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Authorised and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/106/EEC)

Deutsches Institut für Bautechnik

DIBt

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Handelsbezeichnung *Trade name*		CI-System Lichtband B
Zulassungsinhaber *Holder of approval*		LAMILUX Heinrich Strunz GmbH Zehstraße 2 95111 Rehau DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*		Selbsttragendes lichtdurchlässiges Dachbausystem *Self supporting translucent roof kit*
Geltungsdauer: *Validity:*	vom *from* bis *to*	20 June 2013 20 June 2018
Herstellwerk *Manufacturing plant*		LAMILUX Heinrich Strunz GmbH Zehstraße 2 95111 Rehau DEUTSCHLAND

Diese Zulassung umfasst *This Approval contains*	77 Seiten einschließlich 59 Anhänge *77 pages including 59 annexes*
Diese Zulassung ersetzt *This Approval replaces*	ETA-09/0347 mit Geltungsdauer vom 01.02.2010 bis 01.02.2015 *ETA-09/0347 with validity from 01.02.2010 to 01.02.2015*

I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[4], as amended by Article 2 of the law of 8 November 2011[5];*
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6];
- Guideline for European technical approval of "Self supporting translucent roof kits", ETAG 010.

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1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2011*, p. 2178
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 Definition of the construction product

The self supporting curved translucent roof system "CI-System Lichtband B" consists of the following components:

- Translucent polycarbonate (PC)-multi-wall sheets with thicknesses of 6 mm, 10 mm and 16 mm,
- Translucent GRP twin-wall sheet "GFUP 10-cavity" with thickness of 10 mm,
- if necessary, sheets of glass fibre reinforced unsaturated polyester resin (GRP) "LAMILUXplan 1,2 mm GFUP" arranged below the multi-layered sheets,
- in the thermal composite variants, tc16 in short, spacer strips for the air gap,
- bearing profiles and covering profiles made of aluminium (Al),
- Al-profiles "GL-PC10", "GL-PC16" , "GL-PC20", "GL-PC32" and "GL-PC36",
- a connecting profile "FP24°",
- spacing profiles,
- a load converter "LK24°-TS35",
- clamping brackets "SK-Stoß" and "SK-Feld", or "SK-Stoß 26-36" and "SK-Feld 26-36",
- a impost sealing,
- a sealing fixed in a shear-resistant manner within the covering profiles and
- fasteners.

The components are factory-made by the approval holder or by the supplier and assembled on site as self supporting translucent roof systems. The ETA Holder is ultimately responsible for the roof system.

For the covering the following sheets and sheet combinations are used:

- Type "PC10": one PC-multi-wall sheet "Makrolon multi UV 4/10-6"
- Type "PC10 + GFUP": one PC-multi-wall sheet "Makrolon multi UV 4/10-6" and one GRP sheet "LAMILUXplan 1,2mm GFUP"
- Type "PC16": one PC-multi-wall sheet "Makrolon multi UV 6/16-20"
- Type "PC16 + GFUP": one PC-multi-wall sheet "Makrolon multi UV 6/16-20" and one GRP sheet "LAMILUXplan 1,2mm GFUP"
- Type "PC10 + PC10": two PC-multi-wall sheets "Makrolon multi UV 4/10-6"
- Type "PC10 + PC10 + GFUP": two PC-multi-wall sheets "Makrolon multi UV 4/10-6" and one GRP sheet "LAMILUXplan 1,2mm GFUP"
- Type "PC10 + PC6": one PC-multi-wall sheet "Makrolon multi UV 4/10-6" and one PC-multi-wall sheet "LAMILUX PC 4/6"
- Type "PC10 + PC6 tc 16": one PC-multi-wall sheet "Makrolon multi UV 4/10-6" with one air gap of 16 mm and one PC-multi-wall sheet "LAMILUX PC 4/6"
- Type "PC10 + PC10 tc 16": one PC-multi-wall sheet "Makrolon multi UV 4/10-6" with one air gap of 16 mm and one PC-multi-wall sheet "Makrolon multi UV 4/10-6"
- Type "GFUP 10-cavity": one GRP twin-wall sheet "LAMILUX Composite 10 mm GFUP cavity-resist"

The translucent sheets are supported by bearing profiles and secured against uplift loads from wind by covering profiles. The bearing and the covering profiles are arranged at equidistant intervals and run parallel to the span of the sheets. For the thermal composite variants, spacer strips are installed in the clamping areas of the sheets on the impost as well as on the bearing and covering profiles.

Depending on the type of covering, the roof system can be designed with the following support systems:

Covering	Double span system Annex 1.1	Triple span system Annex 1.2	Five-span system Annex 1.3
Type "PC10"	x	x	x
Type "PC10 + GFUP"	x		
Type "PC16"	x	x	
Type "PC16 + GFUP"	x		
Type "PC10 + PC10"	x	x	
Type "PC10 + PC10 + GFUP"	x		
Type "PC10 + PC6"	x	x	
Type "PC10 + PC6 tc16"	x	x	
Type "PC10 + PC10 tc16"	x	x	
Type "GFUP 10-cavity"	x		

The roof system in the installed state consists of coverings strung together of the same type of the above-mentioned systems. The maximum width of the covering is l.e (see Annex 1.1 to 1.3 of the ETA).

Fitting units of up to 500 mm can be designed and built in the case of double and triple systems without any intermediate support (single span system). Fitting units of five-span systems shall have at least one intermediate support; the space between the supports in longitudinal direction shall not exceed 250 mm.

1.2 Intended use

The self supporting translucent roof system is a continuous roof light of any length with a rectangular plane view as roof covering for open and closed building works.

The roof system is not accessible by pedestrians; it may not be used for bracing of the roof support structure.

The provisions made in this European Technical Approval (ETA) are based on an assumed working life of the roof system of at least 10 years, provided that the conditions laid down in section 4 and 5 are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the construction.

2 Characteristics of products and methods of verification

2.1 General

The assessment of the fitness of the self-supporting translucent roof system for the intended use according to the essential requirements has been made in compliance with ETAG 010, "Guideline for European Technical Approvals for self supporting translucent roof kits", edition September 2002 (in this ETA referred to as ETAG 010).

Properties (of the components as well as of the roof system) which are listed neither in this ETA nor in the Annexes shall correspond to the information stated in the technical documentation of this ETA.

2.2 Characteristics of the self-supporting translucent roof system

2.2.1 Mechanical resistance and stability

2.2.1.1 General

The static system of the roof system "CI-System Lichtband B" 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 010.

The load-bearing capacity of the roof system depends on

- the load-bearing capacity of the translucent sheets,
- the load-bearing capacity of the (load) bearing profile, the covering profile, the fixing bracket and the load converter,
- the load-bearing capacity of fasteners and
- the fixing of the roof system on the substructure.

2.2.1.2 Load-bearing capacity of the translucent sheets

The load-bearing capacity depends on the type of covering, on the support system and on the bending radius of the multi-wall sheets.

Provided that the support systems described in Annex 1.1 to 1.3 of the ETA are used, the characteristic values given in the following apply to the maximum action. The actions result in case of gravity load from snow, ice and wind and in case of uplift load from wind. In the following tables the maximum value of action is attributed to a characteristic value of the resistance:

Covering: type "PC10"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
1.50 ≤ R ≤ 4.40	2-span	1.054	2.21	1.90	1.61	1.61
3.54 < R ≤ 5.25	3-span	0.703	2.66	2.65	2.01	2.01
2.69 < R ≤ 3.54	3-span	0.703	3.42	3.41	2.83	2.83
1.50 ≤ R ≤ 2.69	3-span	0.703	3.52	3.52	3.36	2.89
1.50 ≤ R ≤ 3.54	5-span	0.422	9.37	9.37	4.37	4.37

Covering: type "PC10 + GFUP"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
1.50 ≤ R ≤ 4.40	2-span	1.054	2.12	1.89	1.72	1.72

Covering: type "PC16"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
2.40 ≤ R ≤ 4.40	2-span	1.054	2.22	2.22	2.04	2.04
2.40 ≤ R ≤ 5.25	3-span	0.703	4.68	4.68	2.21	2.21

Covering: type "PC16 + GFUP"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
2.40 ≤ R ≤ 4.40	2-span	1.054	2.79	2.79	2.55	2.55

Covering: type "PC10 + PC10"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
1.50 ≤ R ≤ 4.40	2-span	1.054	3.75	2.84	2.32	2.32
2.69 < R ≤ 5.25	3-span	0.703	4.71	4.71	2.87	2.87
1.50 ≤ R ≤ 2.69	3-span	0.703	6.73	6.73	7.10	5.97

Covering: type "PC10 + PC10 + GFUP"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
1.50 ≤ R ≤ 4.40	2-span	1.054	4.09	3.48	2.34	2.34

Covering: type "PC10 + PC6"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
2.40 ≤ R ≤ 4.40	2-span	1.054	1.73	1.73	2.01	1.69
2.40 < R ≤ 5.25	3-span	0.703	3.88	2.74	2.55	2.05

Covering: type "PC10 + PC6 tc 16"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
2.40 ≤ R ≤ 4.40	2-span	1.054	1.99	1.99	1.58	1.58
2.40 < R ≤ 5.25	3-span	0.703	2.80	2.80	2.97	1.72

Covering: type "PC10 + PC10 tc 16"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
2.40 ≤ R ≤ 4.40	2-span	1.054	2.50	2.50	2.45	1.74
2.40 < R ≤ 5.25	3-span	0.703	3.77	3.77	2.87	1.98

Covering: type "GFUP 10-cavity"

Radius	System	Distance	Characteristic structural resistance for the action resulting from			
			Gravity load [kN/m²]		Uplift load [kN/m²]	
R [m]		a.p [m]	R_k	C_k	R_k	C_k
2.40 ≤ R ≤ 4.40	2-span	1.054	3.15	2.12	2.65	1.74

R_k: characteristic value of structural resistance (resp. maximum action at the ultimate limit state of the load-bearing capacity)

C_k: characteristic value of serviceability (resp. maximum action at the ultimate limit state of serviceability)

The failure of the load-bearing capacity occurs at the ultimate limit state due to deformations by the slipping of the covering from the supports. In some cases the ultimate limit state of the serviceability will be reached earlier, partially by buckling of the sheets or by opening the restraint.

2.2.1.3 Load-bearing capacity of the bearing profile, the covering profile, the fixing bracket and the load converter

For the characteristic values of the load-bearing capacity of the components made of aluminium the European harmonized standards shall applies.

2.2.1.4 Load-bearing capacity of the fasteners

For the fasteners to establish the connection covering profile with fixing bracket and fixing bracket with load converter (see Annex 2.3, section E-E and Annex 2.4, section F-F of the ETA) the characteristic values given in the following apply for the tensile load-bearing capacity $N_{R,k}$ of the screws.

Name of screw	Components to be joined	Tensile load-bearing capacity $N_{R,k}$
EJOT JZ3-8,0 x 38	covering profile 38mm / fixing bracket "SK-Feld"; "SK-Feld 26-36"	10.7 kN

Name of screw	Components to be joined	Tensile load-bearing capacity $N_{R,k}$
EJOT JZ3-8,0 x 64	covering profile 60mm / fixing bracket "SK-Stoß"; "SK-Stoß 26-36"	13.7 kN
EJOT JT4-6-6,3 x 30	fixing bracket "SK-Feld"; "SK-Feld 26-36" / load converter "LK24°-TS35" and fixing bracket "SK-Stoß"; "SK-Stoß 26-36" / load converter "LK24°-TS35"	8.6 kN

2.2.2 Safety in case of fire

2.2.2.1 External fire performance

Class according to EN 13501-5 (PV1): F_{ROOF} (no performance determined)

2.2.2.2 Reaction to fire

The reaction to fire of the roof system is classified according to EN 13501-1 in class E.

2.2.2.3 Resistance to fire

No performance determined.

2.2.3 Hygiene, health and the environment

2.2.3.1 Release of dangerous substances or radiation

The self supporting translucent roof system complies with the provisions of guidance paper H ("A harmonized approach relating to dangerous substances under the Construction Product Directive", revised August 2002).

Note: In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.2.3.2 Water tightness and presence of condensation

The proven resistance to wind-driven rain and snow results for water tightness in category 1 "No penetration by no differential air pressure" for the installation of the roof system with roof pitches between 0° to 30° referring to the horizontal, positioned perpendicular to the curve direction.

2.2.4 Safety in use

Resistance to damage from soft body impact load 50 kg is classified according to EN 14963 as category SB 0 (no performance determined).

Resistance of polycarbonate (PC)-multi-wall sheets to hard body impact load 250 g passed the test. Thereby, no damages of the multi-wall sheets surfaces occurred. Measures to avoid brittle fractures in the sense of the ETAG 010 can be renounced. Resistance of GRP twin-wall sheet "GFUP 10-cavity" to hard body impact load 250 g passed the test. Thereby, resin spallings of the twin-wall sheet surfaces occurred. This must be considered in relation to its effect on weather tightness and durability.

For the resistance to horizontal traffic loads no performance was determined.

Handrails or balustrades are not foreseen for the use with the roof kit.

Since this approval does not comprise opening elements for the roof kit, no performance was determined for their safe opening.

2.2.5 Protection against noise

The sound insulation of the roof system was not verified (no performance determined).

2.2.6 Heat retention

If requirements as to the thermal resistance of the roof system are made, the thermal transmittance coefficient U_W is to be determined according to EN ISO 10077-1 as resultant of thermal transmittance coefficients weighted on the basis of the covering surface as well as all areas of thermal bridges existing in the installed state.

The thermal transmittance coefficient of the roof system depends on:

- surface percentage and thermal transmittance coefficient U_P of the covering,
- surface percentage and thermal transmittance coefficient U_f of the bearing profiles,
- surface percentage and thermal transmittance coefficient U_f of the impost and
- surface percentage and thermal transmittance coefficient U_f of further existing areas of thermal bridging, for example gable end fittings.

The respective surface percentages for the manufactured roof system have to be calculated. For the calculation of the thermal transmittance coefficient U_W of this roof system the following equation shall be used:

$$U_W = U_P \cdot A_P + \Sigma U_{fi} \cdot A_{fi} / (A_P + \Sigma A_{fi})$$

Thermal transmittance coefficient of coverings

Covering	Vertical installation U_P [W/(m²·K)]	Horizontal installation U_P [W/(m²·K)]
Type "PC10"	2.5	2.7
Type "PC10 + GFUP"	2.4	2.6
Type "PC16"	1.8	1.9
Type "PC16 + GFUP"	1.8	1.9
Type "PC10 + PC10"	1.6	1.7
Type "PC10 + PC10 + GFUP"	1.6	1.6
Type "PC10 + PC6"	1.8	1.9
Type "PC10 + PC6 tc 16"	1.4	1.5
Type "PC10 + PC10 tc 16"	1.2	1.3
Type "GFUP-cavity"	3.1	3.4

For the purpose of comparing the coverings in the sense of EN 673 the U_P-value shall be used for vertical installations. If the covering pitch is left out of consideration, the U_P-value for horizontal installation shall be applied for the calculation of the thermal transmittance coefficient U_W according to EN ISO 10077-1 in accordance with the EN ISO 6946.

Thermal transmittance coefficient of bearing profiles

Covering	Construction of bearing profile in compliance with	Section A-A U_f [W/(m²·K)]	Section B-B U_f [W/(m²·K)]
Type "PC10"	Annex 2.1	2.0	2.1
Type "PC10 + GFUP"	Annex 3.1	2.0	2.1
Type "PC16"	Annex 5.1	1.6	1.6
Type "PC16 + GFUP"	Annex 6.1	1.6	1.6
Type "PC10 + PC10"	Annex 7.1	1.4	1.4

Covering	Construction of bearing profile in compliance with	Section A-A U_f [W/(m²·K)]	Section B-B U_f [W/(m²·K)]
Type "PC10 + PC10 + GFUP"	Annex 8.1	1.4	1.4
Type "PC10 + PC6"	Annex 4.1	2.0	1.8
Type "PC10 + PC6 tc 16"	Annex 9.1	1.2	1.4
Type "PC10 + PC10 tc 16"	Annex 10.1	1.1	1.1
Type "GFUP-cavity"	Annex 11.1	2.8	2.3

Thermal transmittance coefficient of the impost

The thermal transmittance coefficient U_f of the impost has to be calculated as follows:

$$U_f = (\psi \cdot L + \chi \cdot N) / (L \cdot 0.141m)$$

ψ: longitudinal related thermal bridge loss-coefficient of impost

L: imposts overall length

χ: punctual thermal bridge loss-coefficient of bearing profiles and load converters

N: number of bearing profiles

Covering	Construction of the impost in compliance with	ψ [W/(m·K)]	χ [W/(K)]
Type "PC10"	section D-D, Annex 2.2	0.20	0.031
Type "PC10 + GFUP"	section D-D, Annex 3.2		
Type "PC16"	section D-D, Annex 5.2		
Type "PC16 + GFUP"	section D-D, Annex 6.2		
Type "PC10 + PC10"	section D-D, Annex 7.2		
Type "PC10 + PC10 + GFUP"	section D-D, Annex 8.2		
Type "PC10 + PC6"	section D-D, Annex 4.2		
Type "PC10 + PC6 tc 16"	section D-D, Annex 9.2		
Type "PC10 + PC10 tc 16"	section D-D, Annex 10.2		
Type "GFUP-cavity"	section D-D, Annex 11.2		

Thermal transmittance coefficient of other thermal bridge sectors

The thermal transmittance coefficient of other thermal bridge sectors has to be calculated according to EN ISO 10077-2 or alternatively it has to be tested according to EN 12412-2. These include for example the connections to the gable ends of the roof system.

The thermal transmittance coefficient for the sub-structure (upstand) is not introduced in the thermal transmittance coefficient calculation of the roof system U_W and shall therefore be determined separately according to EN ISO 6946. The water vapor permeability of the roof system has not been verified (no performance determined).

The risk of condensation has to be assessed by analyzing the local environmental conditions (air temperature/air moisture, inside and outside). If necessary, measures have to be foreseen to drain off the condensation.

Depending on the environmental conditions (temperature, humidity) condensate in the form of fine droplets can form on the glazing surfaces as well as in the hollow chamber of the PC-sheets. The droplets scatter the light and make the fogged areas appear white. Hereby the light transmission reduces; all other properties of the covering are not affected.

The air permeability and solar transmission of the roof system have not been verified (no performance determined).

2.2.7 Aspects of durability and serviceability

The roof system is applicable within a temperature range from -30 C to +70 °C.

When applying in a heavy industrial or marine atmosphere, the construction elements made of aluminium have to be coated with an additional protection against corrosion. When applying in a moderately industrial or marine atmosphere and in rural areas it can be done without an additional protection against corrosion, provided that the use and maintenance conditions as described in section 4 and 5 are respected. The design engineer makes a decision whether or not an additional protection against corrosion is required.

At the open ends the multi-wall sheets have to be sealed for dirt protection with a dust proof masking.

In case the roof system, in particular the multi-wall sheets and, if relevant, GFUP sheets, are systematically in contact with chemicals, the resistance to these substances shall be checked. Thereby, the high concentrations of chemicals in the surrounding air also have to be considered.

The precautions listed in section 5.1.7.1 of the ETAG 010 have to be respected.

2.3 Components characteristics

Detailed information about chemical composition and further components properties are deposited with the DIBt, according to section 8.3 of the ETAG 010.

Further information is given in the product data sheets, which are part of the technical documentation of this ETA.

2.3.1 PC-multi-wall sheets

The multi-wall sheets consist of polycarbonate, molding material Makrolon 1143 by manufacturer Bayer AG, D-Leverkusen and they are produced by an extrusion process. The outside is covered with a protective coating against UV-rates of the solar radiation.

The maximum width of the sheets is 2100 mm. The following three multi-wall sheets are used:

- "Makrolon multi UV 4/10-6" with a sheet thickness of 10 mm (see Annex 13.1)
- "Makrolon multi UV 6/16-20" with a sheet thickness of 16 mm (see Annex 13.2)
- "Lamilux PC 4/6" with a sheet thickness of 6 mm (see Annex 13.3)

The reaction to fire of multi-wall sheets is classified according to EN 13501-1 in class E.

2.3.2 GRP twin-wall sheet type "GFUP-10-cavity"

The 10 mm high sheet consist of textile-glass fibre reinforced, unsaturated polyester resin and is manufactured continuously on a flat conveyor plant with a width of 2100 mm with a ratio of textile-glass compound of at least 34 %. For the strengthening a textile glass fabric is used with evenly distributed loop piles over the surface as well as an additional randomly oriented fibre fleece.

The outer surface of the sheets has an additional surface protection, which is applied as gelcoat film of light-stabilized, unsaturated polyester resin.

The maximum width of the sheets is 2100 mm. The following twin-wall sheet is used:

- LAMILUX "Composite 10 mm GFUP cavity-resist" with a sheet thickness of 10 mm (see Annex 13.4)

The reaction to fire of "GFUP 10-cavity" sheet is classified according to EN 13501-1 in class E.

2.3.3 GRP sheet "LAMILUXplan 1.2 mm GFUP"

Sheet made of glass fiber reinforced unsaturated polyester resin with a thickness of 1.2 mm and with a ratio of glass compound of at least 20 %.

The reaction to fire of GRP sheet is classified according to EN 13501-1 in class E.

2.3.4 Bearing profiles and covering profiles 38 mm and 60 mm

The Al-profiles, EN AW-6060 T66 according to EN 755-2, have the dimensions given in Annex 12.1 of the ETA.

The reaction to fire of the Al-profiles is classified according to EN 13501-1 in class A1.

The corrosion resistance of the Al-profiles is classified according to EN 1999-1-1 in class B.

2.3.5 Al-profiles "GL-PC10", "GL-PC16" ,"GL-PC20" ,"GL-PC32" and "GL-PC36"

The Al-profiles, EN AW-6060 T66 according to EN 755-2, have the dimensions given in Annex 12.2 and 12.3 of the ETA.

The reaction to fire of the Al-profiles is classified according to EN 13501-1 in class A1.

The corrosion resistance of the Al-profiles is classified according to EN 1999-1-1 in class B.

2.3.6 Connecting profile "FP24°"

The connecting profile consists of polyvinylchloride (PVC-U, EGL, 078-25-T33 according to EN ISO 1163-1) and has the dimensions given in Annex 12.4 of the ETA.

The reaction to fire of the PVC-profiles is classified according to EN 13505-1 in class E.

2.3.7 Spacing profiles 10 mm, 16 mm and 20 mm

The spacing profiles consist of polyvinylchloride (PVC-U, EGL, 078-25-T33) according to EN ISO 1163-1 and have the dimensions given in Annex 12.4 of the ETA.

The reaction to fire of the PVC-profiles is classified according to EN 13505-1 in class E.

2.3.8 Spacing profiles TSD-16 and TSD-20

The spacing profiles consist of PVC (PVC-U, EGL, 078-25-T33) according to EN ISO 1163-1 and show the dimensions listed in Annex 12.5 of the ETA.

The reaction to fire of the PVC profiles is classified in class E according to EN 13501-1.

2.3.9 Spacer strips 16 x 28 and 16 x 52

The spacer strips consist of a core of PE foam according to EN ISO 7214 with an apparent density of 60 kg/m³ which is laminated on the topside and the underside with PE foam according to EN ISO 7214 with an apparent density of 24 kg/m³. The dimensions given in Annex 12.5 of the ETA.

The reaction to fire of the spaces strips profiles is classified in class E according to EN 13501-1.

2.3.10 Load converter "LK24°-TS35"

The load converter consists of Al–cast (EN AC-44200 according to EN 1706) and has the dimensions given in Annex 12.6 of the ETA.

The reaction to fire of the Al–cast component is classified according to EN 13501-1 in class A1.

The corrosion resistance of the Al–cast component is classified according to EN 1706 in class B.

2.3.11 Fixing bracket "SK-Stoß" , "SK-Stoß 26-36" , "SK-Feld" and "SK-Feld 26-36"

The fixing brackets consist of Al–cast (EN AC-44200 according to EN 1706) and have the dimensions given in Annex 12.7 up to 12.10 of the ETA.

The reaction to fire of the Al–cast component is classified according to EN 13501-1 in class A1.

The corrosion resistance of the Al–cast component is classified according to EN 1706 in class B.

2.3.12 Impost sealing

The impost sealing consists of ethylene-propylene terpolymer (EPDM) and has the dimensions given in Annex 12.11 of the ETA. The shore A-hardness is 60° +/-5° according to EN ISO 868.

The reaction to fire of the sealing is classified according to EN 13501-1 in class E.

2.3.13 Covering profile sealing

The sealing consists of a supportive structure made of polypropylene (PP) and a sealing lip made of EPDM and has the dimensions given in Annex 12.11 of the ETA.

The shore A hardness of the supportive structure made of PP shall be 98° +/-5° according to EN ISO 868.

The shore A hardness of the sealing lip made of EPDM shall be 60° +/-5° according to EN ISO 868.

The reaction to fire of sealing is classified according to EN 13501-1 in class F (no performance determined).

2.3.14 Fasteners

The following screws have to be used according to the Annex 12.12 of the ETA:

- self-tapping screw "EJOT JZ3-8.0x38"
  junction between covering profile 38 mm and fixing bracket "SK-Feld", "SK-Feld 26-36"
- self-tapping screw "EJOT JZ3-8.0x64"
  junction between covering profile 60 mm and fixing bracket "SK-Stoß", "SK-Stoß 26-36"
- self-drilling screw "EJOT JT4-6-6.3x30"
  junction between fixing bracket "SK-Feld" or "SK-Feld 26-36" and load converter "LK24°-TS35" and
  junction between fixing bracket "SK-Stoß" or "SK-Stoß 26-36"and load converter "LK24°-TS35"
- self-drilling screw "EJOT JT4-STS-3-5.5x48"
  junction between bearing profile and load converter "LK24°-TS35"

The screws shall be made of stainless steel material number 1.4301 according to EN 10088 and they shall comply with the information deposited in the technical documentation of this ETA.

The characteristic load-bearing capacity of screws type "EJOT JZ3-8.0x38", "EJOT JZ3-8.0x64" and "EJOT JT4-6-6.3x30" is listed in section 2.2.1 of the ETA. The self-drilling screw "EJOT JT4-STS-3-5,5x48" is used for the protection of the bearing profile position only.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 98/600/EG of the European Commission[7] system 3 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 3: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:
  (1) factory production control;

(b) Tasks for the approved body:
  (2) initial type–testing of the product.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. The factory production control shall ensure that the product is in conformity with this European technical approval.

The manufacturer may only use initial-, raw- and constituent materials stated in the technical documentation of this European technical approval.

[7] Official Journal of the European Communities L 287 of 24.10.1998, Ä: L 209 of 02.08.2001

The factory production control shall be in accordance with the "control plan" relating to the European technical approval ETA-09/0347 which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system and deposited with Deutsches Institut für Bautechnik.[8]

The results of the factory production control shall be recorded and evaluated in accordance with the provisions of the "control plan".

3.2.1.2 Other tasks of the manufacturer

The manufacturer shall, on the basis of a contract, involve a body, which is approved for tasks referred to in section 3.1 in the field of multi-wall sheets, in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of the European technical approval ETA-09/0347 issued on 20 June 2013.

3.2.2 Tasks of the approved bodies

The approved body shall perform the following tasks in accordance with the provisions of the "control plan":

- Initial type test of the product.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

3.3 Marking

3.3.1 CE marking

The CE marking shall be affixed by the manufacturer on the accompanying commercial documents of the roof kit and on the installed product itself. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and the address of the producer (legal entity responsible for manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the European technical approval,
- the number of the guideline for European technical approval,
- the trade name of the product,
- the used type of the covering and the bending radius of the covering,
- the used support system and the spacing of the bearing profiles,
- the maximum admissible actions determined according to section 2.2.1 for the loading conditions surcharge and gravity load for the installed system,
- the achieved class of the roof system reaction to fire,
- the classification of the water tightness with specification of the admissible installation inclination,
- the U_W factor of the complete construction calculated according to section 2.2.6.

The marking upon the installed product is carried out by the manufacturer or his agent using a self-adhesive label which has to be stuck on covering profile with a wide of 60 mm within the area of the front side fittings.

[8] The "control plan" is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

3.3.2 Additional marking

The outside of the multi-wall sheets with the UV protective coating as well as the outer side of the GRP twin-wall sheet with gelcoat film shall be marked in the edge area.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The components of the self supporting translucent roof system have to be compliant in their composition and production process with those, which were the base for the approval tests. The composition and production process are deposited with DIBt.

In the connecting profile "FP24°" all penetrations which are necessary for the installation and the safe functioning of the roof system have to be implemented. The bearing profiles shall be bent circularly towards the curve radius by cold forming. The multi-wall sheets, the GRP sheets, the aluminium profiles and the covering profiles shall be delivered in the required nominal length. The covering profile sealing shall be pulled into the covering profile on both sides and shall be fixed continuously braced. For the glazing variants "thermal composite", short (tc) the spacer strips shall be fixed against slipping on the inner multi-wall sheet.

The ETA is issued for self supporting translucent roof systems on the basis of agreed data and information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Installation

4.2.1 General

This European technical approval applies to the manufacturing, surveillance and marking of the self supporting translucent roof system "CI-System Lichtband B".

4.2.2 Design of the roof system

4.2.2.1 General

The given calculations apply only in so far as no corresponding values and no corresponding calculation formula are demanded in the relevant national regulatory provisions.

The fixing of the roof system on the substructure is not subject of this ETA. The verification of stability shall be calculated depending on the substructure according to the valid European provisions.

4.2.2.2 Design of the translucent sheets

The design value of the maximum action of the load-bearing capacity R_d can be calculated as follows:

$$R_d = \eta_{dC} \cdot R_k / \gamma_{MR}$$

The design value of the maximum action of the serviceability C_d can be calculated as follows:

$$C_d = \eta_{dC} \cdot C_k / \gamma_{MC}$$

The characteristic values R_k and C_k are listed in section 2.2.1.2 of the ETA.

The material factor η_{dC} can be calculated depending on the magnification factors relevant for the loading situation as follows:

$\eta_{dC} = 1 / (C_t \cdot C_u \cdot C_\theta)$

C_t takes into consideration the influence of load duration

$C_{t(0,1h)}$	= 1.00	for short-term loads
$C_{t,PC,(2000h)}$	= 1.15	for load durations up to 2000 h on PC
$C_{t,GRP,(2000h)}$	= 1.30	for load durations up to 2000 h on GRP

C_u takes into consideration the ageing and environmental influences

$C_{u,PC}$	= 1.10	for ageing and environmental influences on PC
$C_{u,GRP}$	= 1.20	for ageing and environmental influences on GRP

C_θ takes into consideration the effect of temperature influences

$C_{\theta\ (23°C)}$	= 1.00	for temperature influences up to 23 °C
$C_{\theta,PC,(70°C)}$	= 1.20	for temperature influences above 23 °C up to 70 °C on PC
$C_{\theta,GRP,(60°C)}$	= 1.30	for temperature influences above 23 °C up to 60 °C on GRP

The partial safety factors for the verification of the load-bearing capacity γ_{MR} and the verification of the serviceability γ_{MC} can be calculated as follows:

$$\gamma_{MR} = a_1 \cdot \gamma_{Rd} \cdot e^{(\alpha_R \cdot \beta_K - k) \cdot v}$$

$$\gamma_{MC} = a_2 \cdot \gamma_{Rd} \cdot e^{(\alpha_R \cdot \beta_C - k) \cdot v}$$

where

γ_{Rd}	= 1.05	partial safety factor for the uncertainty of the model used
α_R	= 0.8	weight factor
β_K	= 4.2	index of reliability for ultimate limit state loads
β_C	= 2.5	index of reliability for serviceability limit state loads
k	= 1.645	fractile factor
v	≥ 0.10	variation coefficient
a_1, a_2:		correction factors
		can be used with 1.0, if no other determinations have been made on national level

4.2.2.3 Design of the bearing and covering profile

The components made of aluminium have to be designed depending on the use, according to the valid European provisions.

For the verification of bearing intermediate supports (see Annex 2.1 of the ETA, section A-A) the complete continuous effect shall be considered when calculating actions.

The displacement of the supports in consequence of the horizontal load shares from the curve have to be taken into account when verifying curved bearing profiles. The supporting structures made of aluminium have to be constructed stable for themselves; a consideration of multi-wall sheets for bracing is not allowed.

4.2.2.4 Design of the fasteners

The design value of load-bearing capacity $N_{R,d}$ can be calculated as follow:

$$N_{R,d} = N_{R,k} / \gamma_M$$

The characteristic values $N_{R,k}$ are listed in section 2.2.1.4 of the ETA.

γ_M = 1.33 safety factor

4.3 Installation of the components

The executing company has to provide a qualified foreman for this purpose. The foreman shall be present at the construction site during the execution of the works. The installation of the roof system can only be performed by specialists specially trained for this purpose. The installation guidelines of the applicant shall be respected.

Before installation of the roof system, the substructure has to be inspected for its dimensional accuracy. Thereby, particular attention should be paid to the fact that the ground plan area of the substructure is of rectangular shape. The compliance of the existing substructure with the substructure applied during the planning and during the verification of its bearing capacity shall be checked visually.

During the installation of the roof system components firstly, the load converters are placed into the appropriate openings of the connecting profile "FP24°" and screwed to the substructure with the fasteners specified in the planning. The bearing profiles are positioned into the load converter "LK24°-TS35" and fixed. Thereafter the covering is placed on the bearing profiles and curved thereby by cold forming according to the radius of curvature of the bearing profiles. Afterwards the covering is fixed on both sides to the impost with aluminium profiles and with fixing brackets "SK-Stoß" or "SK-Stoß 26-36", whereas the spacer on the fixing brackets "SK-Stoß" or "SK-Stoß 26-36", shall be in between the covering elements.

When bearing of the multi-wall sheets the minimum fixing distances e_{curve} and e_{impost} given in the Annexes of the ETA shall be respected.

Thereafter the fixing brackets "SK-Feld" or "SK-Feld 26-36" will be mounted in the area of intermediate support and impost sealing and the covering profiles will be fixed with the self-cutting screws. The minimum screwing depth given in sections E-E and F-F of ETA Annexes 2.1 to 11.4 shall be respected.

It shall be ensured that all seals are fixed non-relocatable to avoid a relocation of the seal due to thermal expansion and the resulting leakage. Impacts of the impost sealing have to be realised under the fixing brackets.

