RAICO

SKY | LIGHT | SOLUTION

Glass roof constructions

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$^+$ 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°.

THERM$^+$ A-I

THERM$^+$ H-I

THERM$^+$ S-I

THERM$^+$ A-I

THERM$^+$ S-I

THERM$^+$ H-I
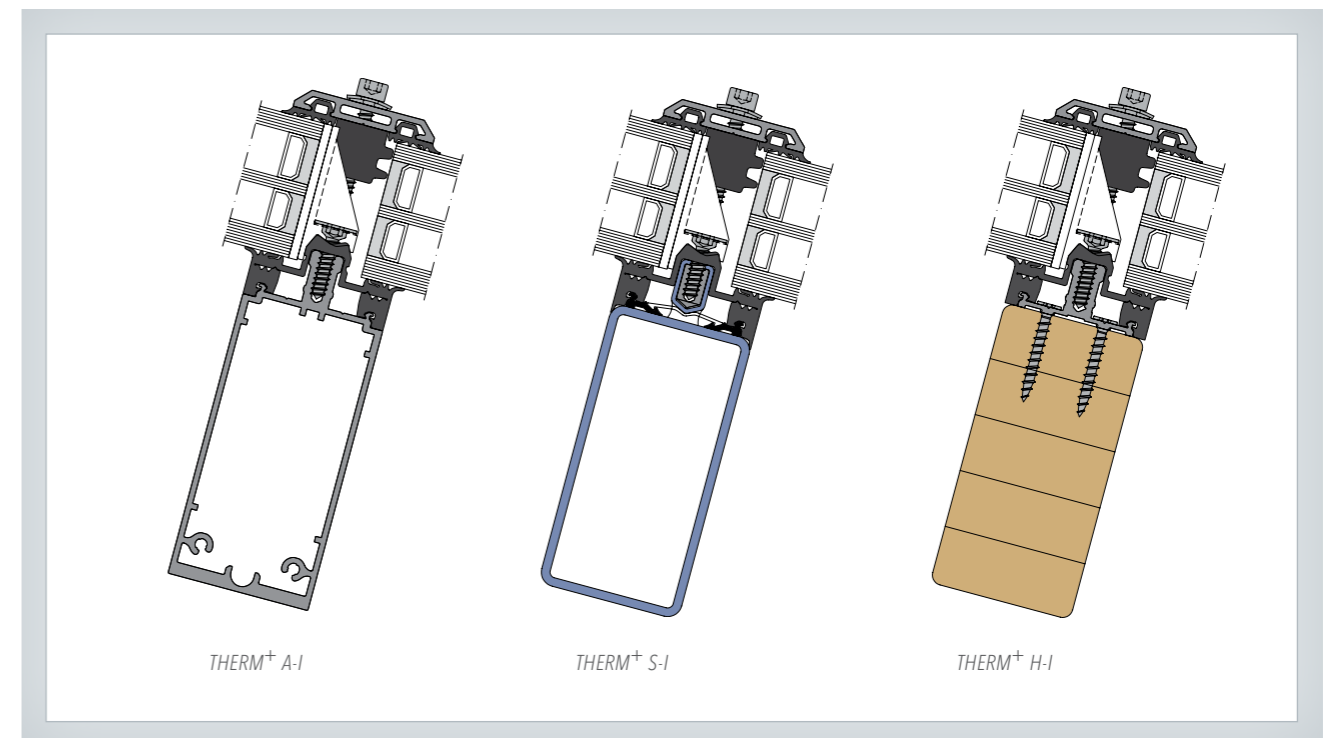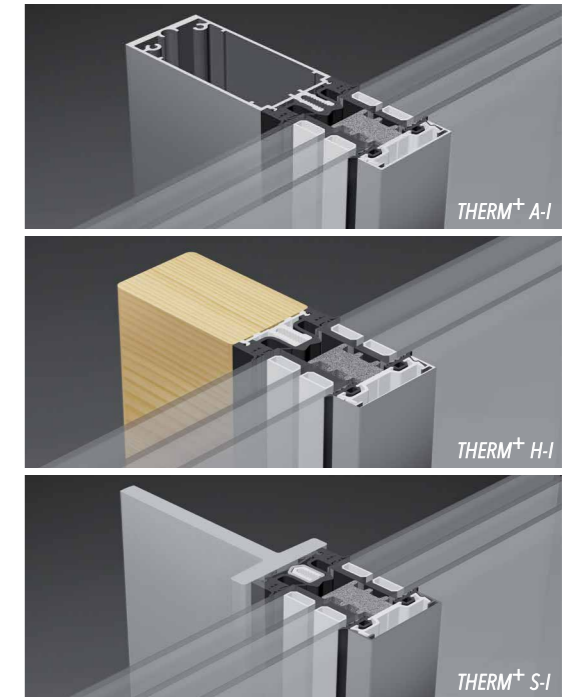
OVERVIEW OF PROJECTS

System solutions from RAICO

The mullion-transom systems THERM$^+$ 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 Zentrale │ Munich
Page 6 – 9

Hofgut Sternen │ Breitnau
Page 26 – 29

Ernst & Young │ Kirchberg
Page 30 – 33

CityCube │ Berlin
Page 10 – 13

Algentechnikum TUM │ Ottobrunn
Page 14 – 17

Lohn AG │ Baden-Baden
Page 34 – 37

Johnson Controls │ Hanover
Page 38 – 41

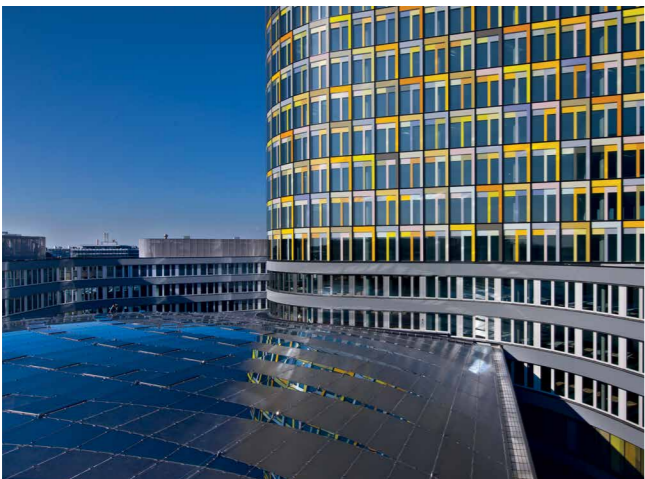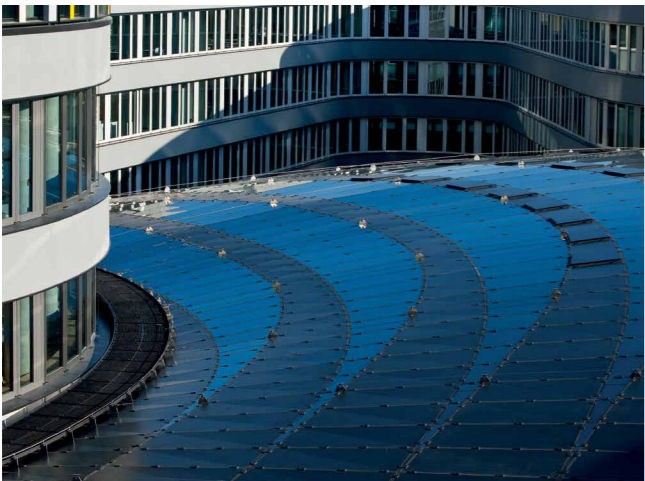**Egger Headquarter │ St. Johann in Tyrol**
Page 18 – 21

