

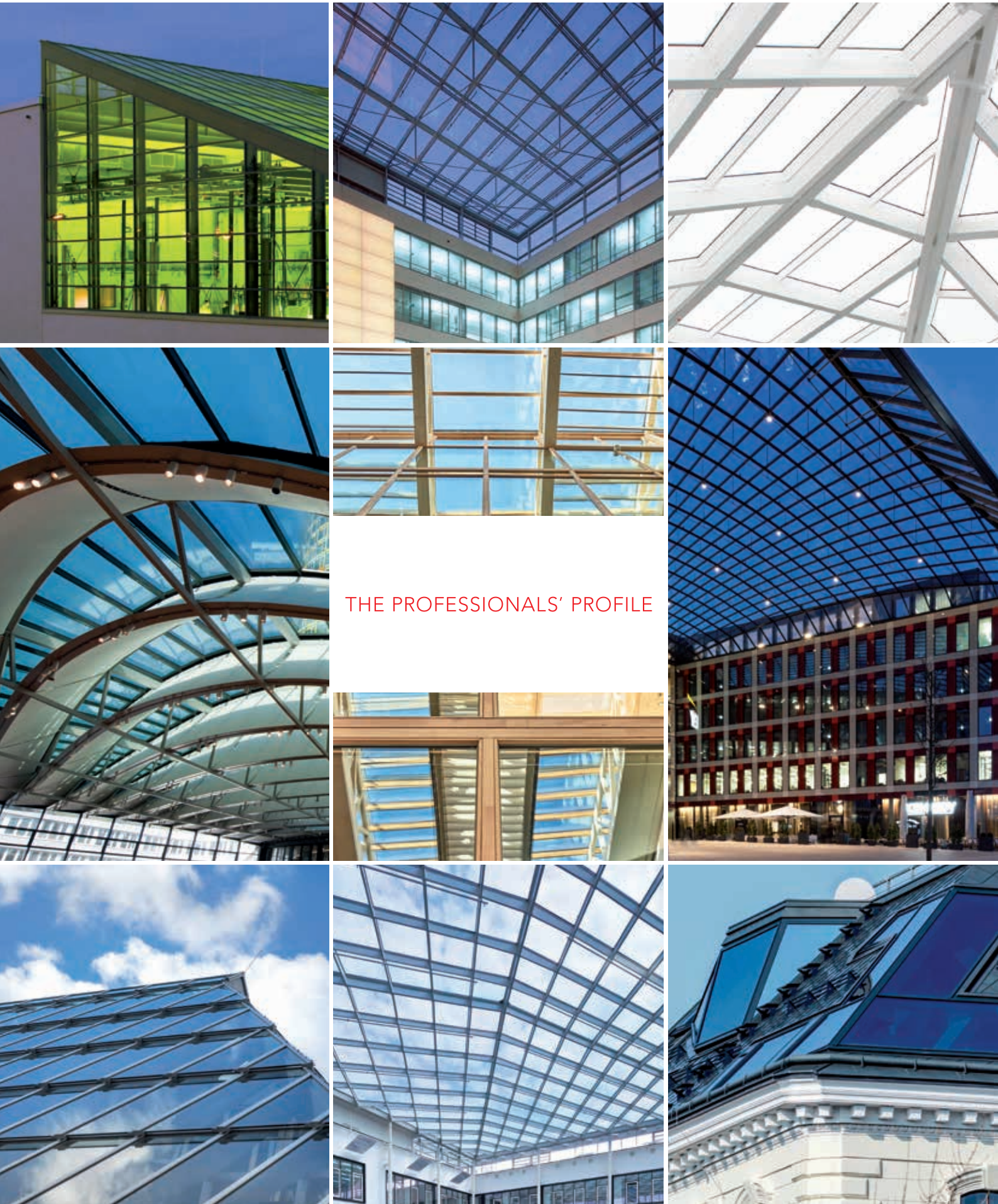
**RAICO**

# SKY | LIGHT | SOLUTION

Glass roof constructions







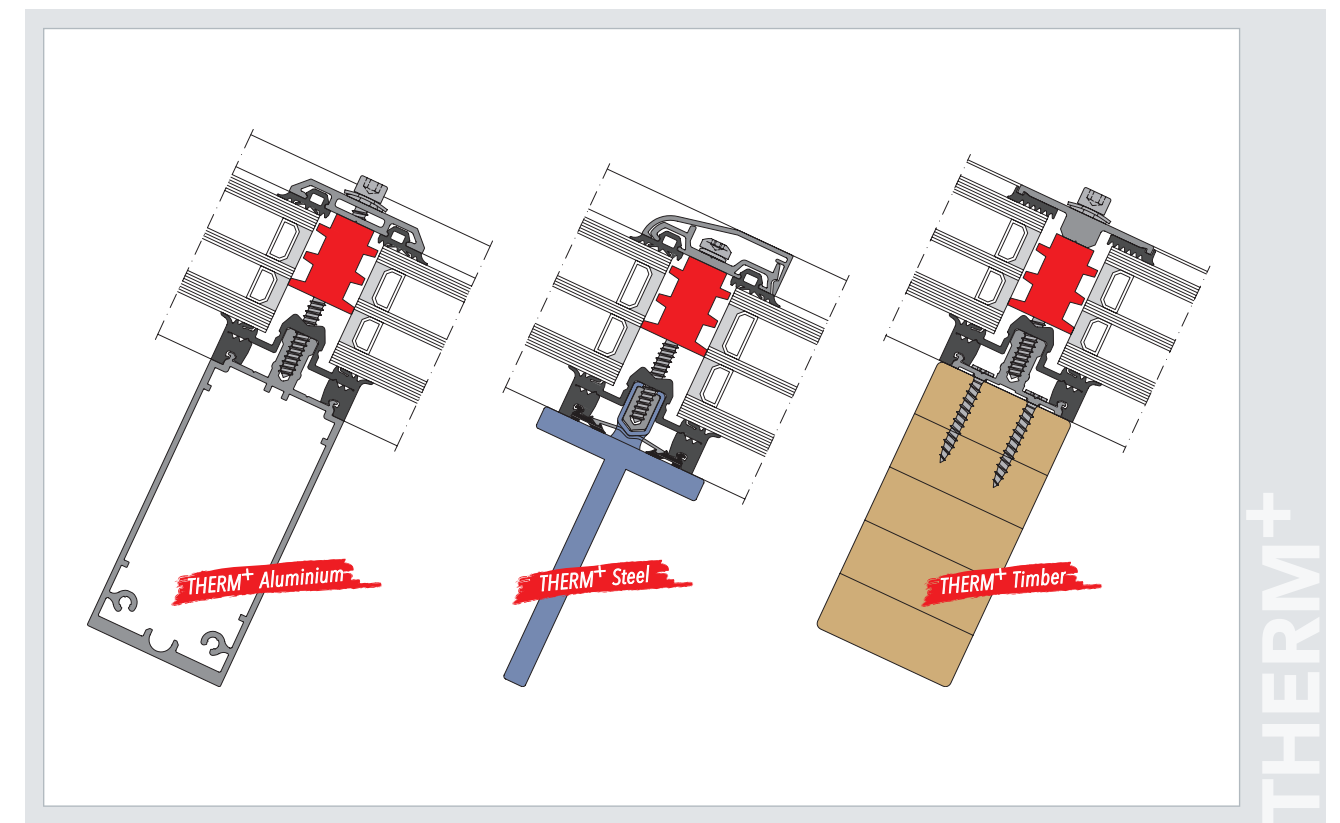
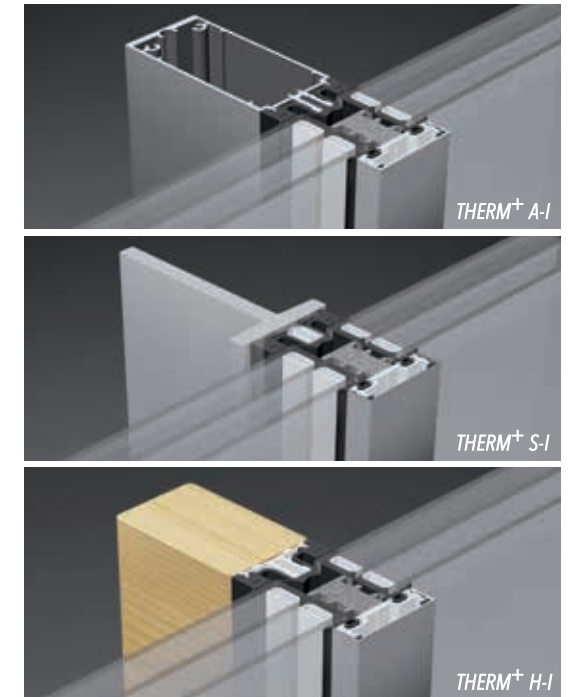
THE PROFESSIONALS' PROFILE

## PROFILE SYSTEMS OF RAICO

### Visions in glass

The creation of bright, light-flooded rooms with widely spanning glass roofs are one of the central challenges of modern architecture. In order to be able to realize the most different drafts, the mullion-transom systems THERM<sup>+</sup> A-I, S-I and H-I are at the architects' and planners' disposal.

Based on our experience as leading manufacturer in this industry, we offer variously proven solutions with which the most challenging plannings can be reliably realized. Our special glazing and sealing technology enables a secure and simple realization for all constructions and roof shapes with an inclination of up to 2°.





# OVERVIEW OF PROJECTS

## System solutions from RAICO

The mullion-transom systems THERM<sup>+</sup> A-I, S-I and H-I provide ideal conditions for the realization of glass roofs. The special and thousandfold proven RAICO glazing and sealing technology enables a secure and simply realizable solution for all constructions and roof shapes with an inclination of up to 2°.

On the following pages you will find a selection of completed glass roofs with detailed information.



**ADAC Headquarter | Munich**  
Page 6 - 9



**Hofgut Sternen | Breitnau**  
Page 26 - 29



**Ernst & Young | Kirchberg**  
Page 30 - 33



**CityCube | Berlin**  
Page 10 - 13



**Algentechnikum TUM | Ottobrunn**  
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**Lohn AG | Baden-Baden**  
Page 34 - 37



**Johnson Controls | Hanover**  
Page 38 - 41



**Egger Headquarter | St. Johann in Tyrol**  
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**Rossauer Lände | Vienna**  
Page 22 - 25



**Mästerhuset | Stockholm**  
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**Stadtwerke | Bochum**  
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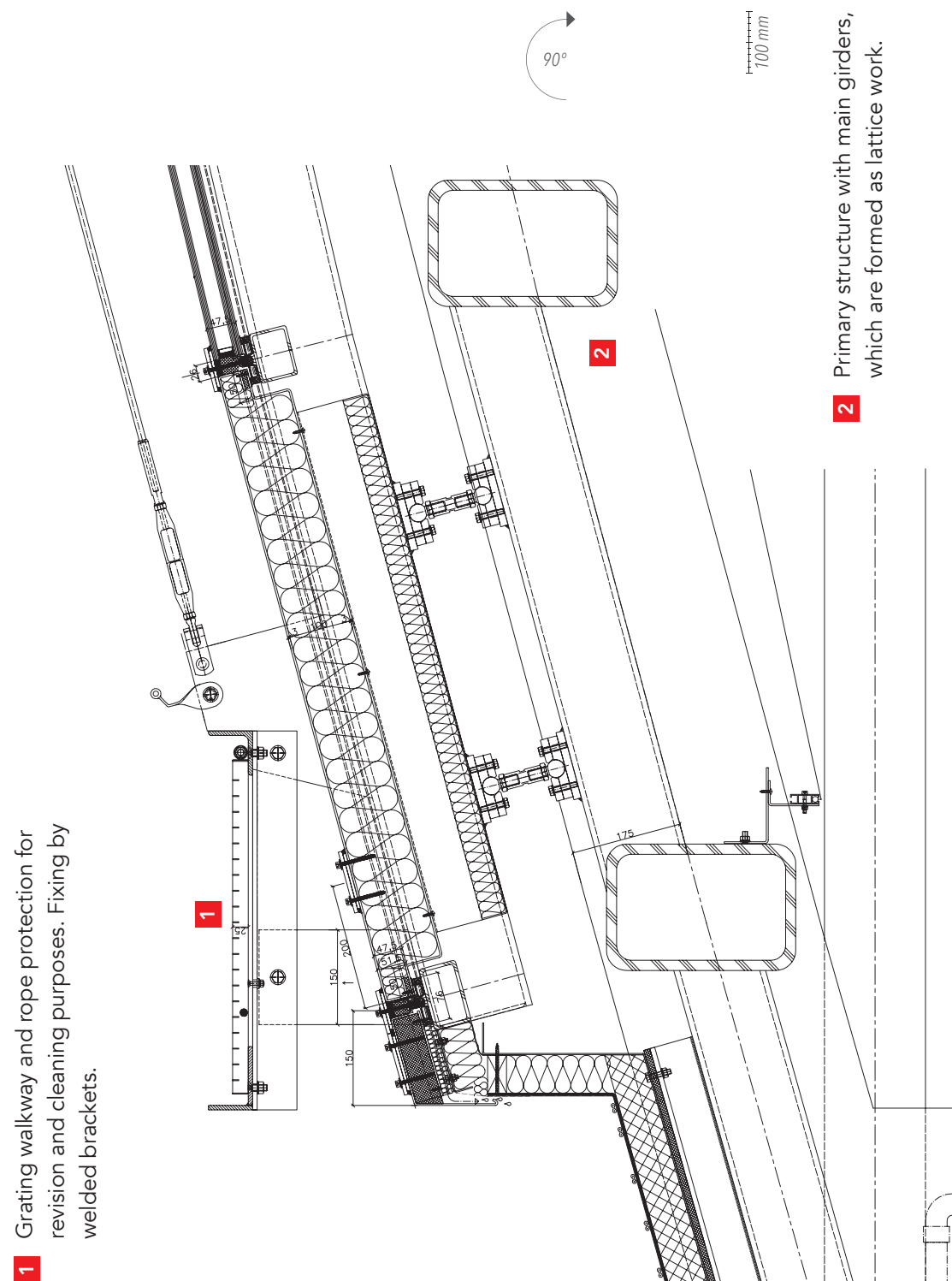




- **Country:**  
Germany
- **Owner:**  
ADAC Allgemeiner Deutscher  
Automobil-Club e.V., Munich
- **Architect:**  
Sauerbruch Hutton Architekten, Berlin
- **Façade and glass roof:**  
Josef Gartner GmbH, Gundelfingen
- **RAICO systems/ area:**  
THERM<sup>+</sup> S-I/roof: 2.300 m<sup>2</sup>
- **Special features:**  
Special mullion gasket:  
System width: 66 mm  
Transom gasket: system width 76 mm
- **Photos:**  
Stephan Liebl, Dillingen

INFORMATION

Detail of the eaves with drainage in heated gutter



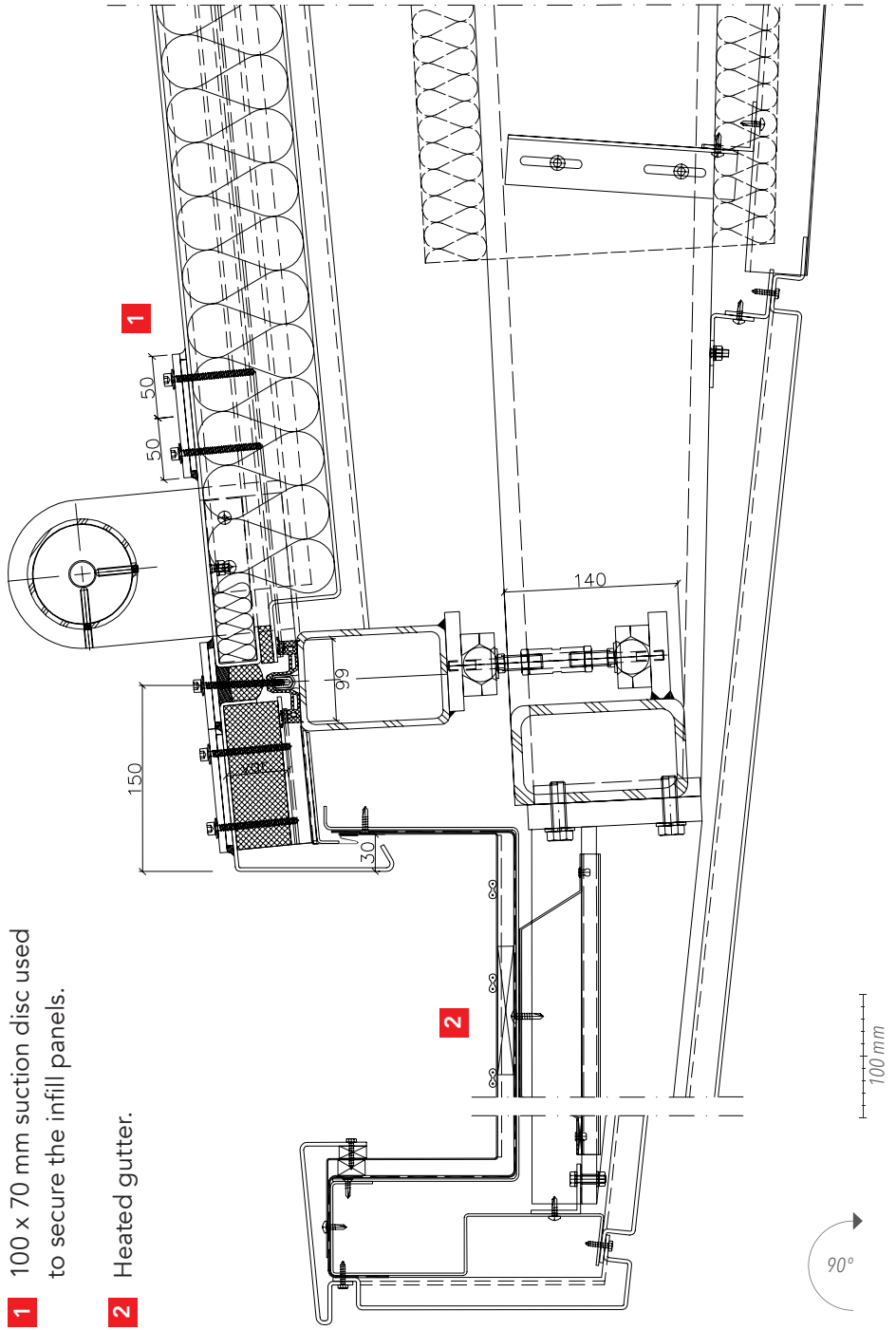
**1** Grating walkway and rope protection for revision and cleaning purposes. Fixing by welded brackets.

