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Technical authority granting approvals and permits for construction products and construction techniques

National technical approval / General construction technique permit

Date: 6 Dec 2024

Reference number: I 66-1.72.1-8/24

Number:
Z-72.1-1

Validity
from: **13 December 2024**
to: **13 December 2029**

Applicant:
RENOLIT Belgium N.V.
Industriepark de Bruwaan 43
9700 OUDENAARDE
BELGIUM

Subject of decision:
'RENOLIT ALKORPLAN Solar' – a solar panel fastening system for use on 'RENOLIT ALKORPLAN F' roof waterproofing membranes

The subject named above is herewith granted a national technical approval (*allgemeine bauaufsichtliche Zulassung*) / general construction technique permit (*allgemeine Bauartgenehmigung*).
This decision contains eleven pages and seven annexes.
The subject concerned was granted the first national technical approval on 11 December 2019.

Translation authorised by DIBt

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I GENERAL PROVISIONS

1 This decision confirms the fitness for use and application of the subject concerned within the meaning of the Building Codes of the federal states (*Landesbauordnungen*).

2 This decision does not replace the permits, approvals and certificates required by law for carrying out construction projects.

3 This decision is granted without prejudice to the rights of third parties, in particular private property rights.

4 Notwithstanding further provisions in the 'Special Provisions', copies of this decision shall be made available to the user and installer of the subject concerned. The user and installer of the subject concerned shall also be made aware that this decision must be made available at the place of use or place of application. Upon request, copies of the decision shall be provided to the authorities involved.

5 This decision shall be reproduced in full only. Partial publication requires the consent of DIBt. Texts and drawings in promotional material shall not contradict this decision. In the event of a discrepancy between the German original and this authorised translation, the German version shall prevail.

6 This decision may be revoked. The provisions contained herein may subsequently be supplemented and amended, in particular if this is required by new technical findings.

7 This decision is based on the information and documents provided by the applicant. Alterations to this basis are not covered by this decision and shall be notified to DIBt without delay.

II SPECIAL PROVISIONS

1 Subject concerned and field of use and application

1.1 Subject of approval and field of use

(1) The subject of approval is the 'RENOLIT ALKORPLAN Solar' solar panel fastening system (hereinafter referred to as the 'fastening system') consisting of:

- 'RENOLIT ALKORPLUS 81601' aluminium insert profiles (hereinafter referred to as 'aluminium inserts'),
- 'RENOLIT ALKORPLAN 81600' extruded plastic profiles (hereinafter referred to as 'extruded profiles') and
- 'EJOT JT3-2-6.0' or 'EJOT JF3-2-5.5' self-drilling screws (fastening screws).

(2) The system design is shown in Annex 1.

(3) The fastening system may be used to fasten solar panels to roof waterproofing membranes in accordance with Section 1.2.

1.2 Subject of the permit and field of application

(1) The subject of the permit is the planning, design and execution of the solar panel fastening using the above-mentioned fastening system.

(2) The fastening system shall be used exclusively on the mechanically fastened 'RENOLIT ALKORPLAN F' roof waterproofing membrane (hereinafter referred to as roof waterproofing membrane).

(3) For application of the fastening system, the substrate (roof structure) shall meet certain requirements, e.g. regarding roof surface and slope, type and spacing of the roof waterproofing membrane fasteners, type and geometry of the insulation.

(4) The fastening system may only be applied for solar panels installed parallel to the roof surface.

(5) The fastening system transfers wind uplift forces acting vertically on the roof surface into the substrate (roof structure). Transfer of horizontal forces shall be ensured through additional measures.

2 Provisions for the construction product

2.1 Properties and composition

2.1.1 Aluminium inserts

The aluminium hollow inserts in accordance with EN 12020-2 shall consist of the aluminium alloy EN AW-6063 (EN AW-Al Mg0.7Si) in accordance with DIN EN 573-3 in the material condition T6 in accordance with DIN EN 515. The geometry and other properties shall correspond to the specifications in Annex 3, Figure A3-1, and Annex 4, Table A4-1, No. 2.

2.1.2 Extruded profile

The extruded profile shall consist of extruded, plasticised polyvinyl chloride (PVC-P) in accordance with the composition deposited with DIBt. The profile shall consist of a square hollow profile with moulded welding flanges. The dimensions and further properties shall correspond to the specifications in Annex 3, Figure A3-2, and Annex 4, Table A4-1, No. 3.

2.1.3 Fastening screw

The 'EJOT JT3-2-6.0' or 'EJOT JF3-2-5.5' self-drilling screw in accordance with national technical approval no. Z-14.4-426 shall be used as the fastening screw with which the subframe of the solar system is fastened in the aluminium insert in accordance with Annex 1, Figure A1-1, and Annex 4, Table A4-1, No. 1.

2.2 Manufacture, transport and storage

(1) The extruded profile shall be manufactured and completed in accordance with the formulation/composition deposited with DIBt in the manufacturing plant of RENOLIT Ibérica S.A., Ctra. Del Montnegre s/n, 08470 Sant Celoni, Spain, from the starting powder mixture using the extrusion process.

(2) The aluminium insert shall be manufactured in accordance with the provisions of this decision and the requirements of the applicant.

(3) The fastening system, i.e. the extruded profile, aluminium insert and fastening screw, shall be packed in the manufacturing plant of RENOLIT Belgium N.V., Industriepark de Bruwaan 9700 Oudenaarde, Belgium.

(4) The fastening system shall be delivered in complete form with all its components using a suitable transport vehicle.

