

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-17/0482
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 curved
(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

85 pages including 75 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 curved" are 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 the category "Curved roof systems with additional bearing profiles parallel to the span" as listed in section 5.1.1.1.1 a) of the ETAG 010¹.

The roof kit comprises 1.05 m- or 2.1 m-wide arched translucent PC multi-wall sheets which are positioned on curved bearing profiles and protected against uplift loads by covering profiles. The sheets are mounted on the eaves side in an impost profile whose execution depends on the type (PVC and/ or aluminium profiles). The multi-wall sheets are joined at their longitudinal edges via a bearing profile. In the multi-span systems, one (for double-span systems), two (for triple-span systems) or three (for four-span systems) additional bearing profiles are arranged parallel to the edge arches as intermediate supports.

The following components may be part of the curved 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),
- arched 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

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 documentation² 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 16153³ 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 – Kaisersberg	Akyver Sun Type 10/1700	10	A 4.2
DS Smith Plastics France F – Kaisersberg	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 – Kaisersberg	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 – Kaisersberg	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

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 an aerogel (amorphous silica) with a maximum bulk density of 85 kg/m³. It is deposited at the DIBt and 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 16240⁴ 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 573-3⁵ with a thickness of 1.0 mm and shall correspond with the multi-wall sheets in width and length.

1.1.4 Bearing profiles, covering profiles and marginal covering profiles

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 755-2⁶ and have the dimensions given in Annex A 3.1.1 and A 3.1.2 of the ETA.

1.1.5 Impost profiles

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 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 1163-1⁷ 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 2.3.1, A 2.3.2 and A 2.3.4) which are connected to the covering profiles and bearing profiles are made from stainless steel material no. 1.4016 according to EN 10088-2⁸ 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, 6 and 7 (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 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, A 3.3.6 and A 3.3.7 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 between the bearing profiles for fixation 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 and A 3.4.3 of the ETA.

1.1.11 Sealing profiles

The sealing profiles (see Annex A 2.1) are made from Ethylen/Propylen-Terpolymer EPDM in accordance with DIN 7863⁹ with Shore hardness of 60° ± 5 Shore A in accordance with DIN ISO 7619-1¹⁰. 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 via the tie bracket is made with a pair of screws and washers Type FAB A BZ Ø 6,3 x L in accordance with ETA-10/0184 (see Annex A 2.3.1 to A 2.3.5).

For the roof kit Essmann "LB plus" using impost profiles made of PVC in accordance with section 1.1.5.2, the connection between tie bracket and bearing profile is made with a pair of screws without washers FAB A Type A Ø 6,5 x L in accordance with ETA-10/0184 made from stainless steel material no. 1.4016 according to EN 10088-2 (see Annex A 2.3.6)

To prevent the sheets from shifting (see Annex A 2.1), at least two nipple screws 4 x 13 (section B-B) distributed symmetrically over the arch are arranged. In addition, for spans L > 3 m, screws and washers type Zebra Piasta 6.3 x L in accordance with ETA-10/0184 are arranged to connect covering and bearing profiles (see Annex A 2.1.1 to A 2.1.4). To fix the fixation brackets pan head screws Type Ø 4,8 x L Pias A2 are used (see Annex A 2.2.5 and A 2.2.6).

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	Elastomer glazing and panel gaskets for windows and claddings - Technical delivery conditions - Part 1: Non cellular 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 Component	LB classic		LB basic		LB classic plus		LB plus	
	single	double	single	double	single	double	single	double
Covering profile 1 (Annex A 3.1.1)	X	X	X	X	–	–	X	X
Covering profile 2 (Annex A 3.1.2)	–	–	–	–	X	X	–	–
Bearing profile, marginal covering profile (Annex A 3.1.2)	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	–	–	–	–	–
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	–	–	–	–	–
Tie bracket 2 (Annex A 3.3.2)	–	–	–	–	X	X	–	X
Tie bracket 3 (Annex A 3.3.3)	–	–	X	X	–	–	X	X
Tie bracket 4 (Annex A 3.3.4)	–	–	X	X	–	–	X	X
Tie bracket 5 (Annex A 3.3.5)	–	–	–	–	–	–	–	X
Tie bracket 6 (Annex A 3.3.6)	–	–	X	X	–	–	X	X
Tie bracket 7 (Annex A 3.3.7)	–	–	–	–	–	–	–	X
Clambling profile (Annex A 3.4.1)	–	–	X	X	X	X	X	X
Fixation bracket 1 (Annex A 3.4.2)	–	–	X	X	–	–	X	X
Fixation bracket 2 (Annex A 3.4.3)	–	–	–	–	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
		$a_p \leq 1060$	$a_p \leq 1060$	$a_p \leq 530$	$a_p \leq 703$	$a_p \leq 530$
PC 10	4.1 bis 4.4	x	x	x	–	x
PC 10 + PC 10	4.1 bis 4.4 (2x identical multi-wall sheets)	x	x	x	–	x
PC 16	4.5 bis 4.9	x	x	x	x	x
PC 16 + PC 16	4.5 bis 4.9 (2x identical multi-wall sheets)	x	x	x	x	x
PC 16 (außen) + PC 10	4.5 + 4.1	x	x	x	x	x
	(4.6 bis 4.8) + 4.3					
	4.6 + 4.4					
PC 16 (außen) + 6mm PETG	(4.5 bis 4.9) + 4.15	x	–	x	x	–
PC 20	4.10 bis 4.14	x	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 profile PVC	
Bearing and covering profiles	
Aluminium impost profiles	
Aluminium sheet	
Clamping profile	
Tie and fixation brackets	
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 building structures. The multi-wall sheets may be combined to form continuous rooflights of any length with When installed, the roof kit is not walkable and 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/m ²] provided that the bearing conditions as described in Annexes A 2.1 to A 2.3 are respected	See Annex B 3.1
Characteristic structural resistance of the impost to forces (actions) resulting from uplift loads [kN]	See Annex B 3.2
Characteristic structural resistance of the fasteners [kN]	See Annex B 3.3
Consideration of the effect of load duration	See Annex B 1.2
Consideration of ageing and environmental effects	See Annex B 1/ B 2
Consideration of thermal effects	See Annex B 1/ B 2
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 of Essmann Continuous rooflight system curved "LB classic", "LB basic", "LB classic plus", "LB plus" roof kit	No performance assessed
Reaction to fire of Essmann "LB classic", "LB basic", "LB classic plus", "LB plus" roof kit	Class E
Resistance to fire of Essmann "LB classic", "LB basic", "LB classic plus", "LB plus" roof kit	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Watertightness and condensation	Category 1 (no leaks with no differential air pressure) up to inclination of the substructure from the horizontal: 5° Design details as per information deposited with DIBt

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)

For the sustainable use of natural resources no performance was investigated for this product.

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

In accordance with the 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 curved (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

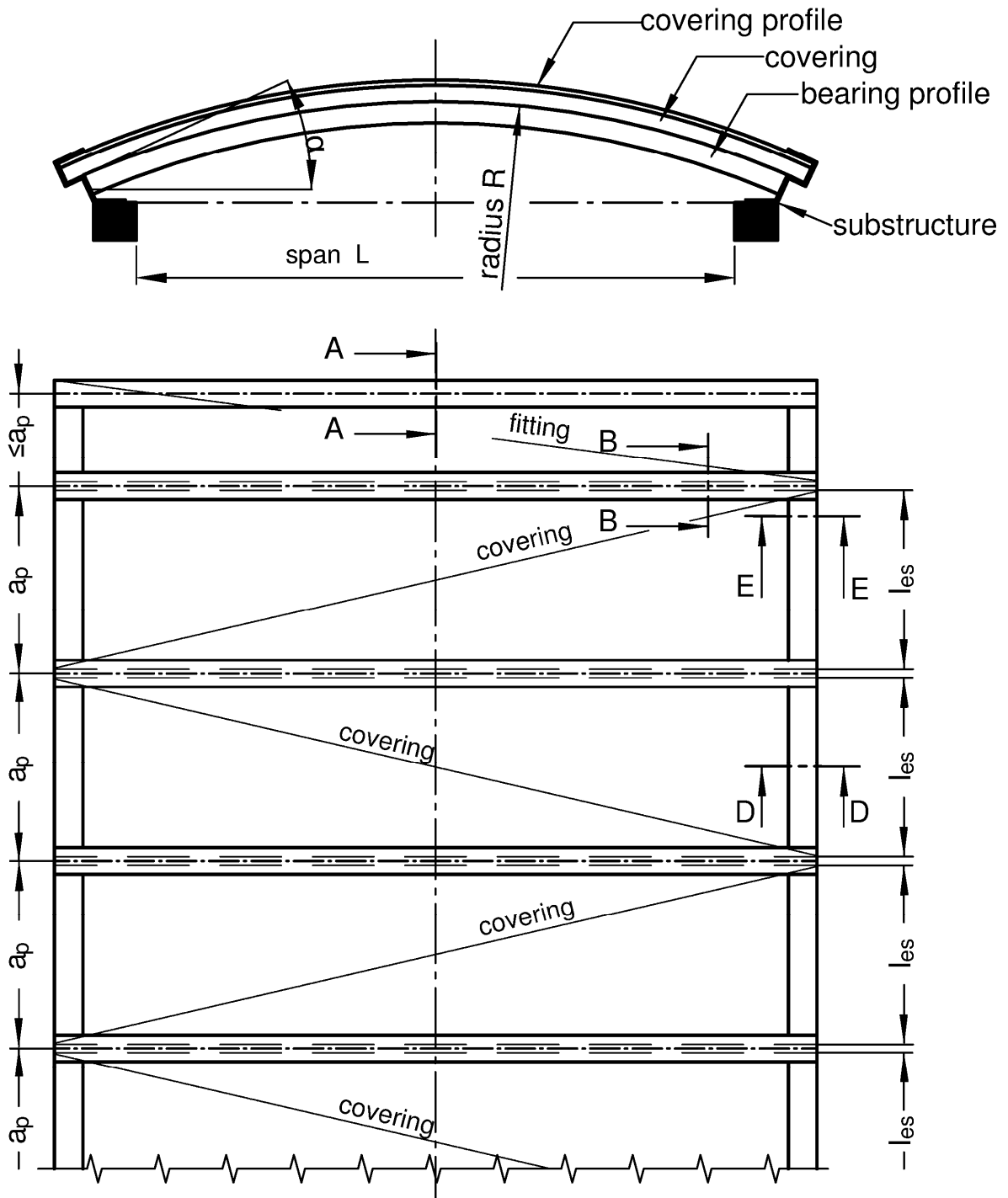
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

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

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Wachner

English translation prepared by DIBt



a_p : spacing of bearing profiles
 l_{es} : width of covering cut from production width l_e

a_p : max. 1060 mm

schematic view

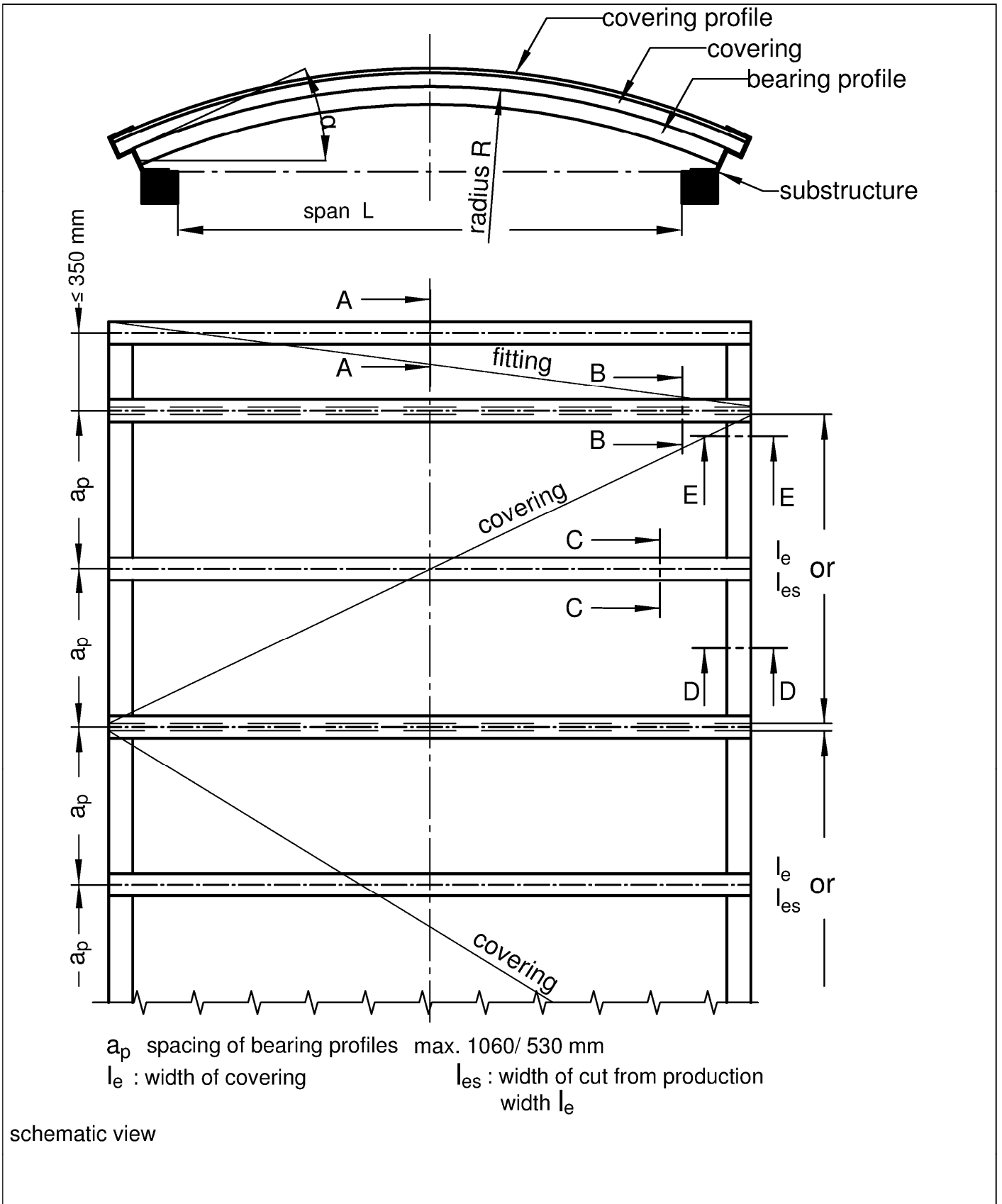
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

System overview
1-span-system

Annex A 1.1

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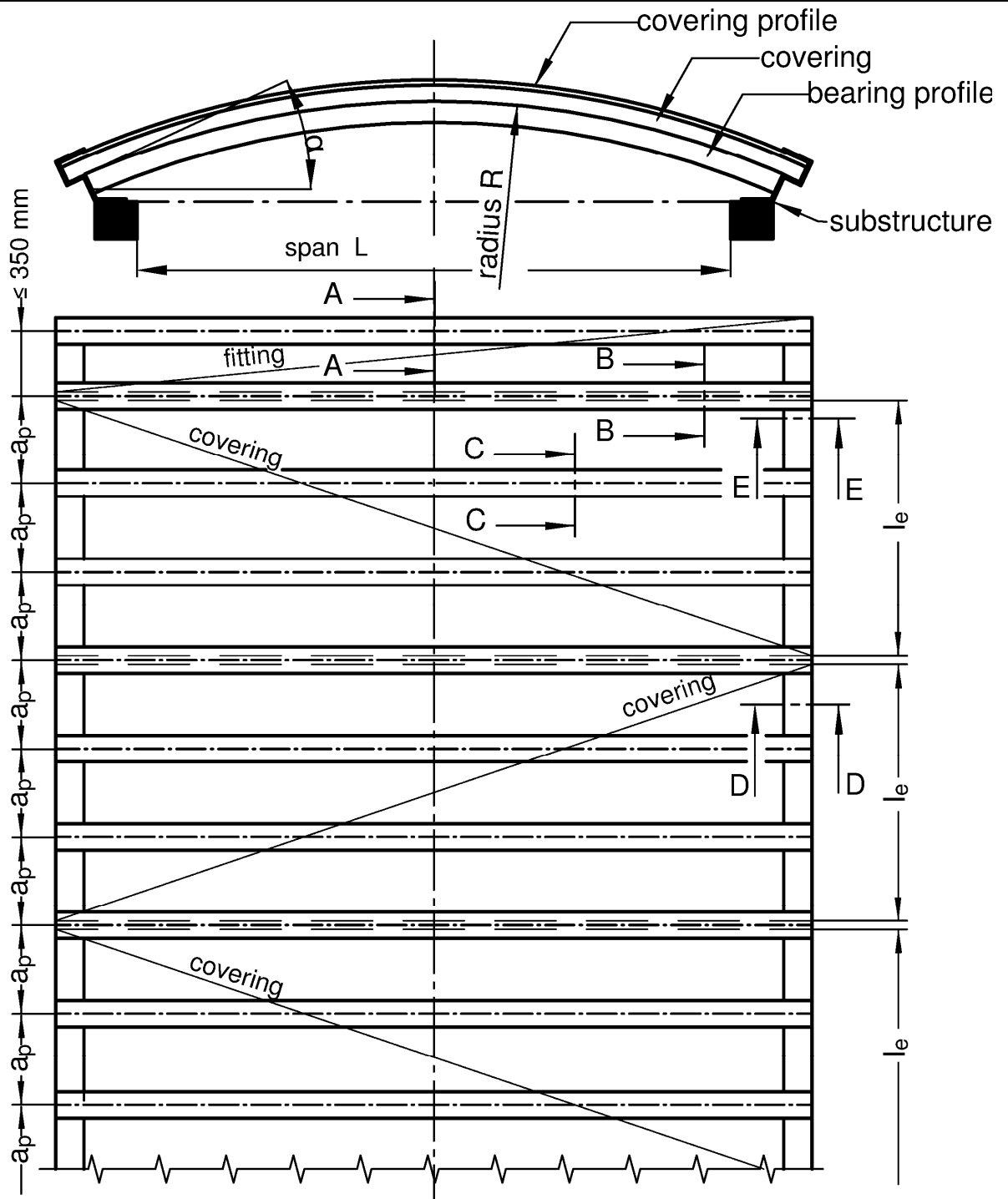
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Essmann Continuous rooflight system curved
 (LB classic, LB basic, LB classic plus, LB plus)

System Overview
 2-span-system

Annex A 1.2

English translation prepared by DIBt



a_p : spacing of bearing profiles max. 703 mm
 l_e : width of covering

schematic view



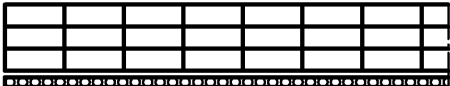
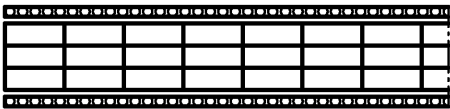

Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

System Overview
3-span-system

Annex A 1.3

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type of covering

- | | | |
|---|--|--|
| ① | outside
 | multi-wall-sheet |
| ② | outside
 | aluminium sheet
multi-wall-sheet |
| ③ | outside
 | multi-wall-sheet
GRP-sheet |
| ④ | outside
 | GRP-sheet
multi-wall-sheet
GRP-sheet |
| ⑤ | outside
 | solid sheet 2-4mm
multi-wall-sheet |

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

Type of covering (1) to (5) for all rooflight types with single covering:
"LB classic", "LB basic", "LB classic plus" and "LB plus"

Annex A 1.5.1

type of covering

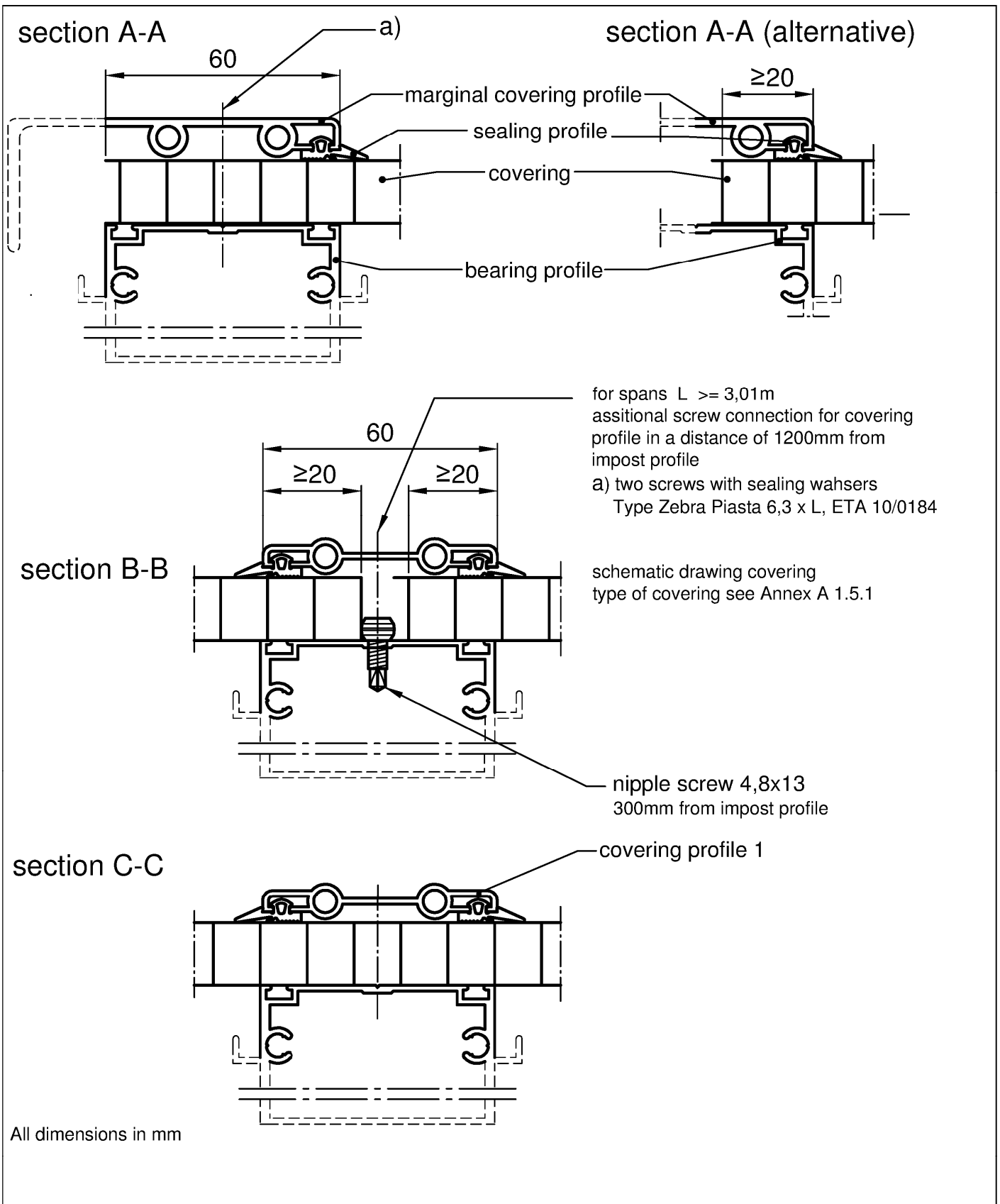
outside		multi-wall-sheet multi-wall-sheet or solid sheet PETG
outside		aluminium sheet multi-wall-sheet multi-wall-sheet or solid sheet PETG
outside		GRP-sheet multi-wall-sheet multi-wall-sheet or solid sheet PETG
outside		multi-wall-sheet multi-wall-sheet or solid sheet PETG GRP-sheet
outside		GRP-sheet multi-wall-sheet multi-wall-sheet or solid sheet PETG GRP-sheet
outside		multi-wall-sheet textile glass mat multi-wall-sheet or solid sheet PETG
outside		multi-wall-sheet GRP-sheet multi-wall-sheet or solid sheet PETG
outside		solid sheet 2mm to 4mm multi-wall-sheet multi-wall-sheet or solid sheet PETG

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

Type of covering (6) to (13) for all rooflight types with double covering:
"LB classic double", "LB basic double", "LB classic plus double" and "LB plus double"