The roof system may be walked upon by single persons for installation purposes by using of laid running boards. The running boards shall be applied on statically proven bearing profiles; the boards shall run crosswise to the fixing profiles.

5 Indications for manufacturing and use

5.1 Packing, transport and storage

The components of the roof system shall be stored and transported according to the manufacturer specifications in such a way that damages to the components are excluded. Particular attention should be paid to the fact that for multi-wall sheets made of polycarbonate only those surfaces with UV protective coating shall be exposed to UV radiation and for the GRP twin-wall sheets, surfaces with the gelcoat film which shall be exposed to the weathering. The packing shall be such that the material is protected from moisture and weathering, however, a heat accumulation in the interior of the packing is avoided.

5.2 Use, maintenance, repair

The roof system is not accessible by pedestrians in the installed state. The multi-wall sheets may not be accessed neither for installation purposes nor for other purpose during use.

Within the framework of maintenance the installed continuous roof light shall be yearly examined visually by expert person. If cracks or other damages on the surface of the polycarbonate multi-wall sheets or GRP twin-wall sheet are visible or if they show a heavy staining, the manufacturer shall be consulted.

Within the framework of the visual inspection it shall be tested on the GRP twin-wall sheet "GFUP 10-cavity" additionally whether there are bare glass fibres on the surface. If bare glass fibres are found a protective coat of appropriate light-stabilized reaction resin shall be applied by the manufacturer.

The aluminium components of the roof system shall be examined for strong corrosion within the scope of a visual inspection. If necessary, a repair shall be initiated by the manufacturer.

When replacing components, the components listed in the ETA may only be use.

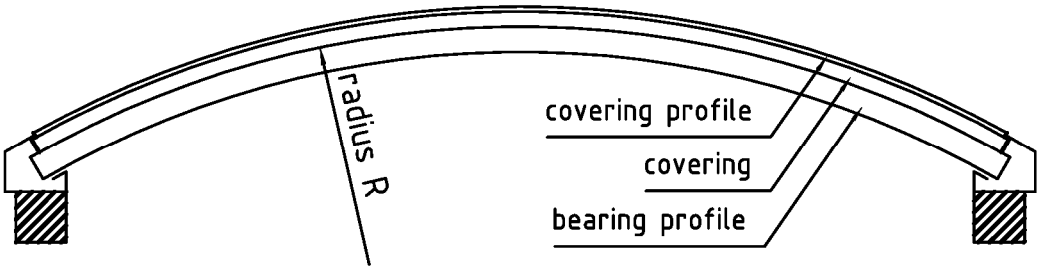
Detergents shall be free of solvents and abrasives. The employment of chemical and biological cleaning additives may only be allowed, if the compatibility with polycarbonate and, where relevant, GFUP had been tested, apart from that only water und soft cloths shall be used for cleaning of the multi-wall-sheets and the GRP twin-wall sheet.

Dirk Brandenburger
Head of Department

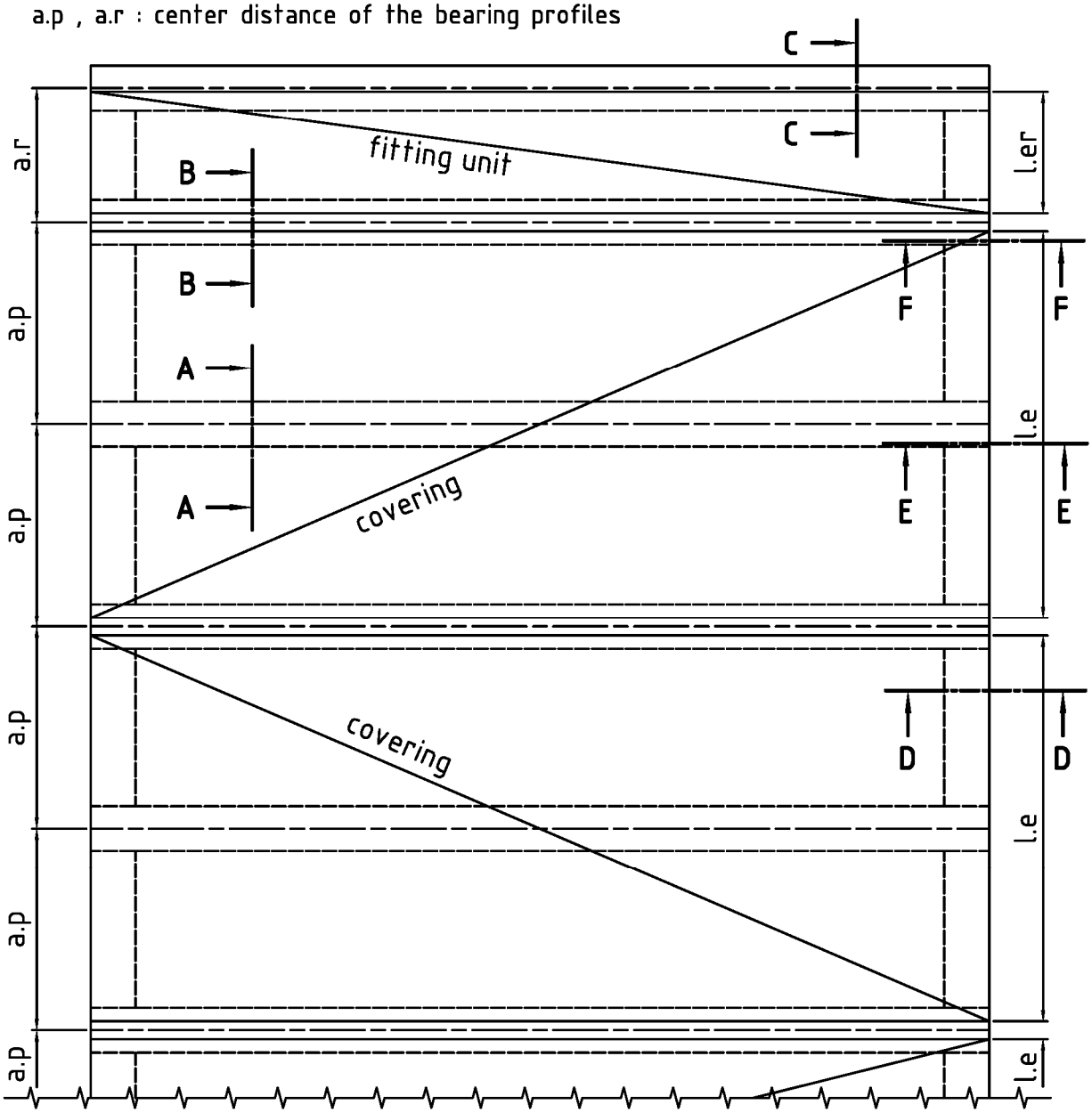
beglaubigt:
Beckmann

Deutsches Institut für Bautechnik DIBt

schematic system overview, 2-span system



a.p , a.r : center distance of the bearing profiles



CI-System Lichtband B	Annex 1.1
system overview 2-span system	

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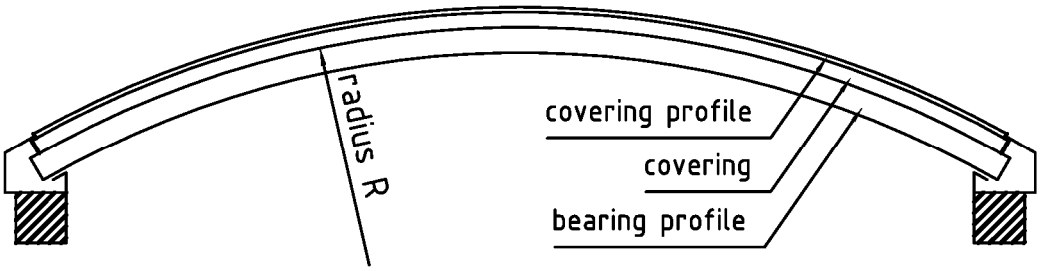
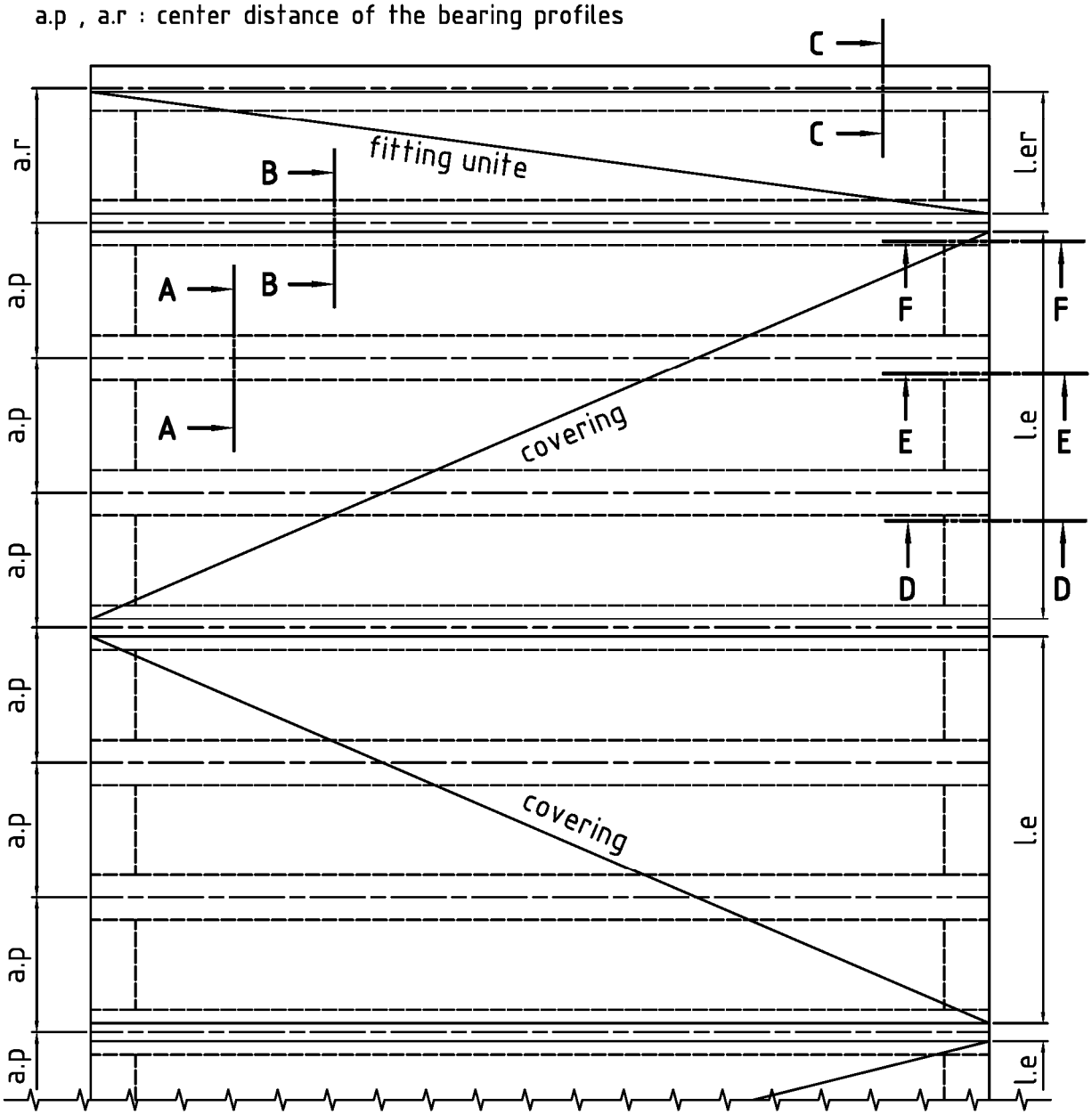
schematic system overview, 3-span system



a.p , a.r : center distance of the bearing profiles



CI-System Lichtband B	Annex 1.2
system overview 3-span system	

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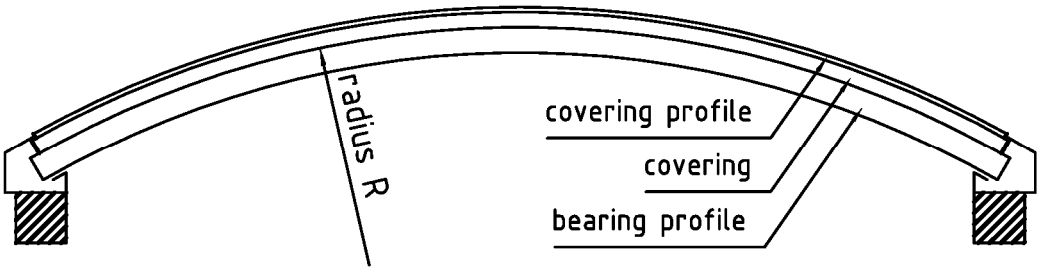
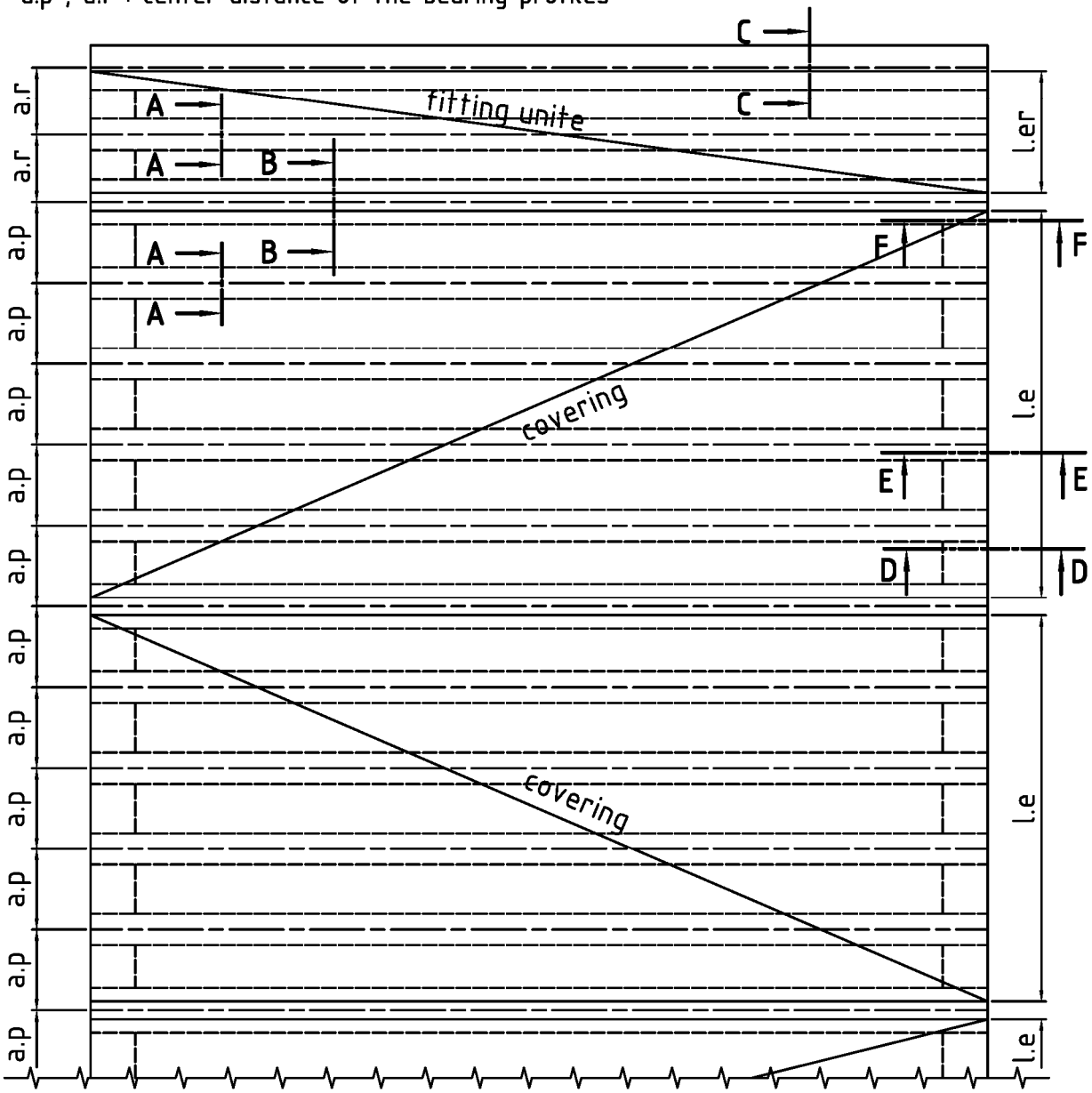
schematic system overview, 5-span system



a.p , a.r : center distance of the bearing profiles



CI-System Lichtband B	Annex 1.3
system overview 5-span system	

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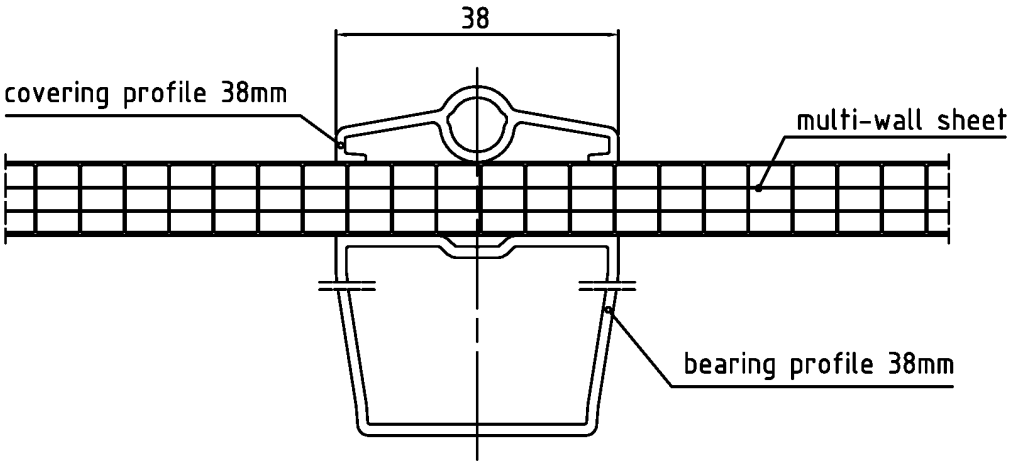
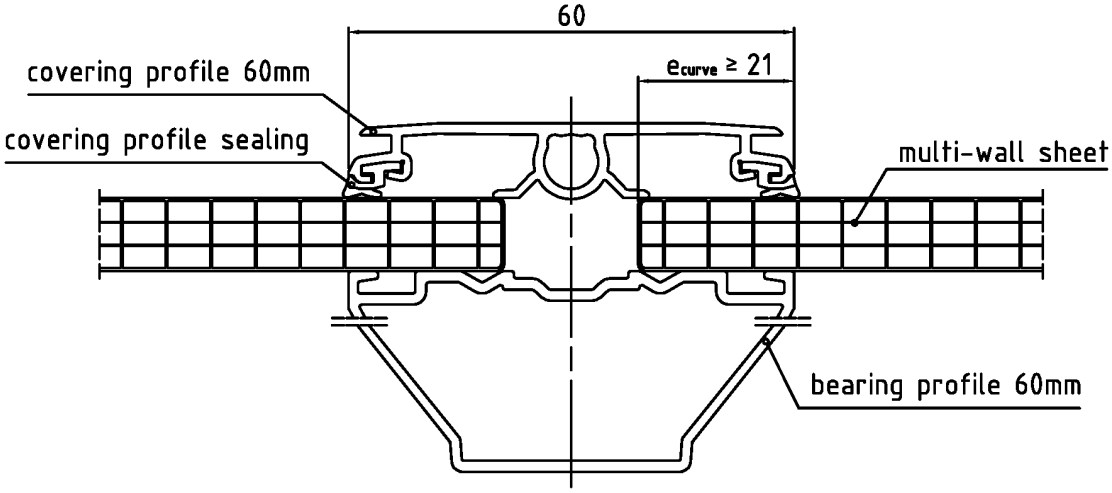
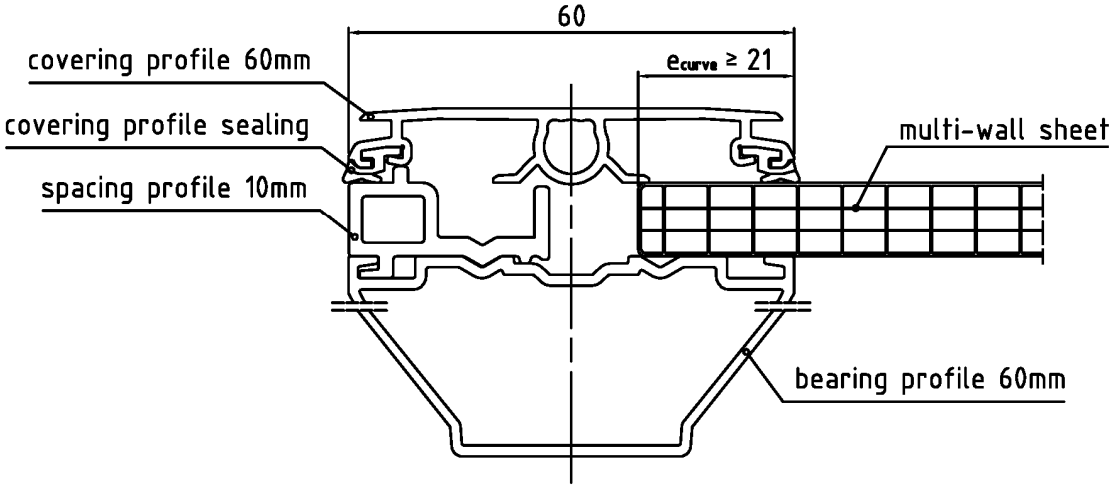
section A-A



section B-B



section C-C



CI-System Lichtband B	Annex 2.1
sectional views covering type "PC10" section A-A; section B-B; section C-C	

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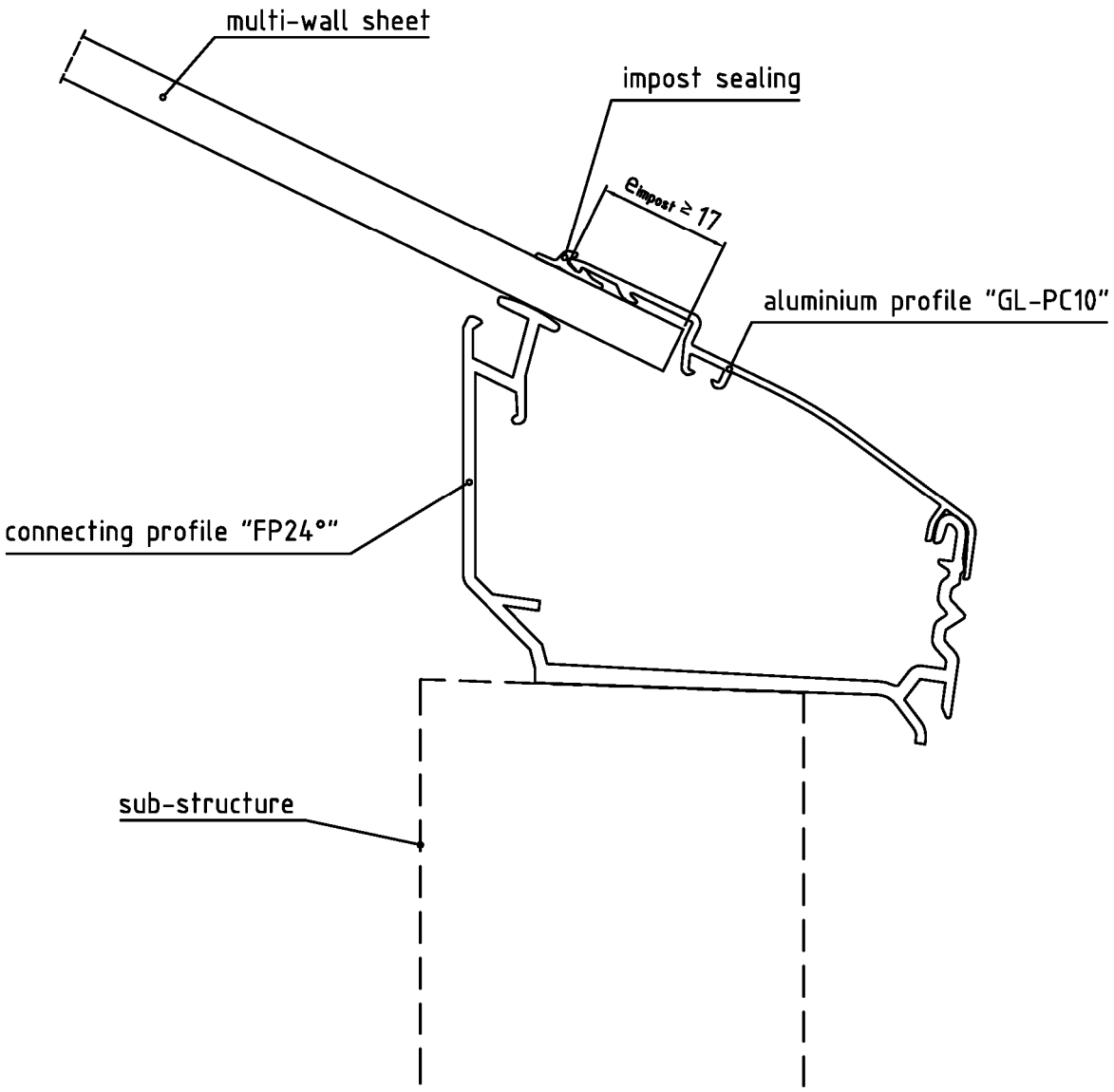
section D-D



CI-System Lichtband B	Annex 2.2
sectional views covering type "PC10" section D-D	

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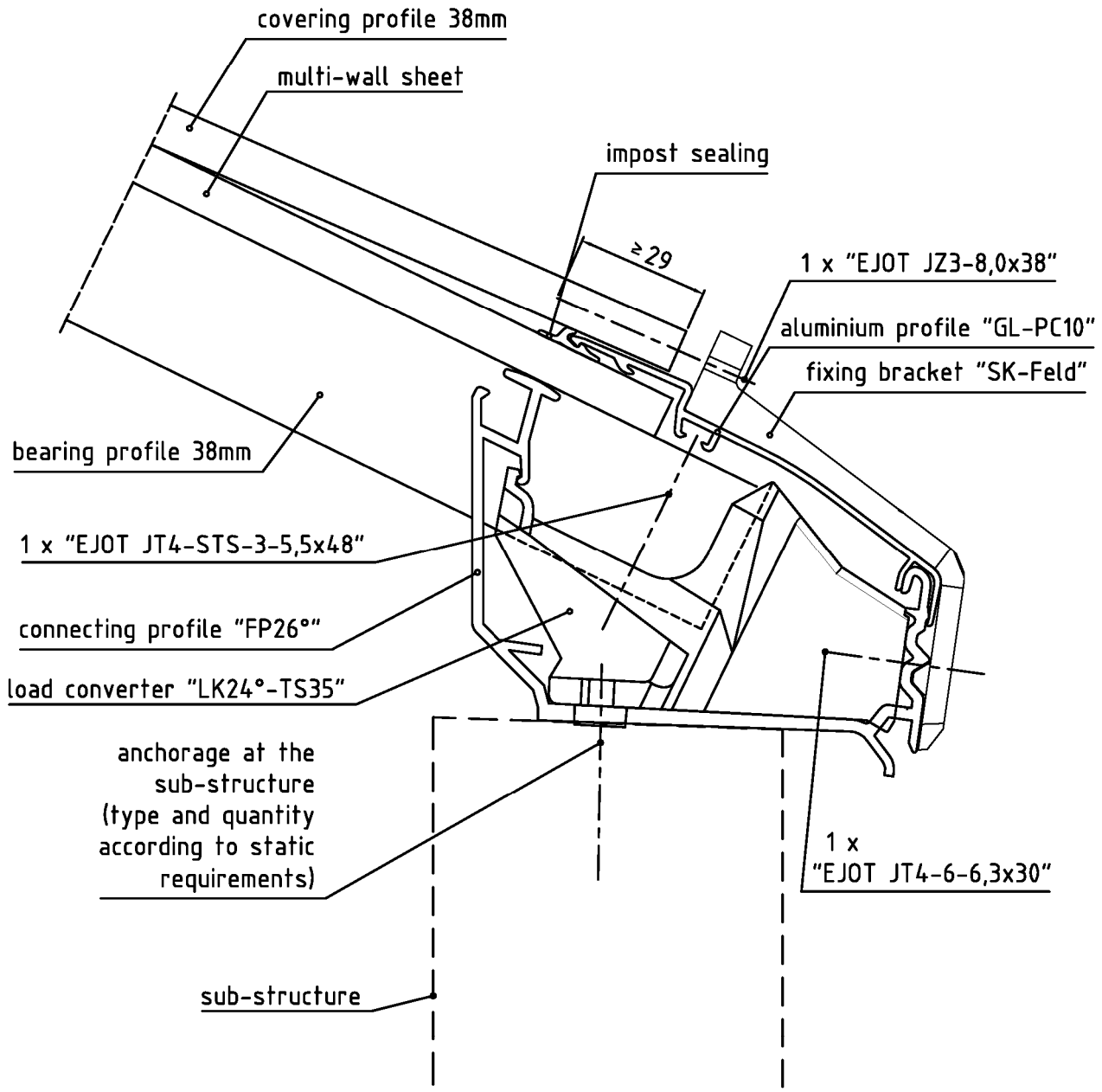
section E-E



CI-System Lichtband B	Annex .2.3
sectional views covering type "PC10" section E-E	

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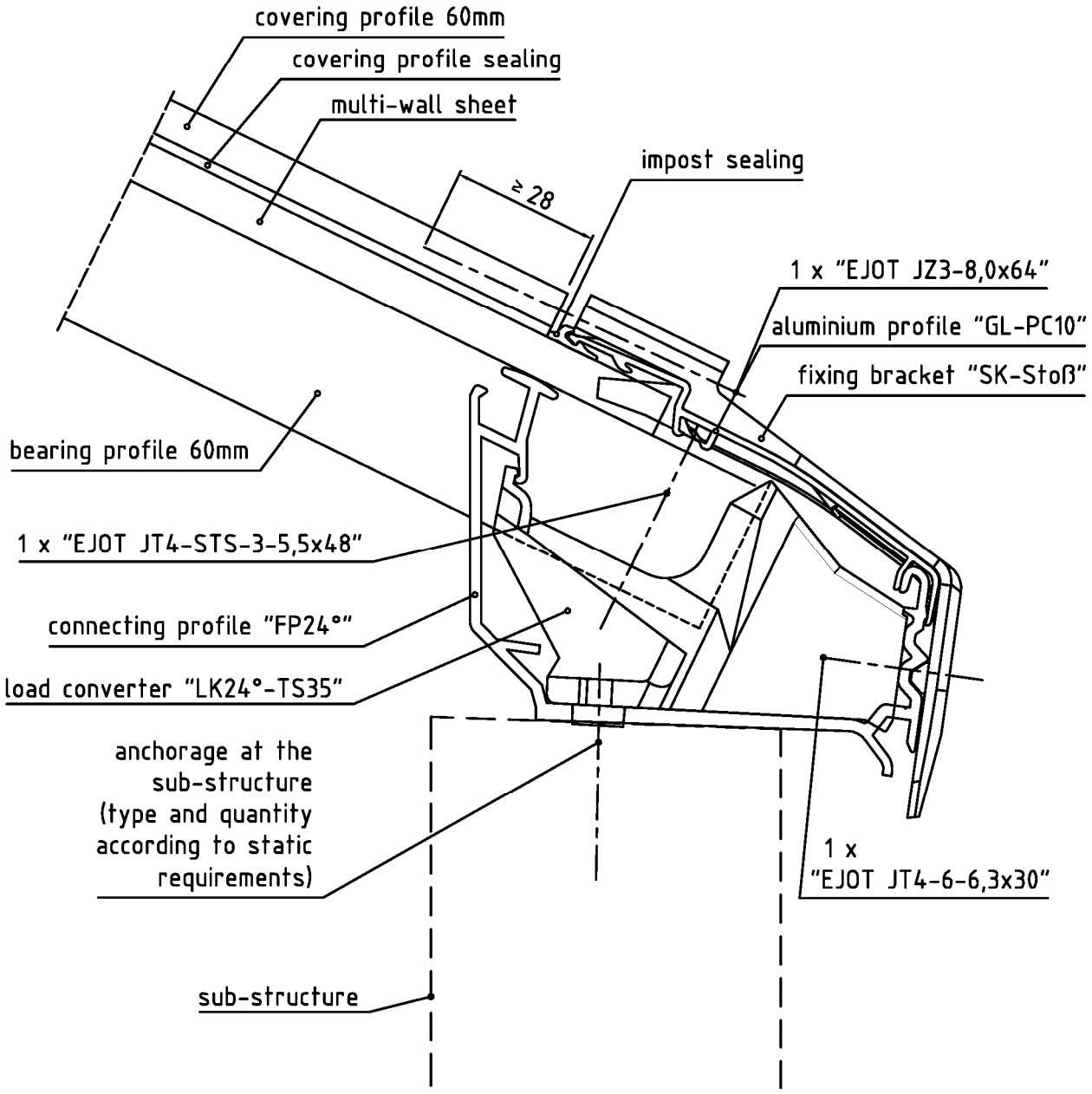
section F-F