Rossauer Lände │ Vienna
Page 22 – 25

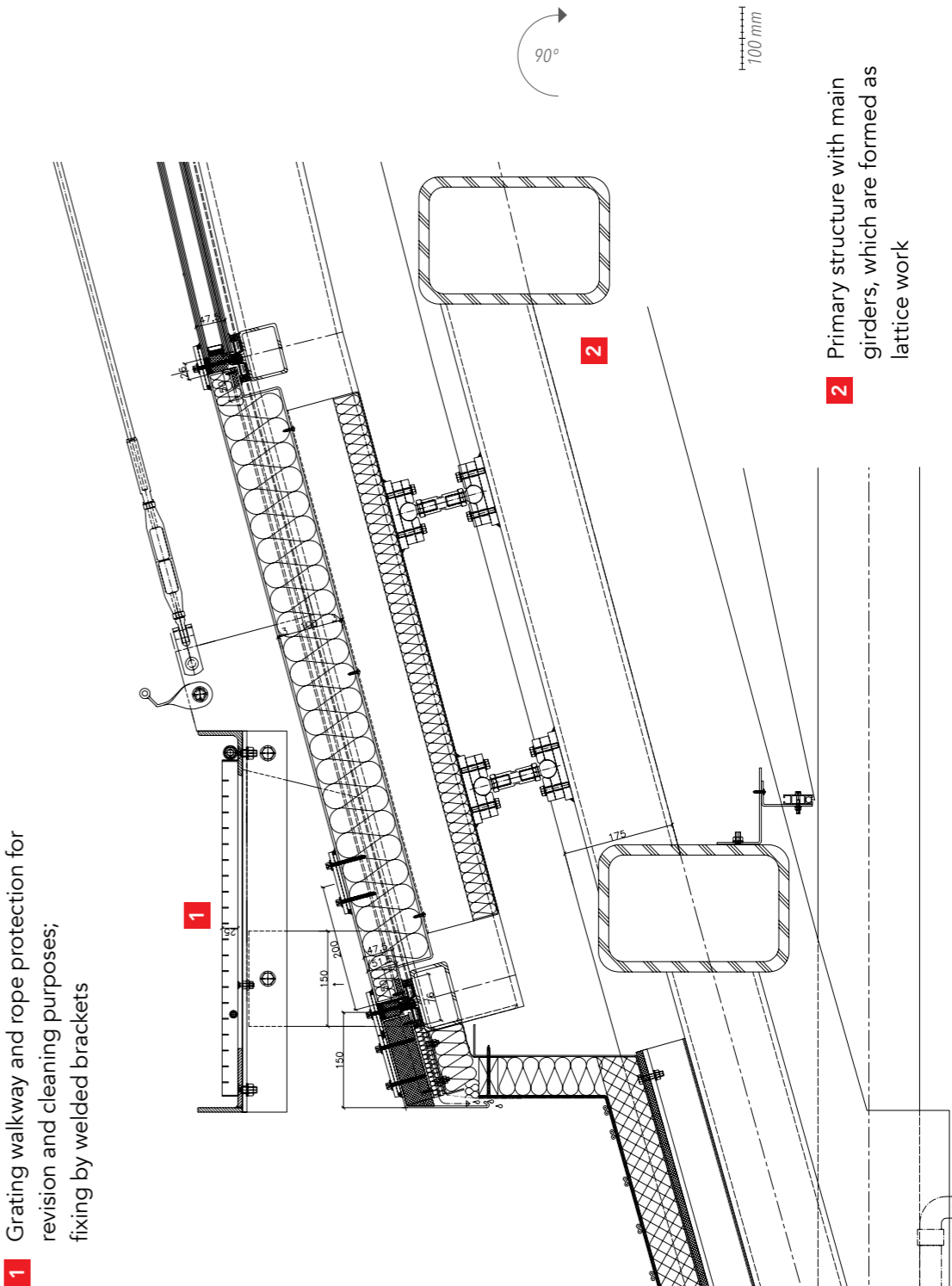**Mästerhuset │ Stockholm**
Page 42 – 45

Stadtwerke │ Bochum
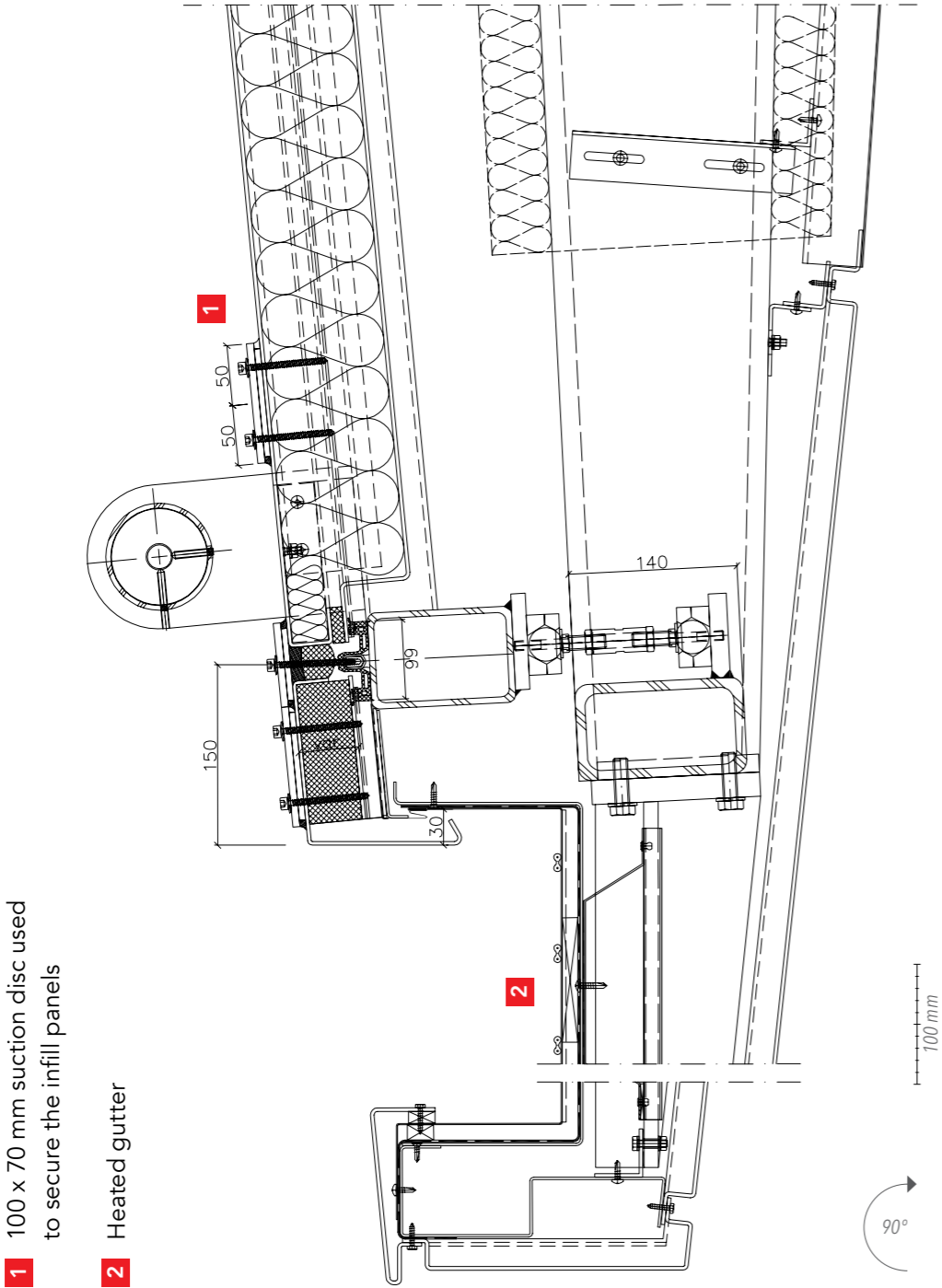Page 46 – 48

ADAC ZENTRALE | Munich

Information

- **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 system / area:**
  THERM$^+$ S-I / roof: 2.300 m²

- **Special features:**
  Special mullion gasket:
  System width: 66 mm
  Transom gasket:
  system width 76 mm

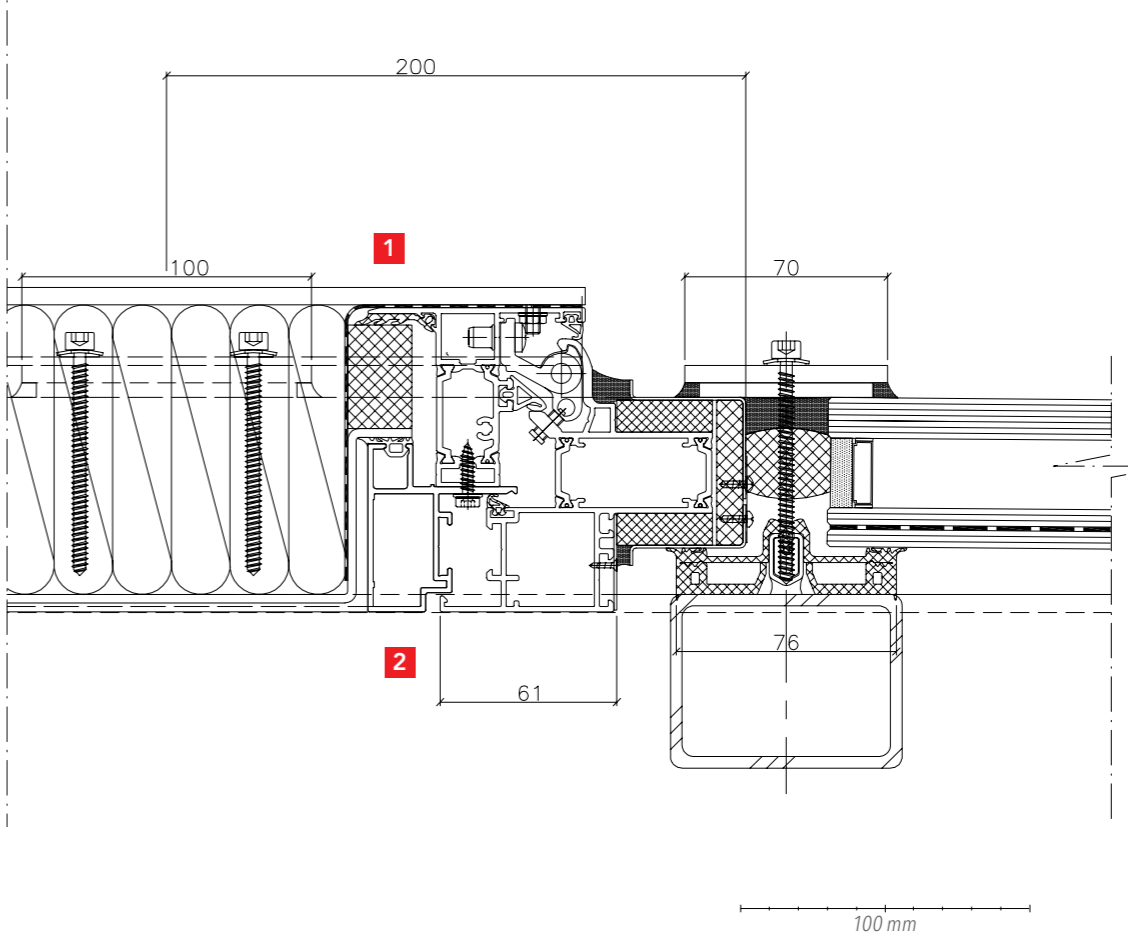- **Photos:**
  Stephan Liebl, Dillingen

## 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

ADAC ZENTRALE | Munich

Roof overhang with connection to heated gutter