Annex 1.5.2

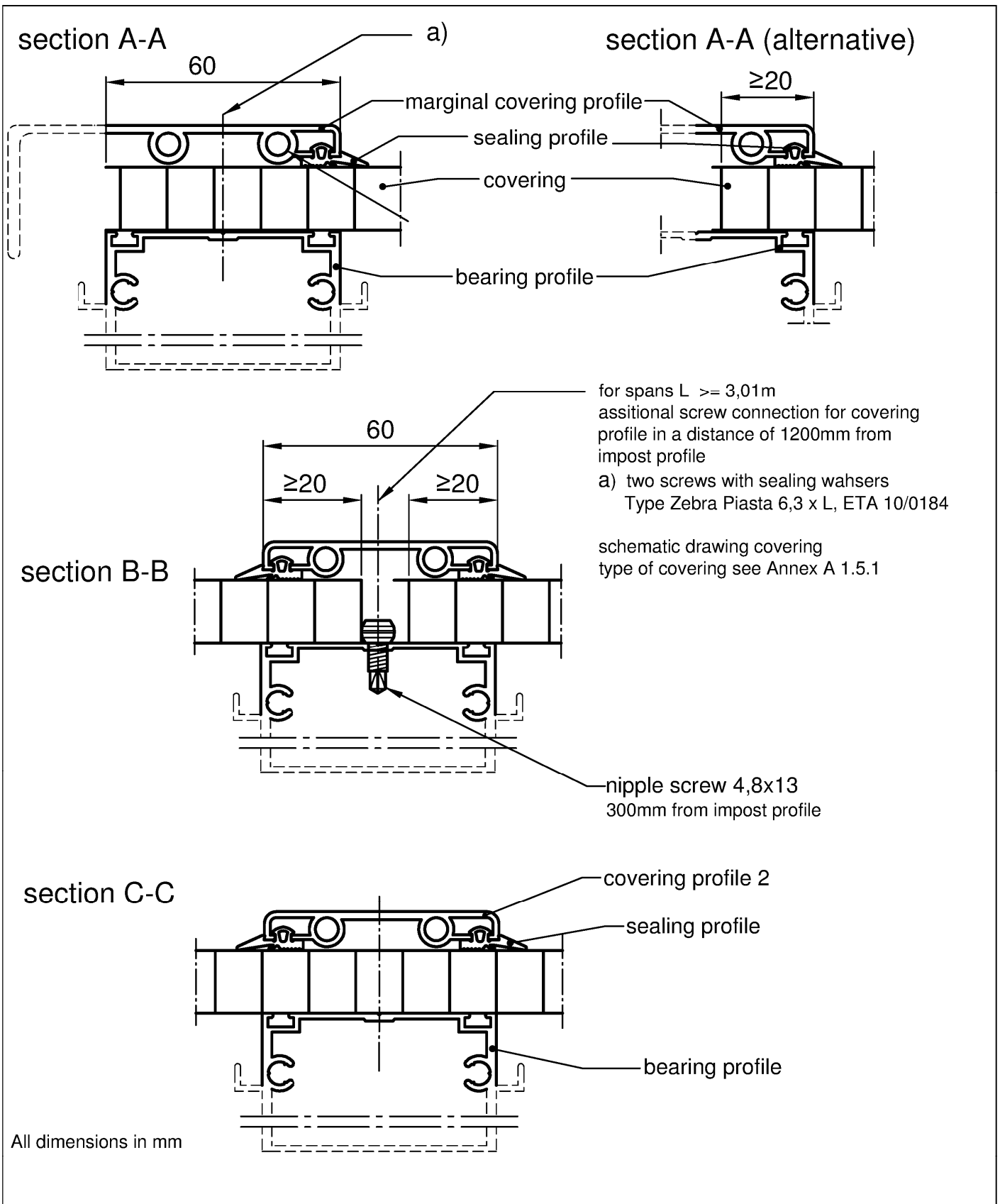
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<p>Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)</p>	<p>Annex A 2.1.1</p>
<p>Combinations of arch profiles, single- and multiple-span-systems section A-A, B-B and C-C for the types: "LB classic", "LB basic" and "LB plus"</p>	

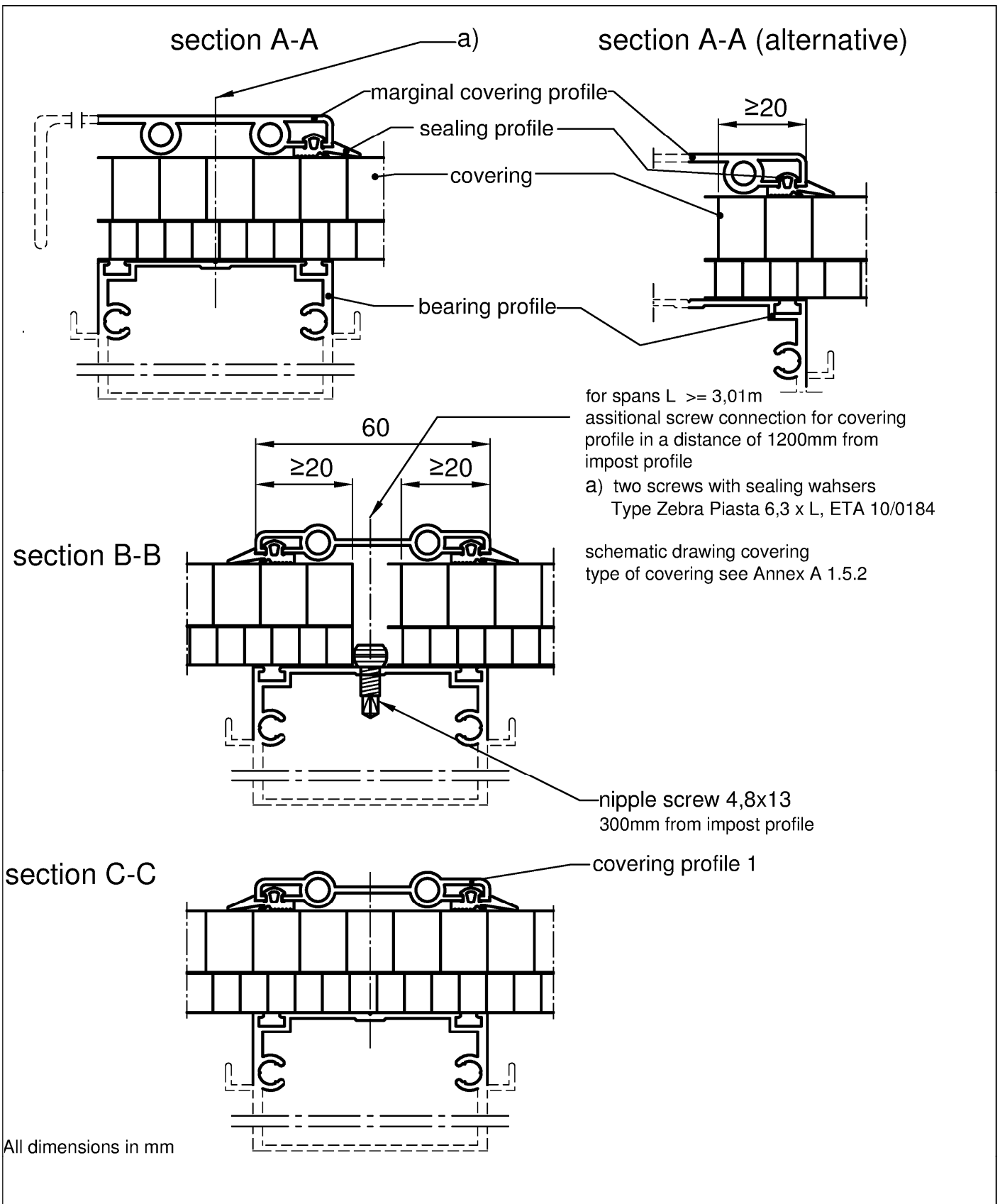
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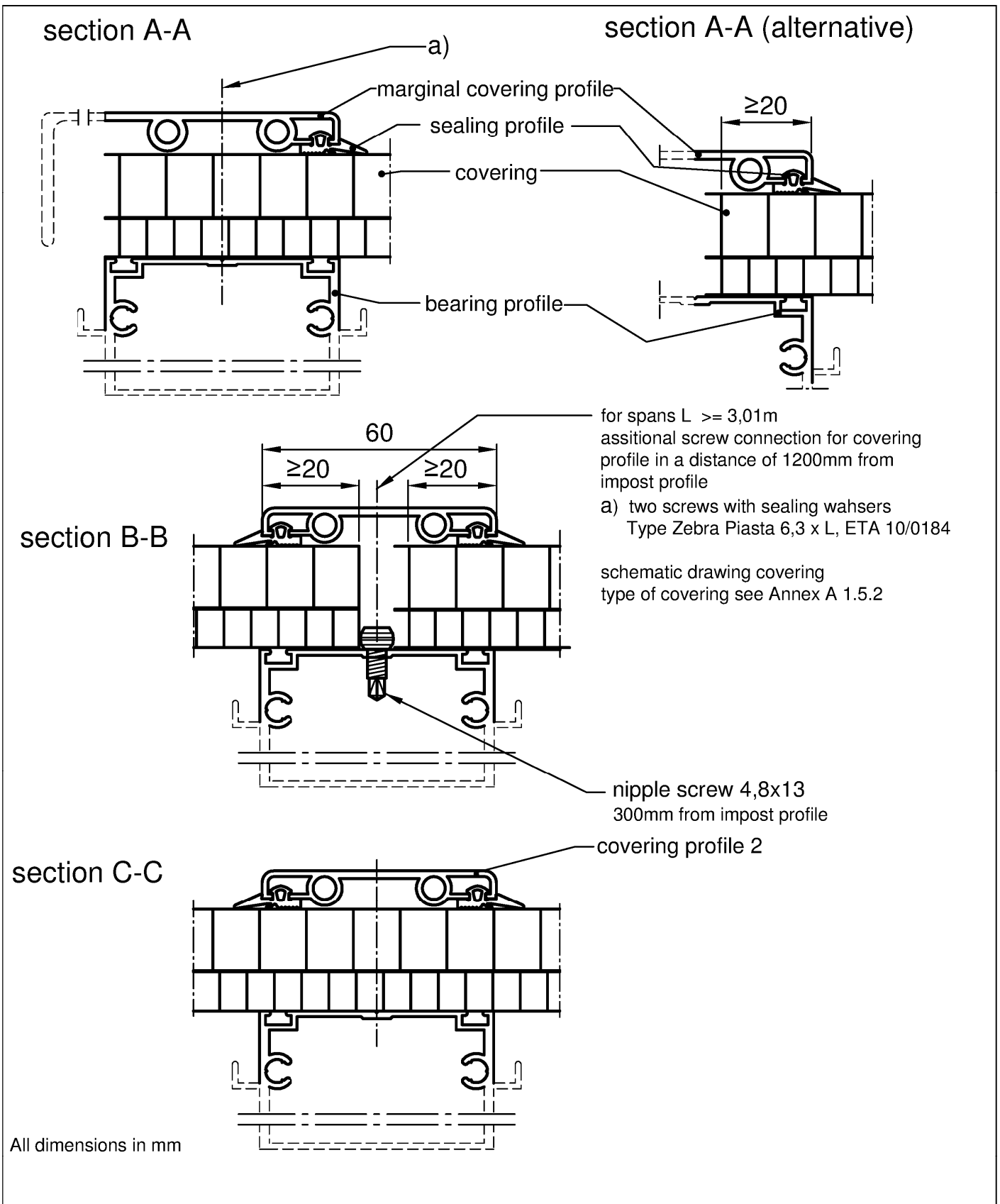
Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)	
Combinations of arch profiles, single- and multiple-span-systems section A-A, B-B, and C-C for the type "LB classic plus"	Annex A 2.1.2

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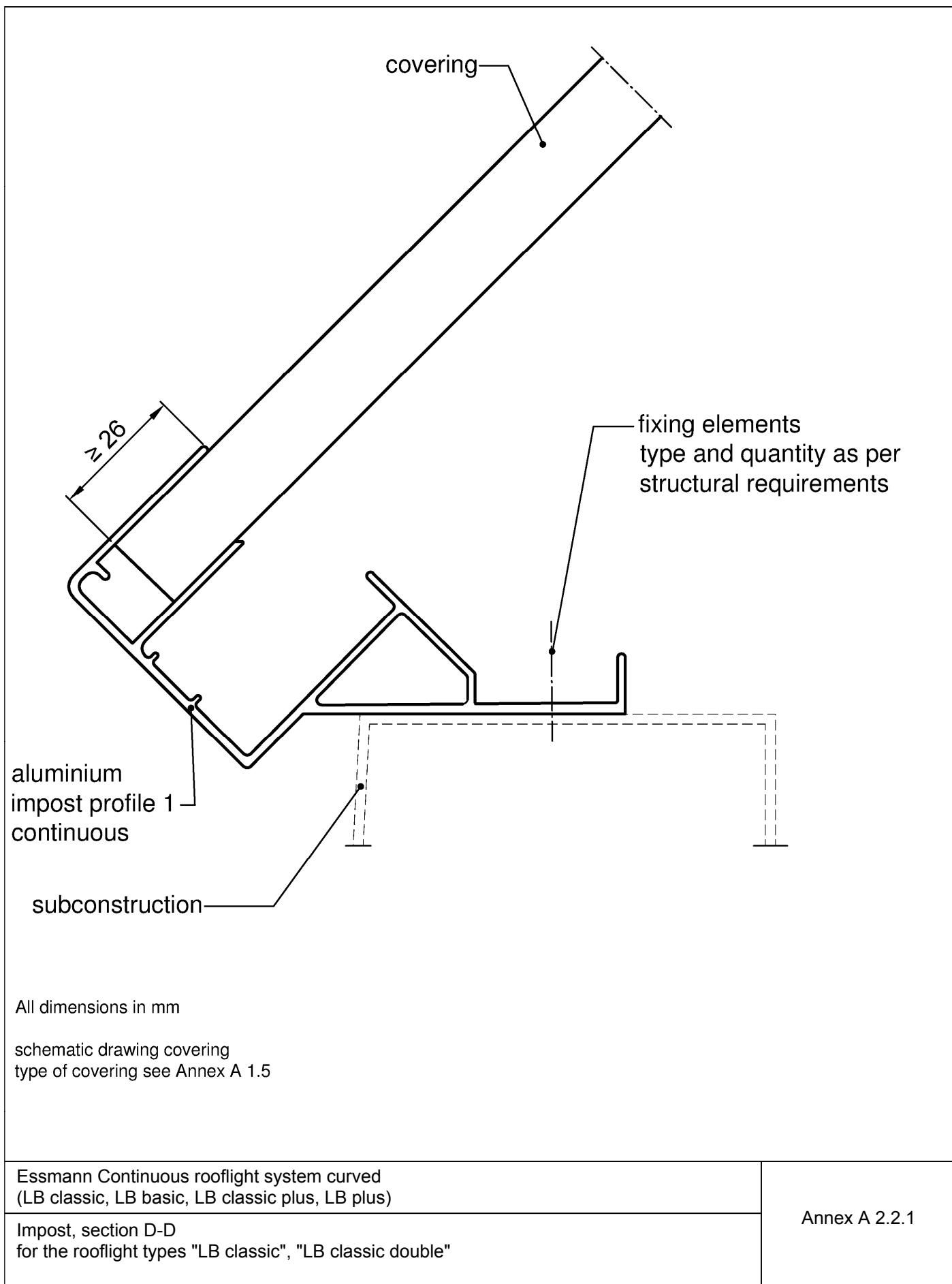
<p>Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)</p>	<p>Annex A 2.1.3</p>
<p>Combinations of arch profiles, single- and multiple-span-systems; section A-A, B-B and C-C for the types "LB classic double", "LB basic double" and "LB plus double"</p>	



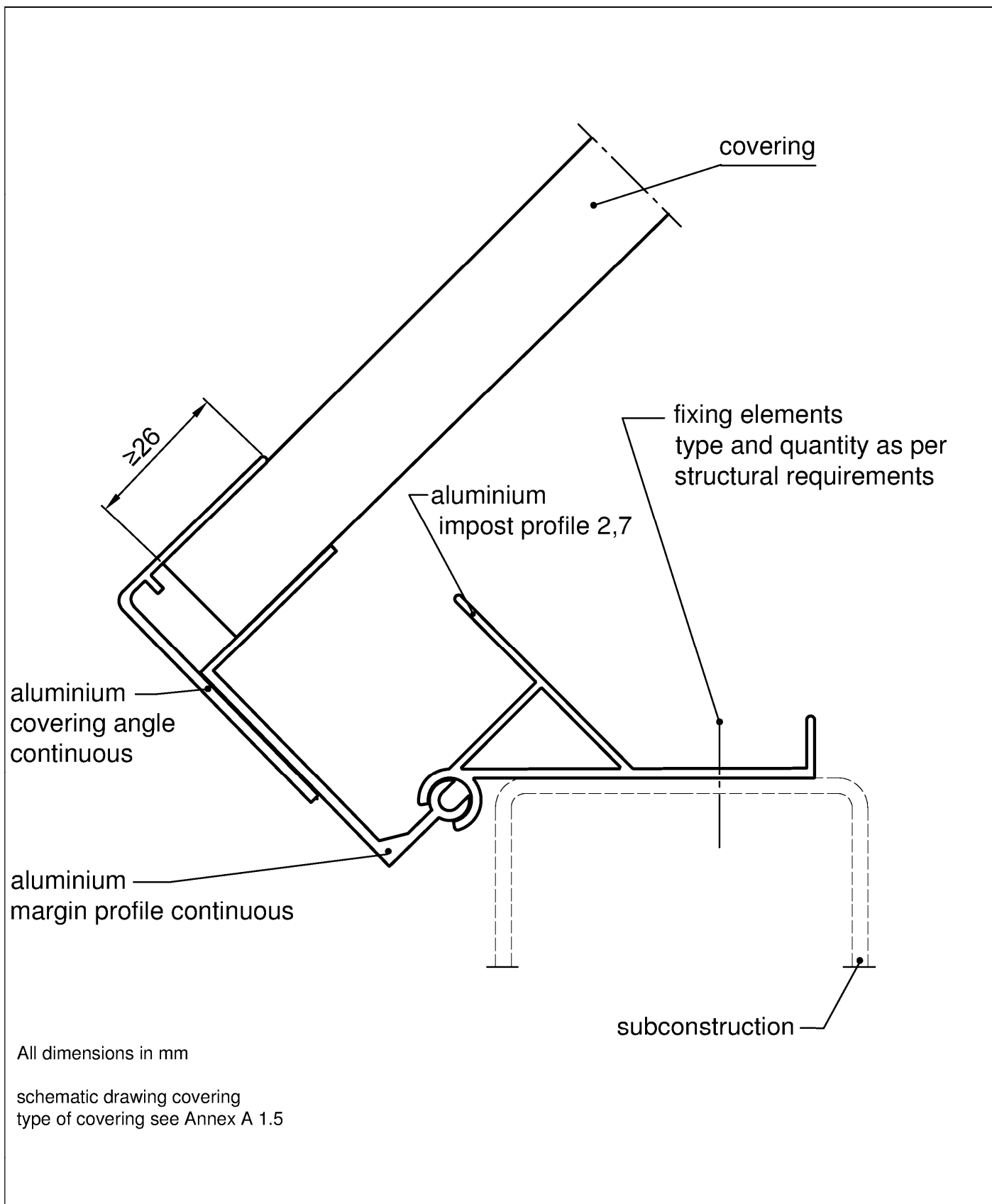
electronic copy of the eta by dibt: eta-17/0482

All dimensions in mm

<p>Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)</p>	<p>Annex A 2.1.4</p>
<p>Combinations of arch profiles, single- and multiple-span-systems section A-A, B-B and C-C for the typ "LB classic plus double"</p>	

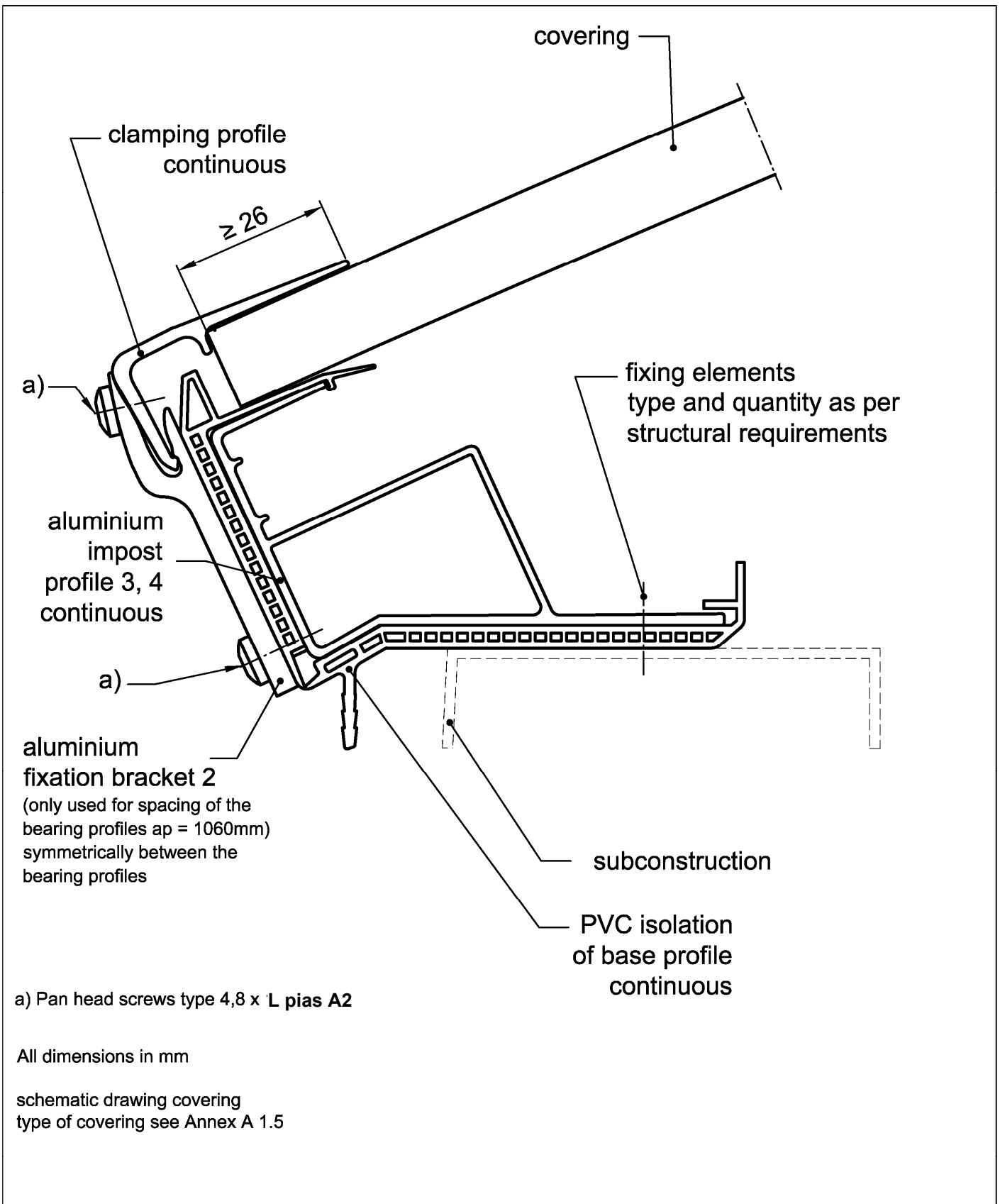


electronic copy of the eta by dibt: eta-17/0482



electronic copy of the eta by dibt: eta-17/0482

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



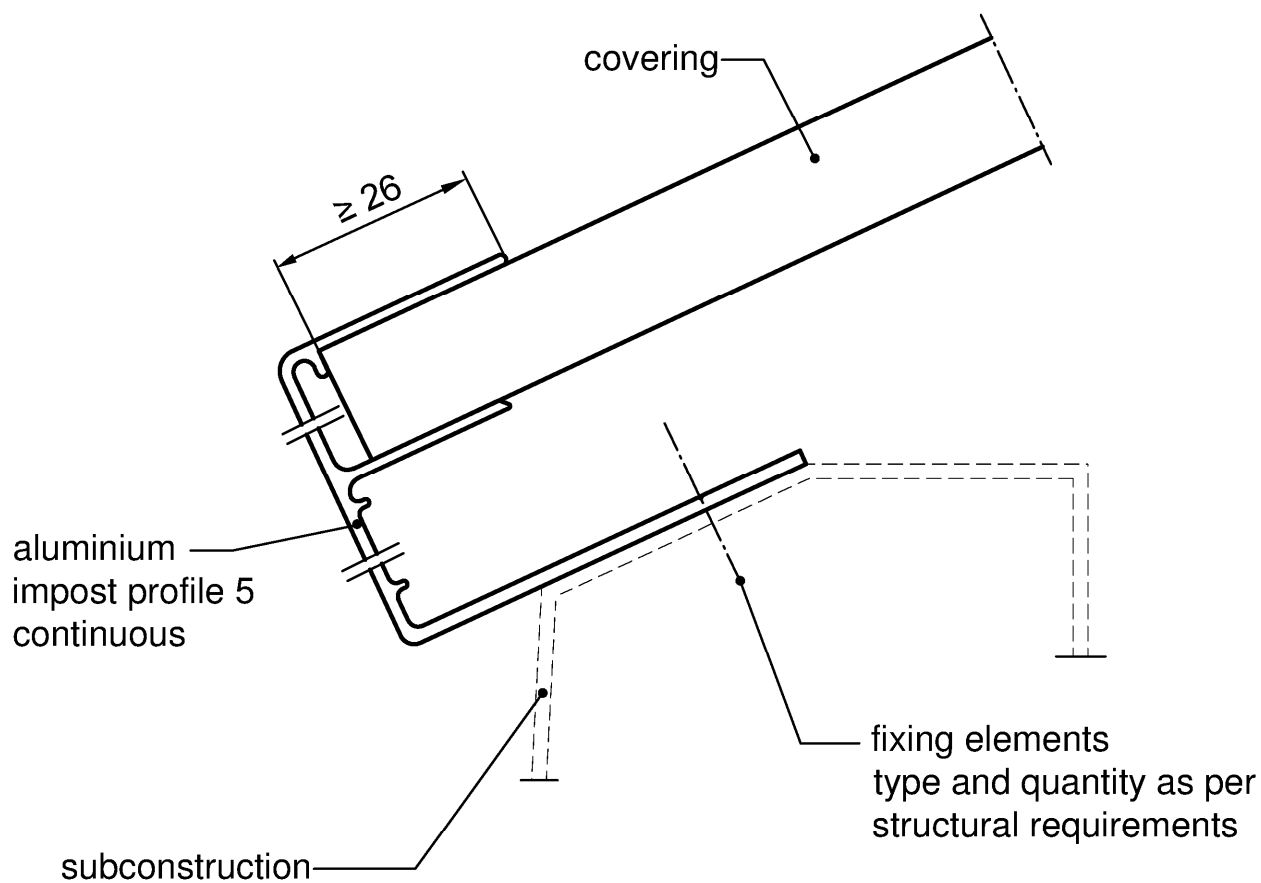
a) Pan head screws type 4,8 x L pias A2

All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

electronic copy of the eta by dibt: eta-17/0482

Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.2.3
Impost profile, section D-D for the rooflight types "LB classic plus", "LB classic plus double"	