CI-System Lichtband B	Annex 2.4
sectional views covering type "PC10" section F-F	

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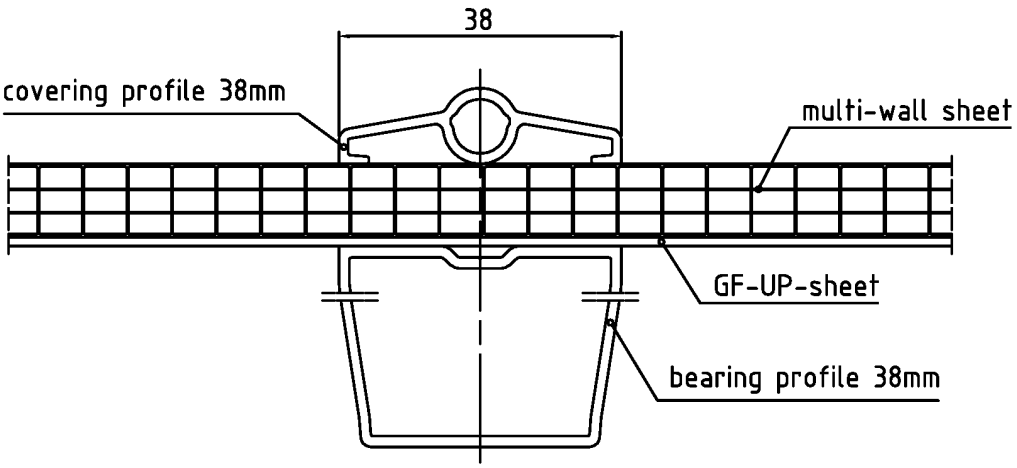
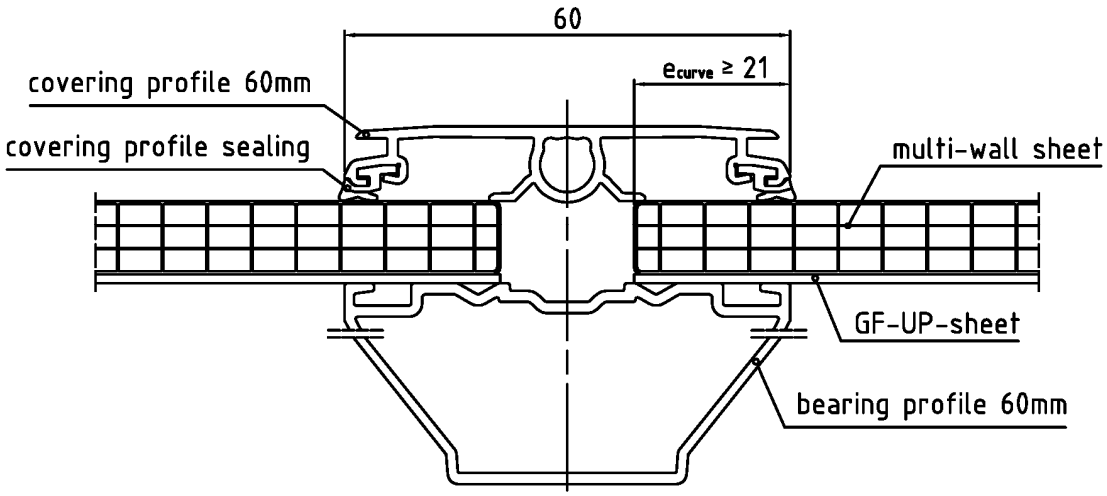
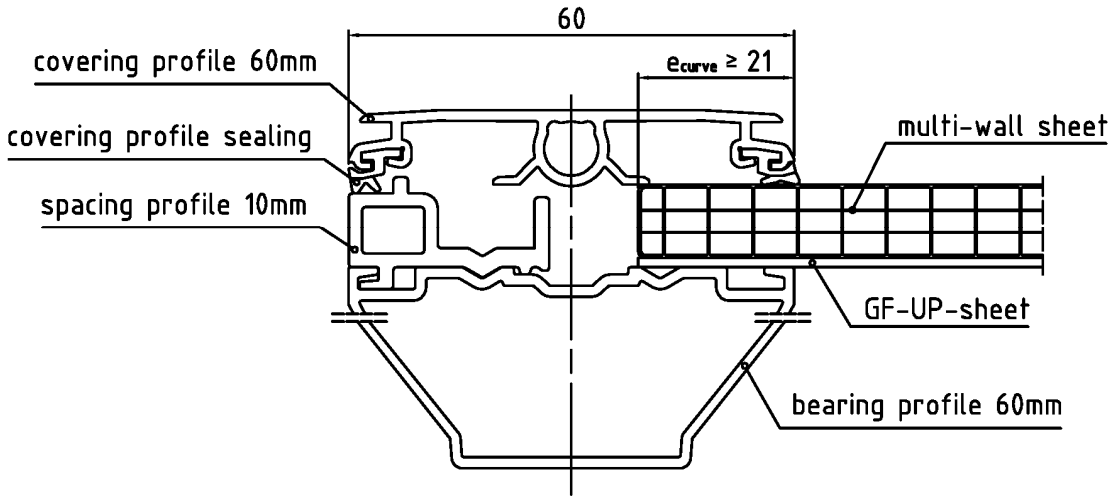
section A-A



section B-B



section C-C



CI-System Lichtband B	Annex 3.1
sectional views covering type "PC10 + GFUP" section A-A; section B-B; section C-C	

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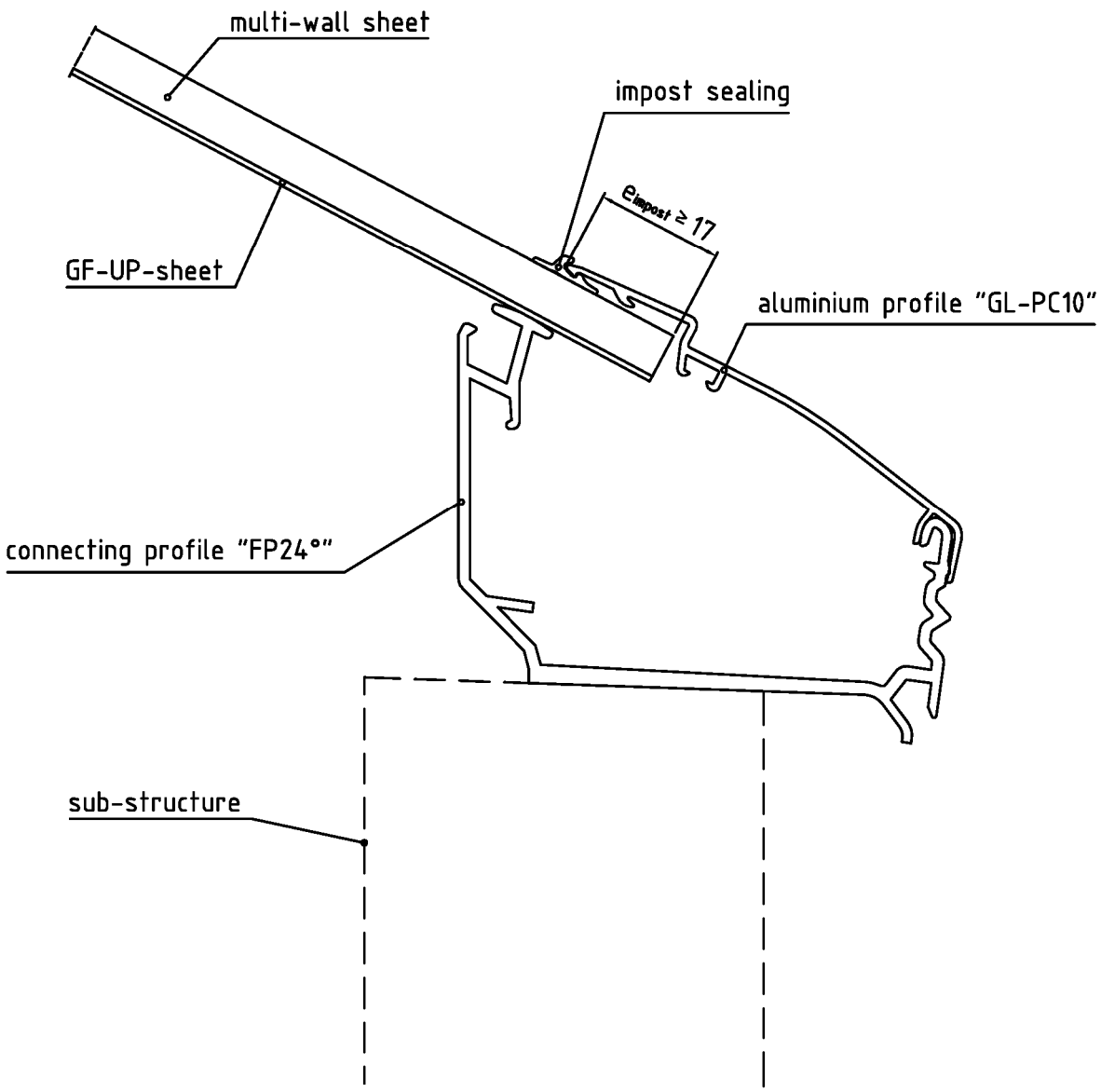
section D-D



CI-System Lichtband B	Annex 3.2
sectional views covering type "PC10 + GFUP" section D-D	

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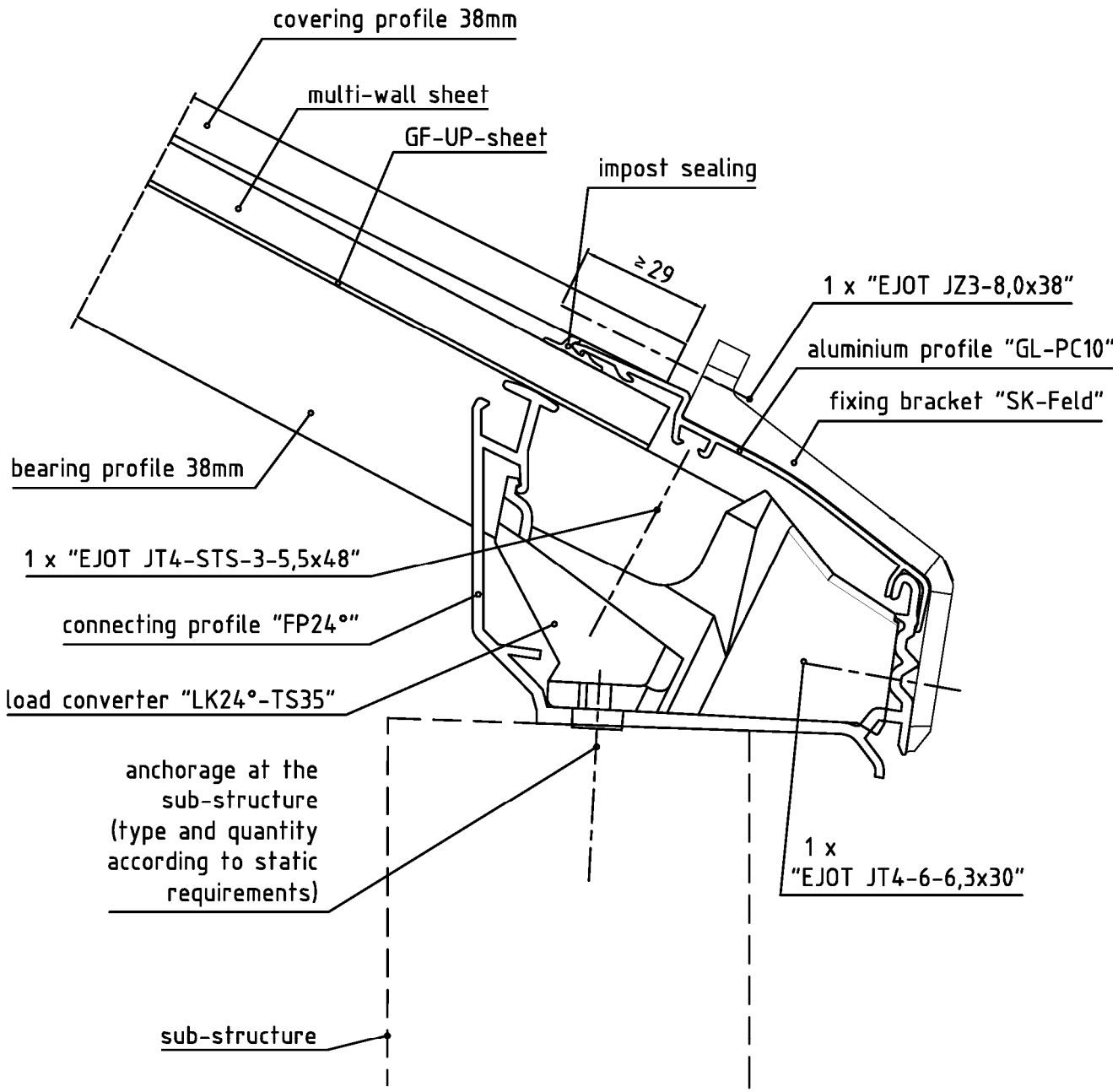
section E-E



CI-System Lichtband B	Annex 3.3
sectional views covering type "PC10 + GFUP" section E-E	

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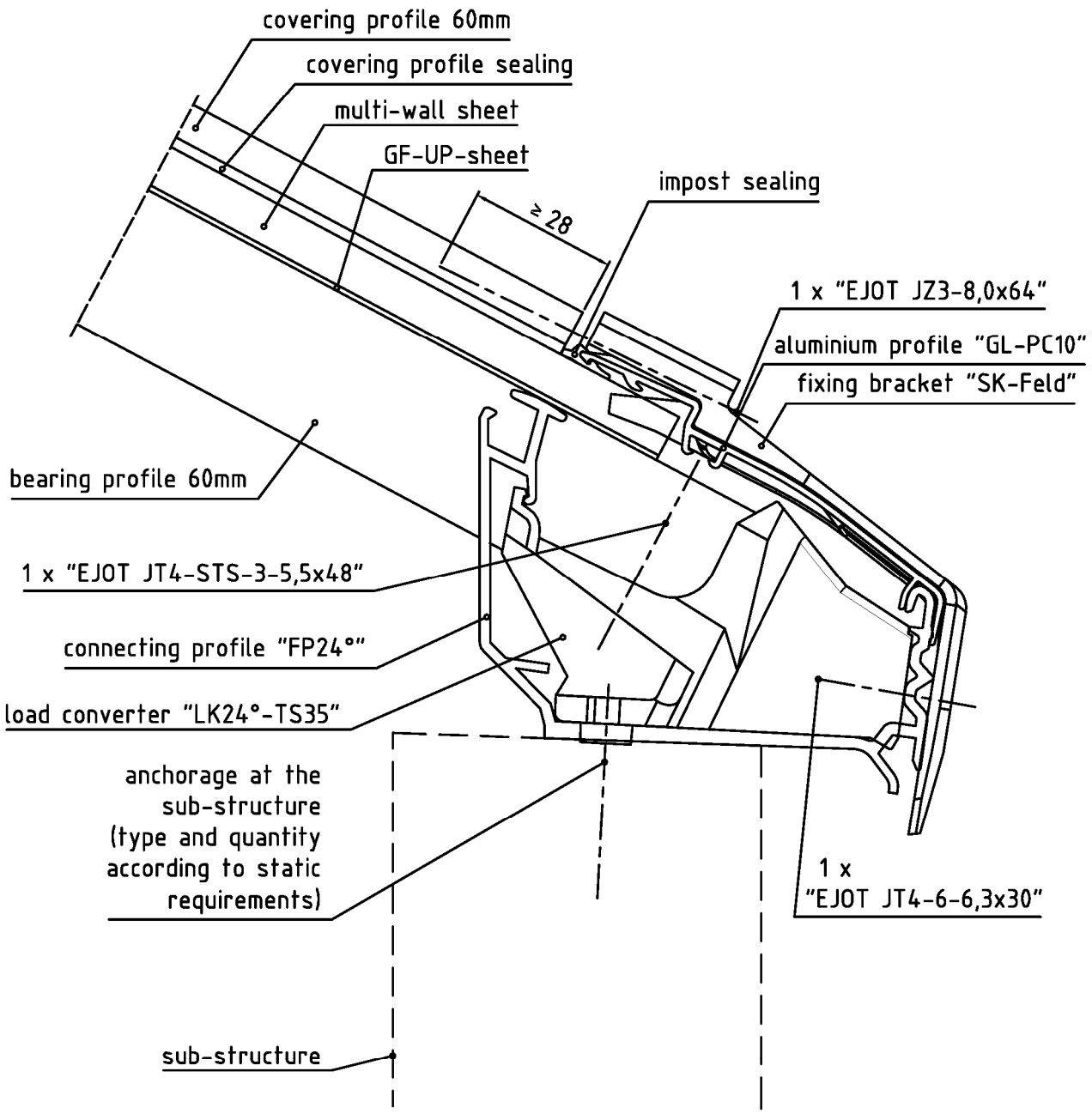
section F-F



CI-System Lichtband B	Annex 3.4
sectional views covering type "PC10 + GFUP" section F-F	

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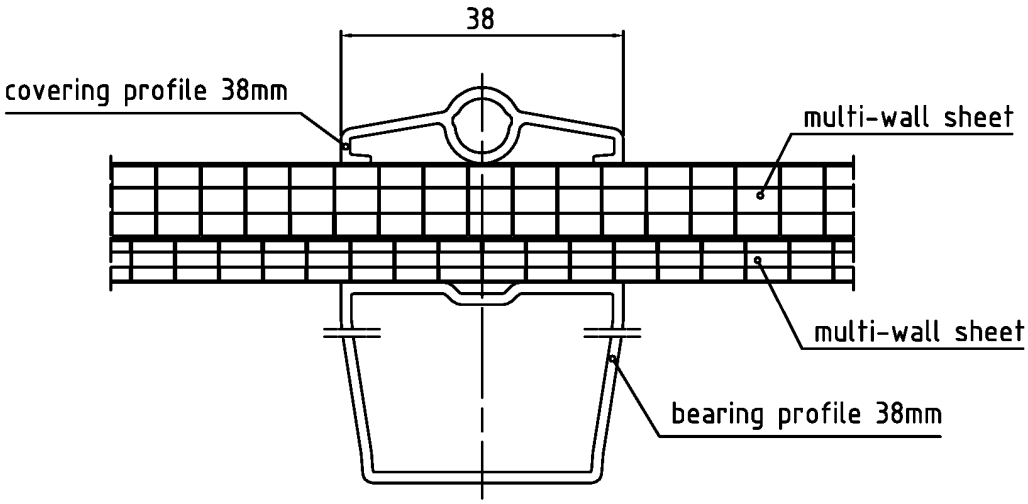
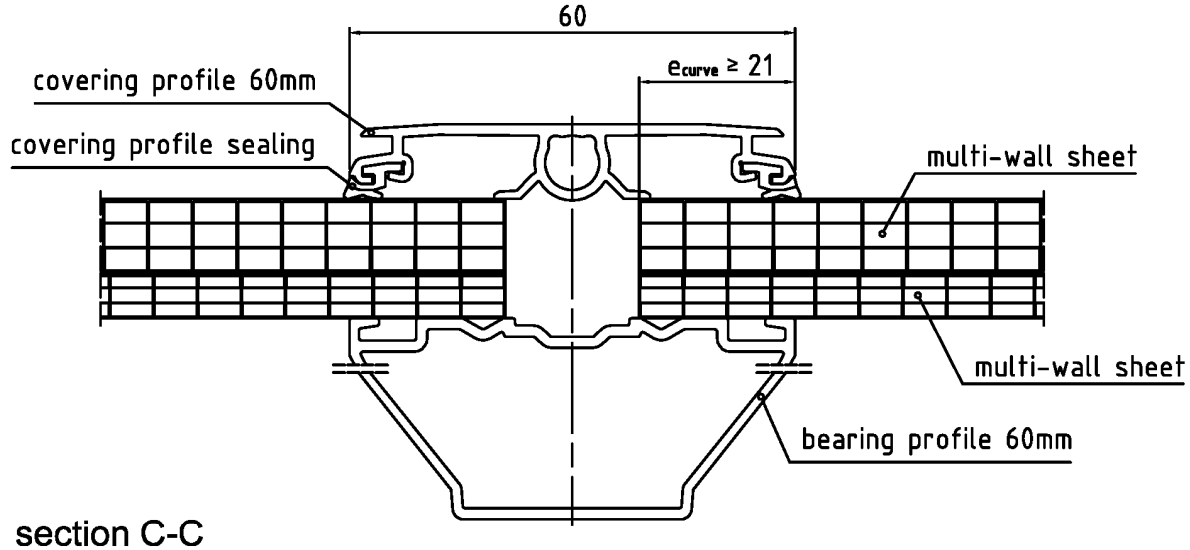
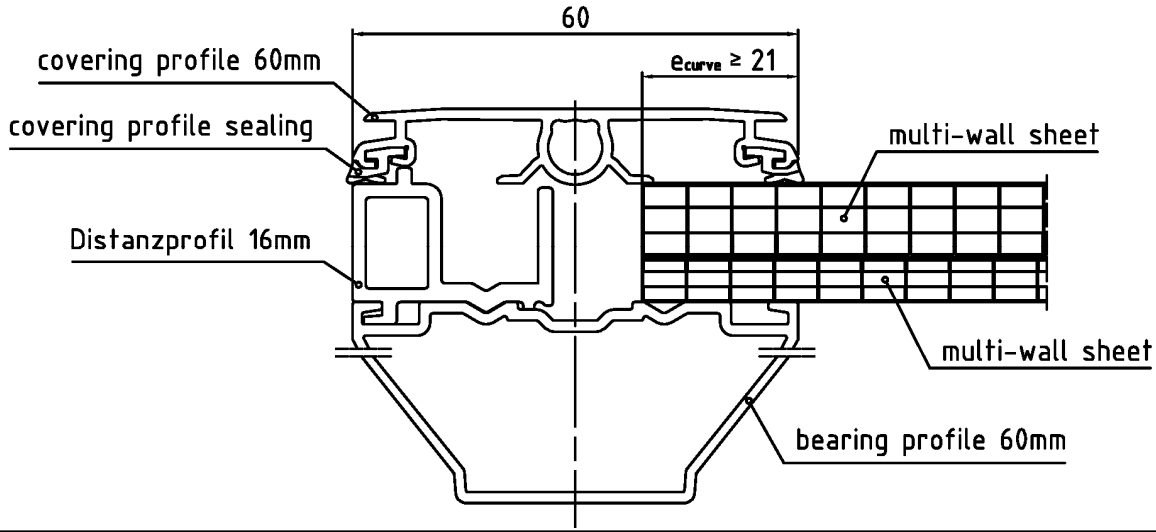
section A-A



section B-B



section C-C



CI-System Lichtband B	Annex 4.1
sectional views covering type "PC10 + PC6" section A-A; section B-B; section C-C	

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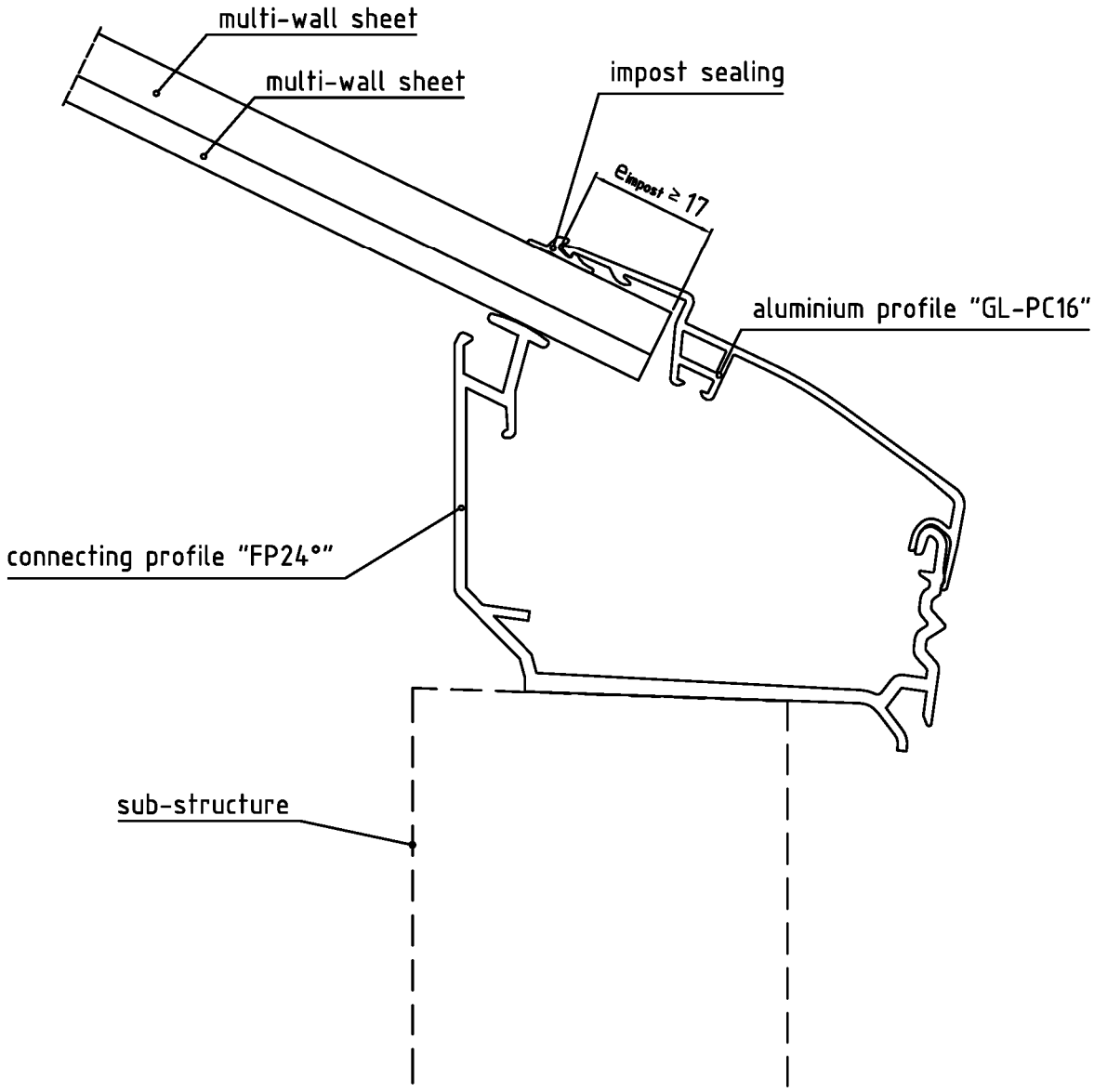
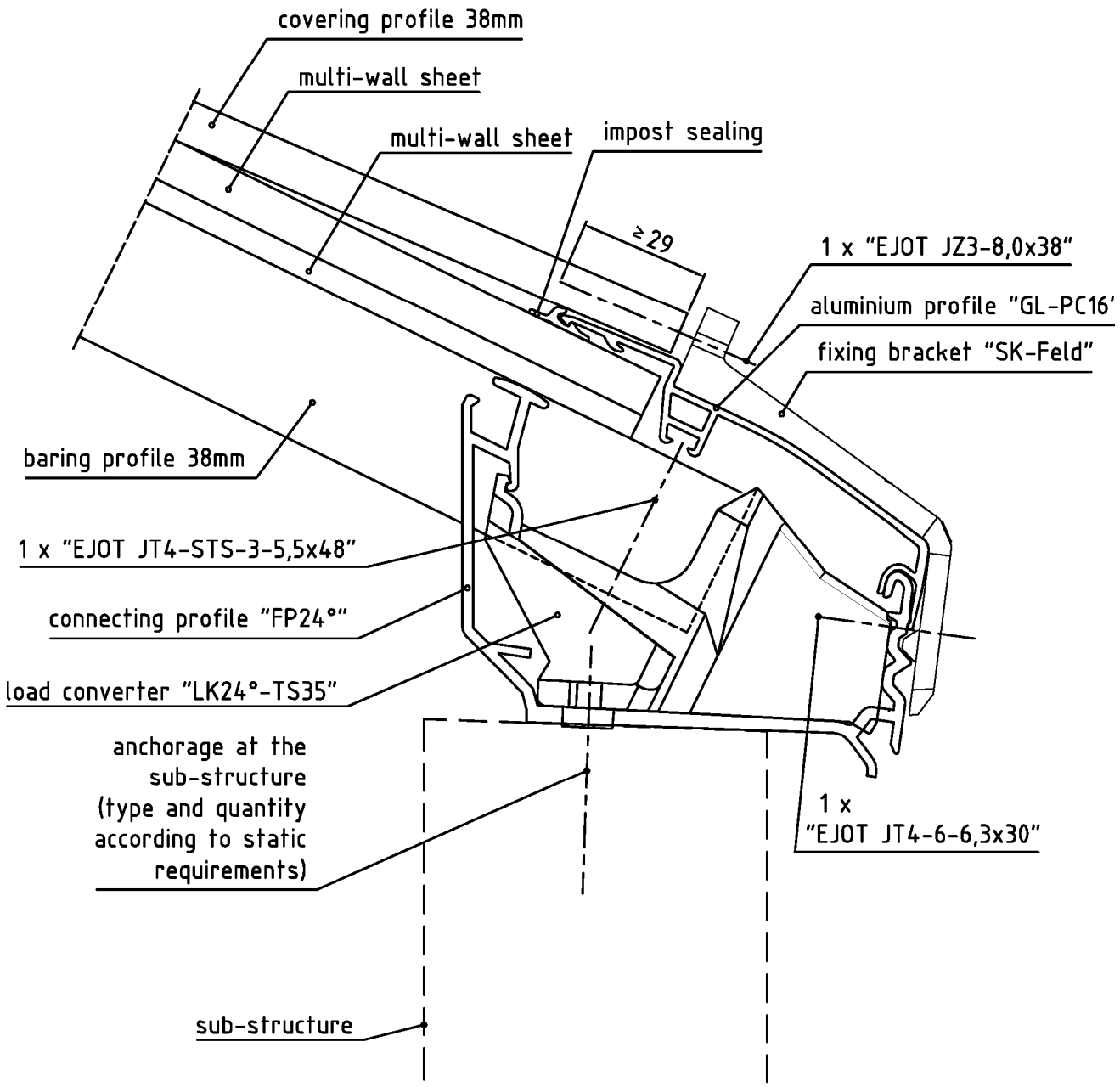
section D-D



CI-System Lichtband B	Annex 4.2
sectional views covering type "PC10 + PC6" section D-D	

Deutsches Institut für Bautechnik DIBt

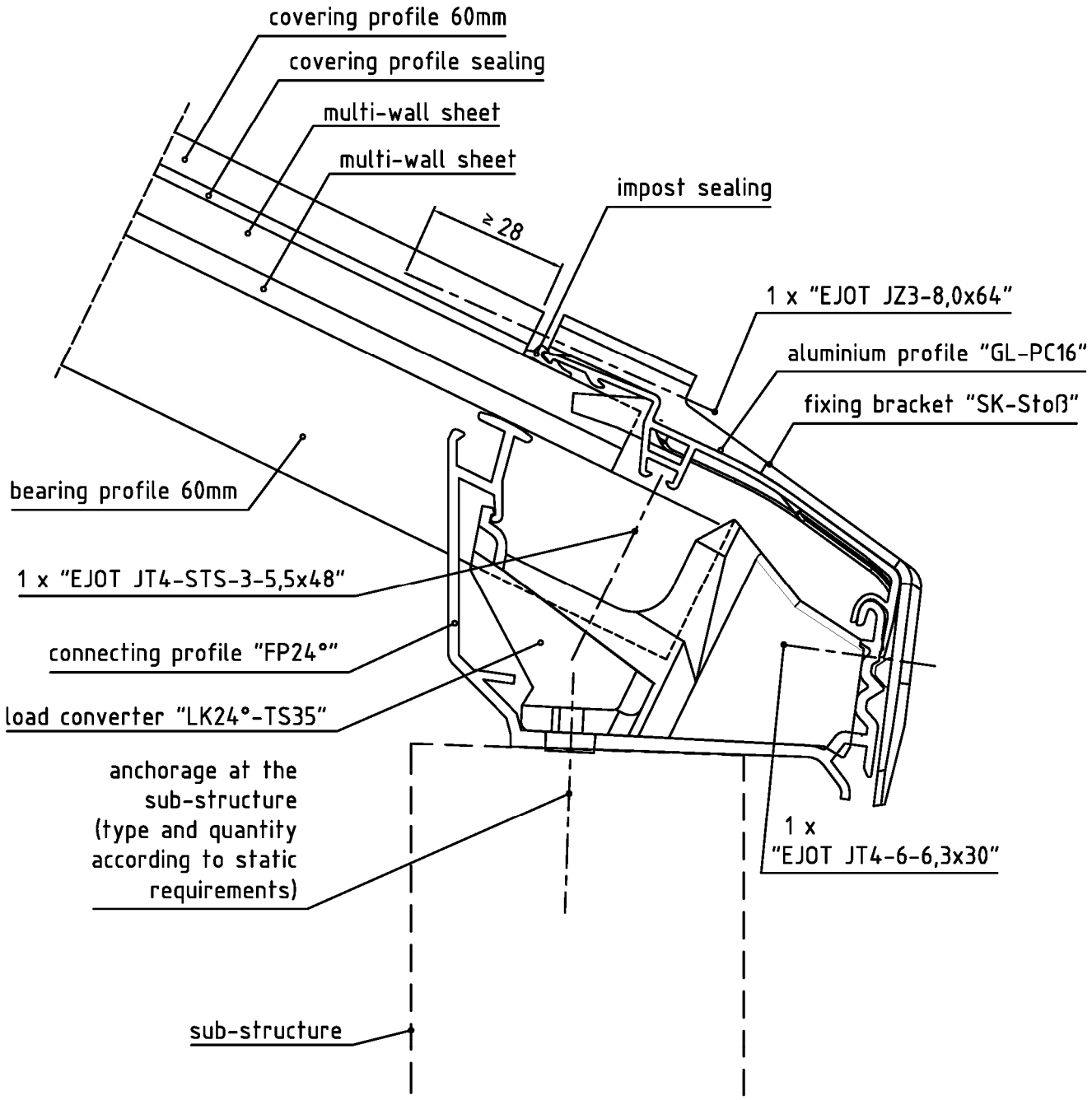
section E-E



CI-System Lichtband B	Annex 4.3
sectional views covering type "PC10 + PC6" section E-E	

Deutsches Institut für Bautechnik DIBt

section F-F



CI-System Lichtband B	Annex 4.4
sectional views covering type "PC10 + PC6" section F-F	

