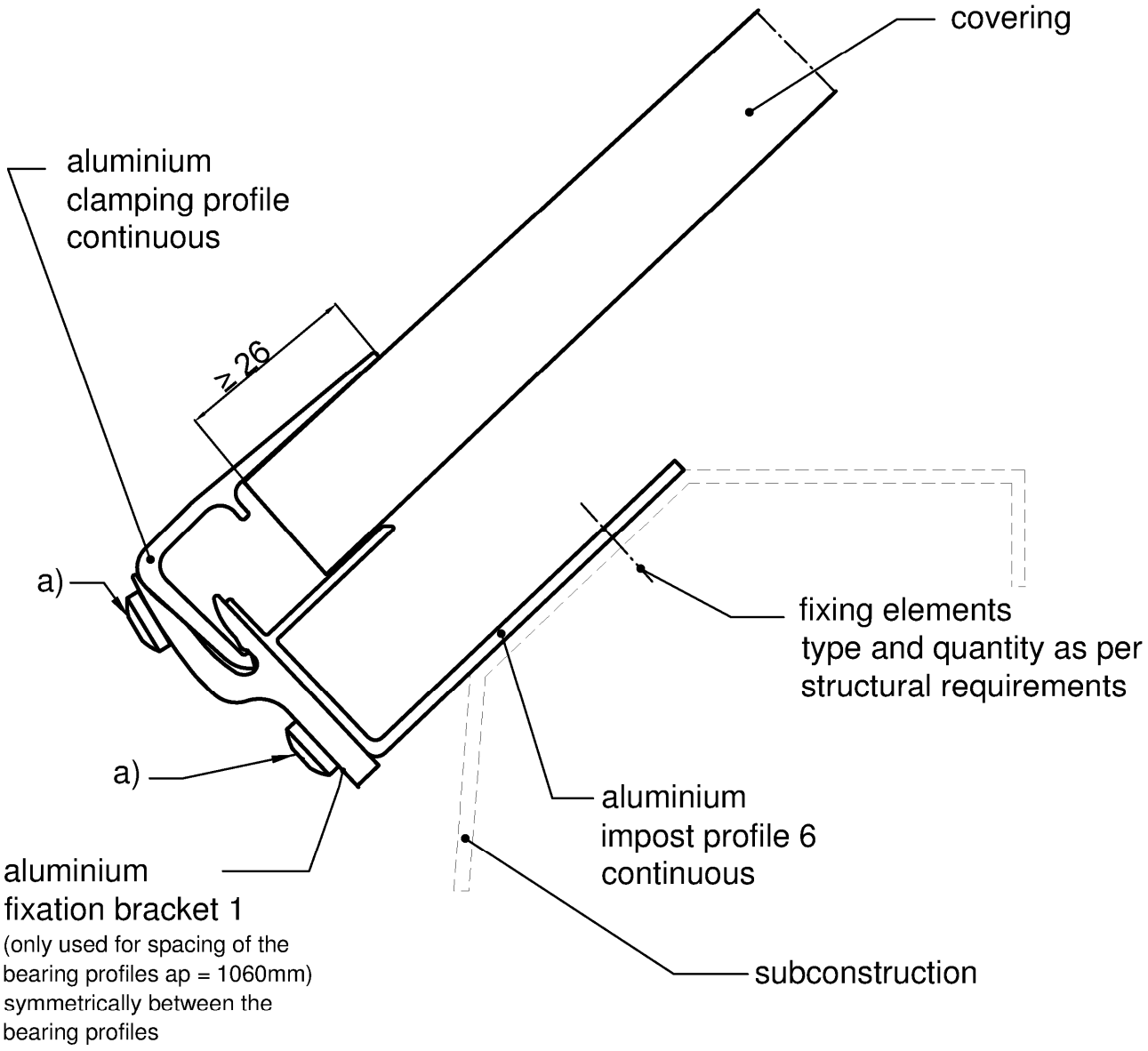

a) Pan head screws type 4,8 x 19

All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.2.5
Impost profile, section D-D for the rooflight types "LB basic", "LB basic double"	

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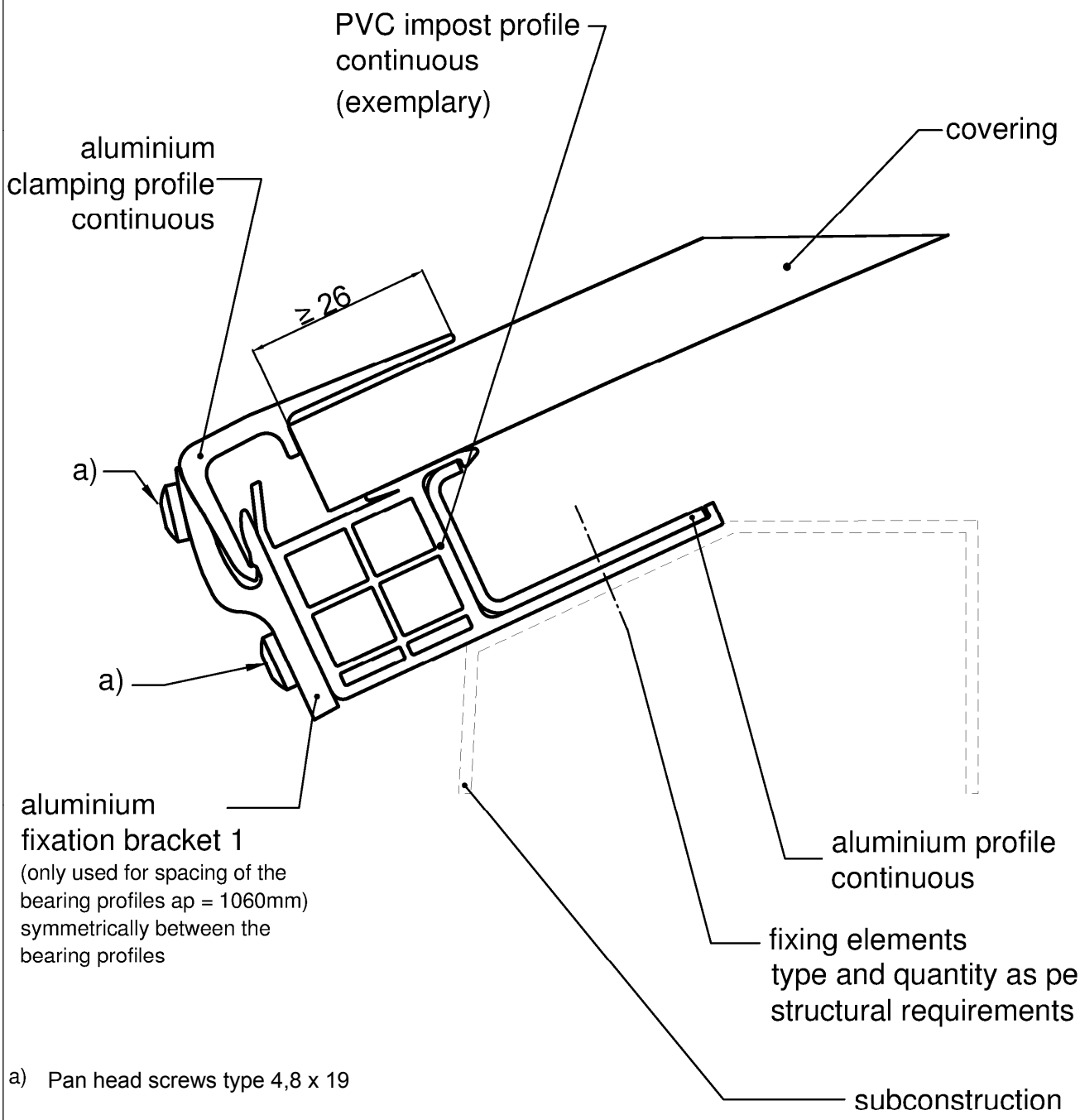

a) Pan head screws type 4,8 x 19

All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.2.6
Impost profile, section D-D for the rooflight types "LB plus", "LB plus double"	

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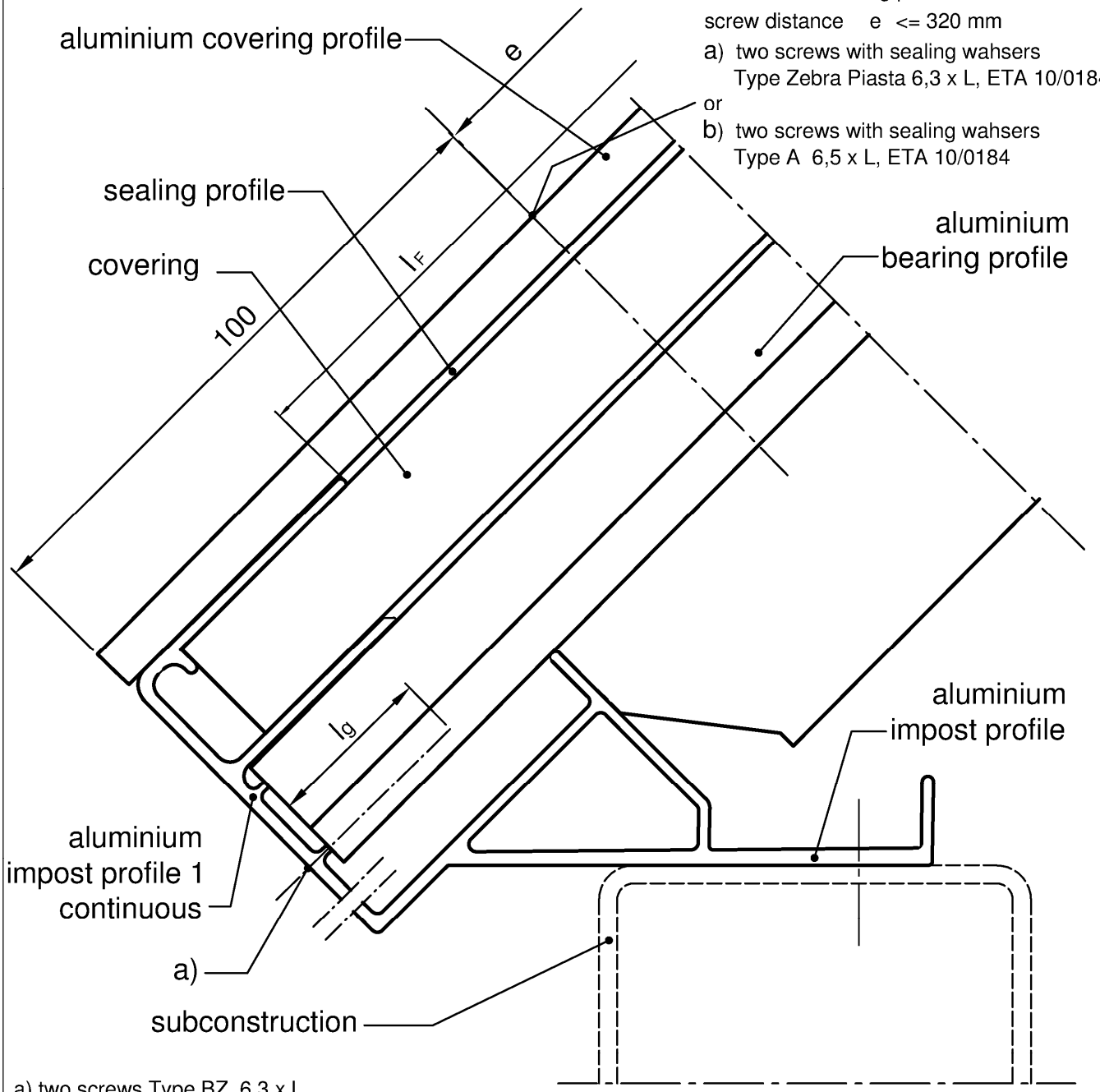

a) two screws Type BZ 6,3 x L
ETA 10/0184, l_g >= 28

schematic drawing covering
type of covering see Annex A 1.5

All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.1
Impost profile, section E-E for the rooflight types "LB classic" and "LB classic double"	

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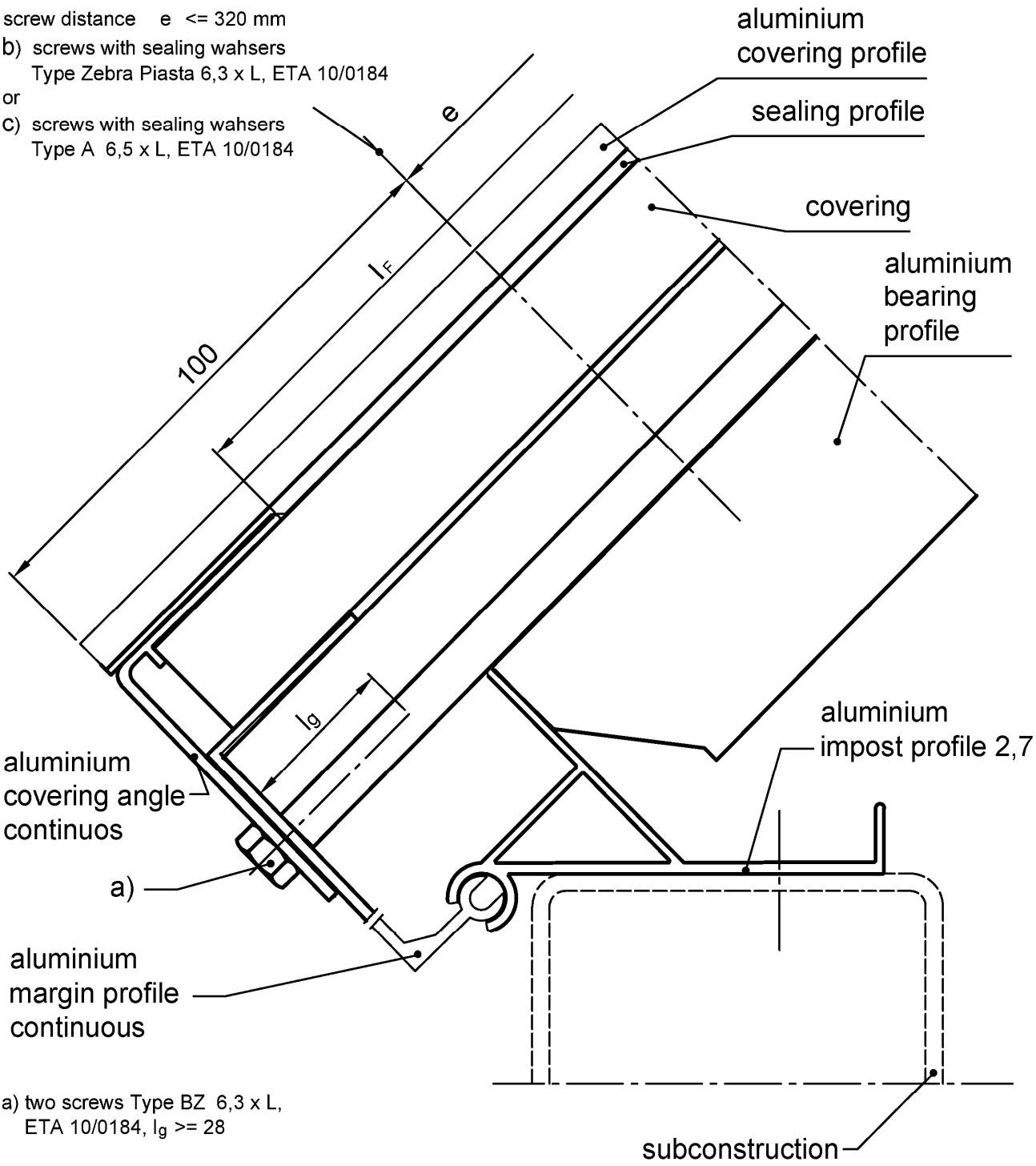
connection covering profile:
screw distance e <= 320 mm
b) screws with sealing wahsers
Type Zebra Piasta 6,3 x L, ETA 10/0184
or
c) screws with sealing wahsers
Type A 6,5 x L, ETA 10/0184



a) two screws Type BZ 6,3 x L,
ETA 10/0184, l_g >= 28

schematic drawing covering
type of covering see Annex A 1.5

All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.2
Impost profile, section E-E alternativ for the rooflight types: "LB classic", "LB classic double"	

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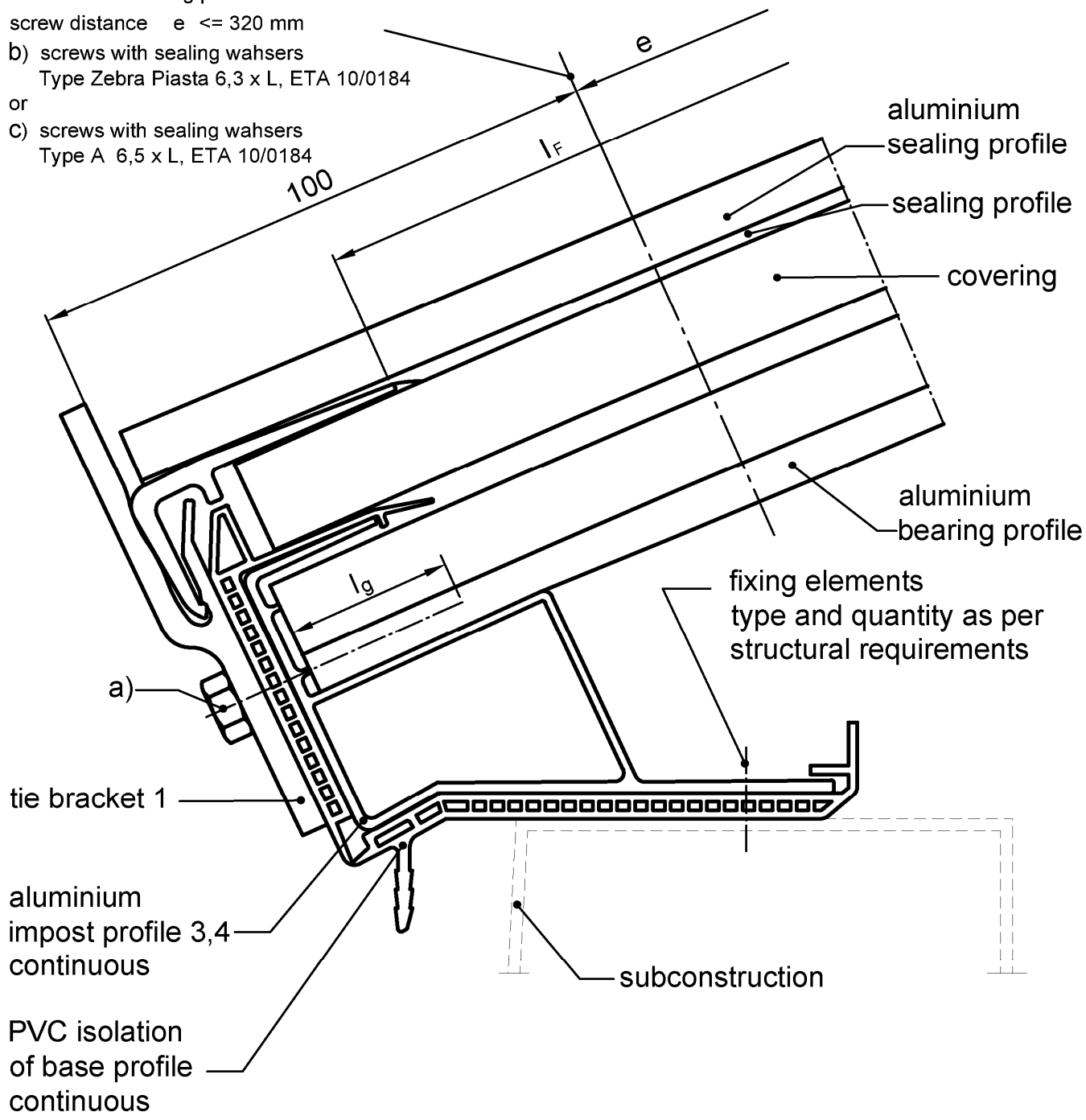
connection covering profile:
screw distance e <= 320 mm
b) screws with sealing wahsers
Type Zebra Piasta 6,3 x L, ETA 10/0184
or
c) screws with sealing wahsers
Type A 6,5 x L, ETA 10/0184



a) two screws Type BZ 6,3 x L,
ETA 10/0184, l_g >= 28

schematic drawing covering
type of covering see Annex A 1.5

All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.3
Impost profile, section E-E for the rooflight types "LB classic plus" and "LB classic plus double"	

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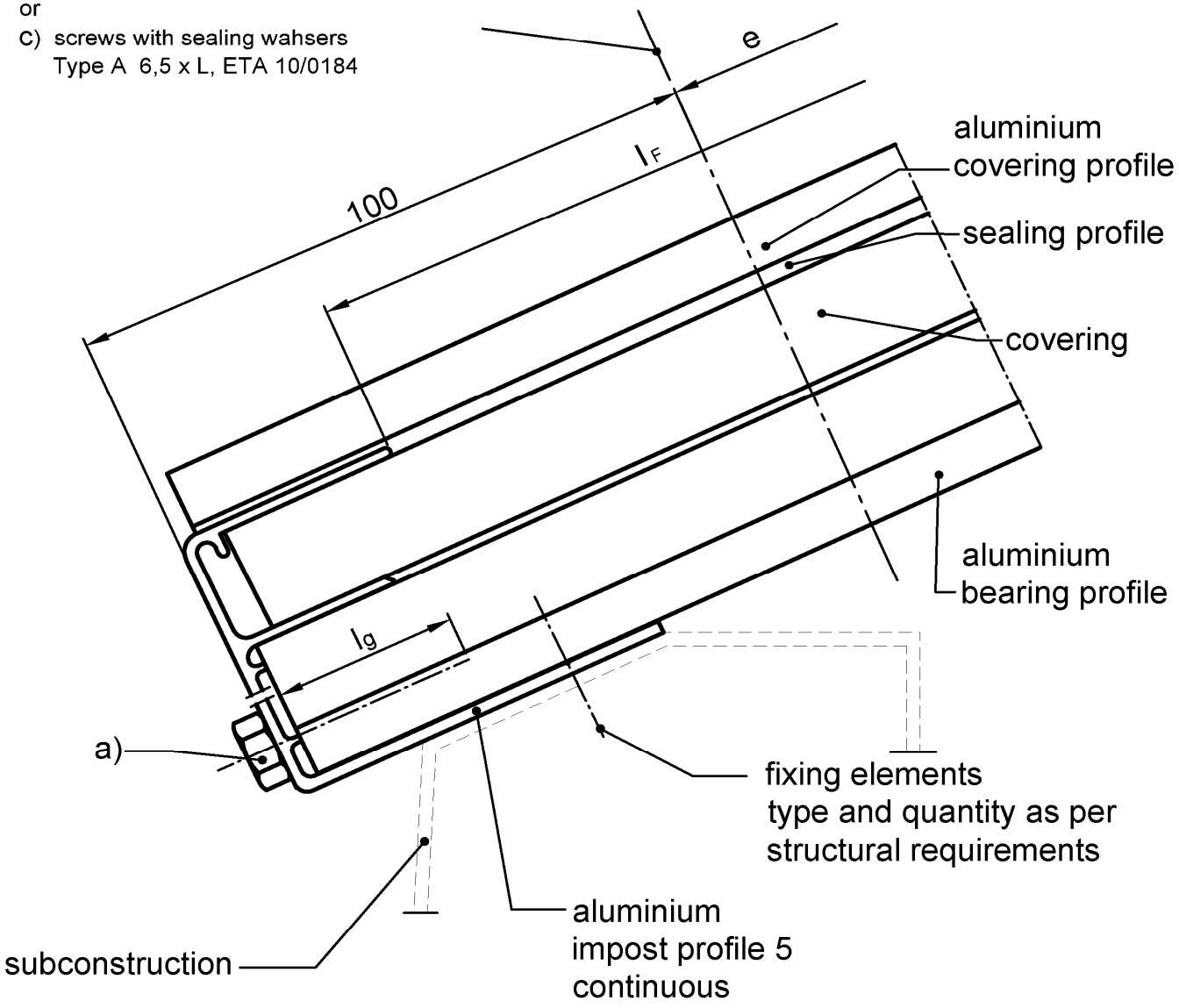
connection covering profile:

screw distance e <= 320 mm

b) screws with sealing wahsers
Type Zebra Piasta 6,3 x L, ETA 10/0184

or

c) screws with sealing wahsers
Type A 6,5 x L, ETA 10/0184



a) two screws Type BZ 6,3 x L
ETA 10/0184, l_g >= 28

schematic drawing covering
type of covering see Annex A 1.5

All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.4
Impost profile, section E-E for the rooflight types "LB basic"	

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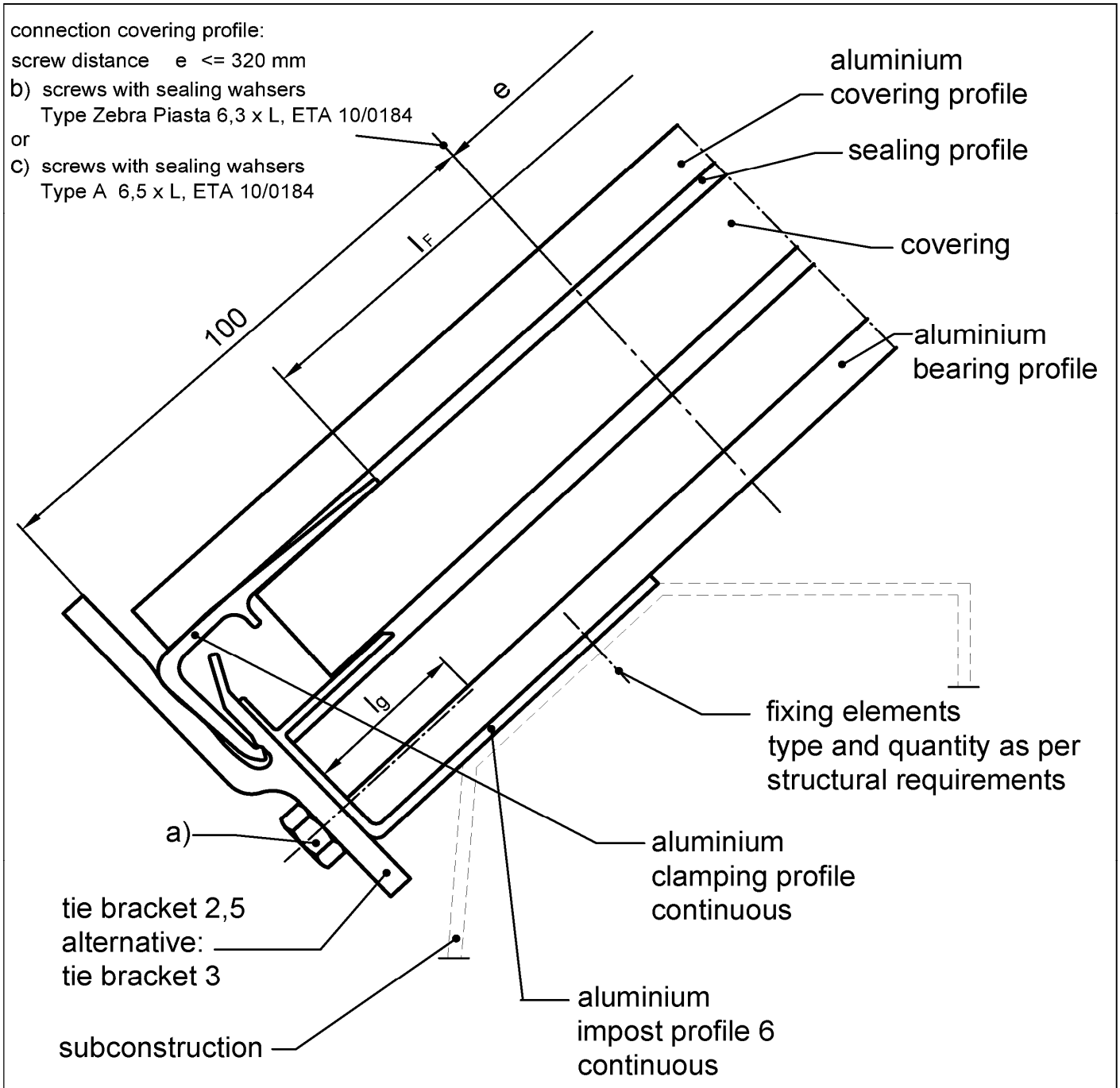

a) two screws Type BZ 6,3 x L
ETA 10/0184, l_g >= 28

schematic drawing covering
type of covering see Annex A 1.5

All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.5
Impost profile, section E-E for the rooflight types "LB basic" and "LB basic double"	

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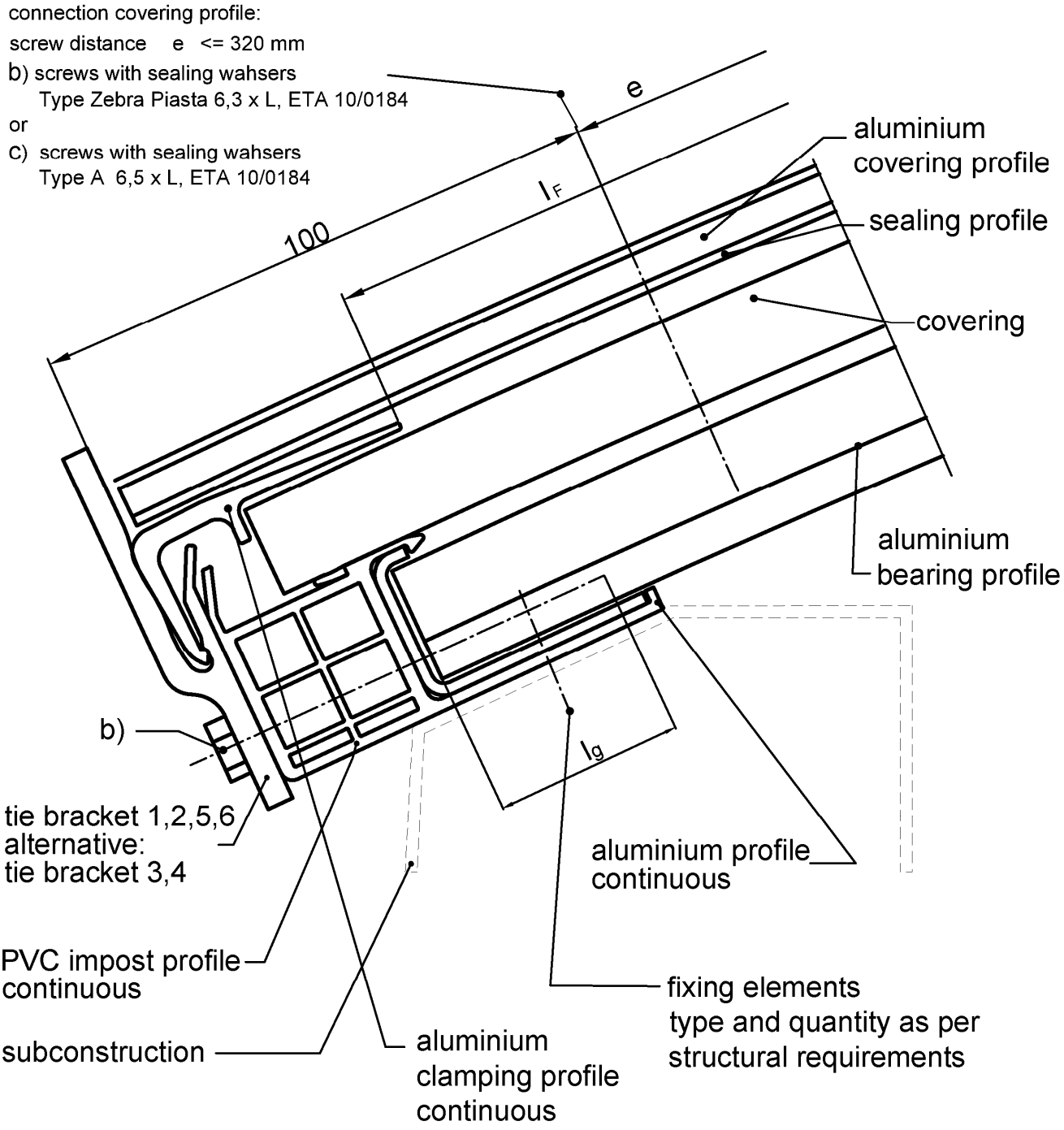

b) two screws Type BZ 6,3 x L
ETA 10/0184, lg >= 28

schematic drawing covering
type of covering see Annex A 1.5

All dimensions in mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.6
PVC impost profile, section E-E for the rooflight types "LB plus" and "LB plus double"	