**2** Primary structure with main girders, which are formed as lattice work.

DETAILS



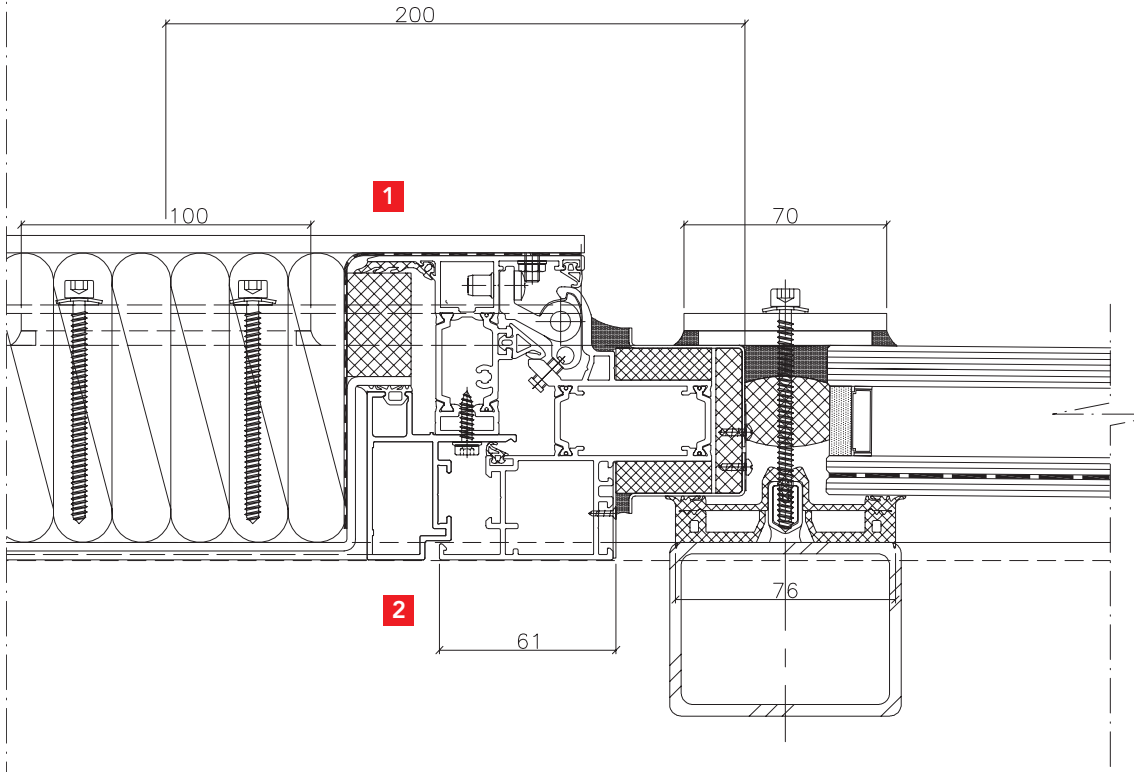
Roof overhang with connection to heated gutter



- 1** 100 x 70 mm suction disc used to secure the infill panels.
- 2** Heated gutter.

DETAILS

WING 105 DI smoke & heat vent



- 1** 6 mm aluminium sheet external facing to the insulated infill panel within the natural smoke and heat vent.
- 2** WING 105 DI Smoke Vent (Tested for natural and as a smoke and heat exhaust ventilator) with a maximum sash surface of 4 m<sup>2</sup>.

DETAILS

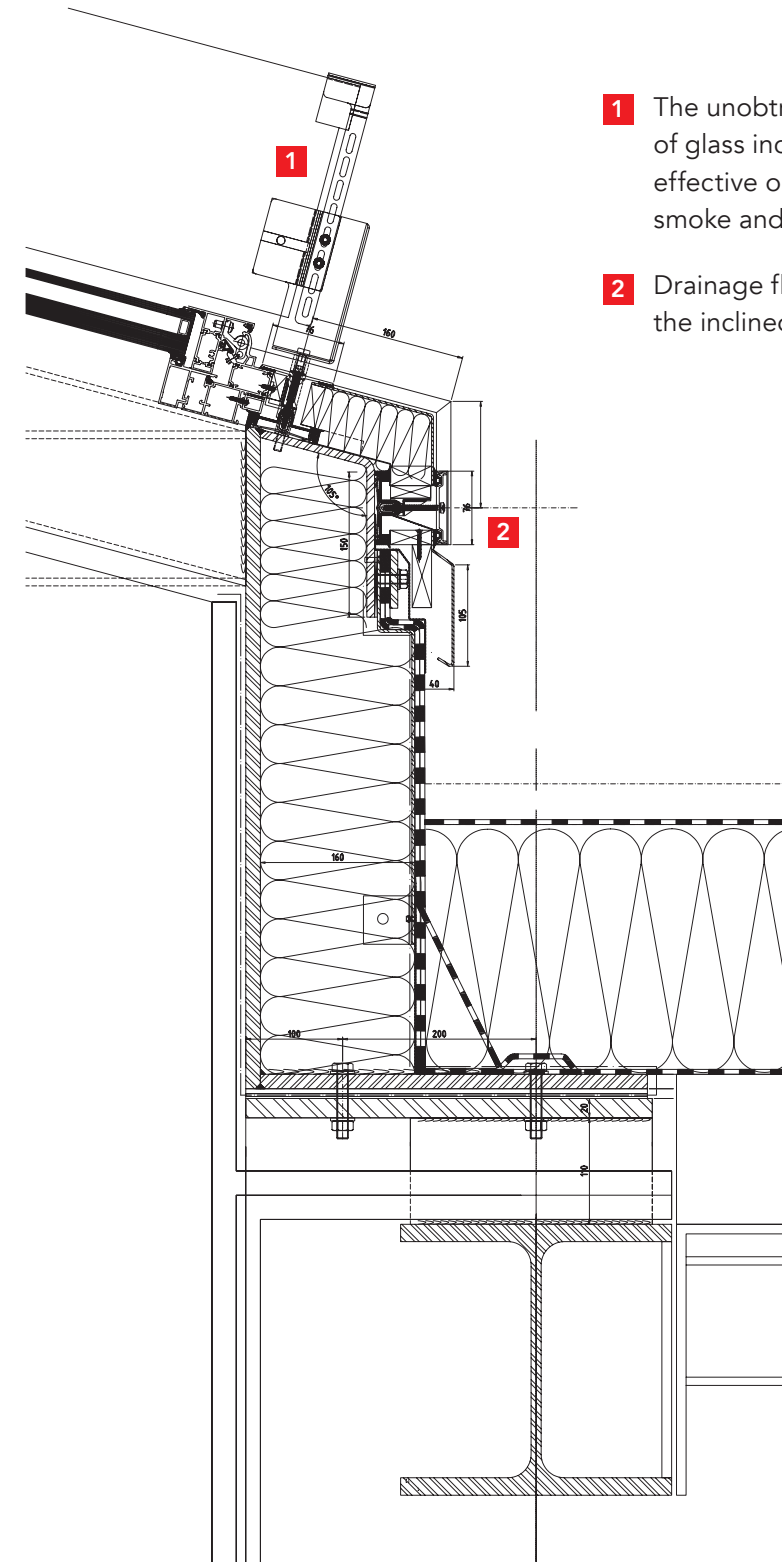




- **Country:**  
Germany
- **Owner:**  
Messe Berlin GmbH
- **Architect:**  
Code Unique Architekten, Dresden
- **Façade and glass roof:**  
Metallbau Windeck GmbH
- **RAICO systems:**  
THERM<sup>+</sup> S-I 76 mm
- **Special features:**  
Rooflight window WING 105 DI  
as natural smoke and heat control  
double flaps with wind deflectors.
- **Photos:**  
Metallbau Windeck GmbH

INFORMATION

Eaves with drainage using the base gasket with flap in the vertical area

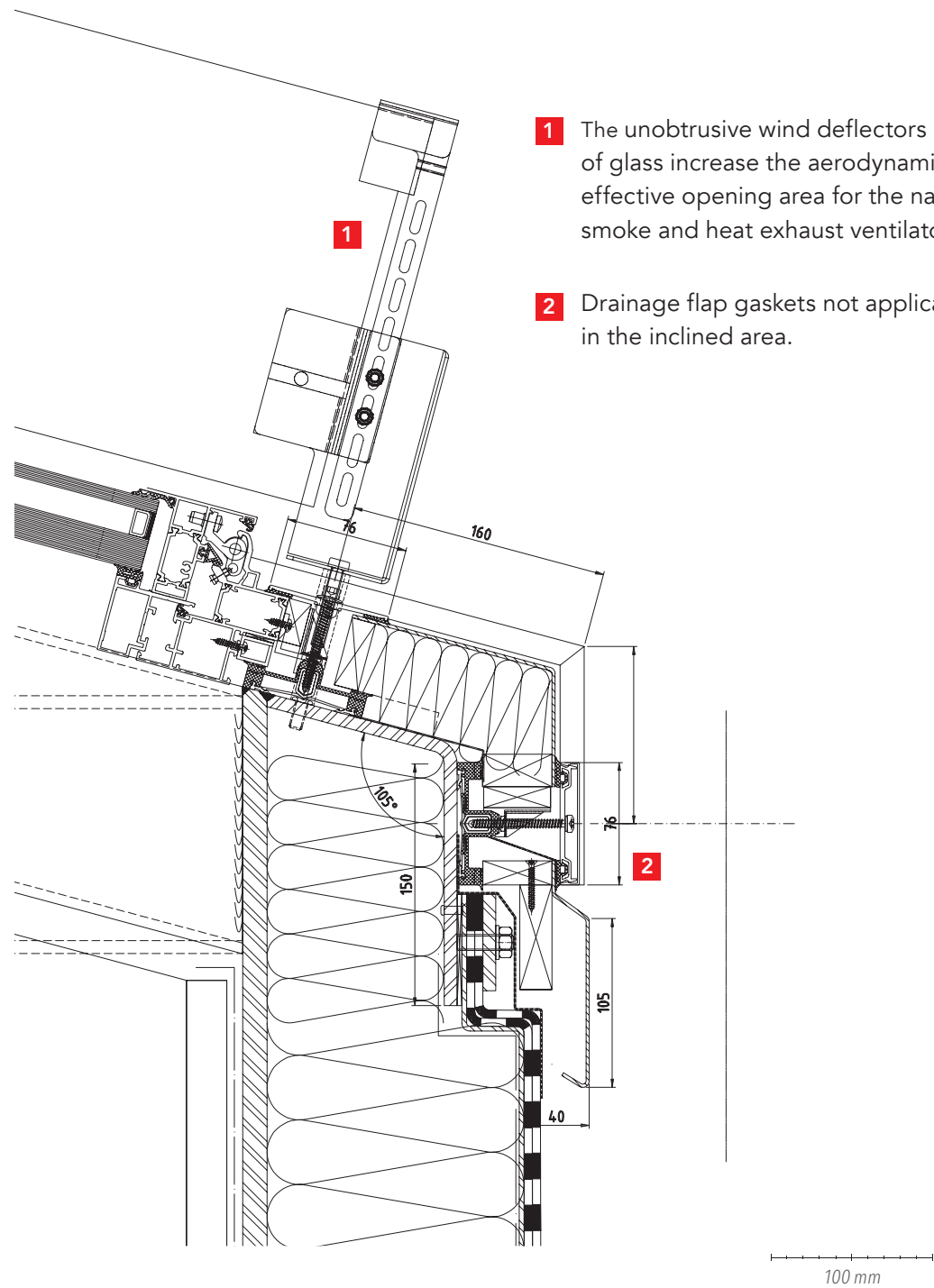


- 1 The unobtrusive wind deflectors made of glass increase the aerodynamically effective opening area for the natural smoke and heat exhaust ventilator.
- 2 Drainage flap gaskets not applicable in the inclined area.

DETAILS



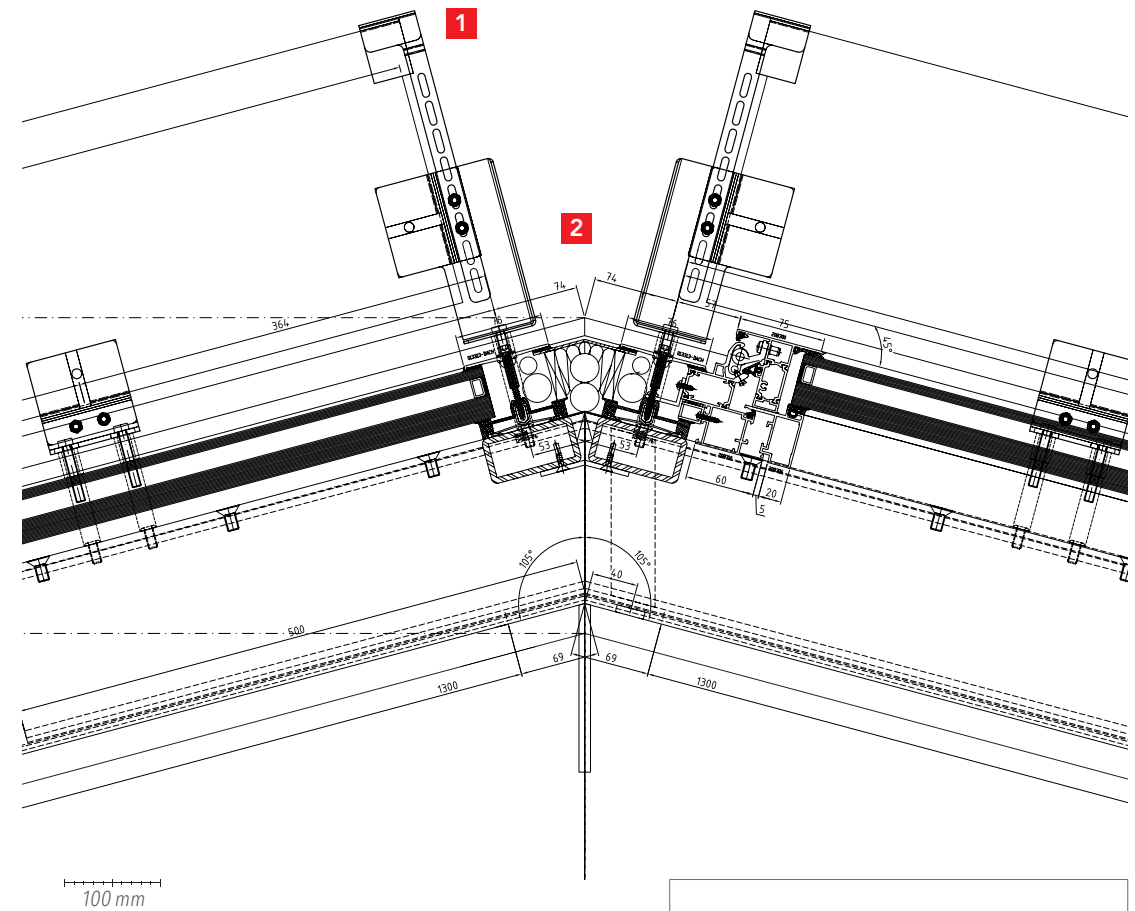
Eaves with drainage using the base gasket with flap in the vertical area



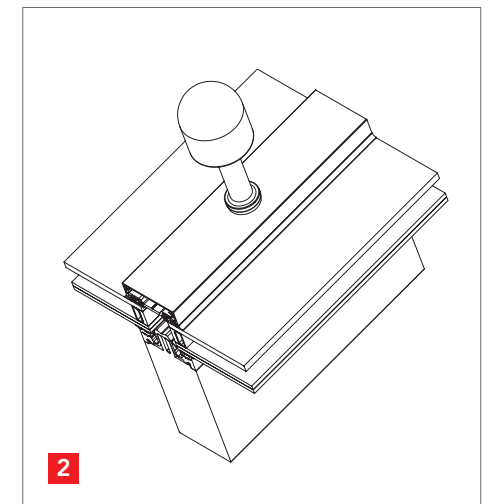
- 1** The unobtrusive wind deflectors made of glass increase the aerodynamic effective opening area for the natural smoke and heat exhaust ventilator.
- 2** Drainage flap gaskets not applicable in the inclined area.

DETAILS

Ridge detail of dual pitch roof with wind deflectors



- 1** The unobtrusive wind deflectors made of glass increase the aerodynamically effective opening area for the natural smoke and heat exhaust ventilator.
- 2** The RAICO roof ventilation kits are suitable for pressure equalisation at the upper end of the ridge bars.