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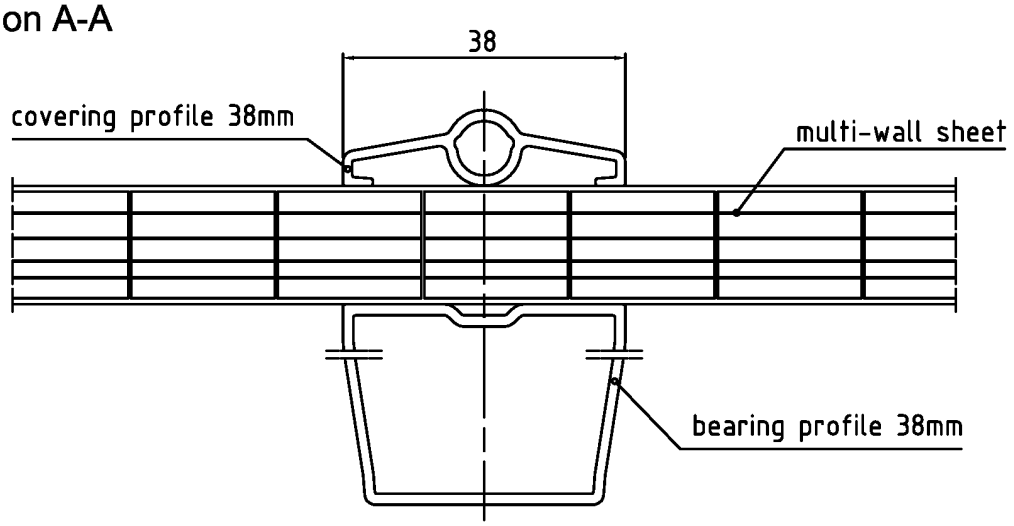
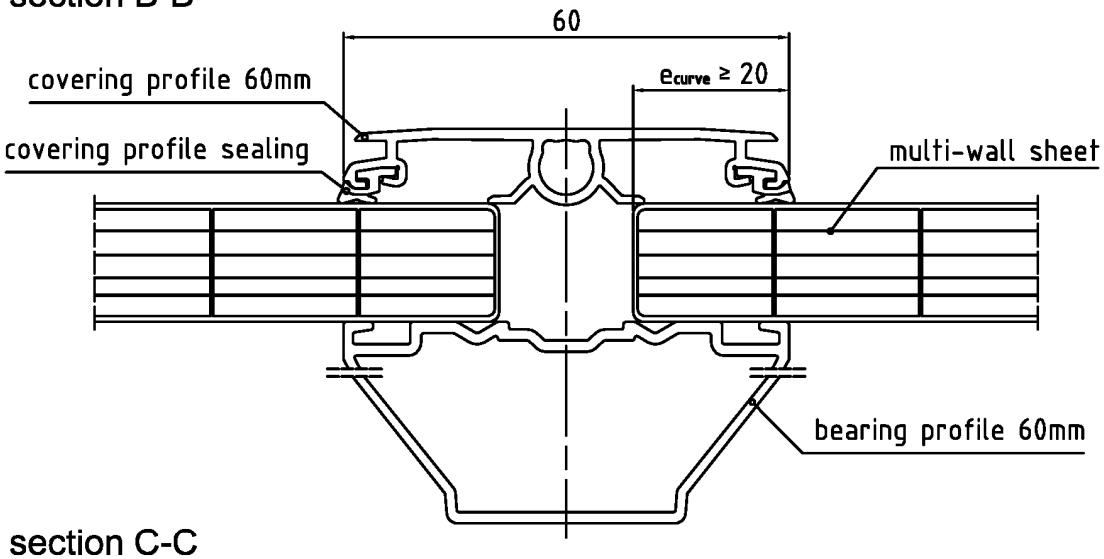
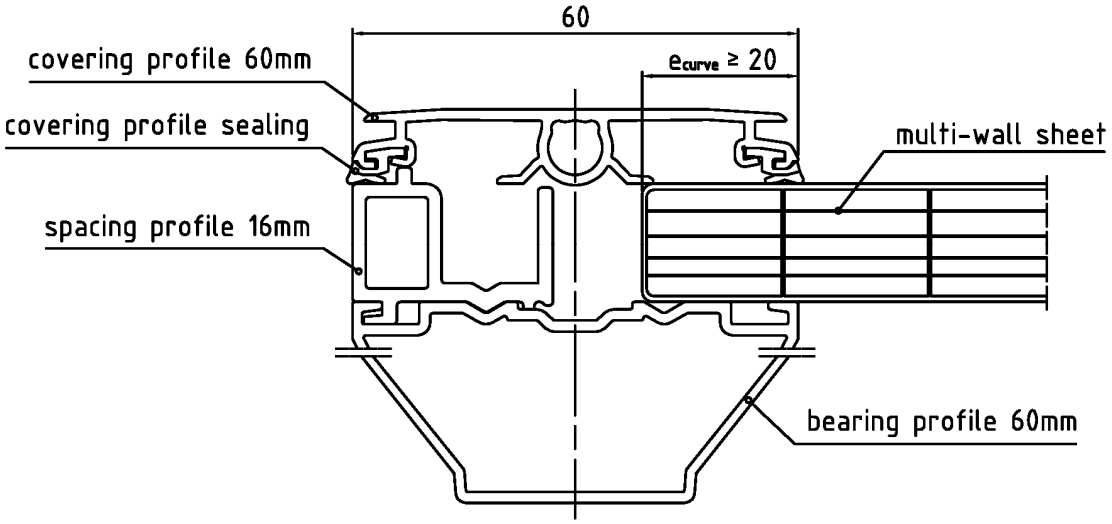
section A-A



section B-B



section C-C



CI-System Lichtband B	Annex 5.1
sectional views covering type "PC16" section A-A; section B-B; section C-C	

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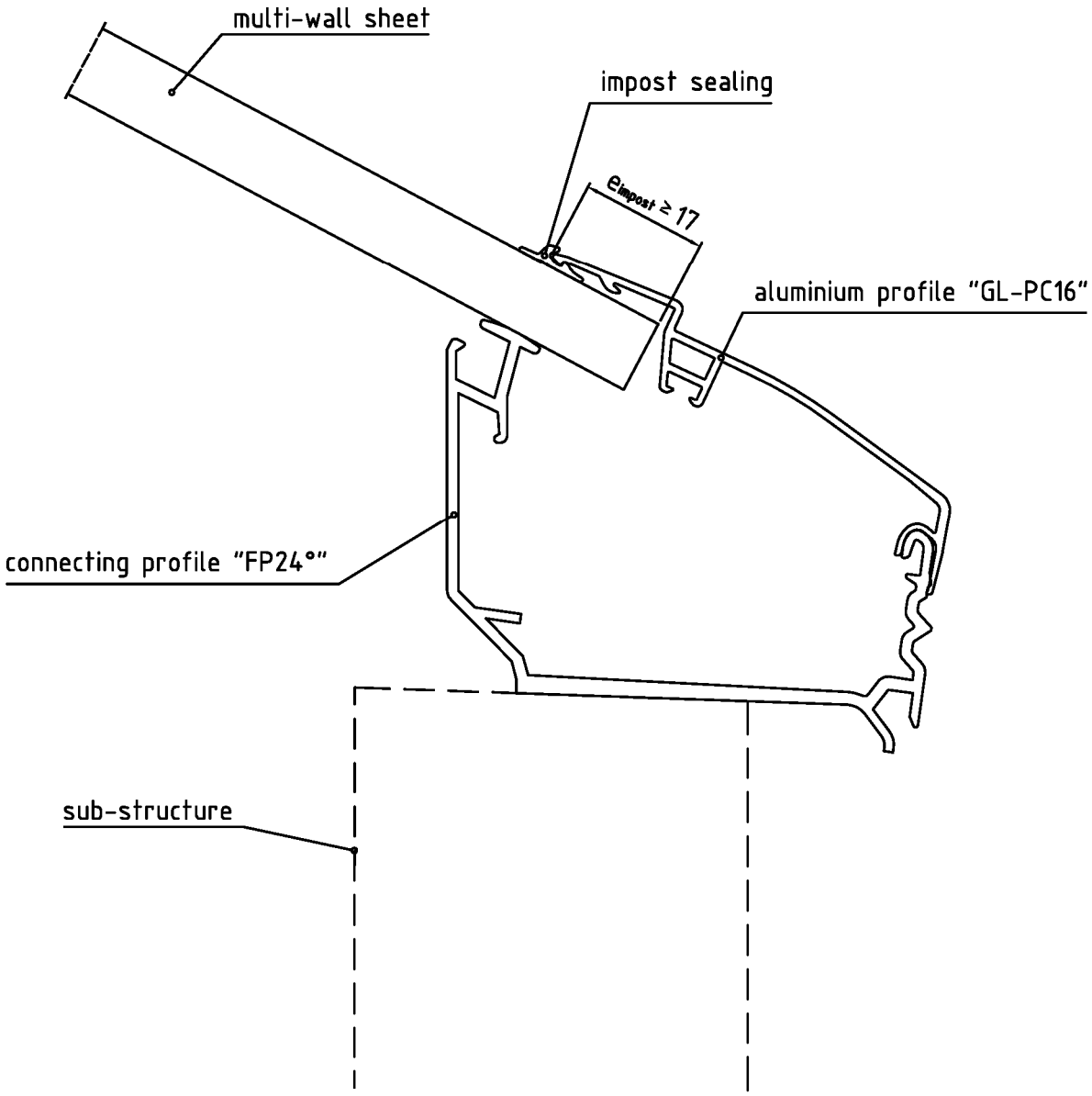
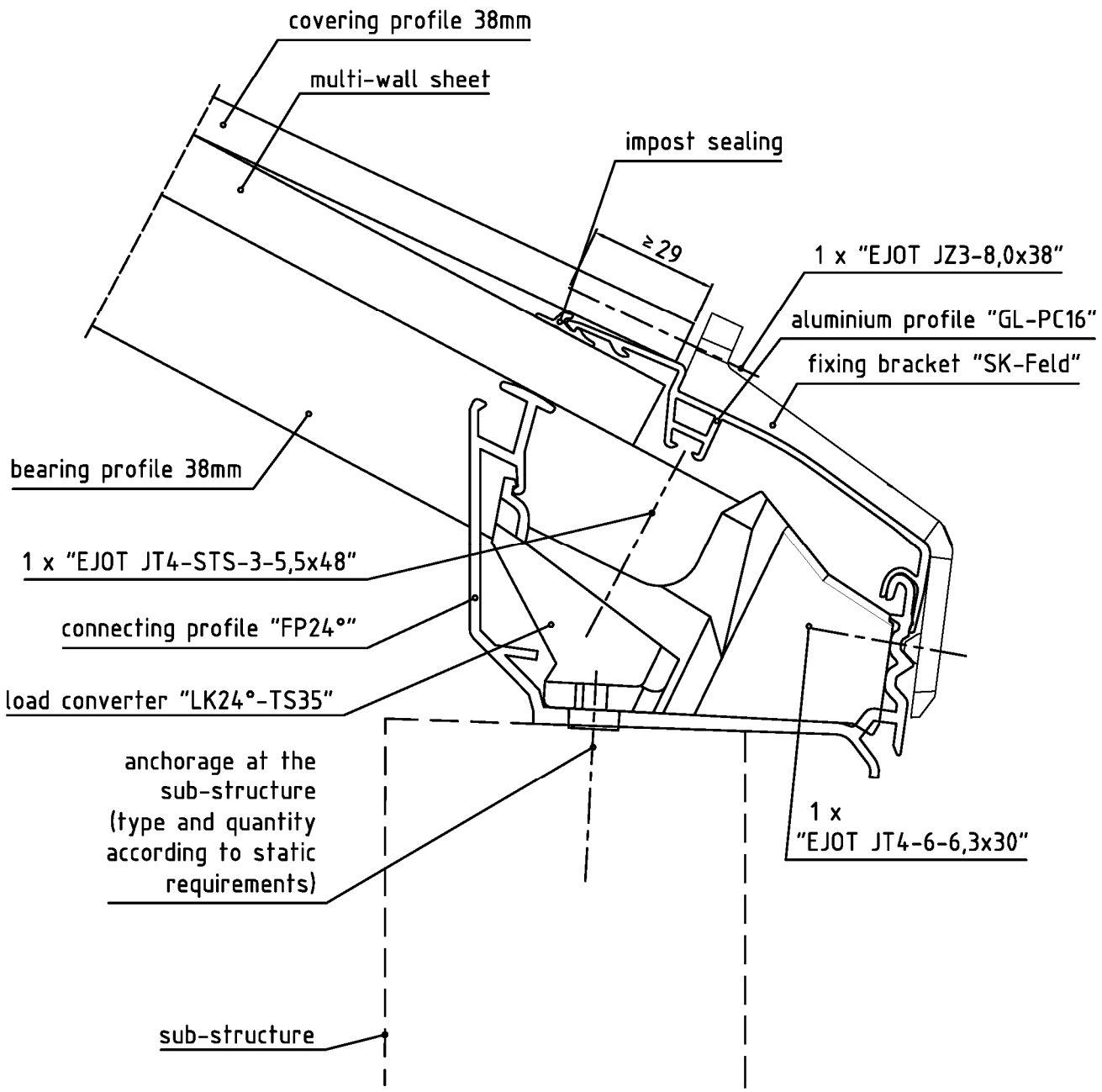
section D-D



CI-System Lichtband B	Annex 5.2
sectional views covering type "PC16" section D-D	

Deutsches Institut für Bautechnik DIBt

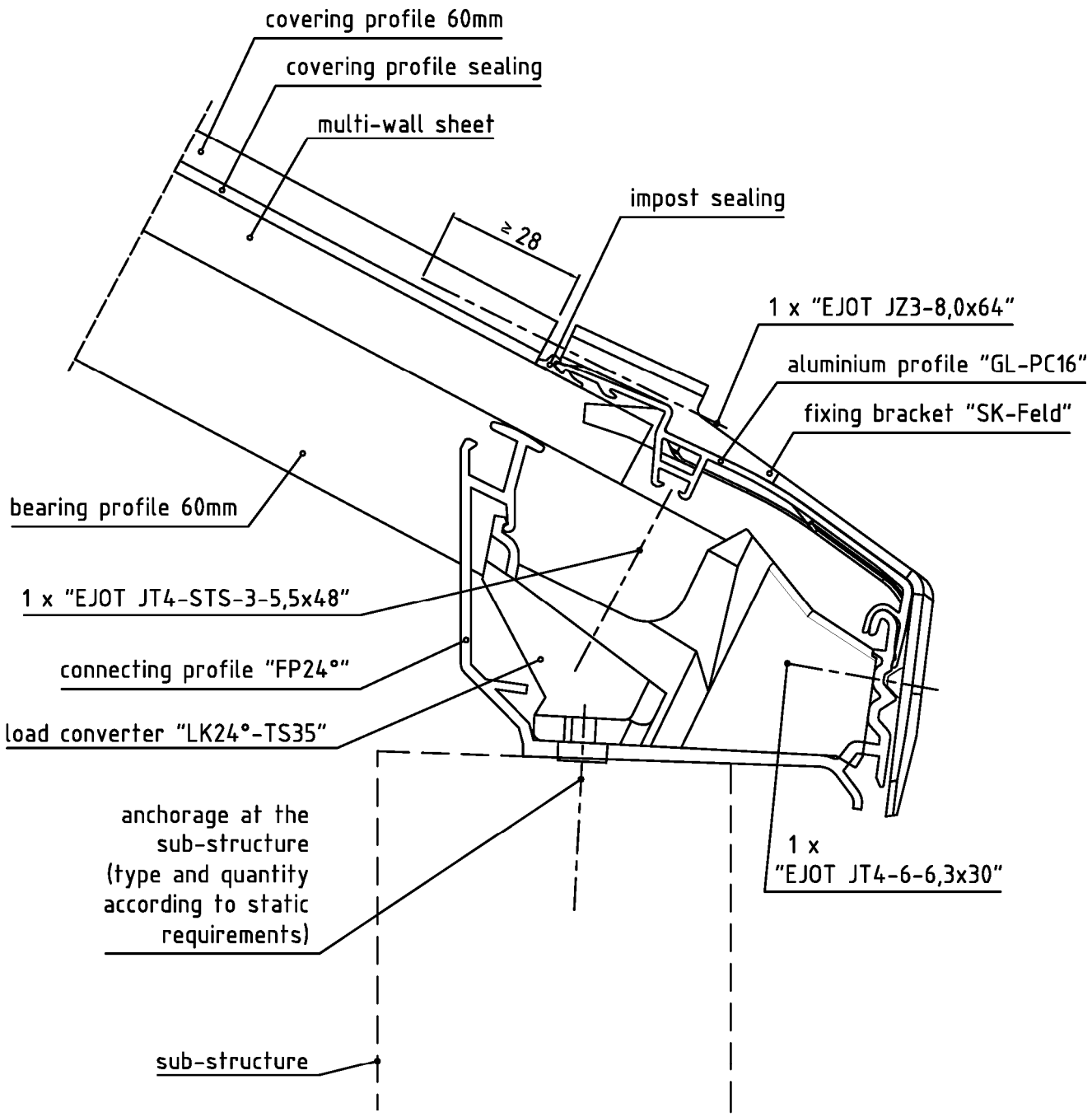
section E-E



CI-System Lichtband B	Annex 5.3
sectional views covering type "PC16" section E-E	

Deutsches Institut für Bautechnik DIBt

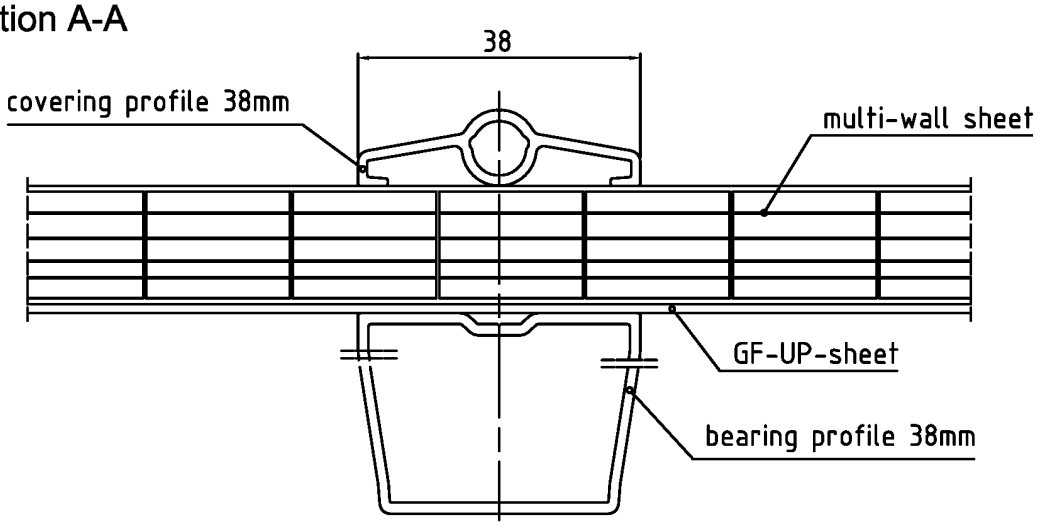
section F-F



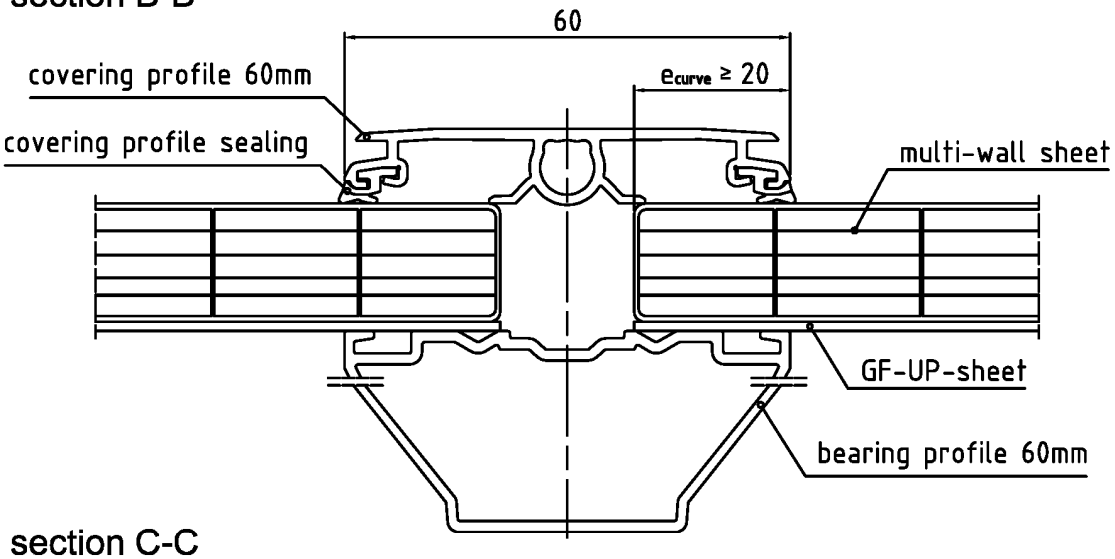
CI-System Lichtband B	Annex 5.4
sectional views covering type "PC16" section F-F	

Deutsches Institut für Bautechnik DIBt

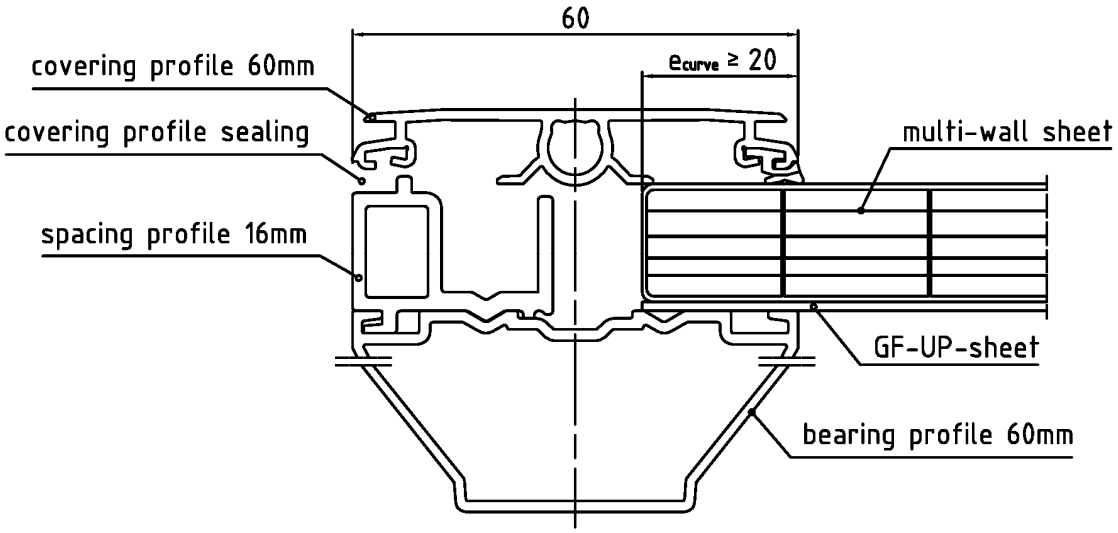
section A-A



section B-B



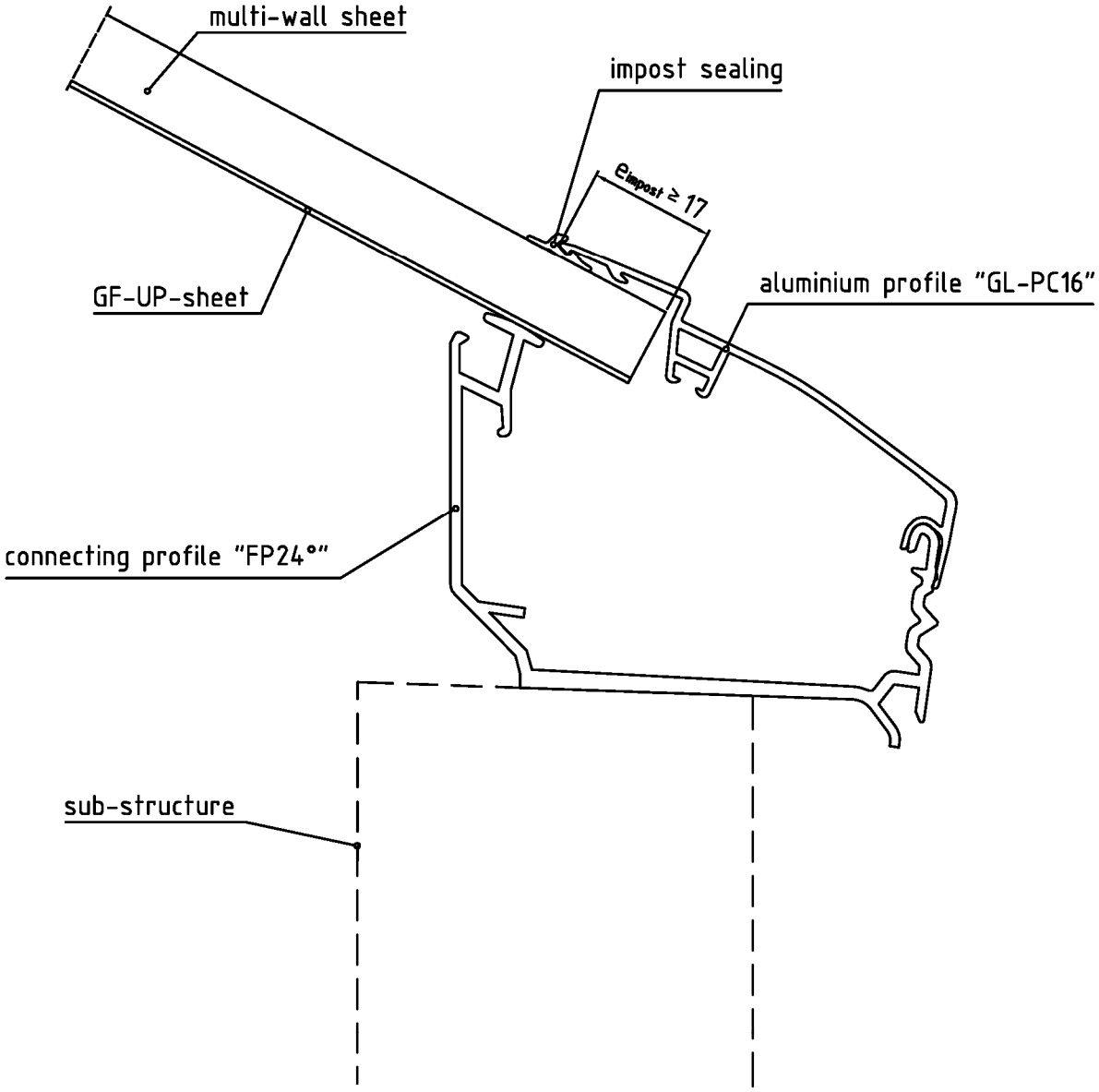
section C-C



CI-System Lichtband B	Annex 6.1
sectional views covering type "PC16 + GFUP" section A-A; section B-B; section C-C	

Deutsches Institut für Bautechnik DIBt

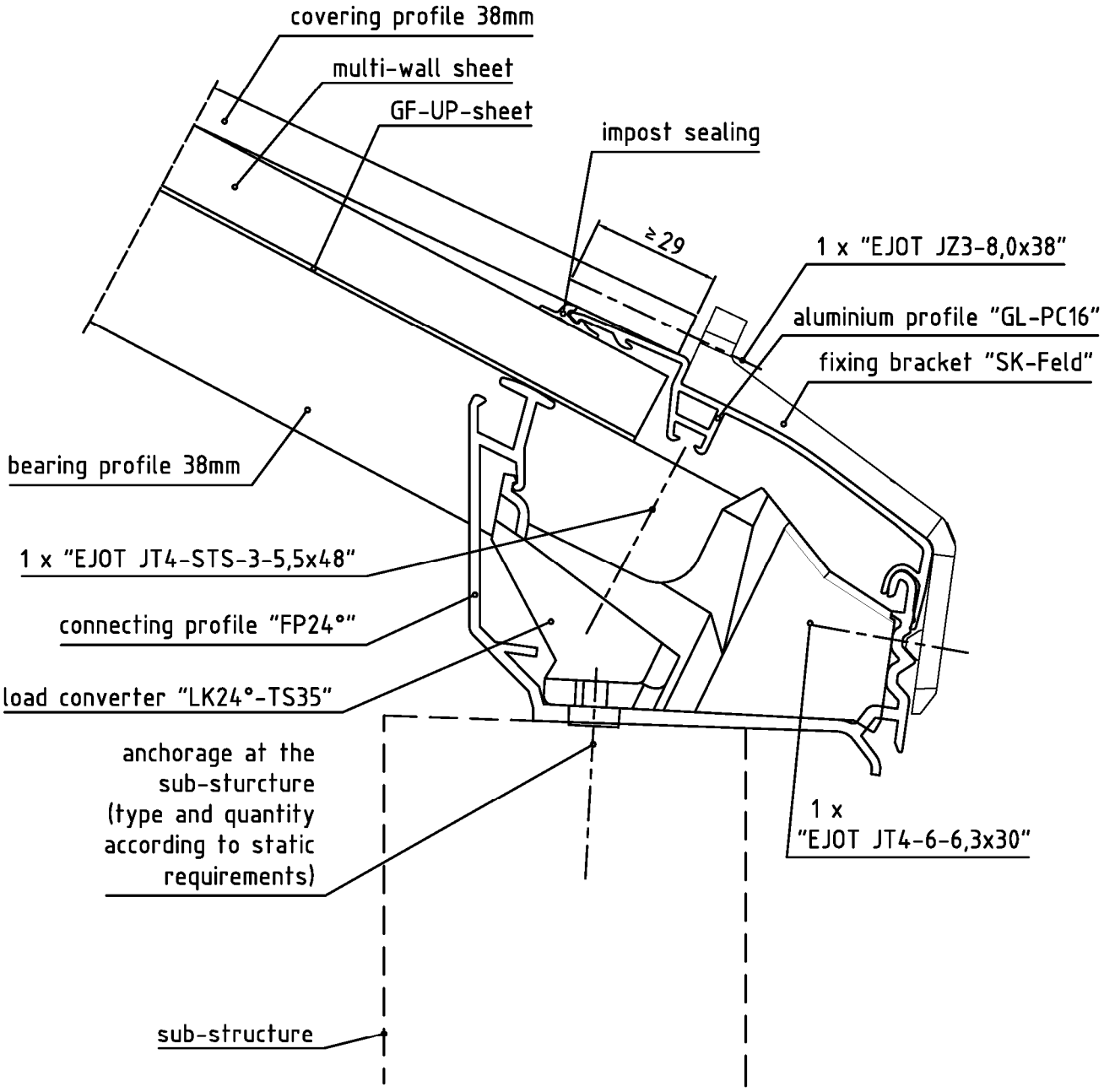
section D-D



CI-System Lichtband B	Annex 6.2
sectional views covering type "PC16 + GFUP" section D-D	

Deutsches Institut für Bautechnik DIBt

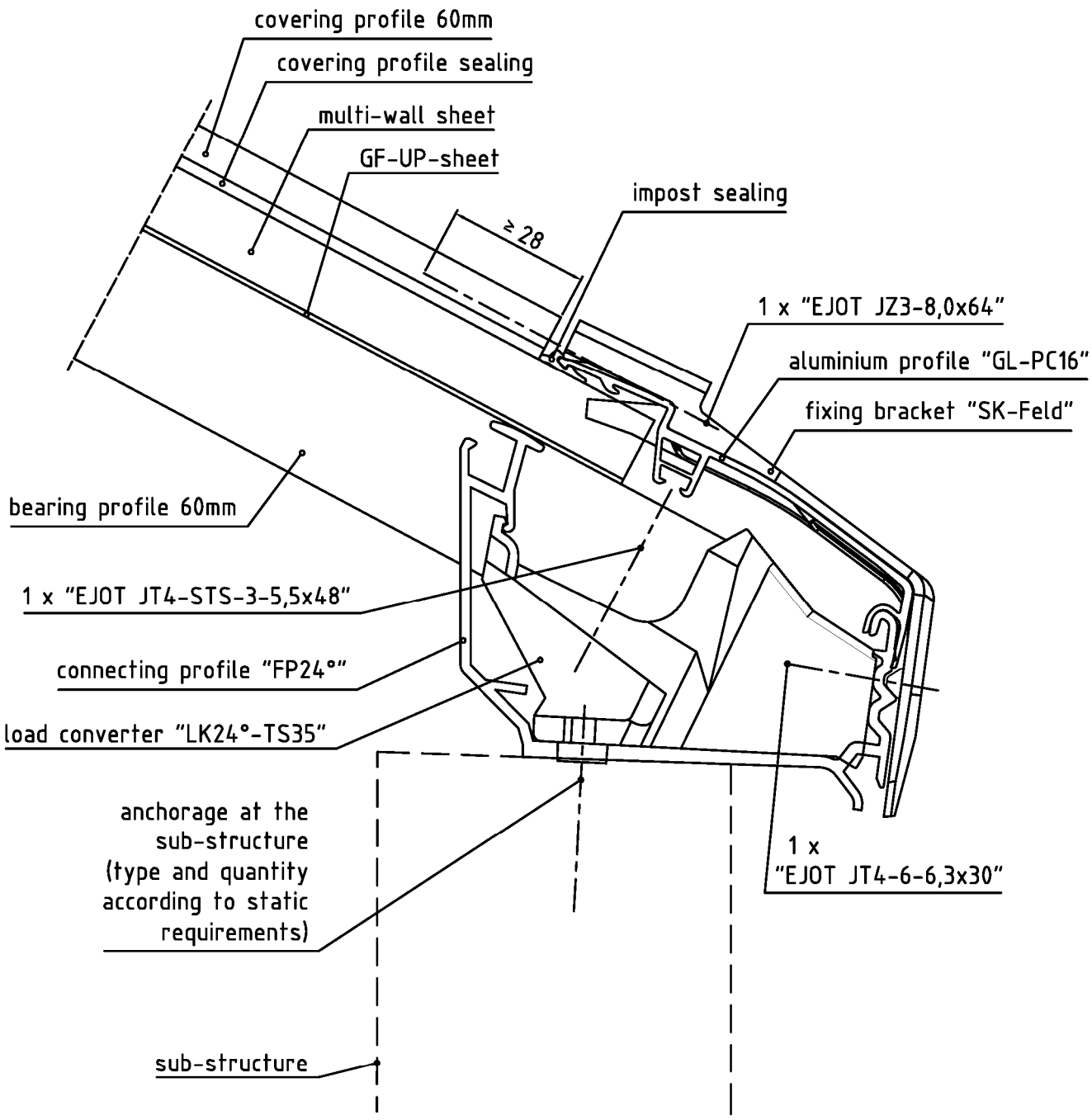
section E-E



CI-System Lichtband B	Annex 6.3
sectional views covering type "PC16 + GFUP" section E-E	