(5) Prior to installation, the fastening system shall be stored such that serviceability is not affected. In particular, all components shall be stored in their unopened original packaging and be protected from moisture and frost. Additional instructions from the component manufacturers shall be observed.

2.3 Marking

(1) The delivery note for the fastening system shall be marked by the manufacturer with the national conformity mark (*Ü-Zeichen*) in accordance with the Conformity Marking Ordinances (*Übereinstimmungszeichen-Verordnungen*) of the federal states. The mark shall only be applied if the requirements given in Section 2.4 are met.

(2) The extruded profiles shall be marked by the manufacturer with:

- the factory identifying mark,
- the manufacturing date (month + year) and
- 'Component of the 'RENOLIT ALKORPLAN Solar' fastening system in accordance with Z-72.1-1',

e.g.: '*Factory identifying mark* ...' Component of the 'RENOLIT ALKORPLAN Solar' fastening system in accordance with Z-72.1-1.

(3) The delivery note for the fastening system shall contain the following information:

- full designations of the individual components,
- 'RENOLIT ALKORPLAN Solar' solar panel fastening system in accordance with national technical approval no. Z-72.1-1',
- name and factory identifying mark of the applicant,
- date of manufacture.

2.4 Confirmation of conformity

2.4.1 General

(1) The manufacturer shall confirm for each manufacturing plant that the fastening system complies with the provisions of the national technical approval included in this decision by way of a declaration of conformity based on factory production control and a certificate of conformity issued by a certification body recognised for these purposes as well as on regular external surveillance carried out by a recognised inspection body in accordance with the following provisions.

(2) To issue the certificate of conformity and for external surveillance, including the associated product testing, the manufacturer shall use a certification body and an inspection body recognised for these purposes.

(3) The declaration of conformity shall be submitted by the manufacturer through marking of the construction product with the national conformity mark including statement of the intended use.

(4) The certification body shall send a copy of the certificate of conformity issued by it to DIBt.

(5) A copy of the initial type-testing report shall also be sent to DIBt.

2.4.2 Factory production control

(1) A factory production control system shall be set up and implemented in the manufacturing plant of the fastening system. Factory production control shall be understood to be continuous surveillance of production by the manufacturer to ensure that the manufactured construction products satisfy the provisions of the national technical approval included in this decision.

(2) The factory production control shall at least include the measures listed in Annex 6.

(3) The results of factory production control shall be recorded and evaluated. The records shall include at least the following information:

- designation of the construction product or the starting material and the components,
- type of check or test,
- date of manufacture and testing of the construction product or the starting material or the components,
- Results of the checks and tests as well as, if applicable, comparison with requirements and
- signature of the person responsible for factory production control.

(4) The records shall be kept for at least five years and submitted to the inspection body used for external surveillance. They shall be submitted to DIBt and the competent supreme building authority upon request.

(5) If the test result is not satisfactory, the person responsible for factory production control shall immediately take the necessary measures to resolve the defect. Construction products which do not meet the requirements shall be handled in such a way that they cannot be confused with compliant products. After the defect has been remedied, the relevant test shall be repeated immediately – where technically feasible and necessary to show that the defect has been eliminated.

2.4.3 External surveillance

(1) At the manufacturing plant, the plant and the factory production control system shall be inspected regularly, at least twice a year, by means of external surveillance. If at least two subsequent external surveillance inspections demonstrate that the factory production control system meets the requirements of this decision, the frequency of the external surveillance by the external surveillance body may be reduced to once yearly. If the inspection results are found to be unsatisfactory during the annual surveillance tests, the sampling and testing interval shall revert back to every six months.

(2) Initial type-testing of the fastening system shall be carried out within the scope of external surveillance. Samples for random testing may also be taken. Sampling and checking shall be the responsibility of the recognised inspection body.

(3) During initial type-testing of the fastening system, the properties and characteristic values shall be determined through carrying out individual tests in accordance with the information provided in Annex 6.

(4) These tests may be dropped if the verification of the fitness for use carried out for this decision was conducted on samples officially taken from ongoing production.

(5) The results of certification and external surveillance shall be kept for at least five years. They shall be presented by the certification or inspection body to DIBt and the competent supreme building authority upon request.

3 Provisions for planning, design and execution

3.1 General

(1) Unless otherwise specified below, the fastening of solar panels to the roof waterproofing membrane shall be planned, designed and executed in accordance with the Technical Building Rules.

(2) The planning and design of the fastening of the solar panels to the mechanically fastened roof waterproofing membrane shall be the responsibility of RENOLIT Belgium NV or specialised planners authorised by RENOLIT Belgium NV. Verifiable design and layout drawings for fastening the solar panels shall be prepared taking into account the expected installation conditions. These drawings shall show the type, number, distribution and spacing of the fasteners, as well as the associated load distribution plates and the minimum requirement to be met by the compressive strength of the insulation.

(3) The fastening system shall be executed (installed) only by companies with suitably qualified construction site personnel. In addition, these companies (including their specialised personnel) shall be trained in and authorised to carry out the aforementioned activities by the approval holder.

3.2 Planning

3.2.1 Substrate / roof waterproofing membrane

(1) The fastening system shall only be fastened to the 'RENOLIT ALKORPLAN F' roof waterproofing membrane with the declaration of performance in accordance with DIN EN 13956.

(2) The roof waterproofing membrane shall consist of plasticised polyvinyl chloride (PVC-P) reinforced by synthetic fibres with the composition deposited with DIBt.

(3) The declared performance characteristics and further properties shall correspond to the specifications provided in Annex 2.