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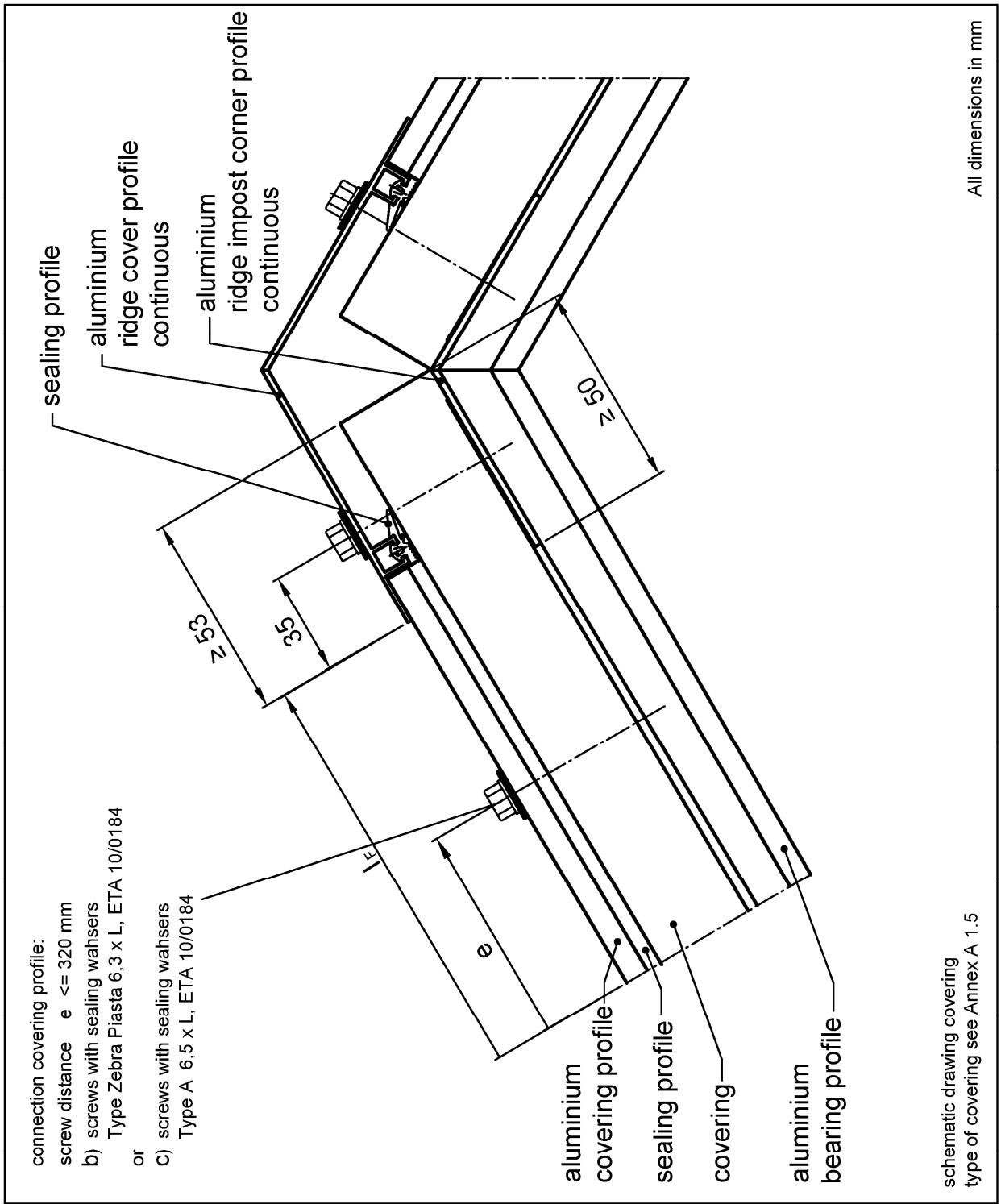

Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Annex A 2.3.7

Impost pofile, section F-F

Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Annex A 2.3.7

impost pofile, ridge for sattel roof section F-F
for all rooflight types

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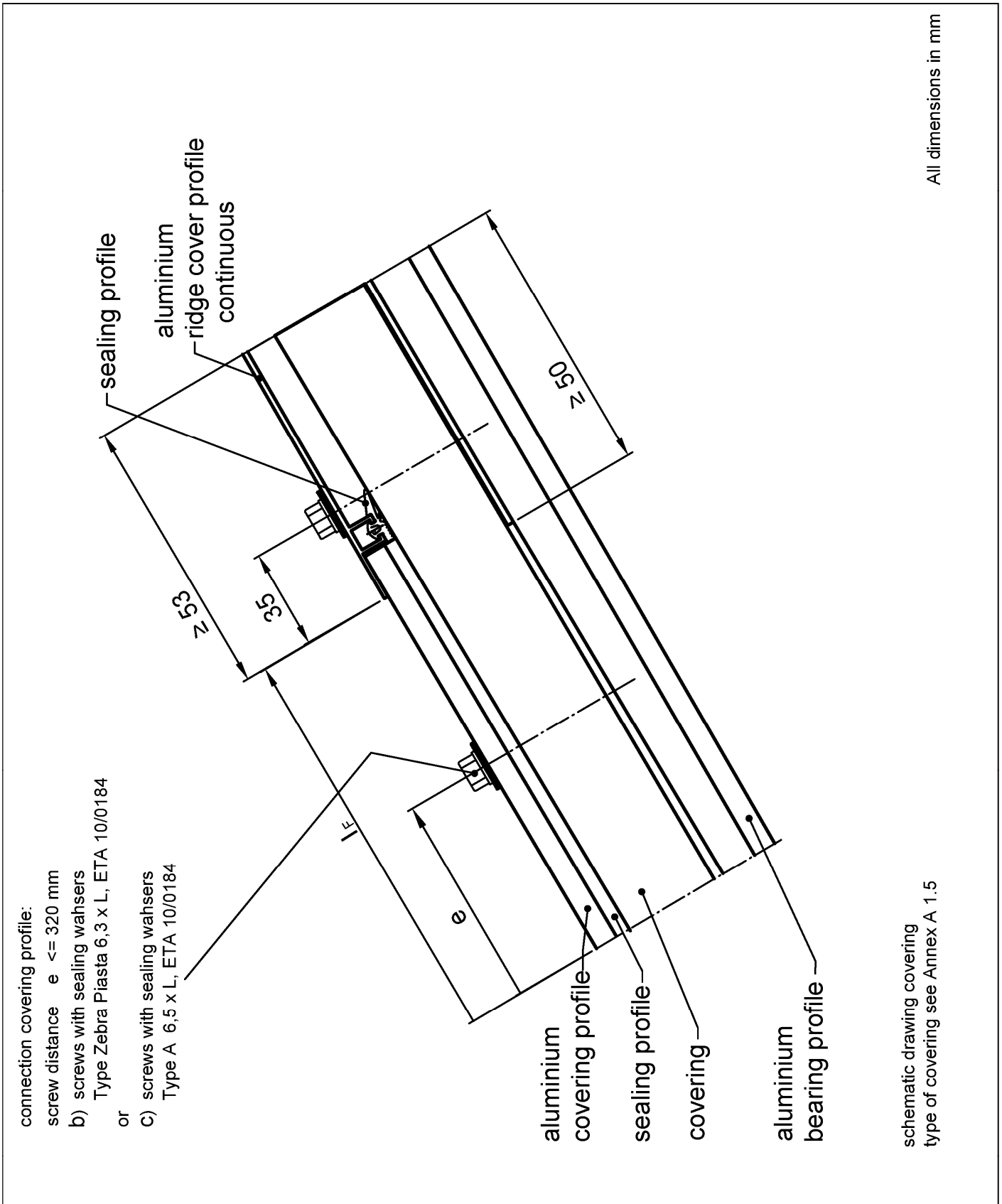

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.8
Impost pofile, section F-F for all rooflight types	

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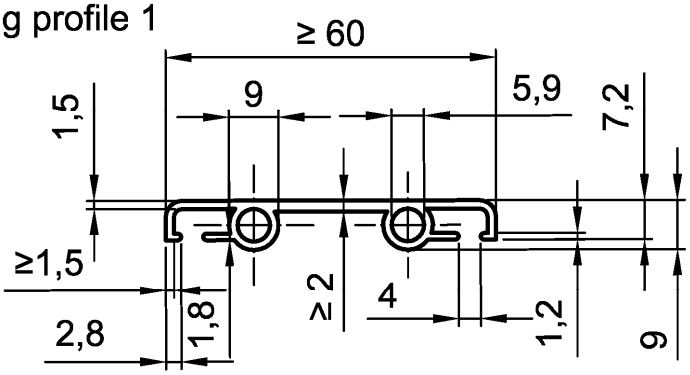
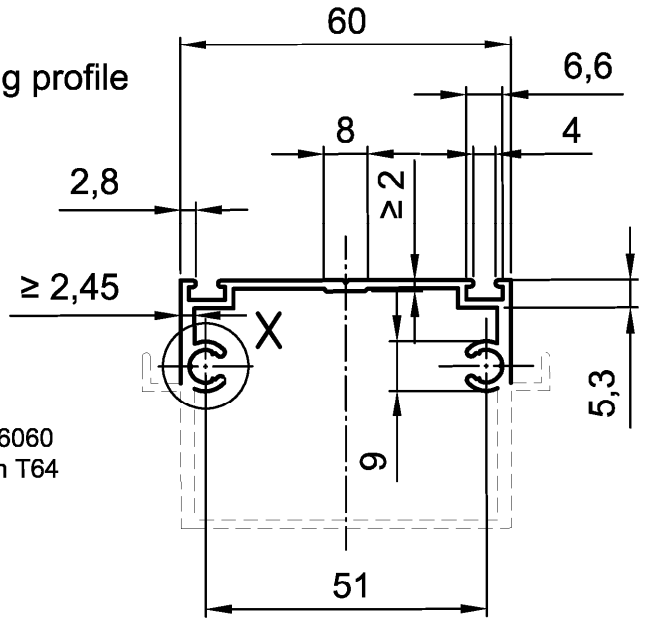
covering profile 1



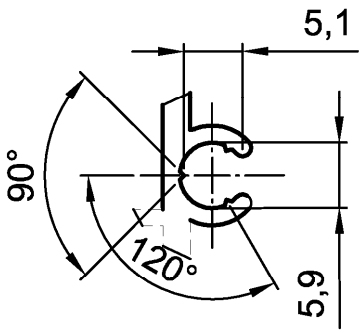
EN AW-6060
condition T66

bearing profile

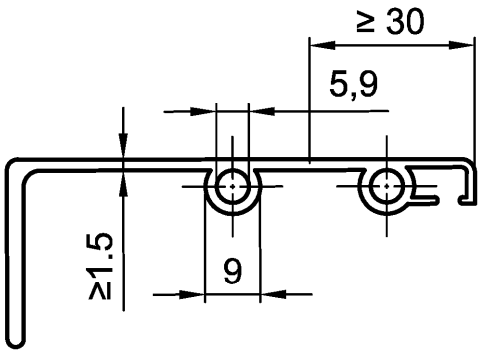


EN AW-6060
condition T64

detail X
M 2:1



marginal covering profile



EN AW-6060
condition T64

All dimensions in mm

undimensioned wall thicknesse ≥ 1,5

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.1.1
Covering profile 1, bearing profile, marginal covering profile, marginal impost profile	

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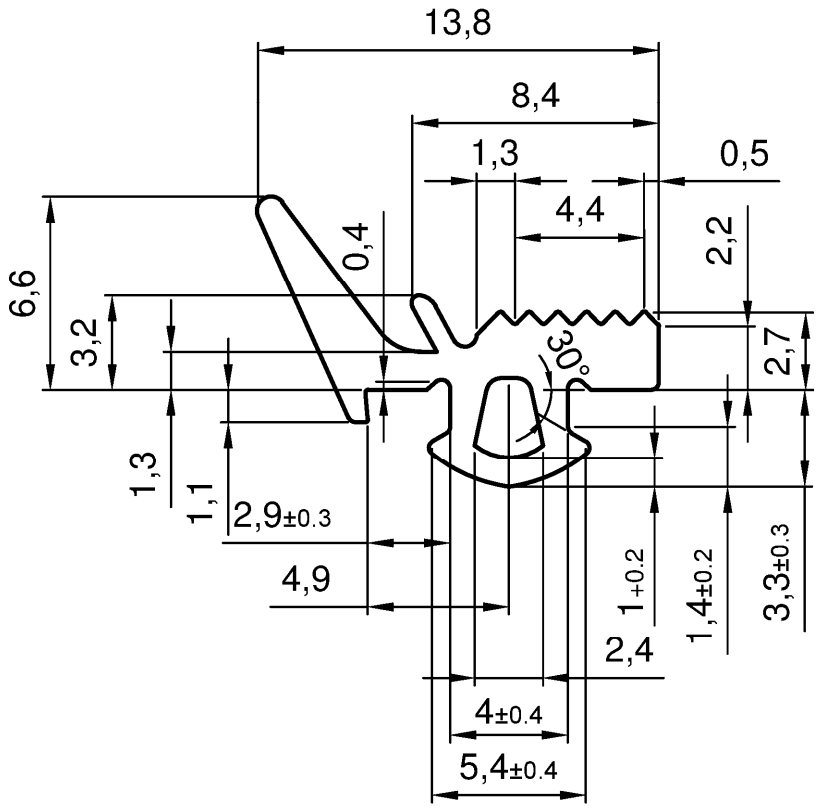
Sealing profile



All dimensions in mm

EPDM as per DIN 7863
hardness (60 ± 5) Shore A as per DIN ISO 7619 -1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.1.2
Sealing profile	

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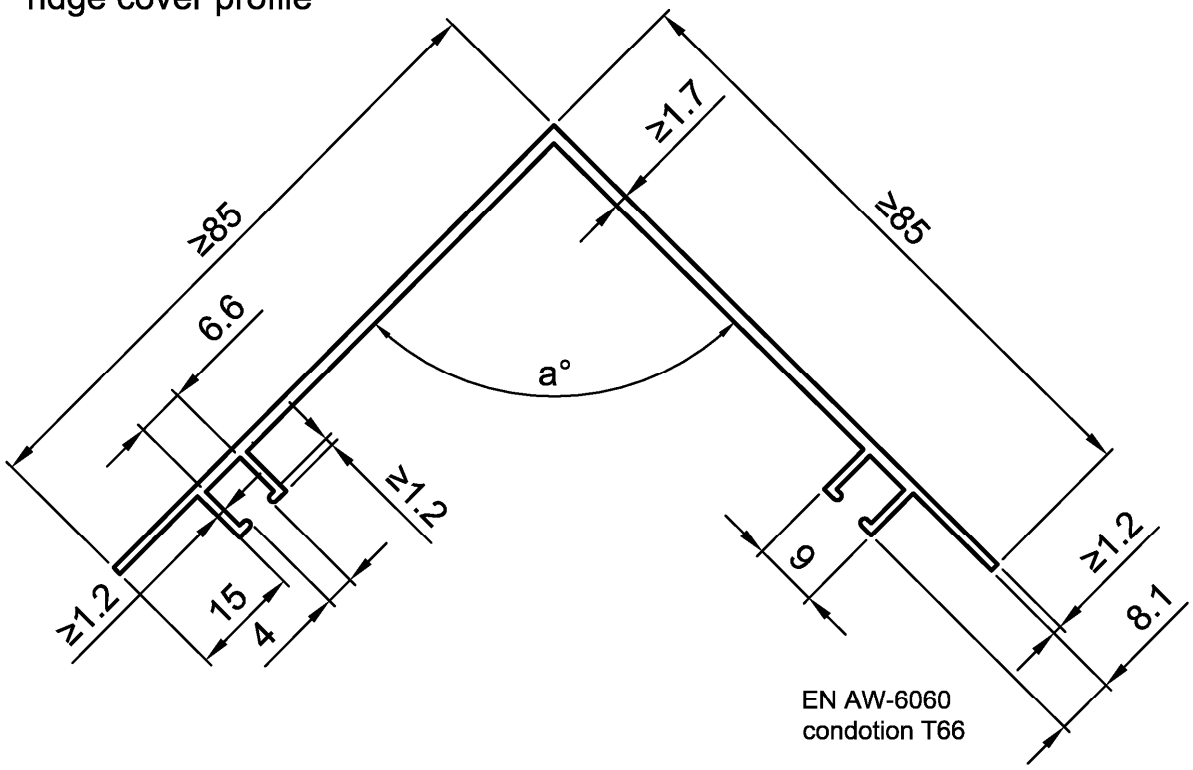
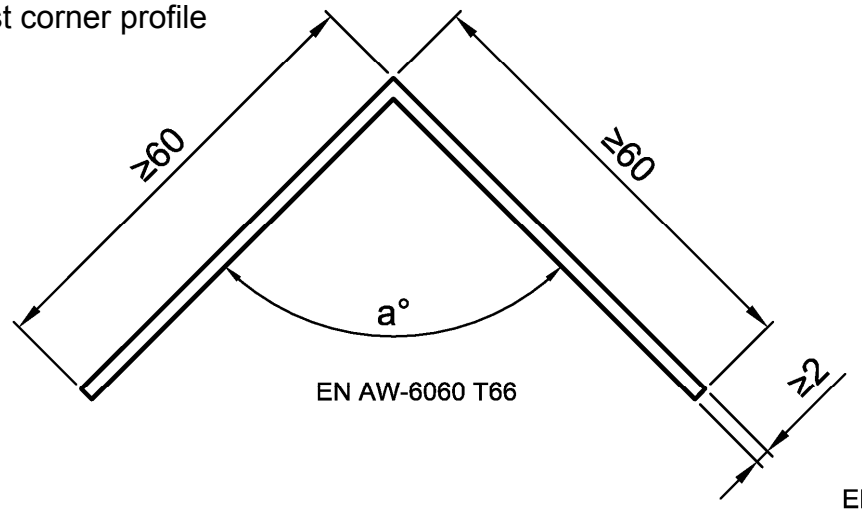
ridge cover profile



ridge impost corner profile



All dimensions in mm

undimensioned radii R = 0,3

Dimensions without tolerance:
as per EN 755-9

a° = appropriate tilt of the rooflight

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.1.3
Ridge cover profile	

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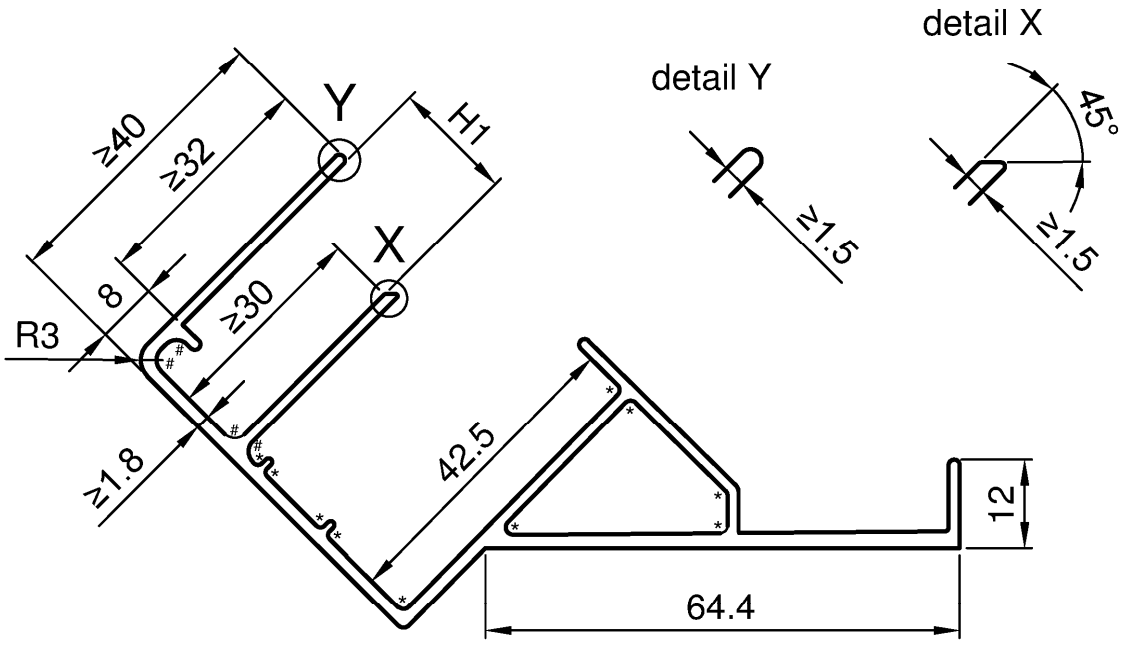
impost profile 1



EN AW-6060
condition T66

All dimensions in mm

* = radius 1,0
\# = radius 2,0

undimensioned wall thickness ≥ 1,8
undimensioned radii R = 0,3

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.1
Impost profile 1	

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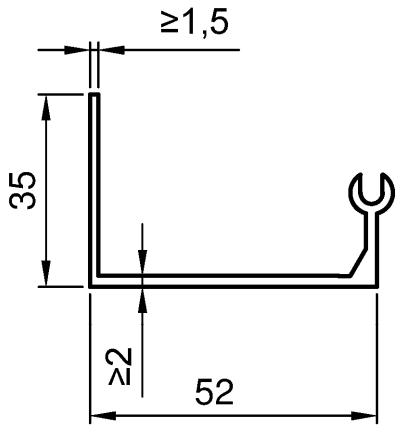
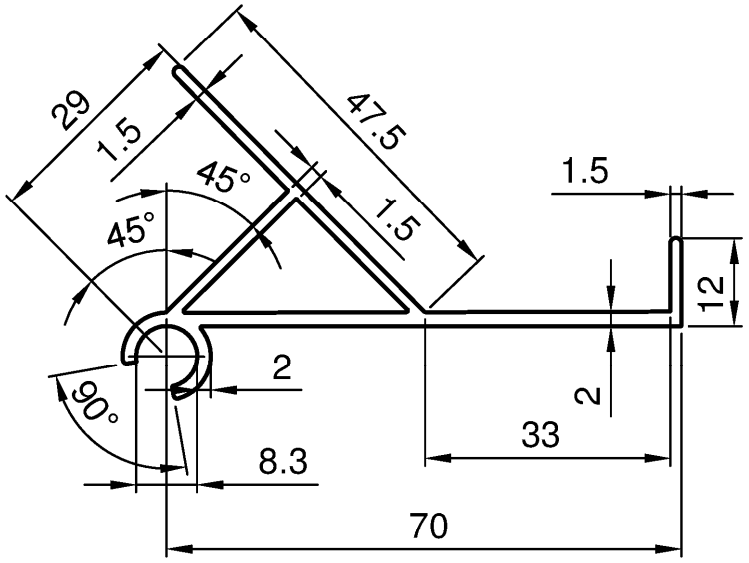
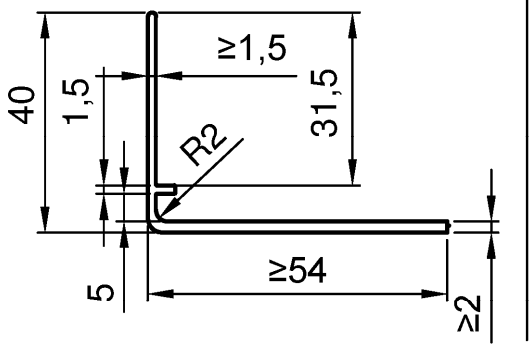
margin profile



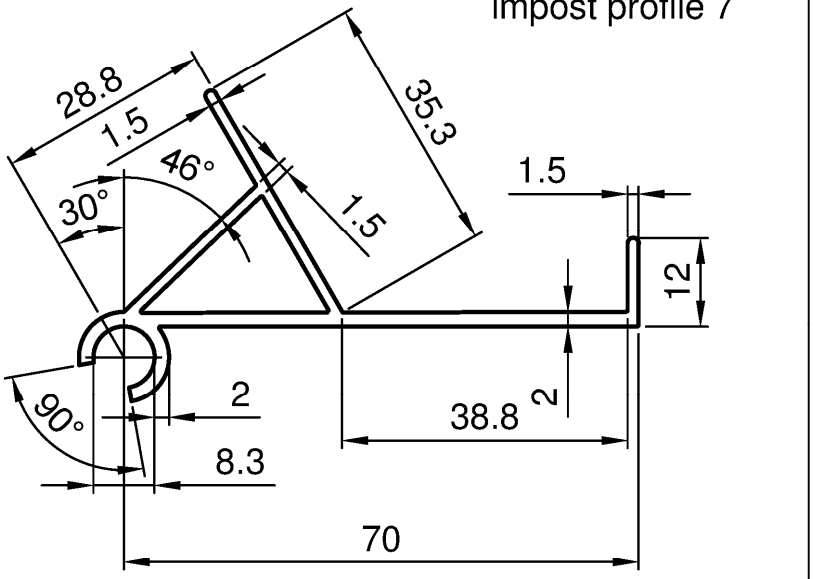
impost profile 2



covering angle profile



impost profile 7



EN AW-6060
condition T66

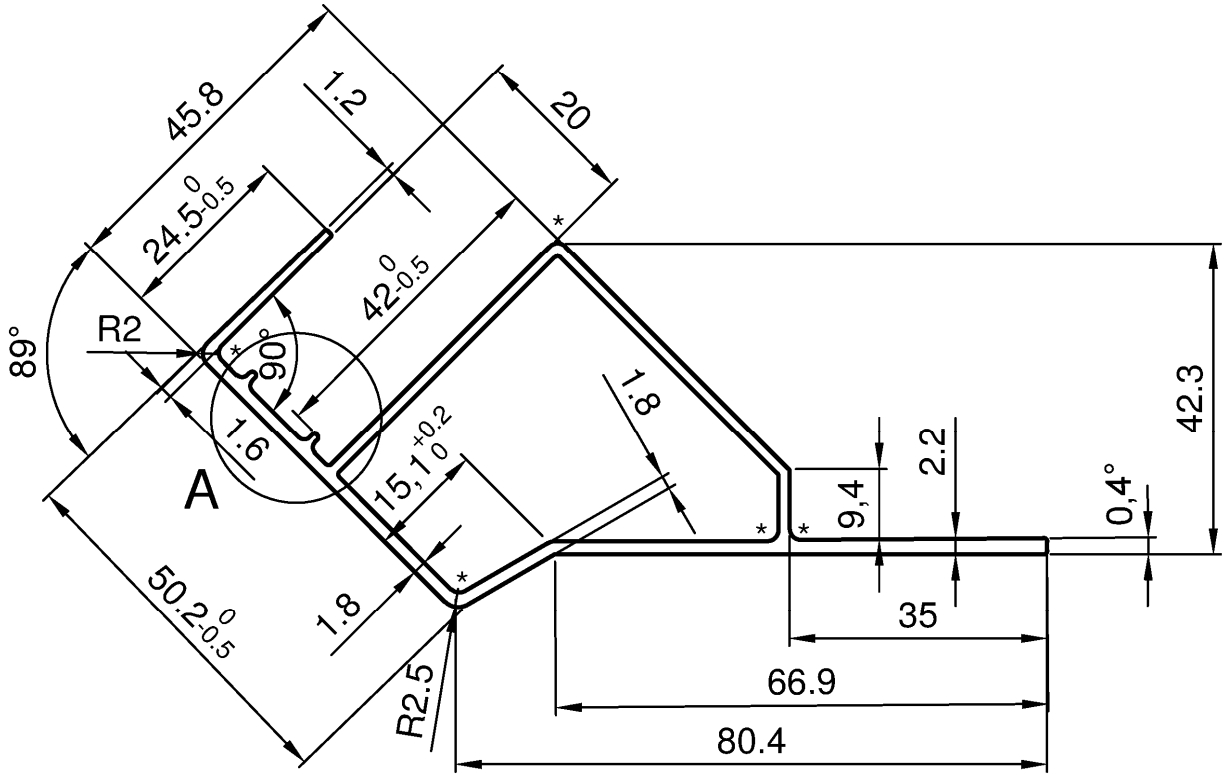
All dimensions in mm
undimensioned radii R = 0,2

Dimensions without tolerance:
as per EN 755-9

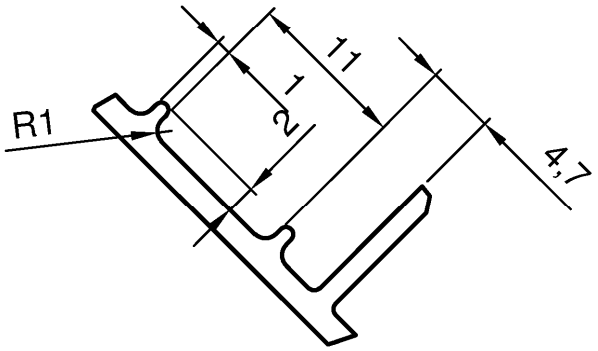
Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.2
Impost profile 2 and 7, margin profile, covering angle	