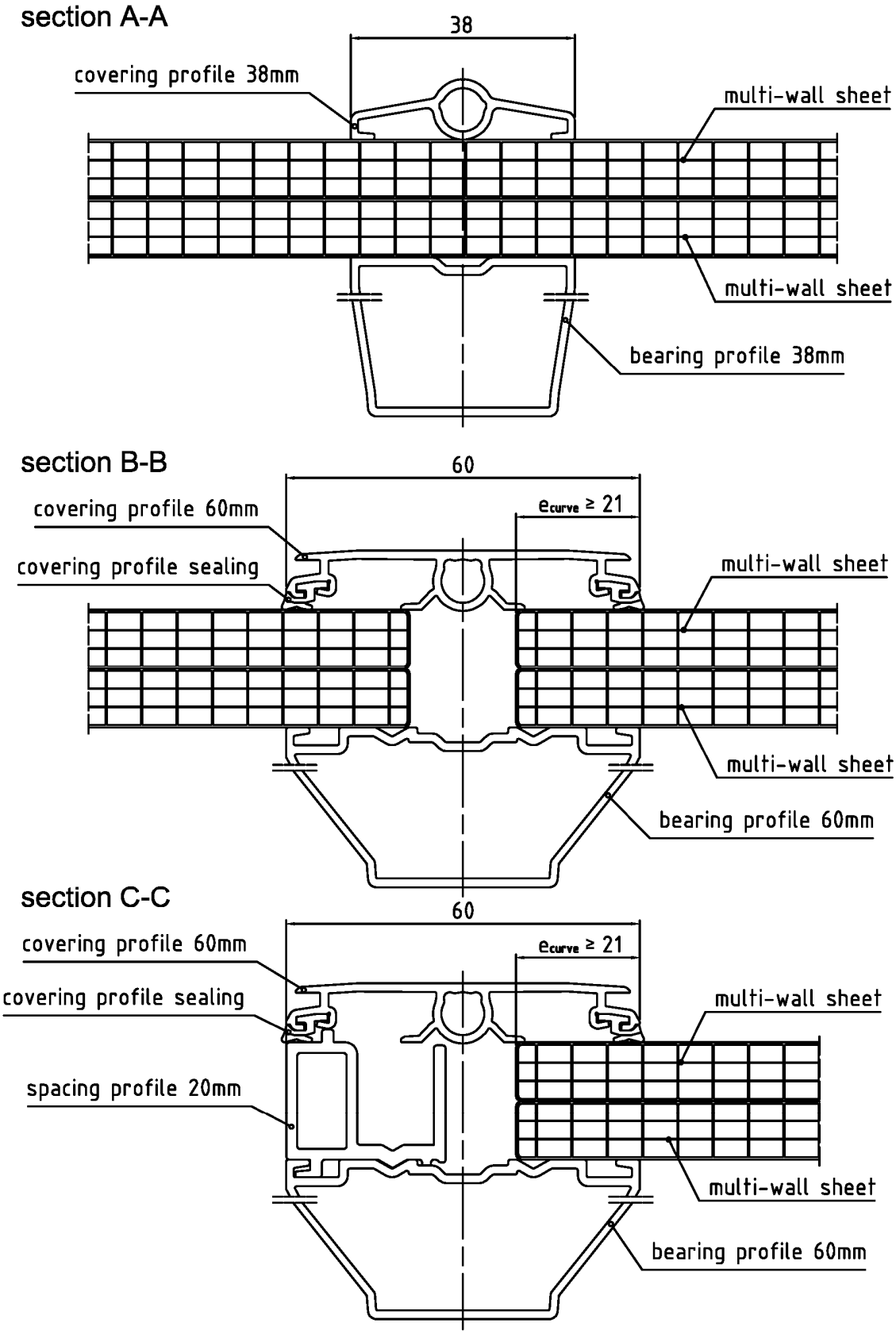
Deutsches Institut für Bautechnik DIBt

section F-F



CI-System Lichtband B	Annex 6.4
sectional views covering type "PC16 + GFUP" section F-F	

Deutsches Institut für Bautechnik DIBt



CI-System Lichtband B	Annex 7.1
sectional views covering type "PC10 + PC10" section A-A; section B-B; section C-C	

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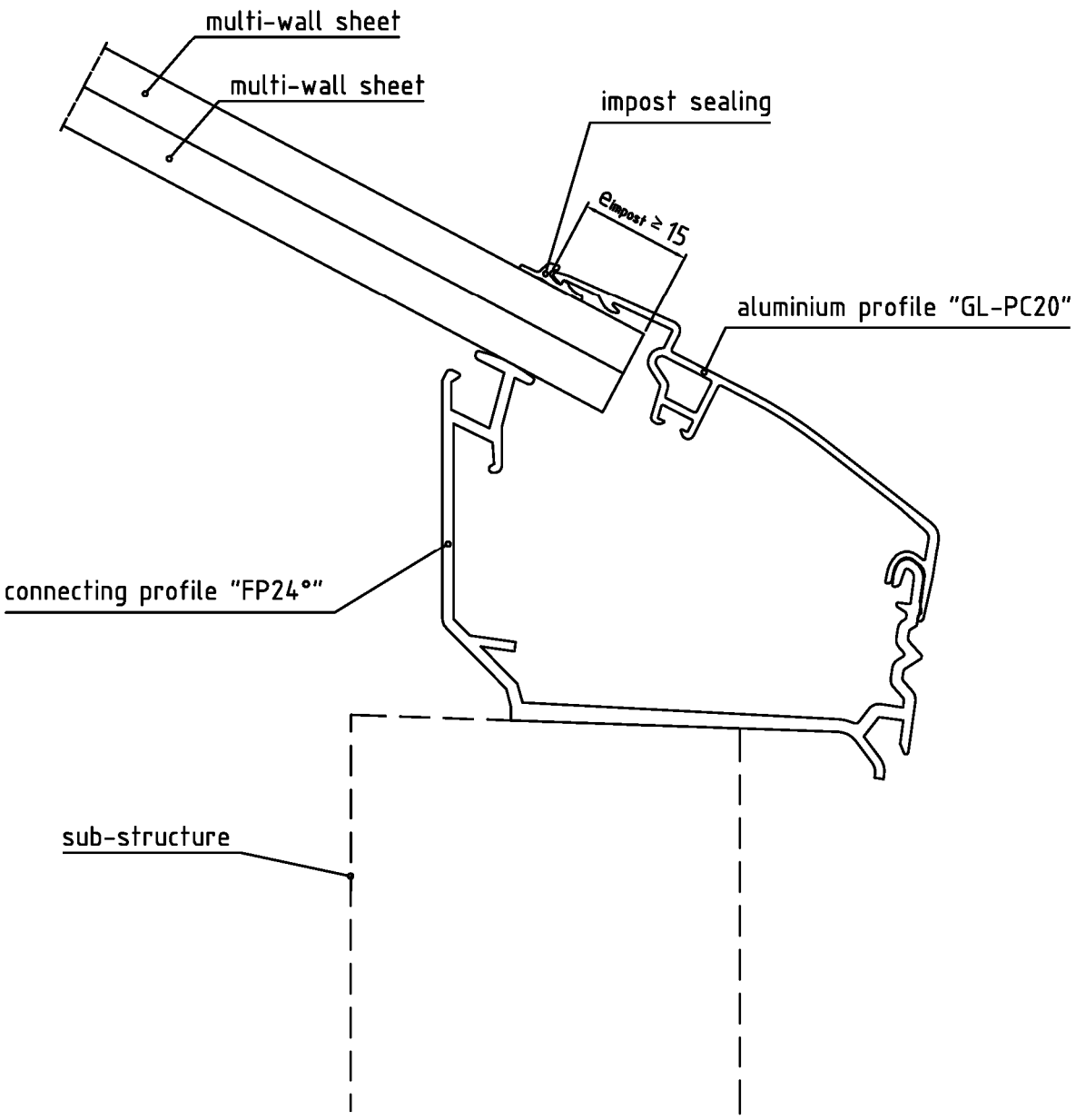
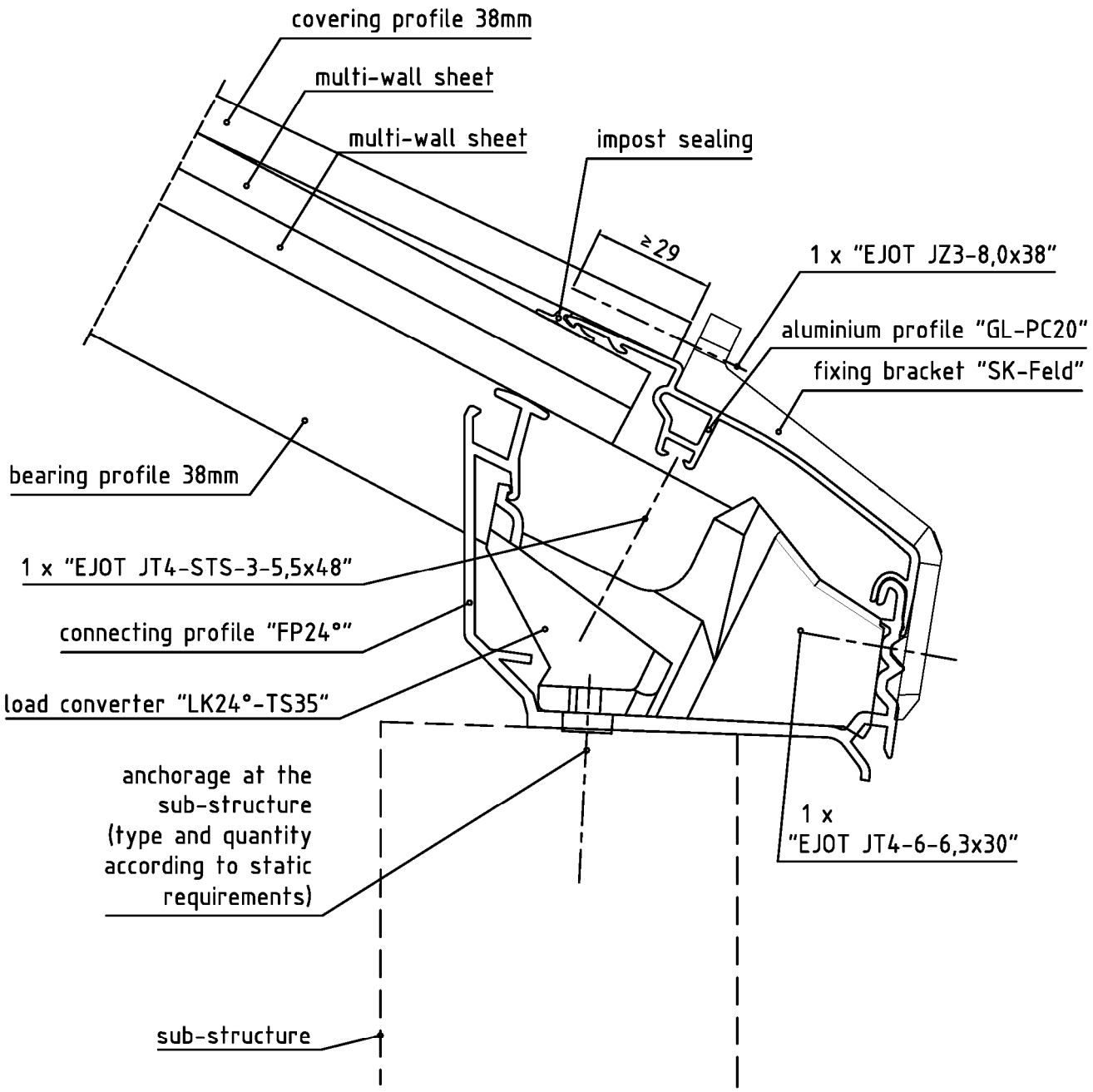
section D-D



CI-System Lichtband B	Annex 7.2
sectional views covering type "PC10 + PC10" section D-D	

Deutsches Institut für Bautechnik DIBt

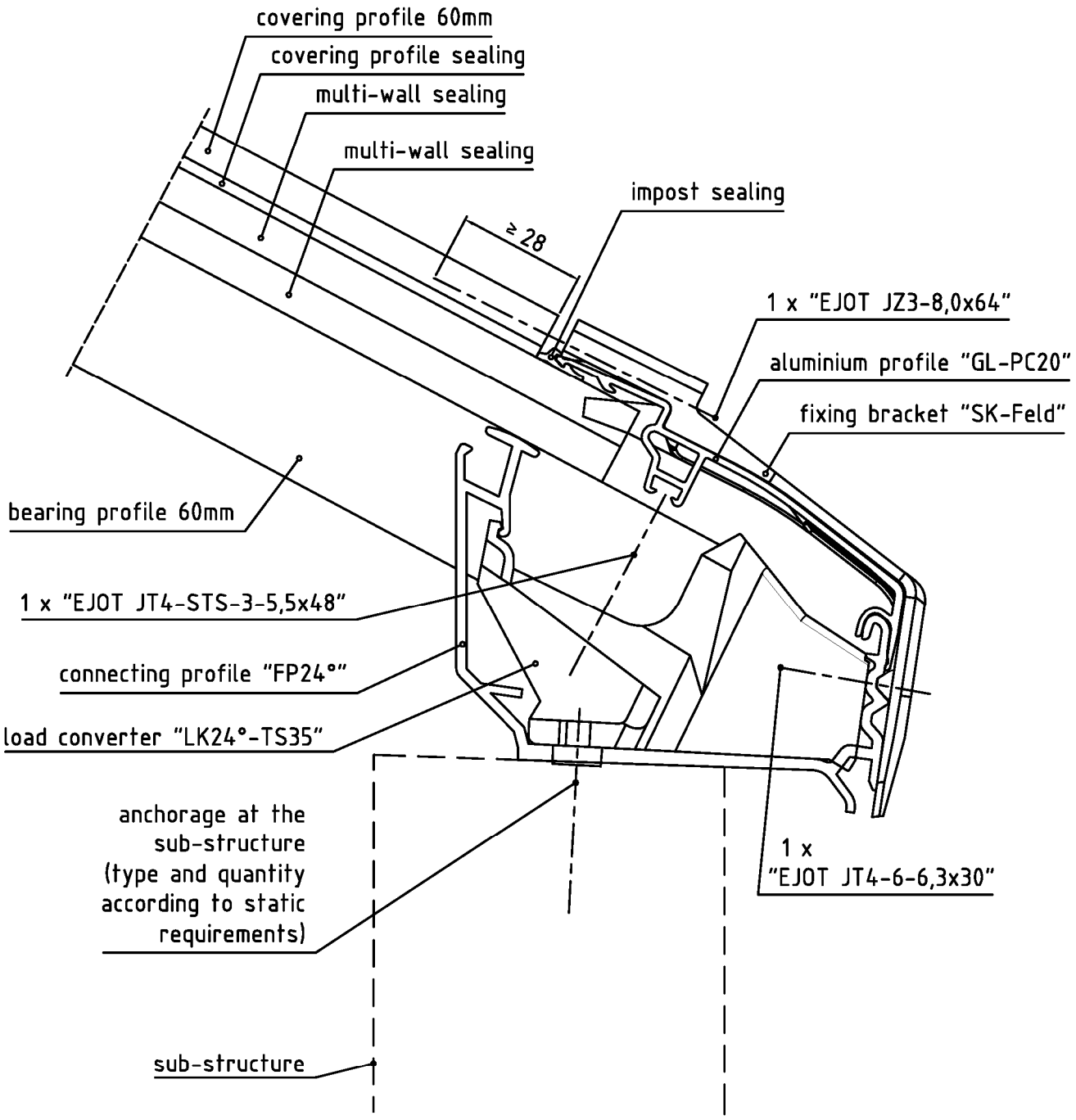
section E-E



CI-System Lichtband B	Annex 7.3
sectional views covering type "PC10 + PC10" section E-E	

Deutsches Institut für Bautechnik DIBt

section F-F



CI-System Lichtband B	Annex 7.4
sectional views covering type "PC10 + PC10" section F-F	

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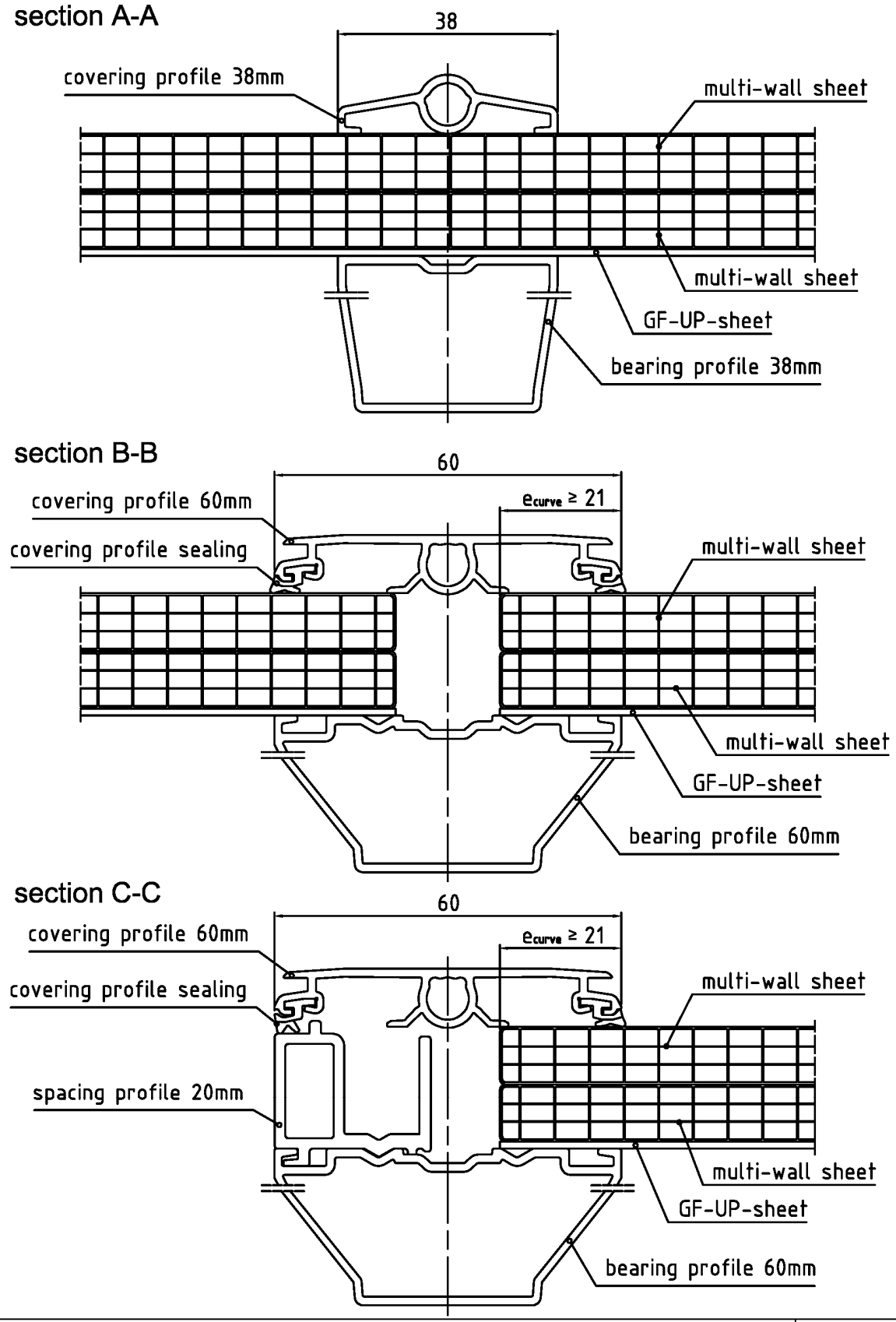

CI-System Lichtband B	Annex 8.1
sectional views covering type "PC10 + PC10 + GFUP" section A-A; section B-B; section C-C	

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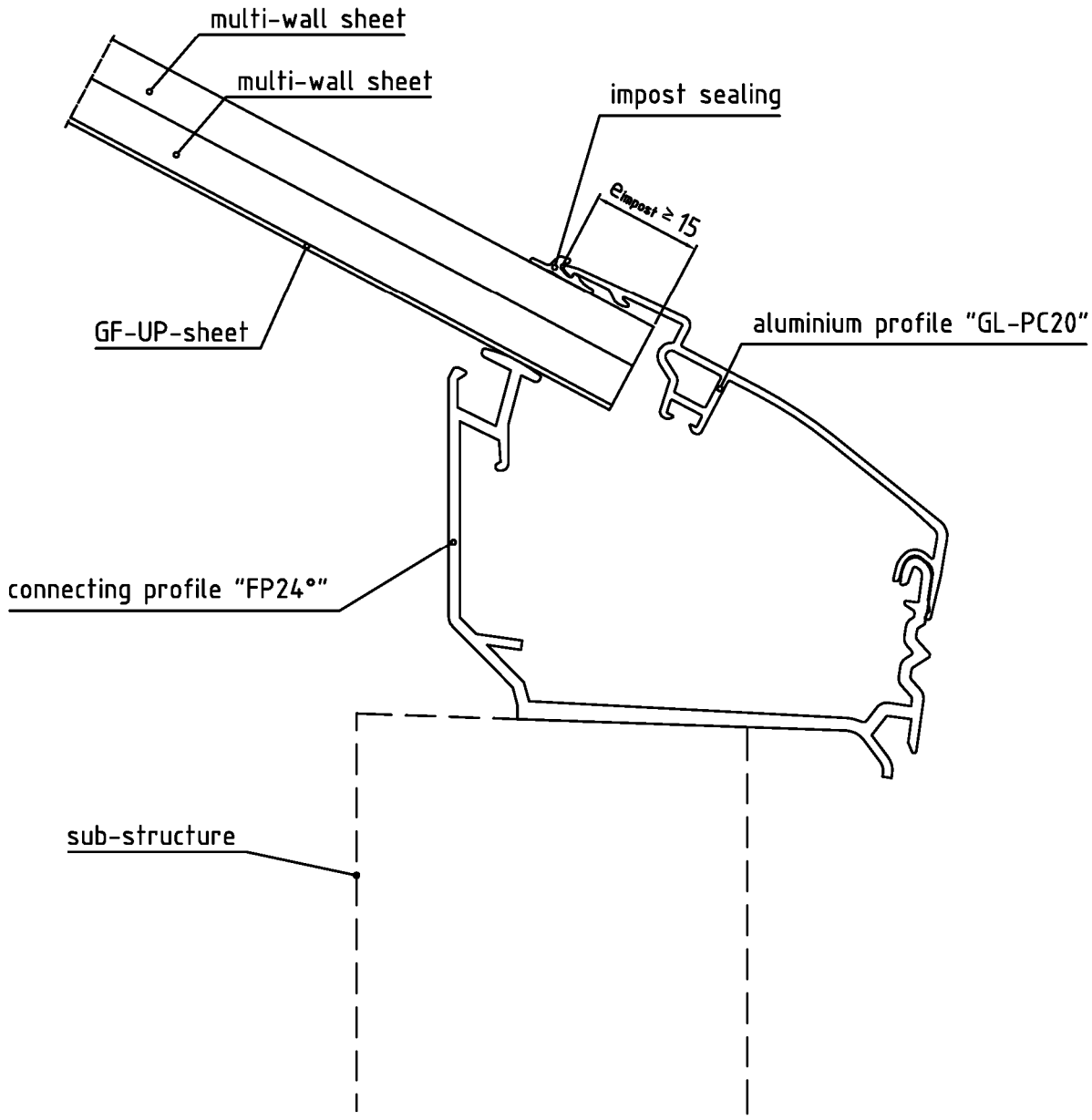
section D-D



CI-System Lichtband B	Annex 8.2
sectional views covering type "PC10 + PC10 + GFUP" section D-D	

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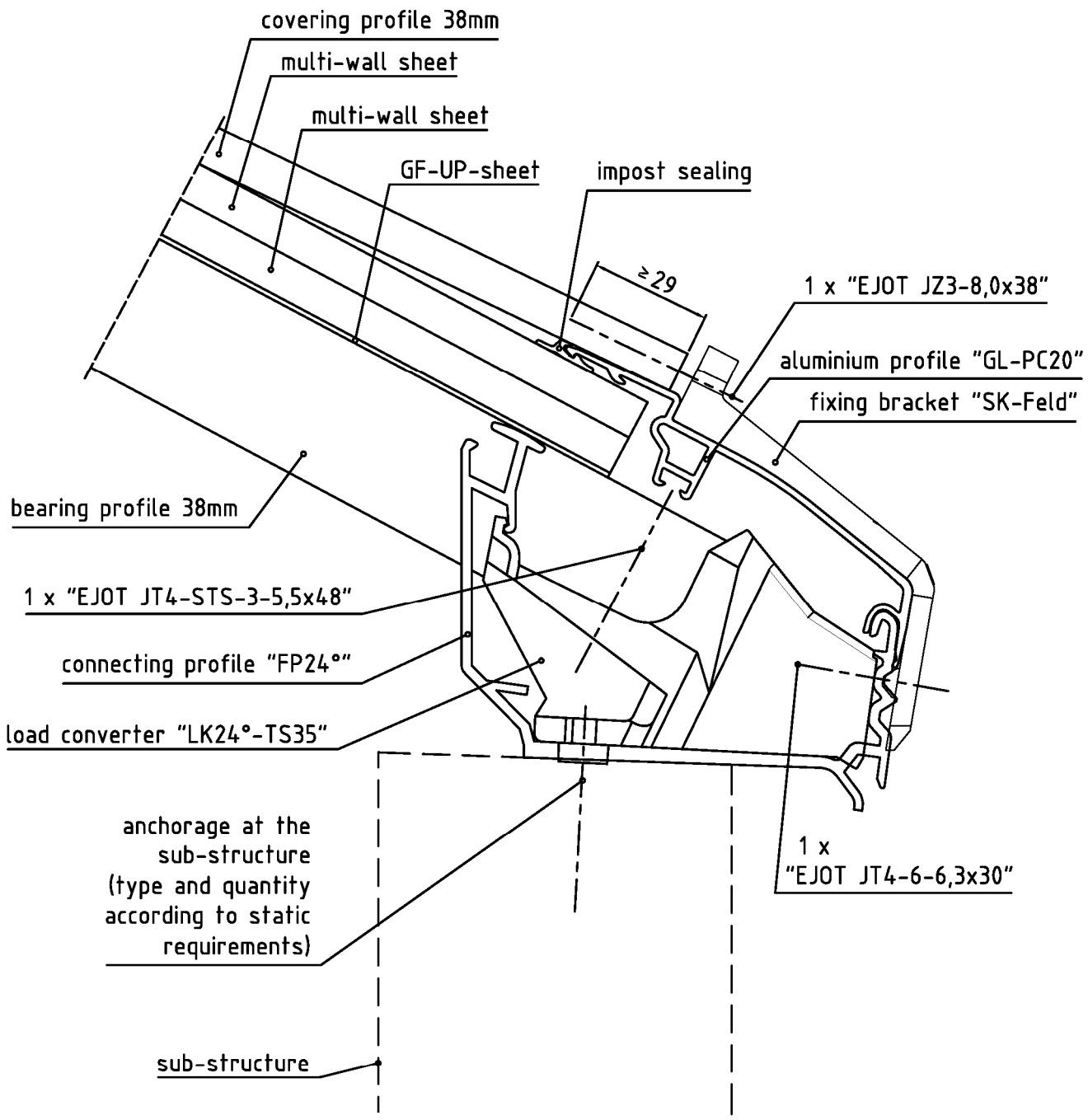
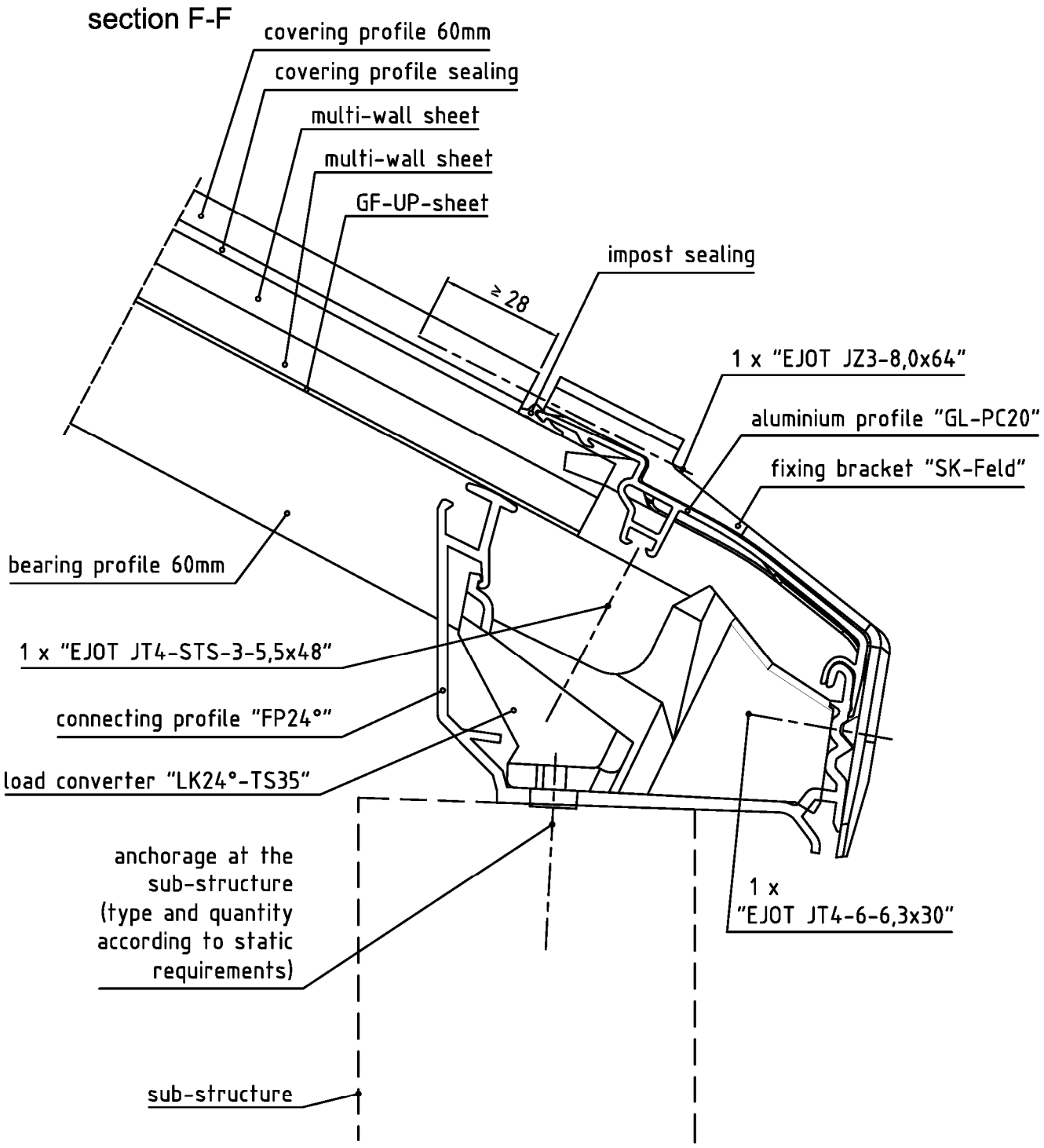
section E-E



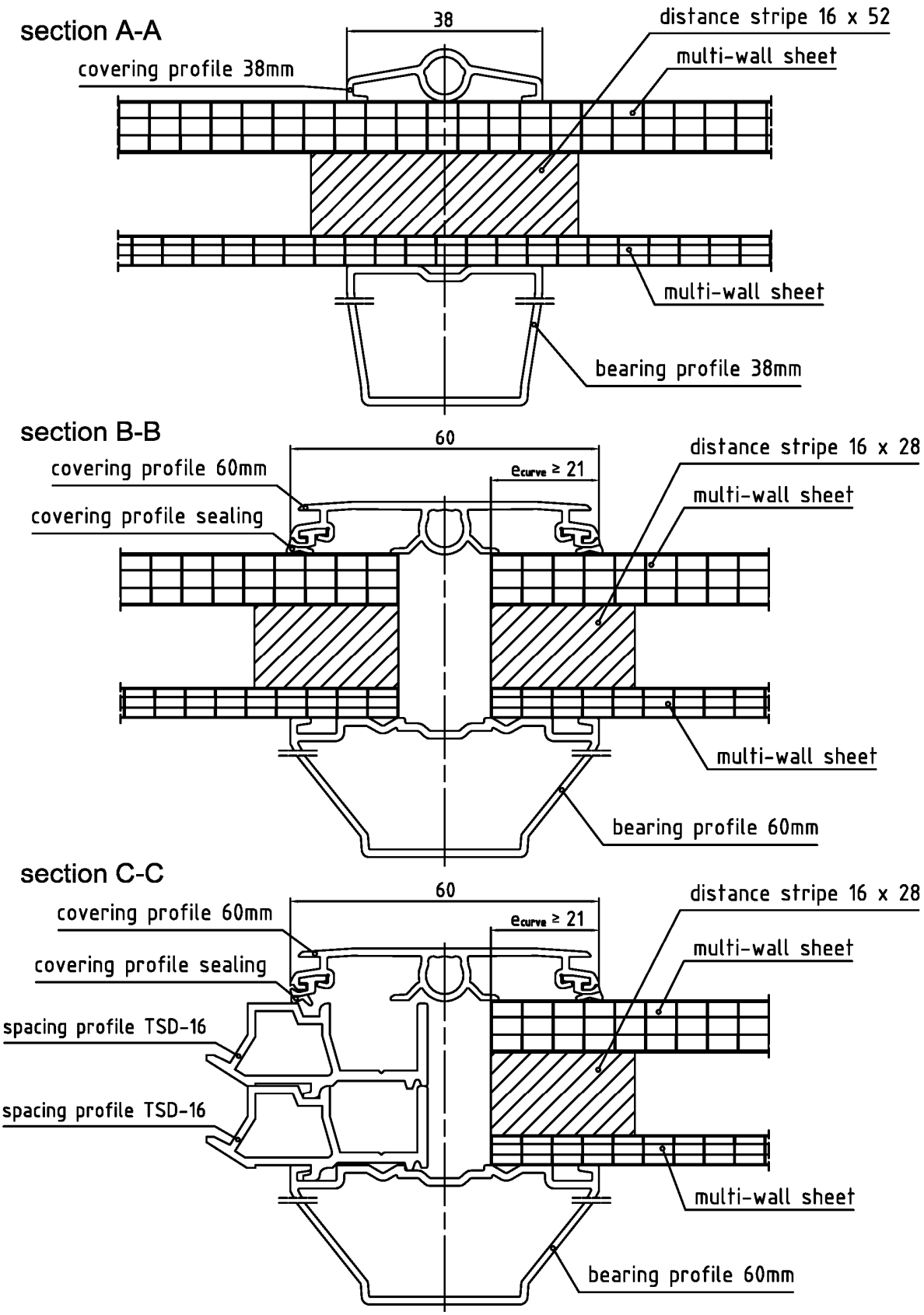
CI-System Lichtband B	Annex 8.3
sectional views covering type "PC10 + PC10 + GFUP" section E-E	