(4) For the function of the roof waterproofing membrane, the planning principles in accordance with DIN 18531-1 or DIN 18531-3, in particular regarding roof slope, unimpeded water drainage and accessibility for waterproofing maintenance, shall be taken into account. In particular, a minimum compressive strength of the thermal insulation shall be specified by the expert planner so that any locally increased compressive stresses resulting from elevation can be transmitted to the substrate without causing any damage.

(5) Verification of resistance to flying sparks and radiating heat shall be demonstrated for the respective roof structure with a national technical test certificate (*allgemeines bauaufsichtliches Prüfzeugnis*) in accordance with the Model Administrative Provisions – Technical Building Rules (*Musterverwaltungsvorschrift Technische Baubestimmungen – MVV TB*), Section C 4.8, or a classification report in accordance with EN 13501-5 with classification $B_{Roof}(t1)$.

3.2.2 Fastening system

(1) An ultimate limit state verification shall be provided for each solar panel fastening on the mechanically fastened roof waterproofing membrane.

(2) The provisions of national technical approval no. Z-14.4-426 for the EJOT self-drilling screw (fastening screw) shall be complied with.

(3) The mechanical fastening of the roof waterproofing membrane shall be designed independently of the solar system such that it is stable even without the solar system.

(4) In addition to the provisions in this decision, a structural analysis shall be carried out to verify the increased load on the building caused by the self-weight of the solar panels.

(5) The solar system shall only be fastened on roof superstructures with mechanically fastened roof waterproofing membranes meeting at least the following requirements:

- The roof waterproofing membrane was executed in accordance with DIN 18531-1 or DIN 18531 -3.
- The time period between the installation of the roof waterproofing membrane and installation of the solar system is less than one year.
- The roof slope is less than 5°.
- The insulation has sufficient compressive strength.
- The fasteners used to fasten the roof waterproofing membrane and their marking correspond to the respective verification of fitness for use.
- The requirements regarding spacing and number of fasteners for the roof waterproofing membrane are yielded from the design.
- The roof waterproofing membrane is free of damage and inadmissible dirt. The surface of the roof waterproofing membrane is to be cleaned, if necessary, and to be pre-treated, if necessary, in accordance with the applicant's specifications.

(6) The extruded profiles shall be arranged directly adjacent to a row of fasteners. If the extruded profile is not arranged next to a welded joint, the roof waterproofing membrane shall be mechanically fastened by means of an additional row of fasteners.

(7) The solar system (module or fastening system) shall be at least 500 mm from the edge of the roof.

3.3 Design

3.3.1 General

(1) When designing the solar panel fastening system, the self-weight of the solar panels may be taken into account.

(2) The verification applies exclusively to uplift vertical forces resulting from wind loads. Any occurring horizontal forces shall be absorbed using suitable additional measures.

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

$E_d \leq R_d$.

Where:

E_d: design value of the action

R_d: design value of the structural resistance for verification of the load capacity

(4) In the planning of the solar system, the possibility of an approx. 2 cm vertical uplift of the profiles at the design wind load shall be taken into account.

(5) The verification shall be provided for the connection of the roof waterproofing membrane to the fastening element (roof waterproofing membrane fastener). Verification for the other components of the fastening system (extruded profile, aluminium insert and fastening screw) and the roof waterproofing membrane as well as the interplay between them for fastening the solar system is thus provided.

3.3.2 Design values for actions E_d

(1) The characteristic values for the actions E_k, the partial safety factors γ_F and the combination coefficients ψ shall be taken from the Technical Building Rules officially introduced in the field of construction.

(2) The design value of the action is yielded from the characteristic values of the actions, taking into account the partial safety factors.

(3) When designing the solar panel fastening system, the aerodynamic coefficients of the wind uplift forces in accordance with DIN EN 1991-1-4 may be used. However, a net pressure coefficient of at least $c_{P,net}$ = -0.7 shall be applied.

(4) Moreover, the wind uplift forces and wind pressure actions shall be verified in accordance with DIN EN 1991-1-4/NA, Clause 1.5.

(5) For the wind and temperature effects to be considered in the load case 'summer', the ψ-coefficient defined in DIN EN 1990/NA may be applied. In the design situation in which the wind is considered to be the dominant variable action, the ψ coefficient may be considered in the design value of the structural resistance R_d (see Section 3.3.3).

3.3.3 Design value of structural resistance R_d

(1) The design value of structural resistance R_d is yielded from the characteristic value R_k in consideration of the material safety factor γ_M, the ageing factor K_A and the ambient temperature factor K_T as follows:

$$R_d = \frac{R_k}{\gamma_M * K_A * K_T}$$

R_k: System-specific characteristic value of the structural resistance of the connection between the roof waterproofing membrane and the fastener, R_k = 1.0 kN/fastener

γ_M	Material safety factor		1.3
K_A	Reduction factor for ageing		1.05
K_T	Reduction factor for ambient temperature	Summer (ψ = 100%)	1.3
		Summer (ψ = 60%)	1.18
		Winter	1.0

(2) In the design situation in which the 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 the ambient temperature of 1 + (K-1.0) * ψ may be applied.

(3) The verification shall be provided for all design situations:

Summer load case 1: $K_{t,Summer\ (\psi = 100\ \%)}$ in combination with 60% wind action

Summer load case 2: $K_{t,Summer\ (\psi = 60\ \%)}$ in combination with 100% wind action

Winter load case: $K_{t,Winter}$ in combination with 100% wind action

(4) The characteristic value of the pull-out force of the fastener and the associated safety factors and reduction values shall be taken from the respective national technical approvals, declarations of performance or European Technical Assessments.

3.4 Execution

3.4.1 Installation

(1) The fastening system shall be installed in accordance with the prepared design documents, the ultimate limit state and serviceability limit state verifications and the installation and assembly instructions of the manufacturer, taking into account the specifications of this decision.