50

50

140

99

150

30

100 mm

90°

1 100 x 70 mm suction disc used to secure the infill panels

2 Heated gutter

WING 105 DI smoke & heat vent


200

100

1

70

61

76

100 mm

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 m²
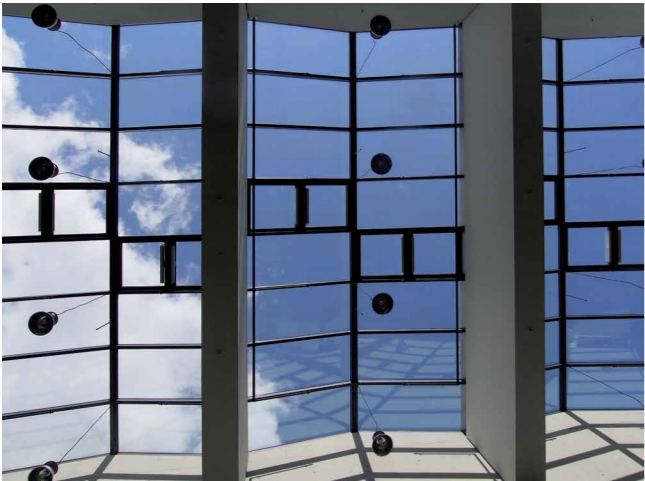
Information

- **Country:**
  Germany

- **Owner:**
  Messe Berlin GmbH

- **Architect:**
  Code Unique Architekten, Dresden

- **Façade and glass roof:**
  Metallbau Windeck GmbH

- **RAICO systems:**
  THERM$^+$ S-I 76 mm
  WING 105 DI

- **Special features:**
  Rooflight window WING 105 DI
  as natural smoke and heat control
  double flaps with wind deflectors.