DETAILS

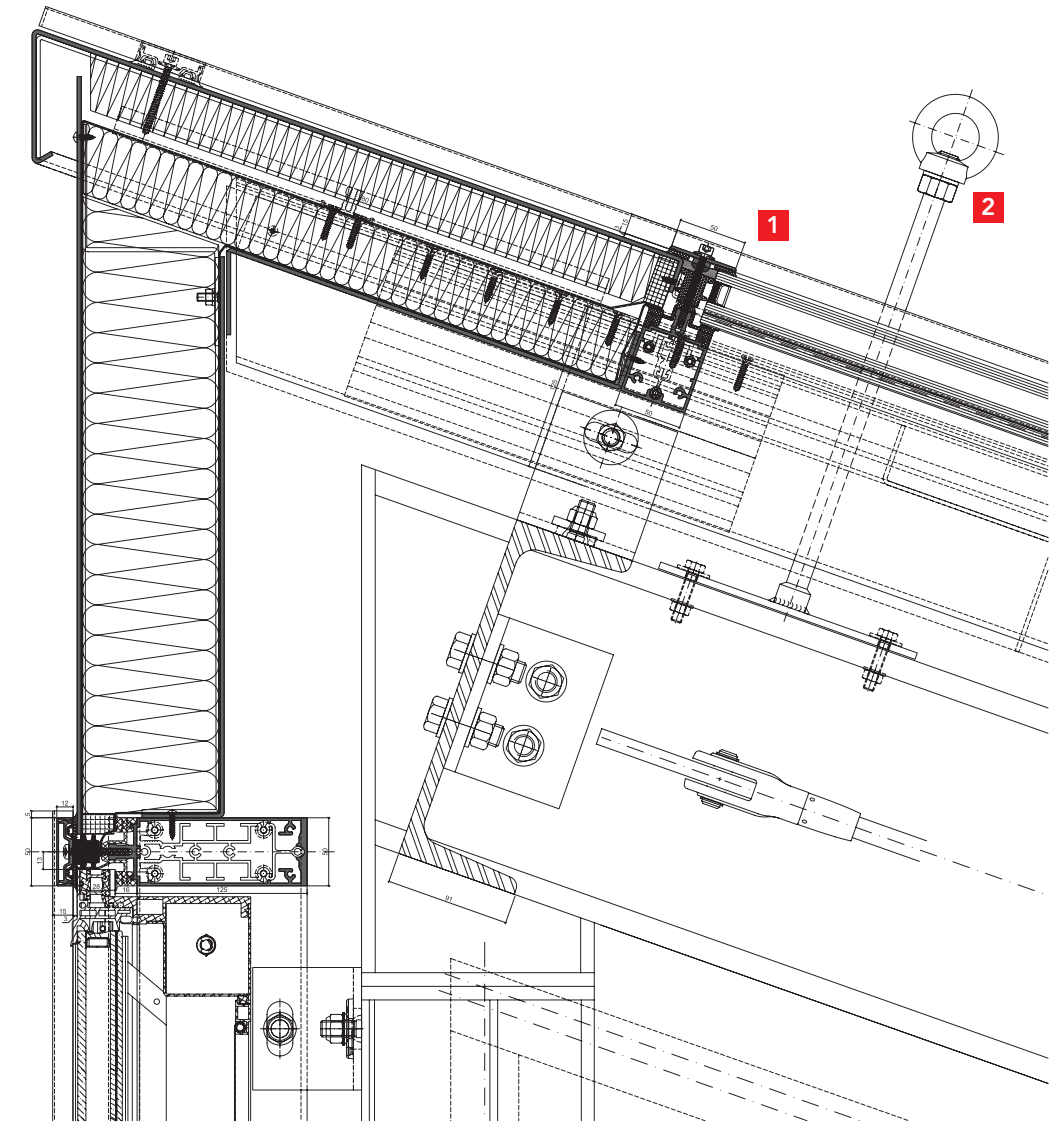




- **Country:**  
Germany
- **Owner:**  
Airbus Group
- **Architect:**  
OBERMEYER Planen + Beraten GmbH
- **Façade und glass roof:**  
Roschmann Konstruktionen aus  
Stahl und Glas GmbH, Gersthofen
- **RAICO systems:**  
THERM<sup>+</sup> A-I 56 mm
- **Photos:**  
TU München/Heddergott

INFORMATION

Ridge detail at interface with vertical façade



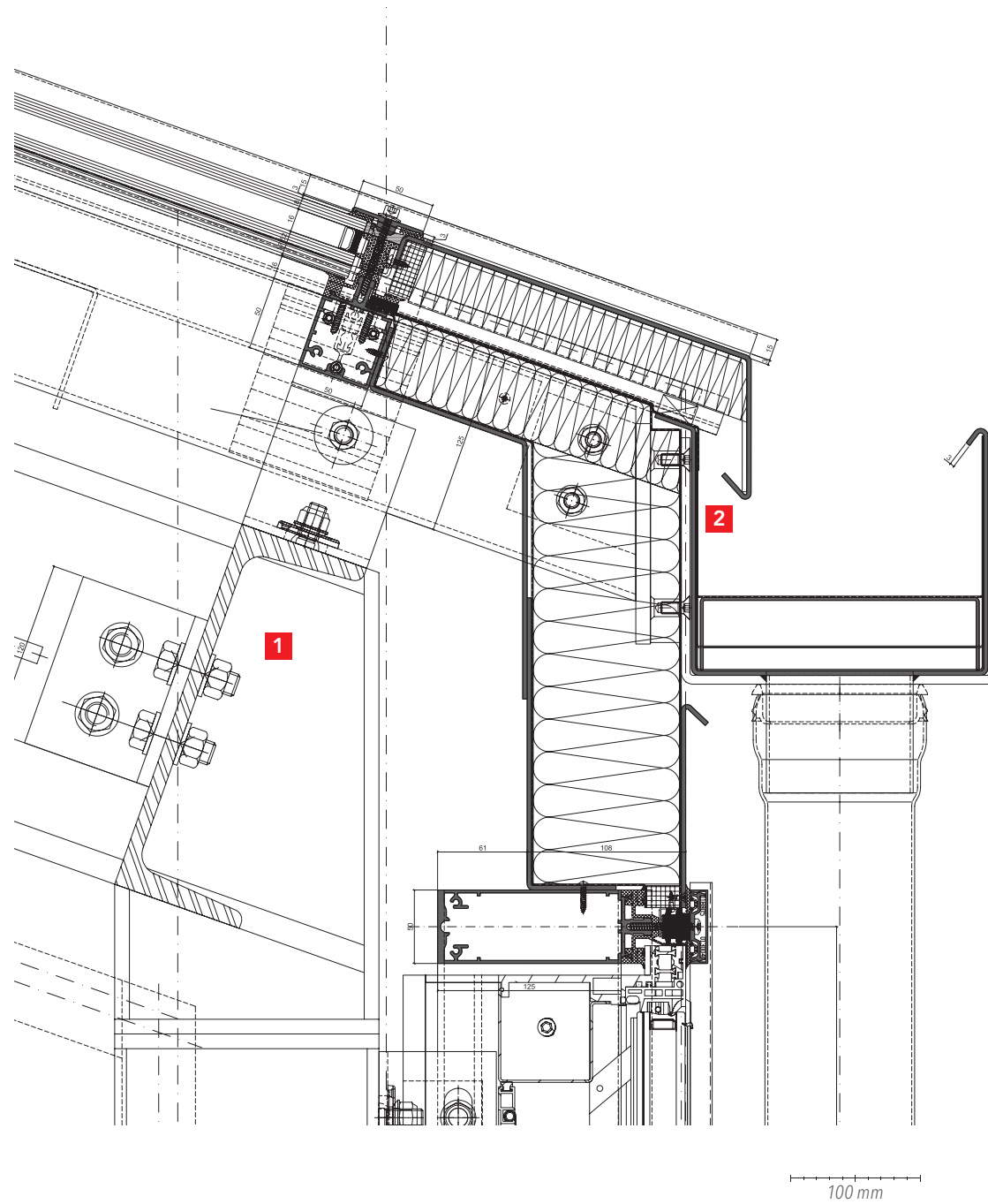
- 1** SG silicone joint in the transom with suction discs. Suction disc quantities and positions determined with static calculations.
- 2** ‚Man-Safe‘ anchorage point for cleaning purposes.

100 mm

DETAILS

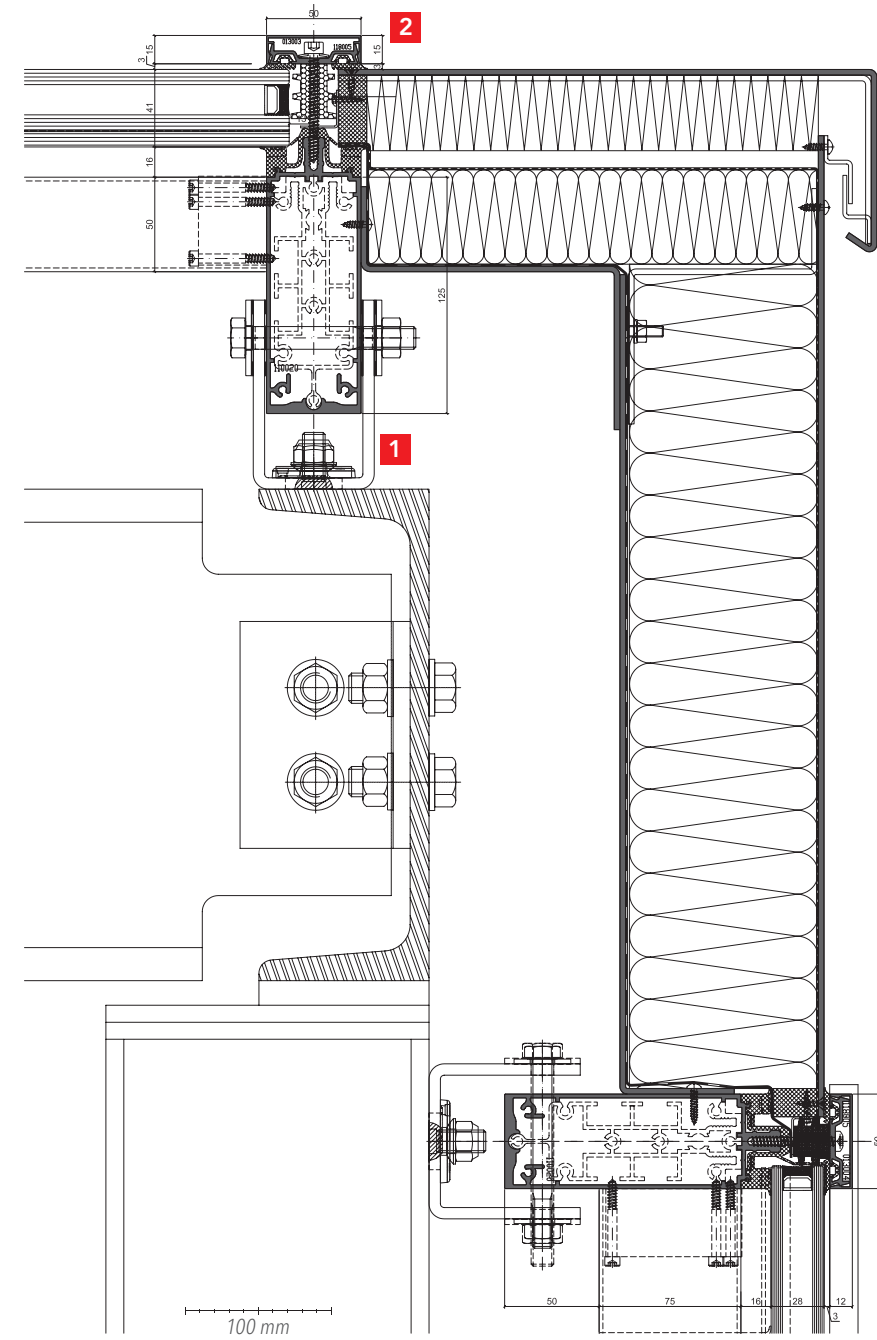


Eaves drainage via mullion gasket



- 1** Primary supporting steelwork to the aluminium façade.
- 2** Recess within the insulation to the mullion area for pressure equalisation and for drainage of the glazing edge. Exterior sealing membrane below the drainage level.

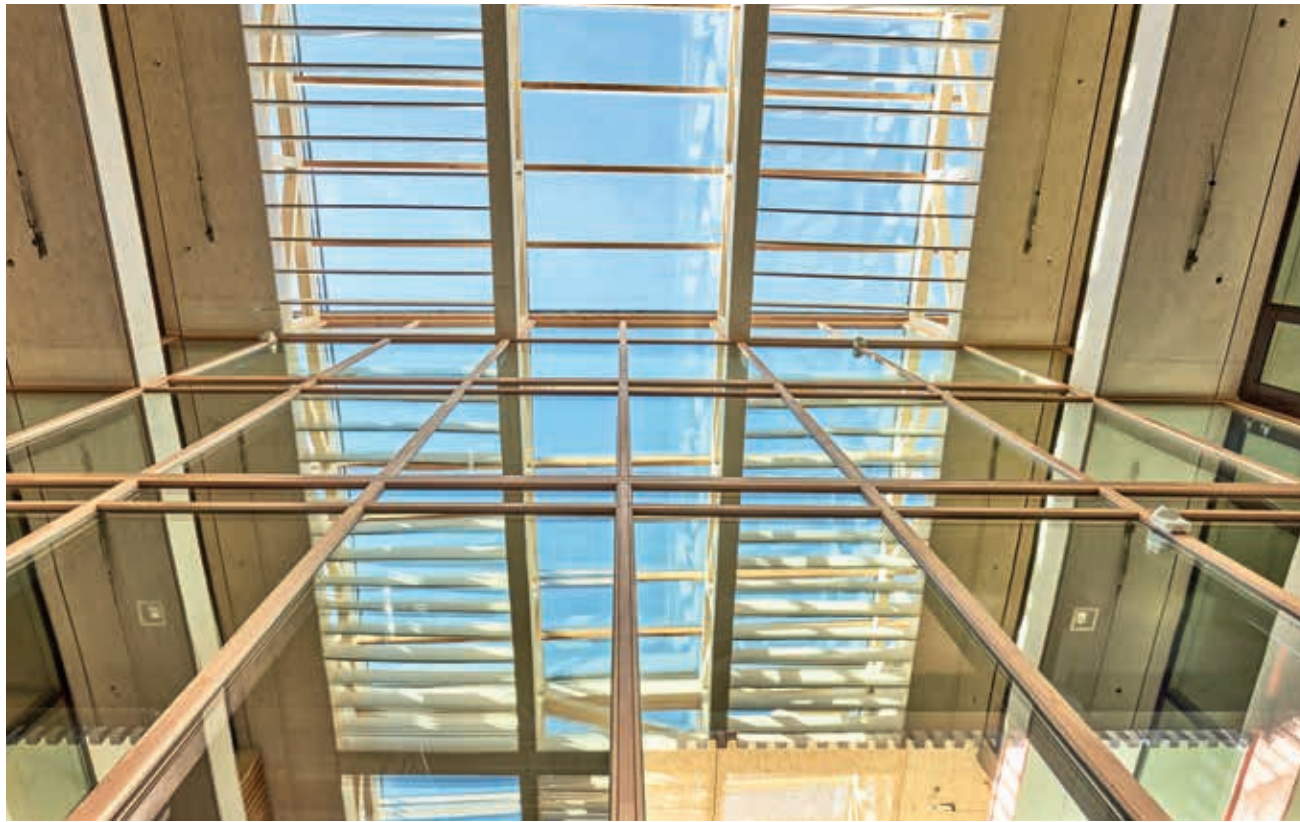
Verge section with interface to the vertical façade



- 1** Primary supporting steelwork to the aluminium façade.
- 2** The proven THERM<sup>+</sup> sealing technology enables a glazed roof to be constructed as low as 2° from horizontal. 3 mm exterior gaskets on rafters only applicable for roof inclination > 10°.



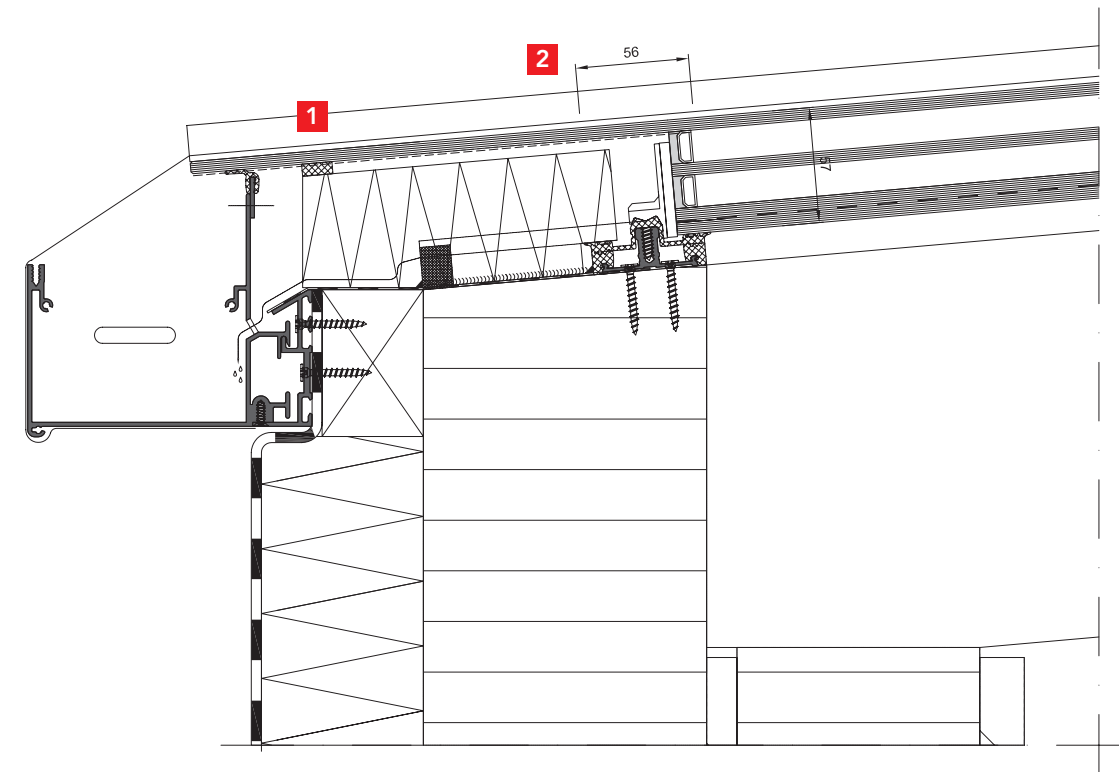
# EGGER HEADQUARTER | Tyrol



- **Country:**  
Austria
- **Owner:**  
Fritz EGGER GmbH & Co. OG,  
St. Johann in Tyrol
- **Architect:**  
Bruno Moser, architekturWERKSTATT,  
Breitenbach
- **Façade und glass roof:**  
Holzbau Saurer, Höfen
- **RAICO systems:**  
THERM<sup>+</sup> H-I 56 mm
- **Photos:**  
EGGER/Christian Vorhofer

INFORMATION

## Eaves detail with drainage into aluminium gutter profile



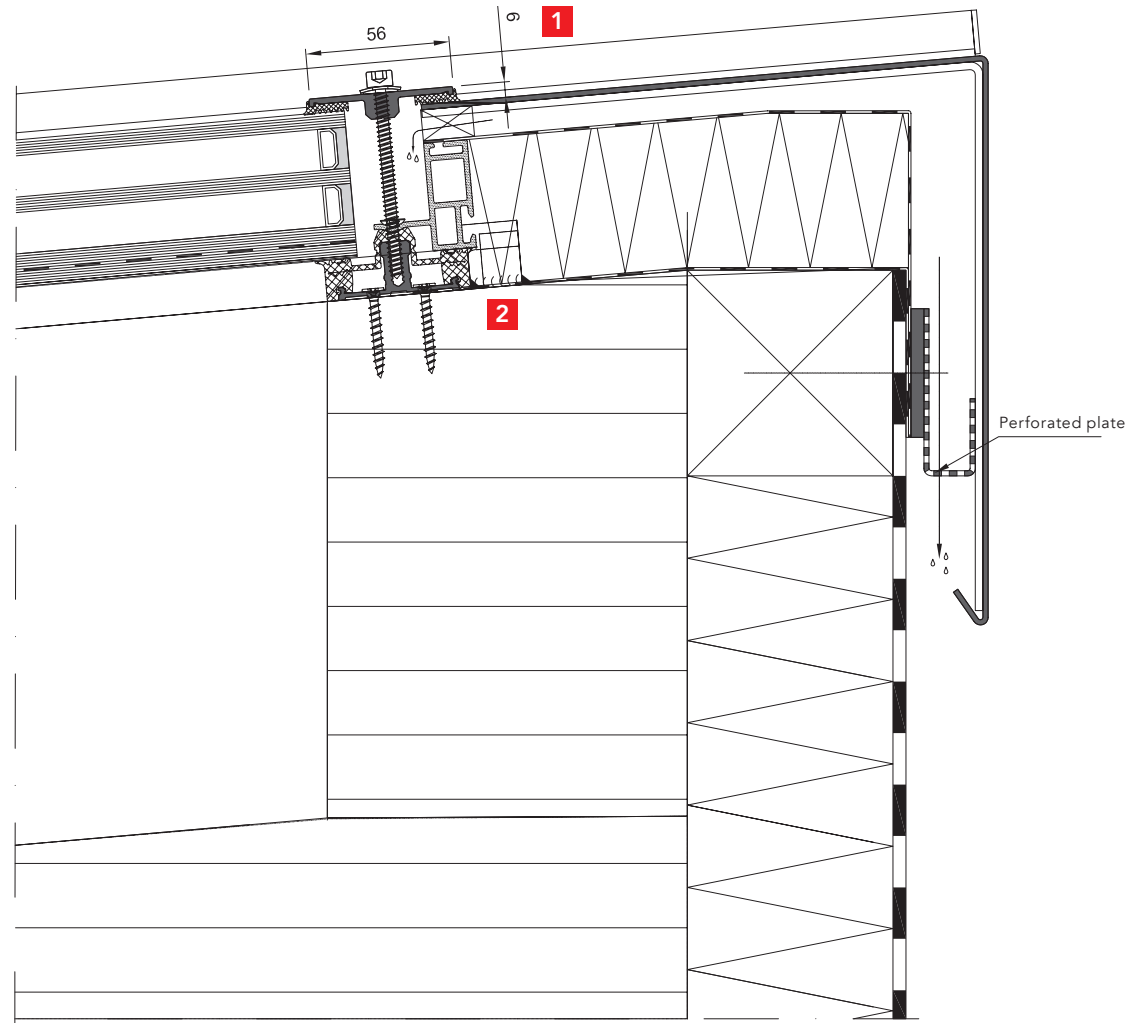
- 1 Recommendation: Enamel frit pattern to stepped edge of glazed unit for aesthetic reasons.
- 2 Project specific static calculations are required for three-edge support conditions to glazing.