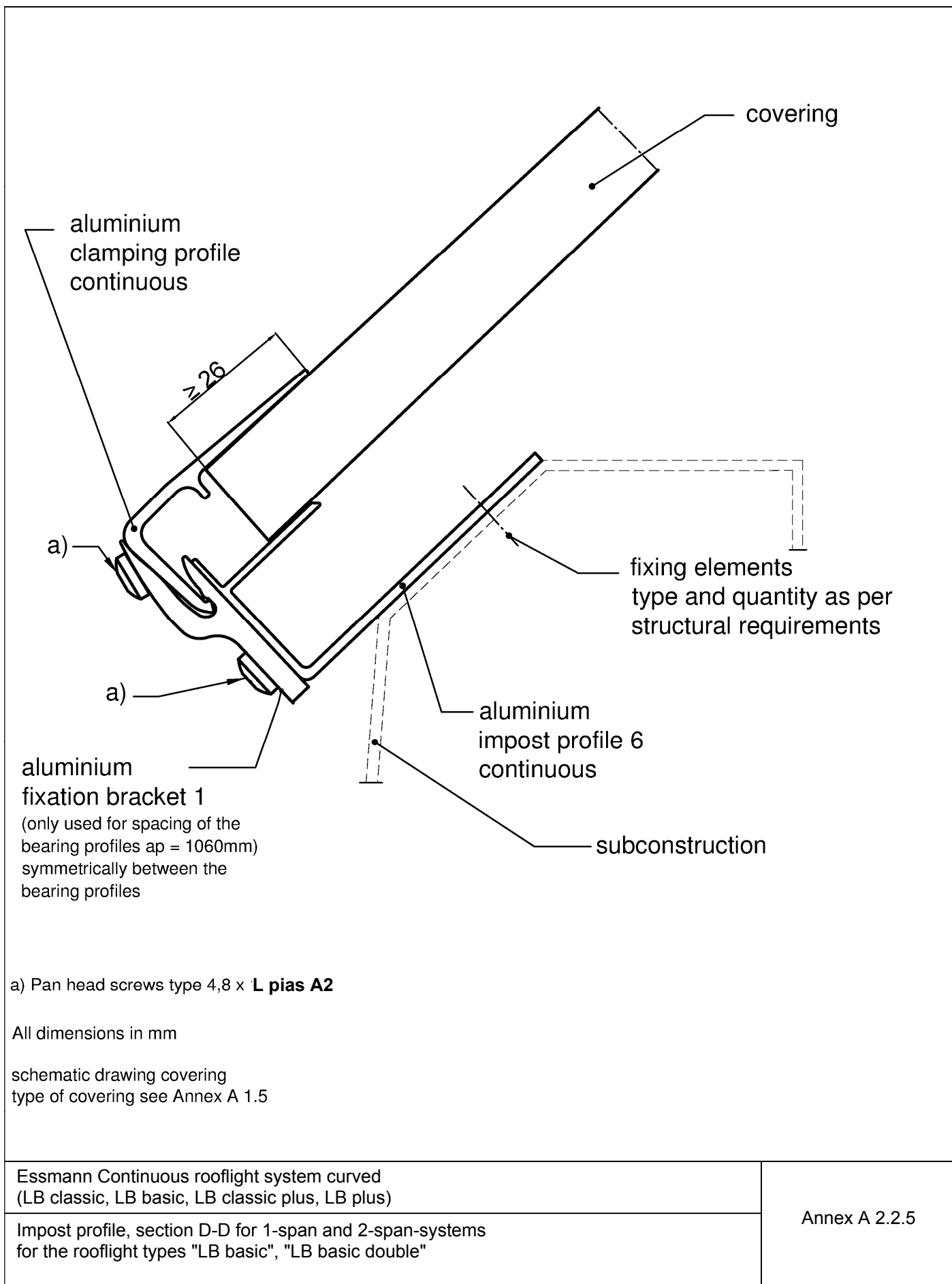
All dimensions in mm

schematic drawing covering
type of covering see Annex A 1.5

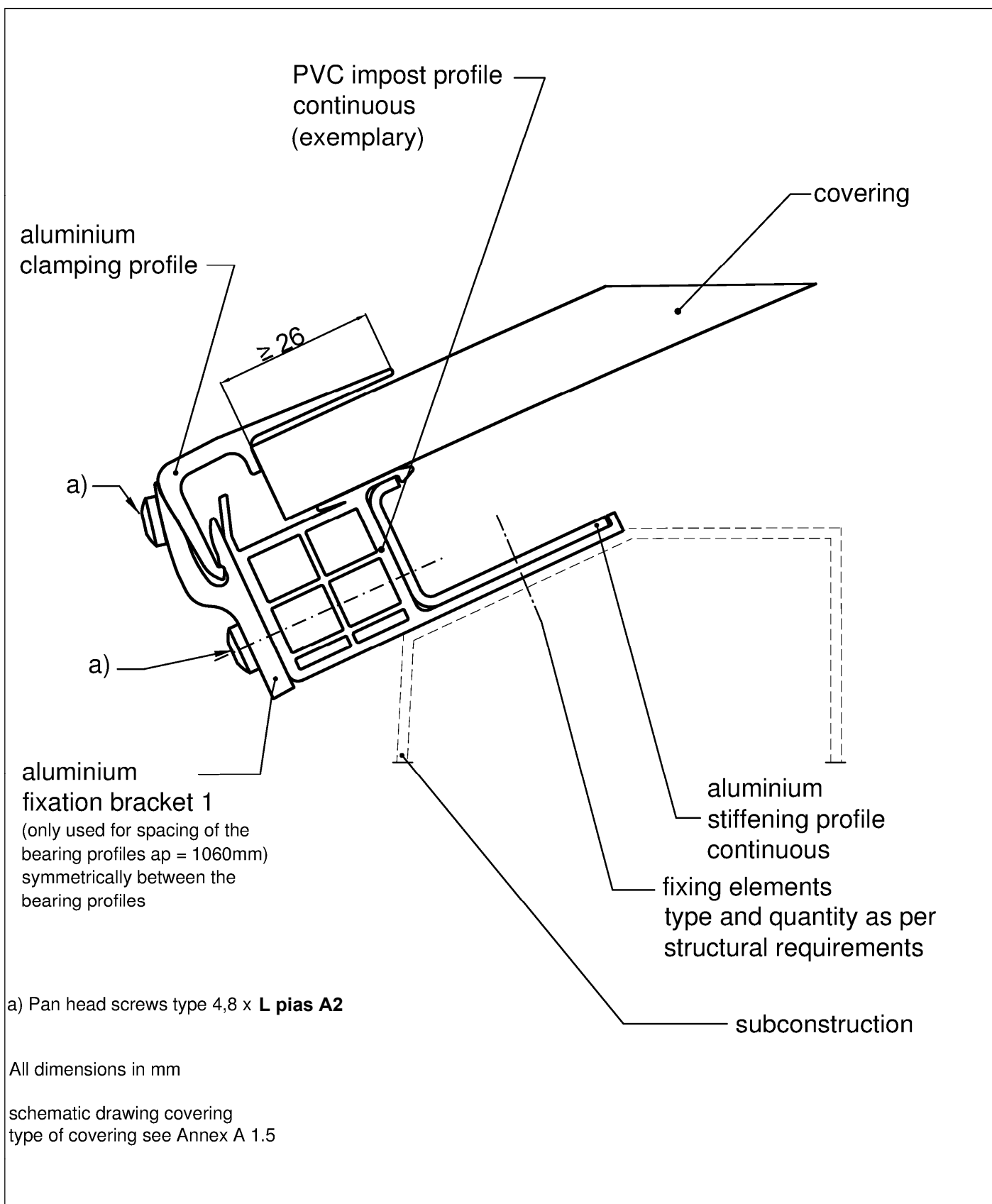
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Impost profile, section D-D
for the rooflight types "LB basic"

Annex A 2.2.4

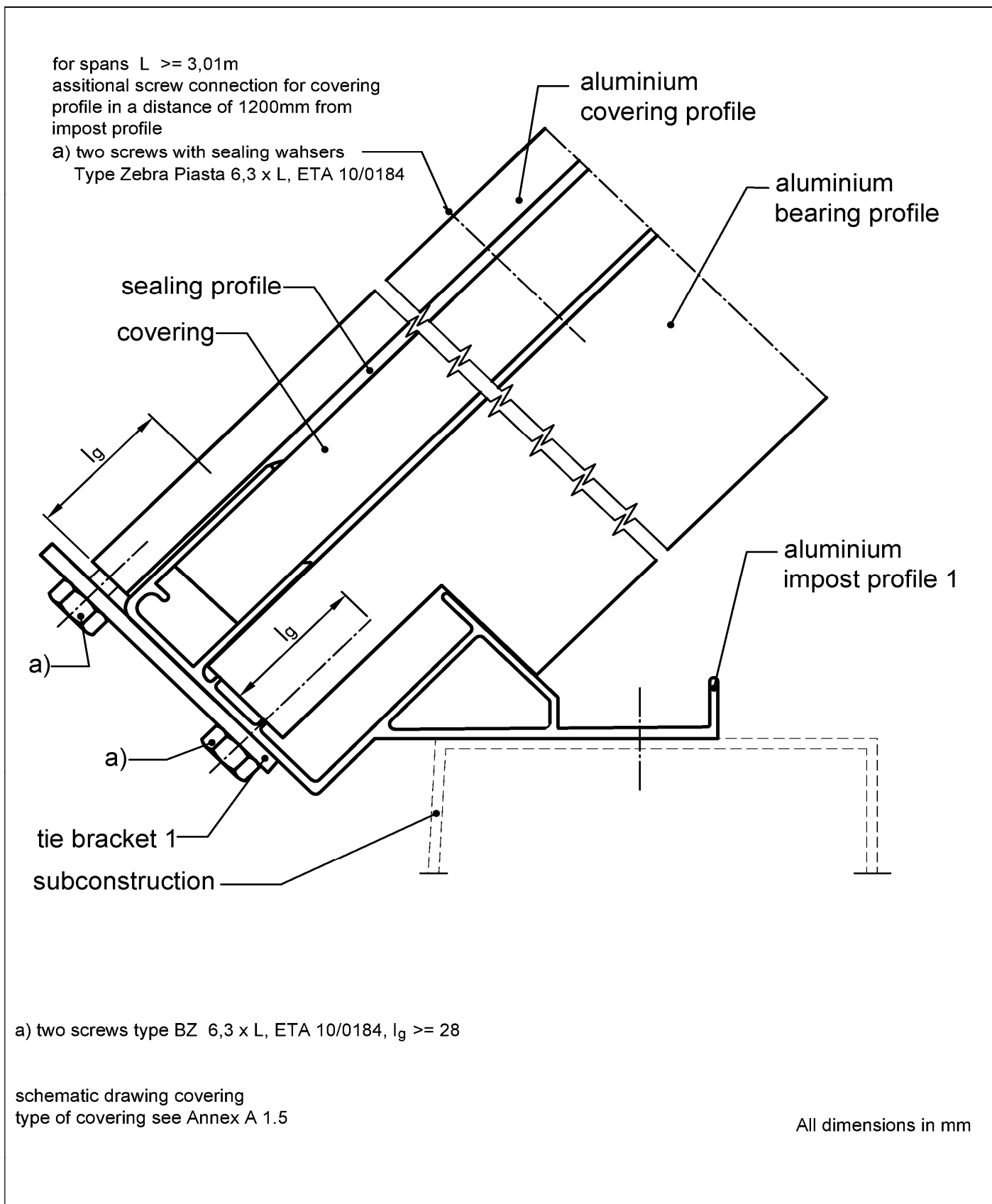


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electronic copy of the eta by dibt: eta-17/0482

Essmann Continuous rooflight system curved (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"	



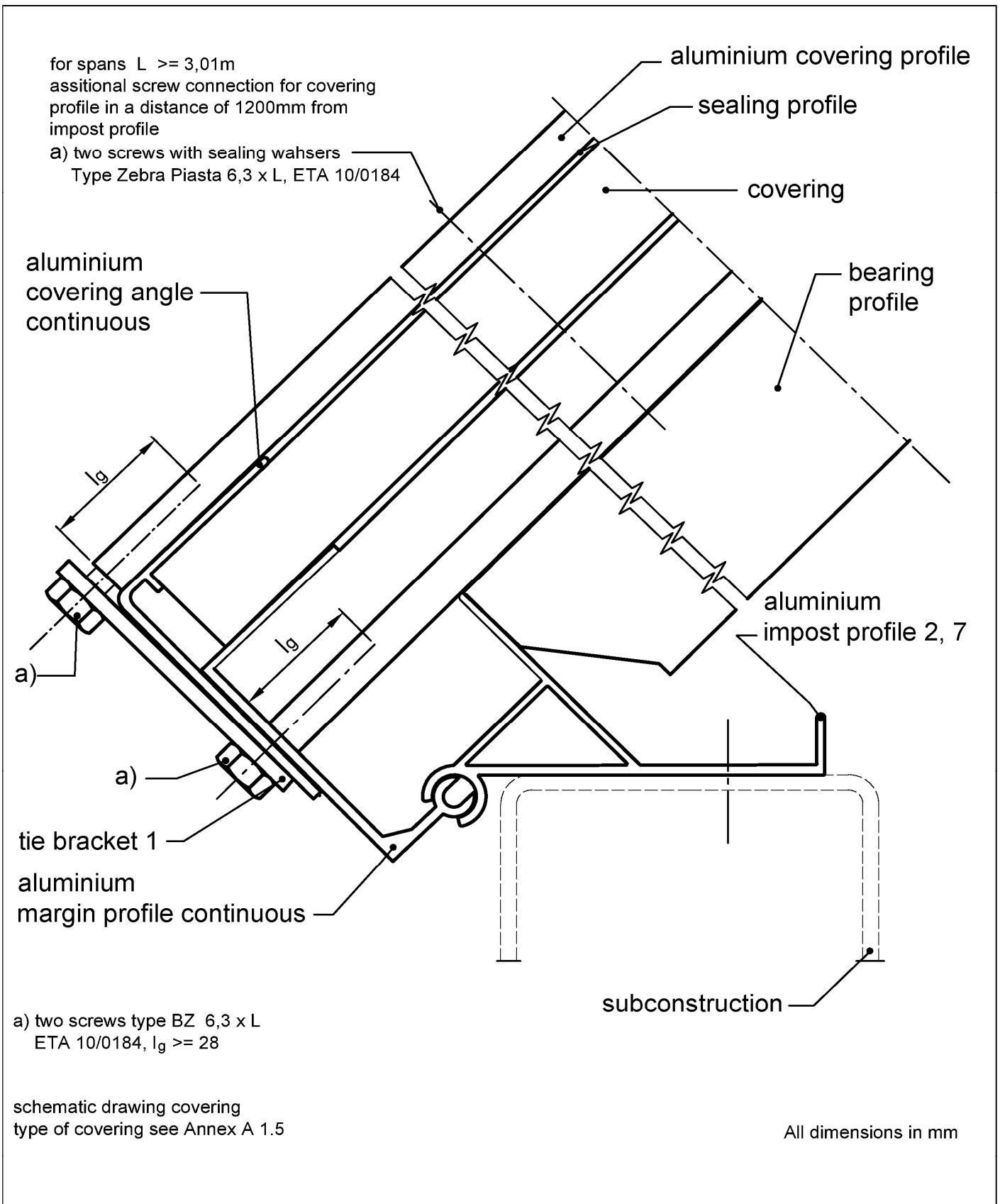
electronic copy of the eta by dibt: eta-17/0482

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

Impost profile, section E-E
for the rooflight types "LB classic" and "LB classic double"

Annex A 2.3.1

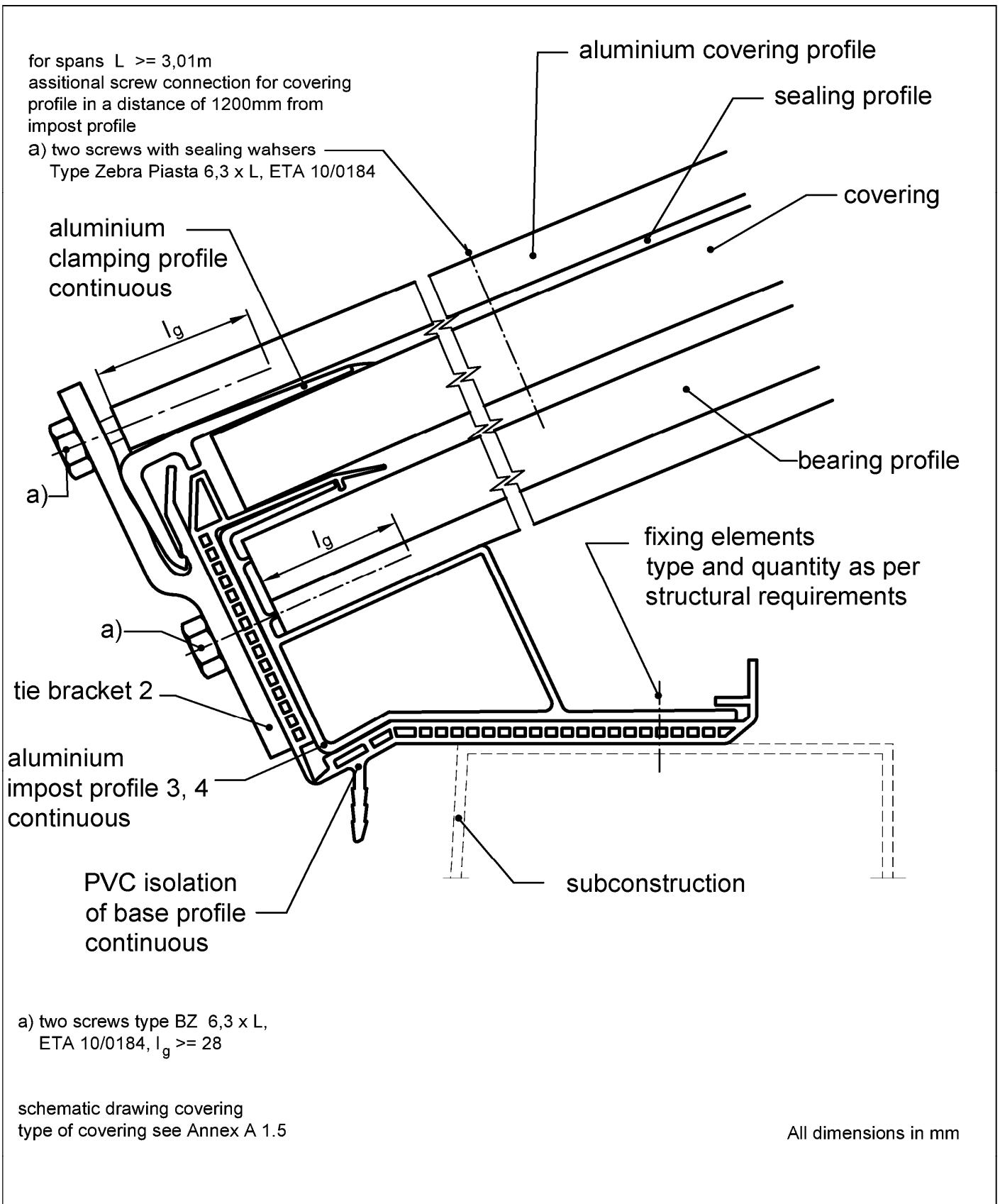
English translation prepared by DIBt



electronic copy of the eta by dibt: eta-17/0482

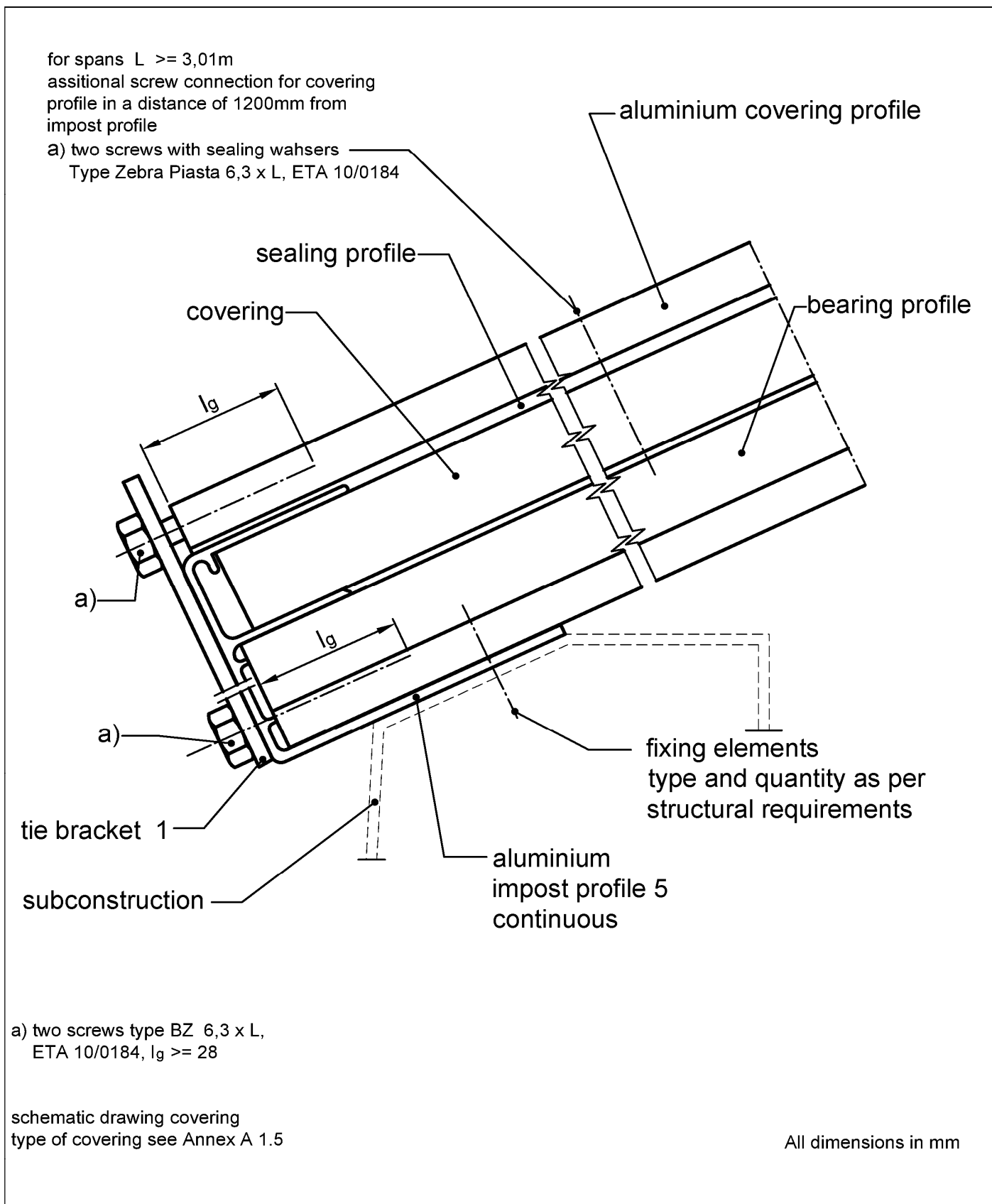
Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.2
Impost profile, section E-E, alternativ for the rooflight types "LB classic", "LB classic double"	

English translation prepared by DIBt



electronic copy of the eta by dibt: eta-17/0482

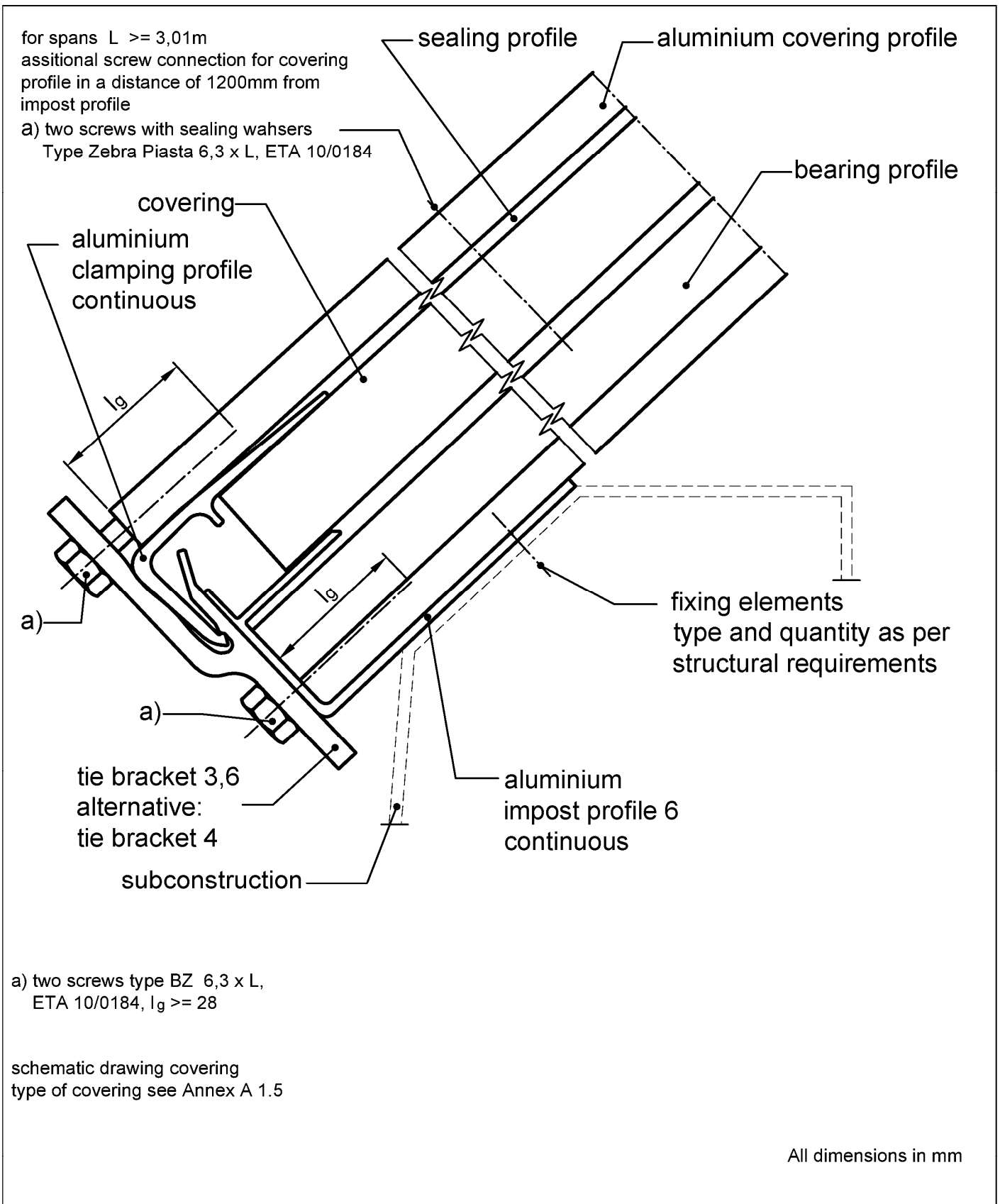
Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)	Annex A 2.3.3
Impost profile, section E-E for the rooflight types "LB classic plus" and "LB classic plus double"	



electronic copy of the eta by dibt: eta-17/0482

Essmann Continuous rooflight system curved (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"	