- **Photos:**
  Metallbau Windeck GmbH

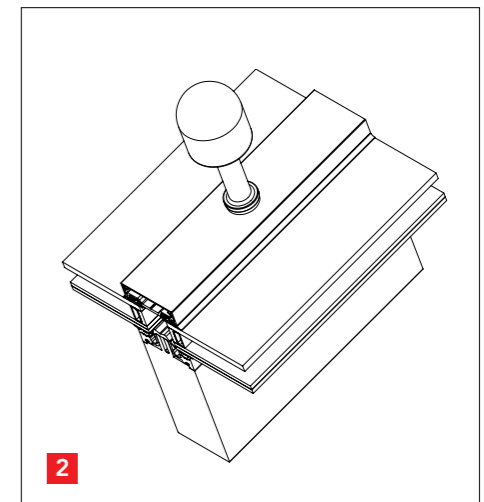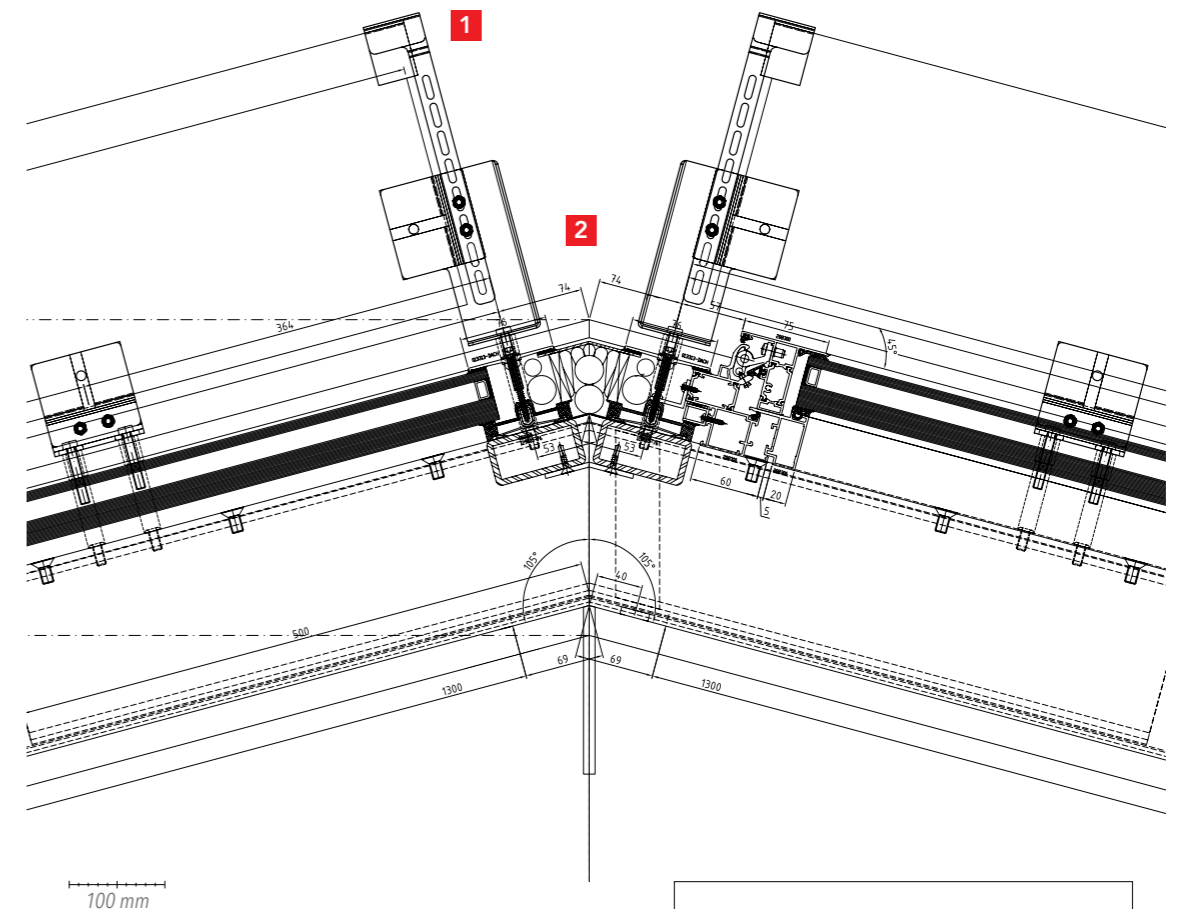### Eaves with drainage using the base gasket with flap in the vertical area
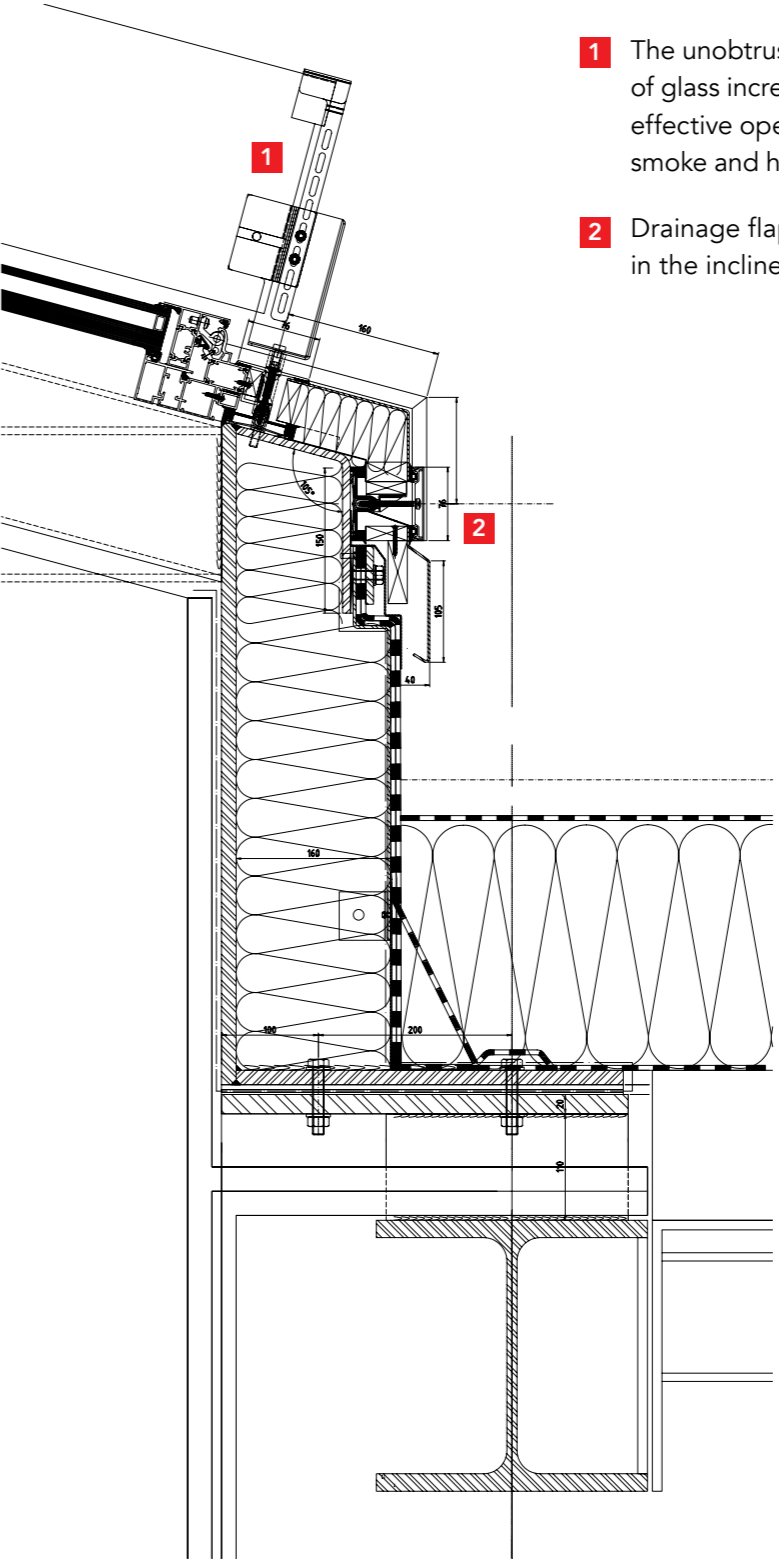
1 The unobtrusive wind deflectors made of glass increase the aerodynamically effective opening area for the natural smoke and heat exhaust ventilator