Deutsches Institut für Bautechnik DIBt

impost profile 3



detail A



EN AW-6060
condition T66

All dimensions in mm

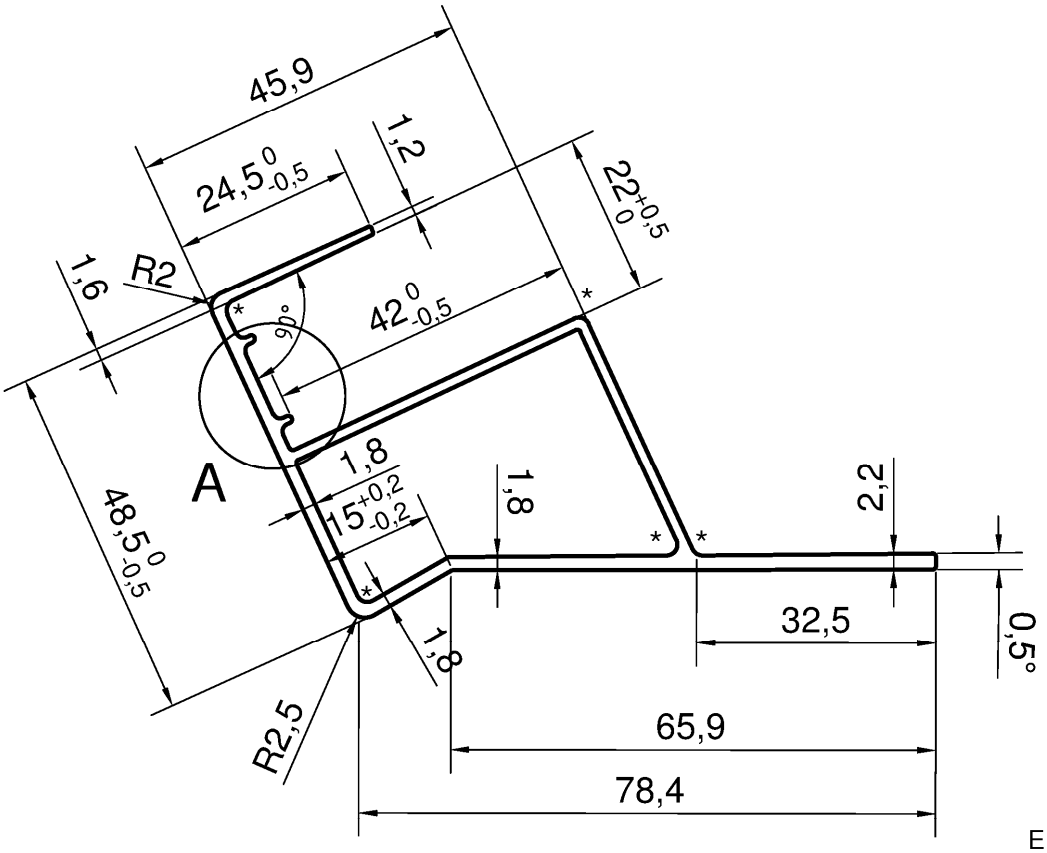
* = radius R =1,5
undimensioned radii R = 0,5
undimensioned wall thickness > 1,5

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.3
Impost profile 3	

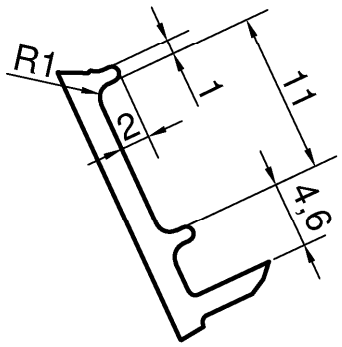
Deutsches Institut für Bautechnik DIBt

impost profile 4



EN AW-6060
condition T66

detail A



All dimensions in mm

* = radius R = 1,5
undimensioned radii R = 0,5
undimensioned wall thickness > 1,5

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.4
Impost profile 4	

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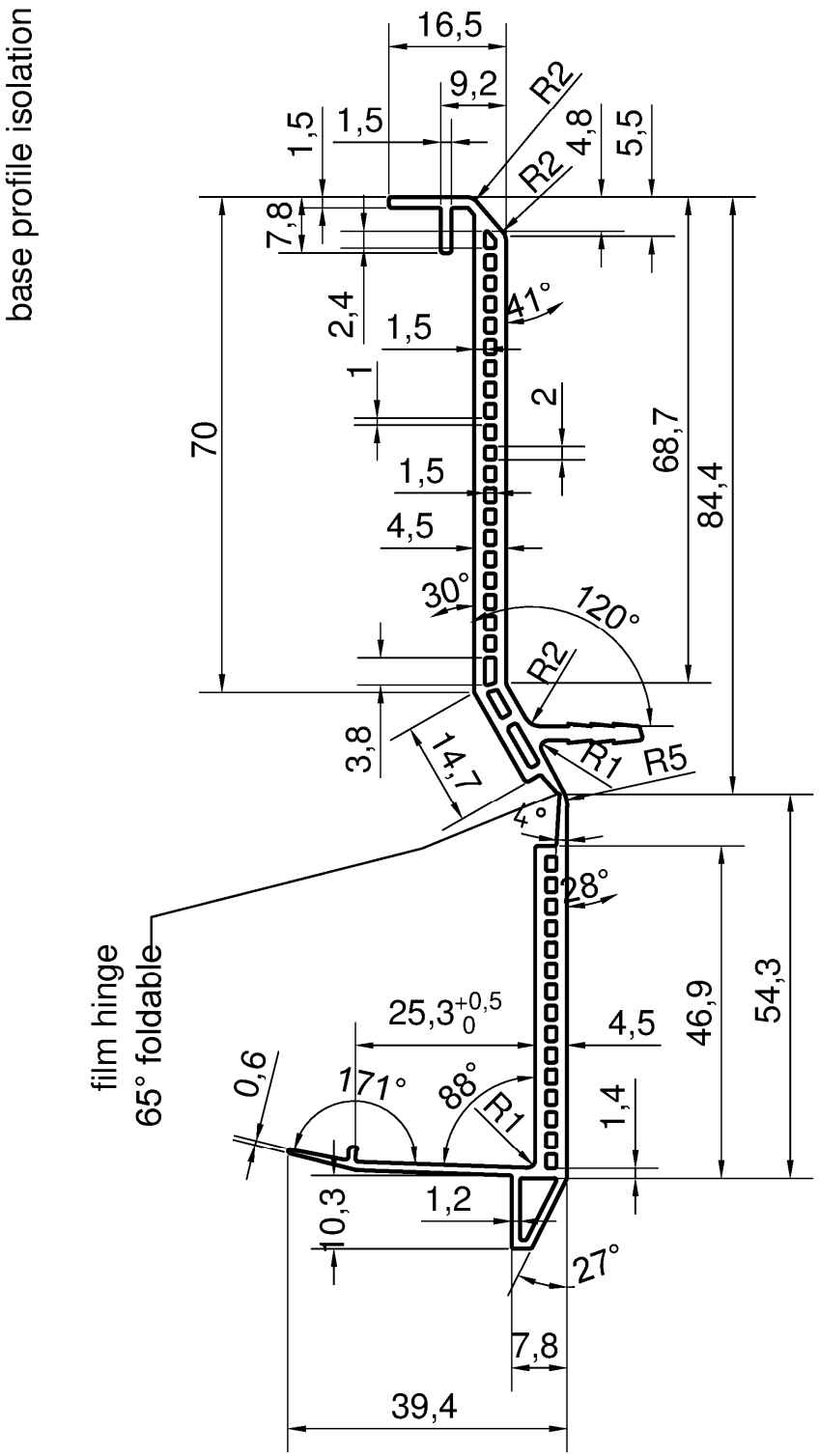

ISO 1163 - PVC - U, EP, 078 - 25 - 23

All dimensions in mm

outer wall thickness 1,5
undimensioned radius R = 0,3

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.5
Base profile isolation	

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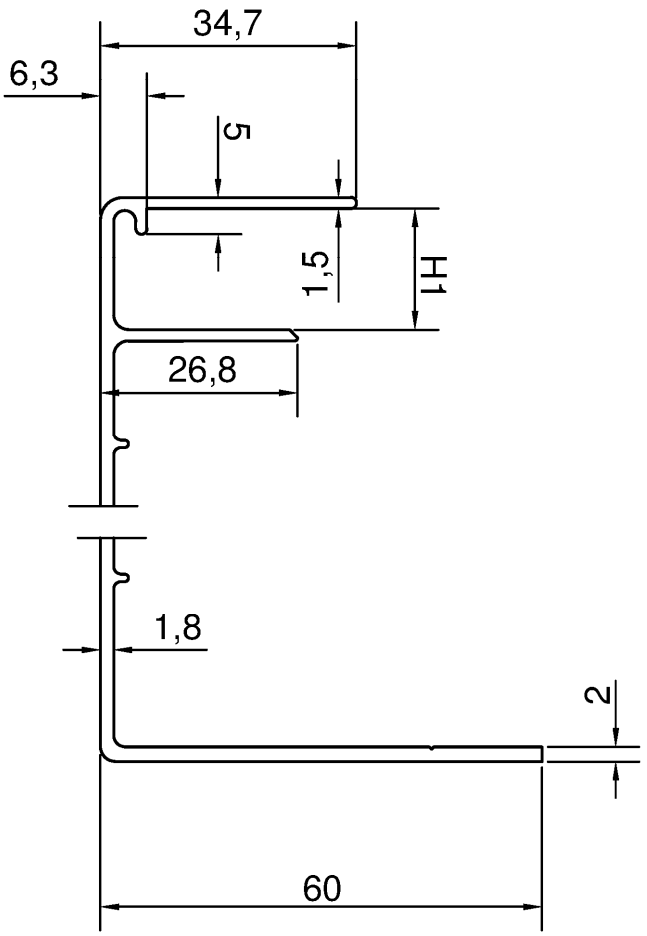
impost profile 5



EN AW-6060
condition T66

All dimensions in mm

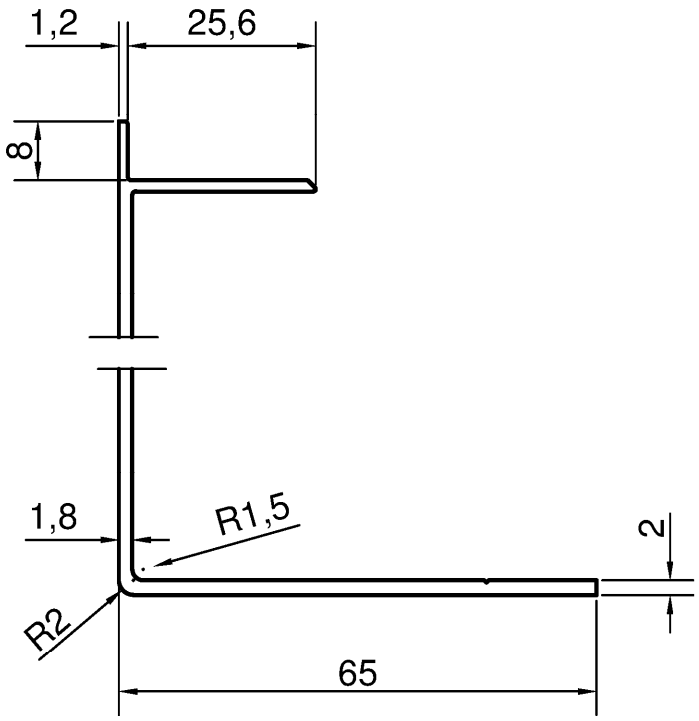
undimensioned radii R = 0,5
undimensioned wall thickness > 1,5

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.6
Impost profile 5	

Deutsches Institut für Bautechnik DIBt

impost profile 6



EN AW-6060
condition T66

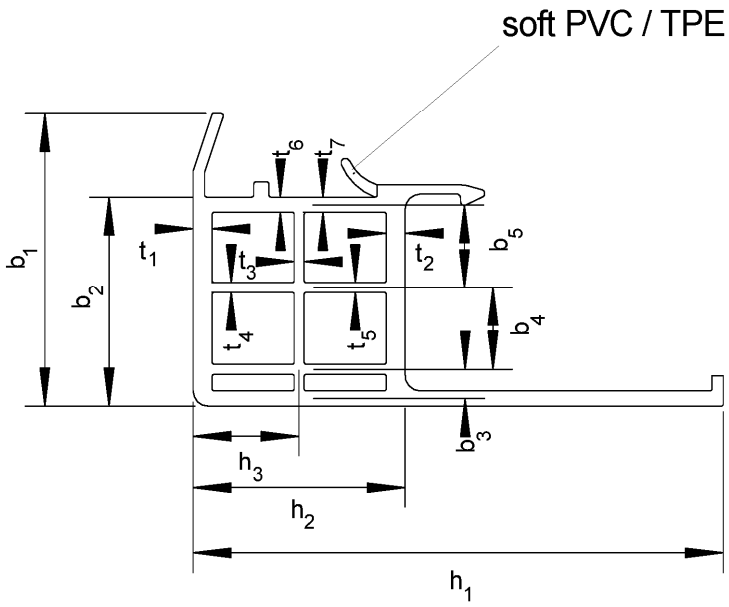
All dimensions in mm

undimensioned radii R = 0,5
undimensioned wall thickness > 1,5

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.7
Impost profile 6	

Deutsches Institut für Bautechnik DIBt



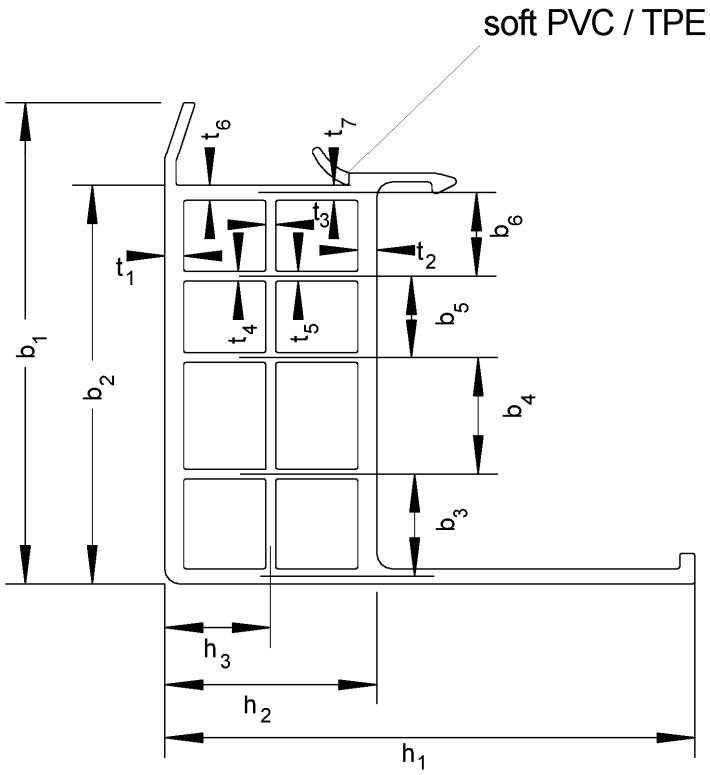
h_1 mm	h_2 mm	h_3 mm	b_1 mm	b_2 mm	b_3 mm	b_4 mm	b_5 mm
69,8	28,2	14,0	38,4	27,6	4,3	10,2	10,9
+ 0,1 - 0,1	+ 0,1 - 0,1	+ 0,2 - 0,1	+ 0,6 - 0,6	+ 0,1 - 0,1	+ 0,2 - 0,2	+ 0,5 - 0,4	+ 0,2 - 0,2

t_1 mm	t_2 mm	t_3 mm	t_4 mm	t_5 mm	t_6 mm	t_7 mm	weight per length kg/m
2,59	2,65	1,48	1,55	1,61	2,21	2,26	0,66
- 0,16	- 0,08	- 0,13	- 0,10	- 0,13	- 0,05	- 0,16	- 0,01

ISO 1163 - PVC - U, EP, 078 - 25 - 23

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.8
Impost profile PVC 1	

Deutsches Institut für Bautechnik DIBt



h_1 mm	h_2 mm	h_3 mm	b_1 mm	b_2 mm	b_3 mm	b_4 mm	b_5 mm	b_6 mm
69,8	27,8	13,7	63,3	52,7	13,0	14,5	11,8	11,2
+ 0,2 - 0,2	+ 0,1 - 0,1	+ 0,1 - 0,1	+ 0,7 - 0,7	+ 0,2 - 0,2	+ 0,1 - 0,2	+ 0,1 - 0,2	+ 0,1 - 0,1	+ 0,1 - 0,1

t_1 mm	t_2 mm	t_3 mm	t_4 mm	t_5 mm	t_6 mm	t_7 mm	weight per length kg/m
2,34	2,42	1,40	1,50	1,45	2,22	2,22	0,89
- 0,05	- 0,09	- 0,12	- 0,14	- 0,09	- 0,13	- 0,07	- 0,01

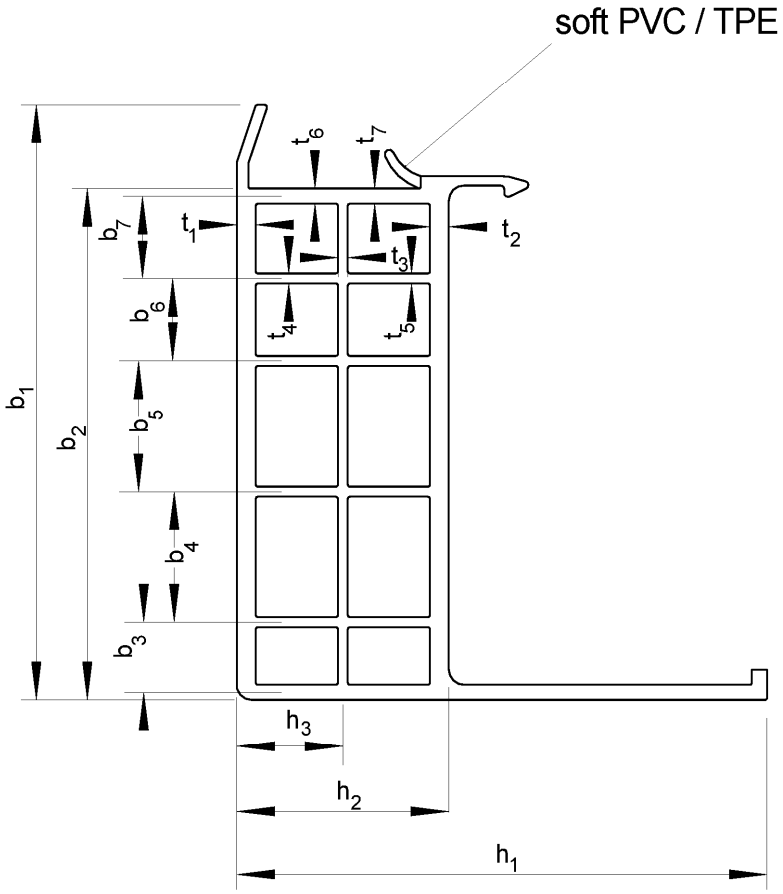
ISO 1163 - PVC - U, EP, 078 - 25 - 23

Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Impost profile PVC 2

Annex A 3.2.9

Deutsches Institut für Bautechnik DIBt



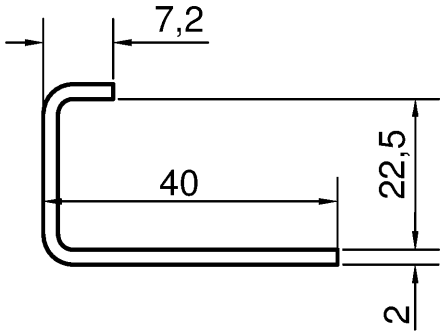
h_1 mm	h_2 mm	h_3 mm	b_1 mm	b_2 mm	b_3 mm	b_4 mm	b_5 mm	b_6 mm
70,0	28,1	13,8	78,0	67,6	9,1	16,3	16,4	12,0
+ 0,1 - 0,1	+ 0,1 - 0,1	+ 0,1 - 0,1	+ 0,2 - 0,1	+ 0,1 - 0,1	+ 0,1 - 0,1	+ 0,1 - 0,1	+ 0,2 - 0,1	+ 0,1 - 0,1

b_7 mm	t_1 mm	t_2 mm	t_3 mm	t_4 mm	t_5 mm	t_6 mm	t_7 mm	weight per length kg/m
11,3	2,50	2,58	1,44	1,40	1,36	2,31	2,29	1,08
+ 0,1 - 0,1	- 0,05	- 0,05	- 0,06	- 0,05	- 0,05	- 0,06	- 0,08	- 0,01

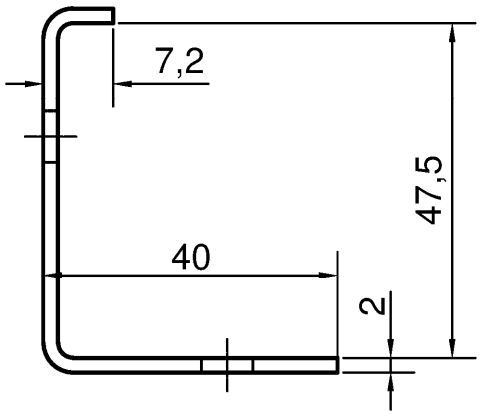
ISO 1163 - PVC - U, EP, 078 - 25 - 23

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.10
Impost profile PVC 3	

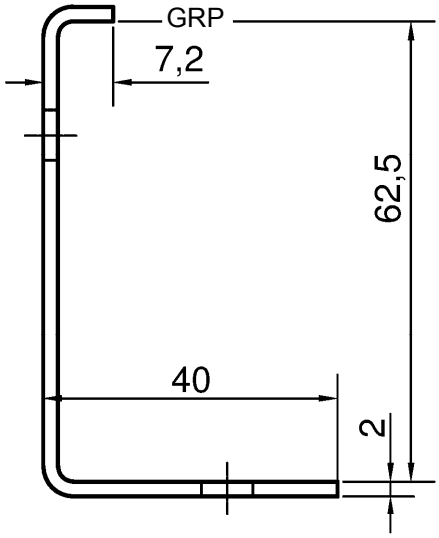
Deutsches Institut für Bautechnik DIBt



stiffening profile 1870
for impost profile PVC 1



stiffening profile 1880
for impost profile PVC 2



stiffening profile 1890
for impost profile PVC 3

All dimensions in mm

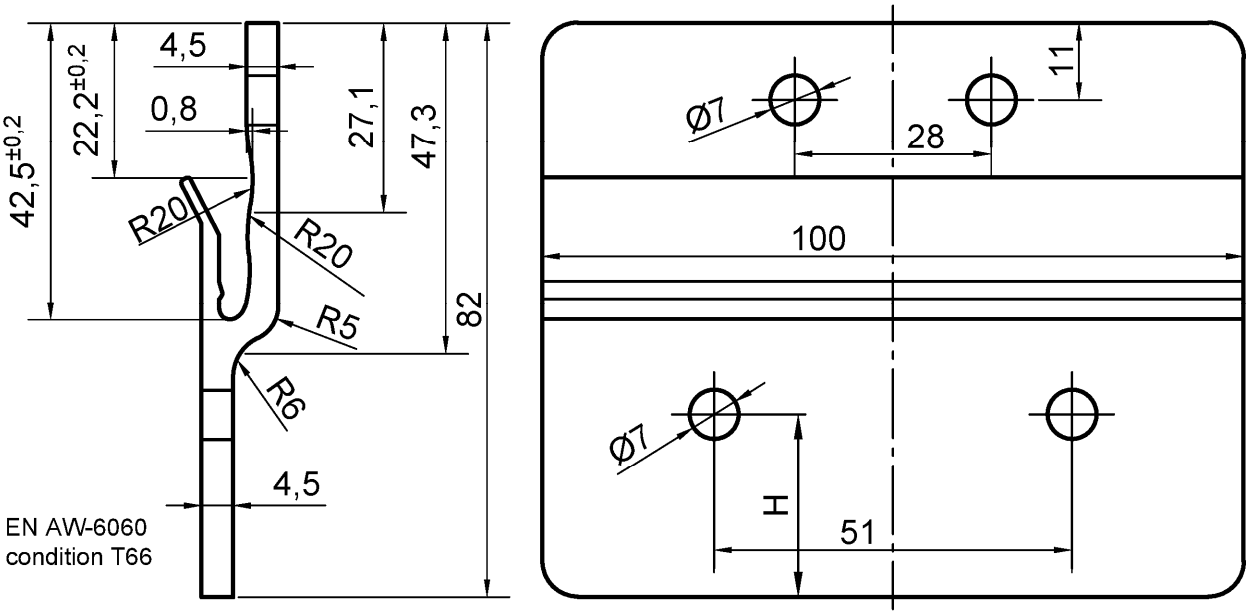
EN AW-6060
condition T66

Dimensions without tolerance:
as per EN 755-9 ^^

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.11
Stiffening profiles for impost profile PVC	

Deutsches Institut für Bautechnik DIBt

tie bracket 1



Dimensions without tolerance:
as per EN 755-9

adding plates:	
glass veil	X= 0mm
aluminium	X= 1mm
solid sheet	X= 2mm to 4mm
GRP	X= 1mm/ 2mm

LB classic plus	
covering	H
PC 10	32-X
PC 16	26-X
PC 20	22-X

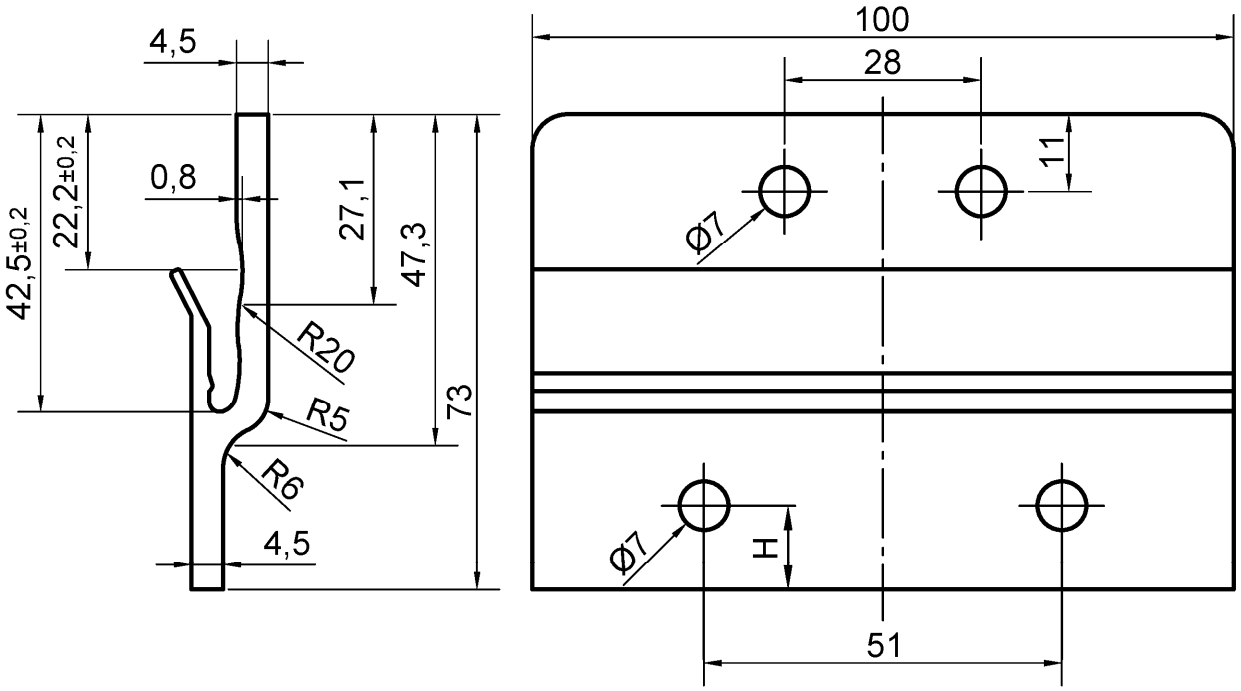
LB classic plus double		LB plus doppelt
covering	H	H
PC 10 + PC 10	22-X	---
PC 16 + PC 10	16-X	16-X
PC 16 + 6 mm PETG	20-X	---
PC 16 + PC 16	10-X	10-X

All dimensions in mm
undimensioned radii R = 0,3

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Anhang A 3.3.1
tie bracket 1	

Deutsches Institut für Bautechnik DIBt

tie bracket 2



EN AW-6060
condition T66

All dimensions in mm

undimensioned radii R = 0,3

Dimensions without tolerance:
as per EN 755-9

adding plates:	
glass veil	X= 0mm
aluminium	X= 1mm
solid sheet	X= 2mm to 4mm
GRP	X= 1mm/ 2mm

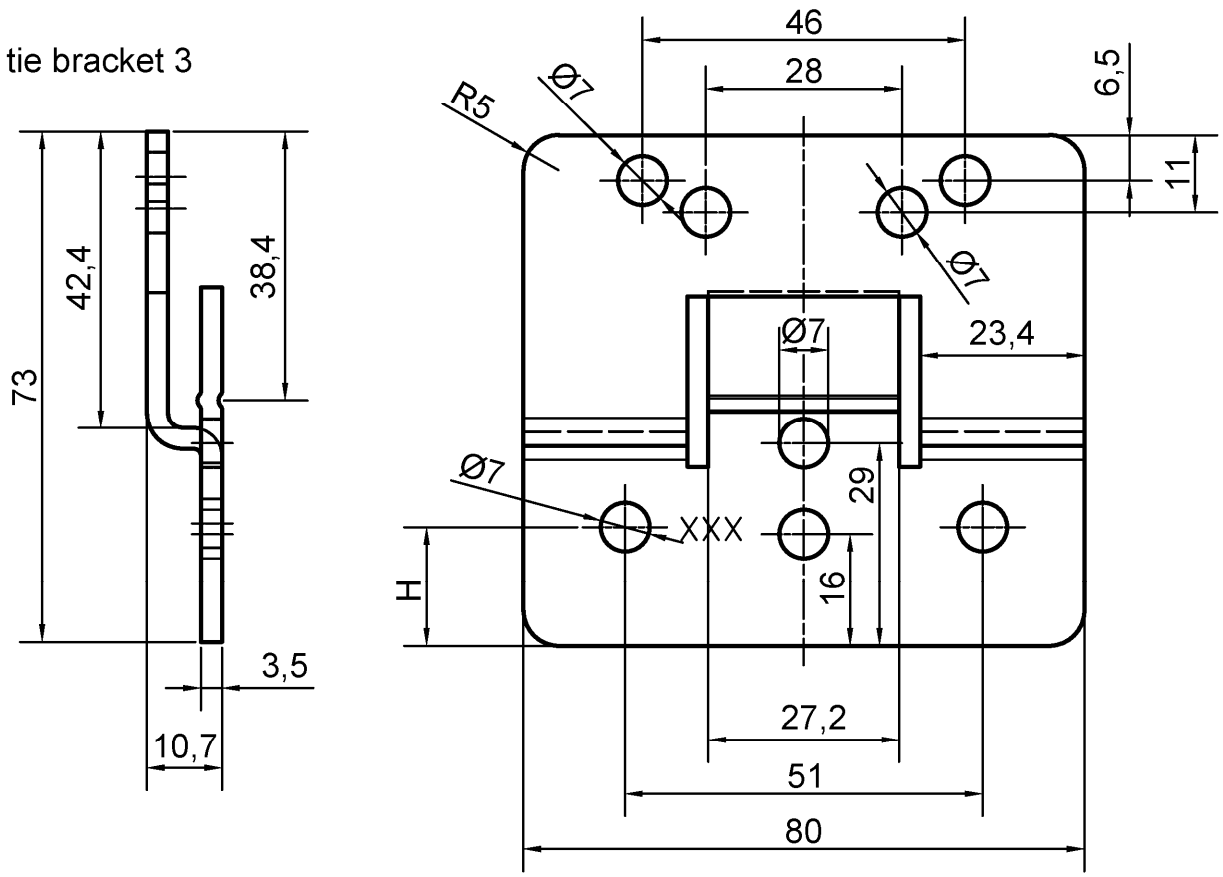
value table for H tie console	LB plus	LB basic
covering	H	H
PC 16	17-X	----
PC 20	13-X	17-X

value table for H tie console	LB plus double	LB basic double
covering	H	H
PC 10 + PC 10	13-X	17-X
PC 16 + 6mm PETG	11-X	15-X
PC 16 + PC 10	----	11-X