(2) Before installing the fastening system, appropriate measures shall be taken to ensure that the existing roof structure is in a suitable condition for the fastening system. It shall be checked that the compressive strength of the installed insulation layer is suitable. It shall be ensured that the type, distribution, arrangement and number of fasteners for the roof waterproofing membrane correspond to the structural design. Fasteners may be supplemented retroactively where necessary.

(3) The fastening system shall be installed manually. Hot gas welding equipment is used for welding the extruded profiles on to the roof waterproofing membrane. The welding work is carried out based on DVS 2225-1, -2 and -6.

(4) The aluminium insert shall not protrude from the extruded profile and shall be shortened where necessary.

(5) The executing company shall hand over a copy of the decision as well as the installation and assembly instructions of the applicant to the operator of the system.

3.4.2 Inspection of execution

(1) A check is required to determine that the declared roof waterproofing membrane performances comply at least with the requirements in accordance with Annex 2. If the declared performance does not completely cover the values, an inspection certificate shall be demanded and checked.

(2) A check is required to ensure that the correct components of the fastening system, e.g. the EJOT self-drilling screws (fastening screws), have been delivered to the site together with the relevant identification markings.

(3) Before and during installation of the fastening system, the following shall be checked:

- The compressive strength of the insulation shall correspond to the planning requirements.
- The roofing membrane shall be laid in accordance with the specifications of DIN 18531-1 and DIN 18531-3. All weld seams shall be watertight over their entire lengths.
- The type, distribution and number of fasteners shall correspond to the structural design data.
- The extruded profile shall be welded on to the roof waterproofing membrane on both sides over the entire length.
- The aluminium insert end shall be flush with the extruded profile end.
- The cross beams of the solar panel subframe shall be anchored with two fastening screws each in the aluminium insert.

(4) The results of the checks shall be recorded and evaluated as well as documented by at least submitting a production report based on Annex 7 including the reports and checks listed therein.

(5) The records shall be available at the construction site during the construction period. They shall be kept by the executing company for a minimum of five years after completion of the project. Copies of the records shall be handed over to the building owner for inclusion in the construction record and, upon request, presented to DIBt, the supreme building authority and the inspection body.

(6) If the test results are unsatisfactory, the executing company shall immediately take the necessary measures to resolve the defect. Construction products used which do not meet the requirements shall be handled in such a way that they cannot be confused with compliant products. After the defect has been remedied, the relevant test shall be repeated immediately, where technically feasible and necessary to show that the defect has been eliminated.

3.4.3 Declaration of conformity for execution

(1) For the execution, the executing company shall provide a declaration of conformity in accordance with Section 16a(5) in conjunction with Section 21(2) of the Model Building Code (*Musterbauordnung – MBO*)[1] to confirm the conformity of the construction technique with this general construction technique permit. The following checks shall form the basis for the declaration of conformity:

– check whether the construction products used comply with the provisions of this national technical approval incl. its marking specifications,

[1] Model Building Code *(Musterbauordnung – MBO)* of November 2002, as last amended by the decision of the Conference of Construction Ministers of 22/23 September 2022

– inspection of execution.

(2) The declaration of conformity shall be handed over to the building owner for inclusion in the construction record and shall be presented to DIBt and the competent supreme building authority on request.

4 Provisions for use and maintenance

(1) Unless otherwise specified below, DIN 18531-4 shall apply.

(2) The operator of a solar system shall check and maintain the tightness and functionality of the roof waterproofing membranes and the proper fastening of the system. The operator of the solar system shall prepare operating instructions for this purpose. The results of regular checks as well as all incidents that deviate from the operating instructions shall be documented.

(3) Checks and maintenance shall include at least the following measures:

- removal of dirt and unwanted vegetation, particularly in the region of the fastened extruded profile,
- checking the roof surface for waterproofing function,
- checking the contact areas of the solar installation in terms of inadmissible deformations (compressive strain of insulation),
- checking the longitudinal weld seams for detachment between the membrane and the extruded profile,
- checking the anchorage of the fastening screws between the cross beams and the aluminium insert,
- initiation of repair work if required.

(4) The system shall be checked at least 2 x annually and after special weather events.

(5) The operator of a solar system shall be obliged to only commission those companies to repair the solar panel fastening system which were authorised and trained by the applicant to do so.

(6) Every 5 years, the fastening construction, the roof surfaces and the connections and terminations shall be verified by a skilled person. The verification shall be documented in writing. The report shall contain information on the identified defects, any necessary further preliminary investigations and the type and urgency of necessary maintenance measures.

References of cited standards

DIN EN 12020-2:2023-02	Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 2: Tolerances on dimensions and form; German version EN 12020-2:2022
DIN EN 573-3:2024-03	Aluminium and aluminium alloys - Chemical composition and form of wrought products – Part 3: Chemical composition and form of products; German version EN 573-3:2019+A2:2023
DIN EN 515:2017-05	Aluminium and aluminium alloys - Wrought products - Temper designations; German version EN 515:2017
DIN EN 13956:2013-03	Flexible sheets for waterproofing - Plastic and rubber sheets for roof waterproofing - Definitions and characteristics; German version EN 13956:2012