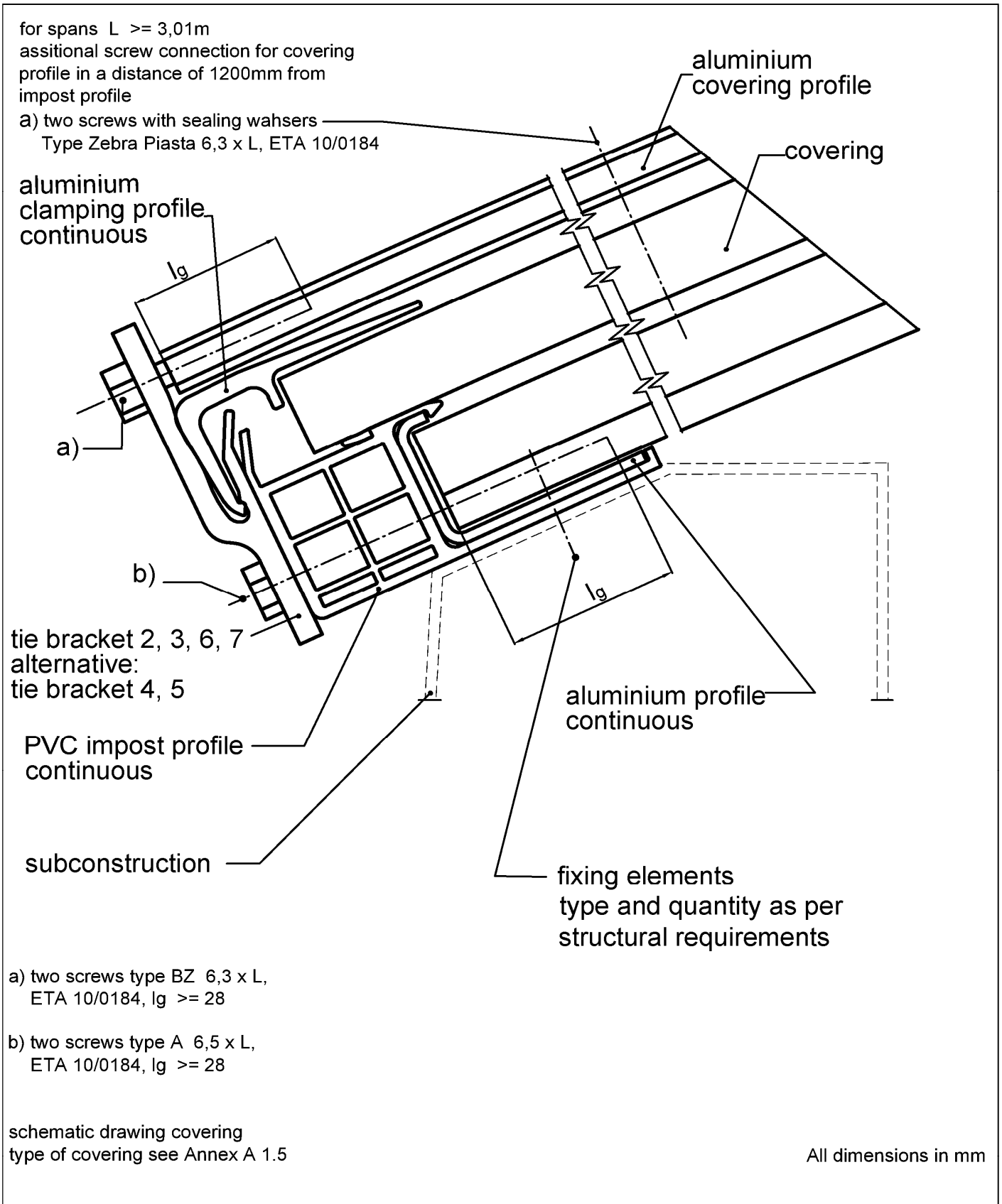
English translation prepared by DIBt



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Essmann Continuous rooflight system curved (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"	

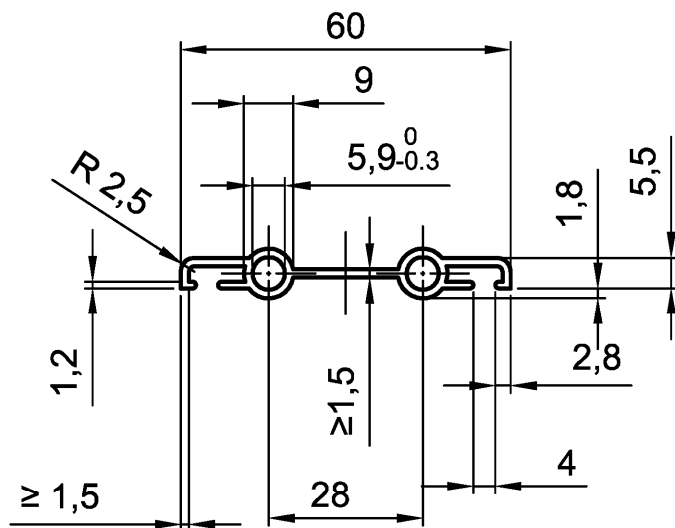
English translation prepared by DIBt



electronic copy of the eta by dibt: eta-17/0482

Essmann Continuous rooflight system curved (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"	

covering profile 1



EN AW-6060
condition T66

All dimensions in mm
Dimensions without tolerance:
as per EN 755-9

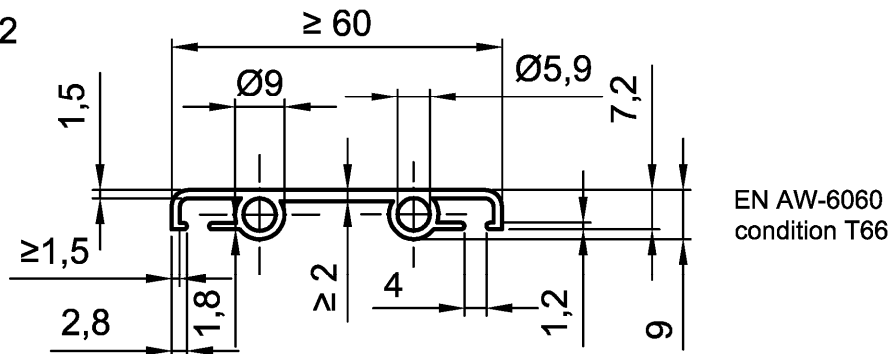
electronic copy of the eta by dibt: eta-17/0482

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

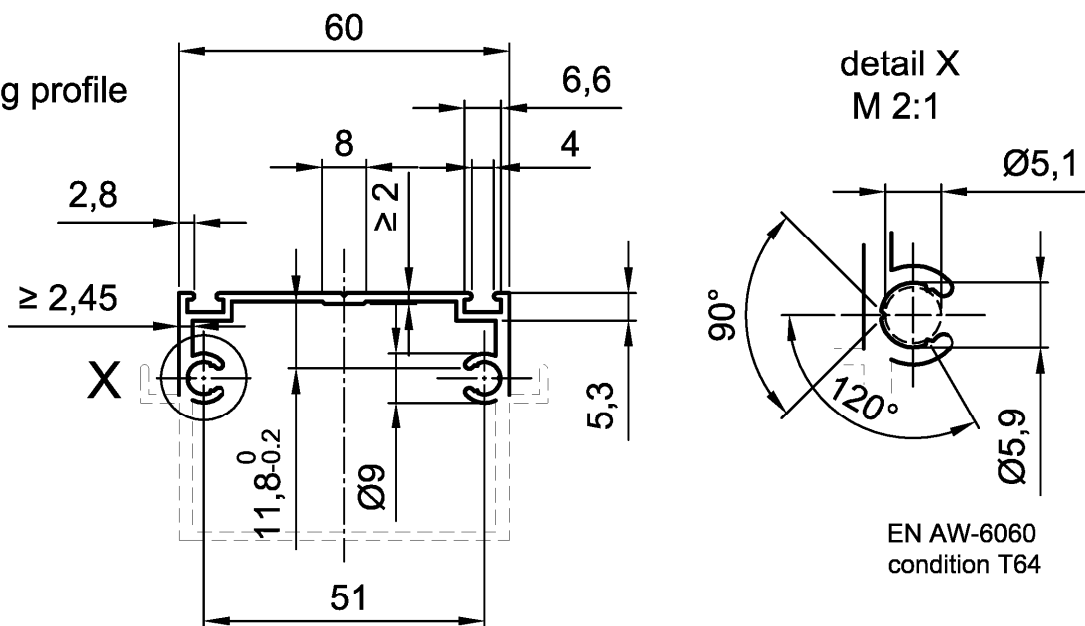
Covering profile 1

Annex A 3.1.1

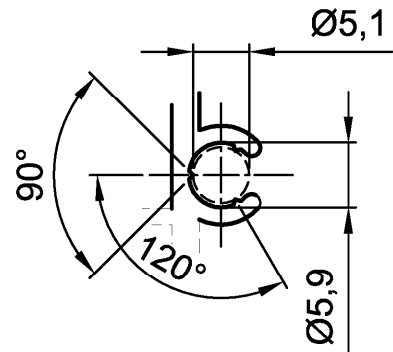
covering profile 2



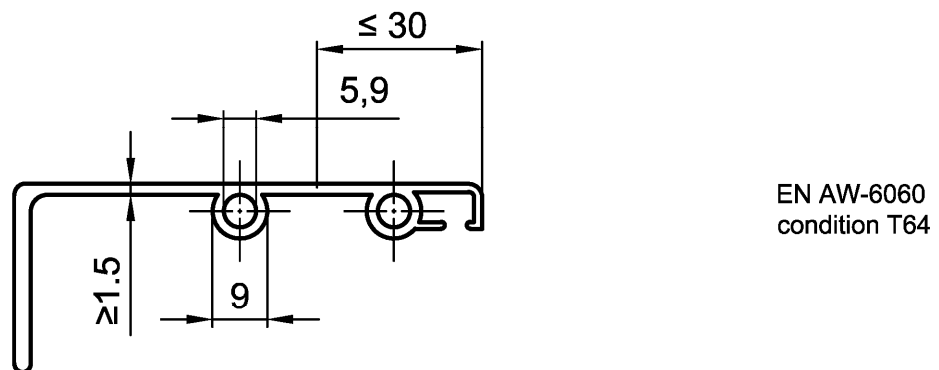
bearing profile



detail X
M 2:1



marginal covering profile



All dimensions in mm

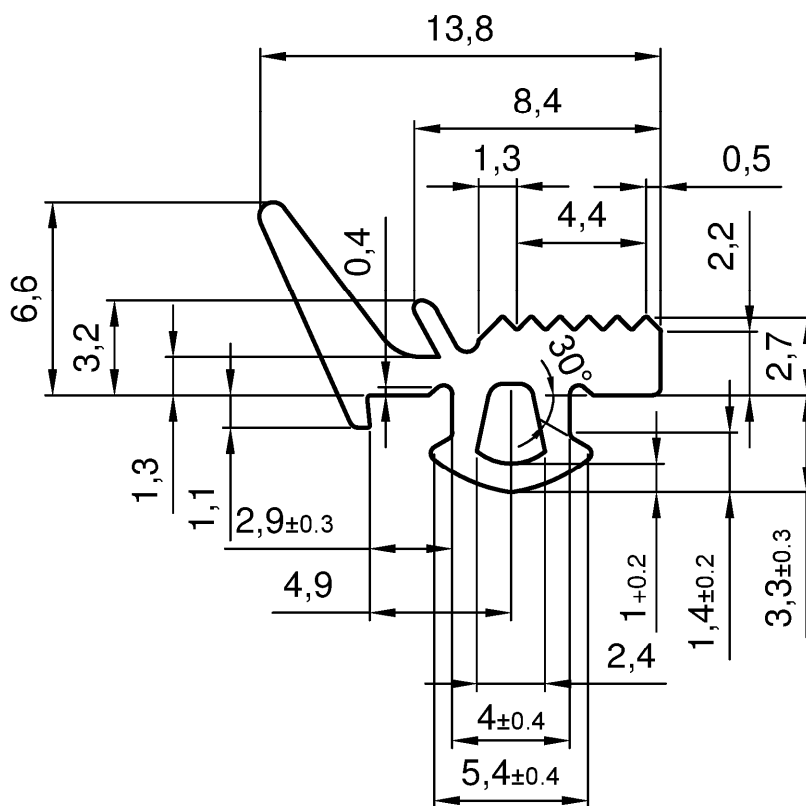
undimensioned wall thickness $\geq 1,5$

Dimensions without tolerance:
as per EN 755-9

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

Covering profile 2, bearing profile and marginal covering profile

Annex A 3.1.2



All dimensions in mm

EPDM as per DIN 7863

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

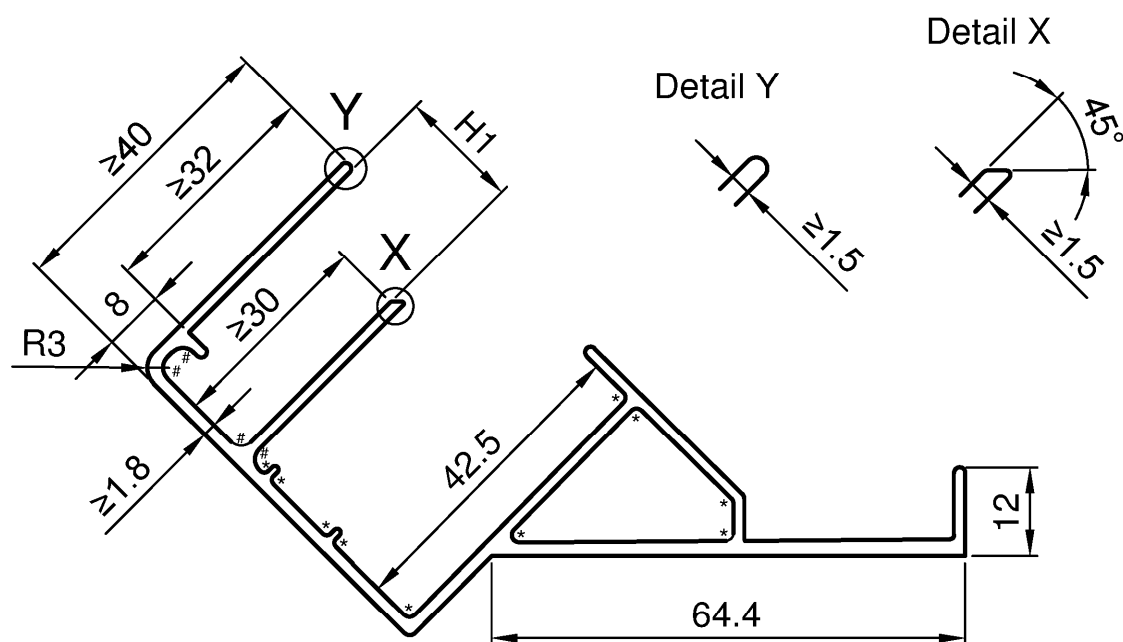
electronic copy of the eta by dibt: eta-17/0482

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

Sealing profile for all rooflight types

Annex A 3.1.3

impost profile 1



EN AW-6060
condition T66

All dimensions in mm

* = radius 1,0
= radius 2,0

undimensioned wall thickness $\geq 1,8$
undimensioned radius $R = 0,3$

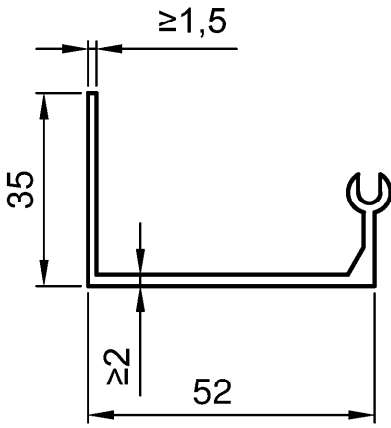
Dimensions without tolerance:
as per EN 755-9

electronic copy of the eta by dibt: eta-17/0482

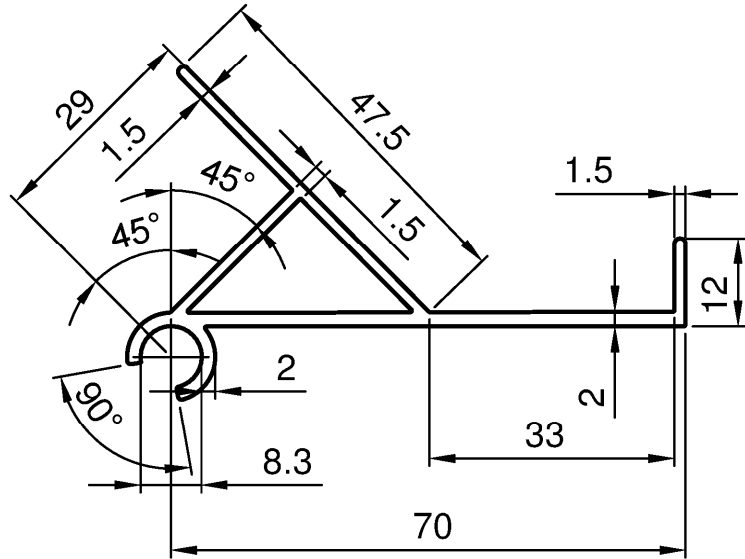
Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, LB plus)	Annex A 3.2.1
Impost profile 1	

English translation prepared by DIBt

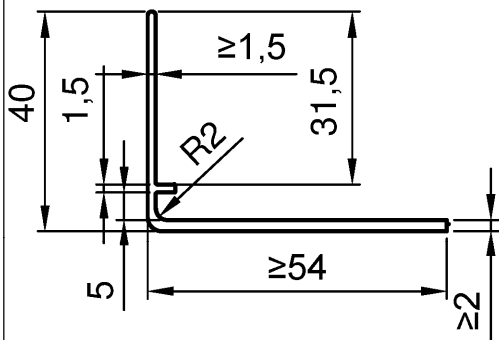
margin profile



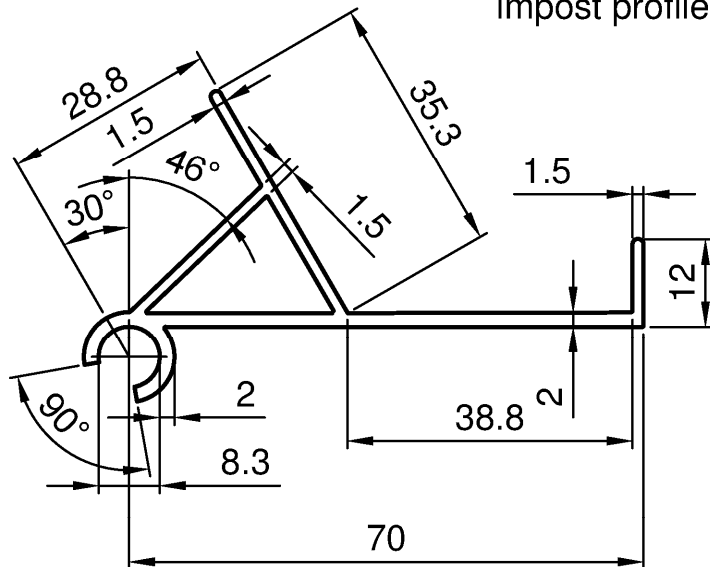
impost profile 2



covering angle



impost profile 7



EN AW-6060
condition T66

All dimensions in mm
undimensioned radii $R = 0,2$

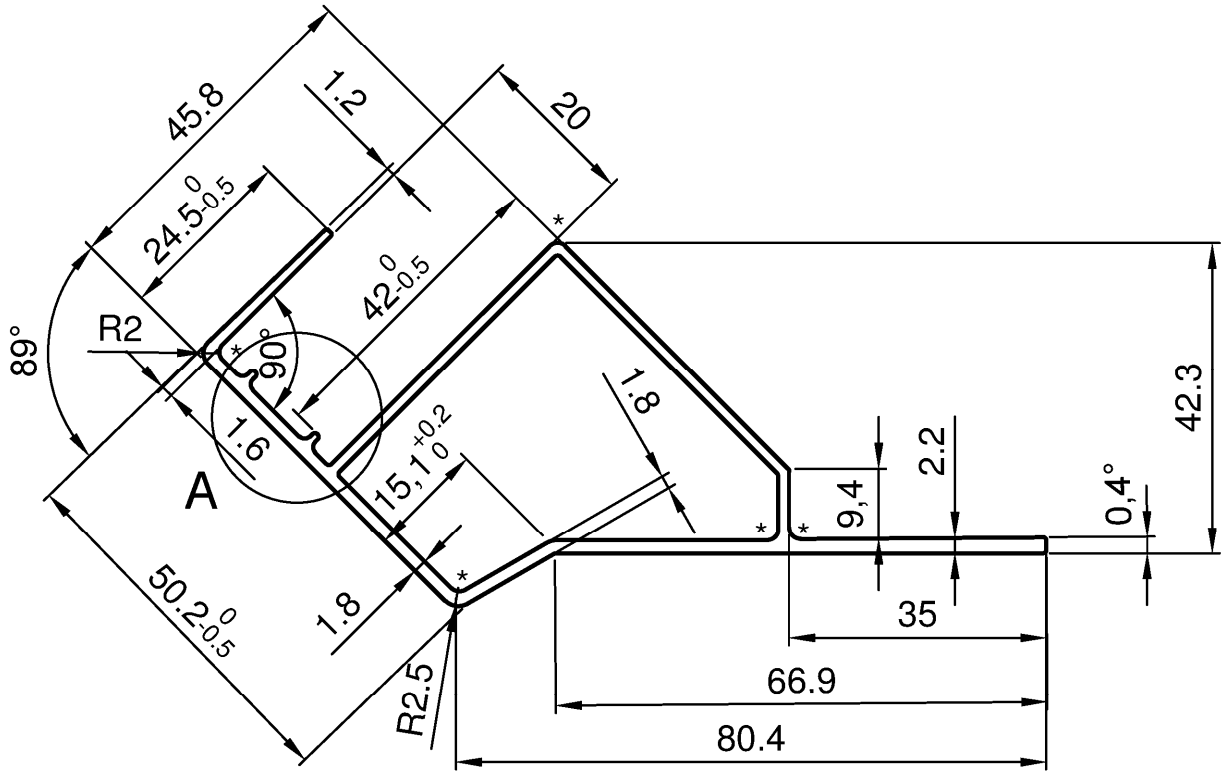
Dimensions without tolerance:
as per EN 755-9

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

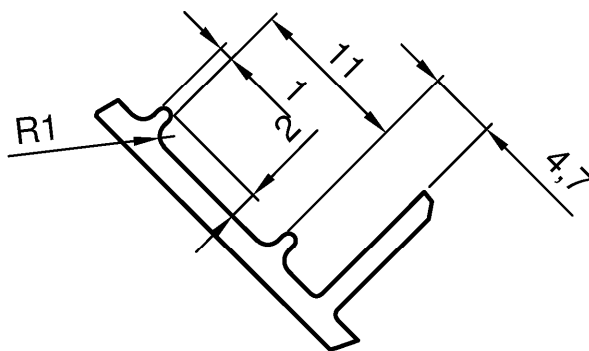
Impost profile 2 and 7, margin profile and covering angle