**2** Drainage flap gaskets not applicable in the inclined area

100 mm

CITYCUBE BERLIN | Berlin

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

100 mm
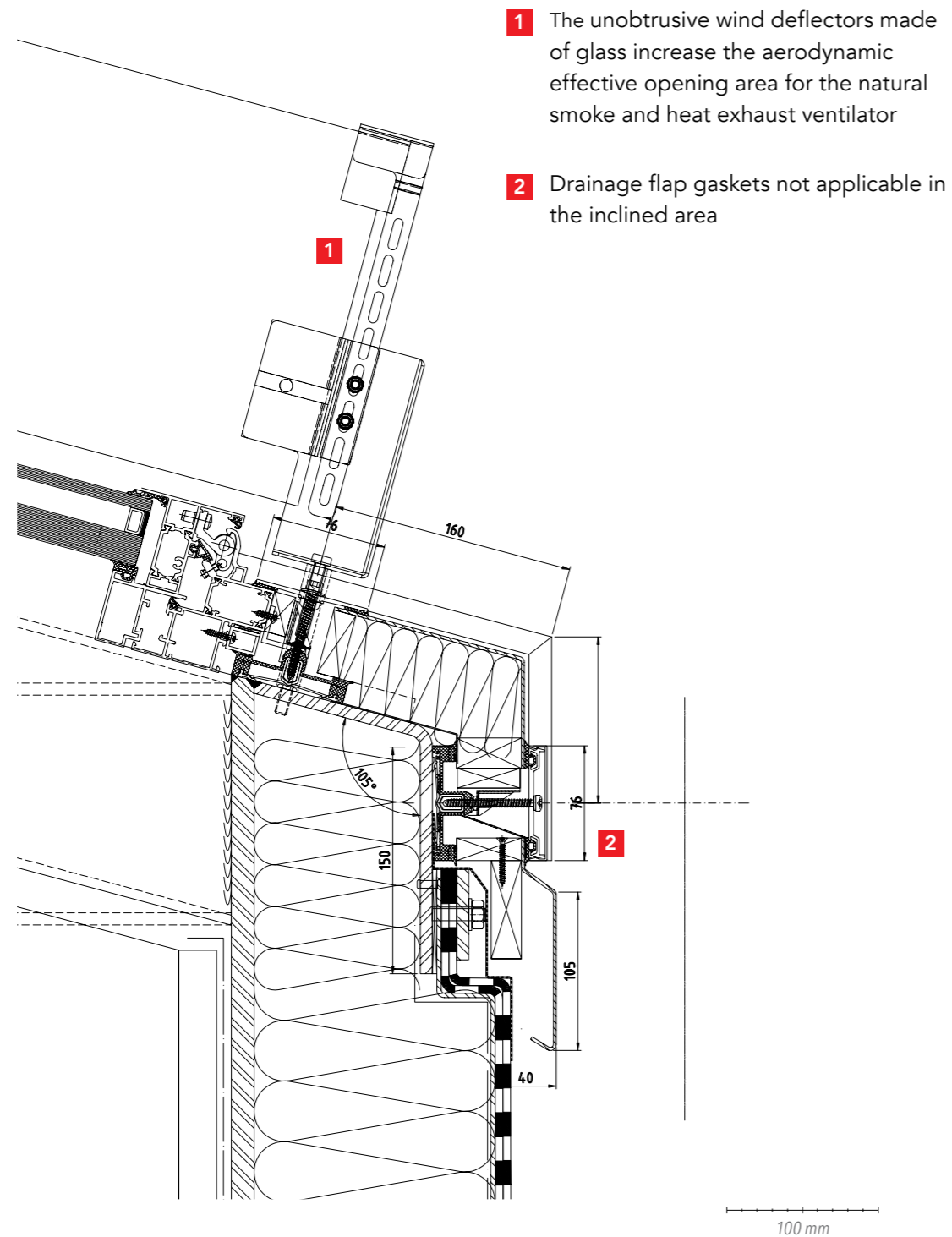
Ridge detail of dual pitch roof with wind deflectors

100 mm

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

# ALGENTECHNIKUM TUM | Ottobrunn
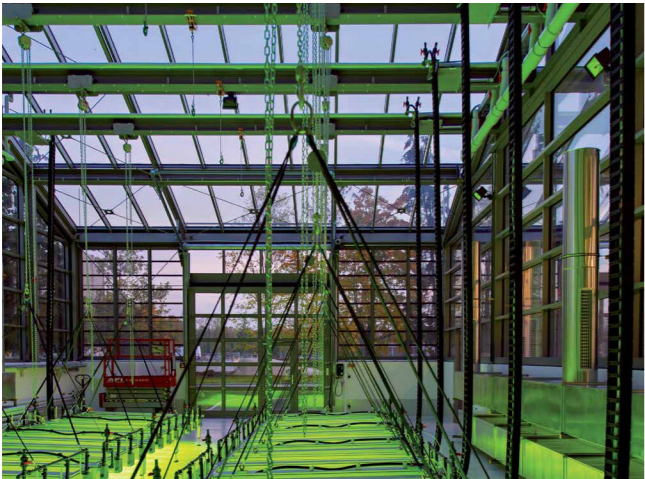
Information

- **Country:**
  Germany

- **Owner:**
  Airbus Group

- **Architect:**
  OBERMEYER Planen + Beraten GmbH

- **Façade und glass roof:**
  Roschmann Konstruktionen aus
  Stahl und Glas GmbH, Gersthofen