DIN SPEC 20000-201:2018-08	Application of construction products in structures – Part 201: Application standard for flexible sheets for waterproofing in accordance with European product standards for the use as waterproofing of roofs
DIN 18531-1:2017-07	Waterproofing of roofs, balconies and walkways – Part 1: Non-utilized and utilized roofs - Requirements and principles for execution and design
DIN 18531-3:2017-07	Waterproofing of roofs, balconies and walkways – Part 3: Non-utilized and utilized roofs - Selection, execution and detailing
DIN EN 1991-1-4:2010-12	Eurocode 1: Actions on structures – Part 1-4: General actions - wind actions; German version EN 1991-1-4:2005 + A1:2010 + AC:2010
DIN EN 1991-1-4/NA:2010-12	National Annex - Nationally determined parameters – Eurocode 1: Actions on structures – Parts 1-4: General actions - Wind actions
Guideline DVS 2225-1 (10/2019)	Welding of lining membranes of polymer materials in geotechnical and hydraulic engineering
Guideline DVS 2225-2 (02/2019)	Joining of lining membranes made of polymer materials - Site testing
Guideline DVS 2225-6 (02/2019)	Joining of lining membranes made of polymer materials - Site testing requirements for welding machines and devices
DIN 18531-4:2017-07	Waterproofing of roofs, balconies and walkways – Part 4: Non-utilized and utilized roofs - Maintenance

Bettina Hemme
Head of Section

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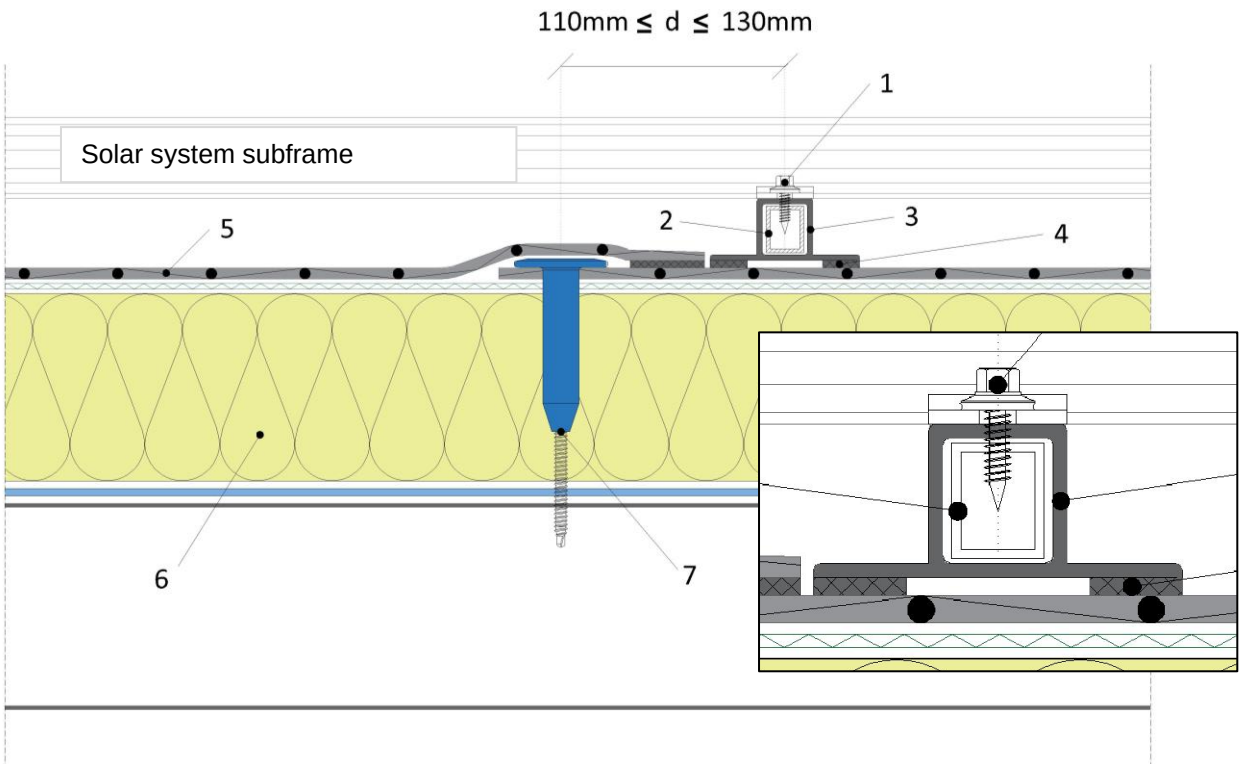

Figure A1-1: Cross-section

1. 'EJOT JT3-2-6.0' or 'EJOT JF3 2 5.5' solar panel fastening screw (part of the fastening system)
2. 'RENOLIT ALKORPLUS 81601' aluminium insert (part of the fastening system)
3. 'RENOLIT ALKORPLAN 81600' extruded profile (part of the fastening system)
4. Welded joint between extruded profile and roof waterproofing membrane
5. 'RENOLIT ALKORPLAN F' roof waterproofing membrane
6. Insulation material
7. Fastener of the roof waterproofing membrane