Annex A 3.2.2

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 $> 1,5$

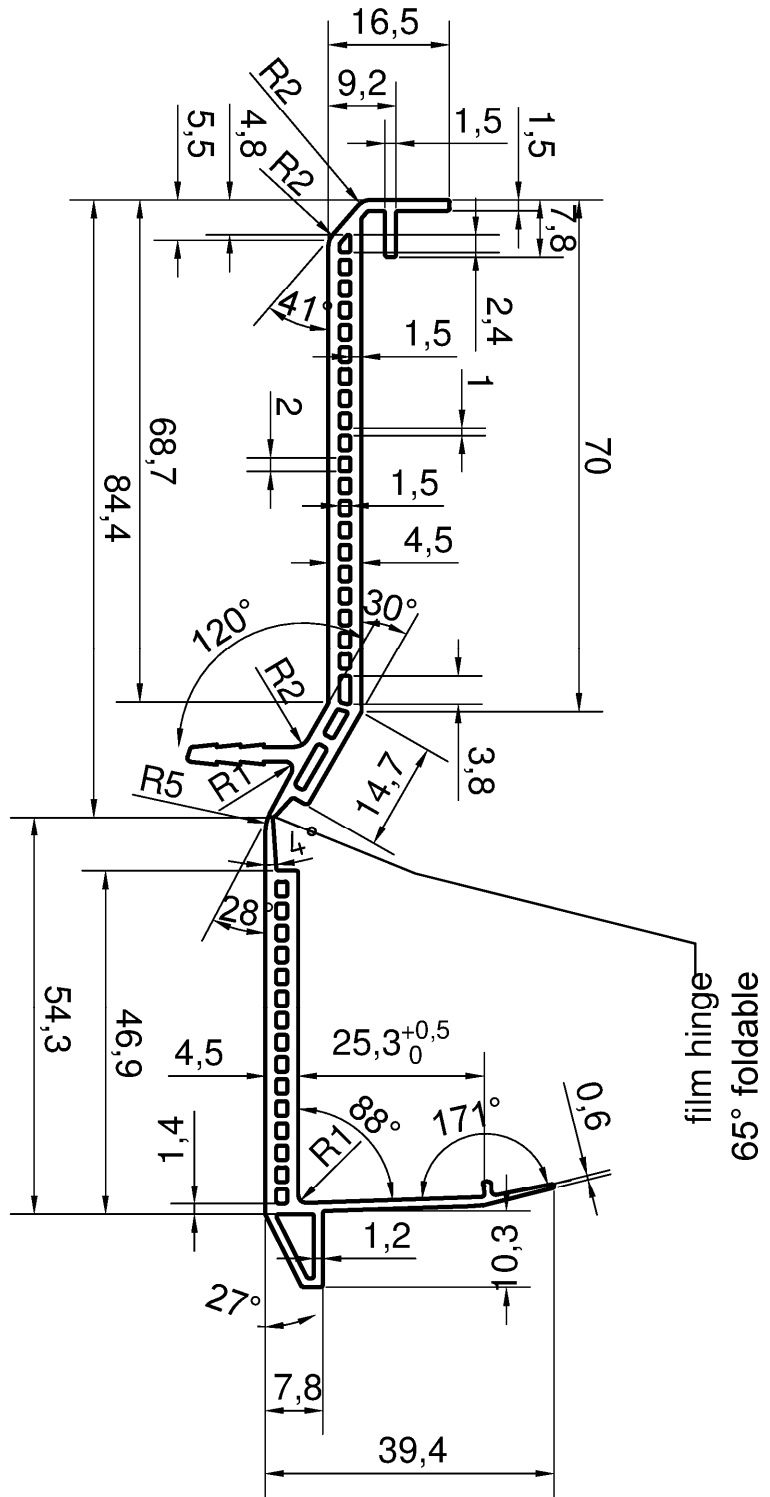
Dimensions without tolerance:
as per EN 755-9

electronic copy of the eta by dibt: eta-17/0482

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

Impost profile 3

Annex A 3.2.3



All dimensions in mm

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

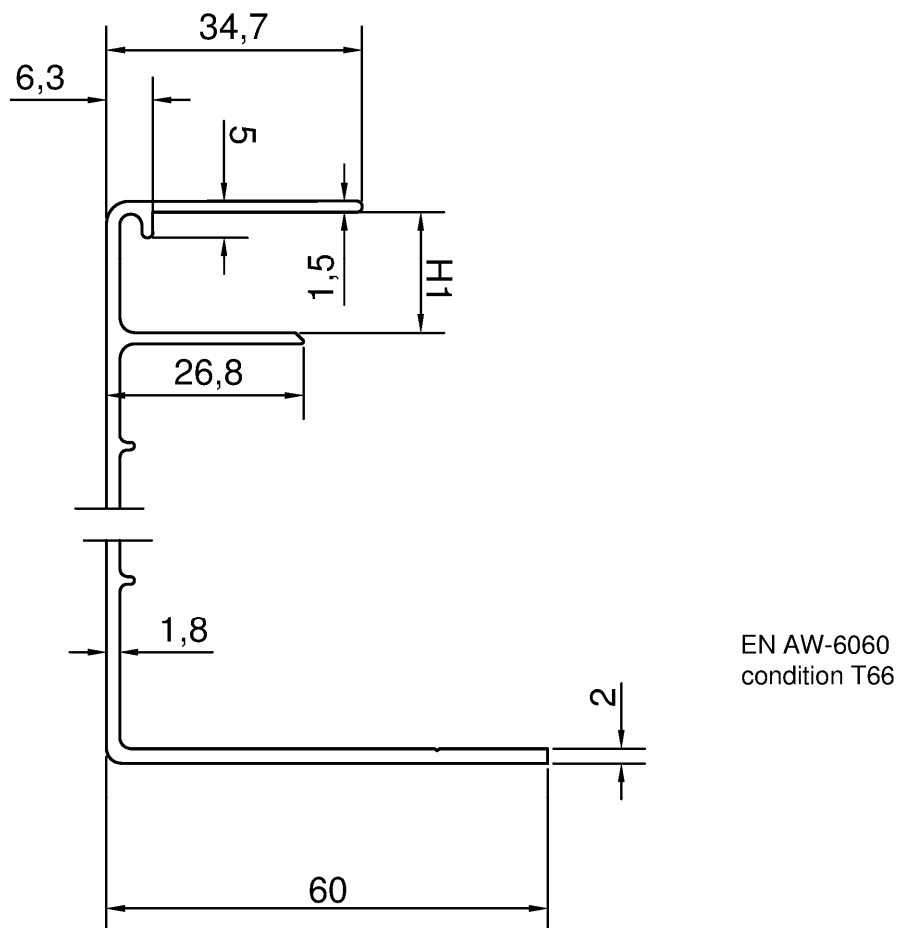
ISO 1163 - PVC - U, EP, 078 - 25 - 23

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

Base profile isolation

Annex A 3.2.5

impost profile 5



All dimensions in mm

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

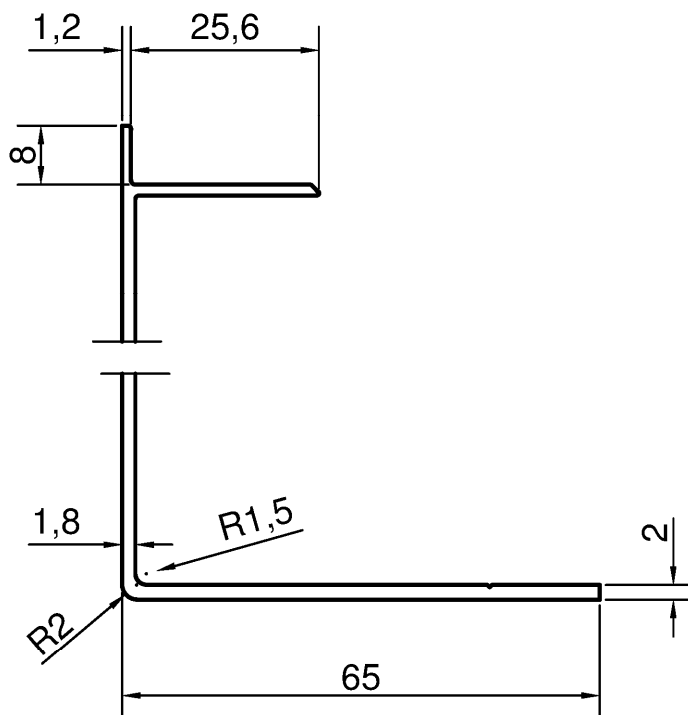
Dimensions without tolerance:
as per EN 755-9

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

Impost profile 5

Annex A 3.2.6

impost profile 6



EN AW-6060
condition T66

All dimensions in mm

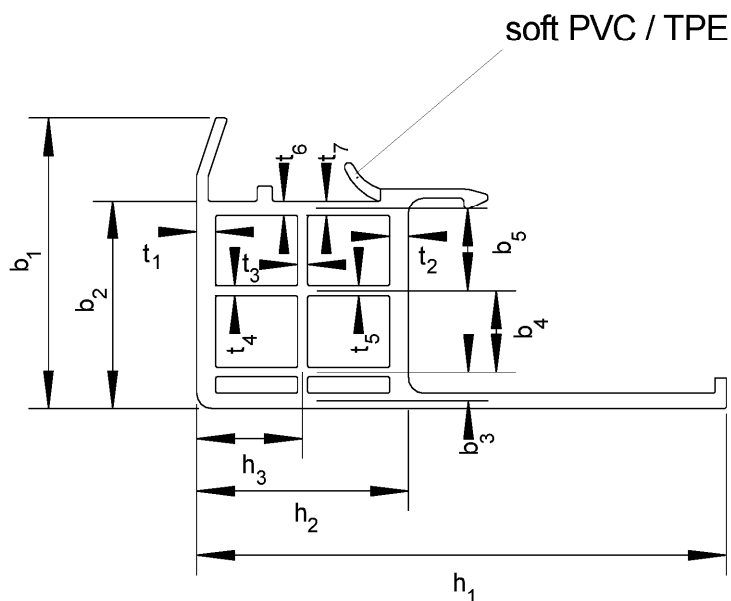
undimensioned radii $R = 0,5$
undimensioned wall thickness $> 1,5$

Dimensions without tolerance:
as per EN 755-9

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

Impost profile 6

Annex A 3.2.7



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

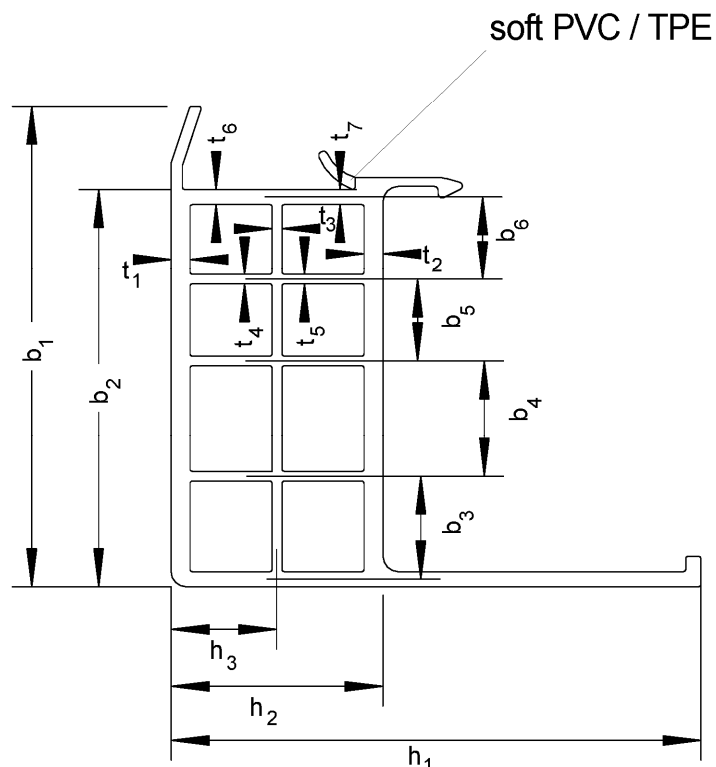
t_1 mm	t_2 mm	t_3 mm	t_4 mm	t_5 mm	t_6 mm	t_7 mm	weight per length kg/m
2,59	2,65	1,48	1,55	1,61	2,21	2,26	0,66
- 0,16	- 0,08	- 0,13	- 0,10	- 0,13	- 0,05	- 0,16	- 0,01

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

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

Impost profile PVC 1

Annex 3.2.8



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

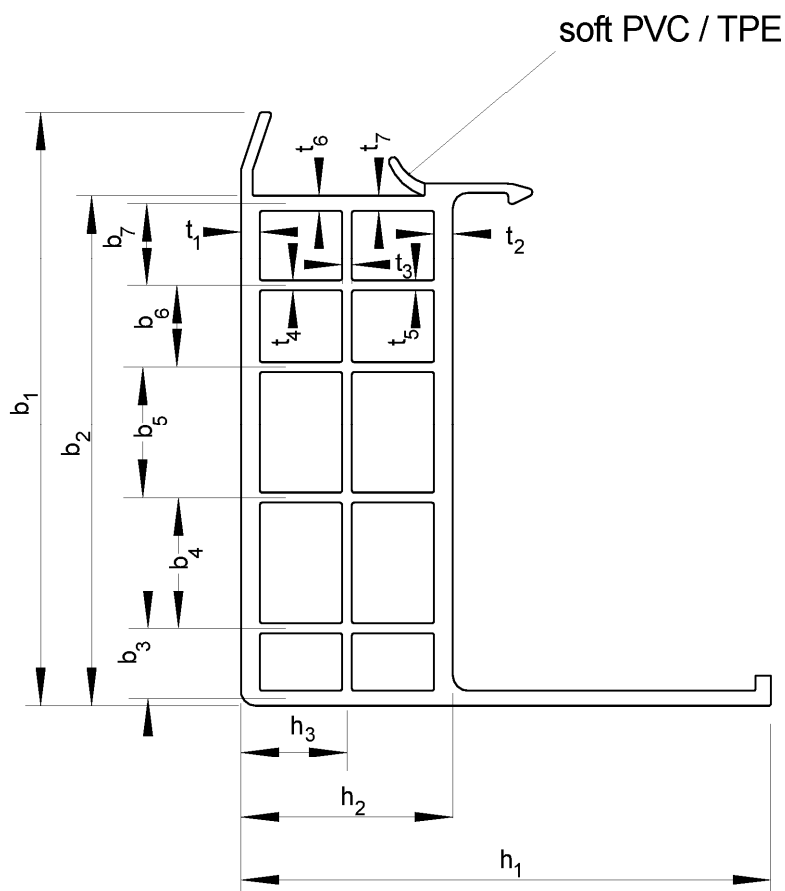
t_1 mm	t_2 mm	t_3 mm	t_4 mm	t_5 mm	t_6 mm	t_7 mm	weight per length kg/m
2,34	2,42	1,40	1,50	1,45	2,22	2,22	0,89
- 0,05	- 0,09	- 0,12	- 0,14	- 0,09	- 0,13	- 0,07	- 0,01

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

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

Impost profile PVC 2

Annex 3.2.9



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

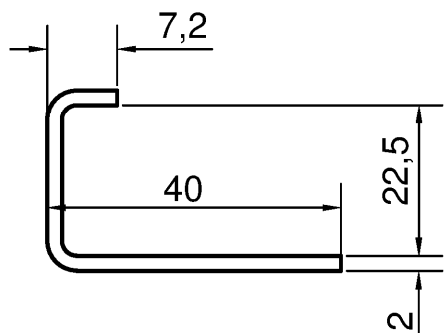
b_7 mm	t_1 mm	t_2 mm	t_3 mm	t_4 mm	t_5 mm	t_6 mm	t_7 mm	weight per length kg/m
11,3	2,50	2,58	1,44	1,40	1,36	2,31	2,29	1,08
+ 0,1 - 0,1	- 0,05	- 0,05	- 0,06	- 0,05	- 0,05	- 0,06	- 0,08	- 0,01

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

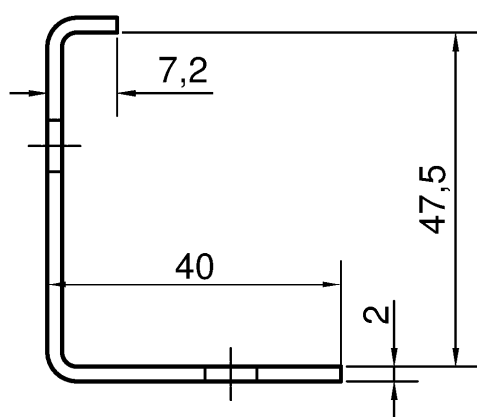
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Impost profile PVC 3

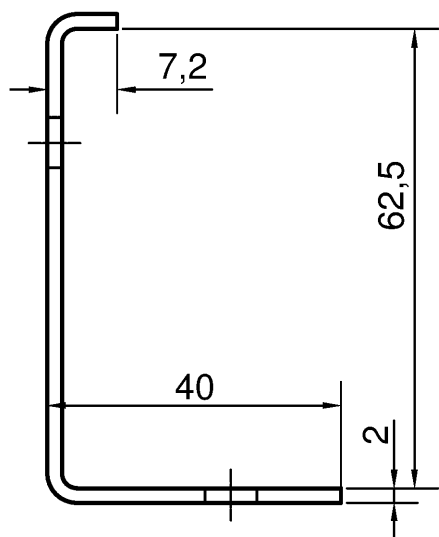
Annex 3.2.10



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

Dimensions without tolerance:
as per EN 755-9

EN AW-6060
condition T66

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

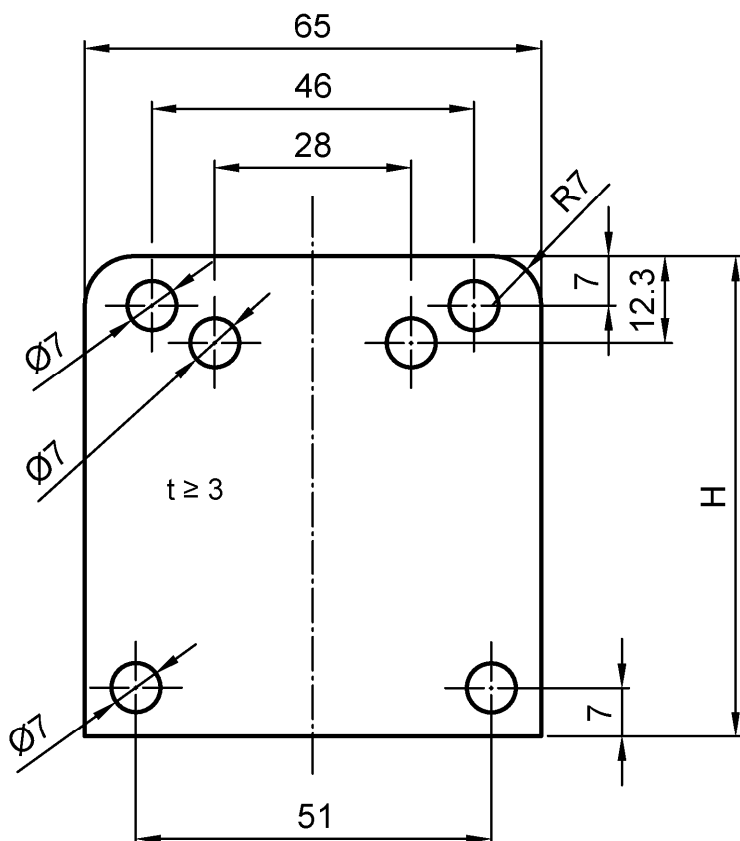
Stiffening profiles for impost profiles PVC

Annex 3.2.11

tie bracket 1

corrosion free steel
material Nr. 1.4016
as per EN 10088-2

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

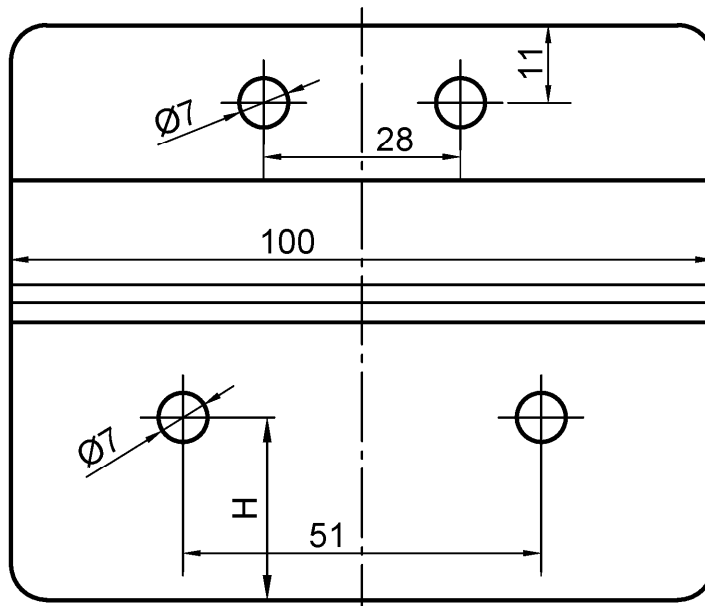
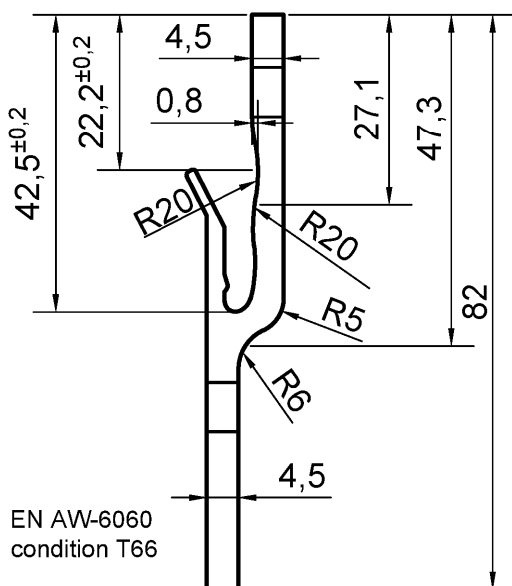
	LB classic	LB basic
covering	H	H
PC 10	51+X	51+X
PC 16	57+X	57+X
PC 20	61+X	----

	LB classic double
covering	H
PC 10 + PC 10	61+X
PC 16 + PC 10	67+X
PC 16 + 6 mm PETG	63+X
PC 16 + PC 16	73+X

All dimensions in mm

English translation prepared by DIBt

tie bracket 2



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

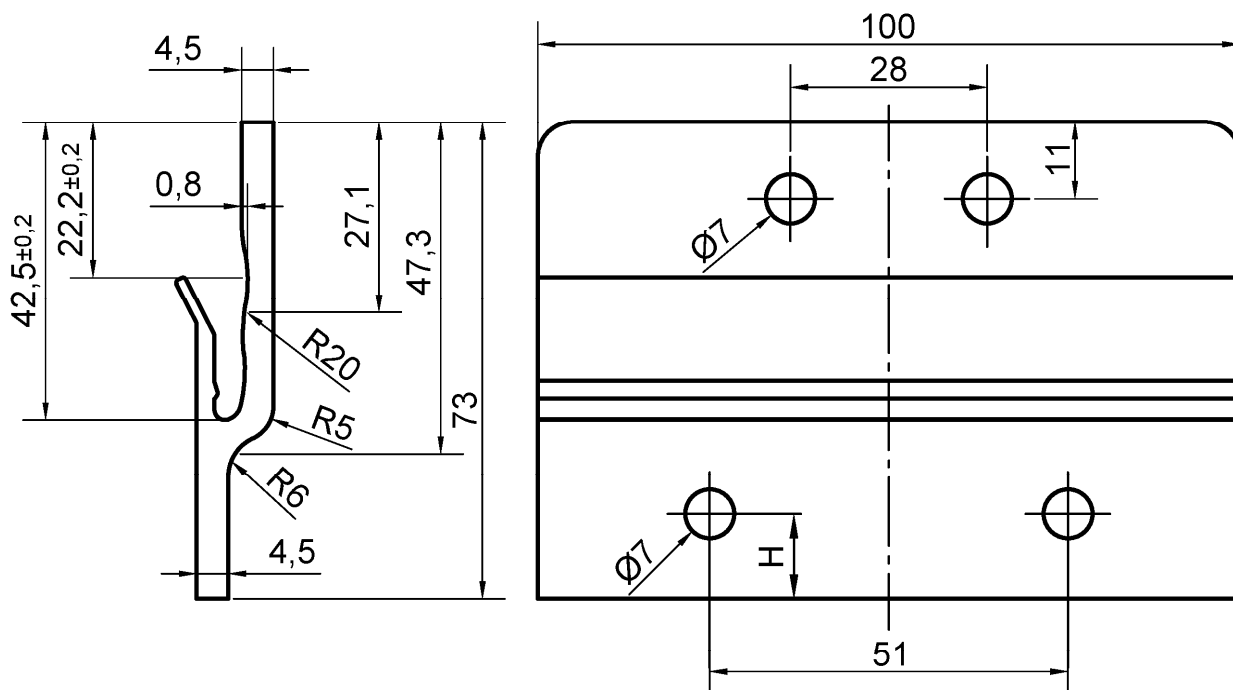
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Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Tie bracket 2

Annex 3.3.2

tie bracket 3



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

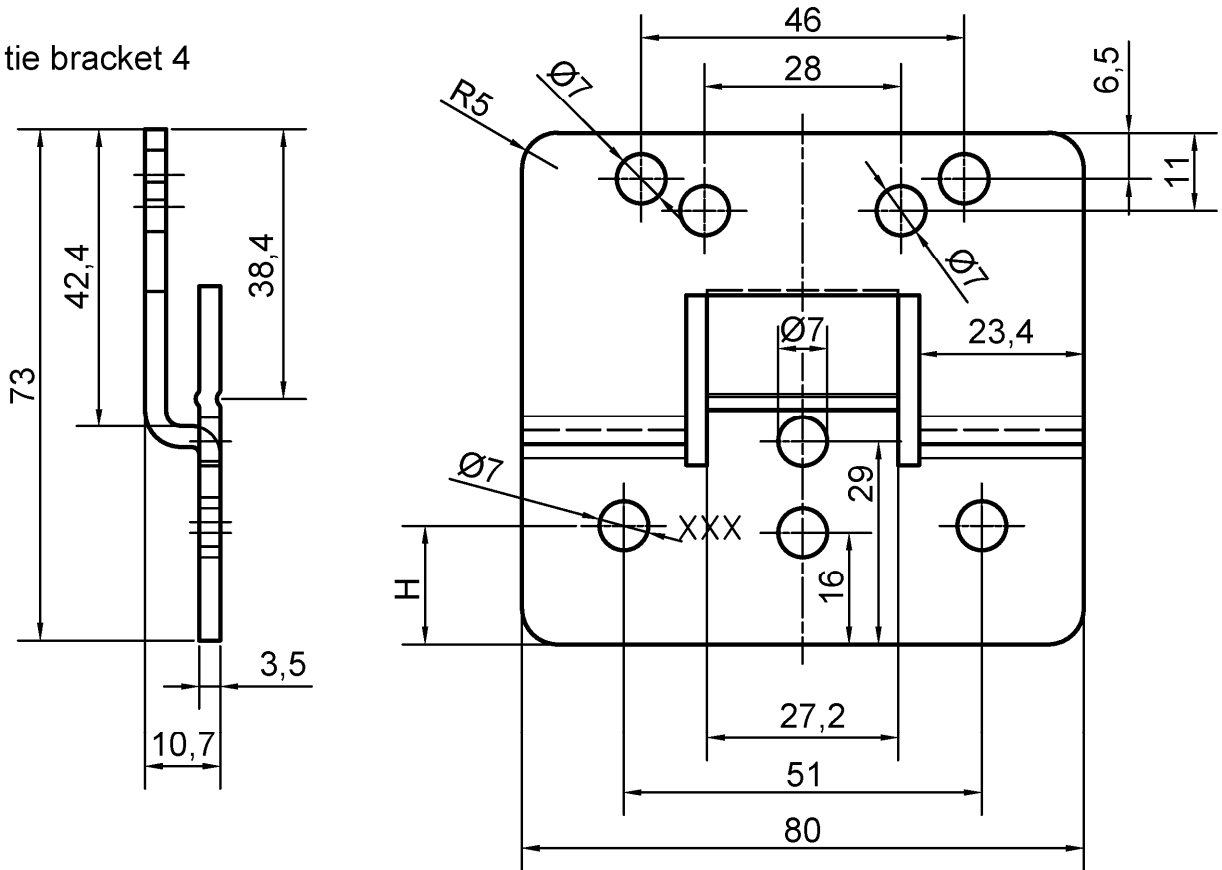
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Tie bracket 3