- **RAICO system:**
  THERM$^+$ A-I 56 mm

- **Photos:**
  TU München / Heddergott

## Ridge detail at interface with vertical façade
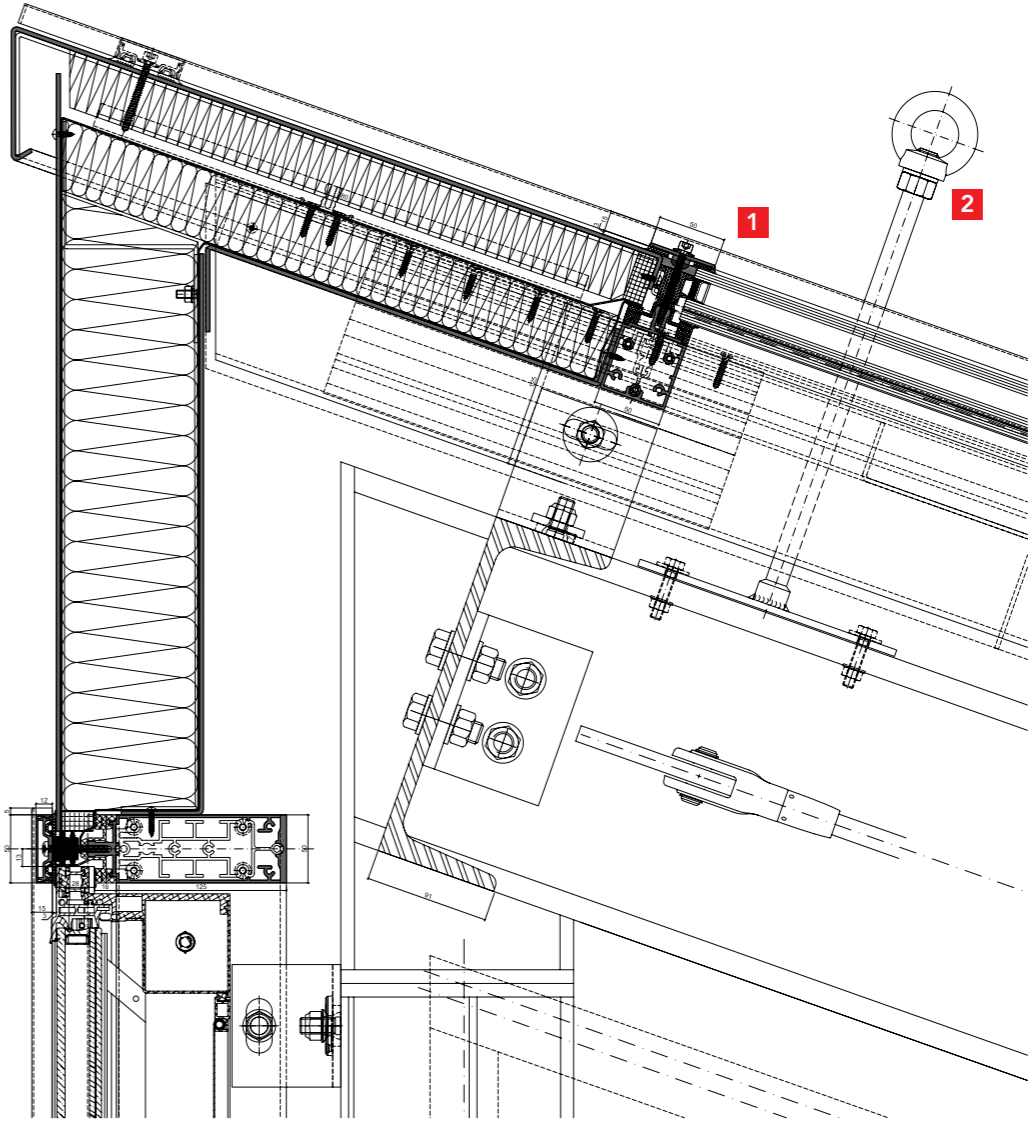
100 mm

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

ALGENTECHNIKUM TUM | Ottobrunn

Eaves drainage via mullion gasket

100 mm
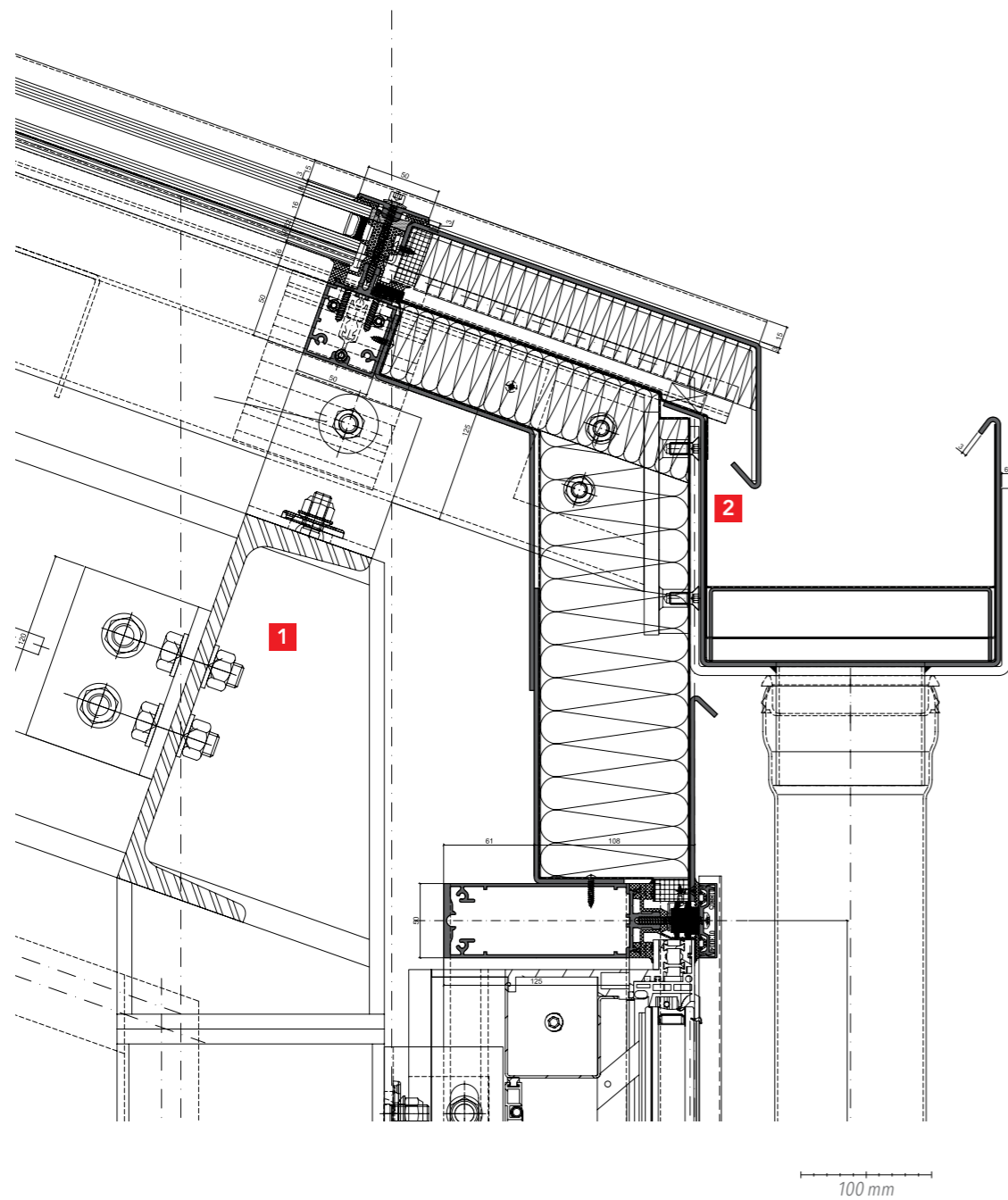
1 Primary supporting steelwork to the aluminium façade