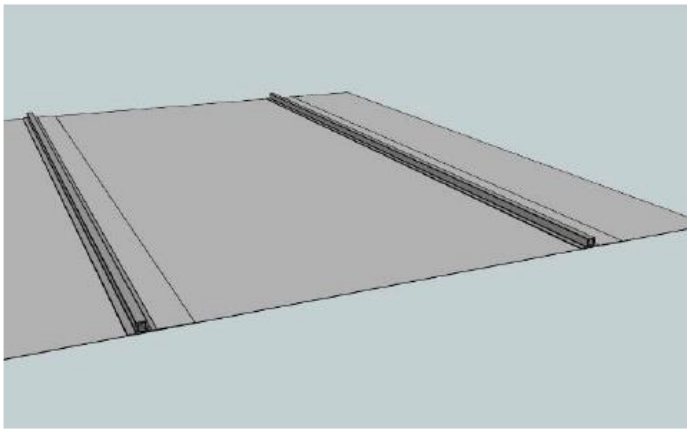

Figure A1-2:
Roof waterproofing membrane with welded-on extruded profiles

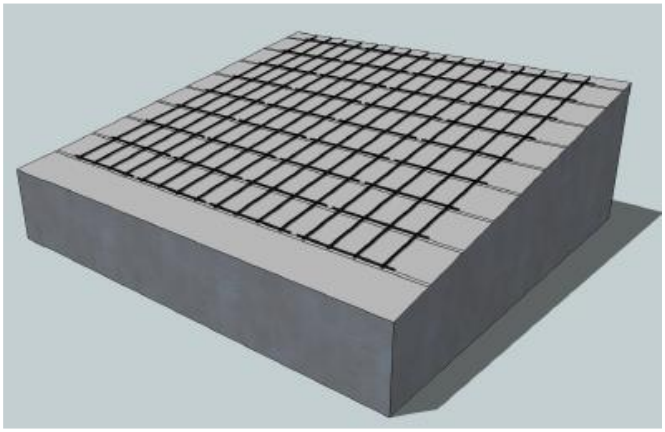

Figure A1-3:
Overview of complete solar system, including its subframe

'RENOLIT ALKORPLAN Solar' – a solar panel fastening system for use on 'RENOLIT ALKORPLAN F' roof waterproofing membranes	Annex 1
System design	

Table A2-1: Special requirements for roof waterproofing membrane used as a component of the substrate (roof structure) for fastening solar panels

No.	RENOLIT ALKORPLAN F	Test method	Unit	Value
1	Thickness	DIN EN 1849-2	mm	1.5 (-5/+10%) 1.8 (-5/+10%) 2.0 (-5/+10 %)
2	Mass per unit area	DIN EN 1849-2	g/m²	1850 (-5/+10%) 2200 (-5/+10%) 2350 (-5/+10 %)
3	Characteristic value R_k of tensile strength	DIN EN 12311-2	N/50 mm	1034
4	Elongation at break	DIN EN 12311-2 (A)	%	≥ 15
5	Characteristic value R_k of peel resistance of joints	DIN EN 12316-2	N/50 mm	364
6	Joint shear resistance	DIN EN 12317-2	N/50 mm	≥ 800
7	Resistance to tearing	DIN EN 12310-2	N	≥ 180
8	UV resistance	DIN EN 1297 5000 h	./.	passed
9	Foldability at low temperatures	DIN EN 495-5	°C	< -25
10	Characteristic peel strength value R_k between the roof waterproofing membrane and the extruded profile	DIN EN 12316-2	N/50 mm	507

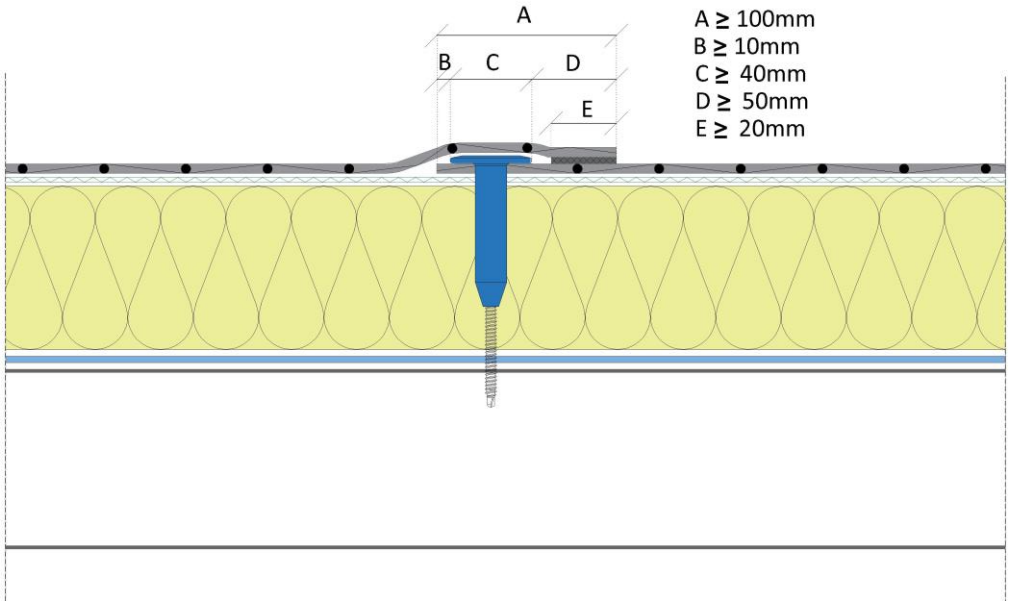

Figure A2-1: Overlapping joints

'RENOLIT ALKORPLAN Solar' – a solar panel fastening system for use on 'RENOLIT ALKORPLAN F' roof waterproofing membranes	Annex 2
'RENOLIT ALKORPLAN F' roof waterproofing membrane properties	