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.3.2
tie bracket 2	

Deutsches Institut für Bautechnik DIBt

tie bracket 3



material: 1.4016

All dimensions in mm

Dimensions without tolerance:
as per EN 2768-mK

adding plates:	
glass veil	X= 0mm
aluminium	X= 1mm
solid sheet	X= 2mm to 4mm
GRP	X= 1mm/ 2mm

value table for H tie console	LB plus	LB basic
covering	H	H
PC 16	17-X	----
PC 20	13-X	17-X

value table for H tie console	LB plus double	LB basic double
covering	H	H
PC 10 + PC 10	13-X	17-X
PGRP + 6mm PETG	11-X	15-X
PC 16 + PC 10	----	11-X

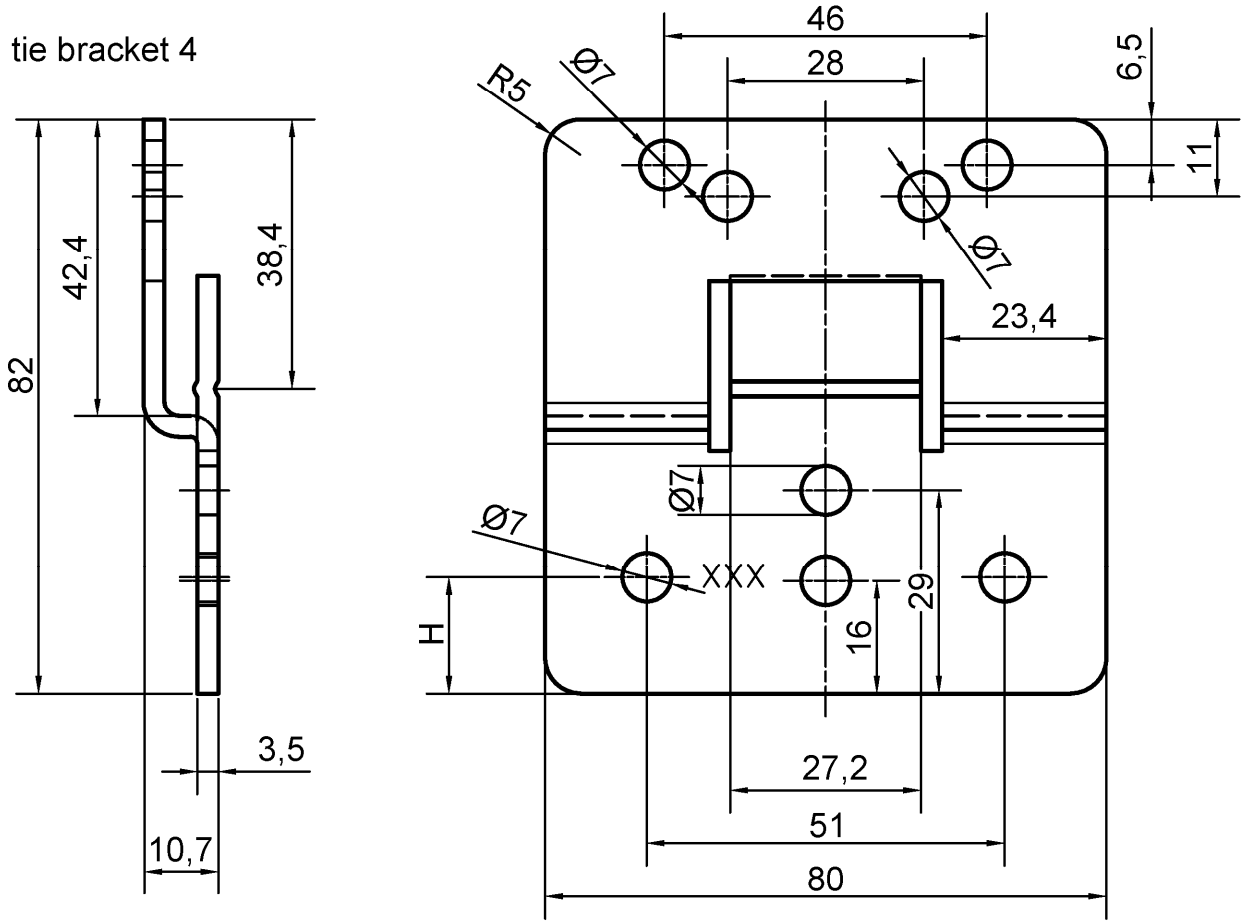
Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Tie bracket 3

Annex A 3.3.3

Deutsches Institut für Bautechnik DIBt

tie bracket 4



All dimensions in mm

material: 1.4016

Dimensions without tolerance:
as per EN 2768-mK

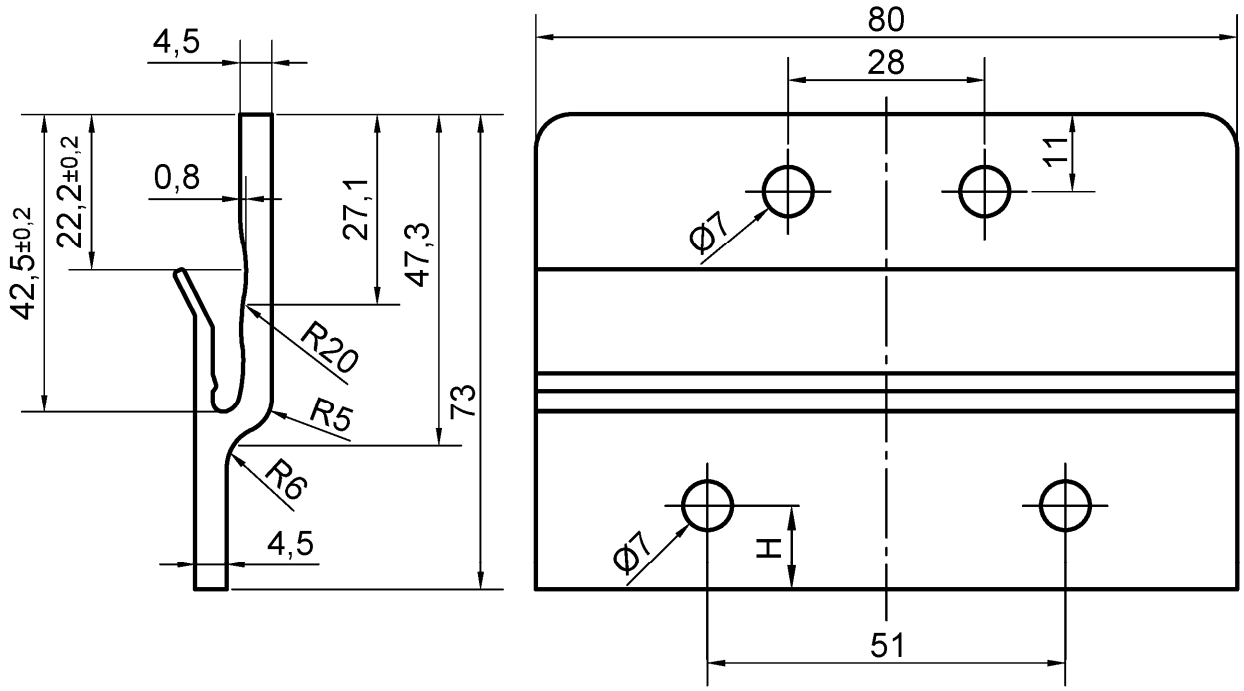
LB plus double	
covering	H
PC 16 + PC 10	16-X
PC 16 + PC 16	10-X

adding plates:	
glass veil	X= 0mm
aluminium	X= 1mm
solid sheet	X= 2mm to 4mm
GRP	X= 1mm/ 2mm

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.3.4
Tie bracket 4	

Deutsches Institut für Bautechnik DIBt

tie bracket 5



All dimensions in mm

undimensioned radii R = 0,3 mm

EN AW-6060
condition T66

Dimensions without tolerance:
as per EN 755-9

adding plates:	
glass veil	X= 0mm
aluminium	X= 1mm
solid sheet	X= 2mm to 4mm
GRP	X= 1mm/ 2mm

value table for H tie console	LB plus	LB basic
covering	H	H
PC 16	17-X	----
PC 20	13-X	17-X

value table for H tie console	LB plus double	LB basic double
covering	H	H
PC 10 + PC 10	13-X	17-X
PC 16 + 6mm PETG	11-X	15-X
PC 16 + PC 10	----	11-X

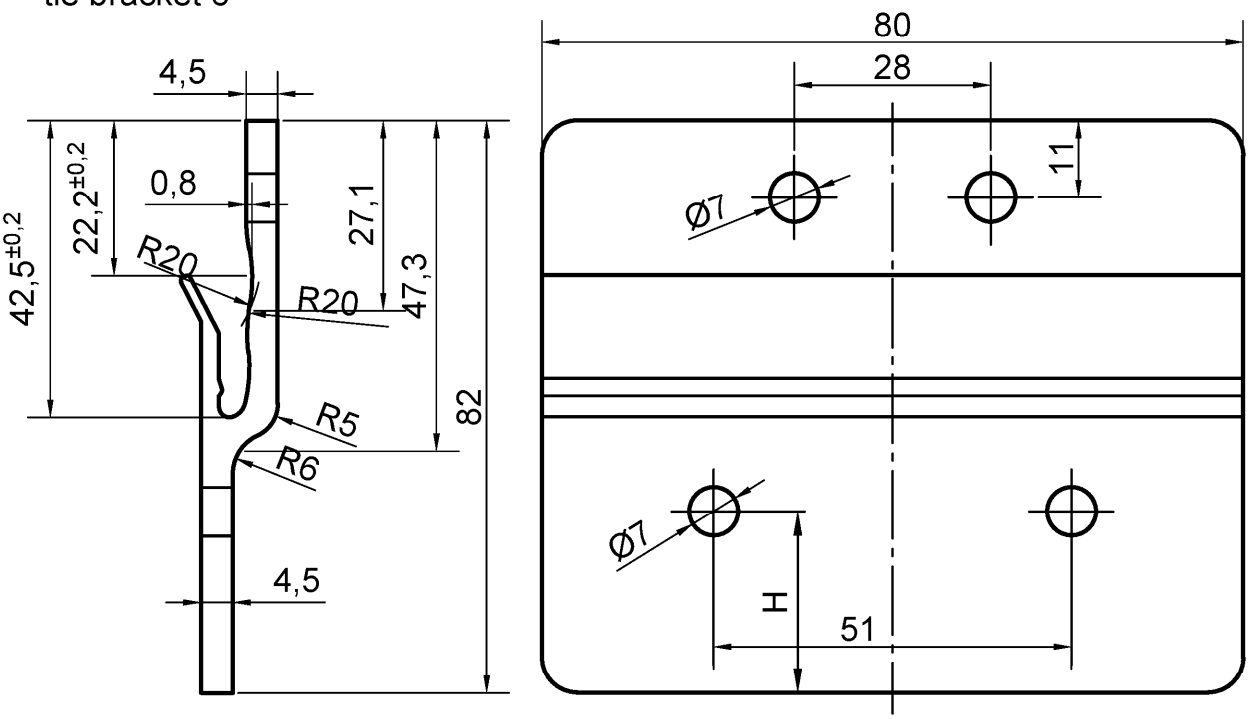
Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Tie bracket 5

Annex A 3.3.5

Deutsches Institut für Bautechnik DIBt

tie bracket 6



EN AW-6060
condition T66

All dimensions in mm

undimensioned radii R = 0,3 mm

Dimensions without tolerance:
as per EN 755-9

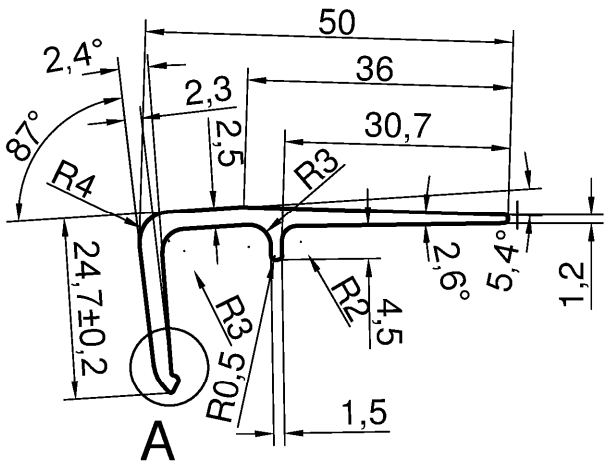
LB plus double	
covering	H
PC 16 + PC 10	16-X
PC 16 + PC 16	10-X

adding plates:	
glass veil	X= 0mm
aluminium	X= 1mm
solid sheet	X= 2mm to 4mm
GRP	X= 1mm/ 2mm

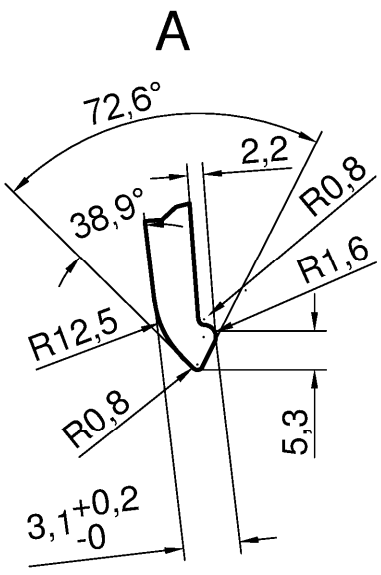
Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.3.6
Tie bracket 6	

Deutsches Institut für Bautechnik DIBt

clamping profile



EN AW-6060
condition T66



All dimensions in mm

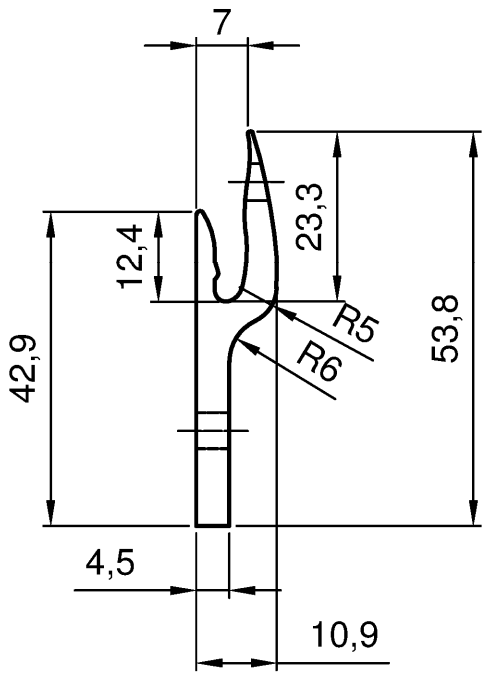
undimensioned radii R = 0,5

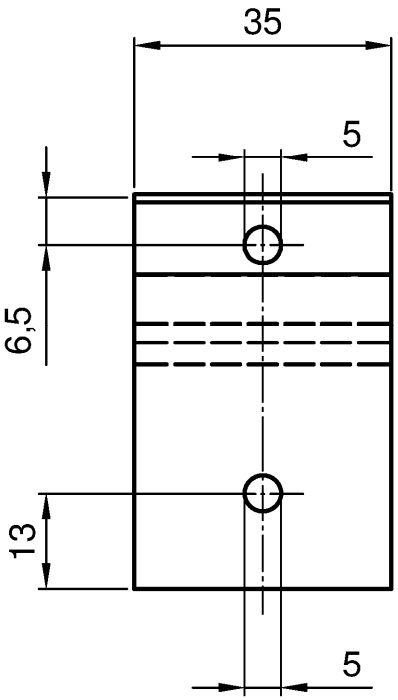
Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.4.1
Cross section clamping profile for rooflight types "LB classic plus", "LB classic plus double" "LB plus", "LB plus double", "LB basic" and "LB basic double"	

Deutsches Institut für Bautechnik DIBt

Fixation bracket 1





EN AW-6060
condition T66

All dimensions in mm

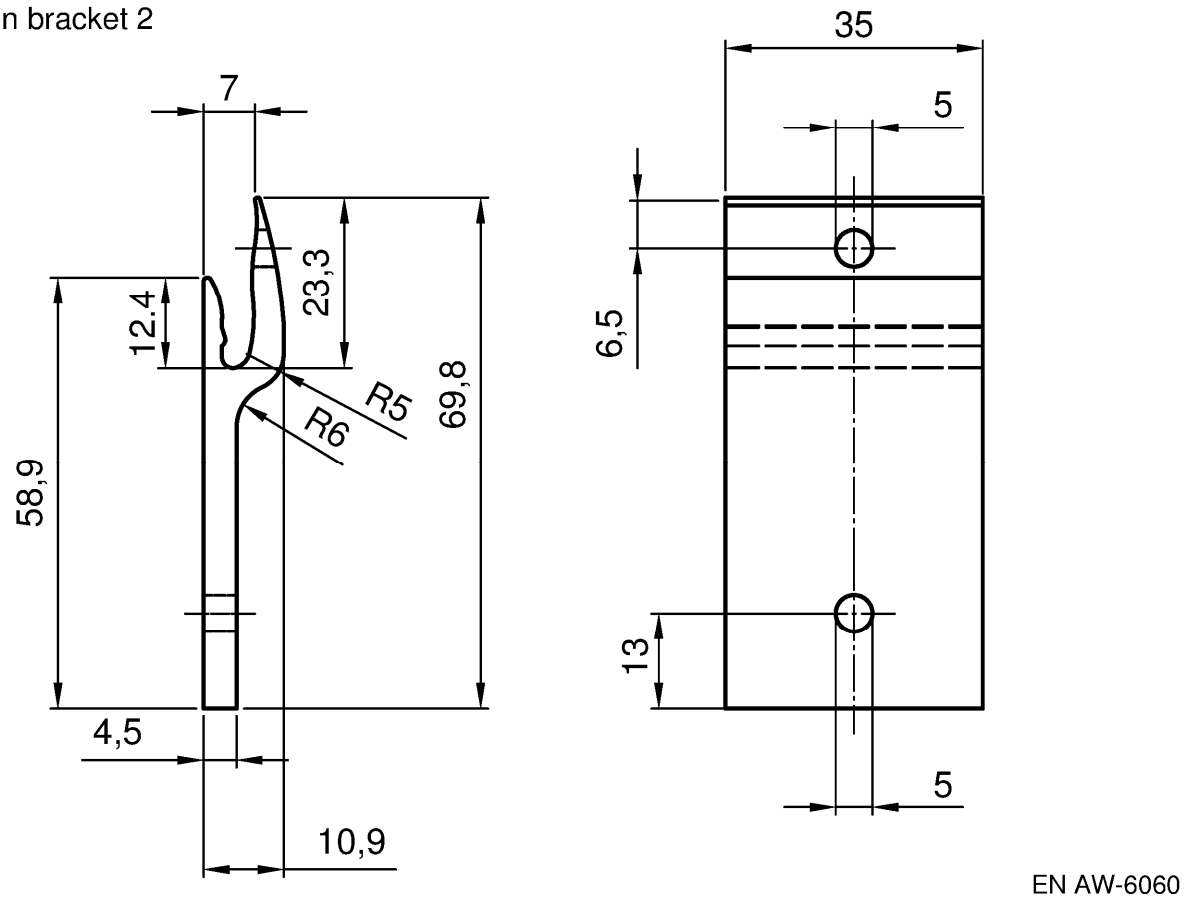
undimensioned radii R = 0,3

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.4.2
Fixation bracket 1	

Deutsches Institut für Bautechnik DIBt

Fixation bracket 2



EN AW-6060
condition T66

All dimensions in mm

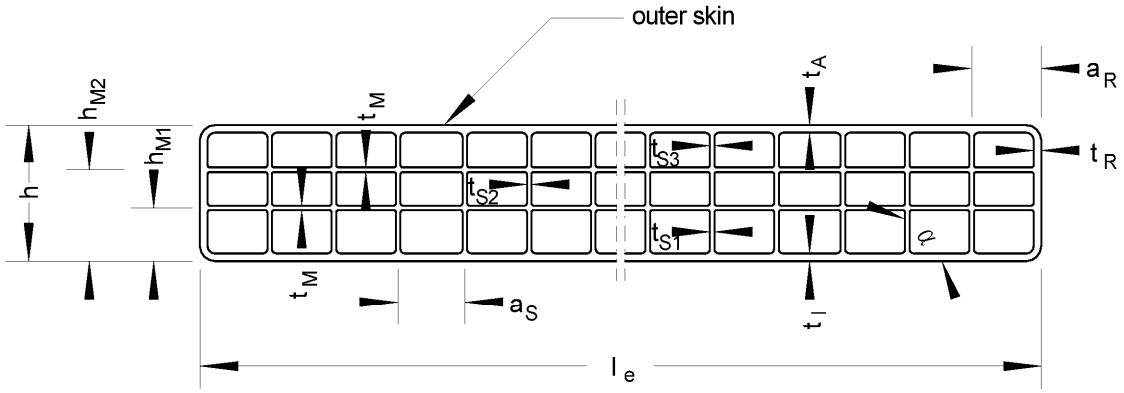
undimensioned radii R = 0,3

Dimensions without tolerance:
as per EN 755-9

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.4.3
Fixation bracket 2	

Deutsches Institut für Bautechnik DIBt

Sheet: **Kingspan Multiwall 10-4**
Manufacturer: **Kingspan Ltd.**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	a_S mm	a_R mm	t_A mm	t_I mm	t_{S1} mm	t_{S2} mm	t_{S3} mm
1150	10,4	3,7	6,9	6,0	5,6	0,46	0,45	0,27	0,25	0,25
+ 6 - 2	+ 0,5 - 0,5	+ 0,3 - 0,4	+ 0,4 - 0,4	+ 0,3	+ 1,8	- 0,08	- 0,04	- 0,08	- 0,08	- 0,05

t_M mm	t_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
0,05	0,51	1,81	
- 0,01	- 0,21	- 0,04	≤2°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
50,5 Nm²/m	26,5 Nm²/m	2594 N/m	57,8 Nm/m	60,2 Nm/m

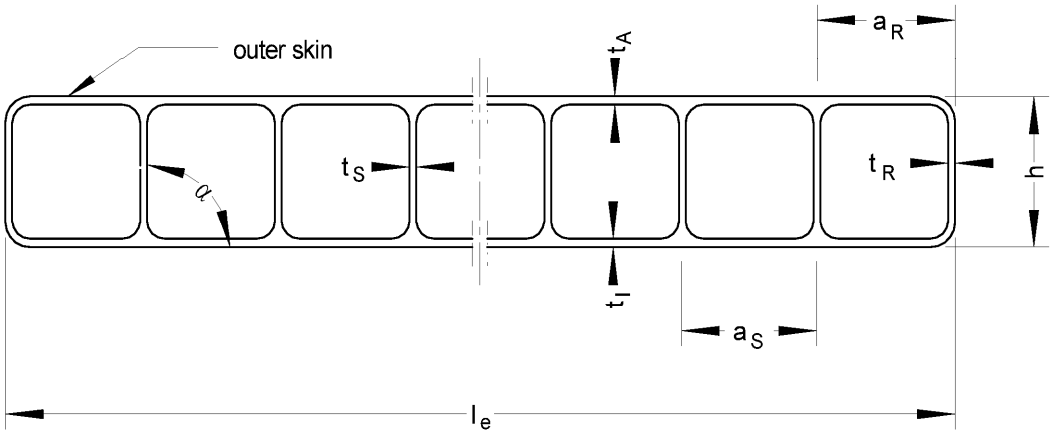
$M_{b,pos}$: outer skin under pressure
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.1
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Kingspan Multiwall 10-4"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Akyver Sun Type 10**
Manufacturer: **DS Smith Plastics France**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	a_S mm	a_R mm	t_A mm	t_I mm	t_S mm	t_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
2100	10,3	10,9	10,1	0,46	0,46	0,47	0,37	1,70	
+ 6 - 2	± 0,5	+ 0,75	+ 1,9	- 0,06	- 0,04	- 0,12	- 0,08	+ 0,10 - 0,07	≤ 7°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
58,1 Nm²/m	35,1 Nm²/m	2756 N/m	35,2 Nm/m	36,1 Nm/m

$M_{b,pos}$: outer skin under pressure

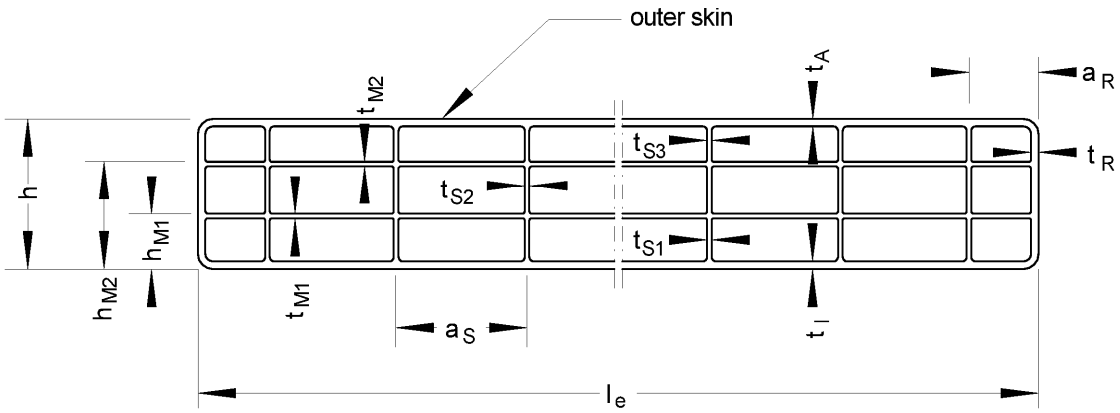
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.2
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Akyver Sun Type 10"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Akyver Sun Type 10/4w-7**
Manufacturer: **DS Smith Plastics France**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	a_S mm	a_R mm	t_A mm	t_I mm	t_{S1} mm	t_{S2} mm	t_{S3} mm
2100	10,1	3,8	7,1	7,3	4,6	0,44	0,43	0,31	0,21	0,22
+ 6 - 2	+ 0,5 - 0,5	+ 0,1 - 0,1	+ 0,1 - 0,1	+ 0,1	+ 0,2	- 0,04	- 0,05	- 0,02	- 0,02	- 0,01

t_{M1} mm	t_{M2} mm	t_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
0,08	0,05	0,48	1,72	
- 0,01	- 0,01	- 0,05	+0,10 - 0,01	≤6°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
54,9 Nm²/m	40,2 Nm²/m	1858 N/m	39,6 Nm/m	39,6 Nm/m

$M_{b,pos}$: outer skin under pressure

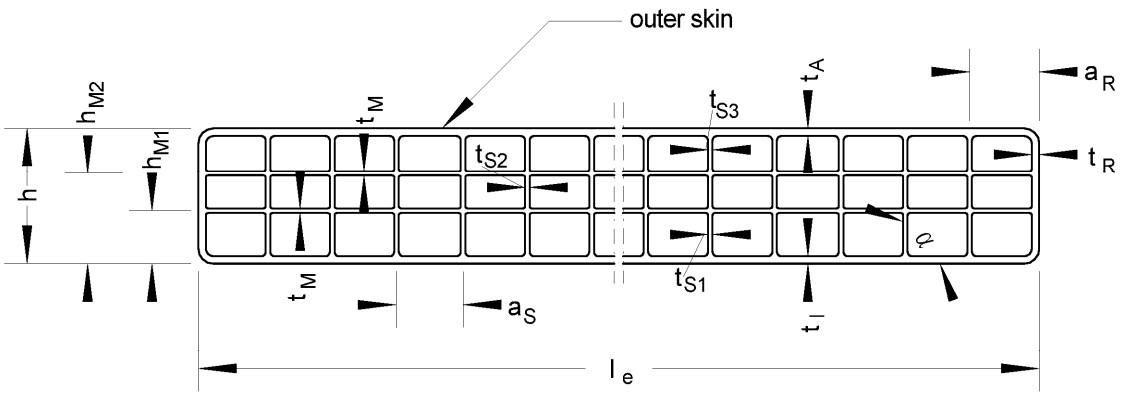
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (Δ A)	5 % (Δ A)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.3
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Akyver Sun Type 10/4w-7"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Makrolon multi UV 4/10-6**
Manufacturer: **Covestro AG**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	a_S mm	a_R mm	t_A mm	t_I mm	t_{S1} mm	t_{S2} mm	t_{S3} mm
2100	10,0	3,4	6,8	6,0	3,2	0,44	0,44	0,23	0,16	0,20
+ 6 - 2	+ 0,5 - 0,5	+ 0,4 - 0,3	+ 0,35 - 0,45	+ 0,25	+ 0,3	- 0,04	- 0,05	- 0,04	- 0,05	- 0,03

t_M mm	t_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
0,08	0,26	1,73	
- 0,02	- 0,08	+0,10 - 0,02	≤ 8°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
49,0 Nm²/m	23,1 Nm²/m	2152 N/m	47,4 Nm/m	39,6 Nm/m

$M_{b,pos}$: outer skin under pressure

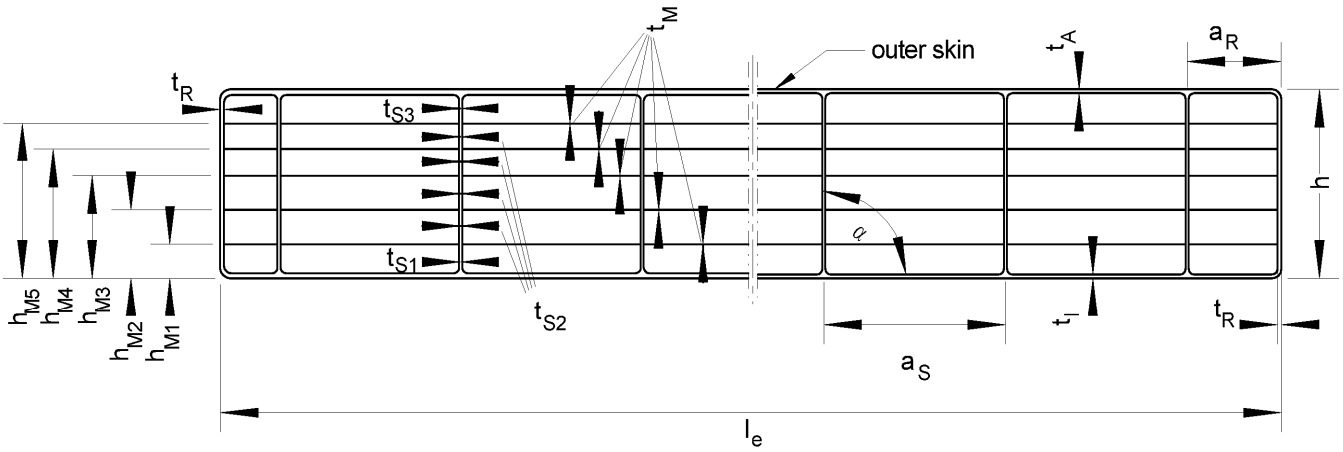
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.4
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Makrolon multi UV 4/10-6"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Kingspan Multiwall 16-7**
Manufacturer: **Kingspan Ltd.**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	h_{M5} mm	a_S mm	a_R mm	weight per area kg/m²
1200	16,1	3,0	5,4	7,8	10,4	13,2	13,8	8,9	2,77
+6 -2	± 0,5	+ 0,1 - 0,2	+ 0,1 - 0,2	+ 0,4 - 0,1	+ 0,2 - 0,1	+ 0,1 - 0,1	+ 0,2	+ 1,3	+ 0,16 - 0,03

t_A mm	t_I mm	t_{S1} mm	t_{S2} mm	t_{S3} mm	t_M mm	t_R mm	difference $\lvert\Delta\alpha\rvert$ to 90°
0,60	0,57	0,34	0,41	0,34	0,10	0,49	
- 0,04	- 0,03	- 0,07	- 0,03	- 0,07	- 0,01	- 0,30	≤ 4°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
177,4 Nm²/m	63,0 Nm²/m	2650 N/m	66,7 Nm/m	48,9 Nm/m