Annex 3.3.3

English translation prepared by DIBt

tie bracket 4



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
PC 16 + 6mm PETG	11-X	15-X
PC 16 + PC 10	----	11-X

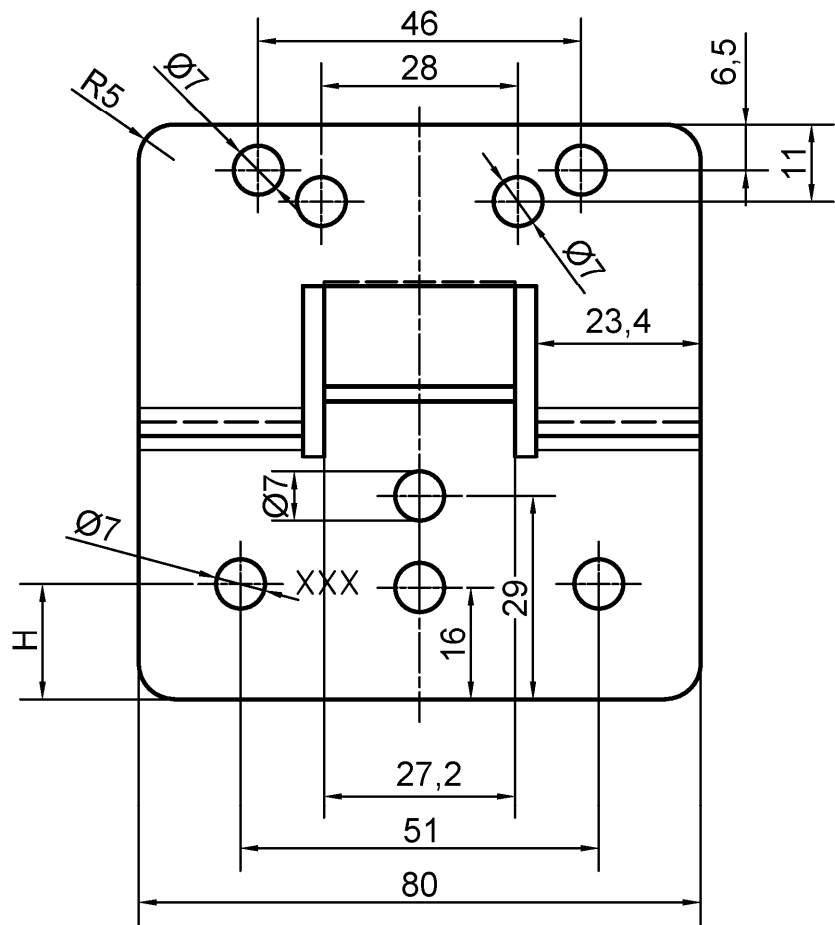
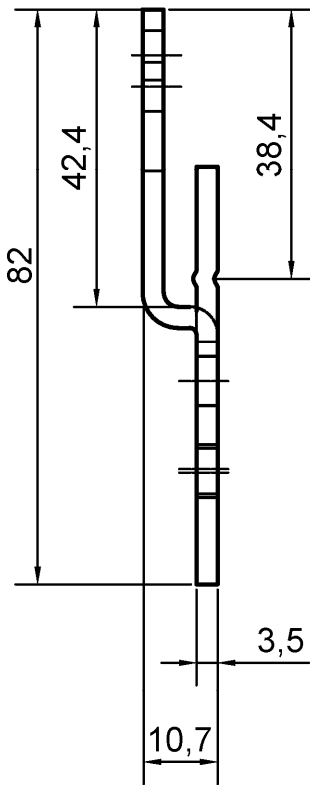
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Tie bracket 4

Annex 3.3.4

English translation prepared by DIBt

tie bracket 5



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

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

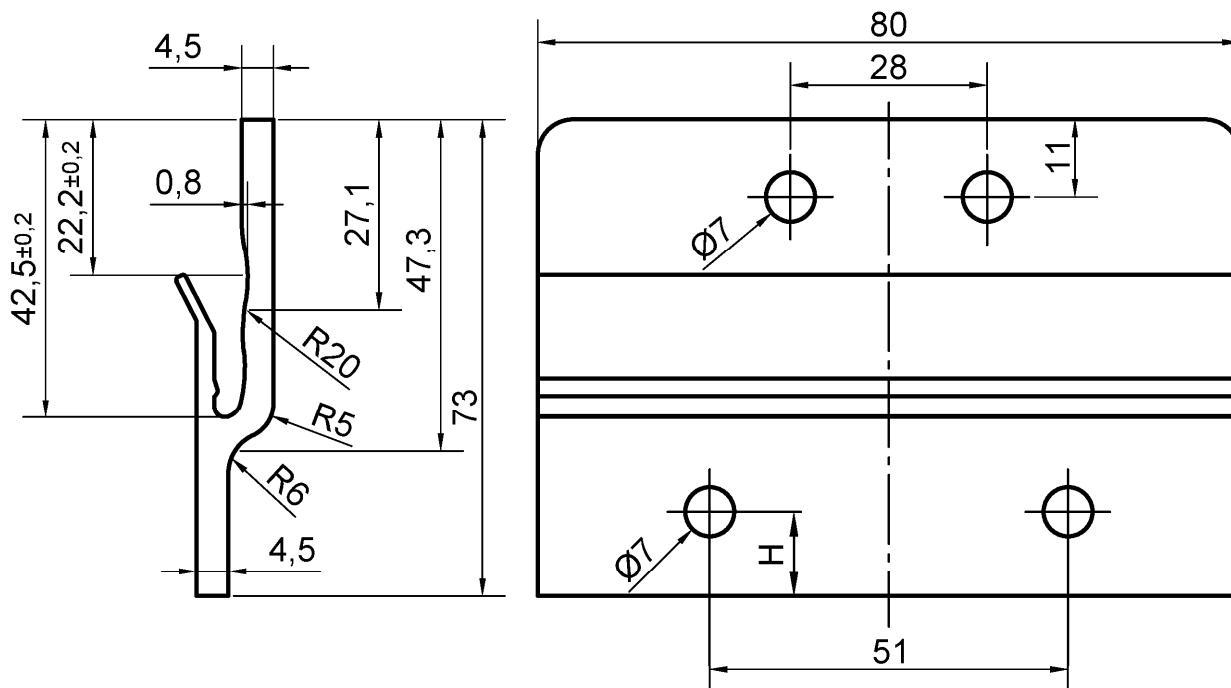
electronic copy of the eta by dibt: eta-17/0482

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

Tie console "LB plus", "LB basic" for rooflight types "LB plus",
"LB plus double", "LB basic" and "LB basic double"

Annex 3.3.5

tie bracket 6



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

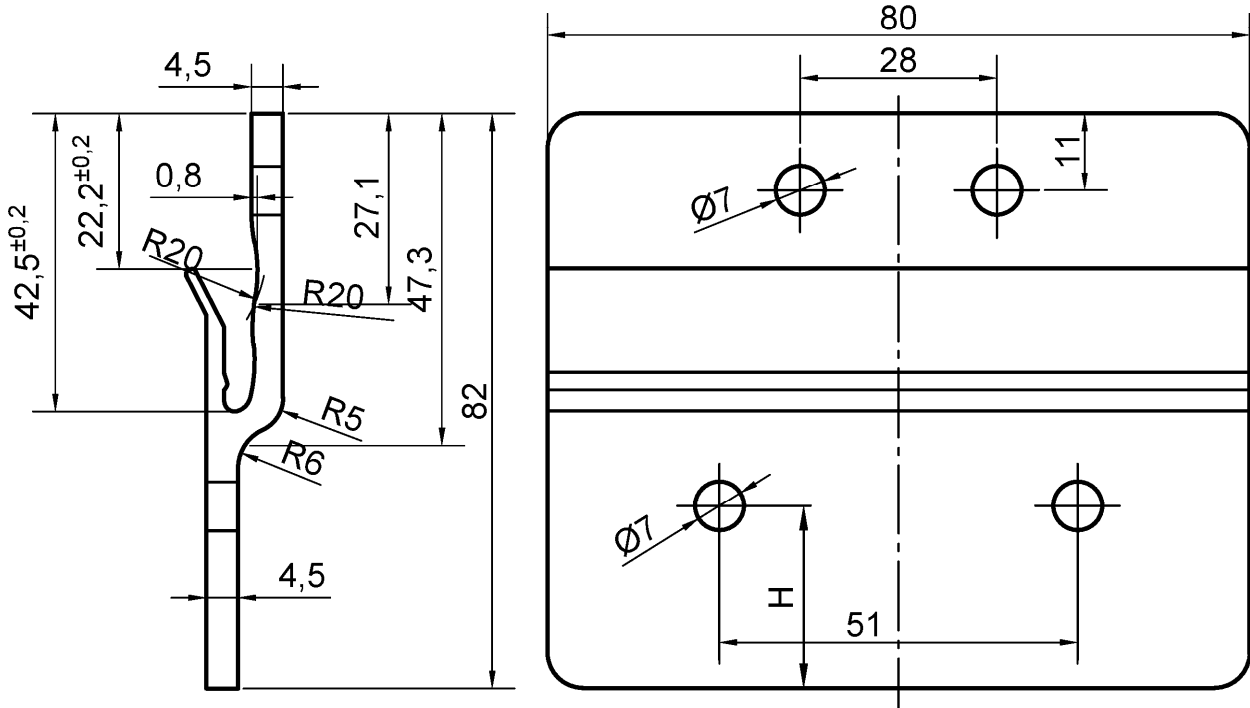
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Tie bracket 6

Annex 3.3.6

English translation prepared by DIBt

tie bracket 7



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

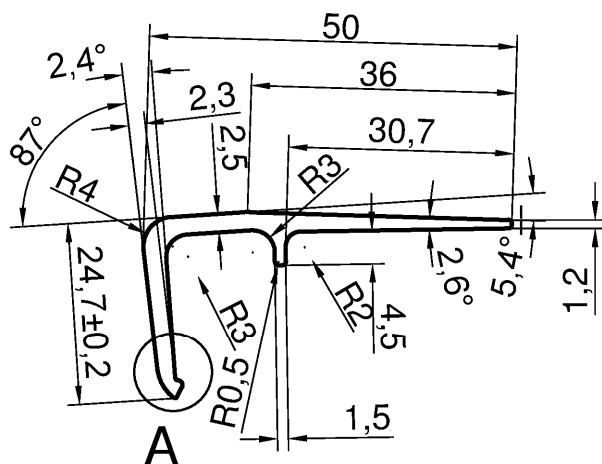
<u>adding plates:</u>	
glass veil	X= 0mm
aluminium	X= 1mm
solid sheet	X= 2mm to 4mm
GRP	X= 1mm/ 2mm

electronic copy of the eta by dibt: eta-17/0482

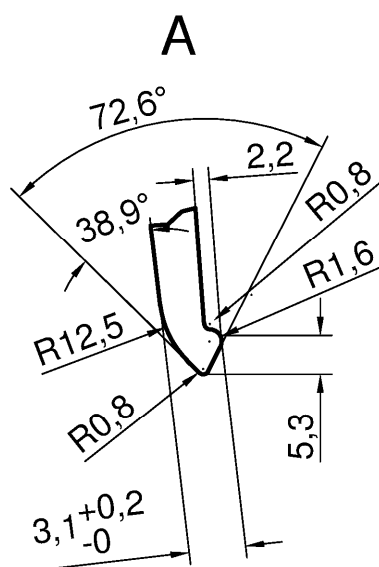
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Tie bracket 7

Annex 3.3.7



EN AW-6060
condition T66



All dimensions in mm
undimensioned radii $R = 0,5$

Dimensions without tolerance:
as per EN 755-9

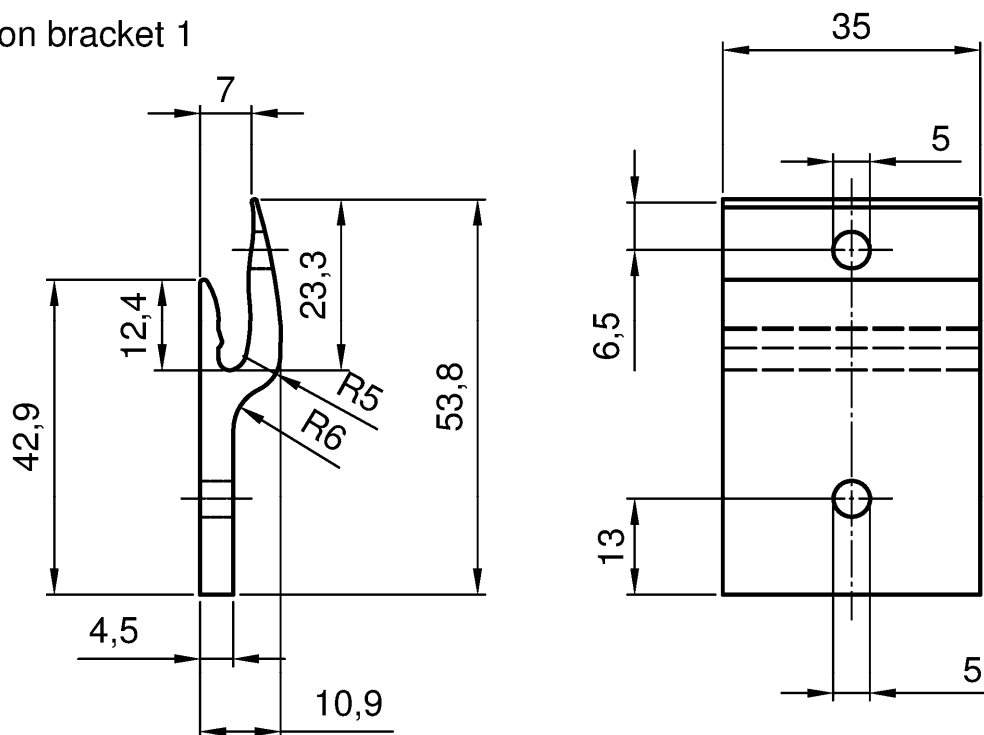
electronic copy of the eta by dibt: eta-17/0482

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

Clamping profile for rooflight types "LB classic plus", "LB classic plus double",
"LB plus" and "LB plus double", "LB basic", "LB basic double"

Annex 3.4.1

fixation bracket 1



EN AW-6060
condition T66

All dimensions in mm
undimensioned radii $R = 0,3$

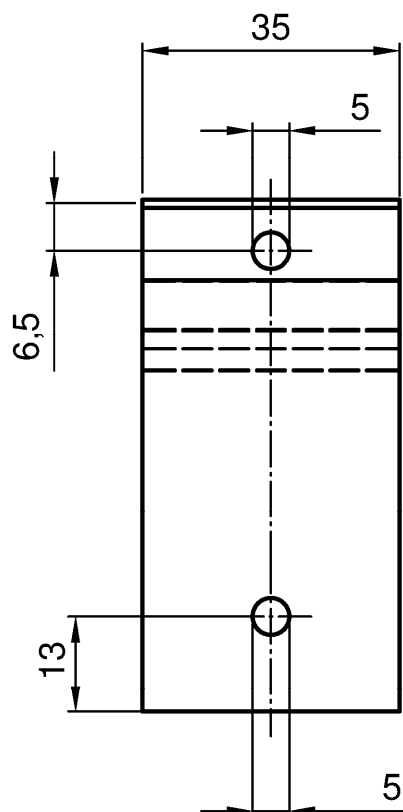
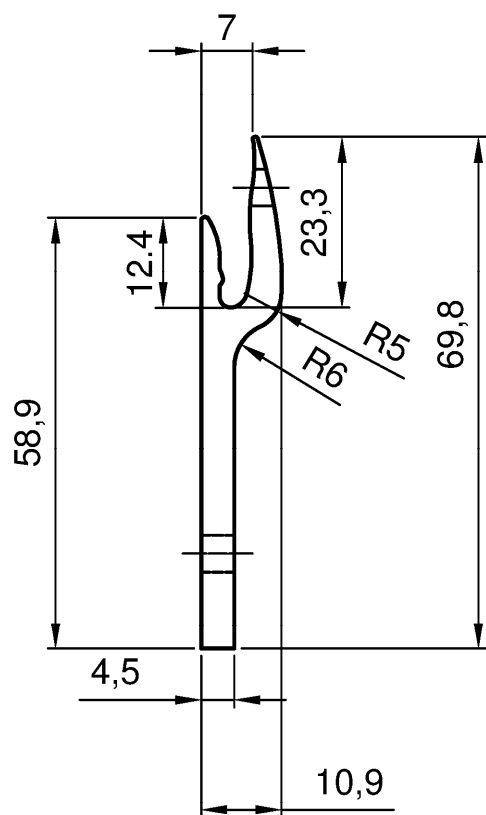
Dimensions without tolerance:
as per EN 755-9

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

Fixation bracket 1

Annex 3.4.2

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

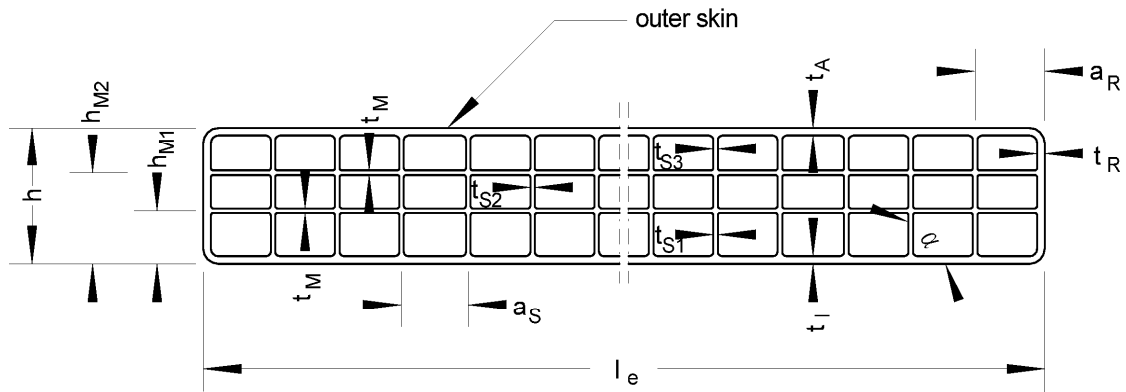
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Fixation bracket 2

Annex 3.4.3

English translation prepared by 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/m ²	difference $ \Delta\alpha $ to 90°
0,05	0,51	1,81	
-0,01	-0,21	-0,04	$\leq 2^\circ$

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 Nm ² /m	26,5 Nm ² /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

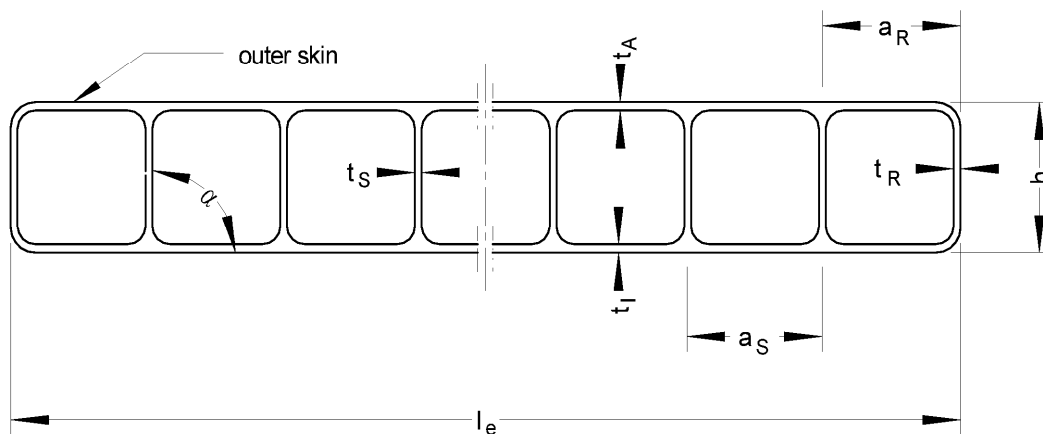
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Kingspan Multiwall 10-4"

Annex A 4.1

English translation prepared by 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_l mm	t_s mm	t_R mm	weight per area kg/m ²	difference $ \Delta\alpha $ 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 Nm ² /m	35,1 Nm ² /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

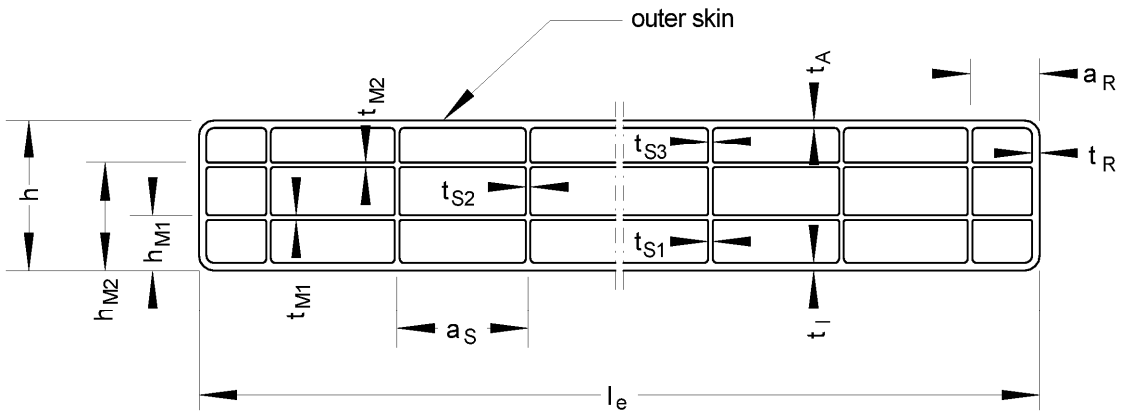
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Akyver Sun Type 10"

Annex A 4.2

English translation prepared by 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/m ²	difference $ \Delta\alpha $ 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 Nm ² /m	40,2 Nm ² /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 % (ΔA)	5 % (ΔA)	Cu 1	Ku 1

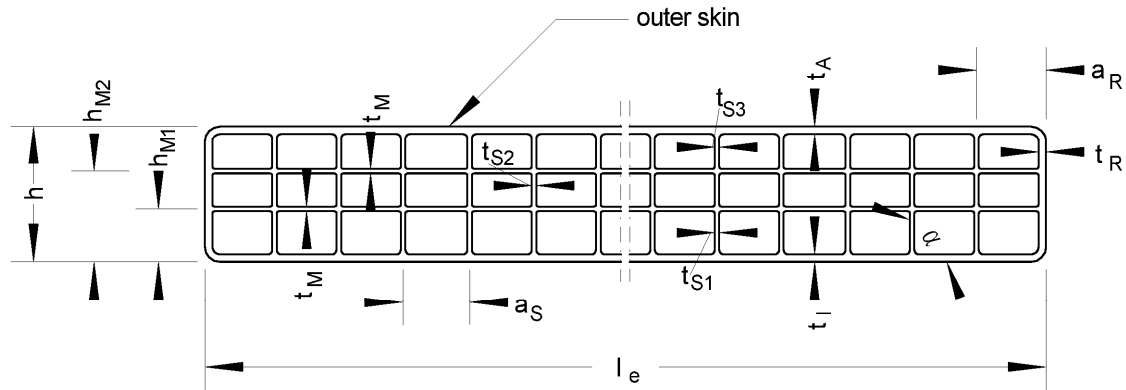
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Akyver Sun Type 10/4w-7"

Annex A 4.3

English translation prepared by 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/m ²	difference $ \Delta\alpha $ 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 Nm ² /m	23,1 Nm ² /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

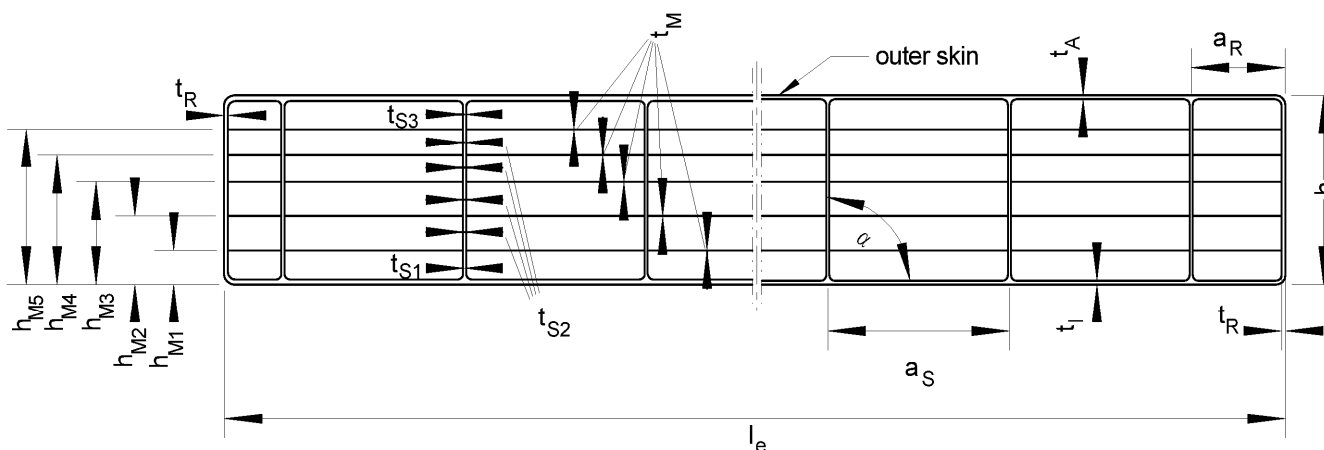
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Makrolon multi UV 4/10-6"