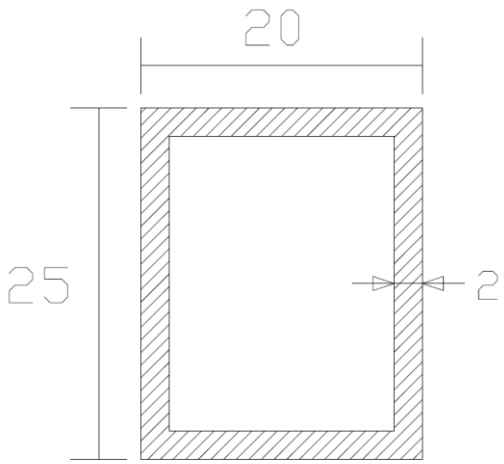

Figure A3-1: 'RENOLIT ALKORPLUS 81601' aluminium insert

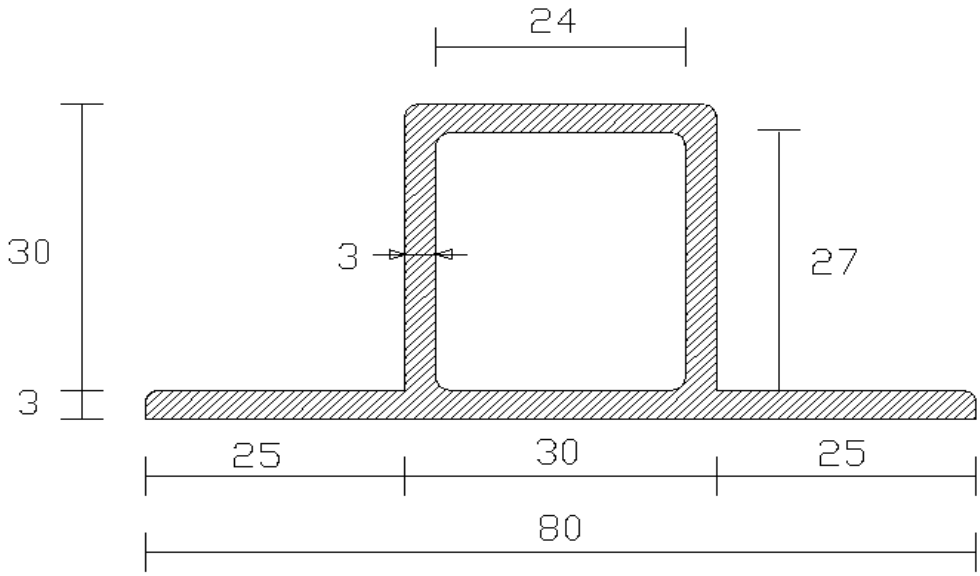

Figure A3-2: 'RENOLIT ALKORPLAN 81600' extruded profile

'RENOLIT ALKORPLAN Solar' – a solar panel fastening system for use on 'RENOLIT ALKORPLAN F' roof waterproofing membranes	Annex 3
Dimensions and properties of the components	

Table A4-1: Materials, properties and requirements

No.	Component	Requirement
1	Fastening screw	'EJOT JT3-2-6.0' and 'EJOT JF3-2-5.5' self-drilling screw with a national technical approval in accordance with Z-14.4-426 with a diameter of 6.0 mm or 5.5 mm and a length of 25 mm in accordance with the specifications given in this approval. Moreover, the Technical Building Rules of national technical approval no. Z-30.3-6 shall apply in relation to corrosion protection.
2	Aluminium insert	The requirements of the applicant as well as this decision shall be taken into account.
3	Extruded profile	The characteristic value R_k of the absorbable vertical force is 24.4 kN/m.
4	Insulation material	In accordance with the designer's compressive strength requirements
5	Fastener of the roof waterproofing membrane	Fasteners with a national technical approval or European Technical Approval or European Technical Assessment in accordance with the specifications of this decision as well as the requirements of the applicant. The washers shall have the following minimum dimensions: 80 mm x 40 mm.
6	Roof waterproofing membrane	'RENOLIT ALKORPLAN F' in accordance with DIN EN 13956 with main properties as specified in Annex 2, Table A2-1