$M_{b,pos}$: outer skin under pressure

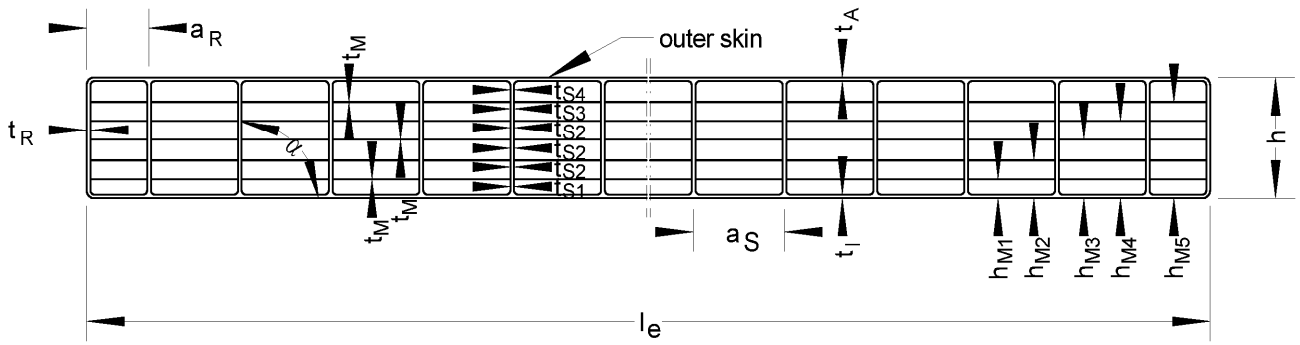
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.5
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Kingspan Multiwall 16-7"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Akyver Sun Type 16/7w-12 2600**
Manufacturer: **DS Smith Plastics France**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	h_{M5} mm	a_S mm	a_R mm	t_A mm	t_I mm
2100	16,0	2,4	4,9	7,7	10,4	12,9	12,0	6,5	0,56	0,52
+6 -2	± 0,5	+ 0,5 - 0,25	+ 0,45 - 0,4	+ 0,4 - 0,55	+ 0,25 - 0,3	+ 0,3 - 0,3	+ 0,40	+ 2,5	- 0,10	- 0,08

t_{S1} mm	t_{S2} mm	t_{S3} mm	t_{S4} mm	t_M mm	t_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
0,41	0,39	0,44	0,44	0,06	0,58	2,56	
- 0,10	- 0,12	- 0,09	- 0,10	- 0,02	- 0,27	+ 0,15 - 0,09	≤ 4°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
176,5 Nm²/m	58,8 Nm²/m	2703 N/m	68,8 Nm/m	59,1 Nm/m

$M_{b,pos}$: outer skin under pressure

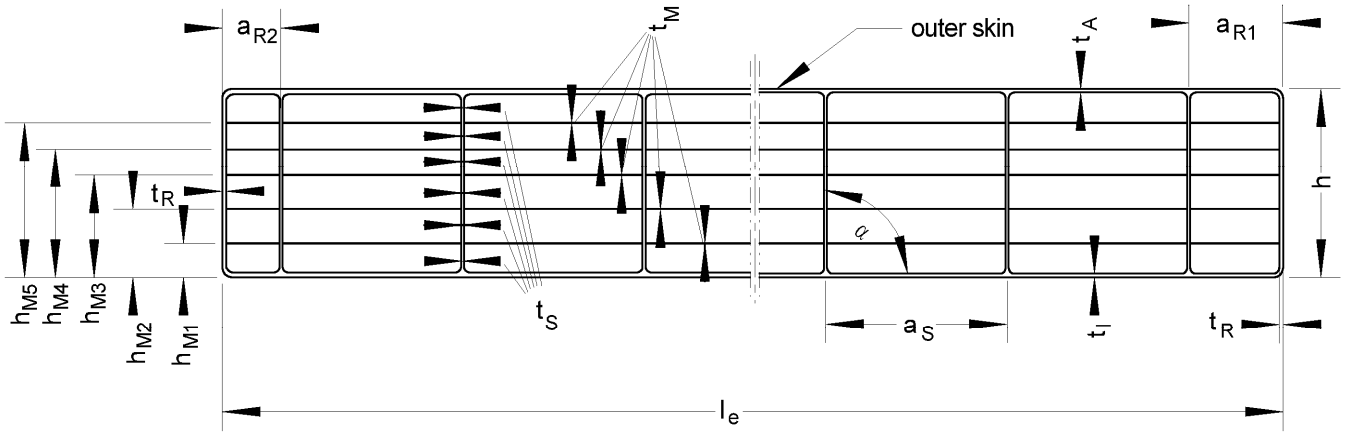
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.6
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Akyver Sun Type 16/7w-12 2600"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Makrolon multi UV 7/16-14**
Manufacturer: **Covestro AG**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	h_{M5} mm	a_S mm	a_{R1} mm	a_{R2} mm	weight per area kg/m²
2100	16,3	3,0	5,4	7,9	10,6	13,4	13,8	10,2	6,6	2,64
+6 -2	± 0,5	+ 0,15 - 0,2	+ 0,2 - 0,15	+ 0,4 - 0,2	+ 0,2 - 0,15	+ 0,25 - 0,35	+ 0,25	+ 0,90	+ 0,75	+ 0,16 - 0,01

t_A mm	t_I mm	t_S mm	t_M mm	t_R mm	difference $\lvert\Delta\alpha\rvert$ to 90°
0,57	0,60	0,37	0,08	0,78	
- 0,04	- 0,05	- 0,08	- 0,01	- 0,06	≤ 3°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
170,9 Nm²/m	70,1 Nm²/m	2845 N/m	63,2 Nm/m	49,9 Nm/m

$M_{b,pos}$: outer skin under pressure

$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

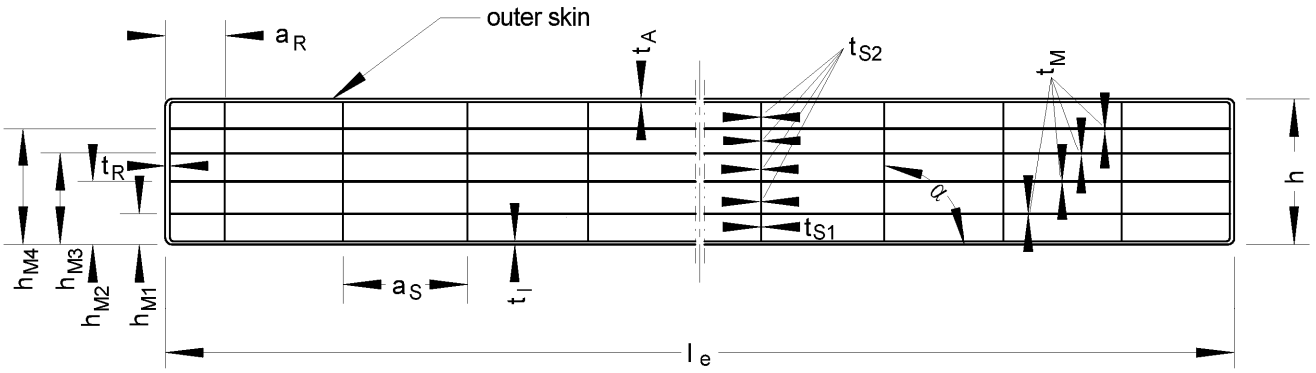
Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153
"Makrolon multi UV 7/16-14"

Annex A 4.7

Deutsches Institut für Bautechnik DIBt

Sheet: **Makrolon multi UV 6/16-20**
Manufacturer: **Covestro AG**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	a_S mm	a_R mm	t_A mm	t_I mm
2100	16,5	3,3	6,2	9,3	12,6	19,5	16,8	0,86	0,78
+6 -2	± 0,5	+ 0,25 - 0,15	+ 0,25 - 0,3	+ 0,35 - 0,25	± 0,25	+ 0,45	+ 1,15	- 0,05	- 0,08

t_{S1} mm	t_{S2} mm	t_M mm	t_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
0,47	0,33	0,05	0,46	2,73	
- 0,05	- 0,08	- 0,01	- 0,09	+ 0,16 - 0,06	≤ 4°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
201 Nm²/m	28,0 Nm²/m	1868 N/m	65,6 Nm/m	60,6 Nm/m

$M_{b,pos}$: outer skin under pressure

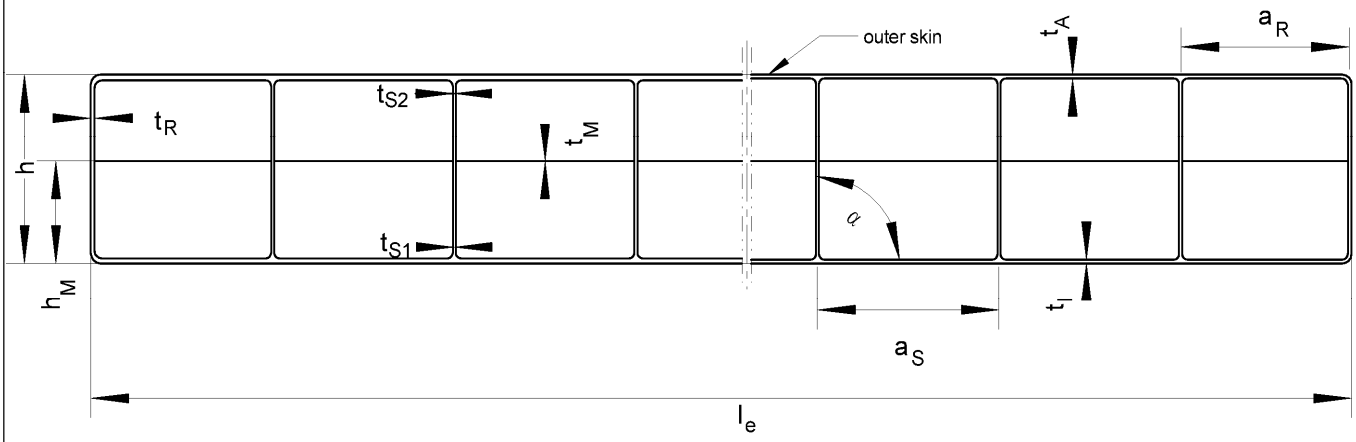
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.8
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Makrolon multi UV 6/16-20"	

Deutsches Institut für Bautechnik DIBt

Sheet: **IMPEX MULTIWALL 16/3w**
Manufacturer: **Polycasa N.V., Geel (Belgium)**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_M mm	a_S mm	a_R mm	t_A mm	t_I mm	t_{S1} mm	t_{S2} mm	weight per area kg/m²
2100	15,75	7,2	19,9	20,3	0,80	0,66	0,75	0,53	2,65
+6 -2	± 0,5	+ 0,5 - 0,5	+ 0,3	+ 2,2	- 0,13	- 0,08	- 0,12	- 0,03	+ 0,16 - 0,10

t_M mm	t_R mm	difference $\lvert\Delta\alpha\rvert$ to 90°
0,27	0,37	
- 0,03	- 0,14	≤ 7°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
179,7 Nm²/m	101,4 Nm²/m	2584 N/m	61,6 Nm/m	66,4 Nm/m

$M_{b,pos}$: outer skin under pressure

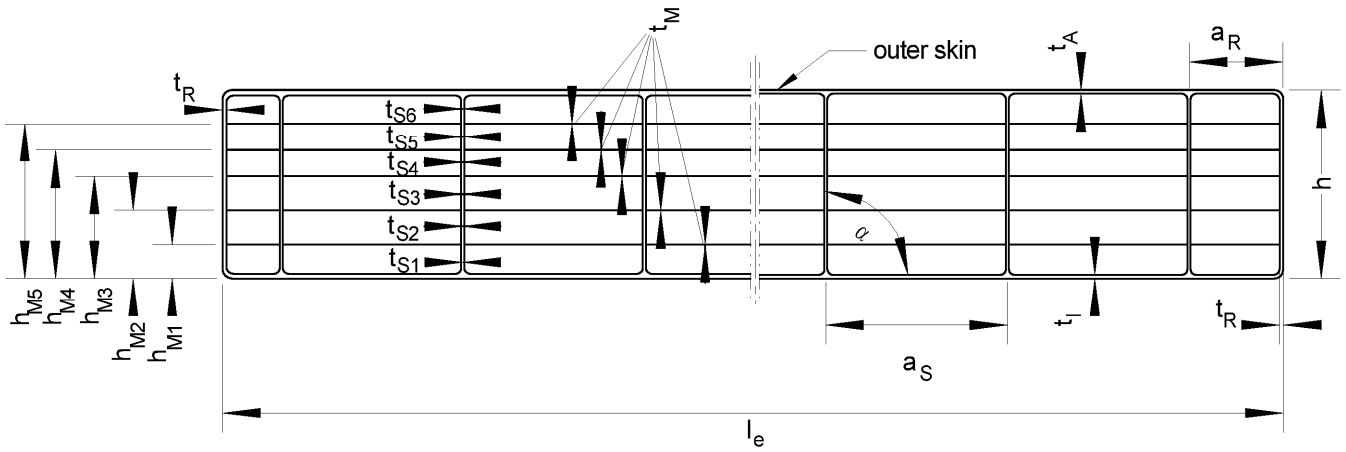
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex 4.9
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "IMPEX MULTIWALL 16/3w	

Deutsches Institut für Bautechnik DIBt

Sheet: **Kingspan Multiwall 20-7**
Manufacturer: **Kingspan Ltd.**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	h_{M5} mm	a_S mm	a_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
1200	20,3	4,0	7,0	10,3	13,2	16,6	13,8	11,1	2,97	
+6 -2	± 0,5	+0,3 -0,2	+0,5 -0,3	+0,8 -0,3	+1,4 -0,4	+0,6 -0,3	+0,3	+3,3	+0,18 -0,06	≤ 1°

t_A mm	t_I mm	t_M mm	t_{S1} mm	t_{S2} mm	t_{S3} mm	t_{S4} mm	t_{S5} mm	t_{S6} mm	t_R mm
0,65	0,68	0,11	0,32	0,37	0,39	0,27	0,37	0,31	0,56
-0,07	-0,04	-0,02	-0,05	-0,12	-0,14	-0,06	-0,09	-0,09	-0,24

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
300,1 Nm²/m	70,7 Nm²/m	2409 N/m	67,8 Nm/m	51,9 Nm/m

$M_{b,pos}$: outer skin under pressure

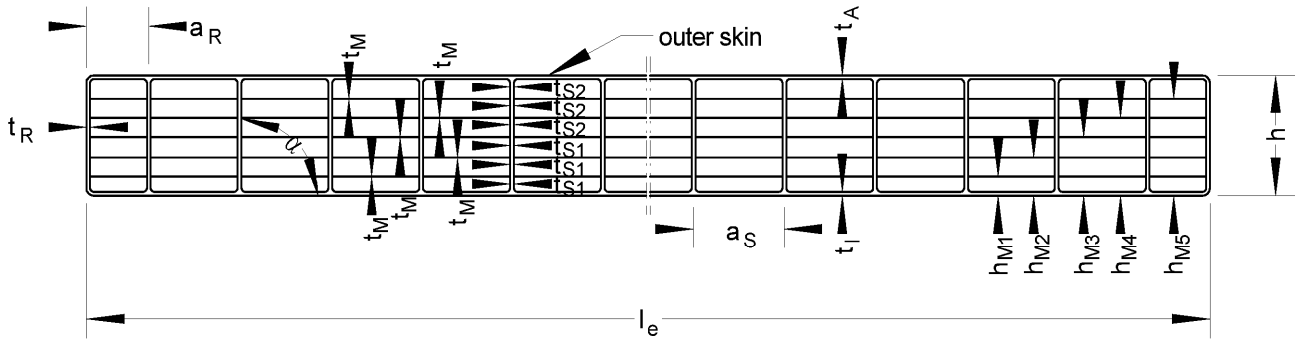
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.10
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Kingspan Multiwall 20-7"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Akyver Sun Type 20/7w-12**
Manufacturer: **DS Smith Plastics France**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	h_{M5} mm	a_S mm	a_R mm	t_A mm	t_I mm
2100	20,0	3,9	7,0	9,9	12,4	16,3	12,3	8,9	0,65	0,63
+ 6 - 2	± 0,5	+ 0,15 - 0,15	+ 0,25 - 0,25	+ 0,25 - 0,25	+ 0,3 - 0,3	+ 0,15 - 0,15	+ 0,1	+ 0,35	- 0,05	- 0,05

t_{S1} mm	t_{S2} mm	t_M mm	t_R mm	weight per area kg/m²
0,41	0,37	0,07	0,79	2,85
- 0,02	- 0,04	- 0,01	- 0,04	+ 0,17 - 0,05

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
317,7 Nm²/m	100,1 Nm²/m	2401 N/m	68,4 Nm/m	68,4 Nm/m

$M_{b,pos}$: outer skin under pressure

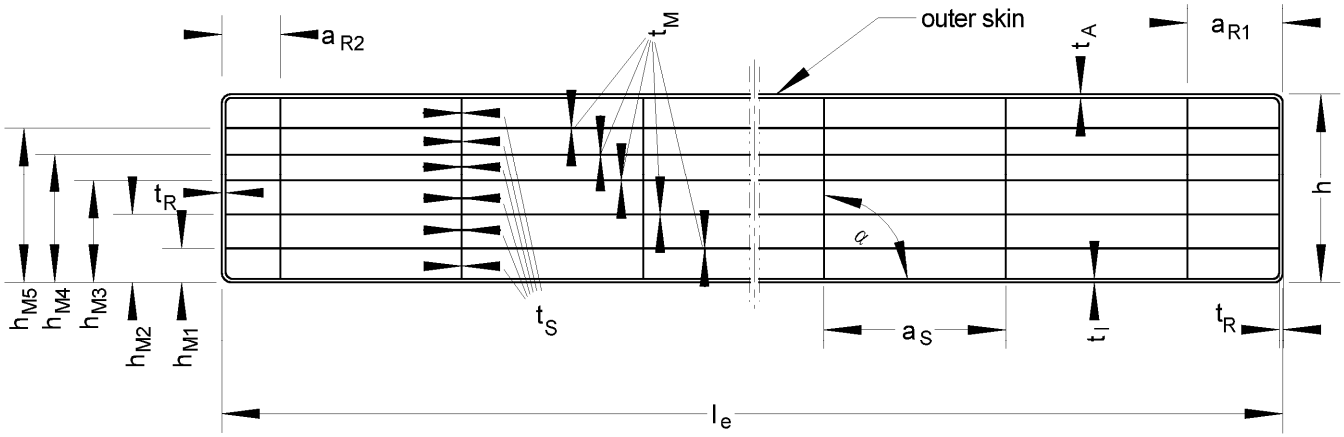
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.11
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Akyver Sun Type 20/7w-12"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Makrolon multi UV 7/20-14**
Manufacturer: **Covestro AG**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	h_{M5} mm	a_S mm	a_R mm	weight per area kg/m²
2100	19,6	3,6	6,6	9,6	12,6	15,9	13,8	8,0	2,85
+ 6 - 2	± 0,5	+ 0,3 - 0,25	+ 0,2 - 0,3	+ 0,25 - 0,3	+ 0,3 - 0,2	+ 0,25 - 0,3	+ 0,4	+ 2,4	+ 0,17 - 0,06

t_A mm	t_I mm	t_S mm	t_M mm	t_R mm	difference $\lvert\Delta\alpha\rvert$ to 90°
0,63	0,65	0,33	0,07	0,85	
- 0,07	- 0,09	- 0,07	- 0,02	- 0,43	≤ 6°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
320 Nm²/m	56,6 Nm²/m	1925 N/m	63,4 Nm/m	71,4 Nm/m

$M_{b,pos}$: outer skin under pressure

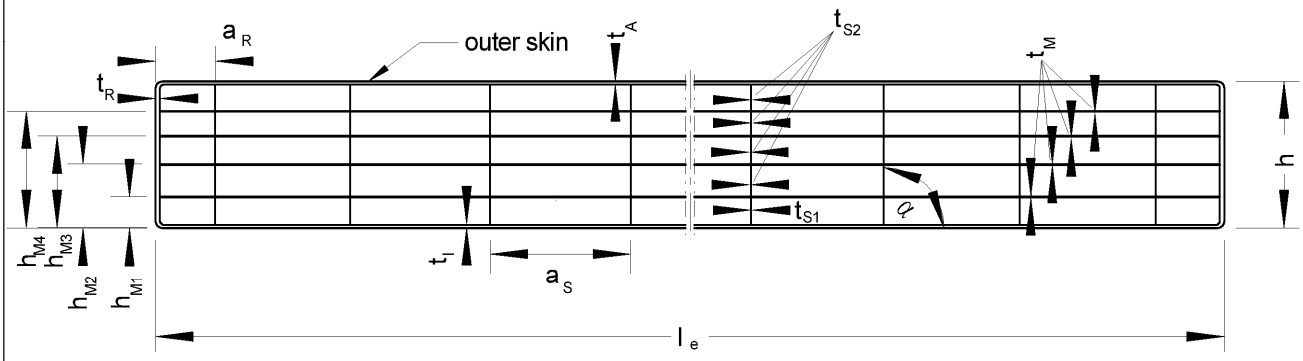
$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.12
Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153 "Makrolon multi UV 7/20-14"	

Deutsches Institut für Bautechnik DIBt

Sheet: **Makrolon multi UV 6/20-20**
Manufacturer: **Covestro AG**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_{M1} mm	h_{M2} mm	h_{M3} mm	h_{M4} mm	a_S mm	a_R mm	t_A mm	t_I mm
2100	20,5	3,9	7,1	11,0	15,5	19,5	18,0	0,96	0,87
+6 -2	± 0,5	+ 0,35 - 0,25	+ 0,3 - 0,3	+ 0,45 - 0,4	+ 0,4 - 0,45	+ 0,4	+ 0,95	- 0,06	- 0,05

t_{S1} mm	t_{S2} mm	t_M mm	t_R mm	weight per area kg/m²	difference $\lvert\Delta\alpha\rvert$ to 90°
0,47	0,33	0,06	0,44	3,05	
- 0,06	- 0,14	- 0,03	- 0,14	+ 0,18 - 0,07	≤ 4°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
408,6 Nm²/m	30,8 Nm²/m	1704 N/m	73,0 Nm/m	79,8 Nm/m

$M_{b,pos}$: outer skin under pressure

$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

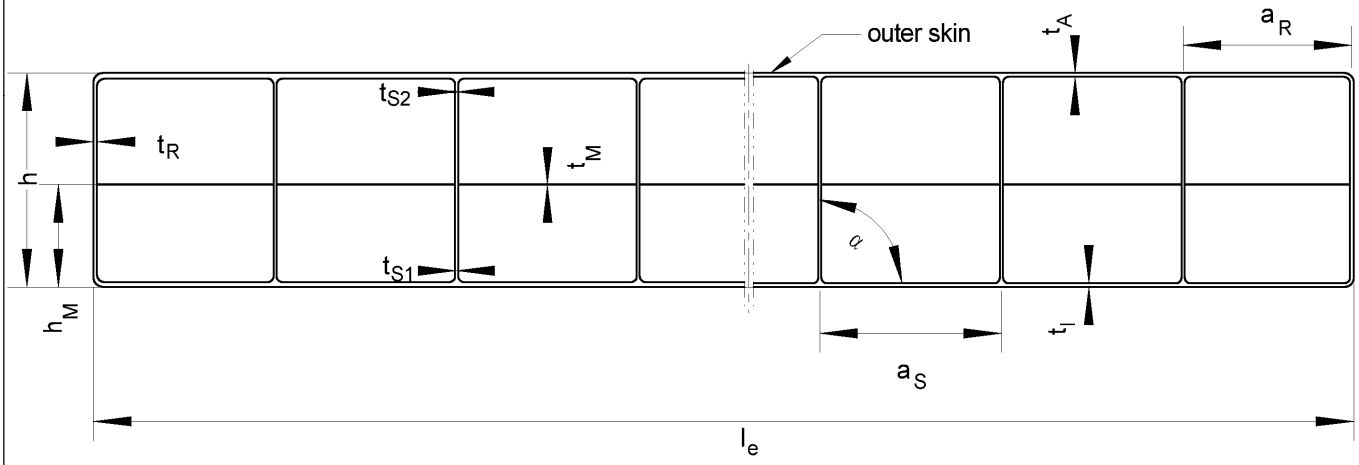
Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153
" Makrolon multi UV 6/20-20"

Annex A 4.13

Deutsches Institut für Bautechnik DIBt

Sheet: **IMPEX MULTIWALL 20/3w**
Manufacturer: **Polycasa N.V., Geel (Belgium)**
Resin: **ISO 7391-PC,EL,61-03-9**



l_e mm	h mm	h_M mm	a_S mm	a_R mm	t_A mm	t_I mm	t_{S1} mm	t_{S2} mm	weight per area kg/m²
2100	20,1	9,3	20,3	20,3	1,08	0,95	0,70	0,54	3,22
+6 -2	± 0,5	+ 0,6 - 0,4	+ 0,4	+ 3,0	- 0,16	- 0,08	- 0,18	- 0,12	+ 0,19 - 0,05

t_M mm	t_R mm	difference $\lvert\Delta\alpha\rvert$ to 90°
0,16	0,47	
- 0,04	- 0,16	≤ 3°

Minimum performance levels or classes for the sheets
(as declared in the DoP in accordance with EN 16153)

mechanical resistance (deformation behavior)				
B_x	B_y	S_y	$M_{b,pos}$	$M_{b,neg}$
414,4 Nm²/m	71,1 Nm²/m	1846 N/m	107,5 Nm/m	87,5 Nm/m

$M_{b,pos}$: outer skin under pressure

$M_{b,neg}$: inner skin under pressure

Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system flat
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes for the sheets in accordance with EN 16153
"IMPEX MULTIWALL 20/3w"

Annex A 4.14

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Sheet: HIPEX G
Manufacturer: Polycasa N.V., Geel, Belgien

* cut from production width l_e

l_e mm	l_{eS} mm	h mm	weight per area kg/m²
2100	1050	6,0	7,62
+ 6 - 0	+ 3 - 0	± 0,3	± 0,38

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex A 4.15
Geometry/ weight per area: : "HIPEX G"	

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus) **Annex B**

Provisions for design and dimensioning

Dimensioning, installation and execution of the roof kit shall be in compliance with the national technical specifications. These differ in terms of their content as well as their status within the legal frameworks of the member states.

If no national provisions exist, dimensioning can be carried out in accordance with Annexes B 1, B 2 and B 3. In case the roof system, in particular the multi-wall sheets are systematically in contact with chemicals, the resistance to these substances shall be checked. Thereby, high concentrations of chemicals in the surrounding air shall be also considered.

Installation, packaging, transport, storage as well as use, maintenance and repair shall be carried out in accordance with the manufacturer's instructions (extract see Annex C).

B 1 Load-bearing capacity and serviceability of the covering

B 1.1 General

The design and arrangement of the multi-wall sheets as described in Section 1.1.1 in the translucent roof kit shall correspond to the specifications given in Annexes A 1 to A 4. The design specifications (see Section 2) shall be complied with.

The stability shall be verified for the ultimate limit state (ULS)

$E_d \leq R_d$

and for the serviceability limit state (SLS)

$E_d \leq C_d$.

E_d: design value of the action

R_d: design value of the structural resistance for verification of the ultimate limit state

C_d: design value of the structural resistance for verification of the serviceability limit state

The multi-wall sheets shall not be used for bracing the aluminium structure.

The multi-wall sheets shall not be walked on.

Assessment pertaining to fall-through protection is not included in this ETA.

The bearing construction consisting of the bearing profile, the covering profile and their fixing as well as the substructure shall be verified on a case-by-case basis; for the verification of bearing profiles which are used as intermediate supports for multi-span systems (see Annex A 2.1, section C-C), the effect of the continuity of the multi-wall sheets shall be factored in using a factor of 1.25 (for double-span systems), 1.1 (for triple-span systems) and 1.15 (for quadruple-span systems) for load determination.

The screws may not be considered for the transfer of loads in the plane of the multi-wall sheets.

B 1.2 Design values for actions, E_d for ULS and SLS verification

The design values for the actions shall be determined in accordance with the applicable European specifications.

The action resulting from the dead weight of the multi-wall sheets may be neglected in the roof kit verifications in accordance with Section B.1.3.

Live loads are not permitted.

The design value of the action results from the characteristic values of the actions, taking into account the partial safety factors γ_F, the coefficients ψ and the factors for the effects of action duration K_t or C_t. The load cases 'summer' and 'winter' shall be differentiated.

For the wind and temperature effects to be considered in the load case 'summer' the ψ coefficient defined in EN 1990 may be applied. In design situations where the wind is applied as the dominant variable action, the ψ coefficient may be considered in the design value of the structural resistance R_d (see Section B.1.3).

The actions E_k shall be increased through multiplication by the factors $K_t = C_t$ in consideration of the action duration and based on load.

Load action	Duration of load action	$K_t = C_t$
Wind	very short	1.00
Snow as an extraordinary snow load (e.g. in the low-lying plains of northern Germany)	short: up to one week	1.15
Snow	medium: up to three months	1.20
Dead Load	constantly	1.50

B 1.3 Design values for structural resistance R_d (ULS) and C_d (SLS)

The design values for structural resistance R_d and C_d result from the characteristic value of structural resistance R_k in consideration of the material safety factor γ_M, the factor taking into account the effects of media C_u and the temperature factor C_θ as follows:

$$R_d = \frac{R_k}{\gamma_{MR} \cdot C_u \cdot C_\theta} \qquad C_d = \frac{C_k}{\gamma_{MC} \cdot C_u \cdot C_\theta}$$

The following factors shall be applied:

Factor taking into account the effects of media and ageing C_u		1.10
Temperature factor C_θ	summer	1.20
	winter	1.00

The following material safety factors shall be applied as a function of the consequence class (CC) in accordance with EN 1990:

Consequence class	Material safety factor γ_{MR}	Material safety factor γ_{MC}
CC 1	1.25	1.09
CC 2	1.30	1.13

In design situations where wind is considered to be the dominant variable action, the reduction in structural resistance due to temperature may be reduced by means of the ψ coefficient for the summer load case. For this design situation a reduction factor for temperature of $C'_\theta = 1 + \psi \cdot (C_\theta - 1.0)$ may be applied.

The characteristic values for the component's structural resistances R_k and C_k shall be taken from the Annex B 2.

B 1.4 Limitation of deflection (SLS)

The design value of the component's structural resistance C_d to deflection results from the design value of the limitation of deflection $f_{R,d}^{GZG}$. Deflection for loads that are distributed evenly shall be verified as follows assuming a linear-elastic material behaviour:

$$\frac{f_{E,d}^{GZG}}{f_{R,d}^{GZG}} \leq 1{,}0$$

$f_{E,d}^{GZG}$: design value of deflection caused by E_d

$f_{R,d}^{GZG}$: design value of the limitation of deflection

The deflection values $f_{E,k}$ shall be taken from the following Annexes B 3 for the relevant characteristic action and clear span l_F, multiplied by the action-specific factor C_t and added together subsequently.

Intermediate values may be interpolated.