Deutsches Institut für Bautechnik DIBt



CI-System Lichtband B	Annex 8.4
sectional views covering type "PC10 + PC10 + GFUP" section F-F	

Deutsches Institut für Bautechnik DIBt



CI-System Lichtband B	Annex 9.1
sectional views covering type "PC10 + PC6 tc 16" section A-A; section B-B; section C-C	

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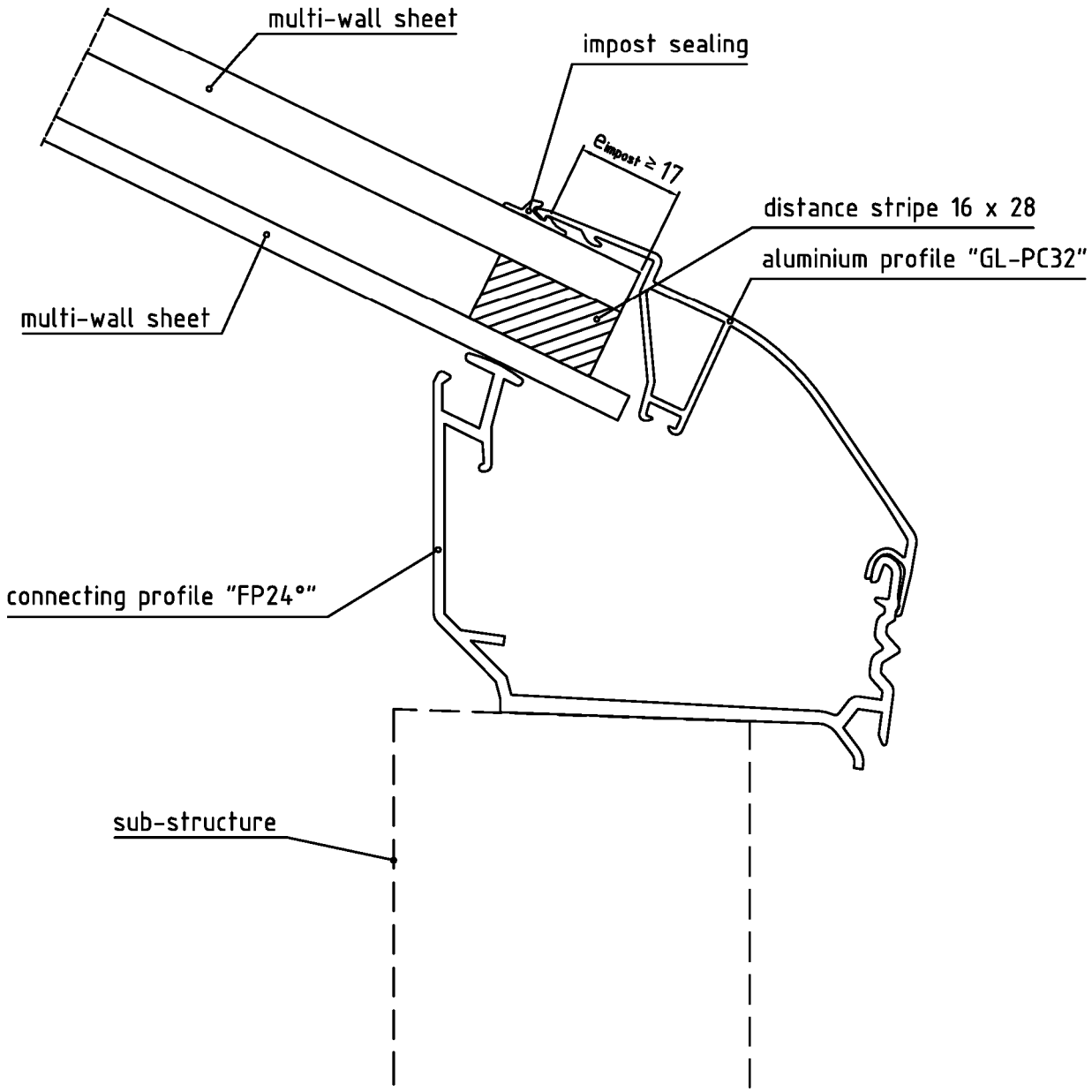
section D-D



CI-System Lichtband B	Annex 9.2
sectional views covering type "PC10 + PC6 tc 16" section D-D	

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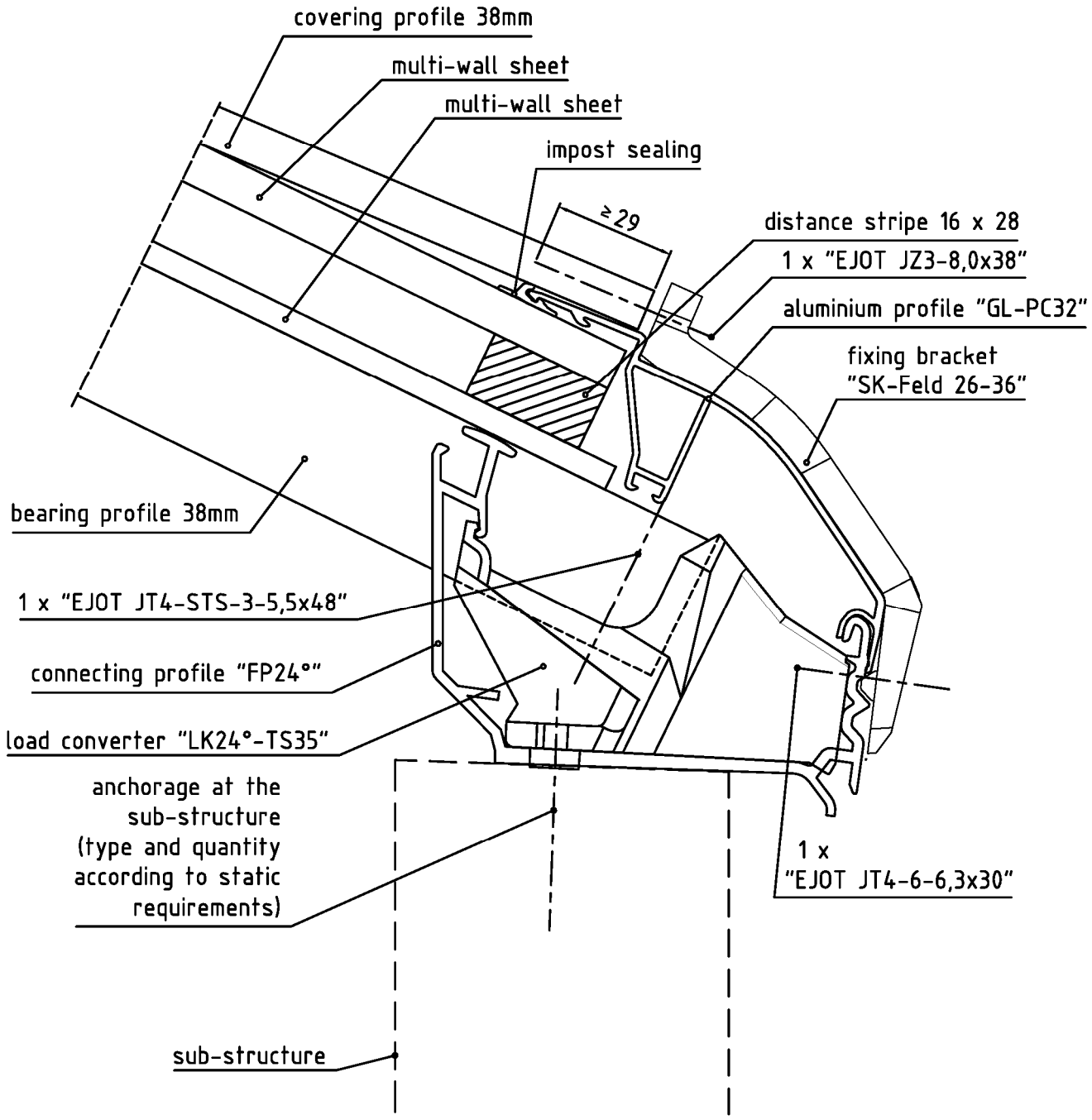
section E-E



CI-System Lichtband B	Annex 9.3
sectional views covering type "PC10 + PC6 tc 16" section E-E	

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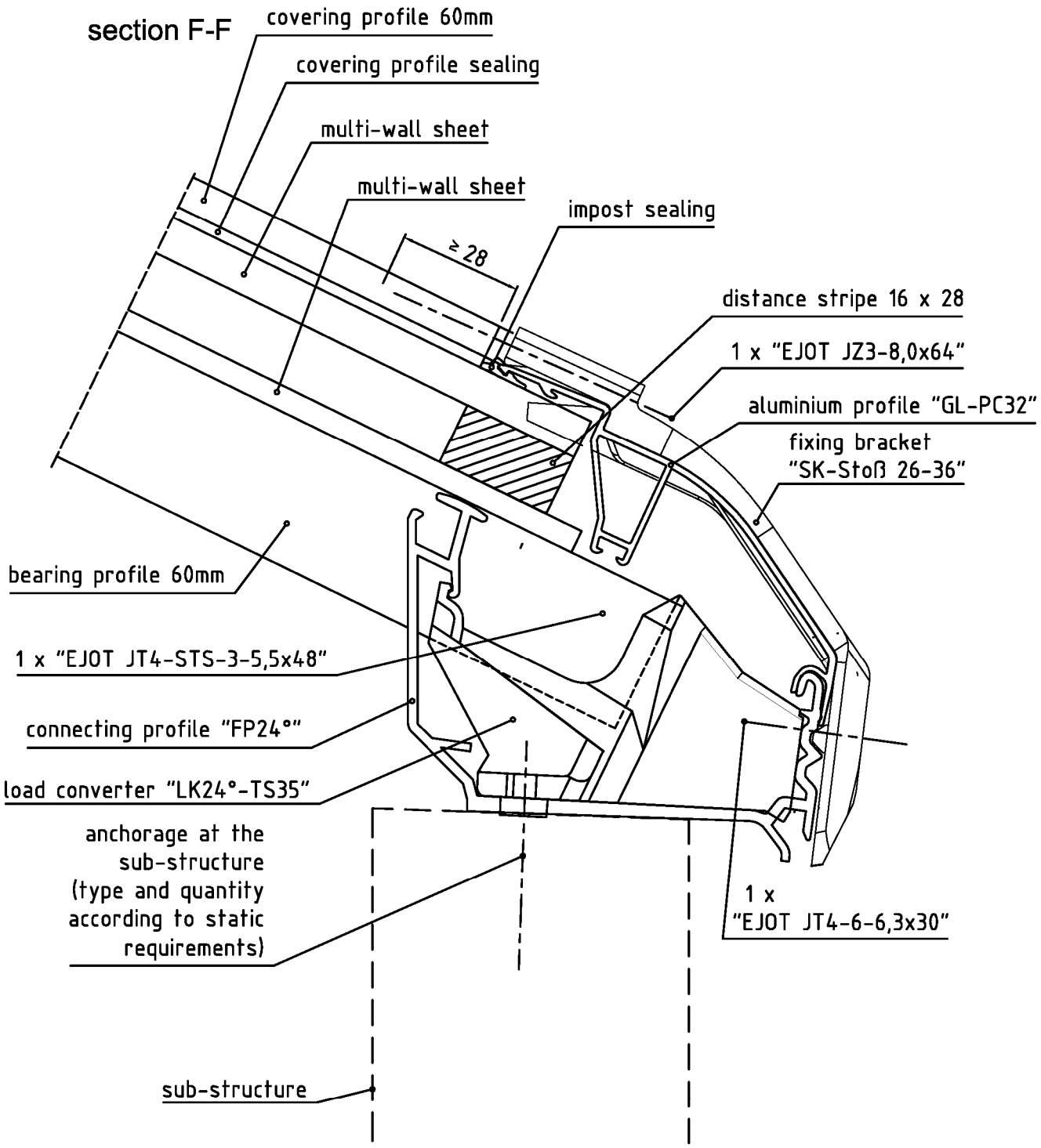

CI-System Lichtband B	Annex 9.4
sectional views covering type "PC10 + PC6 tc 16" section F-F	

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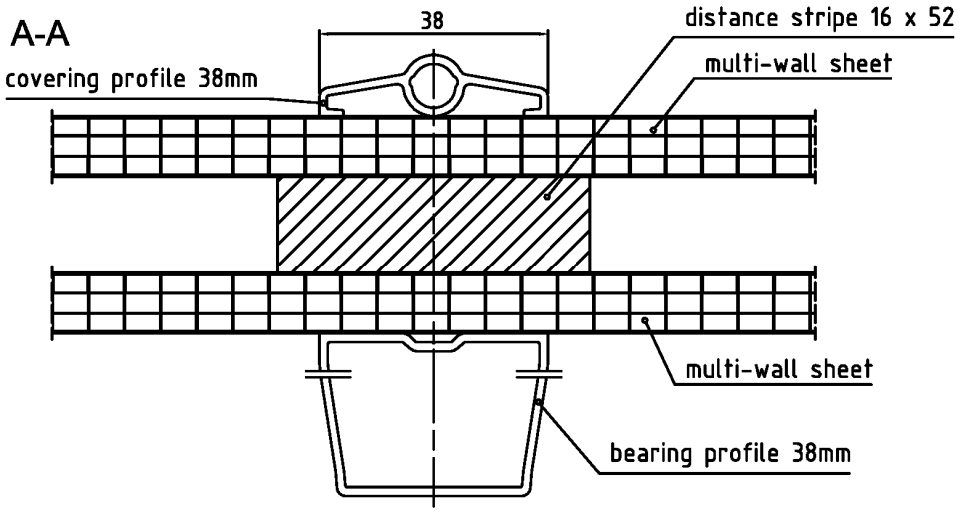
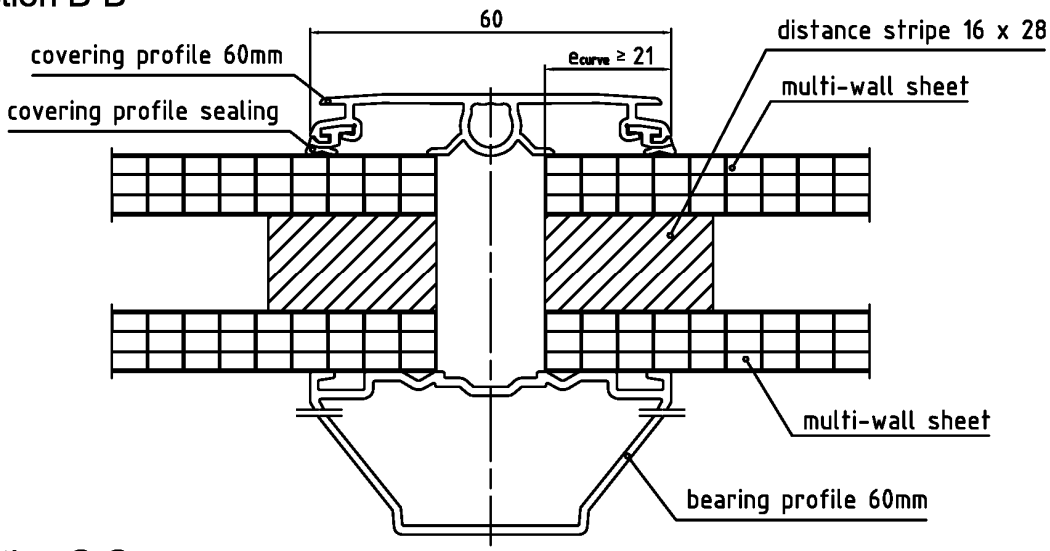
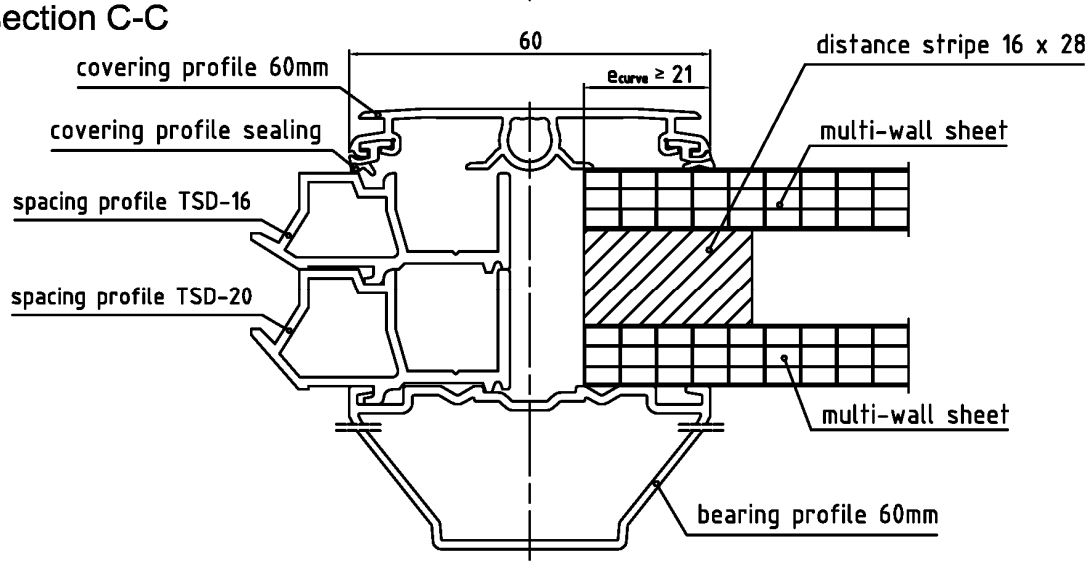
section A-A



section B-B



section C-C



CI-System Lichtband B	Annex 10.1
sectional views covering type "PC10 + PC10 tc 16" section A-A; section B-B; section C-C	

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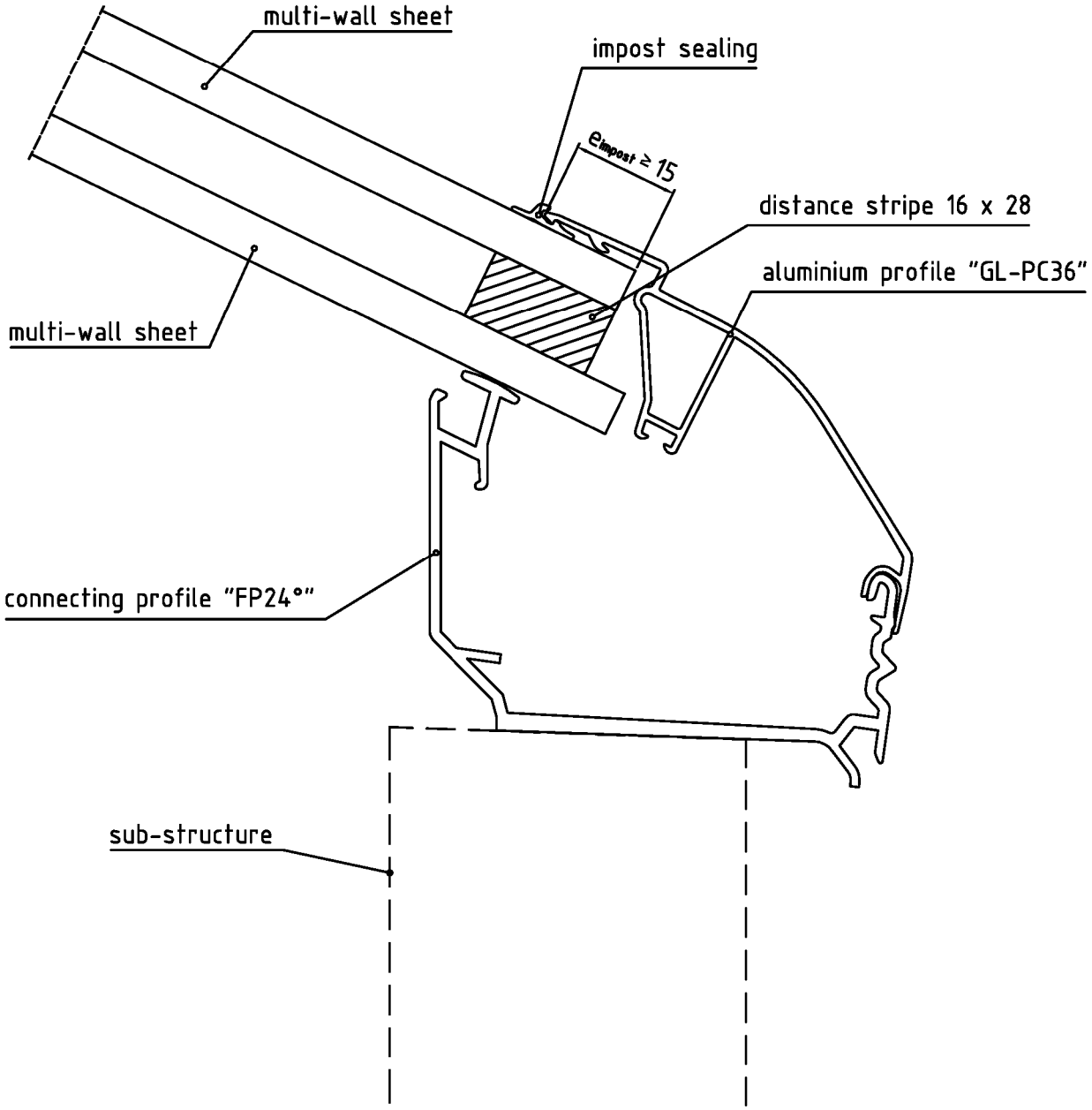
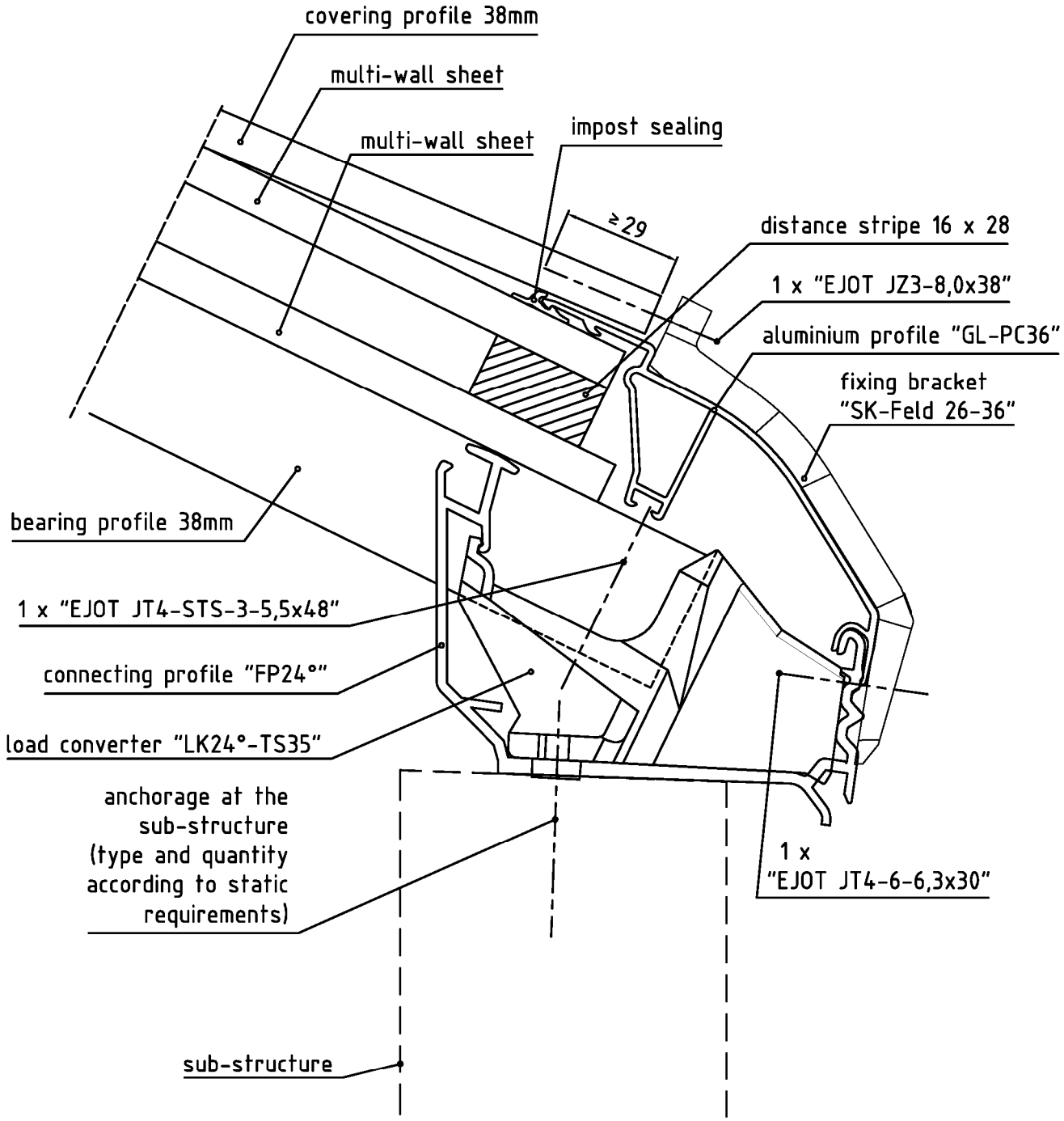
section D-D



CI-System Lichtband B	Annex 10.2
sectional views covering type "PC10 + PC10 tc 16" section D-D	

Deutsches Institut für Bautechnik DIBt

section E-E



CI-System Lichtband B	Annex 10.3
sectional views covering type "PC10 + PC10 tc 16" section E-E	

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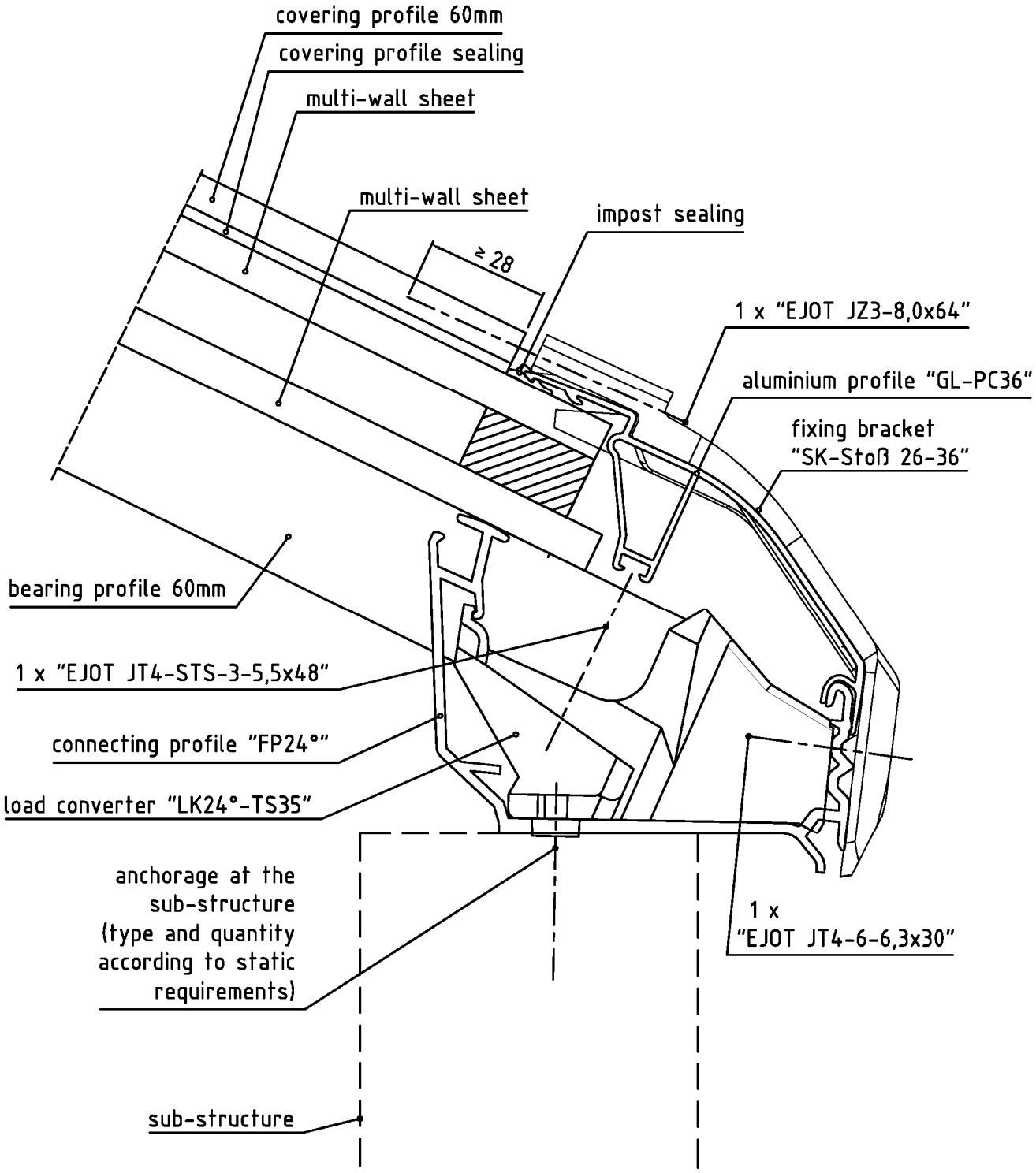

CI-System Lichtband B	Annex 10.4
sectional views covering type "PC10 + PC10 tc 16" section F-F	

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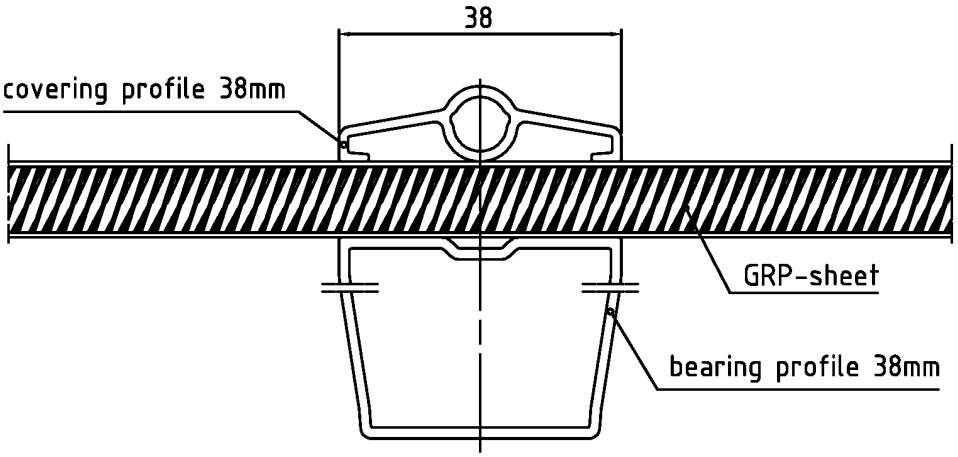
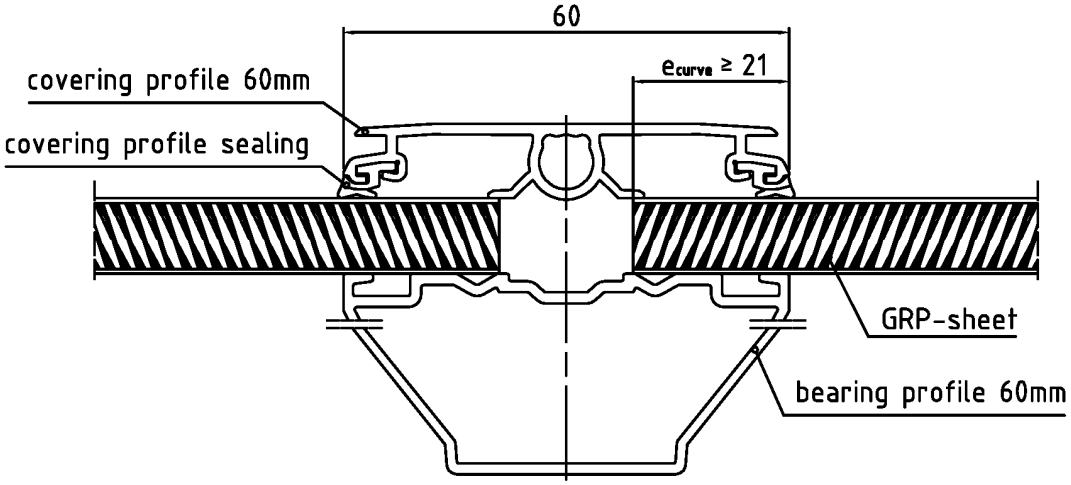
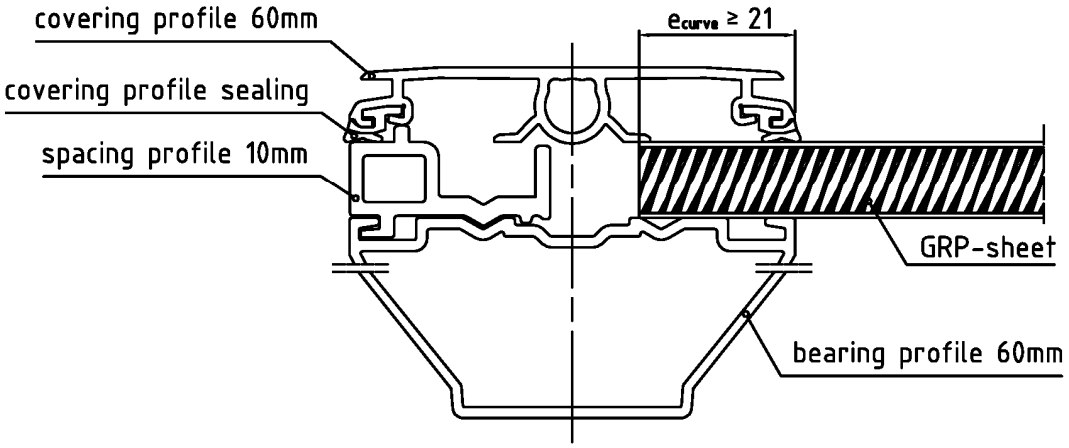
section A-A



section B-B



section C-C



CI-System Lichtband B	Annex 11.1
sectional views covering type "GFUP 10-cavity" section A-A; section B-B; section C-C	