100 mm

DETAILS



Monopitch ridge detail

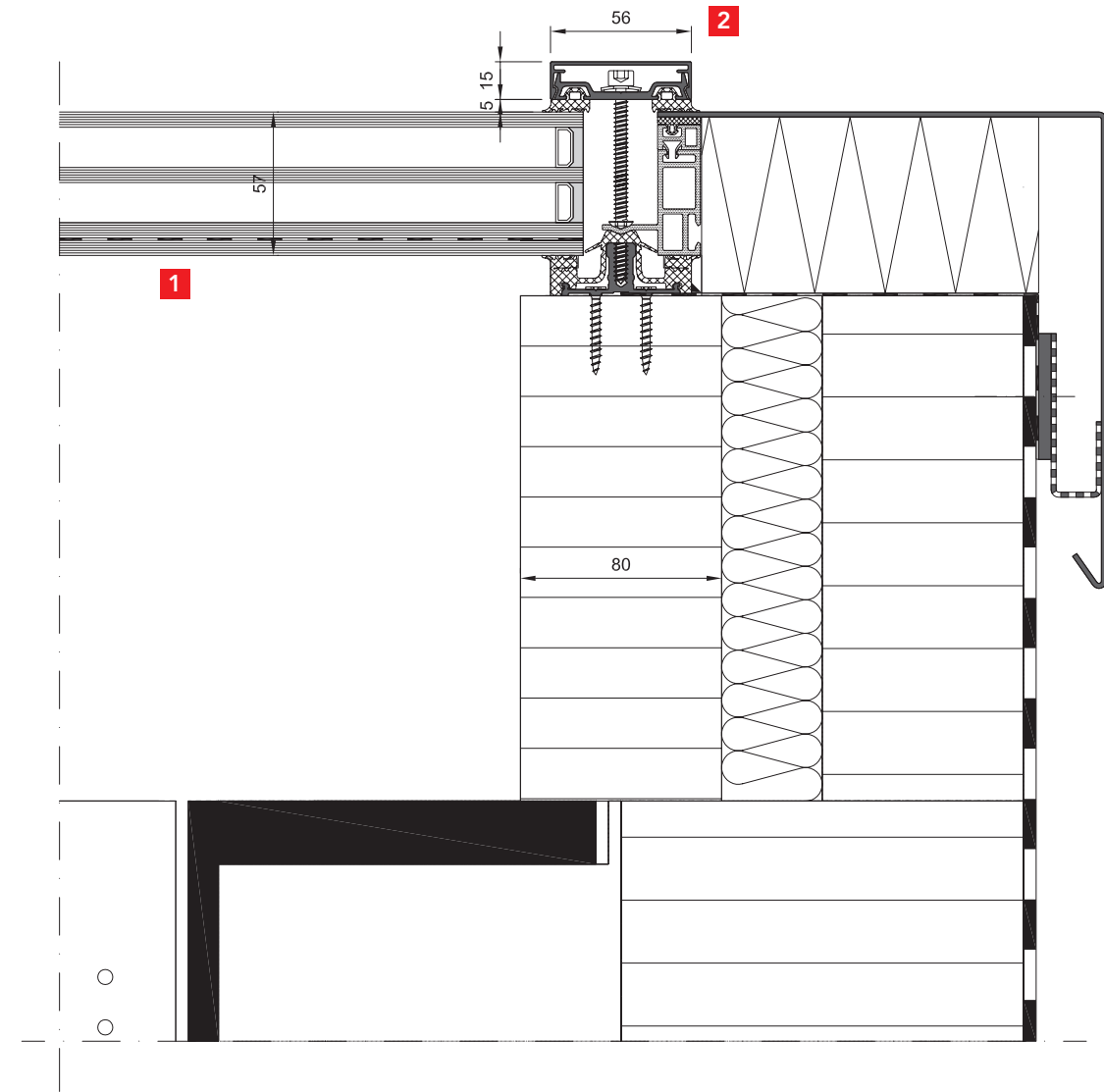


- 1** Pressure equalisation via the spacer and perforated sheet in the verge pressings.
- 2** Vapour-tight sealing of the area between transition, gasket and film.

100 mm

DETAILS

Verge section



- 1** Overhead glazing to be in accordance with DIN EN 18008.
- 2** Pressure profile screws to be fitted with sealing washers to rafters with a roof inclination <math>< 10^\circ</math>.

100 mm

DETAILS

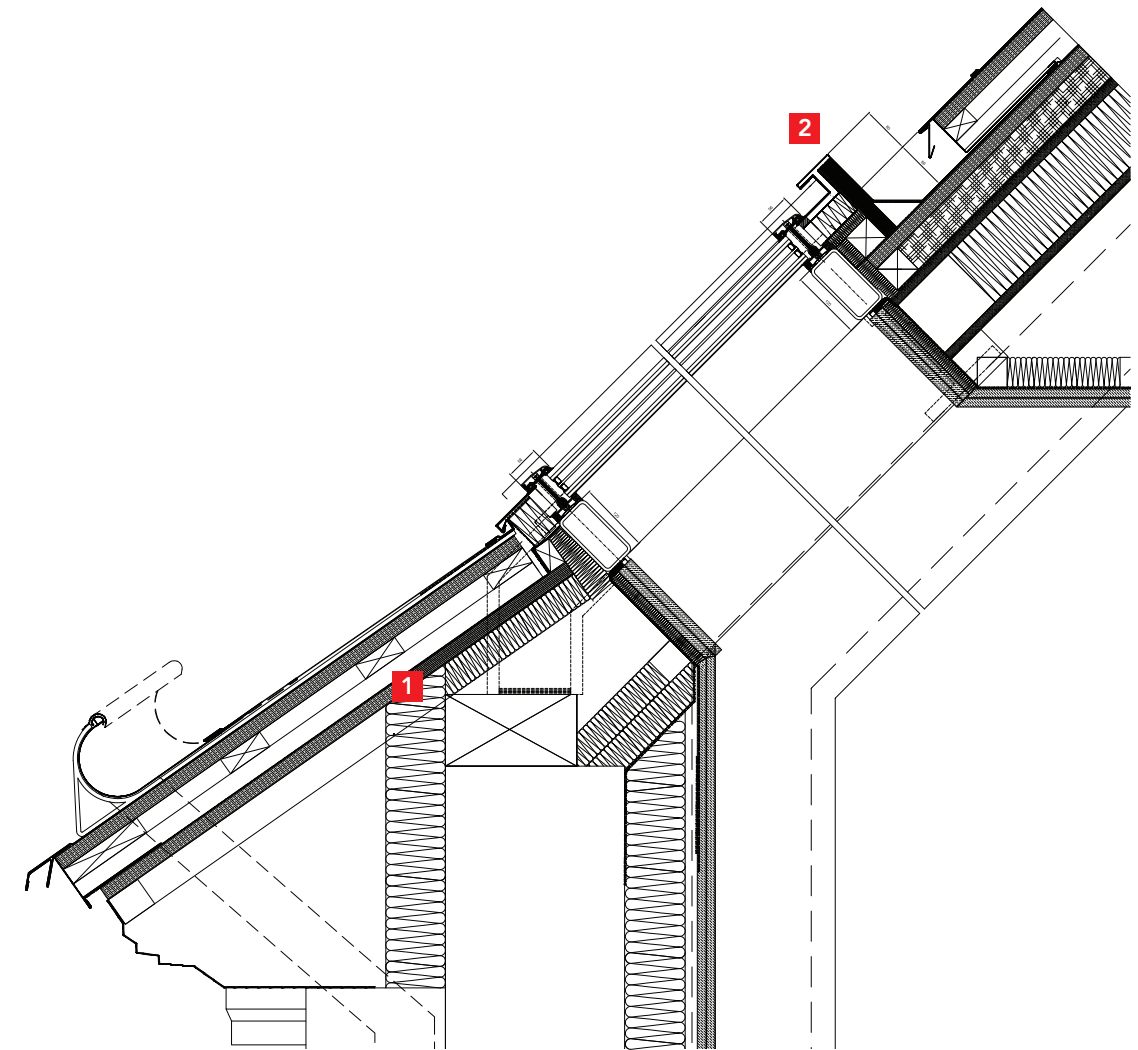




- **Country:**  
Austria
- **Owner:**  
Astral Handelsgesellschaft mbH
- **Architect:**  
Guntram Lill, Linz
- **Execution glass roof:**  
Metallbau Heidenbauer GmbH & Co KG
- **RAICO systems/ area:**  
THERM<sup>+</sup> S-I 56 mm  
Roof glazing: 140 m<sup>2</sup>
- **Photos:**  
Martin Steinkellner

INFORMATION

Vertical section roof glazing



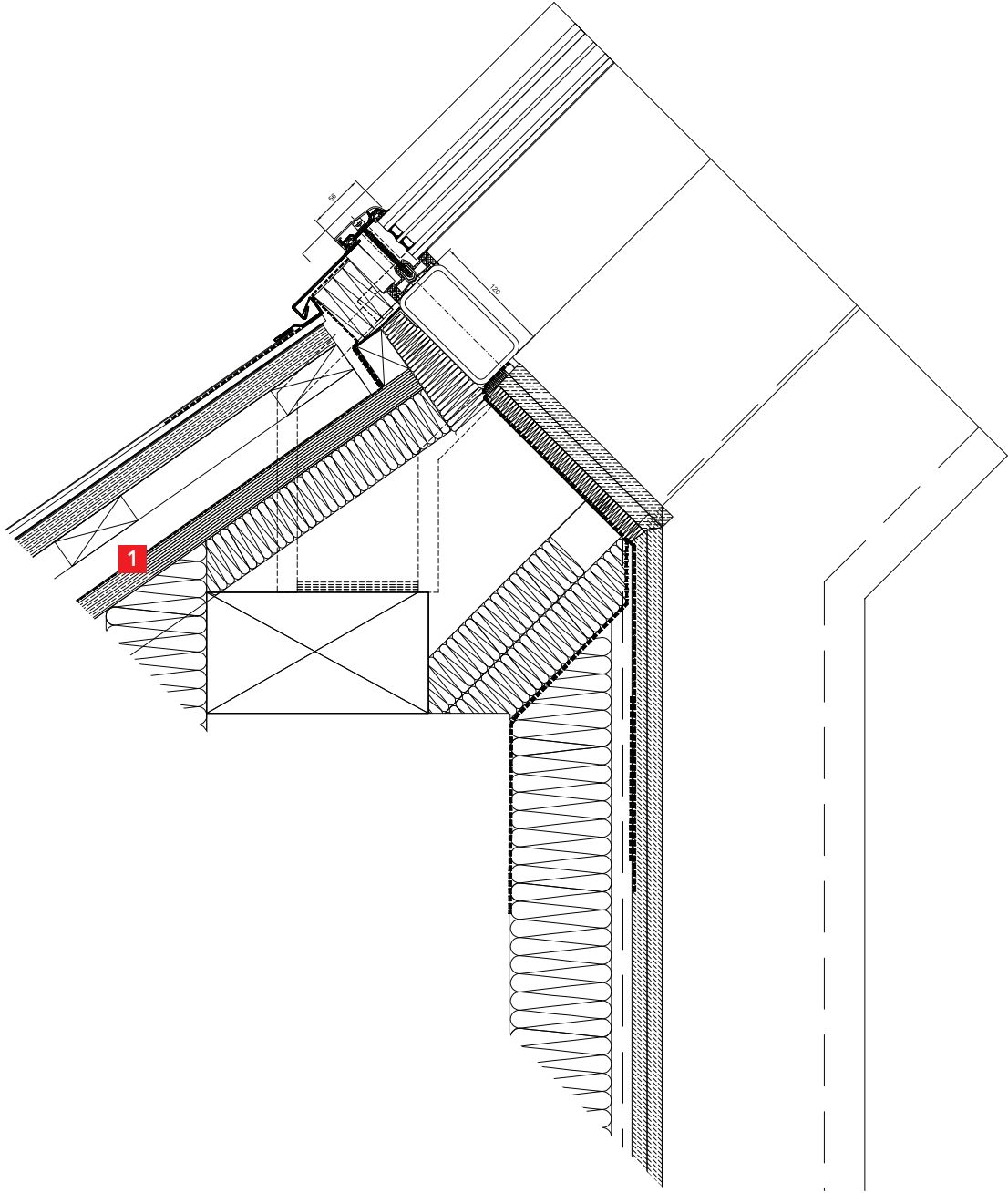
- 1** Façade drainage directed through the panel ventilation void.
- 2** Formation of the three-sided gutter by means of a vertical board. Façade pressure equalisation created via drainage slots in the flashing.

100 mm

DETAILS



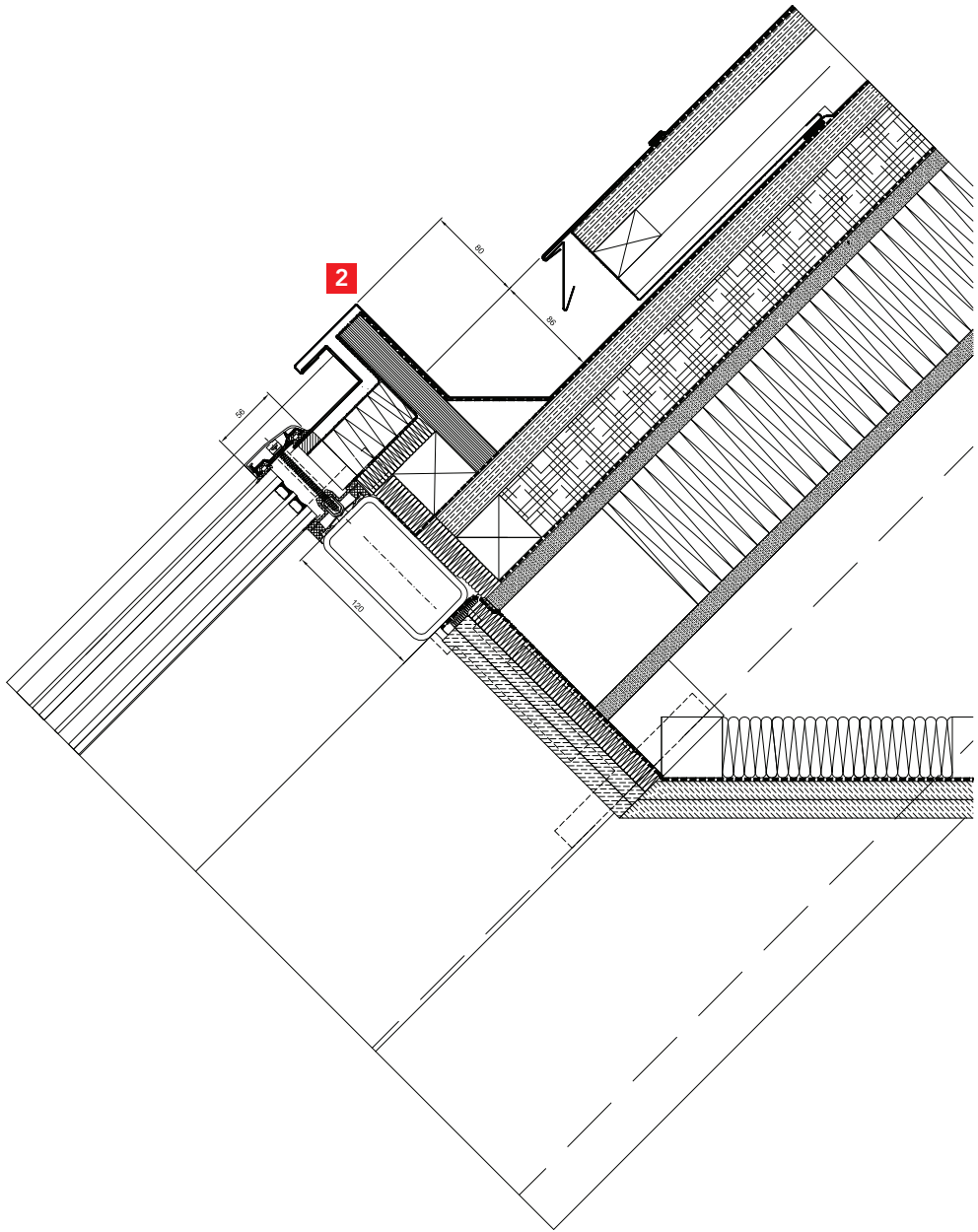
Interface with roof cladding at the head



1 Façade drainage directed through the panel ventilation void.

DETAILS

Interface with roof cladding and gutter formation



2 Formation of the three-sided gutter by means of a vertical board. Façade pressure equalisation created via drainage slots in the flashing.