Annex A 4.4

English translation prepared by 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/m ²
1200	15,9	3,2	5,4	7,6	10,1	12,8	13,8	12,0	2,75
+6 -2	± 0,5	+ 0,2 - 0,2	+ 0,4 - 0,3	+ 0,5 - 0,4	+ 0,7 - 0,3	+ 0,8 - 0,2	+ 0,2	+ 1,3	+ 0,16 - 0,03

t_A mm	t_l mm	t_{s1} mm	t_{s2} mm	t_{s3} mm	t_M mm	t_R mm	difference $ \Delta\alpha $ to 90°
0,62	0,65	0,34	0,41	0,34	0,10	0,59	
- 0,07	- 0,10	- 0,07	- 0,03	- 0,07	- 0,01	- 0,10	≤ 1°

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	$M_{b,pos}$	$M_{b,neg}$
171,0 Nm ² /m	45,9 Nm ² /m	2722 N/m	60,6 Nm/m	47,2 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

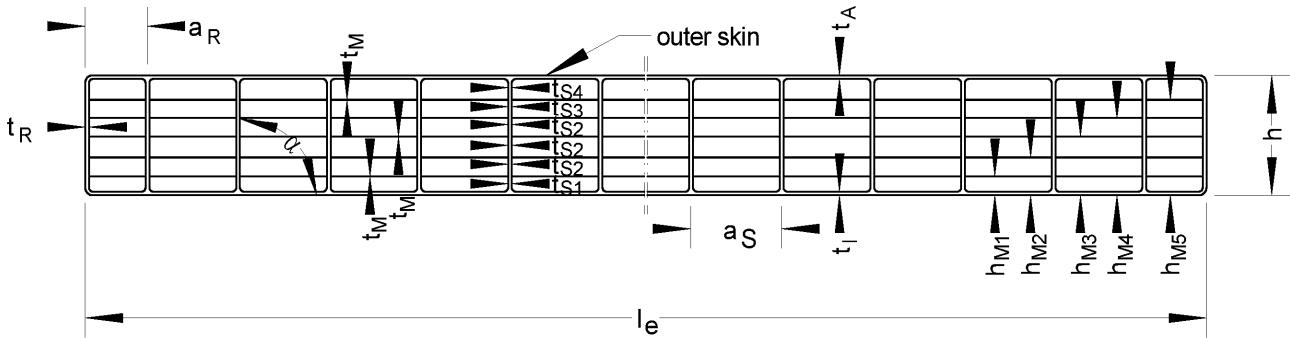
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Kingspan Multiwall 16-7"

Annex A 4.5

English translation prepared by 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	$\pm 0,5$	+ 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/m ²	difference $ \Delta\alpha $
0,41	0,39	0,44	0,44	0,06	0,58	2,56	to 90°
- 0,10	- 0,12	- 0,09	- 0,10	- 0,02	- 0,27	+ 0,15 - 0,09	$\leq 4^\circ$

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 Nm ² /m	58,8 Nm ² /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

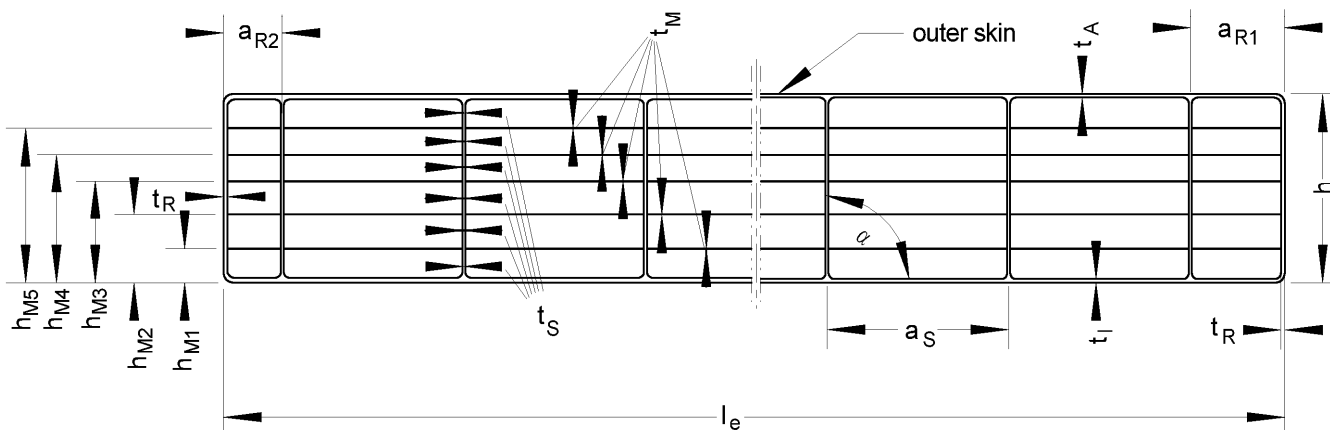
Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 % (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system curved
(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
"Akyver Sun Type 16/7w-12 2600"

Annex A 4.6

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/m ²
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 $ \Delta\alpha $ 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 Nm ² /m	70,1 Nm ² /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

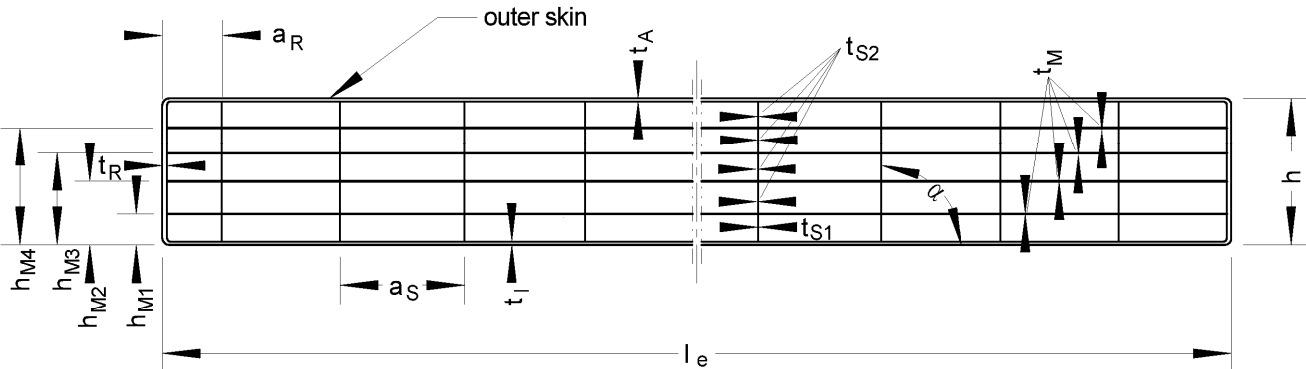
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

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

English translation prepared by 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	$\pm 0,5$	+ 0,25 - 0,15	+ 0,25 - 0,3	+ 0,35 - 0,25	$\pm 0,25$	+ 0,45	+ 1,15	- 0,05	- 0,08

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

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 Nm ² /m	28,0 Nm ² /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

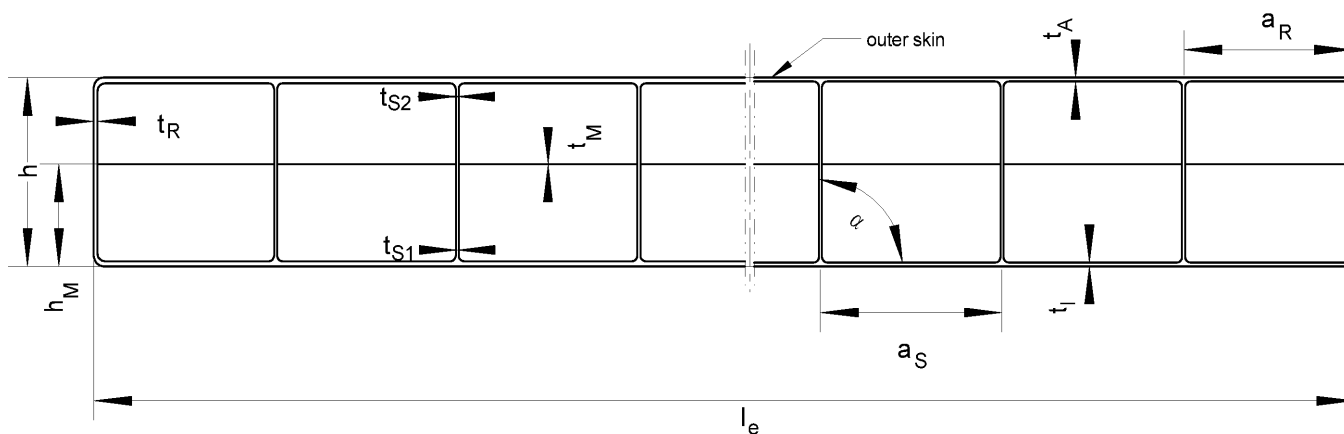
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Makrolon multi UV 6/16-20"

Annex A 4.8

English translation prepared by 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/m ²
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 $ \Delta\alpha $ to 90°
0,27	0,37	≤ 7°
- 0,03	- 0,14	

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 Nm ² /m	101,4 Nm ² /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

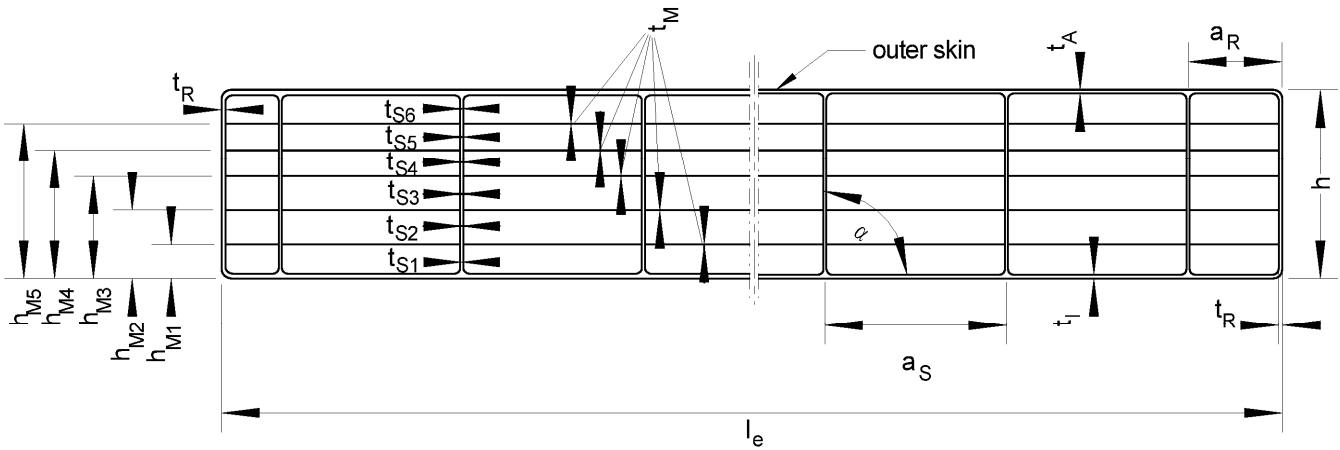
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"IMPEX MULTIWALL 16/3w"

Annex A 4.9

English translation prepared by 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/m ²	difference $ \Delta\alpha $ to 90°
1200	20,3	4,0	7,0	10,3	13,2	16,6	13,8	11,1	2,97	
+6 -2	$\pm 0,5$	+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	$\leq 1^\circ$

t_A mm	t_l 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 Nm ² /m	70,7 Nm ² /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

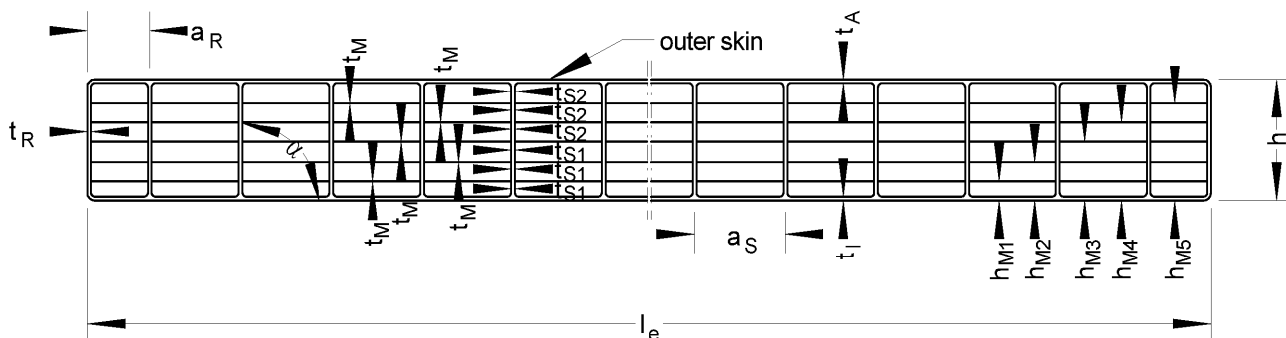
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Kingspan Multiwall 20-7"

Annex A 4.10

English translation prepared by 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/m ²
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 Nm ² /m	100,1 Nm ² /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

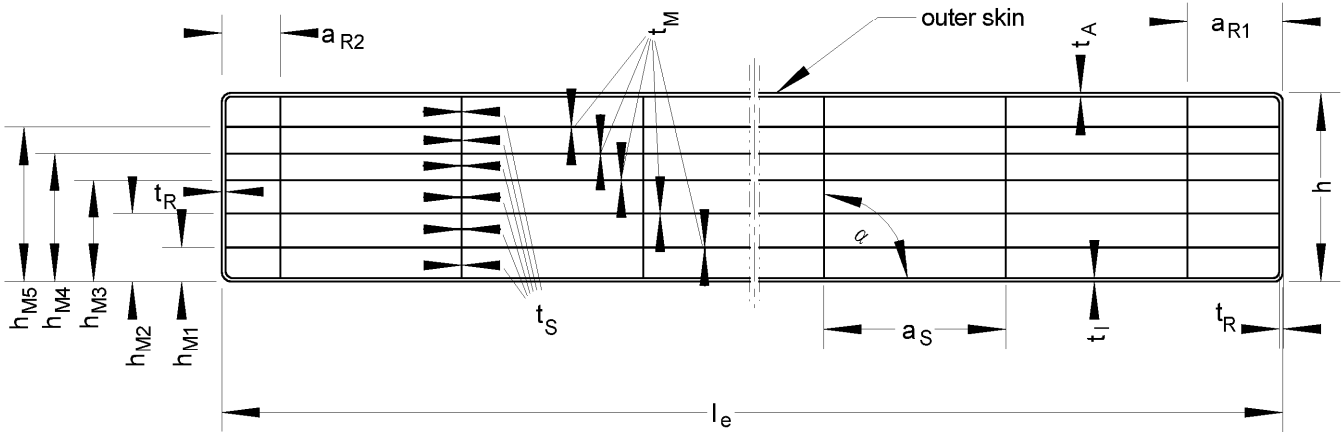
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Akyver Sun Type 20/7w-12"

Annex A 4.11

English translation prepared by 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/m ²
2100	19,6	3,6	6,6	9,6	12,6	15,9	13,8	8,0	2,85
+6 -2	$\pm 0,5$	+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 $ \Delta\alpha $ to 90°
0,63	0,65	0,33	0,07	0,85	
-0,07	-0,09	-0,07	-0,02	-0,43	$\leq 6^\circ$

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 Nm ² /m	56,6 Nm ² /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

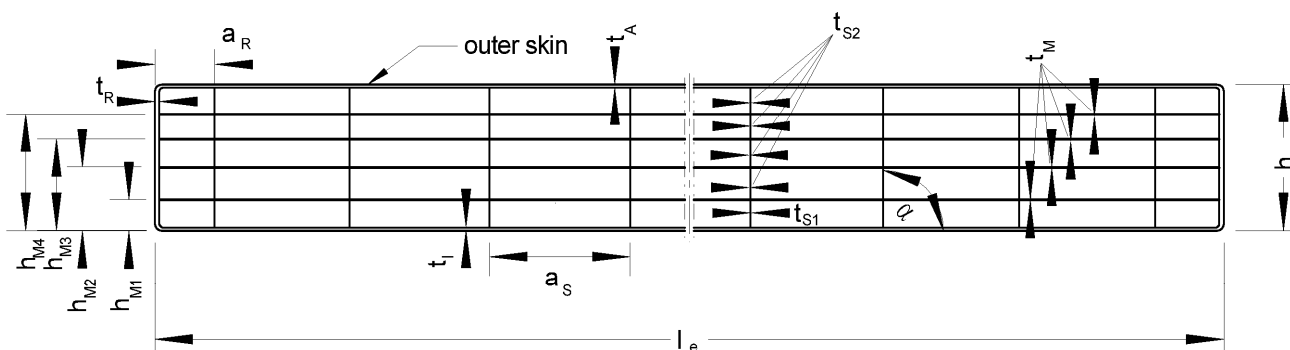
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

Geometry/ weight per area, Minimum performance levels or classes
for the sheets in accordance with EN 16153
"Makrolon multi UV 7/20-14"

Annex A 4.12

English translation prepared by DIBt

Sheet: Makrolon multi UV 620-20
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_l mm
2100	20,5	3,9	7,1	11,0	15,5	19,5	18,0	0,96	0,87
+6 -2	$\pm 0,5$	+ 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/m ²	difference $ \Delta\alpha $ to 90°
0,47	0,33	0,06	0,44	3,05	
- 0,06	- 0,14	- 0,03	- 0,14	+ 0,18 - 0,07	$\leq 4^\circ$

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 Nm ² /m	30,8 Nm ² /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

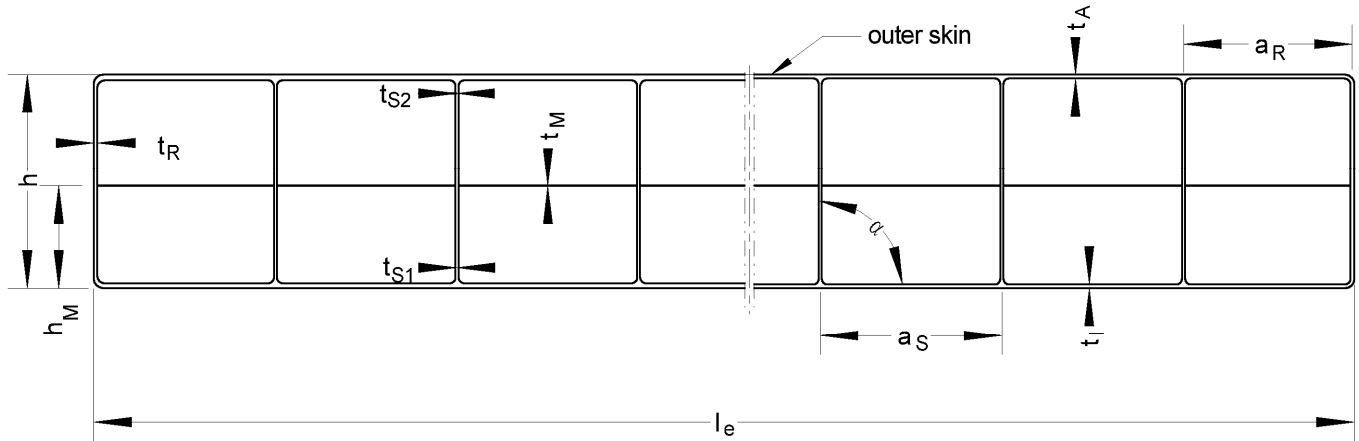
Essmann Continuous rooflight system curved
(LB classic, LB basic, LB classic plus, LB plus)

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

English translation prepared by 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_l mm	t_{S1} mm	t_{S2} mm	weight per area kg/m ²
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 $ \Delta\alpha $ 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 Nm ² /m	71,1 Nm ² /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

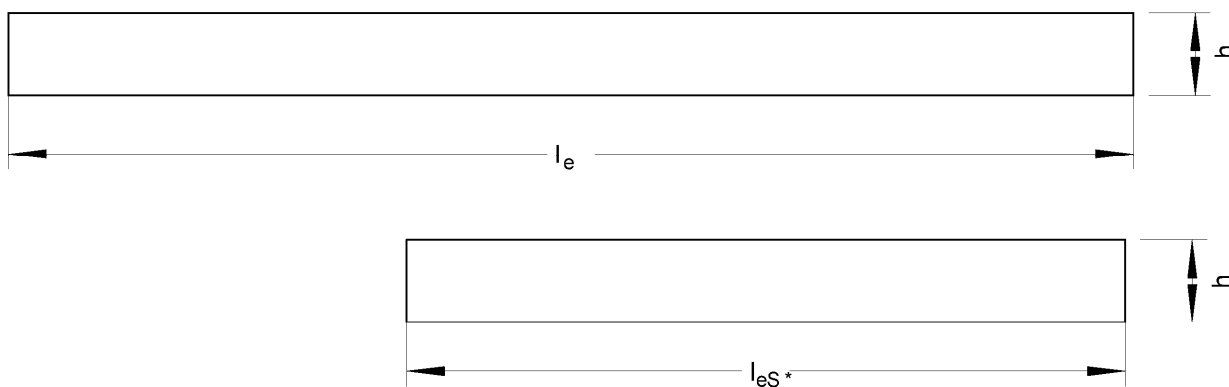
Durability, as variation (after ageing)			
of yellowness index	of the light transmittance	of deformation flexural modulus	of tensile strength
10 % (ΔA)	5 % (ΔA)	Cu 1	Ku 1

Essmann Continuous rooflight system curved
(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

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/m ²
2100	1050	6,0	7,62
+ 6 - 0	+ 3 - 0	± 0,3	± 0,38

**Essmann Continuous rooflight system curved
(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 specifications given in 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.

B 1.2 Design values for actions, E_d

The action resulting from the dead weight of the multi-wall sheets may be neglected in the roof kit verifications. Live loads are not permitted.

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

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

Load action	Duration of load action	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

For the wind and temperature effects to be considered in the load case 'summer' the ψ coefficient defined in EN 1990¹ 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).

If the roof kit is installed with a substructure angle $\alpha \leq 45^\circ$ in roofs with pitches $\leq 20^\circ$ the negative wind pressure loads (wind suction loads) may be applied in simplified form as acting on the translucent roof kit area with a constant aerodynamic coefficient c_p .

$$w_e = q_p(z_e) \cdot c_p$$

The gust velocity pressure $q_p(z_e)$ shall be taken from EN 1991-1-4².

The coefficient c_p shall be selected in accordance with the roof position and type. For enclosed buildings in which the translucent roof kit is installed in the region H, I or N in accordance with Sections 7.2.3 to 7.2.7 of EN 1991-1-4:2010-12 the external pressure coefficient is $c_{pe} = -0.7$.

If the roof kit is installed on the ridge of a mono-gable roof or a hipped end roof in the region J or K in accordance with Section 7.2.5 or 7.2.6 of EN 1991-1-4:2010-12 with a roof pitch $> 10^\circ$ the factor $c_{pe} = -1.2$ applies for enclosed buildings and $c_{p,net} = -2.0$ for freestanding roofs.

In case of conditions deviating from the specified conditions or use of translucent roof kit in region F, G, L or M in accordance with Sections 7.2.3 to 7.2.7 of EN 1991-1-4:2010-12 the verifications shall be done applying special loads (see Section 1.5 of EN 1991-1-4).

B 1.3 Design values for structural resistance R_d and C_d

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:

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

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 structural resistance R_k and C_k shall be taken from the tables in Annex B 3.1 for the given multi-wall sheets and direction of loading.

¹ EN 1990:2010-12 Eurocode: Basis of structural design; German version EN 1990 A1:2005 + A1:2005/AC:2010
² EN 1991-1-4:2010-12 Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

B 2 Load-bearing capacity and serviceability of the impost made of PVC (only for system "LB plus")

B 2.1 General

The implementation and arrangement of the PVC-Impost in accordance with Section 1.1.5.2 shall correspond to the specifications given in Annexes A 1, A 2.2.6 and A 2.3.6. The design specifications (see Annex C) shall be complied with.

The imposts are used to take up tensile forces. The tensile forces from wind suction loads are introduced into the imposts via the roof kit covering profiles.

Verification is done on the plane of the acting tensile force F_Z . For each application case the stability verification shall be done for the ultimate limit state;

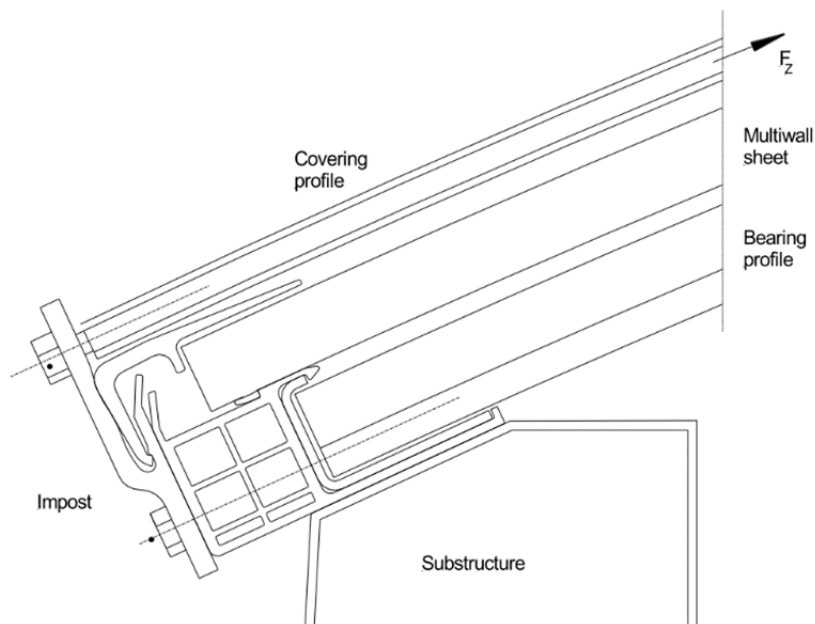
$$\frac{F_{Z,E,d}}{F_{Z,R,d}} \leq 1,0$$

$F_{Z,E,d}$: design value of the action

$F_{Z,R,d}$: design value for structural resistance

shall be adhered to.