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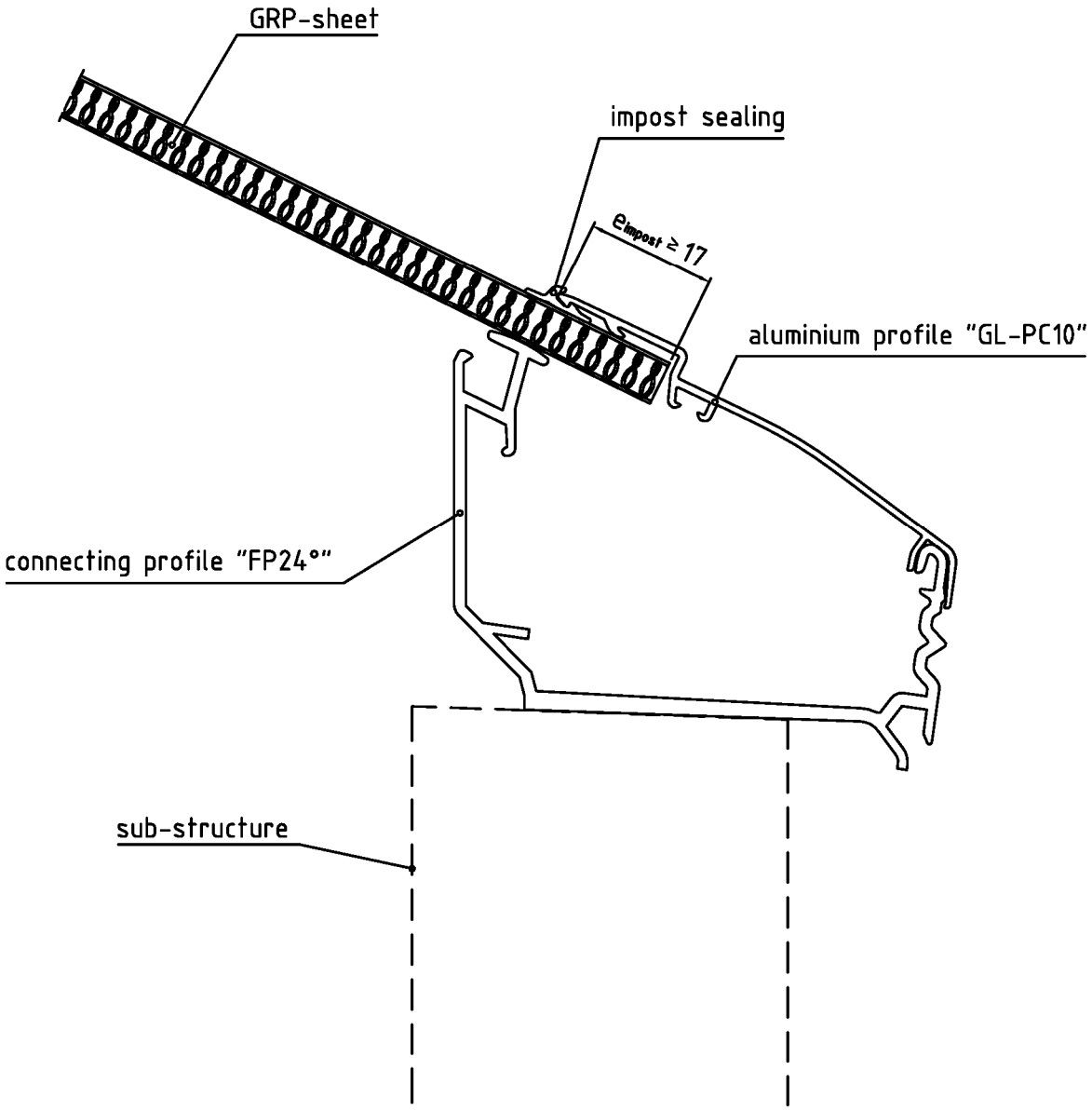
section D-D



CI-System Lichtband B	Annex 11.2
sectional views covering type "GFUP 10-cavity" section D-D	

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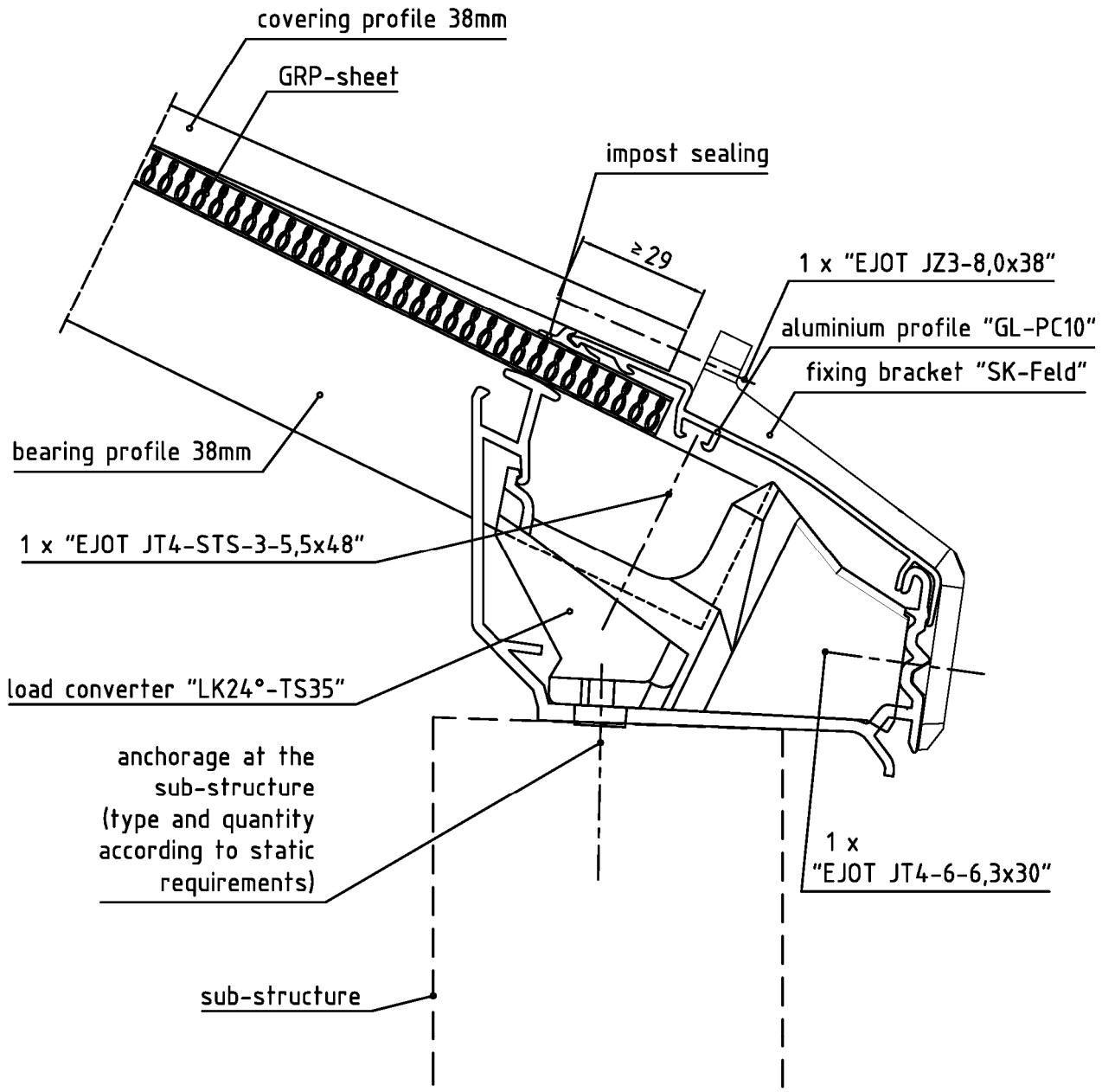
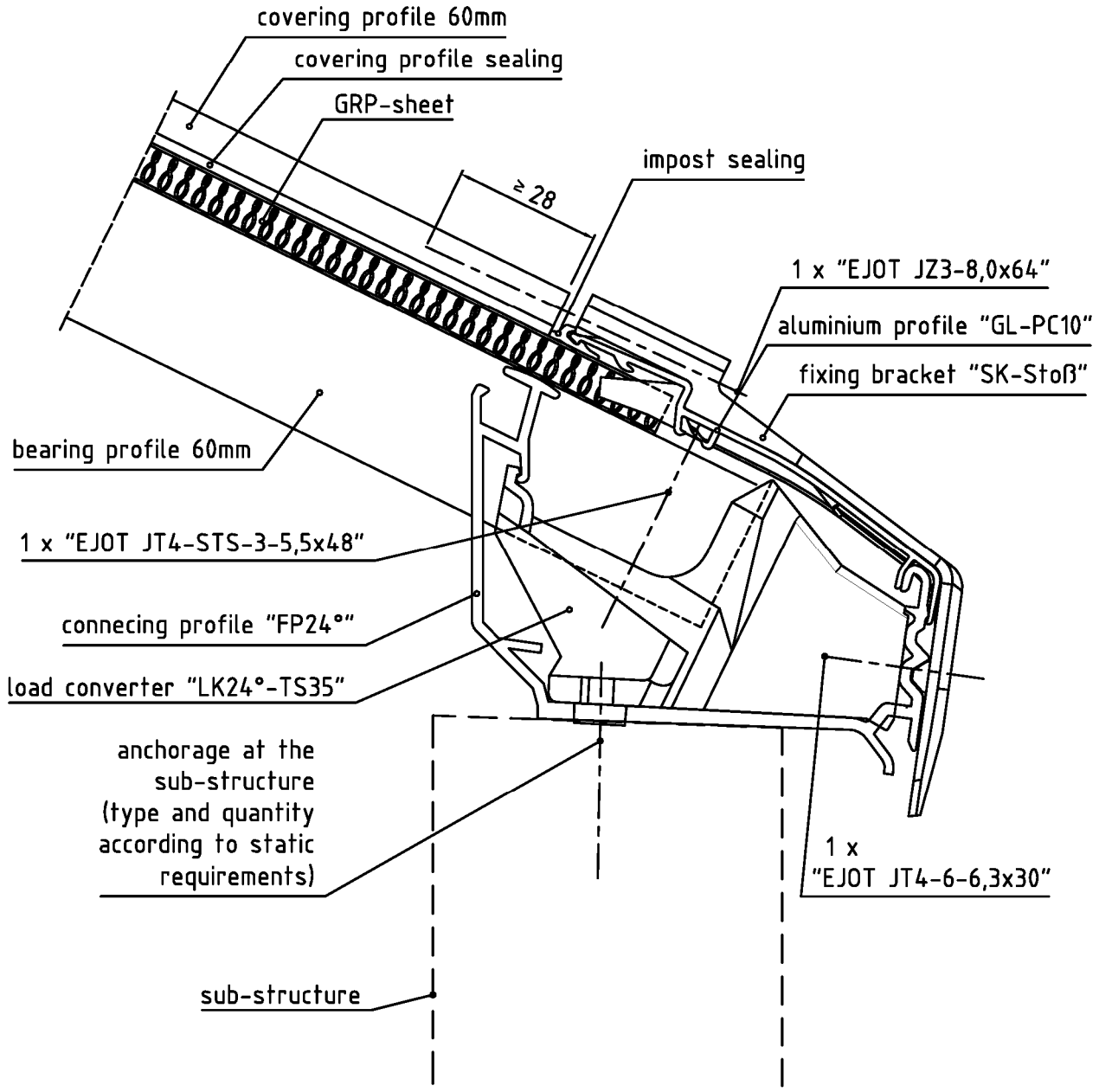
section E-E



CI-System Lichtband B	Annex 11.3
sectional views covering type "GFUP 10-cavity" section E-E	

Deutsches Institut für Bautechnik DIBt

section F-F



CI-System Lichtband B	Annex 11.4
sectional views covering type "GFUP 10-cavity" section F-F	

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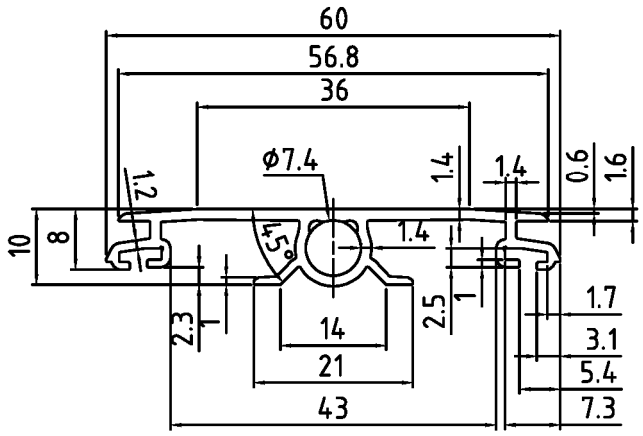
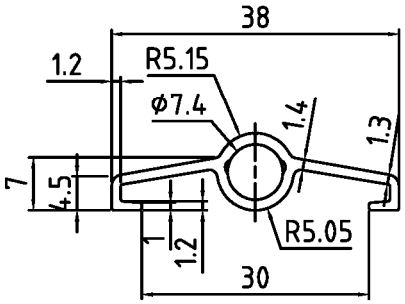
covering profile 60mm



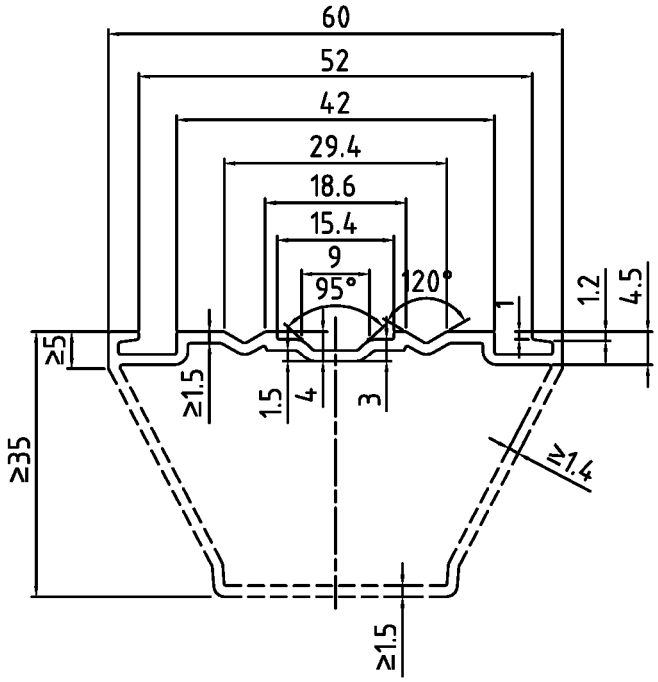
EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

covering profile 38mm



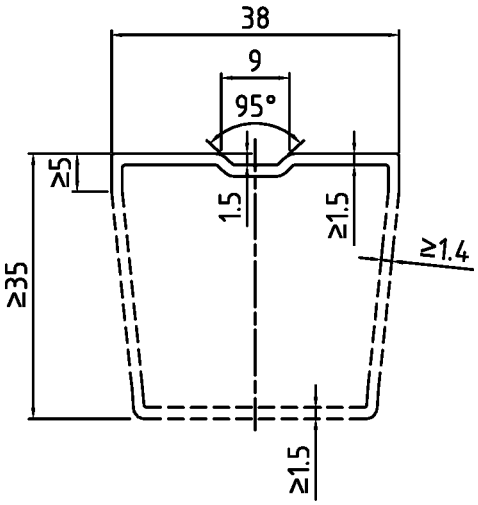
EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

bearing profile 60mm



EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

bearing profile 38mm



EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

CI-System Lichtband B	Annex 12.1
components covering profile 60mm; covering profile 38mm; bearing profile 60mm; bearing profile 38mm	

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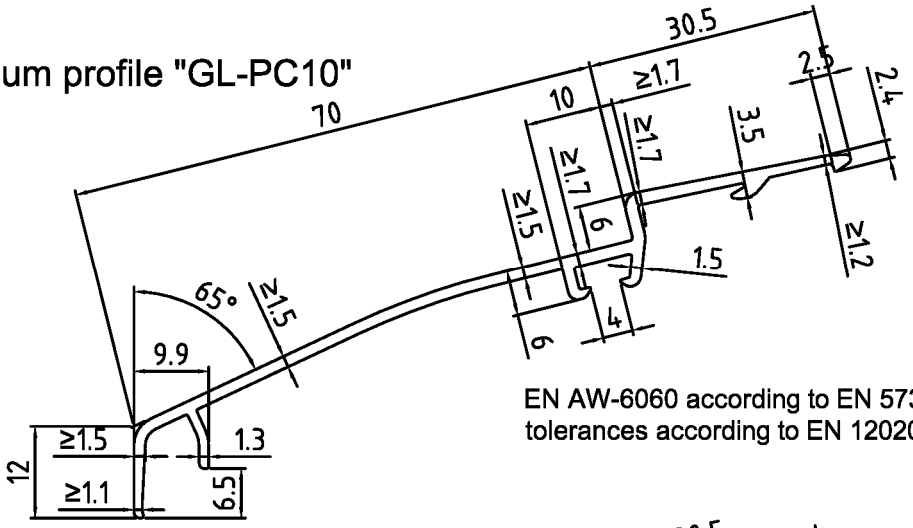
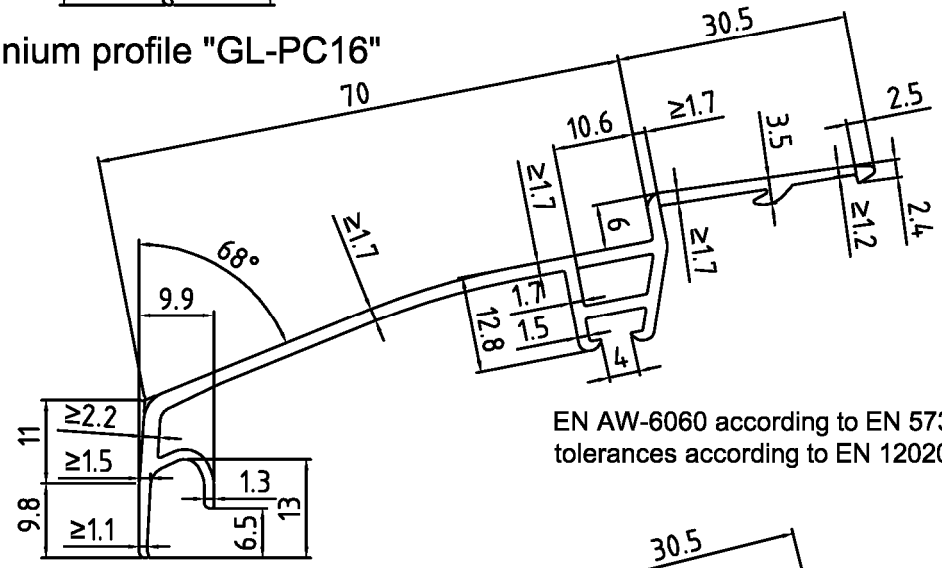
aluminium profile "GL-PC10"



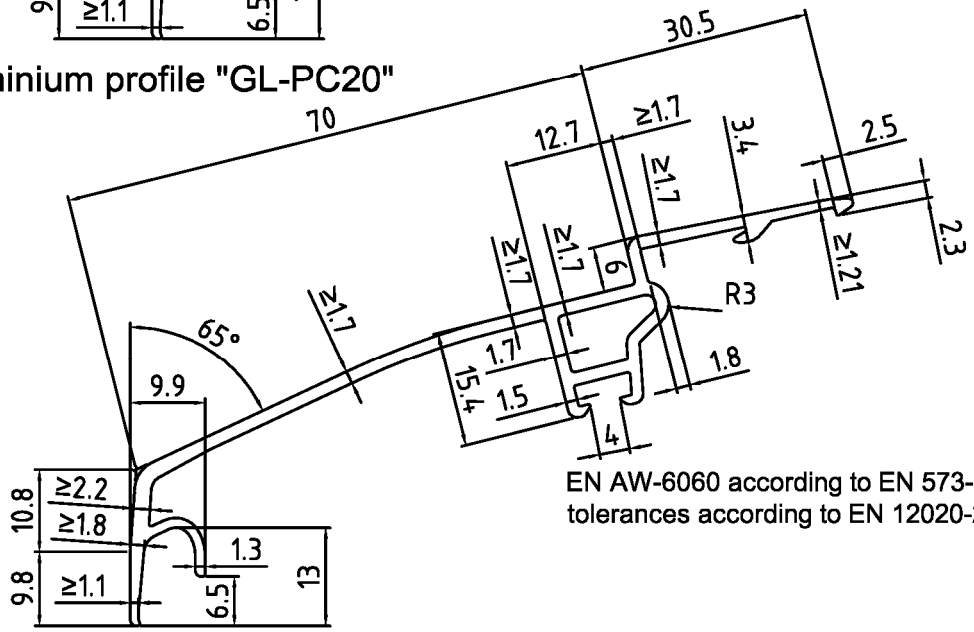
EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

aluminium profile "GL-PC16"



EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

aluminium profile "GL-PC20"



EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

CI-System Lichtband B	Annex 12.2
components aluminium profiles "GL-PC10"; "GL-PC16"; "GL-PC20"	

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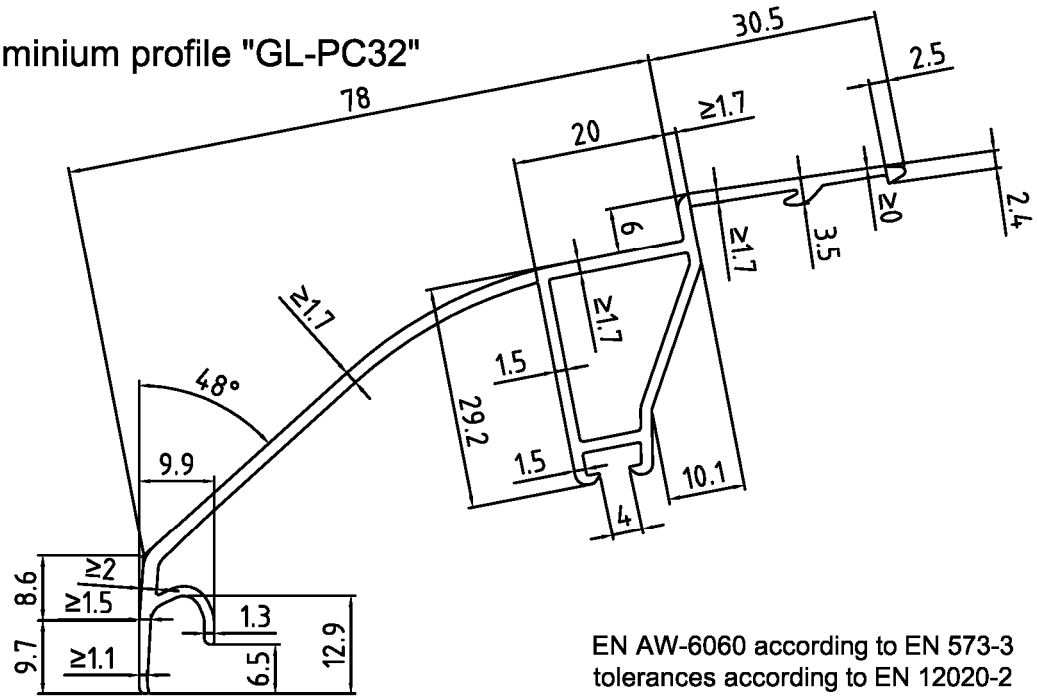
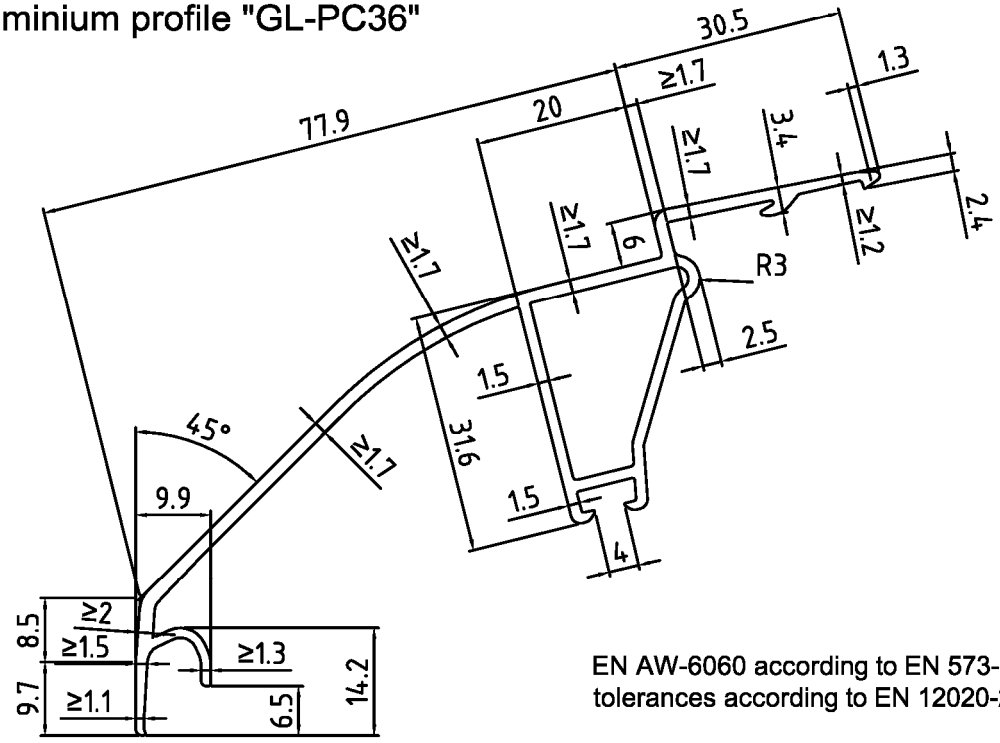
aluminium profile "GL-PC32"



EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

aluminium profile "GL-PC36"



EN AW-6060 according to EN 573-3
tolerances according to EN 12020-2

CI-System Lichtband B	Annex 12.3
components aluminium profiles "GL-PC32"; "GL-PC36"	

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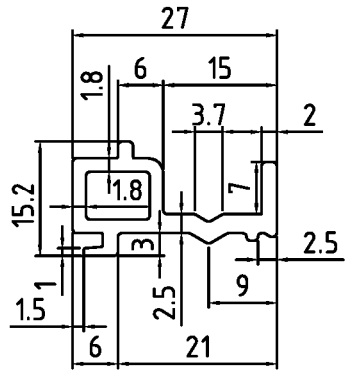
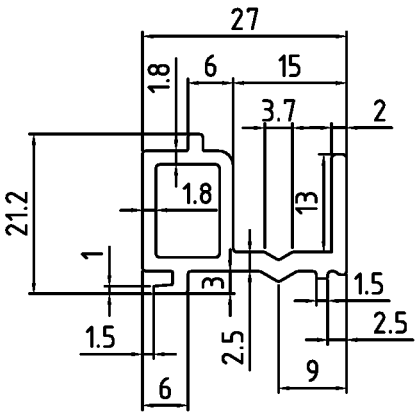
spacing profile 10mm



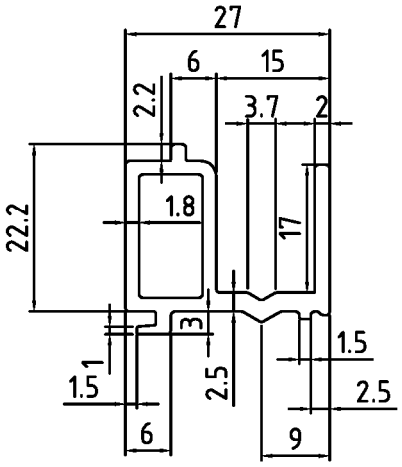
PVC-U; E G L, 078 - 25 - T33
according to EN ISO 1163

spacing profile 16mm



PVC-U; E G L, 078 - 25 - T33
according to EN ISO 1163

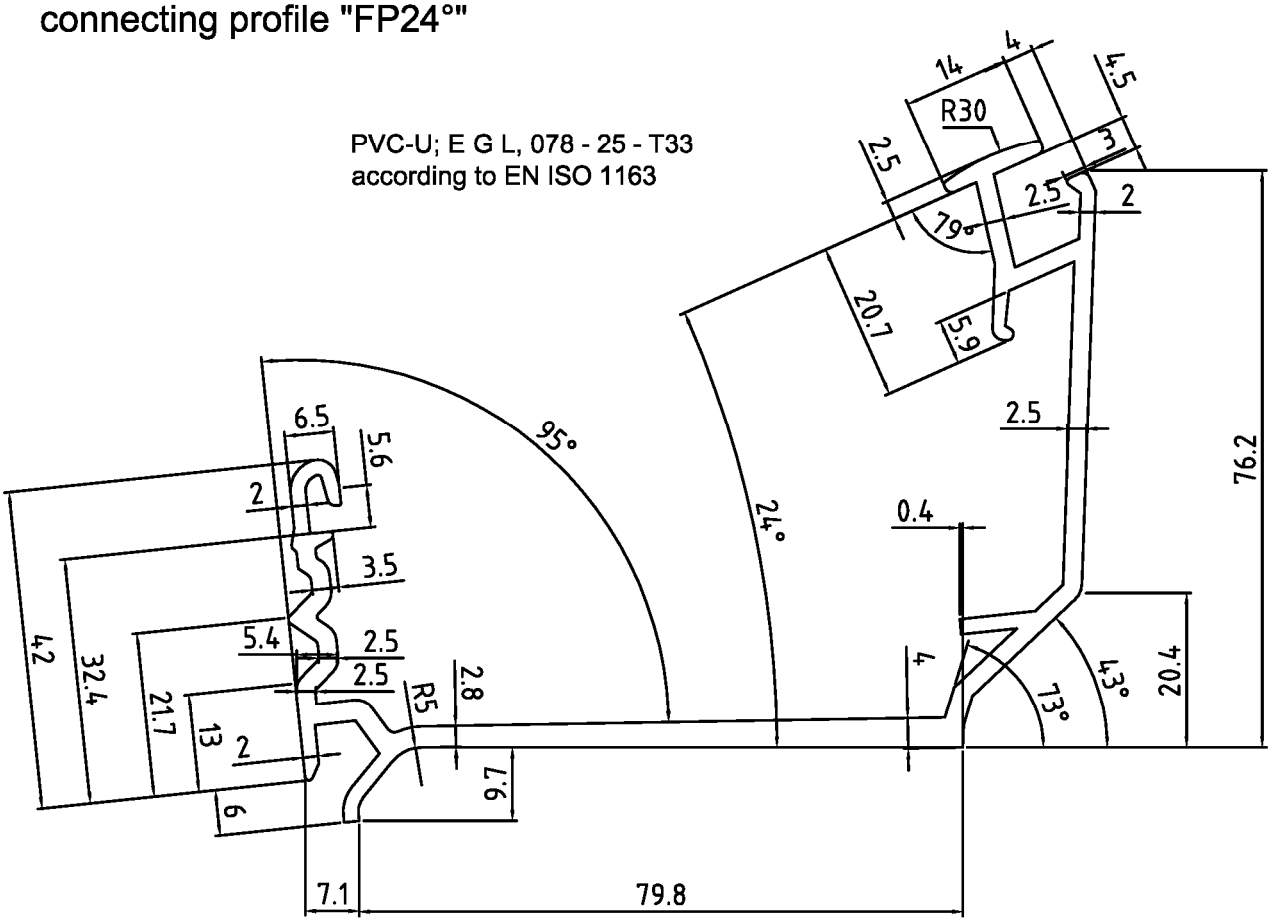
spacing profile 20mm



PVC-U; E G L, 078 - 25 - T33
according to EN ISO 1163

connecting profile "FP24°"

PVC-U; E G L, 078 - 25 - T33
according to EN ISO 1163



CI-System Lichtband B	Annex 12.4
components spacing profiles 10mm; 16mm: 20mm connecting profile "FP24°"	

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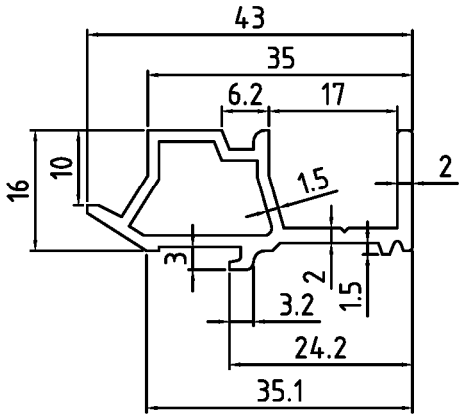
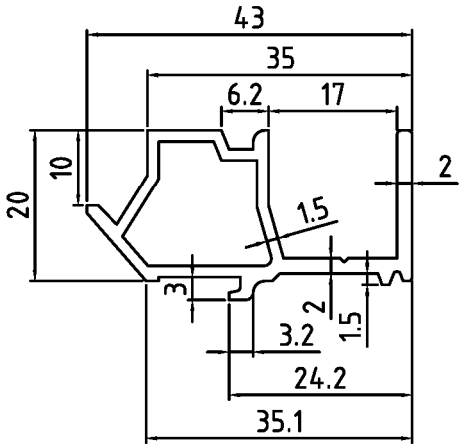
spacing profile TSD-16



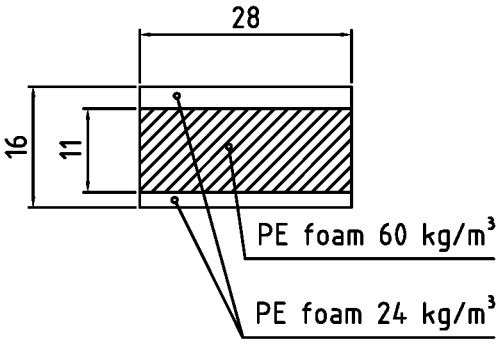
PVC-U; E G L, 078 - 25 - T33
according to EN ISO 1163

spacing profile TSD-20



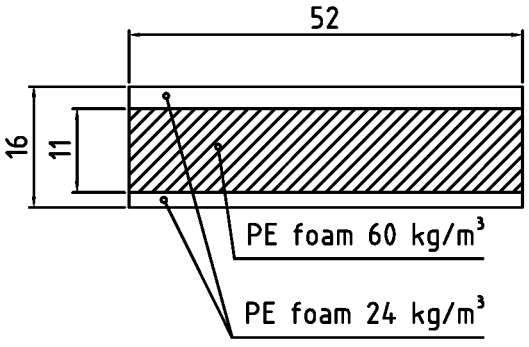
PVC-U; E G L, 078 - 25 - T33
according to EN ISO 1163

distance stripe 16 x 28



PE-foam according to EN ISO 7214

distance stripe 16 x 52



PE-foam according to EN ISO 7214

CI-System Lichtband B	Annex 12.5
components spacing profiles TSD-16; TSD-20 distance stripe 16 x 28; 16 x 52	