DETAILS

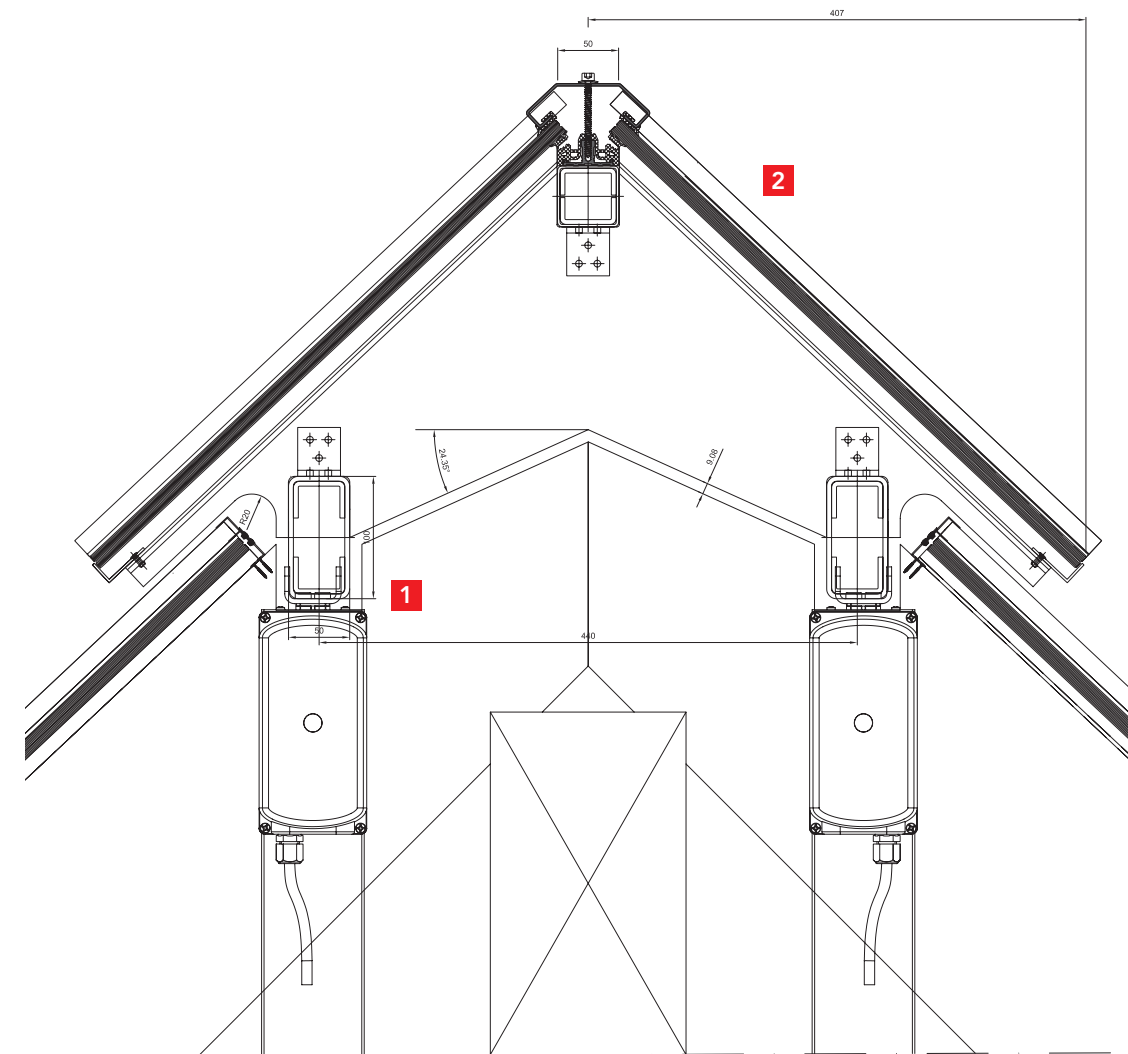




- **Country:**  
Germany
- **Owner:**  
Hofgut Sternen GmbH -  
Fam. Drubba, Breitnau
- **Construction management:**  
Faller<sup>3</sup>- Jochen Faller Dipl.-Ing. (FH),  
Breitnau
- **Execution glass roof:**  
Holzbau Amann GmbH,  
Weilheim - Bannholz;  
Ridge capping cooperation with  
Baier GmbH, Renchen - Ulm
- **RAICO systems:**  
THERM<sup>+</sup> H-I 76 mm
- **Special features:**  
Hip roof
- **Photos:**  
Granacher, RAICO

INFORMATION

Glazed opening ridge capping panels

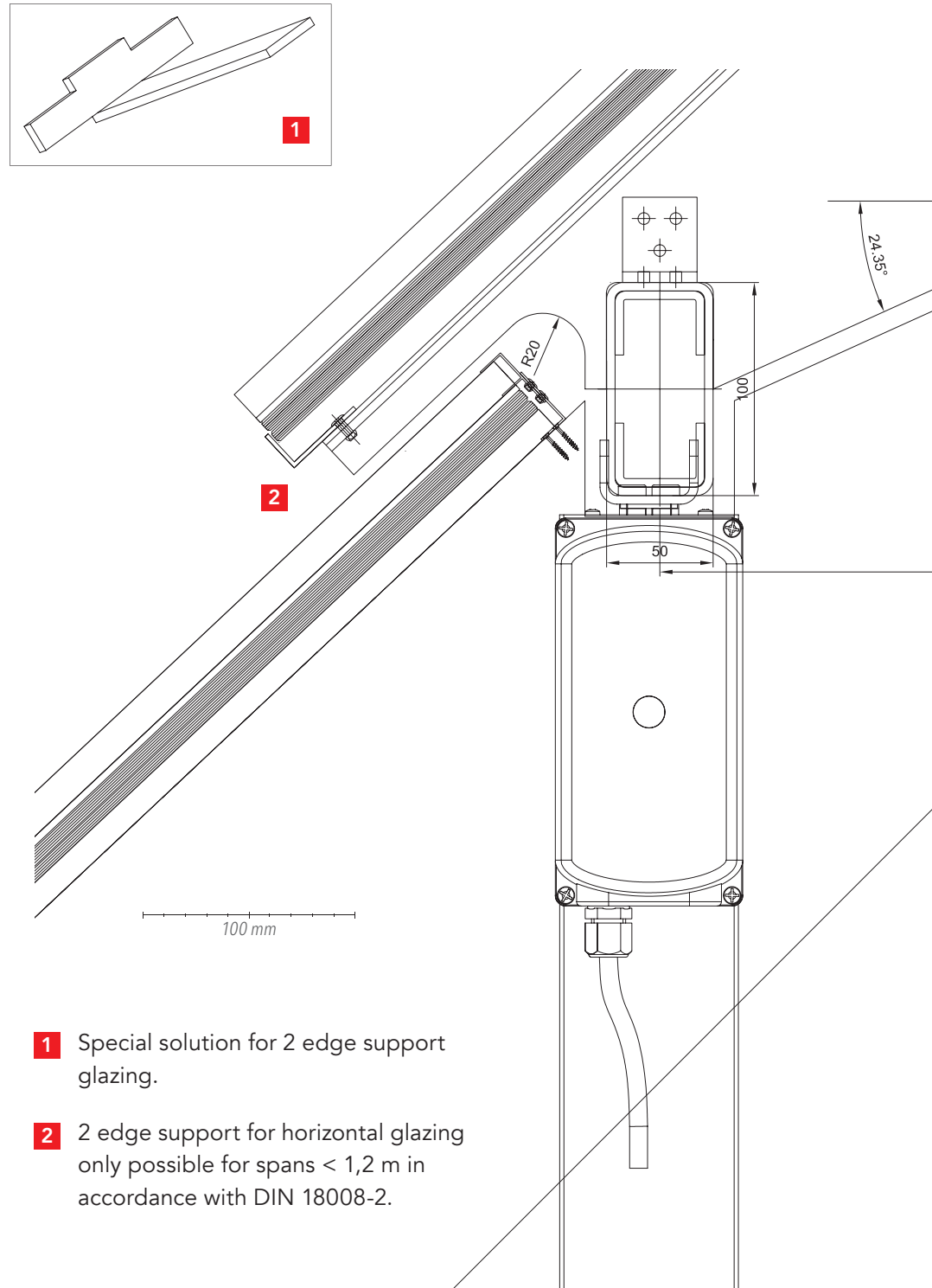


- 1 The glazed ridge capping panels can be opened by the use of linear motor drives. Quantity determined from static calculations.
- 2 Cold glazing in the overhead area: Use laminated safety glass panes from partially pre-stressed glass (residual carrying capacity)

DETAILS



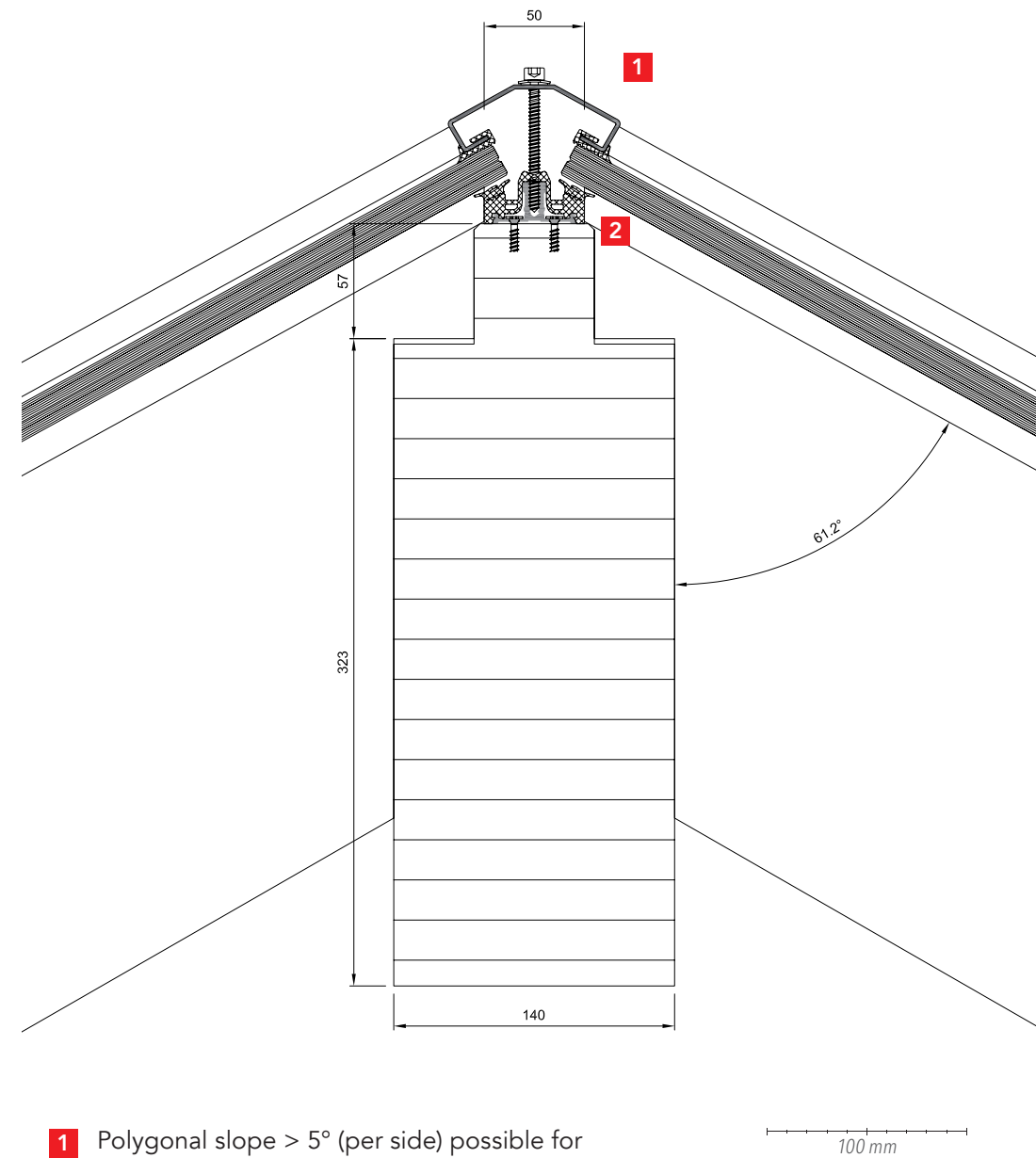
Overlapping glazing panes



- 1 Special solution for 2 edge support glazing.
- 2 2 edge support for horizontal glazing only possible for spans < 1,2 m in accordance with DIN 18008-2.

DETAILS

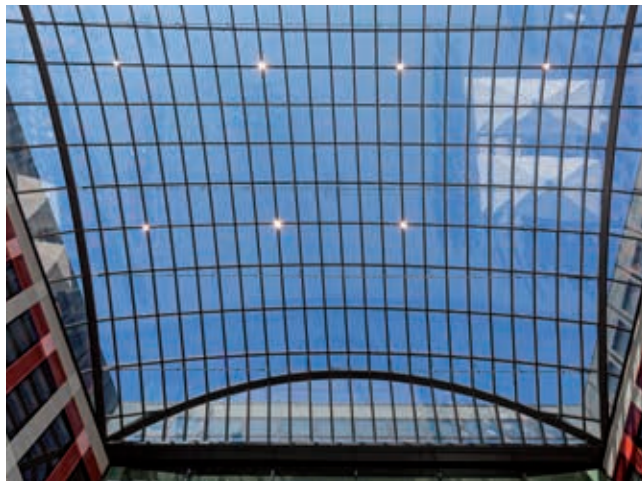
Hip rafter detail



- 1 Polygonal slope > 5° (per side) possible for roof inclination > 10°.
- 2 Polygonal interior gasket available as the system solution for angles between 0-90°.

DETAILS

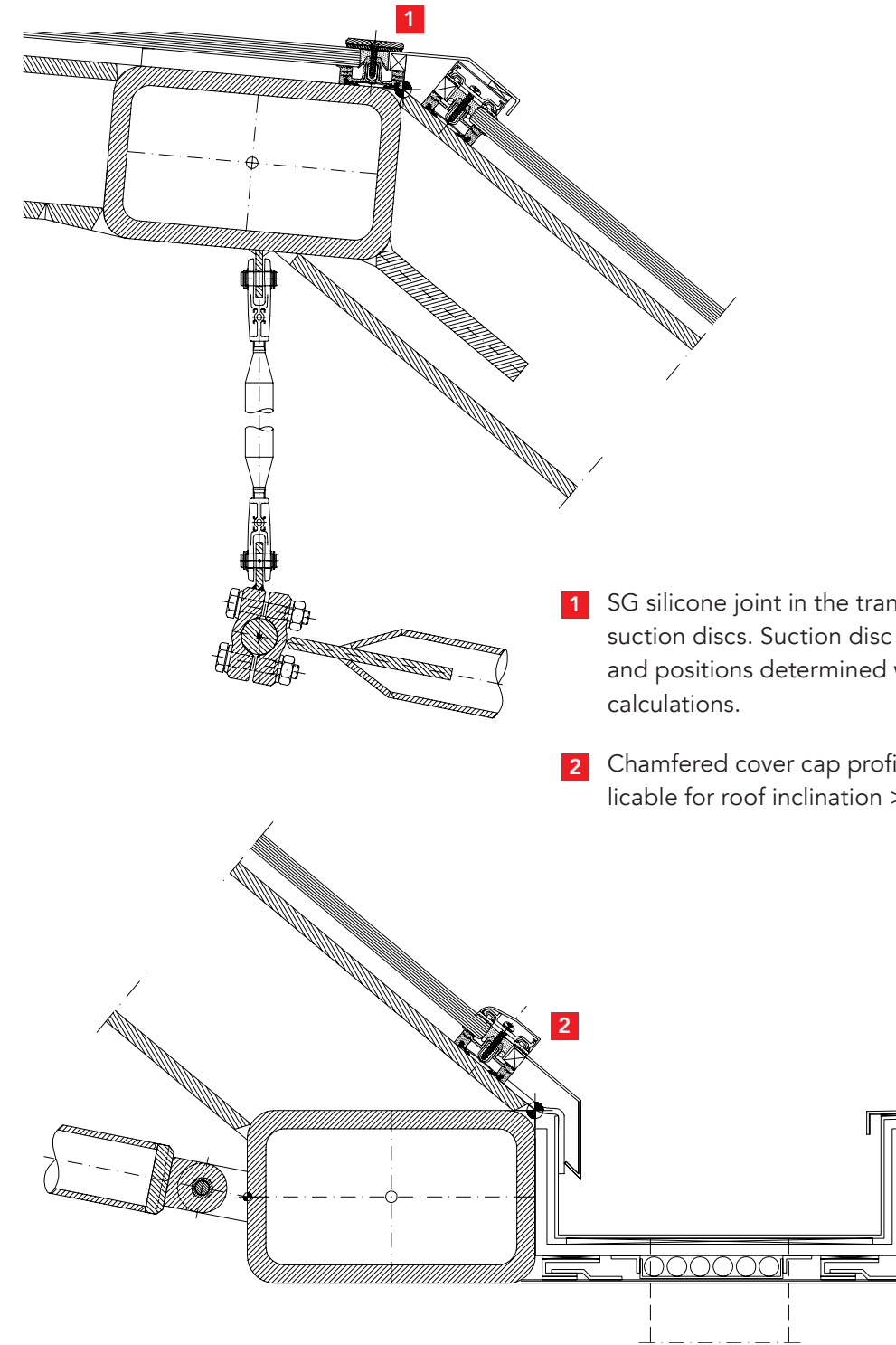




- **Country:**  
Luxembourg
- **Owner:**  
Kirchberg Property Company S.C.A.
- **Architect:**  
Sauerbruch Hutton Architekten, Berlin
- **Processor:**  
Bellapart, SAU Edifici Free Minds,  
Les Preses (Girona/ES)
- **RAICO systems/area:**  
THERM<sup>+</sup> S-I 60 mm/roof: 1.290 m<sup>2</sup>
- **Special features:**  
Due to cold glazing no requirements to  
thermal protection/structural-physical  
properties of the construction.
- **Photos:**  
Bellapart