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

100 mm
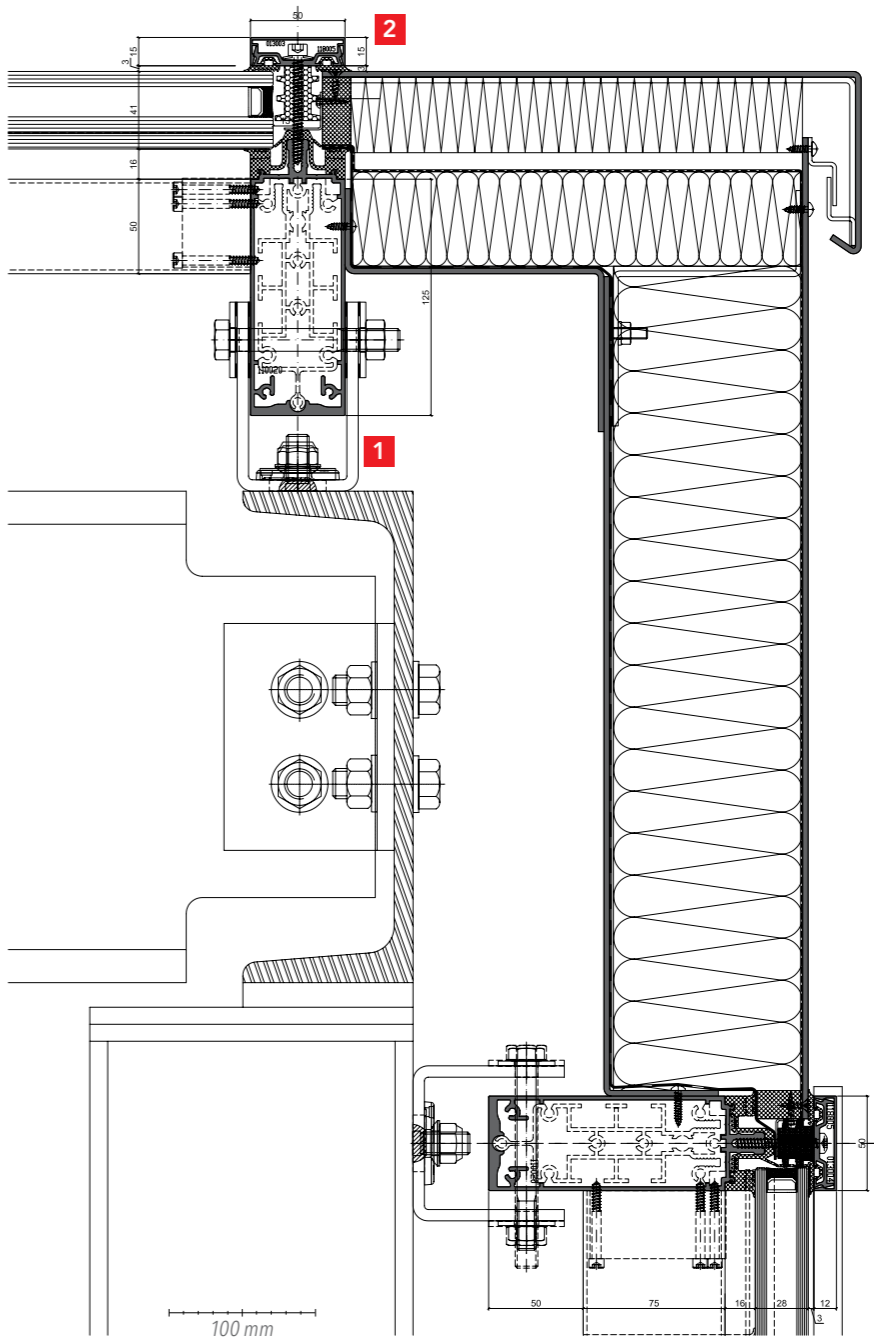
1 Primary supporting steelwork to the aluminium façade

2 The proven THERM$^+$ 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°
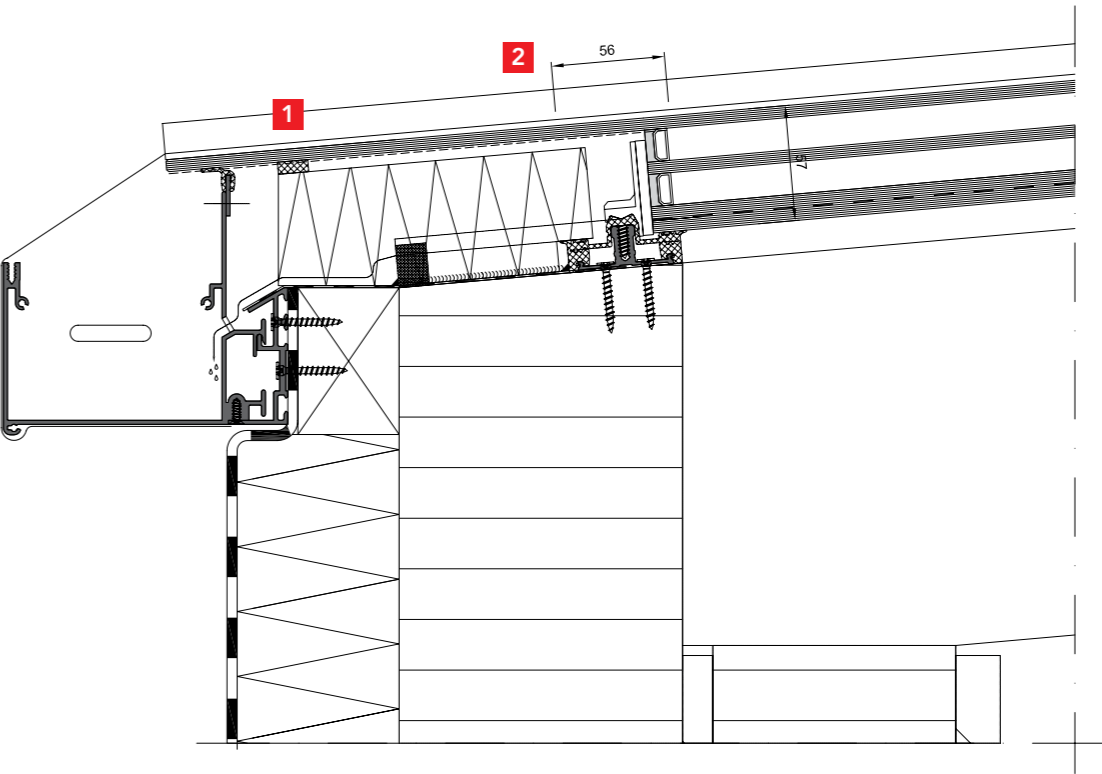
EGGER HEADQUARTER | Tyrol
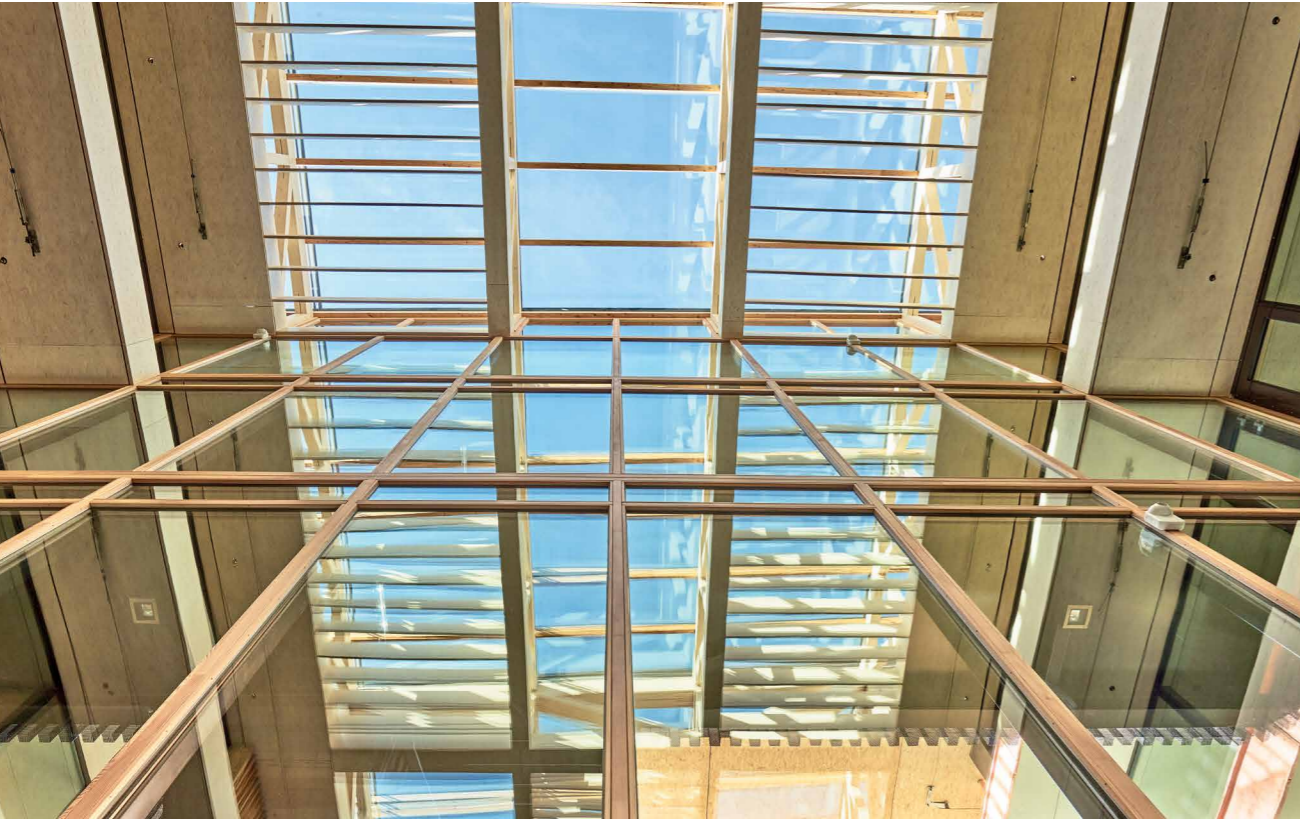