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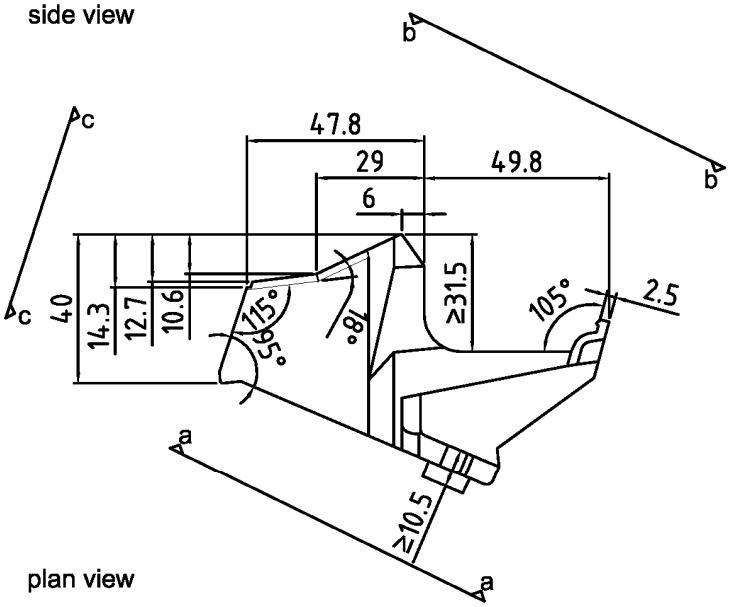
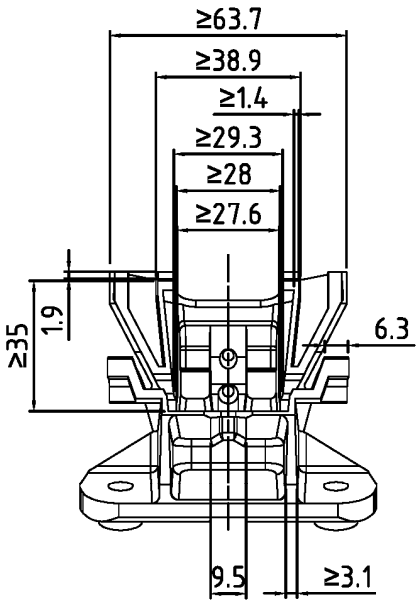
load converter "LK24°-TS35"

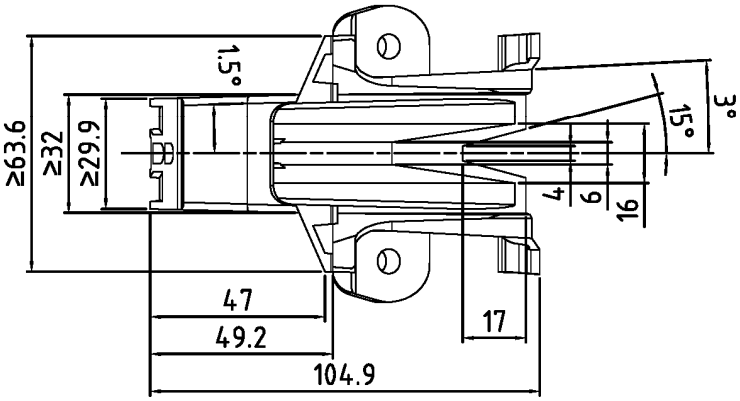
side view



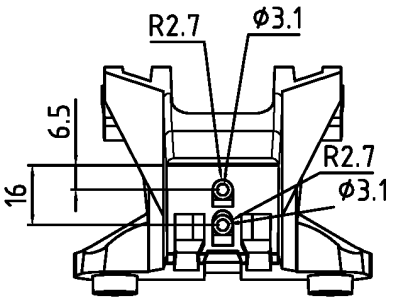
front view



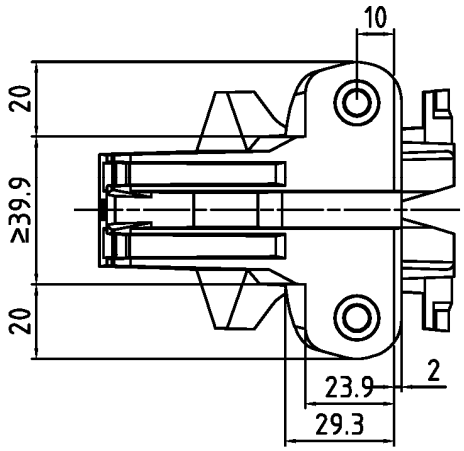
plan view



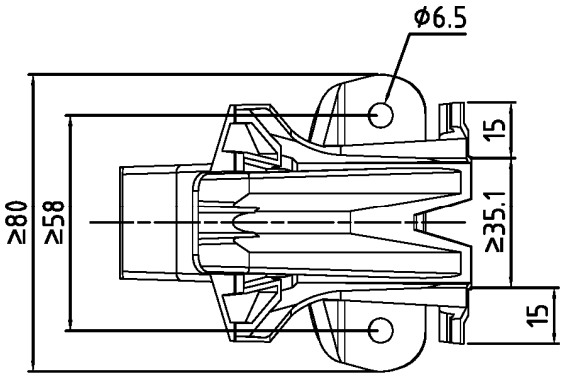
view c-c



view a-a



view b-b



EN AC-44200 according to EN 1706

CI-System Lichtband B	Annex 12.6
components load converter "LK24°-TS35"	

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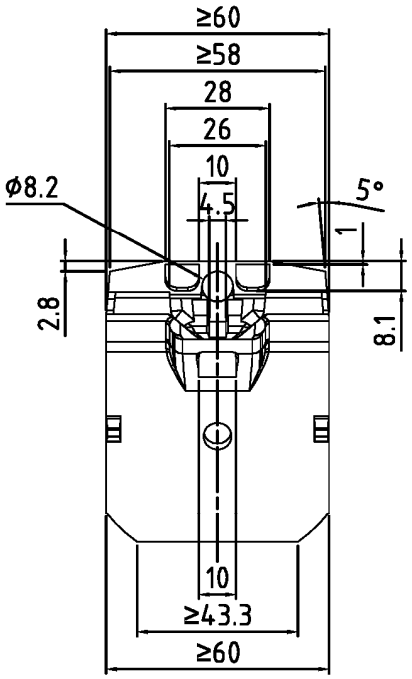
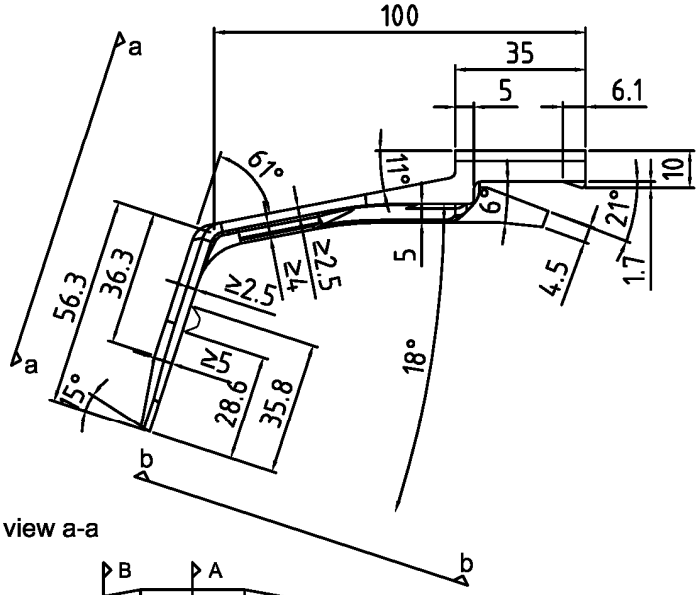
fixing bracket "SK-Stoß"

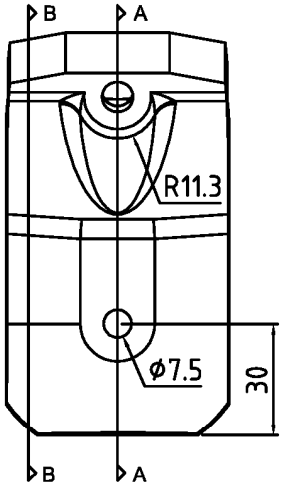
front view



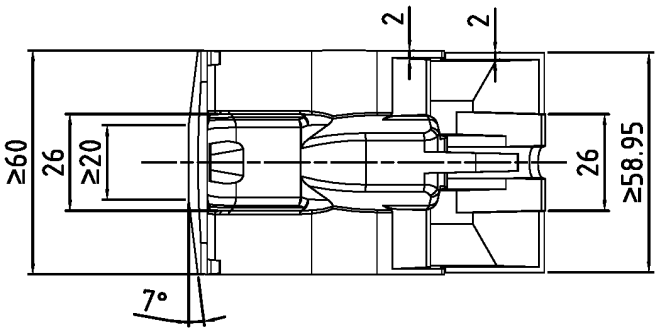
side view



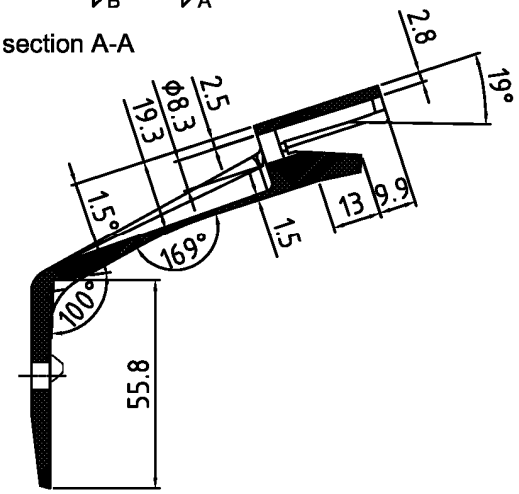
view a-a



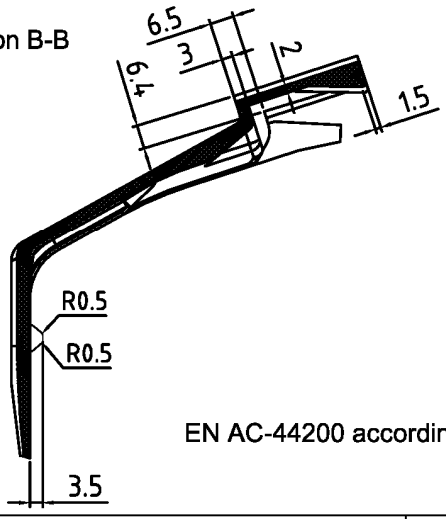
view b-b



section A-A



section B-B



EN AC-44200 according to EN 1706

CI-System Lichtband B	Annex 12.7
components fixing bracket "SK-Stoß"	

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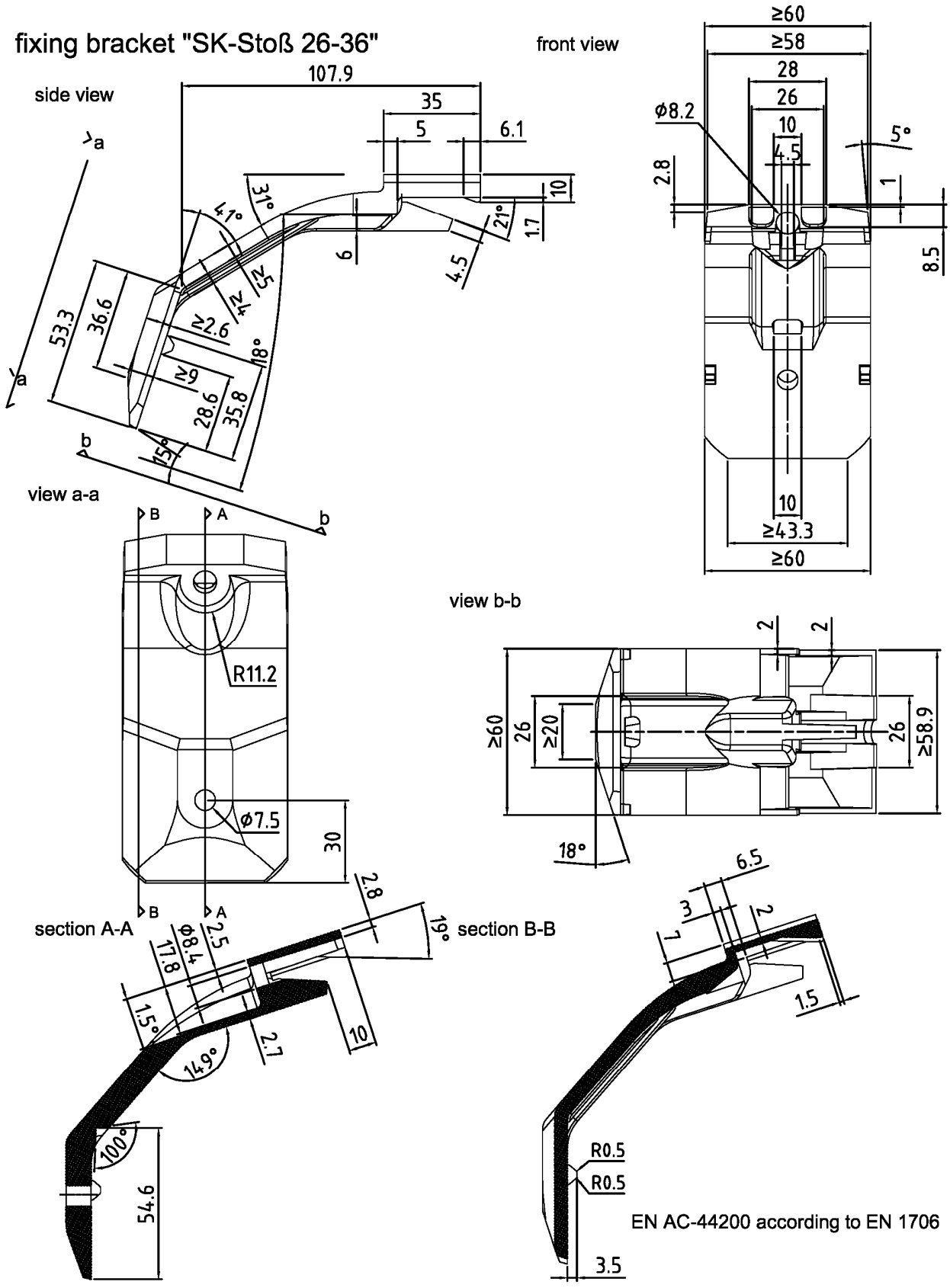

CI-System Lichtband B	Annex 12.8
components fixing bracket "SK-Stoß 26-36"	

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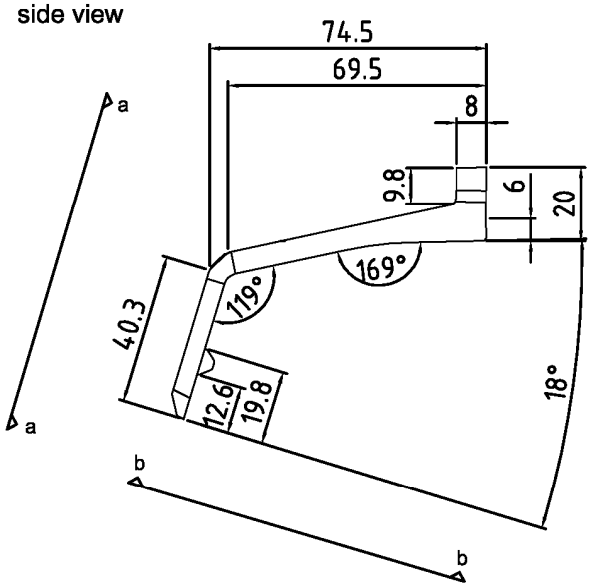
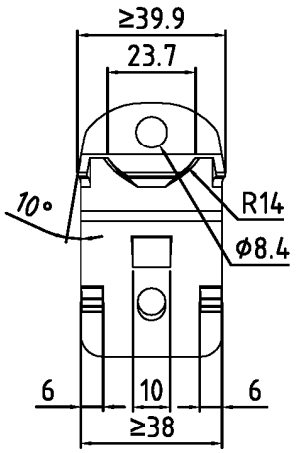
fixing bracket "SK-Feld"

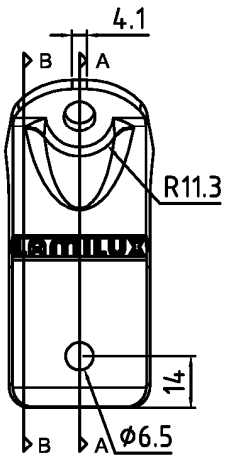
side view



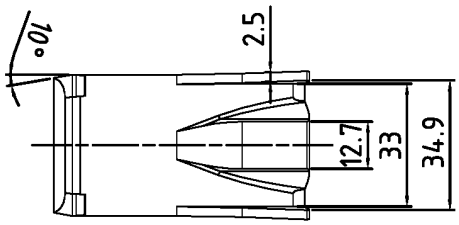
front view



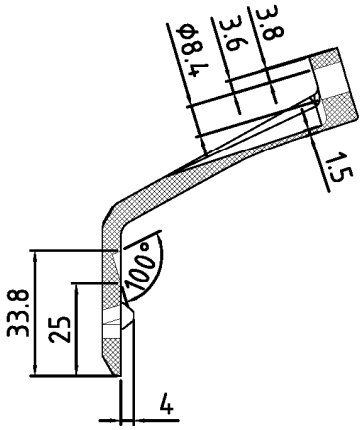
view a-a



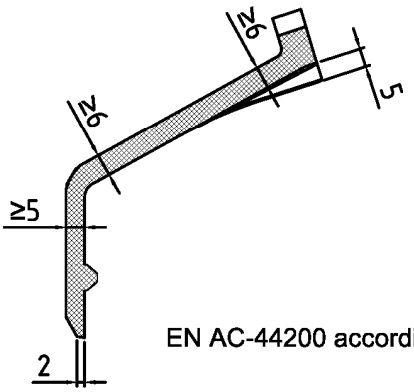
view b-b



section A-A



section B-B



EN AC-44200 according to EN 1706

CI-System Lichtband B	Annex 12.9
components fixing bracket "SK-Feld"	

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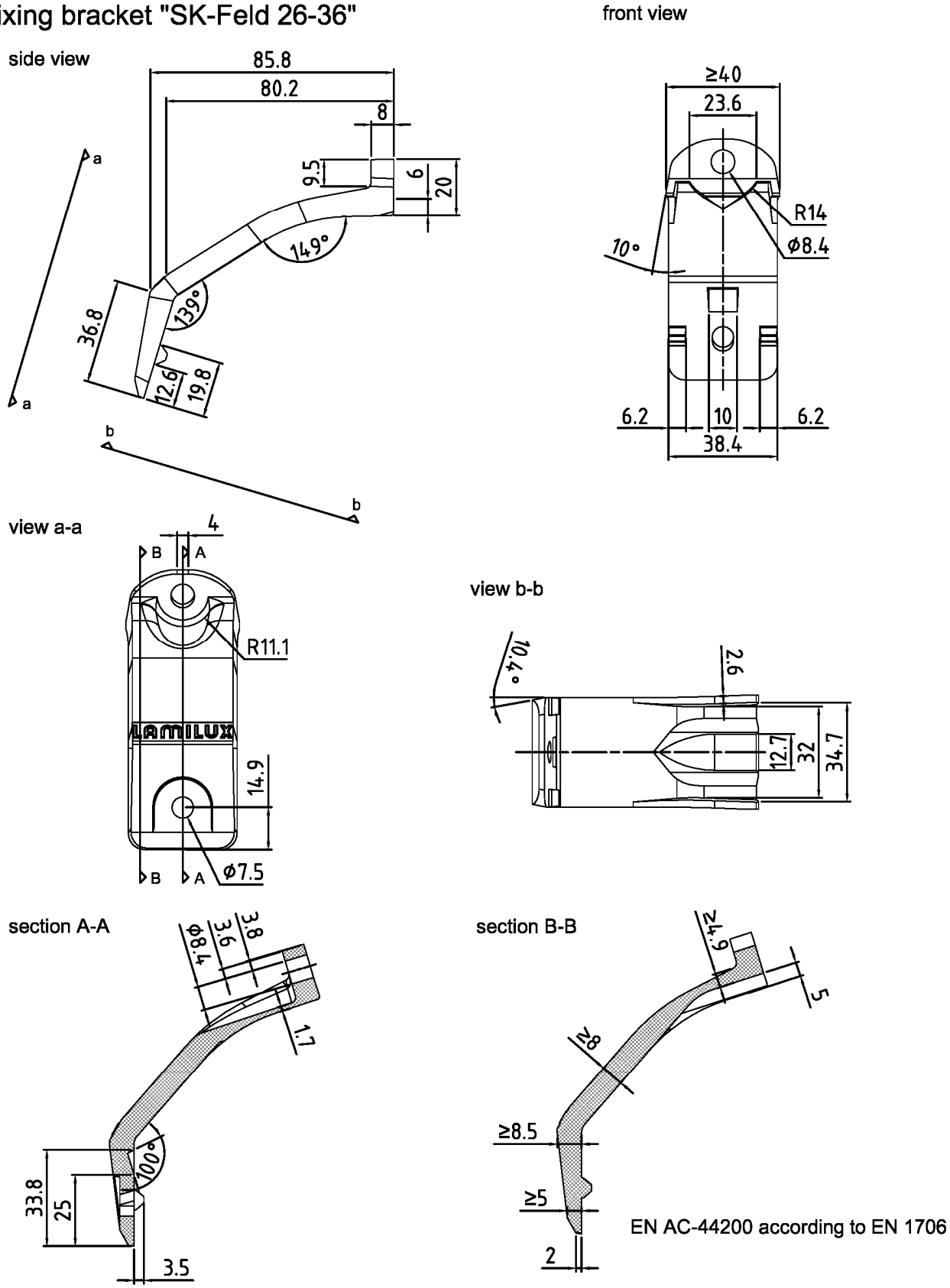
fixing bracket "SK-Feld 26-36"



EN AC-44200 according to EN 1706

CI-System Lichtband B	Annex 12.10
components fixing bracket "SK-Feld 26-36"	

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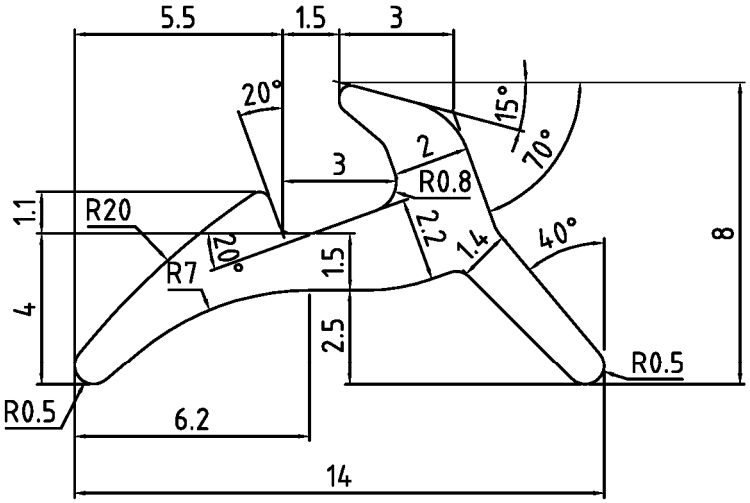
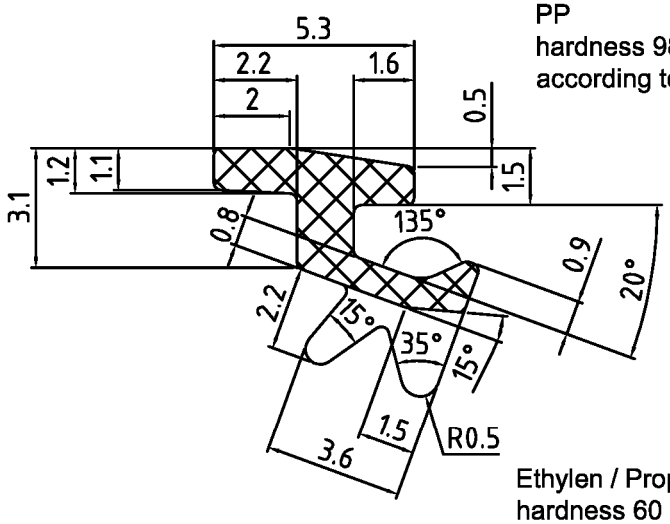
impost sealing



EPDM
hardness 80 +/-5 Shore A
according to EN ISO 868

covering profile sealing



PP
hardness 98 +/-5 Shore A
according to EN ISO 868

Ethylen / Propylen - Terpolymer EPDM
hardness 60 +/-5 Shore A
according to EN ISO 868

CI-System Lichtband B	Annex 12.11
components impost sealing covering profile sealing	

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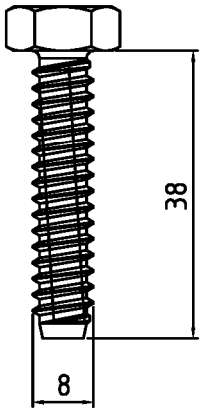
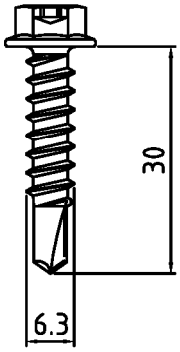
self-tapping screw "EJOT JZ3-8,0x38"



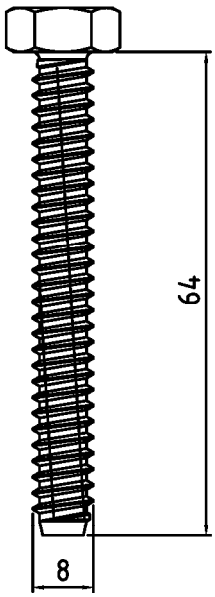
EN 10088 material number 1.4301
actuation: hexangon head 13mm

drilling screw "EJOT JT4-6-6,3x30"



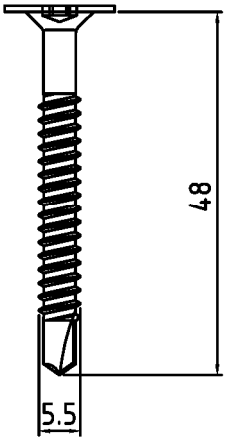
EN 10088 material number 1.4301
actuation: Torx TX 25
drilling capacity 6mm

self-tapping screw "EJOT JZ3-8,0x64"



EN 10088 material number 1.4301
actuation: hexagon head 13mm

drilling screw "EJOT JT4-STS-3-5,5x48"



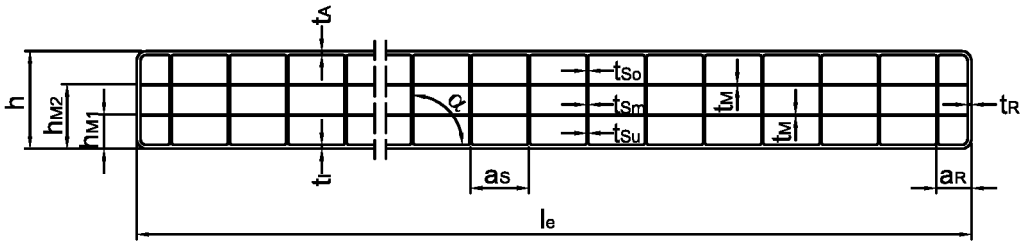
EN 10088 material number 1.4301
actuation: Torx TX 25
drilling capacity 3mm

CI-System Lichtband B	Annex 12.12
components drilling screw self-tapping screw	

Deutsches Institut für Bautechnik DIBt

sheets description:	Makrolon multi UV 4/10-6
sheets manufacturer:	Bayer Sheet Europe GmbH
moulding composition:	ISO 7391 - PC, EL, 61-03-9

dimensions and tolerances



l_e [mm]	a_S [mm]	a_R [mm]	h [mm]	h_{M1} [mm]	h_{M2} [mm]	α [°]
2100	6,0	3,9	10,1	3,4	6,8	90,0

t_A [mm]	t_I [mm]	t_{So} [mm]	t_{Sm} [mm]	t_{Su} [mm]	t_M [mm]	t_R [mm]
0,37	0,37	0,23	0,17	0,23	0,07	0,29

values assessment of conformity

description	code	value
grammage of the sheet	m	≥ 1,72kg/m²

specification of usage

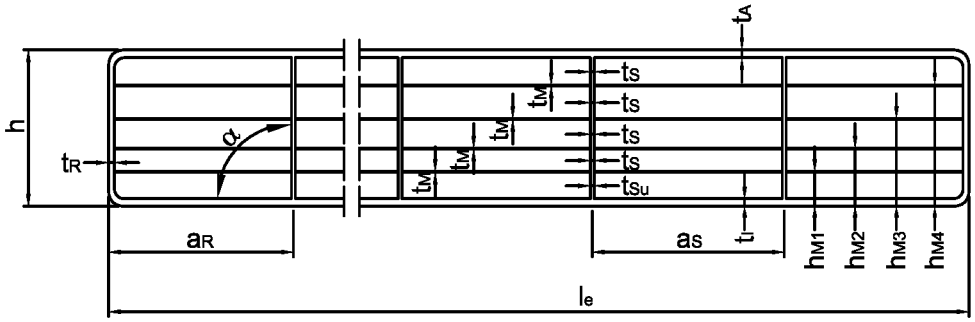
- The least bending radius amounts to 1500mm.
- The ouside with the UV-protection layer is marked by a label at the border area.

CI-System Lichtband B	Annex 13.1
components translucent sheets Makrolon multi UV 4/10-6	

Deutsches Institut für Bautechnik DIBt

sheets description:	Makrolon multi UV 6/16-20
sheets manufacturer:	Bayer Sheet Europe GmbH
moulding composition:	ISO 7391 - PC, EL, 61-03-9

dimensions and tolerances



l_e [mm]	a_S [mm]	a_R [mm]	h [mm]	h_{M1} [mm]	h_{M2} [mm]	h_{M3} [mm]	h_{M4} [mm]
2099	19,6	17,4	16,2	3,5	6,2	9,6	12,7

t_A [mm]	t_I [mm]	t_S [mm]	t_{Su} [mm]	t_M [mm]	t_R [mm]	α [°]
0,78	0,77	0,34	0,48	0,05	0,69	90,0

values assessment of conformity

description	code	value
grammage of the sheet	m	≥ 2,72kg/m²

specification of usage

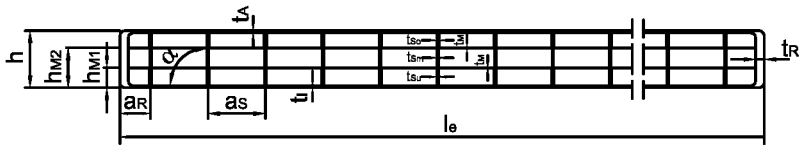
- The least bending radius amounts to 2400mm.
- The outside with the UV-protection leyer is marked by a label at the border area.

CI-System Lichtband B	Annex 13.2
components translucent sheets Makrolon multi UV 6/16-20	

Deutsches Institut für Bautechnik DIBt

sheets description:	Lamilux PC 4/6
sheets manufracturer:	Bayer Sheet Europe GmbH
moulding composition:	ISO 7391 - PC, EL, 61-03-9

dimensions and tolerances



l_e [mm]	a_S [mm]	a_R [mm]	h [mm]	h_{M1} [mm]	h_{M2} [mm]	t_A [mm]	t_I [mm]
2104	5,9	3,1	5,8	2,1	4,1	0,21	0,18

t_{So} [mm]	t_{Sm} [mm]	t_{Su} [mm]	t_M [mm]	t_R [mm]	α [°]
0,24	0,16	0,21	0,03	0,87	90,0

values assessment of conformity

description	code	value
grammage of the sheet	m	≥ 0,92kg/m²

specification of usage

- The least bending radius amounts to 900mm.
- The outside is marked by a label at the border area.

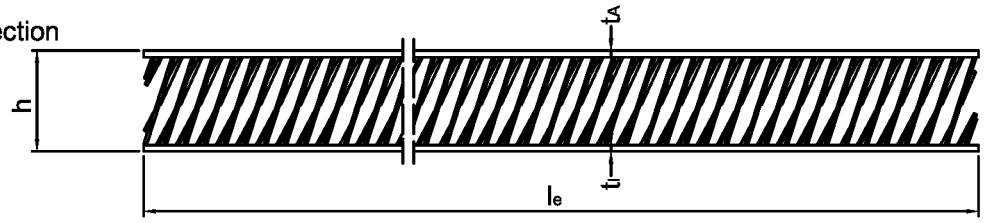
CI-System Lichtband B	Annex 13.3
components translucent sheets Lamilux PC 4/6	

Deutsches Institut für Bautechnik DIBt

sheets description:	Composite 10mm GFUP cavity-resist
sheets manufracturer:	LAMILUX composites GmbH
basic material:	glass fibre reinforced polyester resin

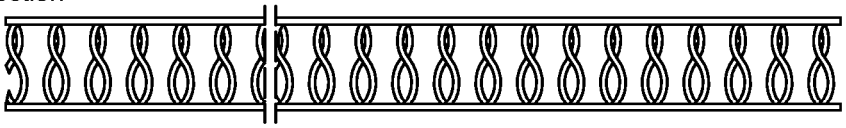
dimensions and tolerances

section



l_e [mm]	h [mm]	t_A [mm]	t_I [mm]
2100	10,3	0,69	0,63

longitudinal section



values assessment of conformity

description	code	value
grammage of the sheet	m_p	≥ 2,63kg/m²
glass fibre insert	m_g	1057g/m²

specification of usage

- The least bending radius amounts to 1500mm.
- The outside with the weather protection layer is marked by a label at the border area.

CI-System Lichtband B	Annex 13.4
components translucent sheets Composite 10mm GFUP cavity-resist	