INFORMATION

Section detail to hip rafter at eaves



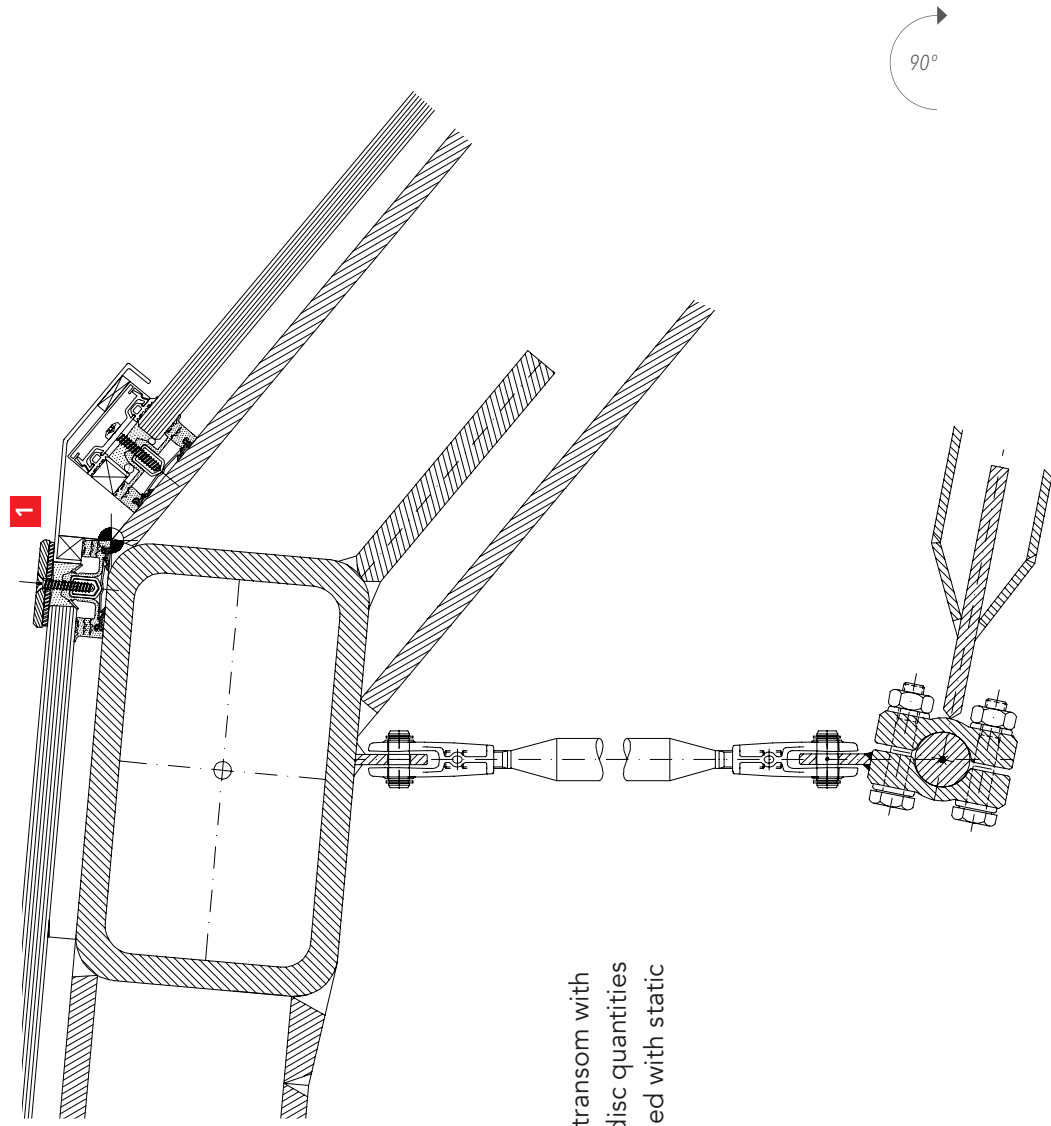
**1** SG silicone joint in the transom with suction discs. Suction disc quantities and positions determined with static calculations.

**2** Chamfered cover cap profile applicable for roof inclination > 25°.

DETAILS



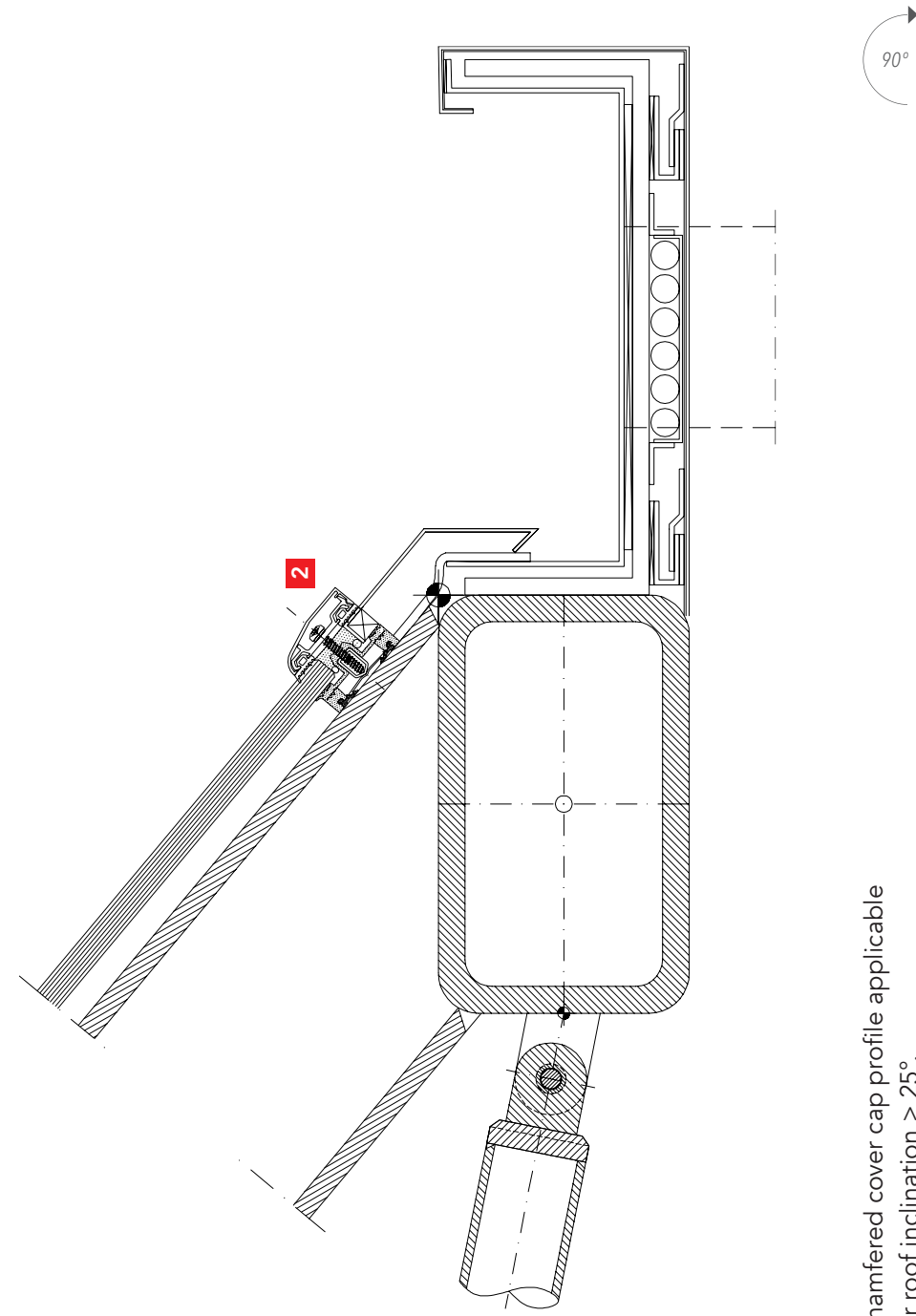
Transition flat roof/hip



**1** SG silicone joint in the transom with suction discs. Suction disc quantities and positions determined with static calculations.

DETAILS

Eaves with drainage in gutter



**2** Chamfered cover cap profile applicable for roof inclination > 25°.

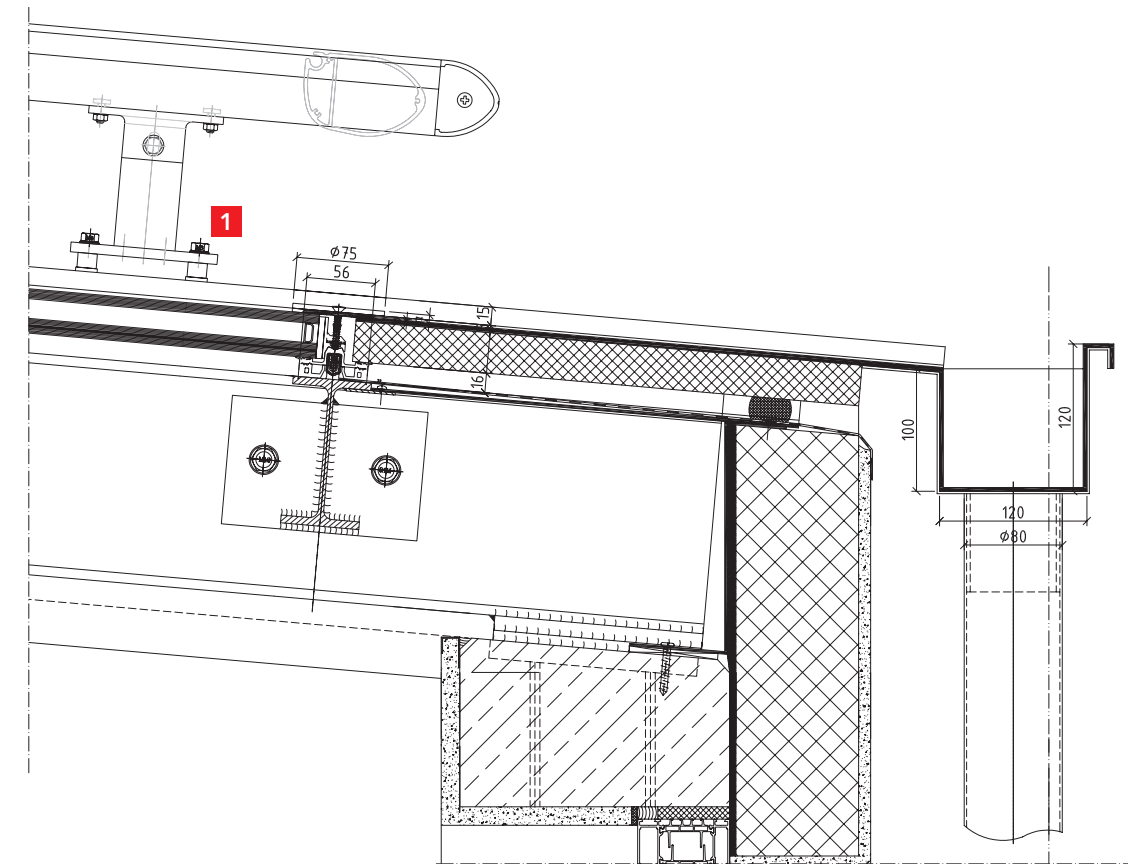
DETAILS



- **Country:**  
Germany
- **Owner:**  
lohn-ag.de Verwaltungs-GmbH
- **Architect:**  
Kühnl + Schmidt; Dipl.-Ing.  
Freie Architekten BDA Karlsruhe
- **Processor:**  
FREYLER Metallbau GmbH, Kenzingen
- **RAICO systems/ area:**  
THERM<sup>+</sup> S-I/roof: 270 m<sup>2</sup>  
FRAME<sup>+</sup> 75 WI  
FRAME<sup>+</sup> DI
- **Photos:**  
Heinz Heister

INFORMATION

Eaves detail



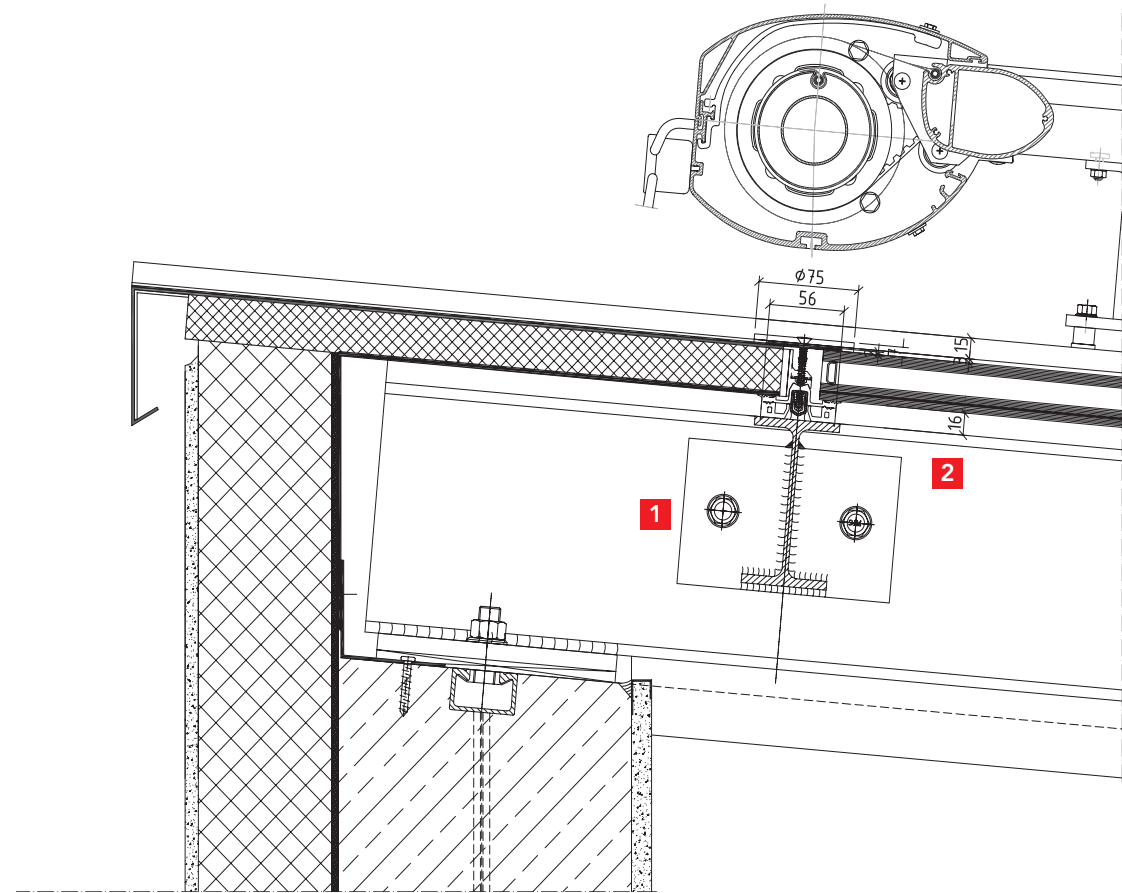
- 1 Solar shading system attached to glazed roof with RAICO fittings, tested with a roof inclination of 2° from horizontal.

100 mm

DETAILS



Ridge detail

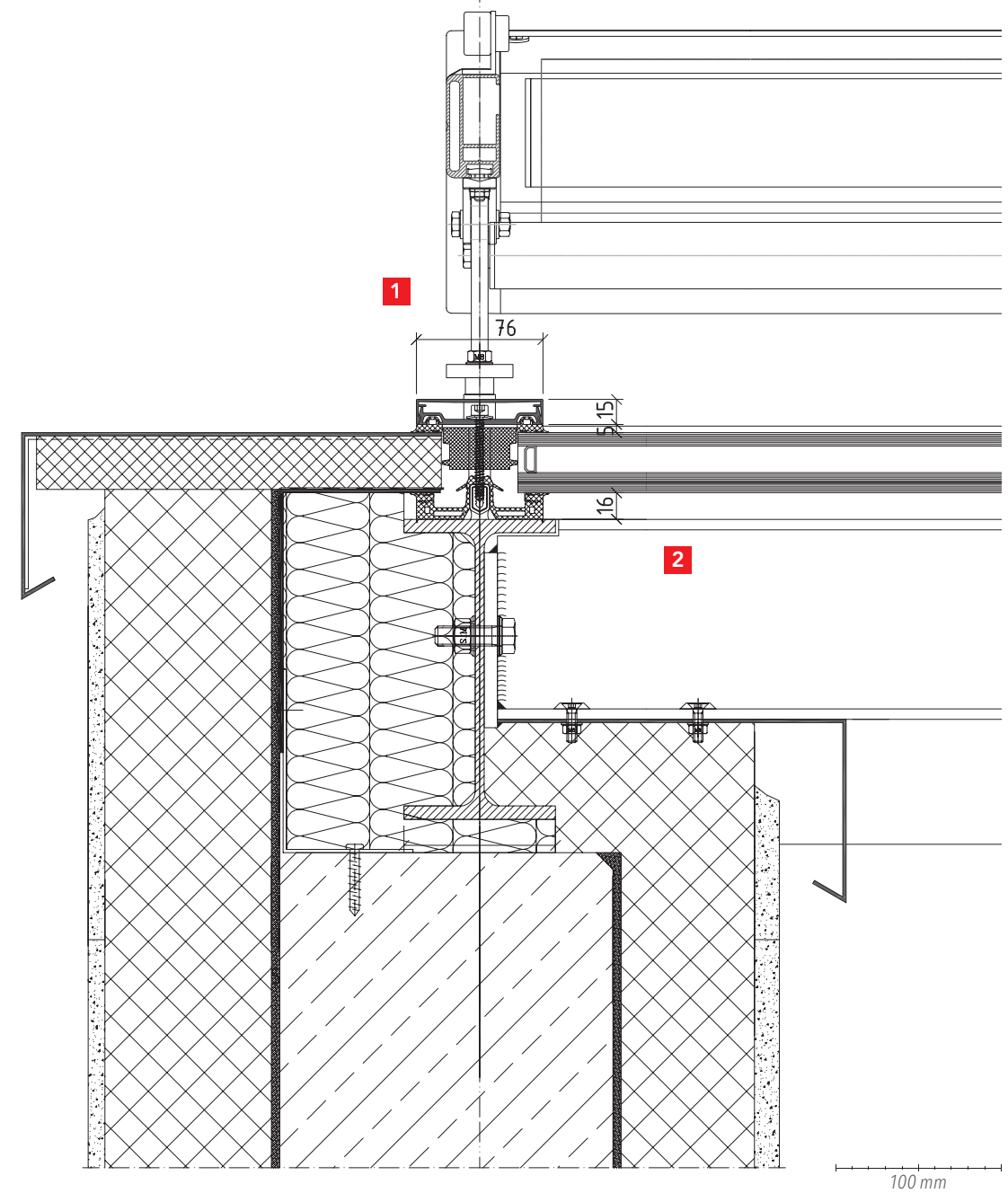


- 1** Bolted connection between mullion and transom enables fast and simple assembly on site.
- 2** Different system widths can be combined:
  - system width 76 mm to the rafter.
  - system width 56 mm to the purlin.

100 mm

DETAILS

Verge Flashing



- 1** Sun protection device by means of RAICO sun protection bolts, tested in the system with a roof inclination of up to 2°.
- 2** Different system widths can be combined:
  - system width 76 mm to the rafter.
  - system width 56 mm to the purlin.