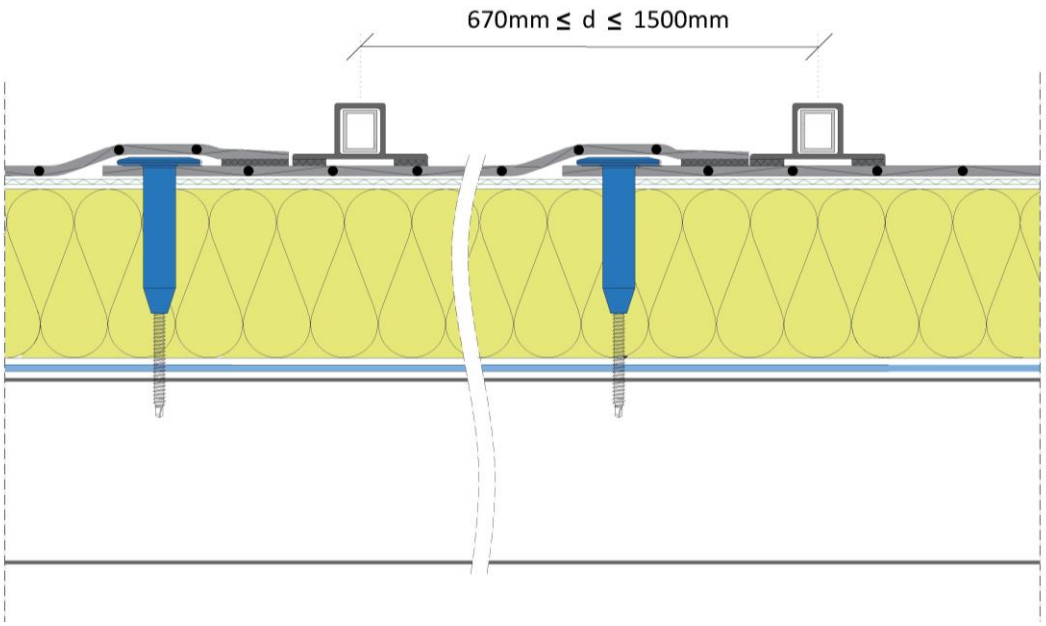

Figure A5-1: Minimum and maximum spacing between the extruded profiles

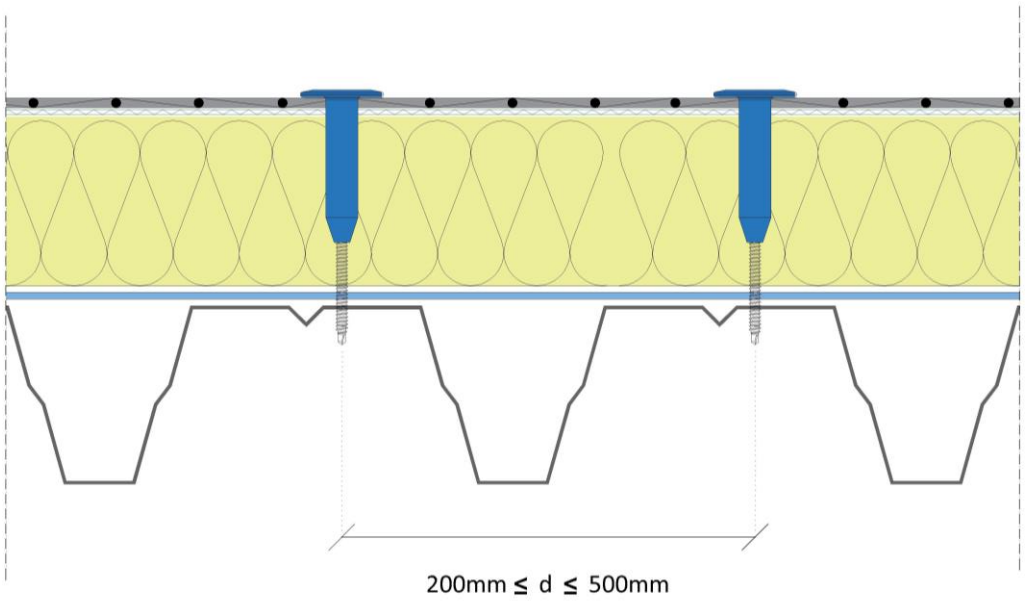

Figure A5-2: Minimum and maximum spacing between the fasteners
(in longitudinal direction of the extruded profile)

'RENOLIT ALKORPLAN Solar' – a solar panel fastening system for use on 'RENOLIT ALKORPLAN F' roof waterproofing membranes	Annex 5
Arrangement of and spacing between the fasteners and the extruded profiles	

Table A6-1: Factory production control and external surveillance

Type of check/test	Test method	Frequency of		Value / Tolerance
		Factory production control (FPC)	External surveillance (ES)	
Inspection of incoming materials				
Fastening screw				
Self-drilling screw: 'EJOT JT3 2 6.0' or 'EJOT JF3 2 5.5' as per Z-14.4-426	Verification of the marking and the delivery note	Every delivery	2 x annually	Section 2.1.3; Annex 4, Table A4-1, No.1
Aluminium insert				
Material	DIN EN 10204	Every delivery	2 x annually	Inspection certificate type 3.1; Section 2.1.1
Dimensions	DIN EN 12020-2	Every delivery	2 x annually	Inspection certificate type 3.1; Annex 3, Figure A3-1
Extruded profile				
Starting materials	DIN EN 10204	Every delivery	2 x annually	Inspection certificate type 3.1; Section 2.1.2
Check after production - extruded profile				
Visible defects	DIN EN 1850-2	Every 288 m	2 x annually	None
Mass per unit area	DIN EN 1849-2	Every 288 m	2 x annually	695 g/m (-5/+10%)
Dimensions	DIN EN 1848-2	Every 288 m	2 x annually	Annex 3, Figure A3-2 (0/+3 mm)
Thickness	DIN EN 1849-2	Every 288 m	2 x annually	3 mm (0/+1 mm)
Profile length	DIN EN 1848-2	Every 288 m	2 x annually	3025 mm (-10/+15 mm)
Dimensional stability of profile	DIN EN 1107-2	Every 288 m	2 x annually	Dimension (+/-2%)
Tensile properties	DIN EN 12311-2	Every 288 m	2 x annually	Longitudinal: ≥15 N/mm² ≥ 250 %
Peel strength between roof waterproofing membrane and extruded profile	EN 12316-2	2 x annually	2 x annually	Annex 2, Table A2-1, No. 10

Seq. no.	**Confirmation of the executing company**	
1.	Project title: Location: ..... Size:.....Building height:.....	
2.	Description of solar system:	
3.	Description of substrate, name of insulation product:	
4.	Approval: No.:..... of (date)	
5.a	Structural analysis and installation plan: ..... (Installer)	
5.b	Executing company:	
5.c	Construction period:	
		Confirmation
6.	The specialised staff of the executing company have been informed by the approval holder of the proper handling	
7.	Evaluation prior to installation of extruded profiles	
	a) Roof waterproofing membrane requirements in accordance with the approval	
	b) Compressive strength of insulation material in accordance with the structural design specifications	
	c) Roof slope	
	d) Type and arrangement of fasteners as per structural analysis	
8.	Installation check	
	a) Reports on weather condition	
	b) Reports on the quantities used exist	
	c) Check through visual inspection	
	d) Other	
	e)	
Remarks:		

'RENOLIT ALKORPLAN Solar' – a solar panel fastening system for use on 'RENOLIT ALKORPLAN F' roof waterproofing membranes

Declaration of conformity template

Annex 7