Covering	Multi-wall sheet in accordance with Annex	System			
		1-span	2-span	3-span	4-span
PC 10	A 4.1 – A 4.4	B 3.1	–	–	–
PC 16/ PC 16+6mm PETG	A 4.5 – A 4.9 (+A 4.15)	B 3.2	B 3.3	B 3.4	B 3.5
PC 20	A 4.10 – A 4.14	B 3.6	B 3.7	B 3.8	B 3.9
PC 10 + 10	2 x A 4.1 – 2 x A 4.4	B 3.10 B 3.11	B 3.12	–	B 3.13
PC 16 + 16	2 x A 4.6 – 2 x A 4.9	B 3.14	B 3.15	B 3.16	B 3.17
PC 16 + 10 (PC 16: top/ outside PC 10 bottom/ inside)	A 4.5 + A 4.1	B 3.18	B 3.19	B 3.20	B 3.21
	A 4.6 + A 4.3				
	A 4.7/ A 4.8 + A 4.4				

The dead weight shall be taken from the Annexes A 4.

The design value of the limitation of deflection is therefore:

$$f_{R,d}^{GZG} = \frac{f_{R,k}}{C_u \cdot C_\theta \cdot \gamma_{MC}}$$

The limitation of deflection ($f_{R,k}$) shall be determined in such a way that proper functioning is not jeopardised. The deflection shall be evaluated on a case-by-case basis to avoid water pockets or ingress of water etc.

The material safety factors and effects given in Section B 1.3 shall be taken into consideration.

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B 2 Characteristic structural resistances

Covering "PC 10" – Annexes A 4.1 – A 4.4

Multi-wall sheet in accordance with Annex	Support span (clear span) l_F [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.1 Kingspan Multiwall 10-4	≤ 2,22	1-span	1,05	1,64	1,32	1,68	1,53
A 4.2 Akyver Sun Type 10/1700 (also applies to sheets filled with nanogel)	≤ 2,22	1-span	1,05	1,93	1,56	1,98	1,80
A 4.3 Akyver Sun Type 10/4W-7	≤ 2,22	1-span	1,05	1,77	1,43	1,82	1,65
A 4.4 Makrolon Multi UV 4/10-6	≤ 2,22	1-span	1,05	1,53	1,24	1,57	1,43

Covering "PC 10+10" – Annexes A 4.1 – A 4.4

Multi-wall sheet in accordance with Annex	Support span (clear span) l_F [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
2 x A 4.1 Kingspan Multiwall 10-4	≤ 2,73	1-span	1,05	1,96	1,91	2,21	2,21
	≤ 3,68			1,55	1,27	1,48	1,30
	≤ 3,68	2-span	1,05	1,92	1,92	1,51	1,51
	≤ 3,68	4-span	0,53	6,33	6,33	5,04	5,04
2 x A 4.2 Akyver Sun Type 10/1700 (also applies to sheets filled with nanogel)	≤ 2,73	1-span	1,05	1,96	1,91	2,21	2,21
	≤ 3,68			1,27	1,04	1,35	1,19
	≤ 3,68	2-span	1,05	1,92	1,92	1,36	1,36
	≤ 3,68	4-span	0,53	6,33	6,33	4,52	4,52
2 x A 4.3 Akyver Sun Type 10/4W-7	≤ 2,73	1-span	1,05	1,96	1,91	2,21	2,21
	≤ 3,68			1,40	1,15	1,39	1,22
	≤ 3,68	2-span	1,05	1,92	1,92	1,39	1,39
	≤ 3,68	4-span	0,53	6,33	6,33	4,65	4,65
2 x A 4.4 Makrolon Multi UV 4/10-6	≤ 2,73	1-span	1,05	1,95	1,90	2,20	2,20
	≤ 3,68			1,50	1,23	1,41	1,24
	≤ 3,68	2-span	1,05	1,86	1,86	1,42	1,42
	≤ 3,68	4-span	0,53	6,12	6,12	4,73	4,73

Covering "PC 16" – Annexes 4.5 - 4.9

Multi-wall sheet in accordance with Annex	Support span (clear span) l_F [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.5 Kingspan Multiwall 16-7	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,60	1,60	1,88	1,88
	≤ 3,62	3-span	0,703	3,13	3,13	2,81	2,81
	≤ 3,68	4-span	0,53	3,67	3,67	3,19	3,19
A 4.6 Akyver Sun Type 16/7w-12	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,63	1,63	1,90	1,90
	≤ 3,62	3-span	0,703	3,18	3,18	2,85	2,85
	≤ 3,68	4-span	0,53	4,25	4,25	4,01	4,01
A 4.7 Makrolon Multi UV 7/16-14	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,59	1,59	1,86	1,86
	≤ 3,62	3-span	0,703	3,10	3,10	2,79	2,79
	≤ 3,68	4-span	0,53	3,77	3,77	3,44	3,44
A 4.8 Makrolon Multi UV 6/16-20	∞	1-span	1,28	1,26	1,30	1,17	1,17
	≤ 3,62	2-span	1,05	1,43	1,43	1,67	1,67
	≤ 3,62	3-span	0,703	2,79	2,79	2,51	2,51
	≤ 3,68	4-span	0,53	3,87	3,87	3,38	3,38
A 4.9 Polycasa SPC 16/3w (also applies to sheets filled with nanogel)	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,76	1,76	2,06	2,06
	≤ 3,62	3-span	0,703	3,44	3,44	3,09	3,09
	≤ 3,68	4-span	0,53	4,14	4,14	4,01	4,01

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"PC 16+16" – Annexes 4.5 - 4.9

Multi-wall sheet in accordance with Annex	Support span (clear span) l_F [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
2 x A 4.5 Kingspan Multiwall 16-7	≤ 3,68	1-span	1,05	1,95	1,76	1,47	1,34
	≤ 3,68	2-span	1,05	2,41	2,41	1,95	1,76
	≤ 3,68	3-span	0,703	4,79	4,79	4,23	3,97
	≤ 2,26	4-span	0,53	6,43	6,43	8,10	7,83
2 x A 4.6 Akyver Sun Type 16/7w-12	≤ 3,68	1-span	1,05	2,26	2,04	1,85	1,69
	≤ 3,68	2-span	1,05	2,79	2,79	2,46	2,22
	≤ 3,68	3-span	0,703	5,54	5,54	5,33	5,00
	≤ 2,26	4-span	0,53	7,10	7,10	10,18	9,85
2 x A 4.7 Makrolon Multi UV 7/16-14	≤ 3,68	1-span	1,05	2,01	1,81	1,59	1,45
	≤ 3,68	2-span	1,05	2,47	2,47	2,11	1,90
	≤ 3,68	3-span	0,703	4,93	4,93	4,57	4,29
	≤ 2,26	4-span	0,53	6,60	6,60	8,73	8,45
2 x A 4.8 Makrolon Multi UV 6/16-20	≤ 3,68	1-span	1,05	2,06	1,86	1,56	1,43
	≤ 3,68	2-span	1,05	2,54	2,54	2,08	1,87
	≤ 3,68	3-span	0,703	5,06	5,06	4,50	4,22
	≤ 2,26	4-span	0,53	6,43	6,43	8,60	8,32
2 x A 4.9 Polycasa SPC 16/3w (also applies to sheets with nanogel)	≤ 3,68	1-span	1,05	2,20	1,98	1,85	1,69
	≤ 3,68	2-span	1,05	2,71	2,71	2,46	2,22
	≤ 3,68	3-span	0,703	5,40	5,40	5,33	5,00
	≤ 2,26	4-span	0,53	6,63	6,63	10,19	9,86

Covering "PC 16+10" – Annexes (4.1 or 4.3 or 4.4) + (4.5 or 4.6 or 4.7 or 4.8)

Multi-wall sheet in accordance with Annex	Support span (clear span) l_F [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.1 + A 4.5 Kingspan Multiwall 10-4 + Kingspan Multiwall 16-7	≤ 3,68	1-span	1,05	1,87	1,87	1,60	1,60
	≤ 3,62	2-span	1,05	1,60	1,60	1,88	1,88
	≤ 3,62	3-span	0,703	3,13	3,13	2,81	2,81
	≤ 3,68	4-span	0,53	6,22	6,22	5,82	5,82
A 4.3 + A 4.6 Akyver Sun Type 10/4W-7 + Akyver Sun Type 16/7w-12	≤ 3,68	1-span	1,05	1,69	1,69	1,50	1,50
	≤ 3,62	2-span	1,05	1,63	1,63	1,90	1,90
	≤ 3,68	3-span	0,703	3,18	3,18	2,85	2,85
	≤ 3,68	4-span	0,53	7,19	7,19	6,77	6,77
A 4.4 +A 4.7 Makrolon Multi UV 4/10-6 + Makrolon Multi UV 7/16-14	≤ 3,68	1-span	1,05	1,81	1,81	1,53	1,53
	≤ 3,62	2-span	1,05	1,59	1,59	1,86	1,86
	≤ 3,68	3-span	0,703	3,10	3,10	2,79	2,79
	≤ 3,68	4-span	0,528	6,39	6,39	6,28	6,28

Multi-wall sheet in accordance with Annex	Support span (clear span) l_F [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.4 + A 4.8 Makrolon Multi UV 4/10-6 + Makrolon Multi UV 6/16-20	≤ 3,68	1-span	1,05	1,58	1,58	1,35	1,35
	≤ 3,62	2-span	1,05	1,43	1,43	1,67	1,67
	≤ 3,68	3-span	0,703	2,79	2,79	2,51	2,51
	≤ 3,68	4-span	0,528	6,56	6,56	6,19	6,19

Covering "PC 16+6" – Annexes (4.5 - 4.9) + "Polycasa 6 PETG" (4.15)

Multi-wall sheet in accordance with Annex	Support span (clear span) l_F [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.5 + A 4.15 Kingspan Multiwall 16-7	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,60	1,60	1,88	1,88
	≤ 3,62	3-span	0,703	3,13	3,13	2,81	2,81
	≤ 3,68	4-span	0,53	3,67	3,67	3,19	3,19
A 4.6 + A 4.15 Akyver Sun Type 16/7w-12	∞	1-span	1,05	1,38	1,38	1,27	1,27
	≤ 3,62	2-span	1,05	1,47	1,47	1,73	1,73
	≤ 3,62	3-span	0,703	2,86	2,86	2,59	2,59
	≤ 3,68	4-span	0,53	3,83	3,83	3,65	3,65
A 4.7 + A 4.15 Makrolon Multi UV 7/16-14	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,59	1,59	1,86	1,86
	≤ 3,62	3-span	0,703	3,10	3,10	2,79	2,79
	≤ 3,68	4-span	0,53	3,77	3,77	3,44	3,44
A 4.8 + A 4.15 Makrolon Multi UV 6/16-20	∞	1-span	1,05	1,30	1,30	1,17	1,17
	≤ 3,62	2-span	1,05	1,43	1,43	1,67	1,67
	≤ 3,62	3-span	0,703	2,79	2,79	2,51	2,51
	≤ 3,68	4-span	0,53	3,87	3,87	3,38	3,38
A 4.9 + A 4.15 Polycasa SPC 16/3w (also applies to sheets filled with nanogel)	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,76	1,76	2,06	2,06
	≤ 3,62	3-span	0,703	3,44	3,44	3,09	3,09
	≤ 3,68	4-span	0,53	4,14	4,14	4,01	4,01

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Covering "PC 20" – Annexes 4.10 - 4.14

Multi-wall sheet in accordance with Annex	**Support span** (clear span) l_F **[m]**	**System**	a_p **[m]**	**Characteristic values of structural resistance [kN/m²]**			
				downward load		**uplift load**	
				R_k	C_k	R_k	C_k
A 4.10 Kingspan Multiwall 20-7	∞	1-span	1,05	1,51	1,50	1,40	1,40
	≤ 3,62	2-span	1,05	1,58	1,58	1,88	1,88
	≤ 3,62	3-span	0,703	3,10	3,10	2,81	2,819
	≤ 3,68	4-span	0,53	3,63	3,63	3,19	3,19
A 4.11 Akyver Sun Type 20/7w-12	∞	1-span	1,05	1,38	1,36	1,27	1,27
	≤ 3,62	2-span	1,05	1,47	1,47	1,73	1,73
	≤ 3,62	3-span	0,703	2,86	2,86	2,59	2,59
	≤ 3,68	4-span	0,53	3,83	3,83	3,65	3,65
A 4.12 Makrolon Multi UV 7/20-14	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,59	1,59	1,86	1,86
	≤ 3,62	3-span	0,703	3,10	3,10	2,79	2,79
	≤ 3,68	4-span	0,53	3,77	3,77	3,44	3,44
A 4.13 Makrolon Multi UV 6/20-20	∞	1-span	1,05	1,28	1,26	1,17	1,17
	≤ 3,62	2-span	1,05	1,43	1,43	1,67	1,67
	≤ 3,62	3-span	0,703	2,79	2,79	2,51	2,51
	≤ 3,68	4-span	0,53	3,87	3,87	3,38	3,38
A 4.14 Polycasa SPC 20/3w (also applies to sheets filled with nanogel)	∞	1-span	1,05	1,53	1,51	1,40	1,40
	≤ 3,62	2-span	1,05	1,76	1,76	2,06	2,06
	≤ 3,62	3-span	0,703	3,44	3,44	3,09	3,09
	≤ 3,68	4-span	0,53	4,14	4,14	4,01	4,01

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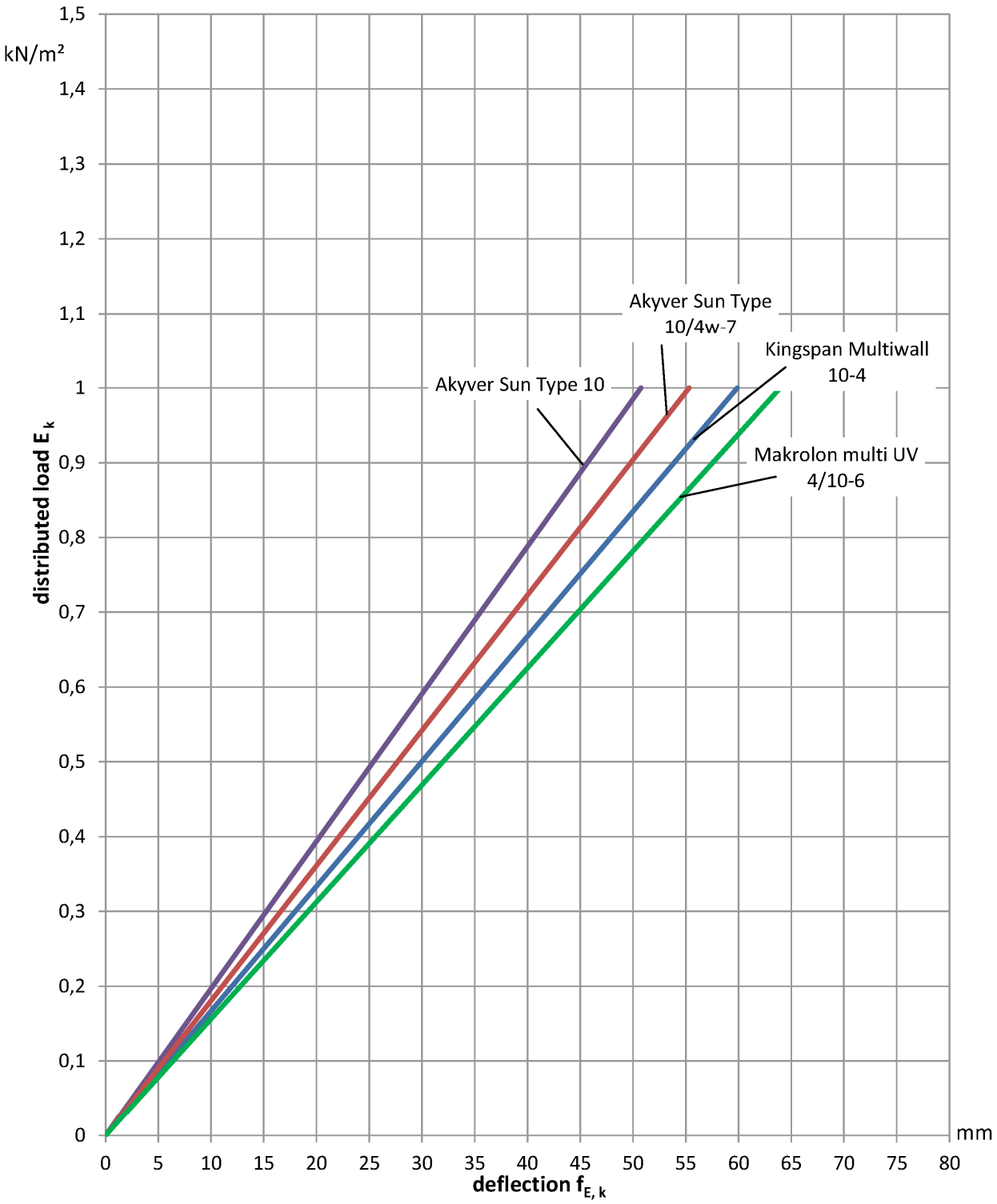

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.1
Covering PC: clear span l_F = 2.220 mm diagram 1 - span system characteristic values, max. deflection in mid span	

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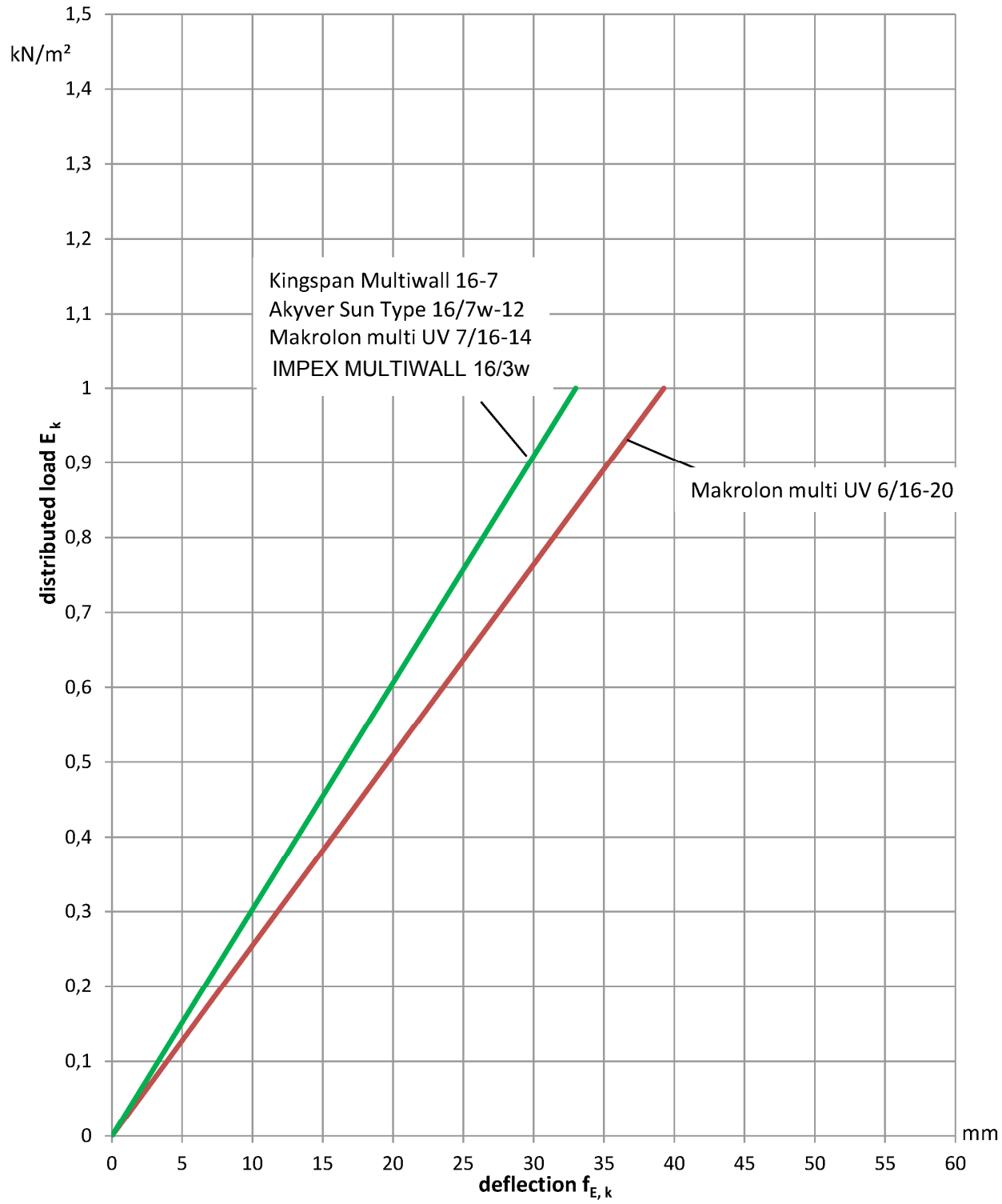

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.2
Covering PC 16 and PC 16+6mm PETG: clear span unlimited diagram 1 - span system characteristic values, max. deflection in mid span	

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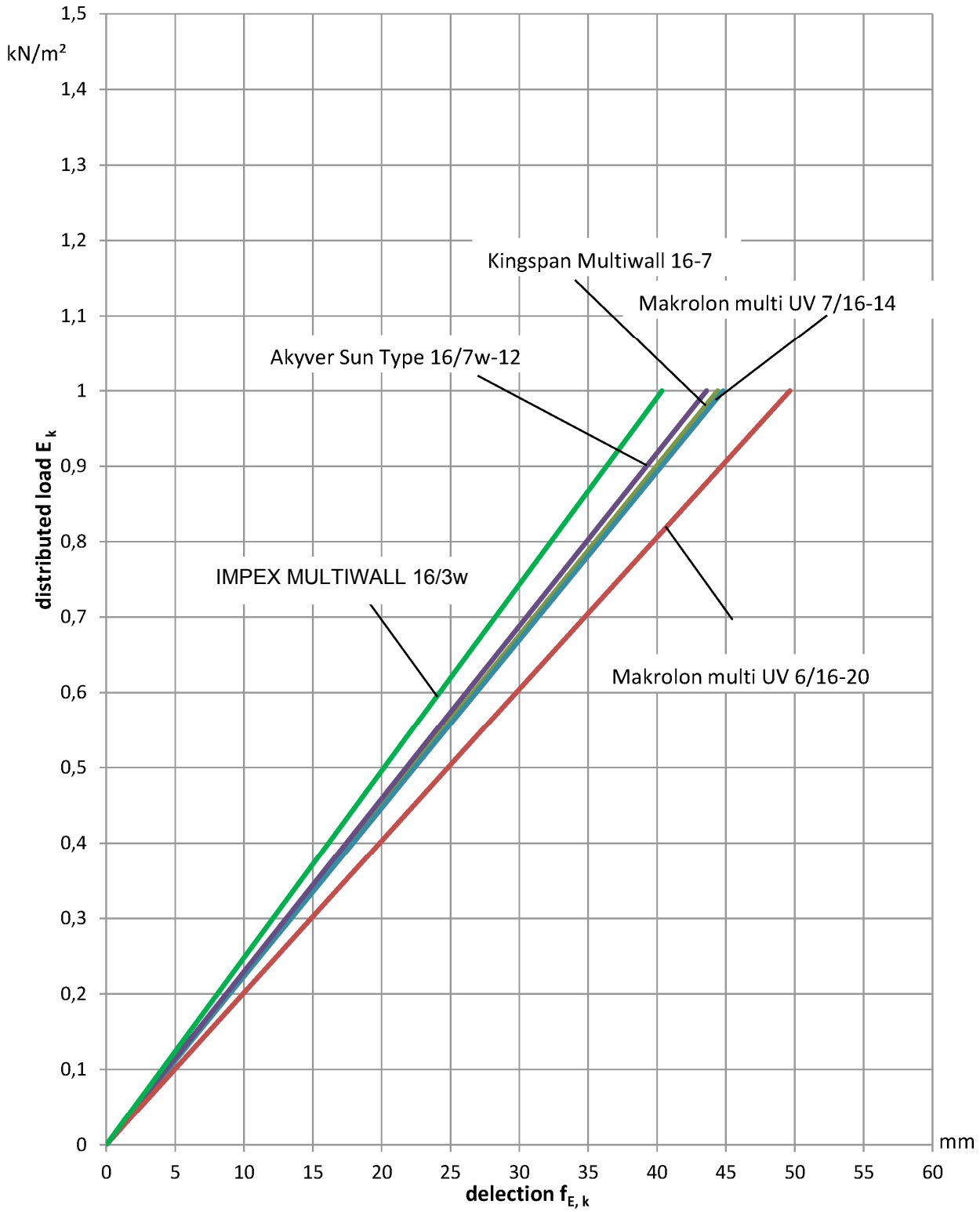

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.3
Covering PC 16 and PC 16+6mm PETG: l_F = 3,62mm clear span diagram 2 - span system characteristic values, max. deflection in mid span	

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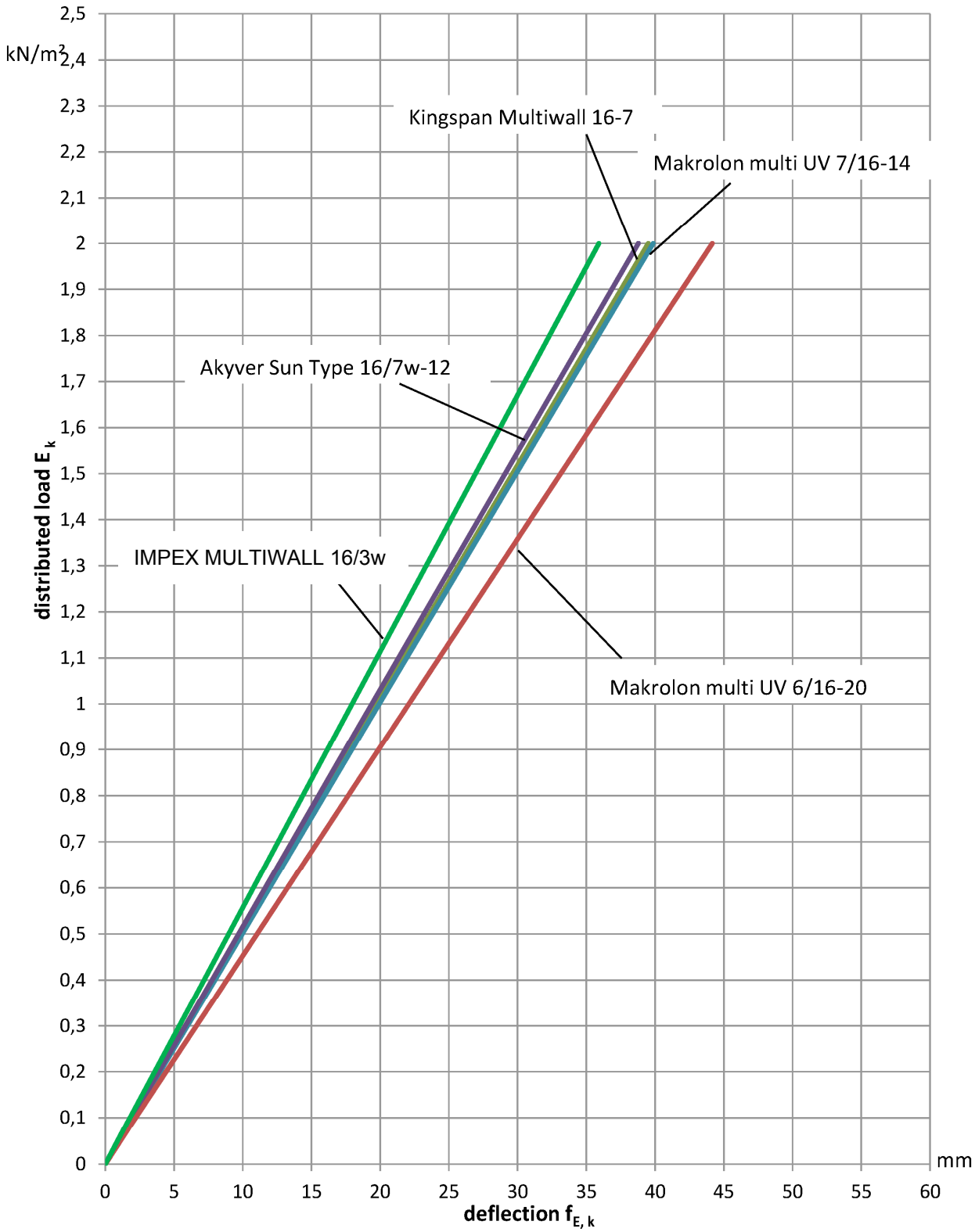
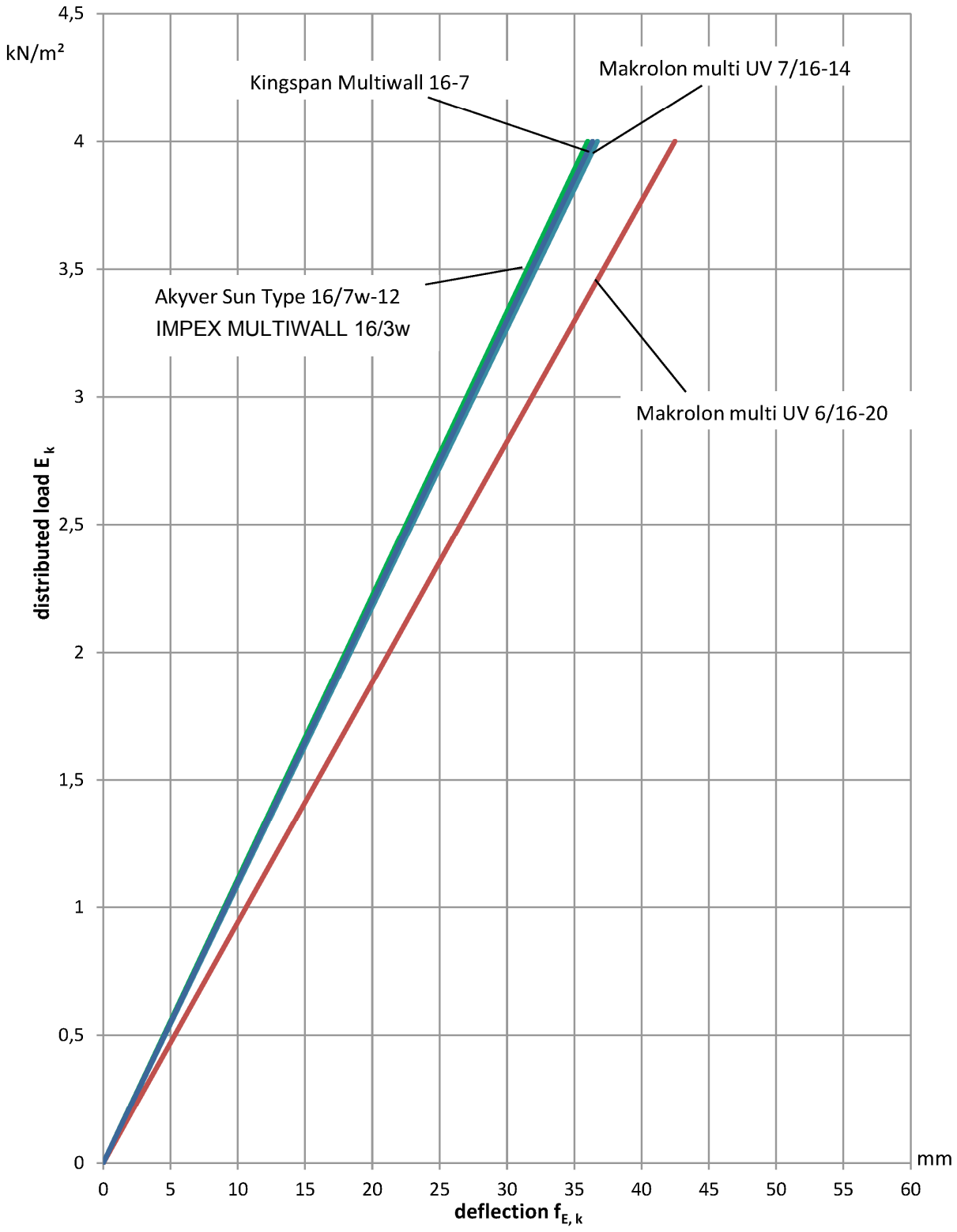


Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.4
Covering PC 16 and PC 16+6mm PETG: l_F = 3,62mm clear span diagram 3 - span system characteristic values, max. deflection in mid span	



Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.5
Covering PC 16 mm PETG: clear span l_F = 3,678mm diagram 4 - span system characteristic values, max. deflection in mid span	

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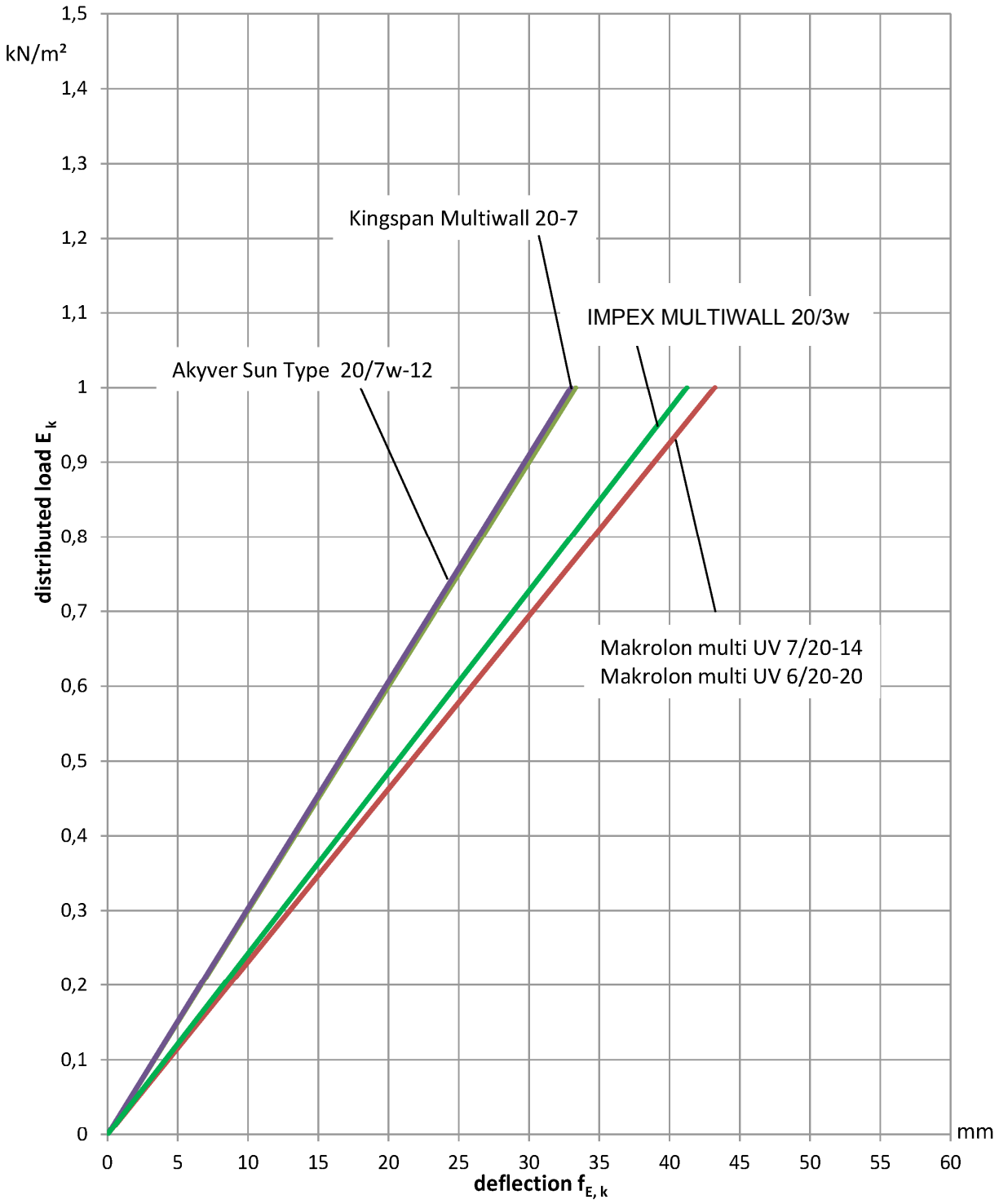

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.6
Covering PC 20: clear span unlimited diagram 1 - span system characteristic values, max. deflection in mid span	

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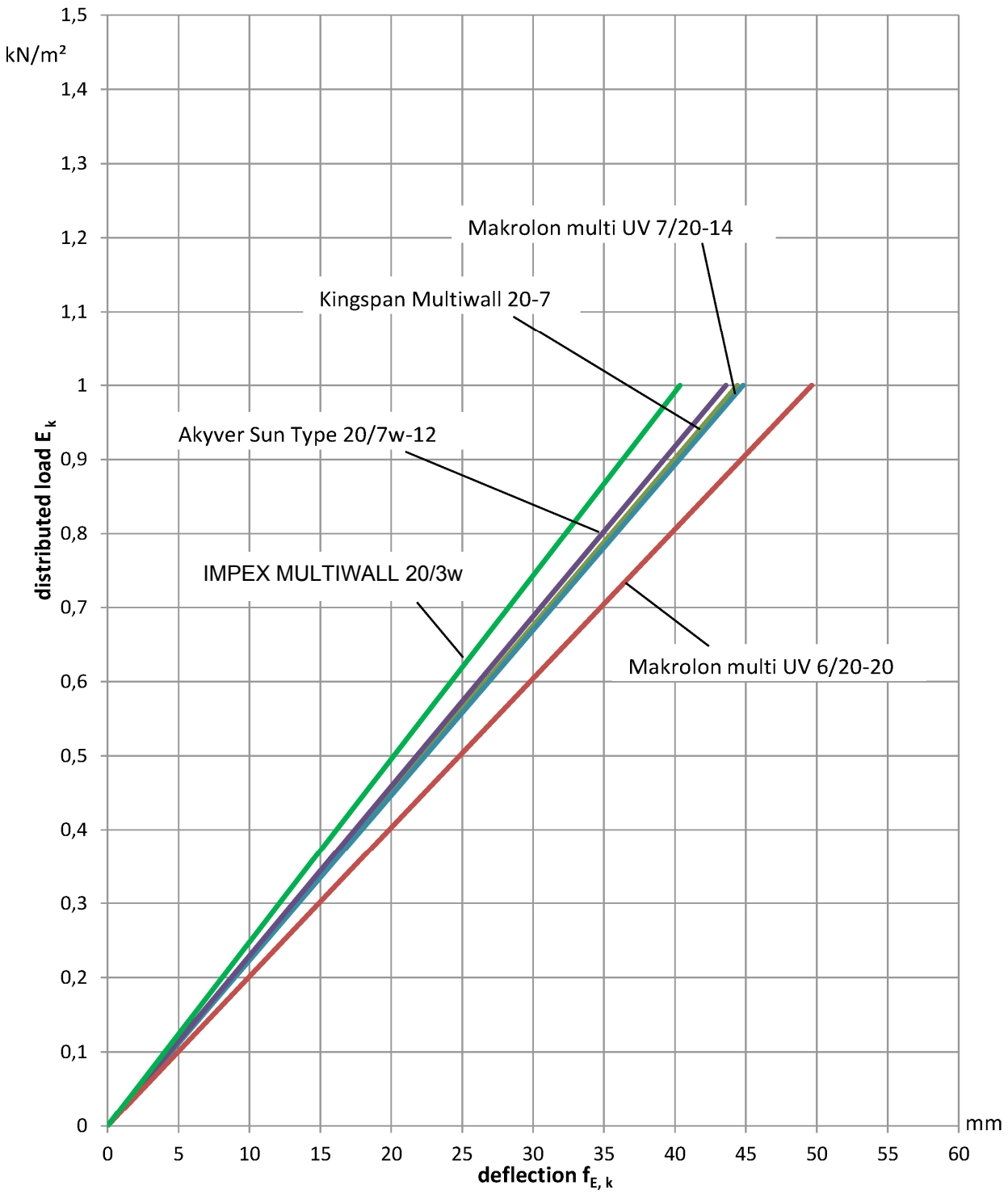

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.7
Covering PC 20: clear span l_F = 3,62mm diagram 2 - span system characteristic values, max. deflection in mid span	

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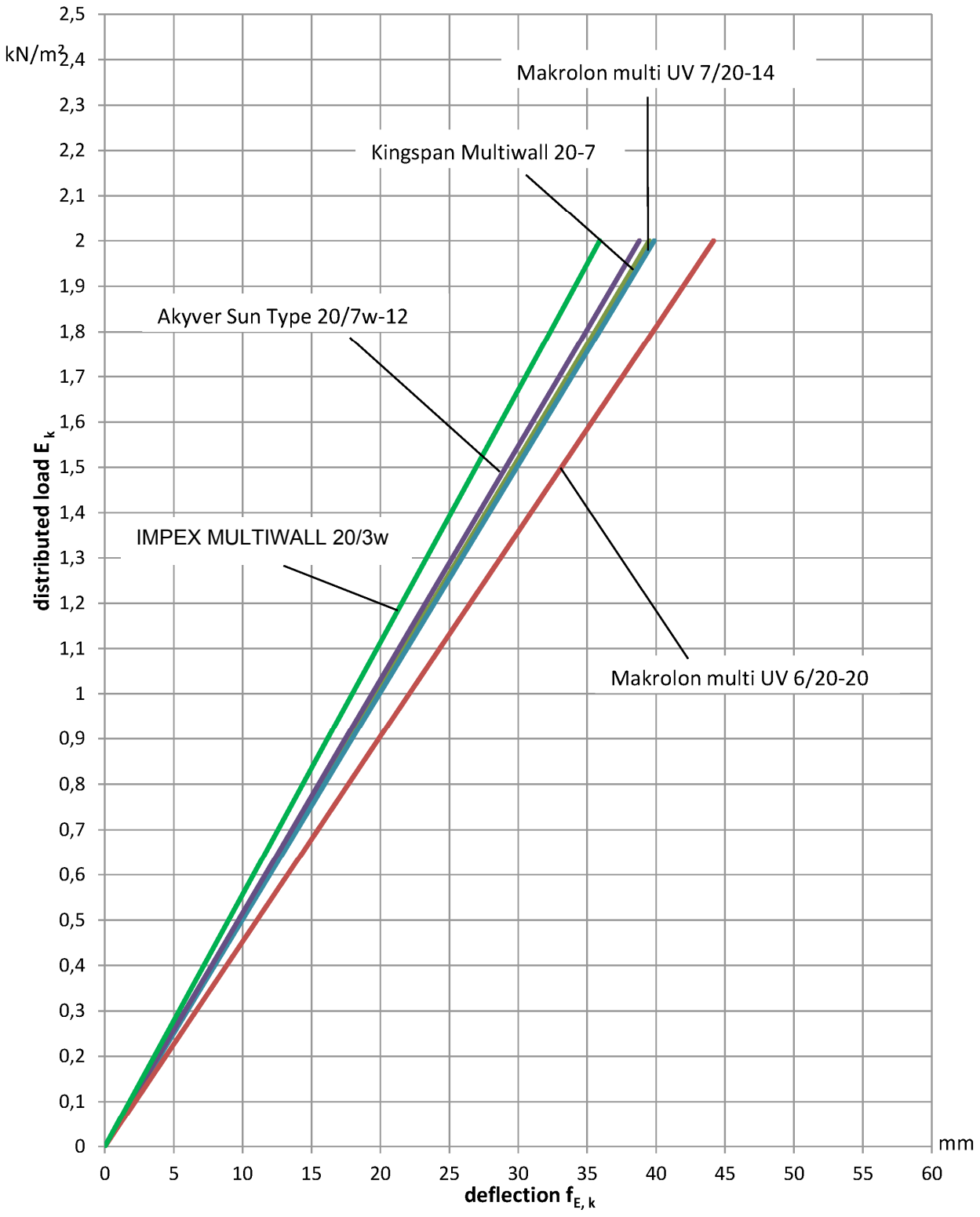

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.8
Covering PC 20: clear span l_F = 3,62mm diagram 3 - span system characteristic values, max. deflection in mid span	

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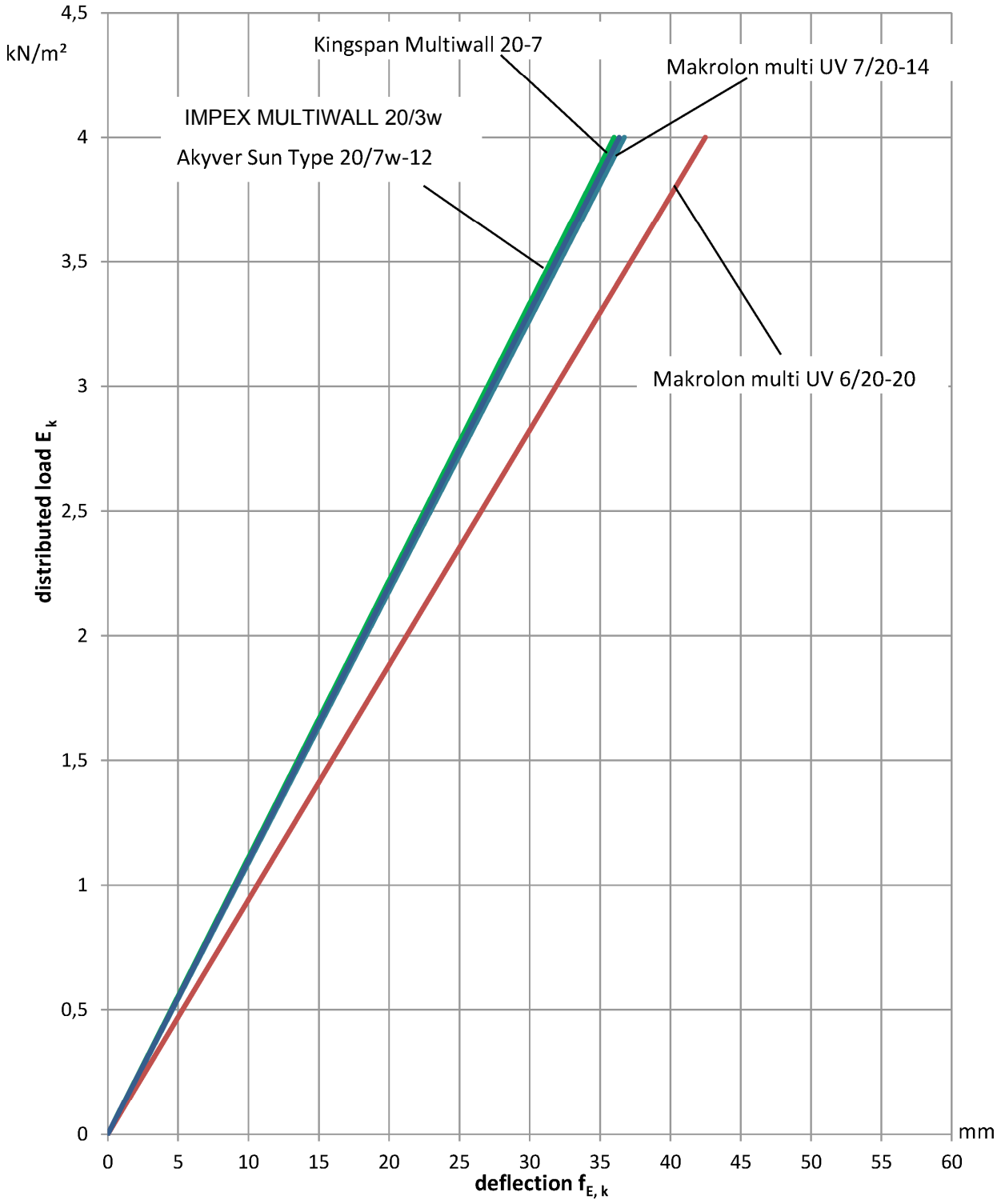

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.9
Covering PC 20: clear span l_F = 3,678mm diagram 4 - span system characteristic values, max. deflection in mid span	

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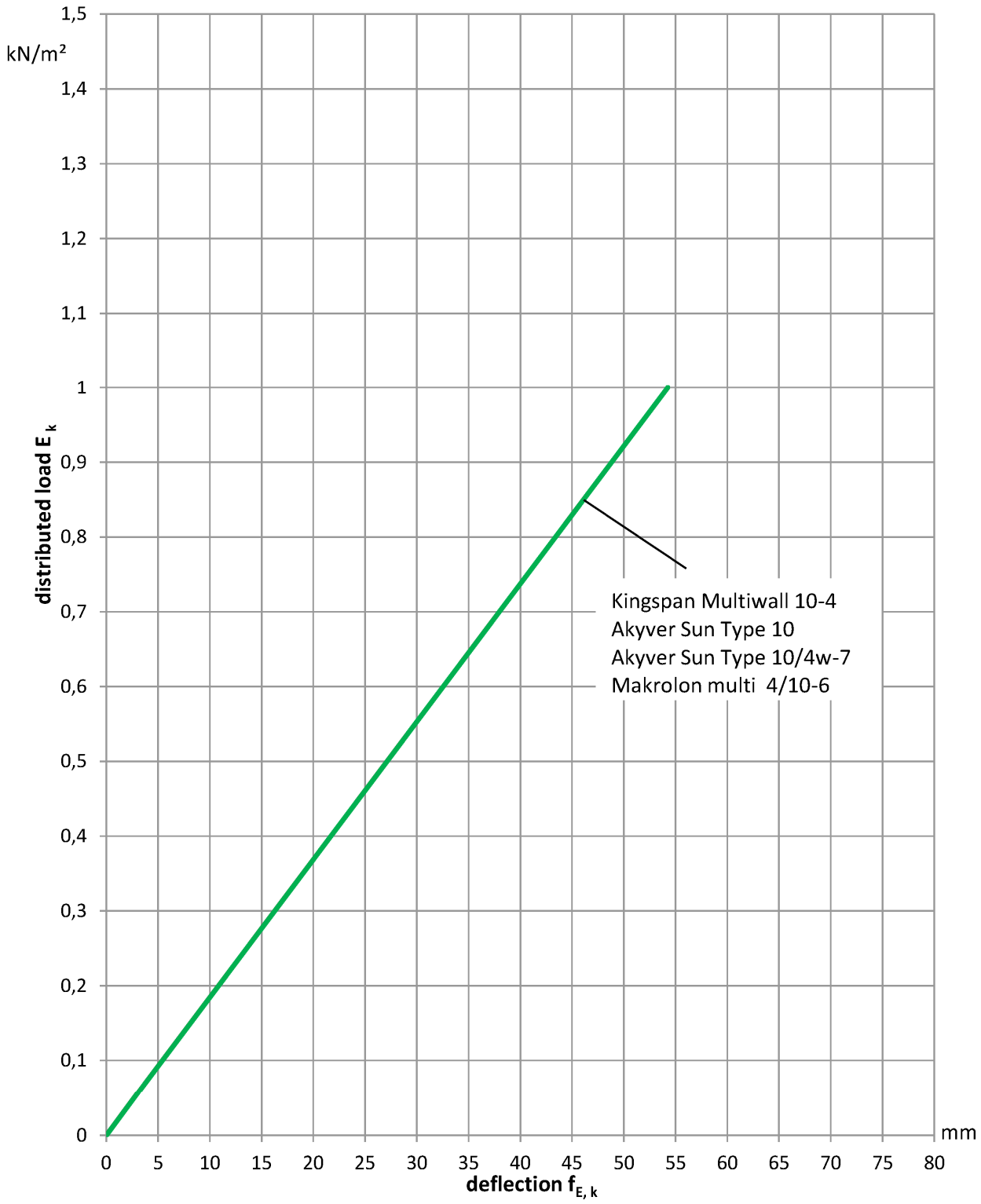

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.10
Covering PC 10+10: clear span l_F = 3,678mm diagram 1 - span system characteristic values, max. deflection in mid span	

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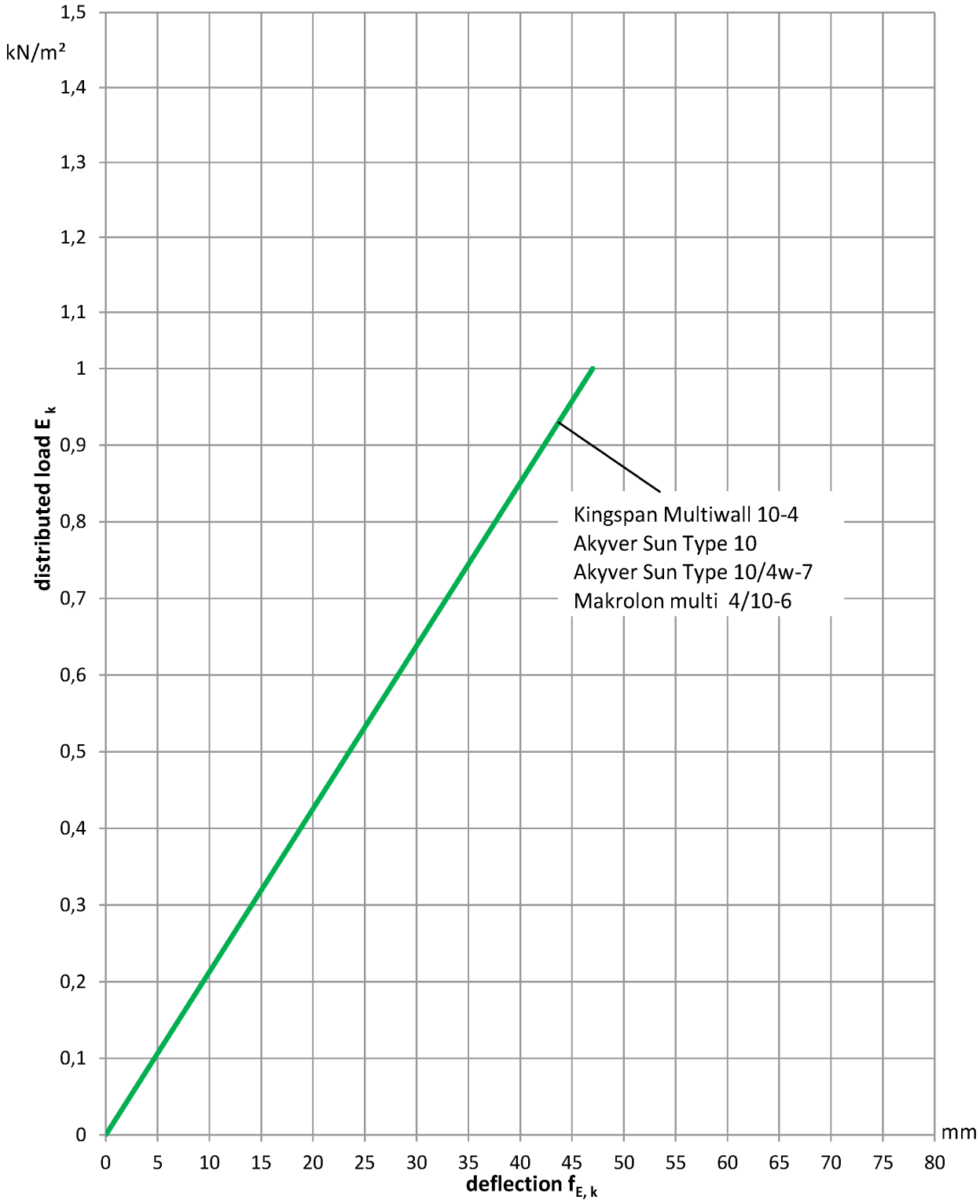

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.11
Covering PC 10+10: clear span l_F = 2,73mm diagram 1 - span system characteristic values, max. deflection in mid span	

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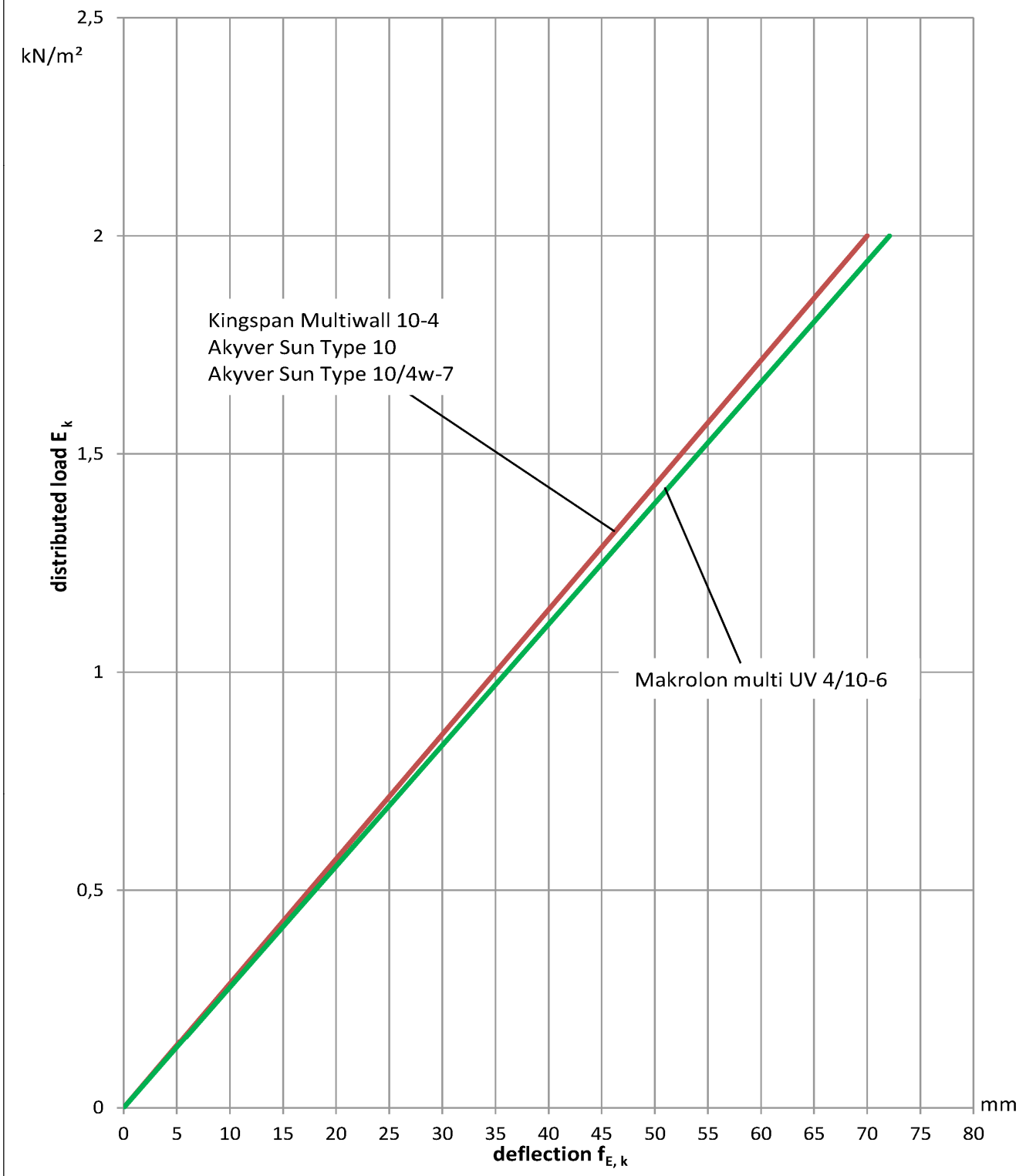

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.12
Covering PC 10+10: clear span l_F = 3,678mm diagram 2 - span system characteristic values, max. deflection in mid span	

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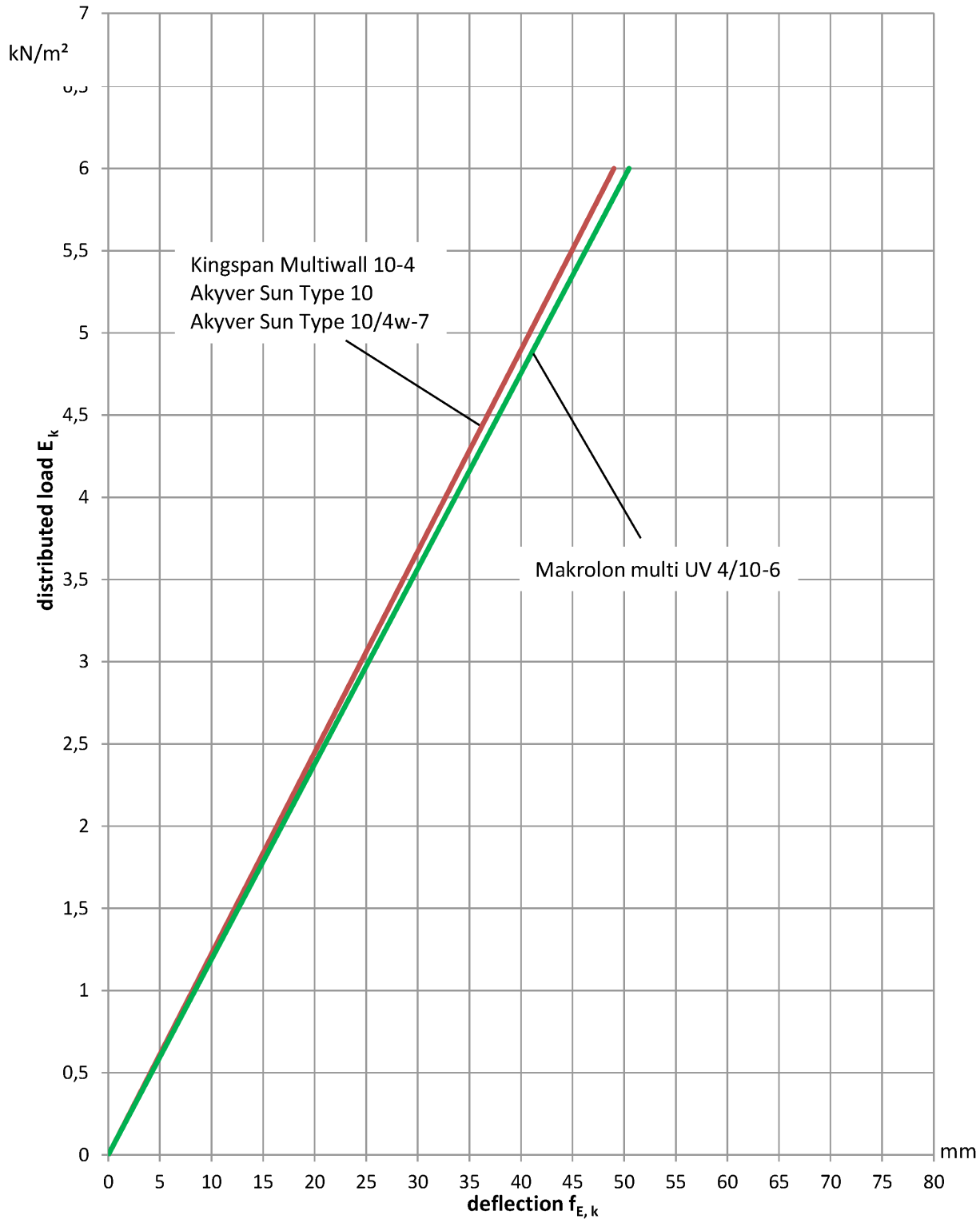