100 mm

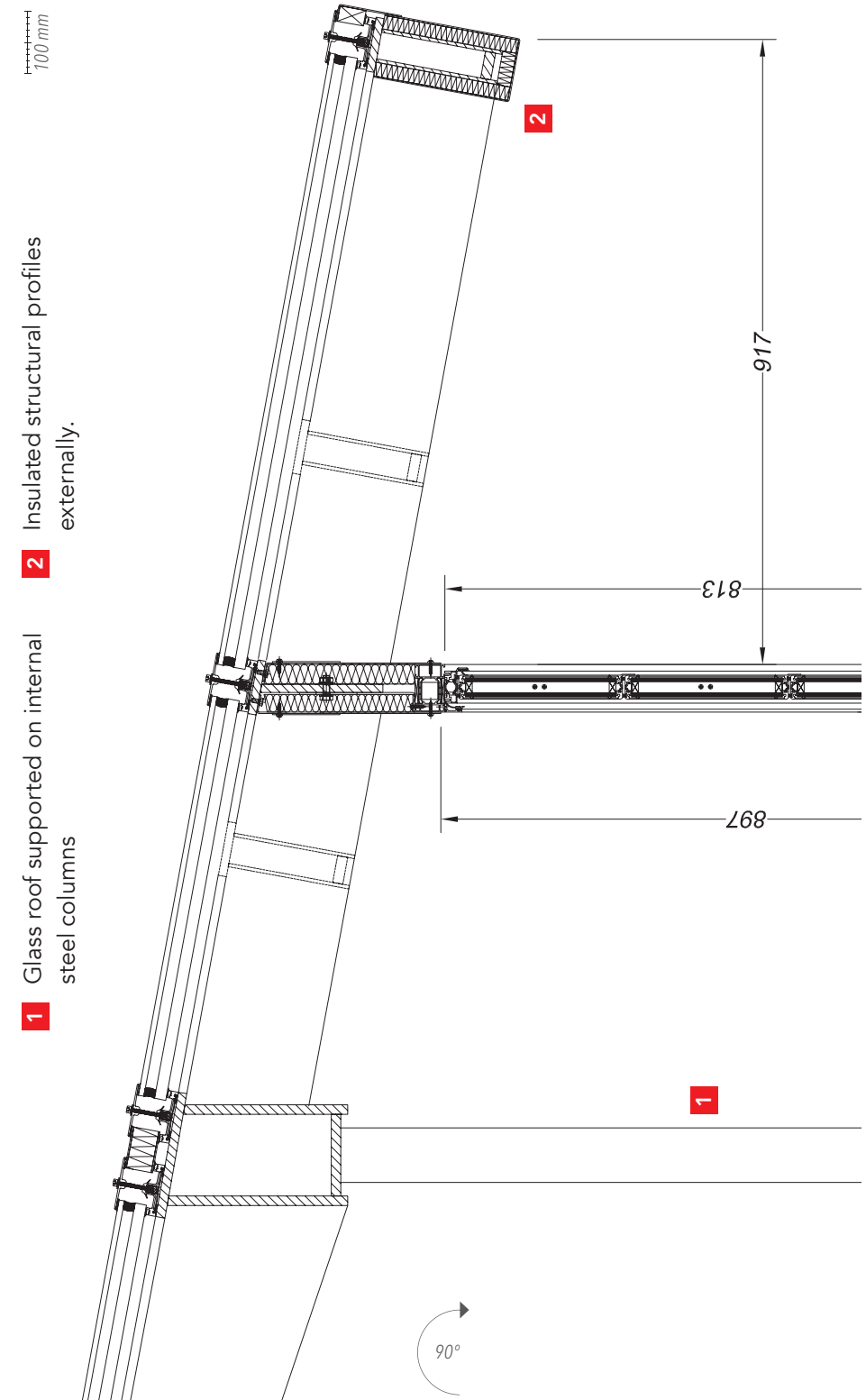
DETAILS



- **Country:**  
Germany
- **Owner:**  
Johnson Controls
- **Architect:**  
Schulze und Partner Architekten
- **Execution glass roof:**  
Metallbau Burckhardt GmbH
- **RAICO systems/ area:**  
THERM<sup>+</sup> S-I 76 mm/roof: 525 m<sup>2</sup>
- **Special features:**  
Glass roof in pyramid form
- **Photos:**  
Johnson Controls

INFORMATION

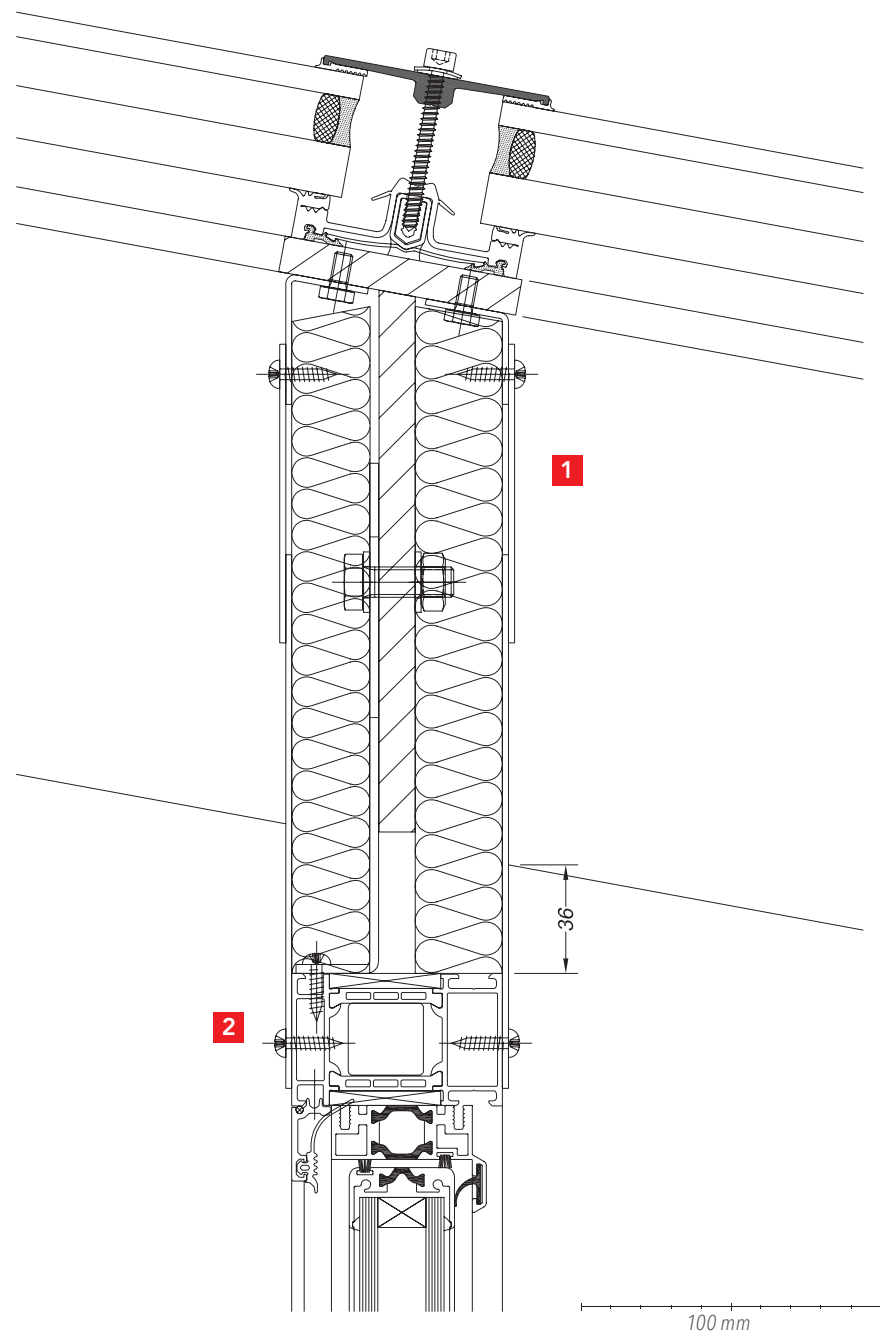
Eaves with overhanging roof



DETAILS



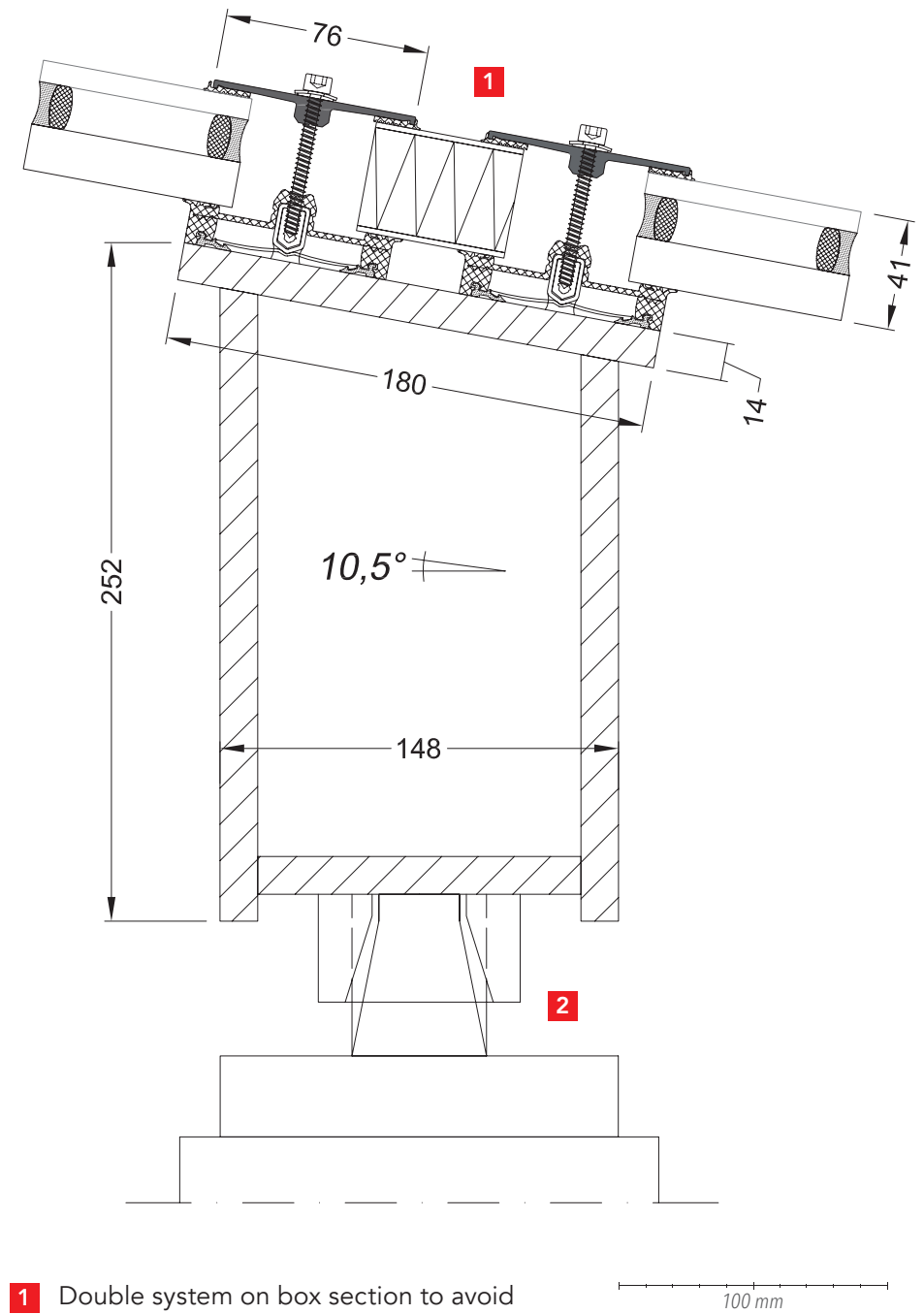
Transition glass roof/apron



- 1** T profile provides separation between interior and exterior climate with insulation on both sides.
- 2** Apron with integrated ventilation plates.

DETAILS

Perimeter profile with column supports



- 1** Double system on box section to avoid thermal stress conditions to glazing.
- 2** Supporting steel columns.

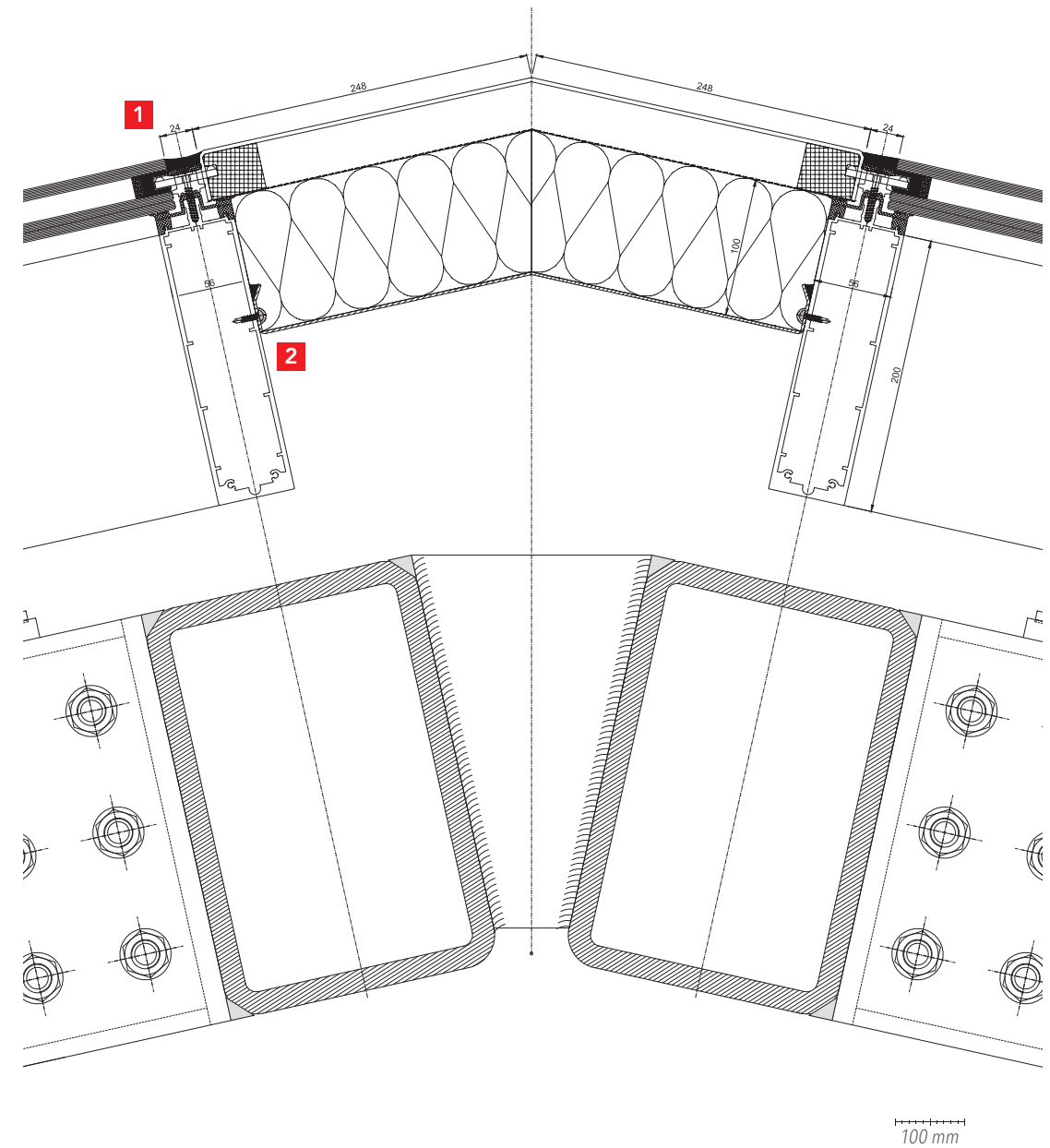
DETAILS



- **Country:**  
Sweden
- **Owner:**  
Pembroke Real Estate
- **Architect:**  
Ivar Tengbom
- **Processor:**  
Scheldebouw B.V., Heerlen  
Netherlands
- **RAICO systems:**  
THERM<sup>+</sup> A-I
- **Special features:**  
Complete roof in SG2 without additional  
mechanical suction securing devices.
- **Photos:**  
Scheldebouw B.V.

INFORMATION

Hip rafter using SG detail



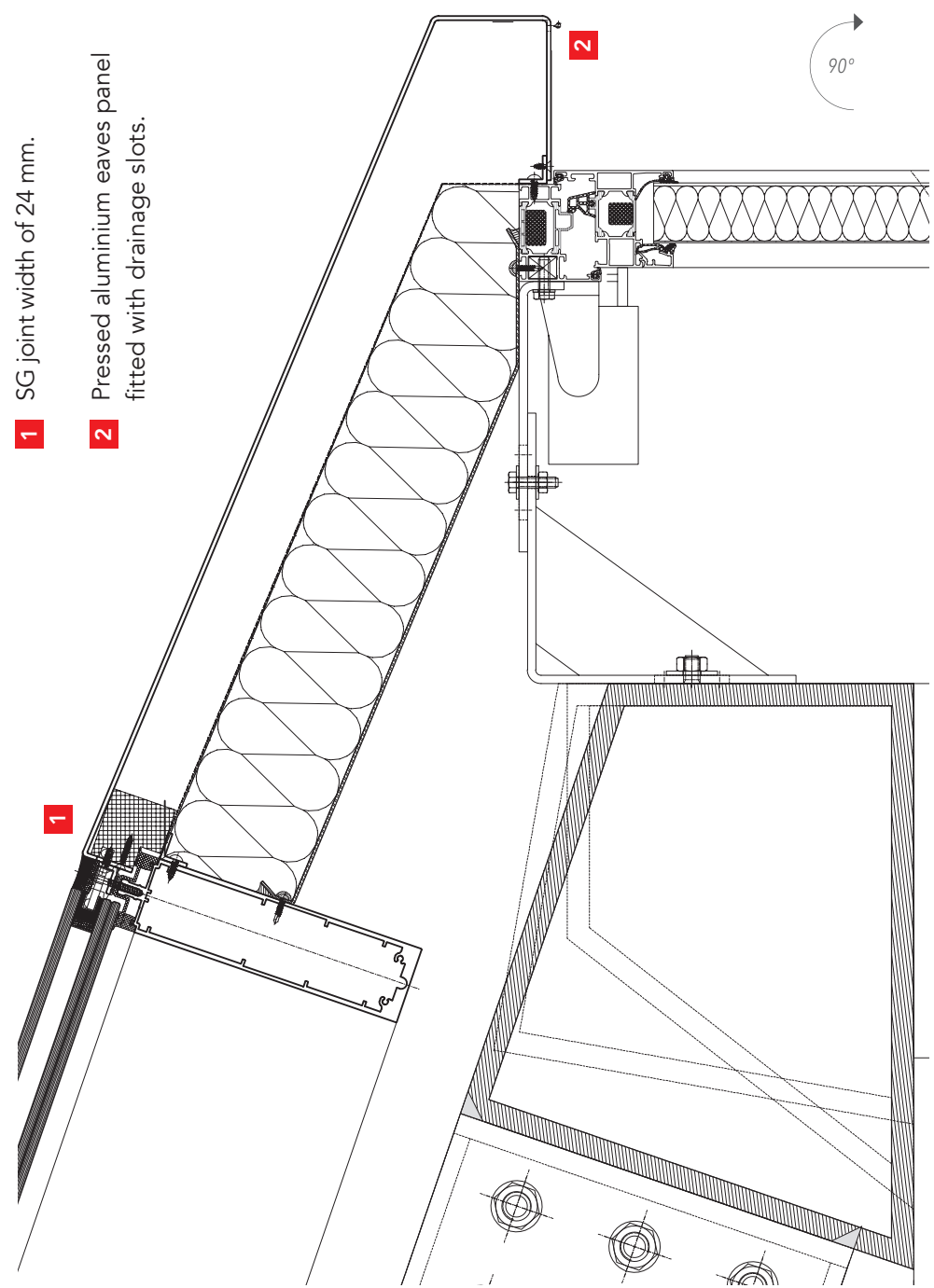
**1** The outer heat soak tested tempered safety glass to be minimum 8 mm thick due to the minimum thickness of the silicone joint.