The verification of the serviceability limit state shall be deemed provided with the verification of the ultimate limit state for load-bearing capacity.



B 2.2 Design value of the action, $F_{Z,E,d}$

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

The design value of the action $F_{Z,E,d}$ results from the characteristic value of the wind suction load in consideration of the partial safety factor γ_F , the coefficient ψ and a factor taking into account the duration of the action K_t .

The characteristic action shall be multiplied by the factor K_t . K_t shall be assumed to be 1.0 for the load action resulting from wind loads (very short duration).

B 2.3 Design value of the structural resistance, $F_{Z,R,d}$

The design value for structural resistance $F_{Z,R,d}$ results from the characteristic value of structural resistance $F_{Z,R,k}$ in consideration of the material safety factor γ_M , the factor taking into account the effects of media K_u and the temperature factor K_θ as follows:

$$F_{Z,R,d} = \frac{F_{Z,R,k}}{\gamma_M \cdot K_u \cdot K_\theta}$$

The following material safety factors and influencing factors shall be applied:

Material safety factor γ_M	CC 1	1.25
	CC 2	1.30
Factor taking into account the effects of media and ageing K_u		1.05
Temperature factor K_θ	Summer (55°C)	1.45
	winter	1.00

The characteristic values for structural resistance $F_{Z,R,k}$ shall be taken from the tables in Annex B 3.2 for the given tie bracket and covering.

B 3 Characteristic structural resistances

B 3.1 Characteristic structural resistances of the covering

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

Multi-wall sheet in accordance with Annex	Radius $R \geq 1,50\text{m}$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.1 Kingspan Multiwall 10-4	$\leq 2,35$	1-span	1,06	2,68	2,65	1,83	1,79
	$\leq 3,95$		1,06	1,38	1,32	1,41	1,41
	$\leq 4,54$		1,06	1,66	1,61	1,34	1,34
	$\leq 3,95$	2-span	1,06	1,6	1,50	1,56	1,34
	$\leq 3,95$		0,53	5,35	5,35	3,78	3,78
	$\leq 3,95$	4-span	0,53	5,67	5,67	5,02	4,80
A 4.2 Akyver Sun Type 10/1700 (also applies to sheets filled with nanogel)	$\leq 2,35$	1-span	1,06	2,28	2,26	1,83	1,79
	$\leq 3,95$		1,06	1,17	1,12	1,41	1,41
	$\leq 4,54$		1,06	1,57	1,57	1,21	1,21
	$\leq 3,95$	2-span	1,06	1,36	1,28	1,56	1,34
	$\leq 3,95$		0,53	4,55	4,55	3,78	3,78
	$\leq 3,95$	4-span	0,53	4,83	4,83	5,02	4,80
A 4.3 Akyver Sun Type 10/4W-7	$\leq 2,35$	1-span	1,06	2,50	2,48	1,83	1,79
	$\leq 3,95$		1,06	1,29	1,23	1,41	1,41
	$\leq 4,54$		1,06	1,61	1,61	1,24	1,24
	$\leq 3,95$	2-span	1,06	1,49	1,40	1,56	1,34
	$\leq 3,95$		0,53	5,00	5,00	3,78	3,78
	$\leq 3,95$	4-span	0,53	5,30	5,30	5,02	4,80
A 4.4 Makrolon Multi UV 4/10-6	$\leq 2,35$	1-span	1,06	2,51	2,49	1,72	1,68
	$\leq 3,95$		1,06	1,29	1,24	1,32	1,32
	$\leq 4,54$		1,06	1,64	1,59	1,26	1,26
	$\leq 3,95$	2-span	1,06	1,50	1,41	1,46	1,26
	$\leq 3,95$		0,53	5,02	5,02	3,55	3,55
	$\leq 3,95$	4-span	0,53	5,32	5,32	4,71	4,50

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

Multi-wall sheet in accordance with Annex	Radius $R \geq 1,50\text{m}$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
2 x A 4.1 Kingspan Multiwall 10-4	$\leq 3,95$	1-span	1,06	2,62	2,36	2,32	2,32
	$\leq 4,59$		1,06	1,90	1,74	2,04	2,04
	$\leq 3,95$	2-span	1,06	2,72	2,62	2,63	2,63
	$\leq 3,95$		0,53	8,39	8,39	4,94	4,94
	$\leq 4,59$		0,53	8,72	8,30	5,33	5,33
	$\leq 3,95$	4-span	0,53	8,39	8,39	5,35	5,35
2 x A 4.2 Akyver Sun Type 10/1700 (also applies to sheets filled with nanogel)	$\leq 3,95$	1-span	1,06	2,23	2,01	2,32	2,32
	$\leq 4,59$		1,06	1,62	1,48	2,04	2,04
	$\leq 3,95$	2-span	1,06	2,31	2,23	2,63	2,63
	$\leq 3,95$		0,53	7,14	7,14	4,94	4,94
	$\leq 4,59$		0,53	7,42	7,06	5,33	5,33
	$\leq 3,95$	4-span	0,53	7,14	7,14	5,35	5,35
2 x A 4.3 Akyver Sun Type 10/4W-7	$\leq 3,95$	1-span	1,06	2,45	2,20	2,32	2,32
	$\leq 4,59$		1,06	1,77	1,63	2,04	2,04
	$\leq 3,95$	2-span	1,06	2,54	2,45	2,63	2,63
	$\leq 3,95$		0,53	7,84	7,84	4,94	4,94
	$\leq 4,59$		0,53	8,14	7,75	5,33	5,33
	$\leq 3,95$	4-span	0,53	7,84	7,84	5,35	5,35
2 x A 4.4 Makrolon Multi UV 4/10-6	$\leq 3,95$	1-span	1,06	2,46	2,21	2,18	2,18
	$\leq 4,59$		1,06	1,78	1,63	1,91	1,91
	$\leq 3,95$	2-span	1,06	2,55	2,46	2,47	2,47
	$\leq 3,95$		0,53	7,87	7,87	4,63	4,63
	$\leq 4,59$		0,53	8,18	7,79	5,00	5,00
	$\leq 3,95$	4-span	0,53	7,87	7,87	5,02	5,02

Covering "PC 16" – Annexes 4.5 - 4.9

Multi-wall sheet in accordance with Annex	Radius $R \geq 2,40\text{m}$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.5 Kingspan Multiwall 16-7	$\leq 3,95$	1-span	1,06	2,00	1,95	1,81	1,81
	$\leq 4,59$		1,06	1,48	1,46	1,25	1,25
	$\leq 3,95$	2-span	1,06	2,27	2,21	2,07	1,67
	$\leq 3,95$		0,53	7,33	7,33	4,24	4,1
	$\leq 4,59$		0,53	6,07	5,73	3,87	3,87
	$\leq 3,95$	3-span	0,703	4,83	4,80	4,17	3,48
	$\leq 4,52$		0,703	3,91	3,91	2,63	2,63
$\leq 3,95$	4-span	0,53	7,75	7,75	4,57	4,45	
A 4.6 Akyver Sun Type 16/7w-12	$\leq 3,95$	1-span	1,06	2,25	2,20	2,01	2,01
	$\leq 4,59$		1,06	1,67	1,64	1,40	1,40
	$\leq 3,95$	2-span	1,06	2,55	2,49	2,32	1,87
	$\leq 3,95$		0,53	8,25	8,25	4,76	4,60
	$\leq 4,59$		0,53	6,83	6,45	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,90
	$\leq 4,52$		0,703	4,29	4,29	2,88	2,88
$\leq 3,95$	4-span	0,53	8,72	8,72	5,13	4,99	
A 4.7 Makrolon Multi UV 7/16-14	$\leq 3,95$	1-span	1,06	2,25	2,20	2,03	2,03
	$\leq 4,59$		1,06	1,67	1,64	1,40	1,40
	$\leq 3,95$	2-span	1,06	2,55	2,49	2,32	1,87
	$\leq 3,95$		0,53	8,25	8,25	4,76	4,60
	$\leq 4,59$		0,53	6,83	6,45	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,9
	$\leq 4,52$		0,703	4,19	4,19	2,82	2,82
$\leq 3,95$	4-span	0,53	8,72	8,72	5,13	4,99	
A 4.8 Makrolon Multi UV 6/16-20	$\leq 3,95$	1-span	1,06	1,88	1,84	1,62	1,62
	$\leq 4,59$		1,06	1,30	1,30	1,17	1,17
	$\leq 3,95$	2-span	1,06	2,05	2,03	1,94	1,56
	$\leq 3,95$		0,53	6,89	6,89	3,97	3,84
	$\leq 4,59$		0,53	5,41	5,25	3,62	3,62
	$\leq 3,95$	3-span	0,703	4,54	4,51	3,91	3,26
	$\leq 4,52$		0,703	3,79	3,79	2,55	2,55
$\leq 3,95$	4-span	0,53	7,28	7,28	4,28	4,17	
A 4.9 IMPEX MULTI WALL 16/3w (also applies to sheets filled with nanogel)	$\leq 3,95$	1-span	1,06	2,25	2,20	2,00	2,00
	$\leq 4,59$		1,06	1,61	1,61	1,40	1,40
	$\leq 3,95$	2-span	1,06	2,53	2,47	2,32	1,87
	$\leq 3,95$		0,53	8,25	8,25	4,76	4,60
	$\leq 4,59$		0,53	6,68	6,34	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,90
	$\leq 4,52$		0,703	4,67	4,67	3,14	3,14
$\leq 3,95$	4-span	0,53	8,72	8,72	5,13	4,99	

Covering "PC 16+16" – Annexes 4.5 - 4.9

Multi-wall sheet in accordance with Annex	Radius $R \geq 2,40\text{m}$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
2 x A 4.5 Kingspan Multiwall 16-7	$\leq 3,95$	1-span	1,06	3,93	3,38	3,11	3,11
	$\leq 4,59$		1,06	2,71	2,56	1,91	1,91
	$\leq 3,95$	2-span	1,06	4,19	4,11	3,25	3,12
	$\leq 3,95$		0,53	7,45	7,45	5,20	5,20
	$\leq 4,59$		0,53	7,45	7,45	5,37	5,37
	$\leq 3,95$	3-span	0,703	9,79	9,64	5,36	4,54
	$\leq 3,95$	4-span	0,53	7,45	7,4	5,44	5,44
2 x A 4.6 Akyver Sun Type 16/7w-12	$\leq 3,95$	1-span	1,06	4,42	3,81	3,49	3,49
	$\leq 4,59$		1,06	3,05	2,88	2,14	2,14
	$\leq 3,95$	2-span	1,06	4,72	4,63	3,65	3,50
	$\leq 3,95$		0,53	8,39	8,39	5,83	5,83
	$\leq 4,59$		0,53	8,39	8,39	6,03	6,03
	$\leq 3,95$	3-span	0,703	11,0	10,9	6,01	5,09
	$\leq 3,95$	4-span	0,53	8,39	8,39	6,11	6,11
2 x A 4.7 Makrolon Multi UV 7/16-14	$\leq 3,95$	1-span	1,06	4,42	3,91	3,49	3,16
	$\leq 4,59$		1,06	3,05	2,88	2,14	2,14
	$\leq 3,95$	2-span	1,06	4,72	4,63	3,65	3,50
	$\leq 3,95$		0,53	8,39	8,39	5,83	5,93
	$\leq 4,59$		0,53	8,39	8,39	6,03	6,03
	$\leq 3,95$	3-span	0,703	11,0	10,9	6,01	5,09
	$\leq 3,95$	4-span	0,53	8,39	8,39	6,11	6,11
2 x A 4.8 Makrolon Multi UV 6/16-20	$\leq 3,95$	1-span	1,06	3,69	3,18	2,91	2,91
	$\leq 4,59$		1,06	2,47	2,38	1,79	1,79
	$\leq 3,95$	2-span	1,06	3,94	3,8	3,05	2,92
	$\leq 3,95$		0,53	6,65	6,65	4,87	4,87
	$\leq 4,59$		0,53	6,65	6,65	5,03	5,03
	$\leq 3,95$	3-span	0,703	9,20	9,06	5,02	4,25
	$\leq 3,95$	4-span	0,53	6,65	6,65	5,10	5,10
2 x A 4.9 IMPEX MULTI WALL 16/3w (also applies to sheets filled with nanogel)	$\leq 3,95$	1-span	1,06	4,42	3,81	3,49	3,49
	$\leq 4,59$		1,06	3,05	2,88	2,14	2,14
	$\leq 3,95$	2-span	1,06	4,72	4,63	3,65	3,50
	$\leq 3,95$		0,53	8,20	8,20	5,83	5,83
	$\leq 4,59$		0,53	8,20	8,20	6,03	6,03
	$\leq 3,95$	3-span	0,703	11,0	10,9	6,01	5,09
	$\leq 3,95$	4-span	0,53	8,20	8,20	6,11	6,11

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	Radius $R \geq 2,40m$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.1 Kingspan Multiwall 10-4 + A 4.5 Kingspan Multiwall 16-7	≤ 3,95	1-span	1,06	3,55	2,93	2,91	2,91
	≤ 4,59		1,06	1,48	1,46	1,25	1,25
	≤ 3,95	2-span	1,06	3,86	3,72	2,96	2,91
	≤ 3,95		0,53	7,45	7,45	5,01	5,01
	≤ 4,59	3-span	0,53	8,47	7,60	5,08	5,08
	≤ 3,95		0,703	7,68	7,60	5,00	4,12
	≤ 4,52	0,703	3,91	3,91	2,63	2,63	
	≤ 3,95	4-span	0,53	7,45	7,45	5,17	5,17
A 4.3 Akyver Sun Type 10/4W-7 + A 4.6 Akyver Sun Type 16/7w-12	≤ 3,95	1-span	1,06	3,74	3,08	3,26	3,26
	≤ 4,59		1,06	1,67	1,64	1,40	1,40
	≤ 3,95	2-span	1,06	4,05	3,91	3,32	3,26
	≤ 3,95		0,53	7,84	7,84	5,62	5,62
	≤ 4,59	3-span	0,53	8,90	8,00	5,70	5,70
	≤ 3,95		0,703	8,08	8,00	5,61	4,62
	≤ 4,52	0,703	4,29	4,29	2,88	2,88	
	≤ 3,95	4-span	0,53	7,84	7,84	5,80	5,80
A 4.3 Akyver Sun Type 10/4W-7 + A 4.7 Makrolon Multi UV 7/16-14	≤ 3,95	1-span	1,06	3,74	3,08	3,26	3,26
	≤ 4,59		1,06	1,67	1,64	1,40	1,40
	≤ 3,95	2-span	1,06	4,05	3,91	3,32	3,26
	≤ 3,95		0,53	7,84	7,84	5,62	5,62
	≤ 4,59	3-span	0,53	8,90	8,00	5,70	5,70
	≤ 3,95		0,703	8,08	8,00	5,61	4,62
	≤ 4,52	0,703	4,19	4,19	2,82	2,82	
	≤ 3,95	4-span	0,53	7,84	7,84	5,80	5,80
A 4.3 Akyver Sun Type 10/4W-7 + A 4.8 Makrolon Multi UV 6/16-20	≤ 3,95	1-span	1,06	3,34	2,76	2,72	2,72
	≤ 4,59		1,06	1,30	1,30	1,17	1,17
	≤ 3,95	2-span	1,06	3,62	3,50	2,77	2,72
	≤ 3,95		0,53	6,65	6,65	4,69	4,69
	≤ 4,59	3-span	0,53	7,96	7,15	4,76	4,76
	≤ 3,95		0,703	7,22	7,15	4,68	3,86
	≤ 4,52	0,703	3,79	3,79	2,55	2,55	
	≤ 3,95	4-span	0,53	6,65	6,65	4,84	4,84

Multi-wall sheet in accordance with Annex	Radius $R \geq 2,40\text{m}$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.4 Makrolon Multi UV 4/10-6 + A 4.6 Akyver Sun Type 16/7w-12	$\leq 3,95$	1-span	1,06	3,75	3,10	3,06	3,06
	$\leq 4,59$		1,06	1,67	1,64	1,40	1,40
	$\leq 3,95$	2-span	1,06	4,07	3,93	3,11	3,06
	$\leq 3,95$		0,53	7,87	7,87	5,27	5,27
	$\leq 4,59$		0,53	8,94	8,03	5,35	5,35
	$\leq 3,95$	3-span	0,703	8,11	8,03	5,26	4,33
	$\leq 4,52$		0,703	4,29	4,29	2,88	2,88
	$\leq 3,95$	4-span	0,53	7,87	7,87	5,44	5,44

Covering "PC 16+6" – Annexes (4.5 - 4.8) + "Polycasa 6 PETG"

Multi-wall sheet in accordance with Annex	Radius $R \geq 2,40\text{m}$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.5 Kingspan Multiwall 16-7 + PETG	$\leq 3,95$	1-span	1,06	2,00	1,95	1,81	1,81
	$\leq 4,59$		1,06	1,48	1,46	1,25	1,25
	$\leq 4,59$	2-span	0,53	6,07	5,73	3,87	3,87
	$\leq 3,95$	3-span	0,703	4,83	4,80	4,17	3,48
A 4.6 Akyver Sun Type 16/7w-12 + PETG	$\leq 3,95$	1-span	1,06	2,25	2,20	2,01	2,01
	$\leq 4,59$		1,06	1,67	1,64	1,40	1,40
	$\leq 4,59$	2-span	0,53	6,83	6,45	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,90
A 4.7 Makrolon Multi UV7/ 16-14 + PETG	$\leq 3,95$	1-span	1,06	2,25	2,20	2,03	2,03
	$\leq 4,59$		1,06	1,67	1,64	1,40	1,40
	$\leq 4,59$	2-span	0,53	6,83	6,45	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,90
A 4.8 Makrolon Multi UV6/ 16-20 + PETG	$\leq 3,95$	1-span	1,06	1,88	1,84	1,62	1,62
	$\leq 4,59$		1,06	1,30	1,30	1,17	1,17
	$\leq 4,59$	2-span	0,53	5,41	5,25	3,62	3,62
	$\leq 3,95$	3-span	0,703	4,54	4,51	3,91	3,26
A 4.9 IMPEX MULTI WALL 16/3w + PETG	$\leq 3,95$	1-span	1,06	2,25	2,20	2,00	2,00
	$\leq 4,59$		1,06	1,61	1,61	1,40	1,40
	$\leq 4,59$	2-span	0,53	6,68	6,34	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,90

Covering "PC 20" – Annexes 4.10 - 4.14

Multi-wall sheet in accordance with Annex	Radius $R \geq 2,40\text{m}$ R [m]	System	a_p [m]	Characteristic values of structural resistance [kN/m ²]			
				downward load		uplift load	
				R_k	C_k	R_k	C_k
A 4.10 Kingspan Multiwall 20-7	$\leq 3,95$	1-span	1,06	2,00	1,95	1,81	1,81
	$\leq 4,59$		1,06	1,48	1,46	1,25	1,25
	$\leq 3,95$	2-span	1,06	2,27	2,21	2,07	1,67
	$\leq 3,95$		0,53	7,33	7,33	4,24	4,1
	$\leq 4,59$		0,53	6,07	5,73	3,87	3,87
	$\leq 3,95$	3-span	0,703	4,83	4,80	4,17	3,48
	$\leq 4,52$		0,703	3,91	3,91	2,63	2,63
$\leq 3,95$	4-span	0,53	7,75	7,75	4,57	4,45	
A 4.11 Akyver Sun Type 20/7w-12	$\leq 3,95$	1-span	1,06	2,25	2,20	2,01	2,01
	$\leq 4,59$		1,06	1,67	1,64	1,40	1,40
	$\leq 3,95$	2-span	1,06	2,55	2,49	2,32	1,87
	$\leq 3,95$		0,53	8,25	8,25	4,76	4,60
	$\leq 4,59$		0,53	6,83	6,45	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,90
	$\leq 4,52$		0,703	4,29	4,29	2,88	2,88
$\leq 3,95$	4-span	0,53	8,72	8,72	5,13	4,99	
A 4.12 Makrolon Multi UV 7/20-14	$\leq 3,95$	1-span	1,06	2,25	2,20	2,03	2,03
	$\leq 4,59$		1,06	1,67	1,64	1,40	1,40
	$\leq 3,95$	2-span	1,06	2,55	2,49	2,32	1,87
	$\leq 3,95$		0,53	8,25	8,25	4,76	4,60
	$\leq 4,59$		0,53	6,83	6,45	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,9
	$\leq 4,52$		0,703	4,19	4,19	2,82	2,82
$\leq 3,95$	4-span	0,53	8,72	8,72	5,13	4,99	
A 4.13: Makrolon Multi UV 6/20-20	$\leq 3,95$	1-span	1,06	1,88	1,84	1,62	1,62
	$\leq 4,59$		1,06	1,30	1,30	1,17	1,17
	$\leq 3,95$	2-span	1,06	2,05	2,03	1,94	1,56
	$\leq 3,95$		0,53	6,89	6,89	3,97	3,84
	$\leq 4,59$		0,53	5,41	5,25	3,62	3,62
	$\leq 3,95$	3-span	0,703	4,54	4,51	3,91	3,26
	$\leq 4,52$		0,703	3,79	3,79	2,55	2,55
$\leq 3,95$	4-span	0,53	7,28	7,28	4,28	4,17	
A 4.14 IMPEX MULTI WALL 20/3w (also applies to sheets filled with nanogel)	$\leq 3,95$	1-span	1,06	2,25	2,20	2,00	2,00
	$\leq 4,59$		1,06	1,61	1,61	1,40	1,40
	$\leq 3,95$	2-span	1,06	2,53	2,47	2,32	1,87
	$\leq 3,95$		0,53	8,25	8,25	4,76	4,60
	$\leq 4,59$		0,53	6,68	6,34	4,34	4,34
	$\leq 3,95$	3-span	0,703	5,44	5,40	4,68	3,90
	$\leq 4,52$		0,703	4,67	4,67	3,14	3,14
$\leq 3,95$	4-span	0,53	8,72	8,72	5,13	4,99	

B 3.2 Characteristic structural resistances of the impost made of PVC (only for system LB plus)

The following characteristic structural resistances $F_{z,R,k}$ shall be adhered to depending on the covering and the tie bracket:

Tie bracket \ Covering	PC 16	PC 20 / PC 10 + 10	PC 16 + PETG	PC 16 + 10	PC 16 + 16
	Tie bracket 2 (Annex A 3.3.2)	–	–	–	3,62 kN
Tie bracket 3 (Annex A 3.3.3)	4,24 kN	3,93 kN	3,78 kN	–	–
Tie bracket 4 (Annex A 3.3.4)	3,41 kN	3,16 kN	3,04 kN	–	–
Tie bracket 5 (Annex A 3.3.5)	–	–	–	3,21 kN	3,21 kN
Tie bracket 6 (Annex A 3.3.6)	3,92 kN	3,63 kN	3,50 kN	–	–
Tie bracket 7 (Annex A 3.3.7)	–	–	–	3,35 kN	3,35 kN

B 3.3 Characteristic structural resistances of the fasteners

For the connections of the covering profile and the bearing profile with the tie bracket, the values from the following table may be used as characteristic structural resistances of the tensile strength for each pair of screws:

Components to be connected	Tensile load-bearing capacity $N_{R,k}$
tie bracket/ covering profile	18,3
tie bracket/ bearing profile	6,2
tie bracket/ PVC- Impost/ bearing profile	2,57

Essmann Continuous rooflight system curved (LB classic, LB basic, LB classic plus, 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 hollow chambers of the multi-wall sheets shall not be filled, with the exception of the multiwall sheets in accordance with Annexes A 4.2; A 4.9 and A 4.14. The filling is carried out with an aerogel to improve thermal insulation/ 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.

The continuous rooflight system consists of a pre-elementated building box system made of extruded aluminium profiles and multiwall sheets. First, the supporting structure, made of aluminium profiles, of the continuous rooflight system is mounted on an existing upstand. The arrangement of the supporting rungs creates single and multi-span systems for multiwall sheets with a maximum support spacing a_P according to Annexes A 1.1 to A 1.4. Fittings up to 350 mm wide may be installed as single-span systems without additional support arches.

Only fasteners in accordance with section 1.1.12 may be used for connecting the aluminium profiles. The connections of the continuous rooflight system with the substructure must be made in accordance with the static calculation.

Components connected to the side of the rooflight system, such as gable connections or head pieces, must not be friction-locked so as not to impede the deformation of the arches.

The multiwall sheets are joined at the longitudinal edges over a supporting profile, the support width must be at least 20 mm. The sheet variants can be installed according to the annexes Annex A 1.5.1 and A 1.5.2. The maximum sheet width is 2100 mm. The sheets are mounted in the joint area of the supporting profiles so that they can be moved.

If textile glass fleece, aluminium sheet or 2 mm solid sheets are installed as required, the Multiwall sheets or Massiv sheets must be fully covered (including the support area).

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 rooflight system can be walked on with a special mounting aid system, which is mounted transversely to the supporting profiles.

For maintenance, the installed roof kit shall be visually inspected by a qualified expert after four years and then every two years. 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 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.