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.13
Covering PC 10+10: clear span l_F = 3,678mm diagram 4 - span system characteristic values, max. deflection in mid span	

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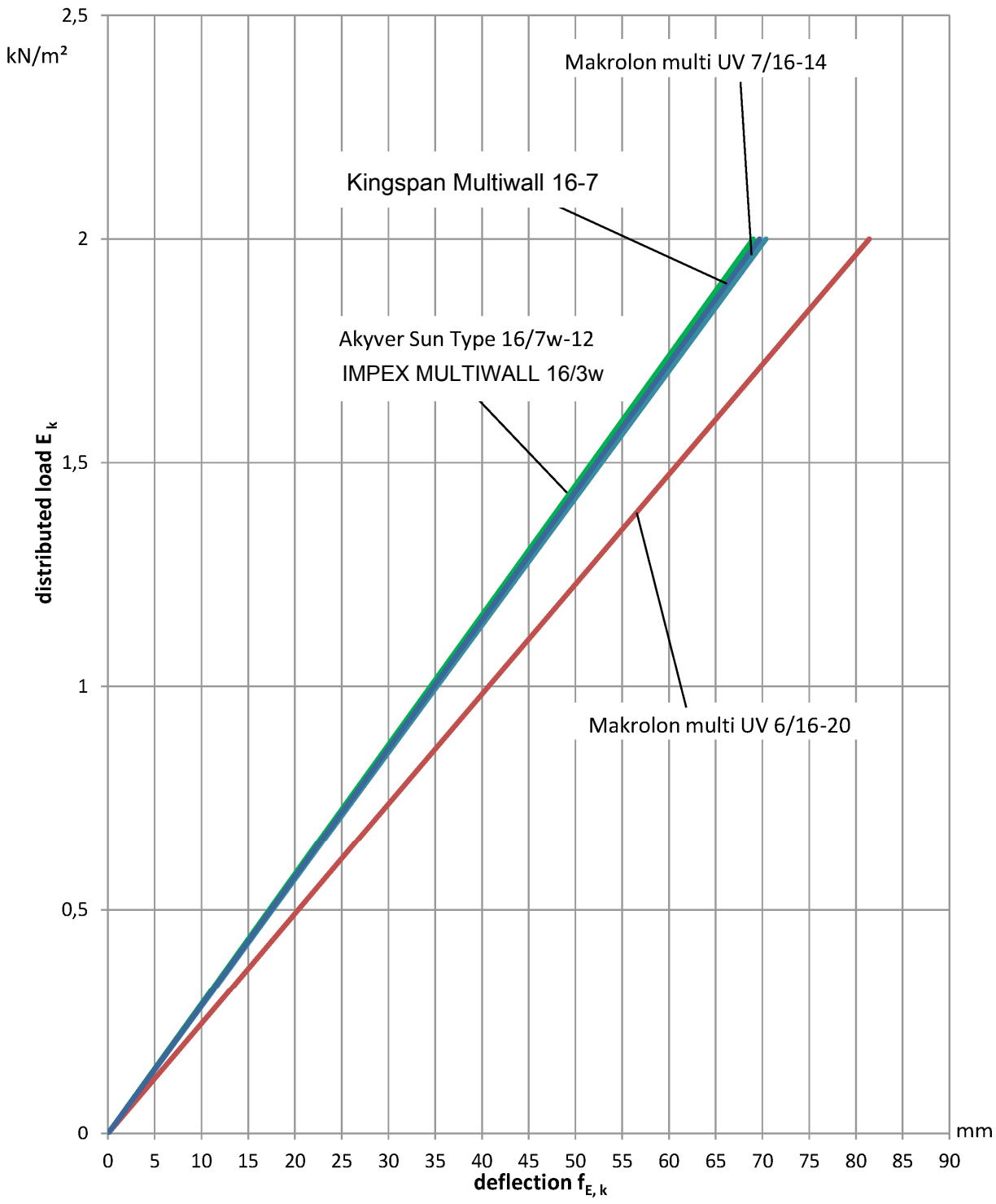

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.14
Covering PC 16+16: clear span l_F = 3,678mm diagram 1 - span system characteristic values, max. deflection in mid span	

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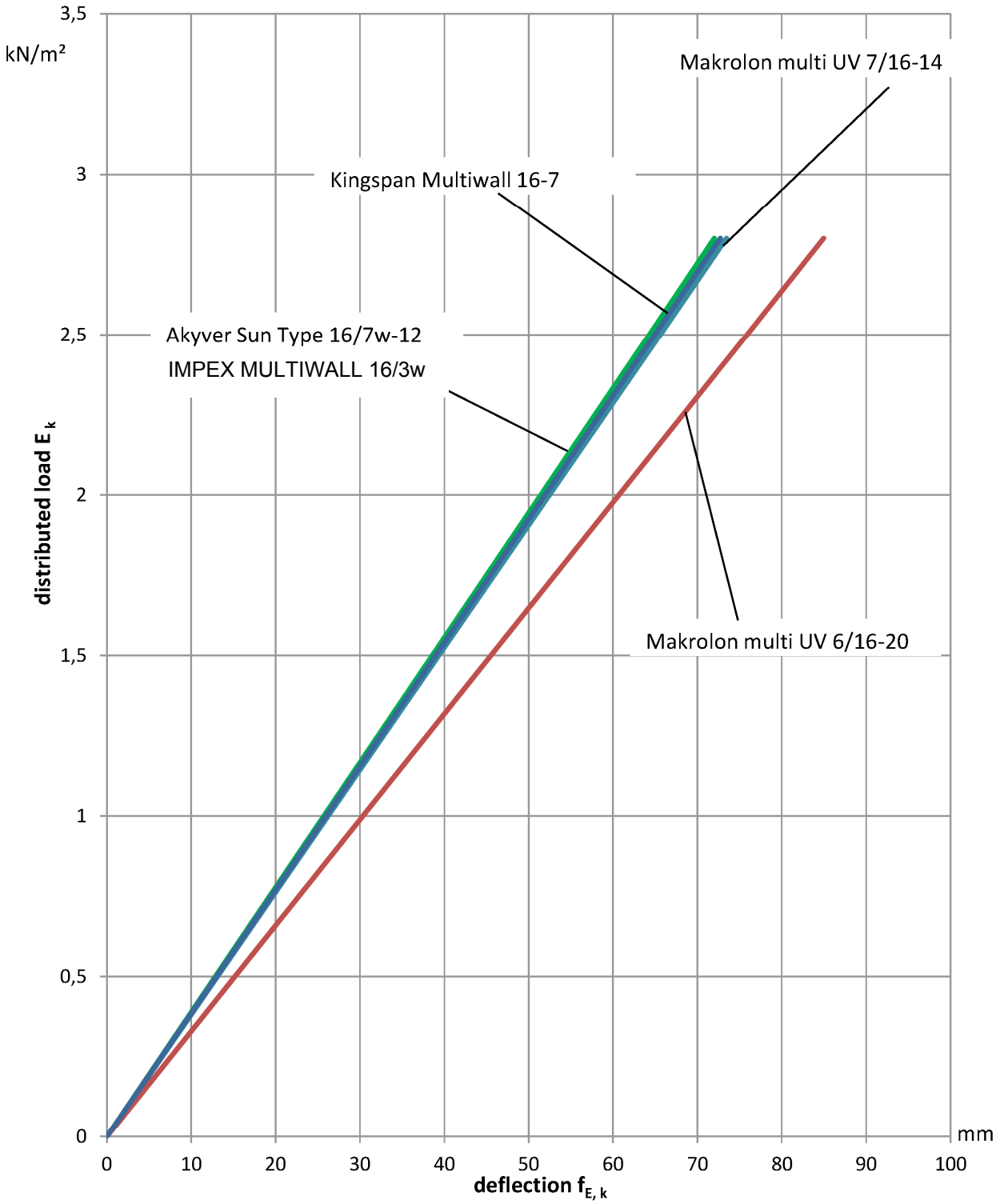

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.15
Covering PC 16+16: clear span l_F = 3,678mm diagram 2 - span system characteristic values, max. deflection in mid span	

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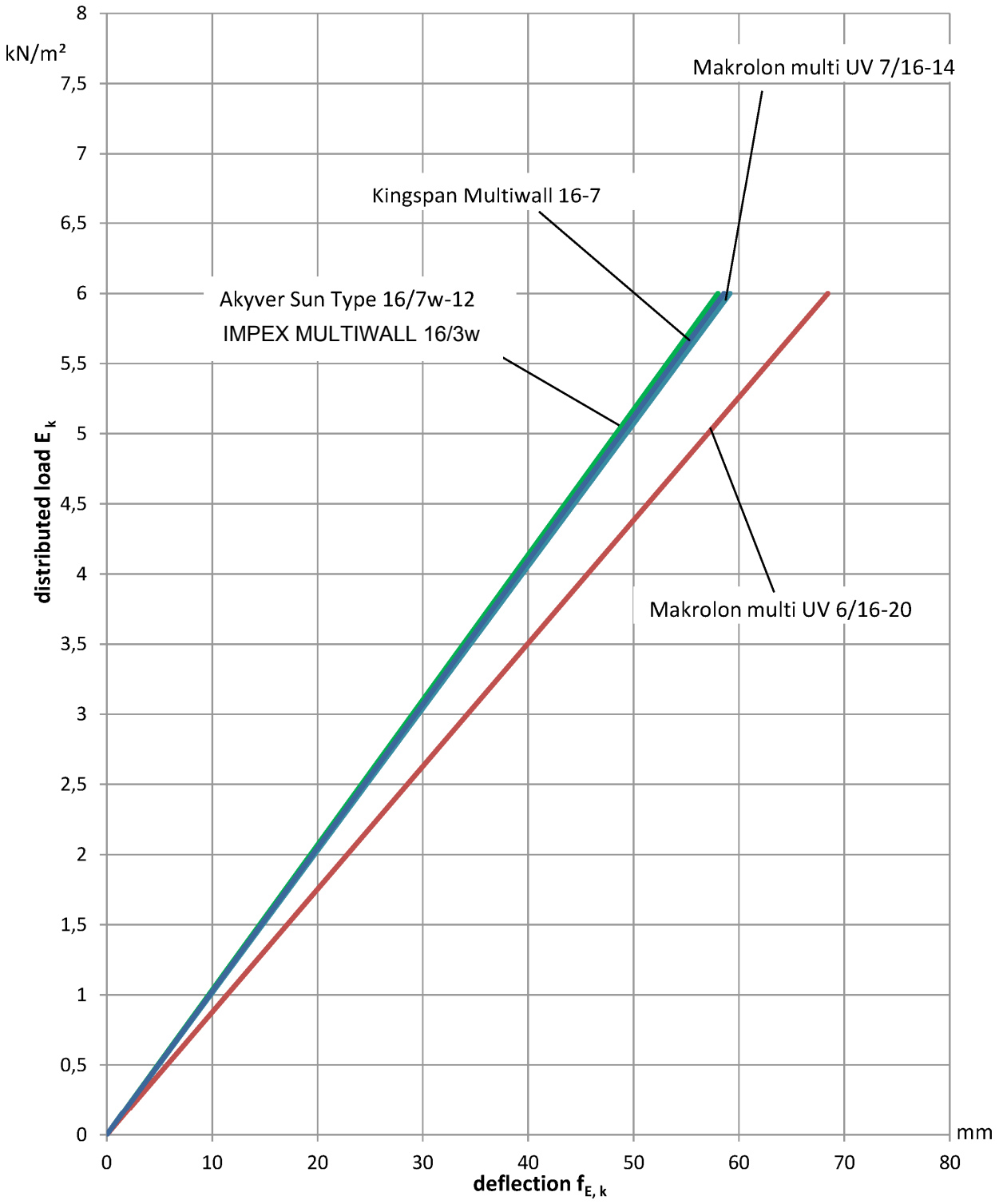

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.16
Covering PC 16+16: clear span l_F = 3,678mm diagram 3 - span system characteristic values, max. deflection in mid span	

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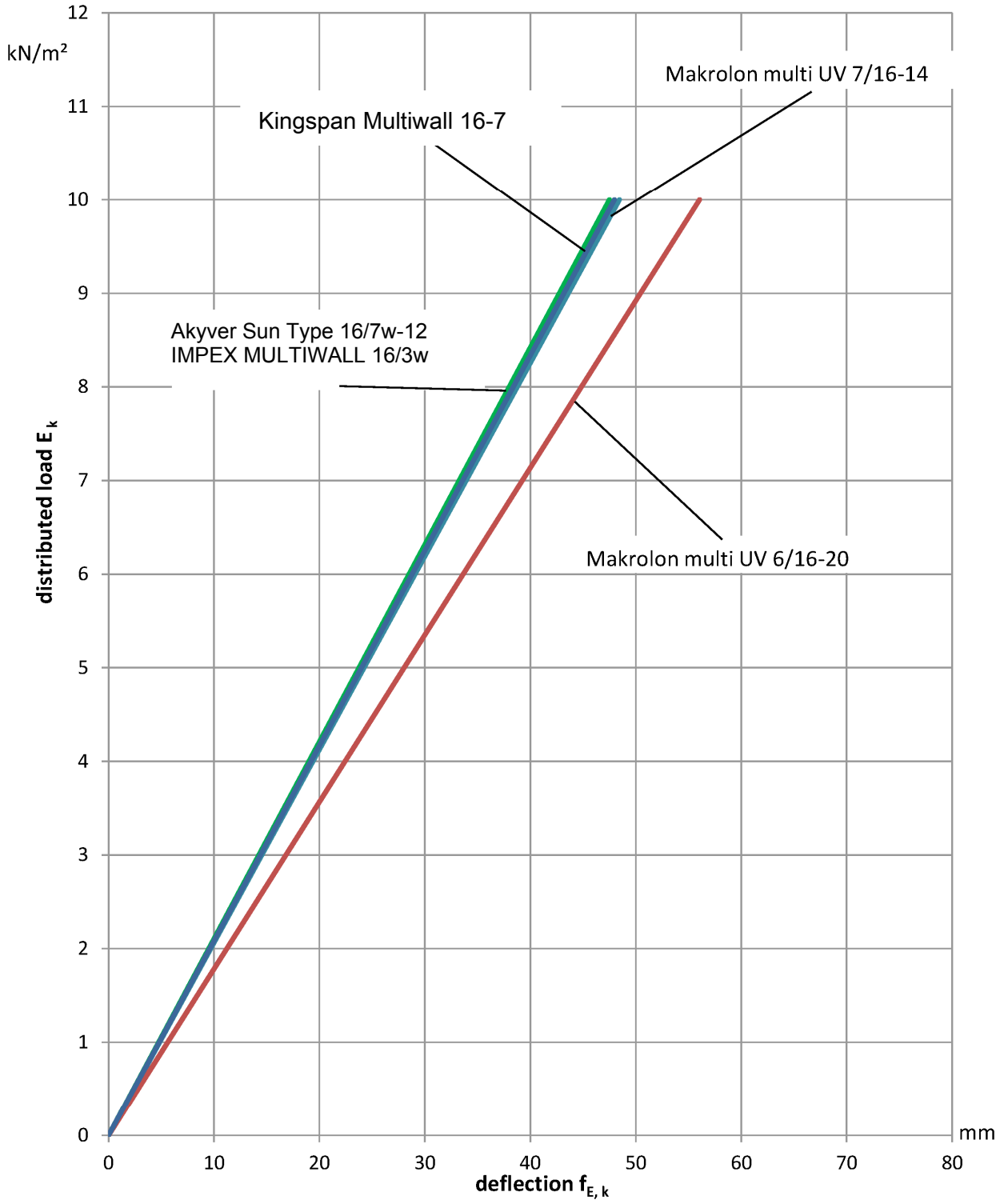

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.17
Covering PC 16+16: clear span l_F = 2,262 mm diagram 4 - span system characteristic values, max. deflection in mid span	

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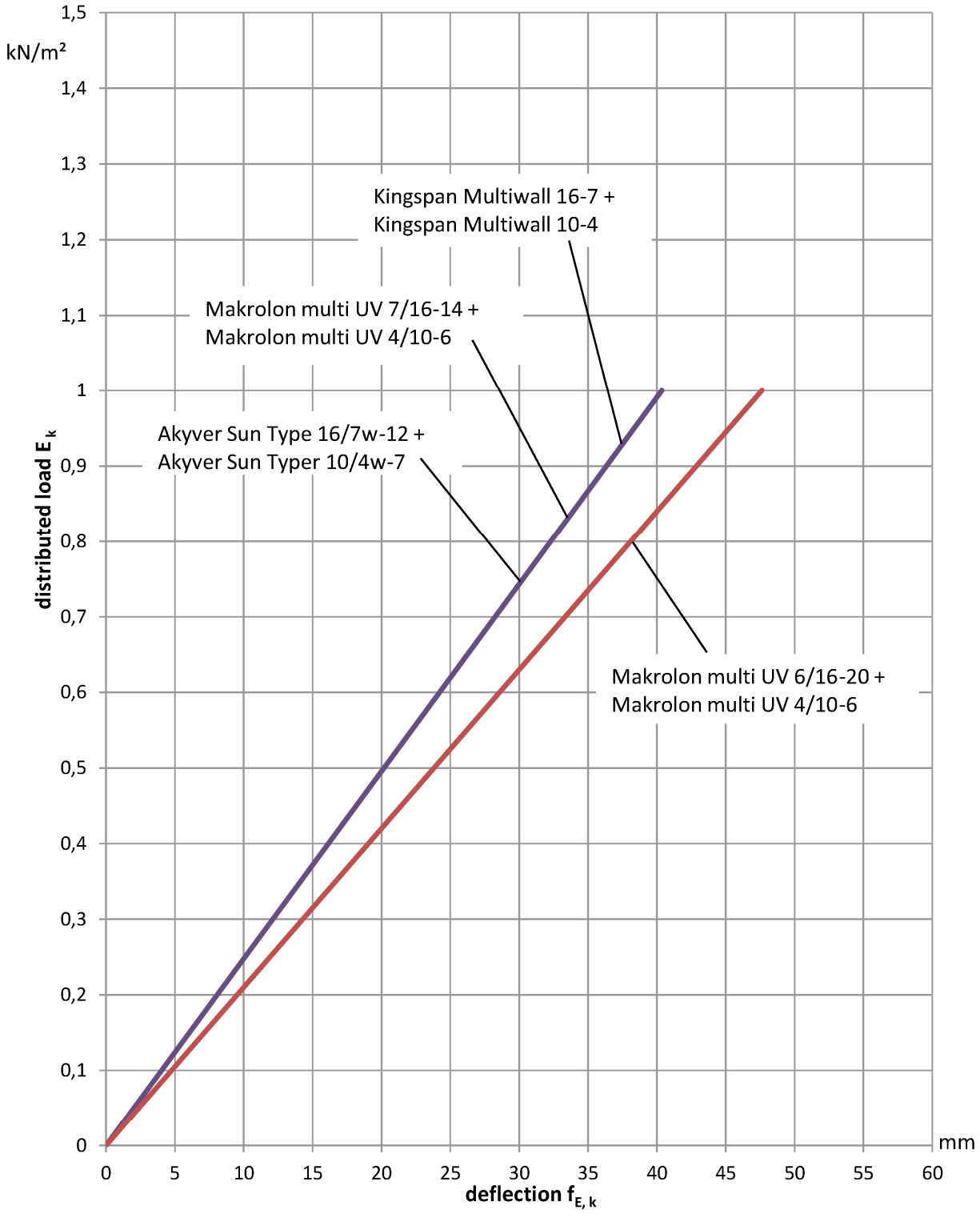

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.18
Covering PC 16+10: clear span l_F = 3,62mm diagram 1 - span system characteristic values, max. deflection in mid span	

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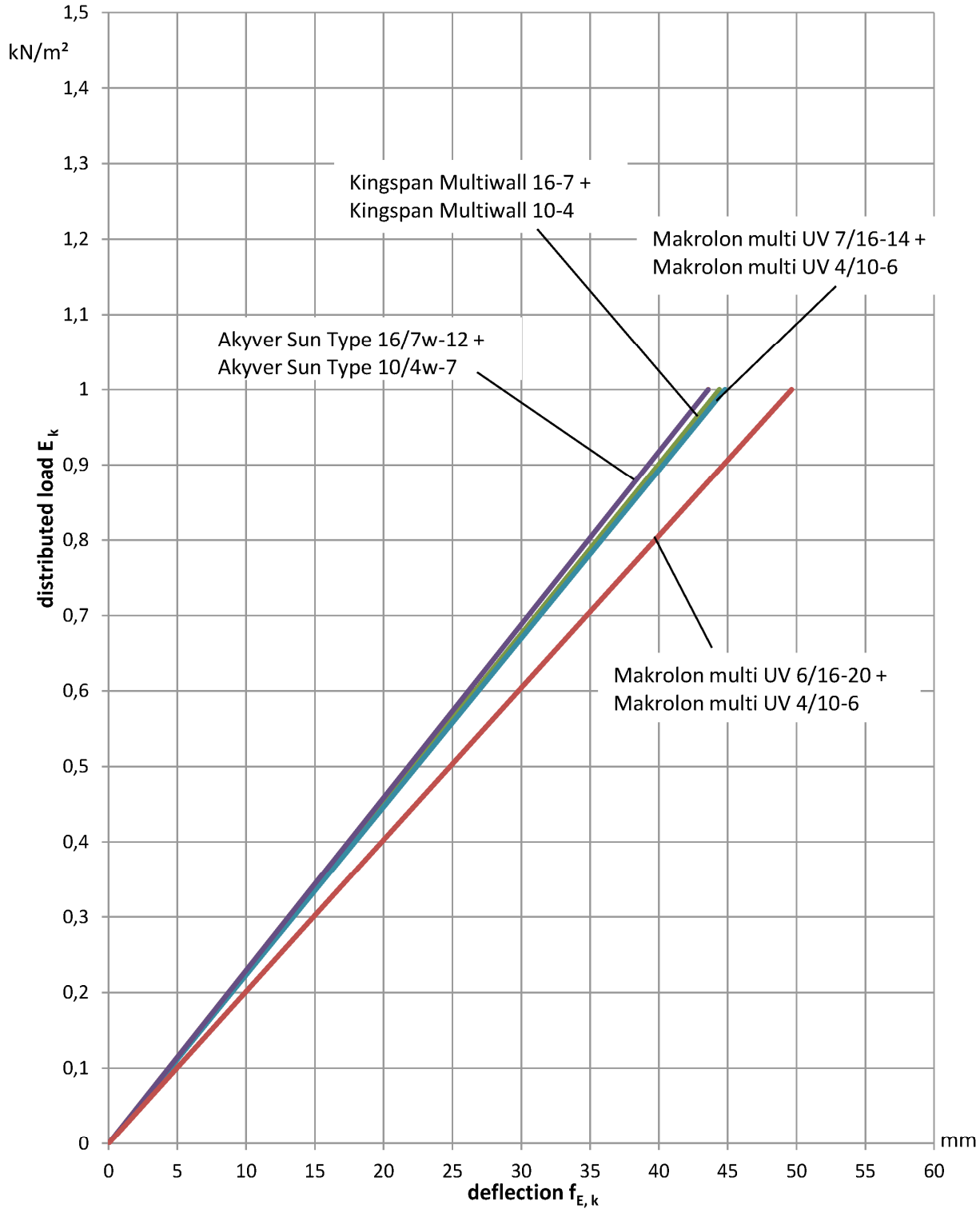

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.19
Covering PC 16+10: clear span l_F = 3,62mm diagram 2 - span system characteristic values, max. deflection in mid span	

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Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.20
Covering PC 16+10: clear span l_F = 3,62mm diagram 3 - span system characteristic values, max. deflection in mid span	

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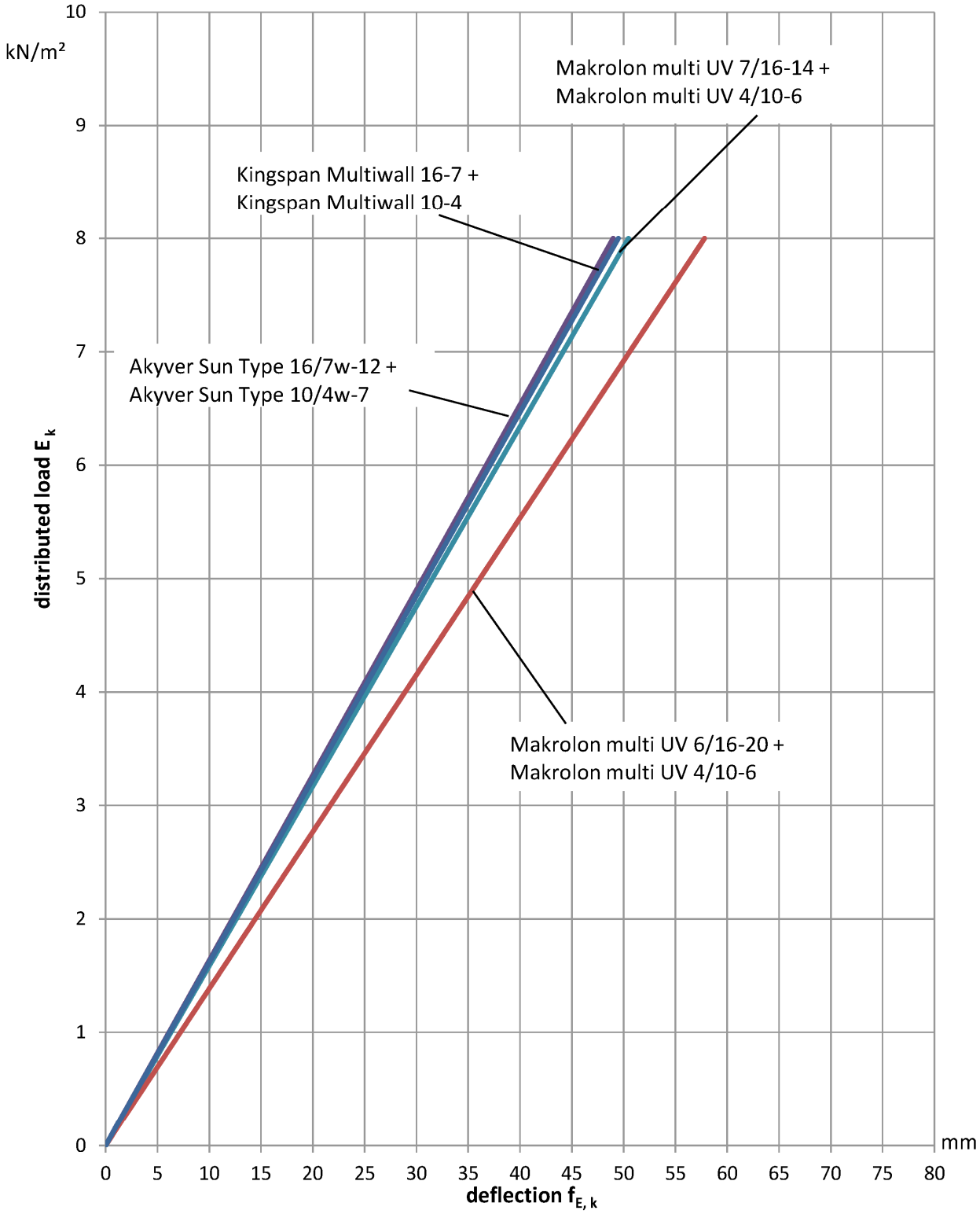

Essmann Continuous rooflight system flat (LB classic, LB basic, LB classic plus, LB plus)	Annex B 3.21
Covering PC 16+10: clear span l_F = 3,678mm diagram 4 - span system characteristic values, max. deflection in mid span	

Essmann Continuous rooflight system flat (LB classic, LB classic plus, LB basic, LB plus)

Annex C

Provisions for installation, packaging, transport, storage, use, maintenance and repair

C 1 Installation

The fixing of the roof kit on the substructure is not covered by this ETA. The stability shall be verified for the relevant substructure in accordance with the applicable European specifications.

Before the roof kit is installed, the dimensional stability of the substructure shall be checked. Particular care shall be taken to ensure that the substructure has a rectangular footprint. The compliance of the existing substructure with the substructure for which the load-bearing capacity was verified in the planning stage shall be checked visually.

The installation of the roof kit may only be performed by specialists who are specially trained for this purpose. The installation guidelines of the manufacturer shall be respected. The manufacturer of the roof kit shall inform the specialists that they may only carry out assembly and installation of the roof kit in accordance with his instructions and the provisions of the ETA. The PC hollow chamber sheets must not be filled. Excluded from this are the sheets according to Annex A 4.2, A 4.9 and A 4.14, which may be filled with nanogel to improve the U-value.

If the translucent roof kit can systematically come into contact with chemical substances, the resistance of the multi-wall sheets and if necessary of other kit components to these substances shall be verified.

During assembly, the coverings are placed on the pre-assembled bearing profiles, impost and ridge impost corner profile. The cover profiles are placed over the bearing profiles and screwed to the impost. The PC sheets are joined at the longitudinal edges over a supporting profile; the support width must be at least 20 mm from the last fully preserved rib. On the Impost (eaves), the sheets must be held displaceably in accordance with the specifications in Appendix A 2.2. The ridge support is designed in accordance with the specifications in Annexes A 2.3.7 (gable roof) or A 2.3.8 (monopitch roof).
The translucent roof kit shall be installed and connected to the adjacent structure in a manner that ensures no moisture can penetrate into it and avoiding thermal bridges. These details shall be evaluated on a case-by-case basis.

C 2 Packaging, transport and storage

The components of the roof kit shall be stored and transported in accordance with the manufacturer's specifications such that the components cannot be damaged. In particular, for multi-wall sheets made from polycarbonate it shall be ensured that only those surfaces with UV protective coatings are exposed to UV radiation. The packaging shall protect the material from moisture and weather effects whilst avoiding heat build-up inside the packaging. It is the responsibility of the manufacturer to ensure that this information is passed on to the people in charge.

C 3 Use, maintenance, repair

The installed roof kit is not a walk-on system. For installation purposes, the roof kit may be walked on by a single person using boards laid across the substructure (at least two bearing profiles) for support; the boards shall run perpendicular to the loading direction of the bearing profiles. The necessary protective measures against falls from a height must be taken into account (fall-through protection is not assessed).

For maintenance, the installed roof kit shall be visually inspected by a qualified expert once a year. The manufacturer shall be consulted if the PC multi-wall sheets show surface cracks or damage or if they are strongly discoloured. The aluminium components of the roof kit shall be examined for pronounced corrosion by visual inspection. Repair shall be arranged where necessary.

Only the components listed in the ETA may be used for replacement of the manufacturer for components.

Cleaning agents shall be free of solvents and abrasives. Chemical and biological cleaning additives may only be used if they have been proven to be compatible with polycarbonate; otherwise only water and a soft cloth shall be used to clean the multi-wall sheets.