**2** Panel has to be vapour-tight sealed internally.

DETAILS



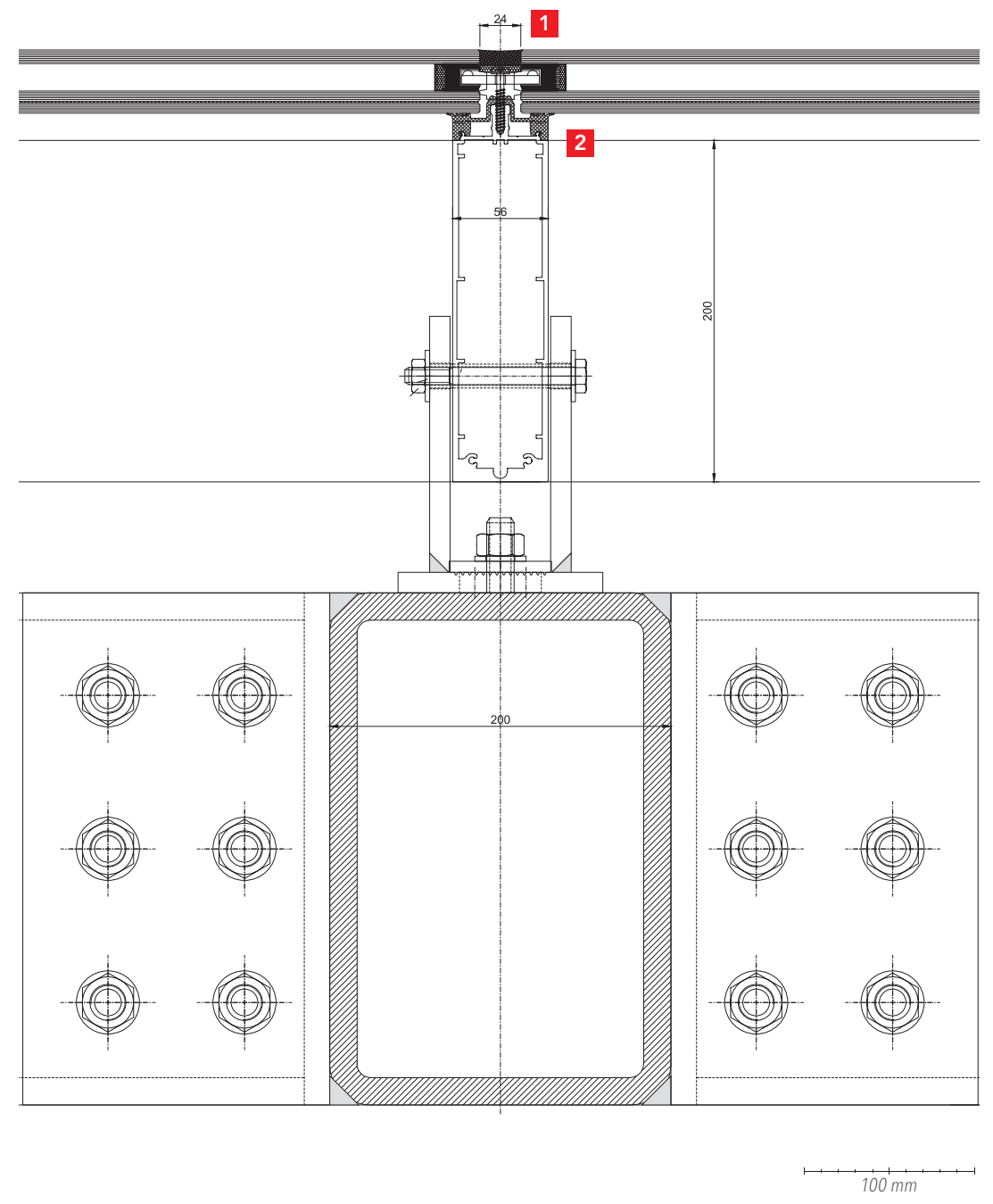
Eaves detail with interface to vertical opening vent



- 1 SG joint width of 24 mm.
- 2 Pressed aluminium eaves panel fitted with drainage slots.

DETAILS

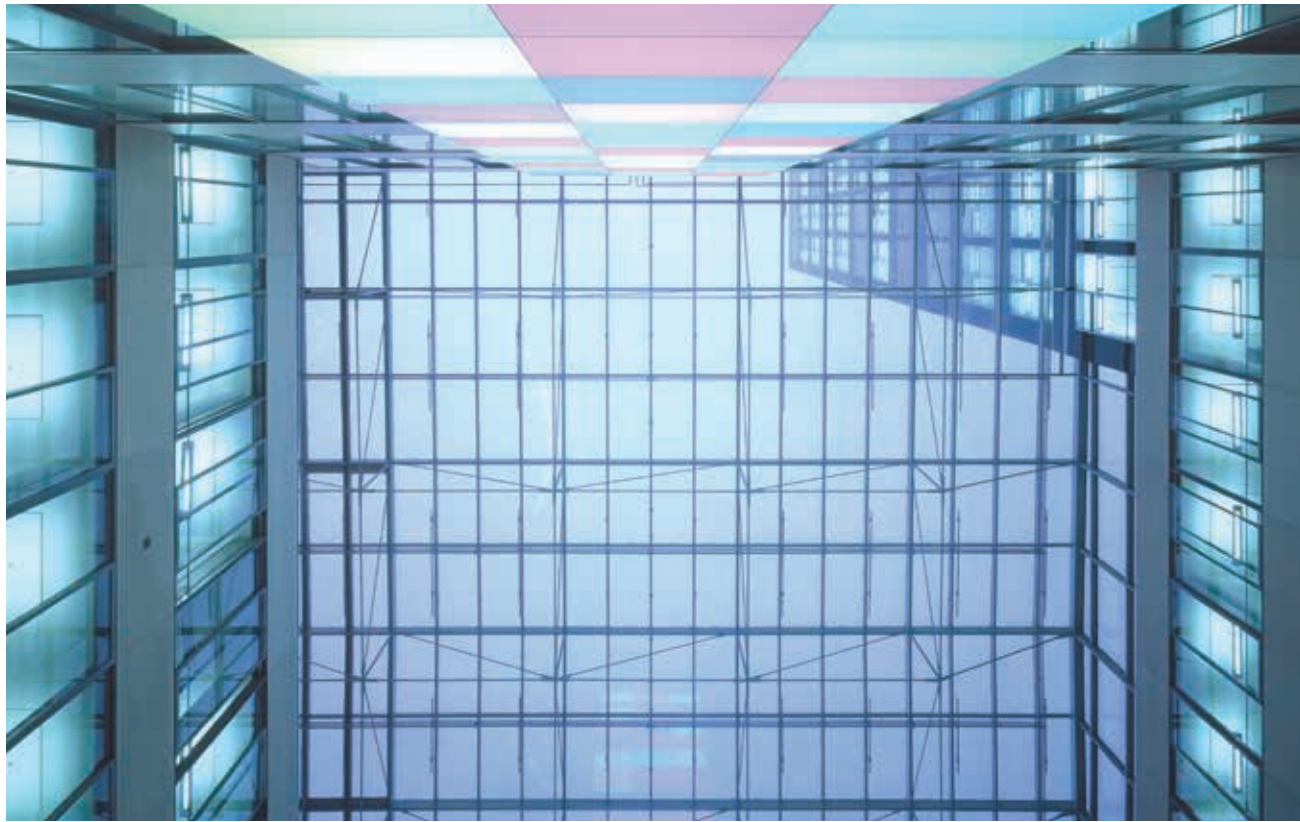
Detail showing rafter connection to the primary supporting structure



- 1 Consider increased glass bite of 16 mm.
- 2 Glass panes secured with concealed „toggles“. These locate into a special U profile in the glass edge seal.

DETAILS

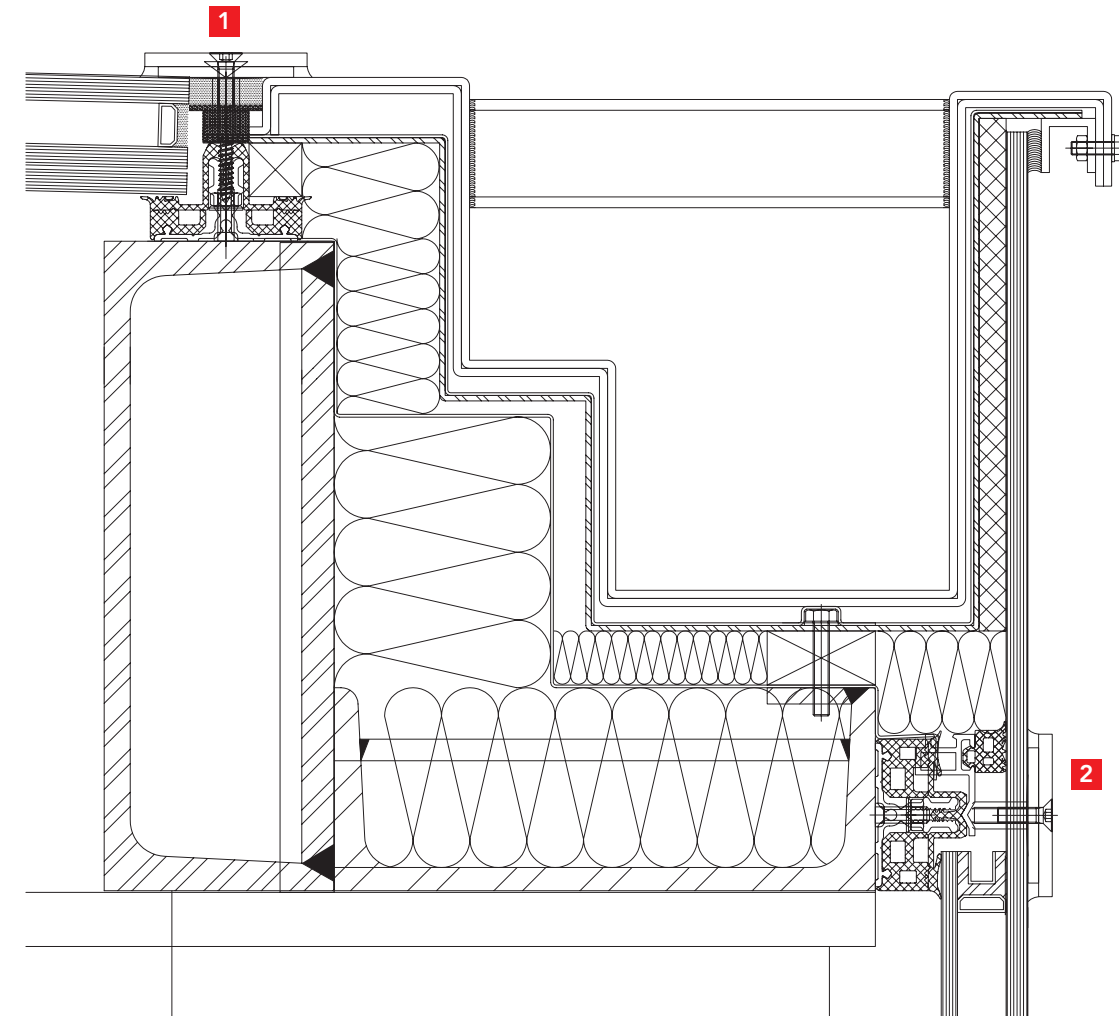




- **Country:**  
Germany
- **Owner:**  
Stadtwerte Bochum GmbH
- **Architect:**  
Gatermann & Schossig Cologne
- **Execution glass roof:**  
Bender GmbH & Co. KG
- **RAICO systems:**  
THERM<sup>+</sup> Steel
- **Photos:**  
Rainer Rehfeld

INFORMATION

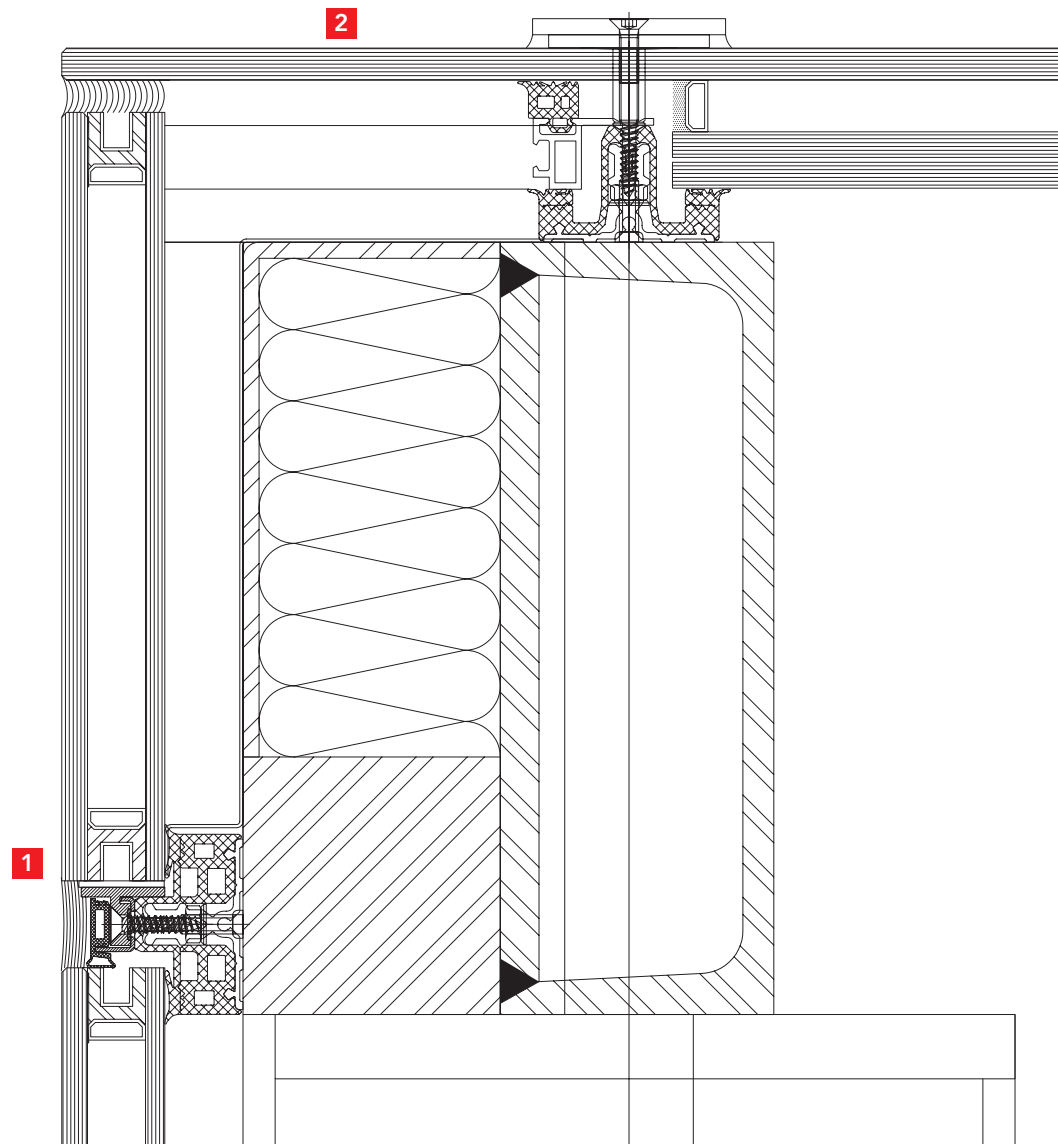
Eaves with gutter



- 1** SG joint with suction disc. Flush transition into gutter.
- 2** Gutter cladding formed by using a stepped edge glass unit within the vertical glass façade. The glass step is fitted with a hole to allow fixation of the suction disc.

DETAILS

Glass to glass corner detail creating glass verge



- 1** SG glazing with U profiles in the glass edge seal for toggle location fixing.
- 2** Recommendation: Apply enamel frit to the stepped edge width. Glass panes secured with concealed „toggles“.

DETAILS

THE NEXT STEP? Further information...



... you will find in our planning manual!

Our „THERM+ Glass Roof Constructions“ planning manual offers architects, technical planners and processors an ideal starting point to create the most diverse glass roof construction. Apart from standard sections and numerous connection details the manual contains information showing variations and selection tables to determine the materials required.

You can find quick and convenient access to all data in the download area of our web-site at [www.raico.de](http://www.raico.de).

For printed versions of the planning manual, please contact your local RAICO consultant.



# RAICO 2.0

RAICO App now available



Discover RAICO also mobile and interactively with the RAICO app! In this way, you have all the important information, such as reference objects, photos and constructive details at a glance.



THE PROFESSIONALS' PROFILE

**Wolkenlos - Teehaus Seeschlösschenbrücke**  
Thermebadur Strand

**THERM+**  
The passive house certified facade system enables unlimited combination possibilities and a high degree of design freedom.

**PRODUCTS**   **OBJECTS**

**Architect**  
Sauerbruch Hutton Architekten, Berlin

**Builder**  
ADAC Allgemeiner Deutscher Automobil-Club e.V., München

**Category**  
Office and administration building

**Our product portfolio**

<b>Location</b> München	<b>Country</b> DE	<b>Architect</b> Sauerbruch Hutton Architekten, Berlin	<b>Fabricator</b> Josef Gartner GmbH/Prager
<b>Planner of building</b> Werner Sobott, Stuttgart	<b>Area of facade panel</b> surface: 20.000 m²	<b>Builder</b> ADAC Allgemeiner Deutscher Automobil-Club e.V., München	<b>Construction time</b> 2009 to 2011
<b>RAICO system</b> THERM+ 2x	<b>Building activity</b> New construction	<b>Category</b> Office and administration building	

RAICO-APP



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[www.raico.eu](http://www.raico.eu)

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