Information

- **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 system:**
  THERM$^+$ H-I 56 mm

- **Photos:**
  EGGER/Christian Vorhofer

Eaves detail with drainage into aluminium gutter profile

100 mm

1 Recommendation: Enamel frit pattern to stepped edge of glazed unit for aesthetic reasons

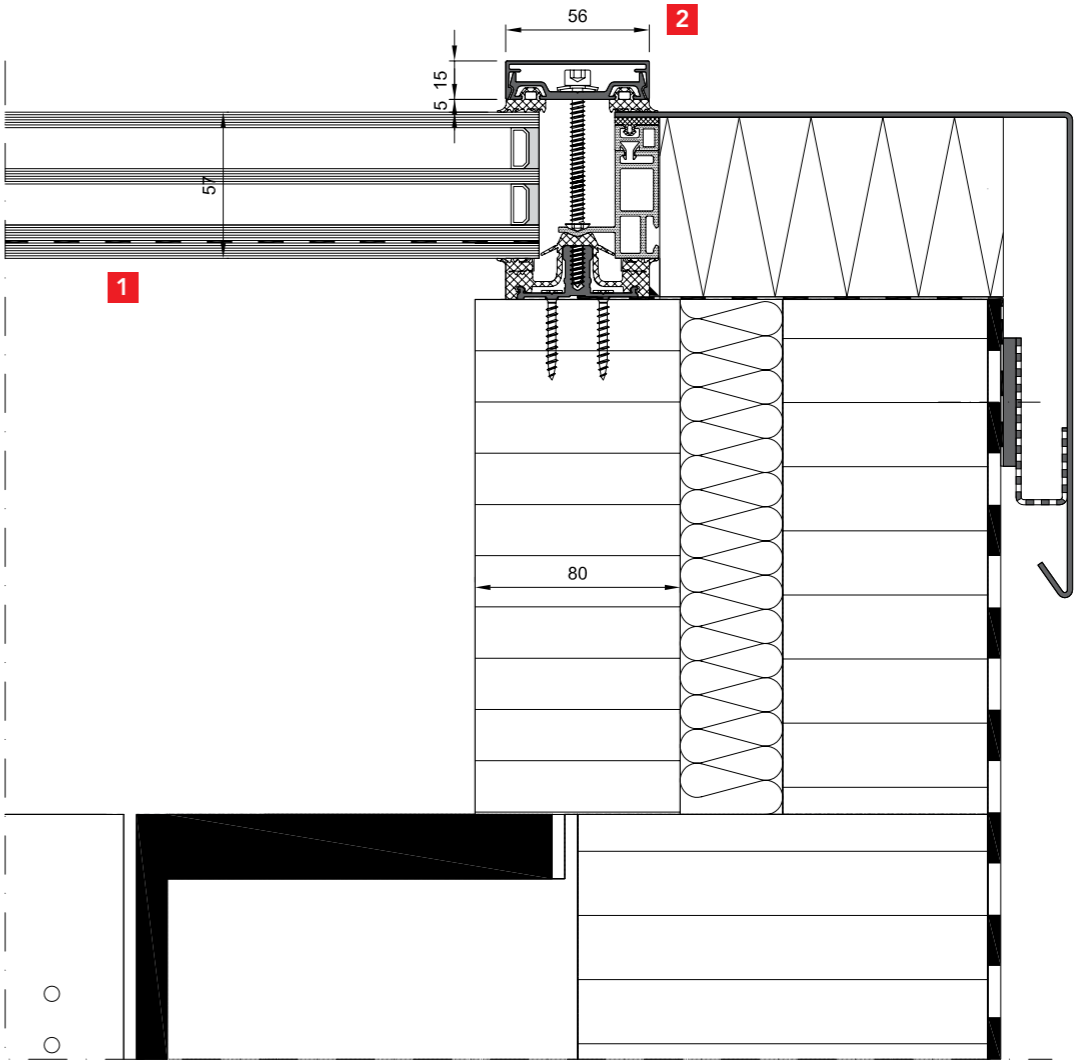**2** Project specific static calculations are required for three-edge support conditions to glazing

EGGER HEADQUARTER | Tyrol

Monopitch ridge detail

56 | 9

1

2

Perforated plate
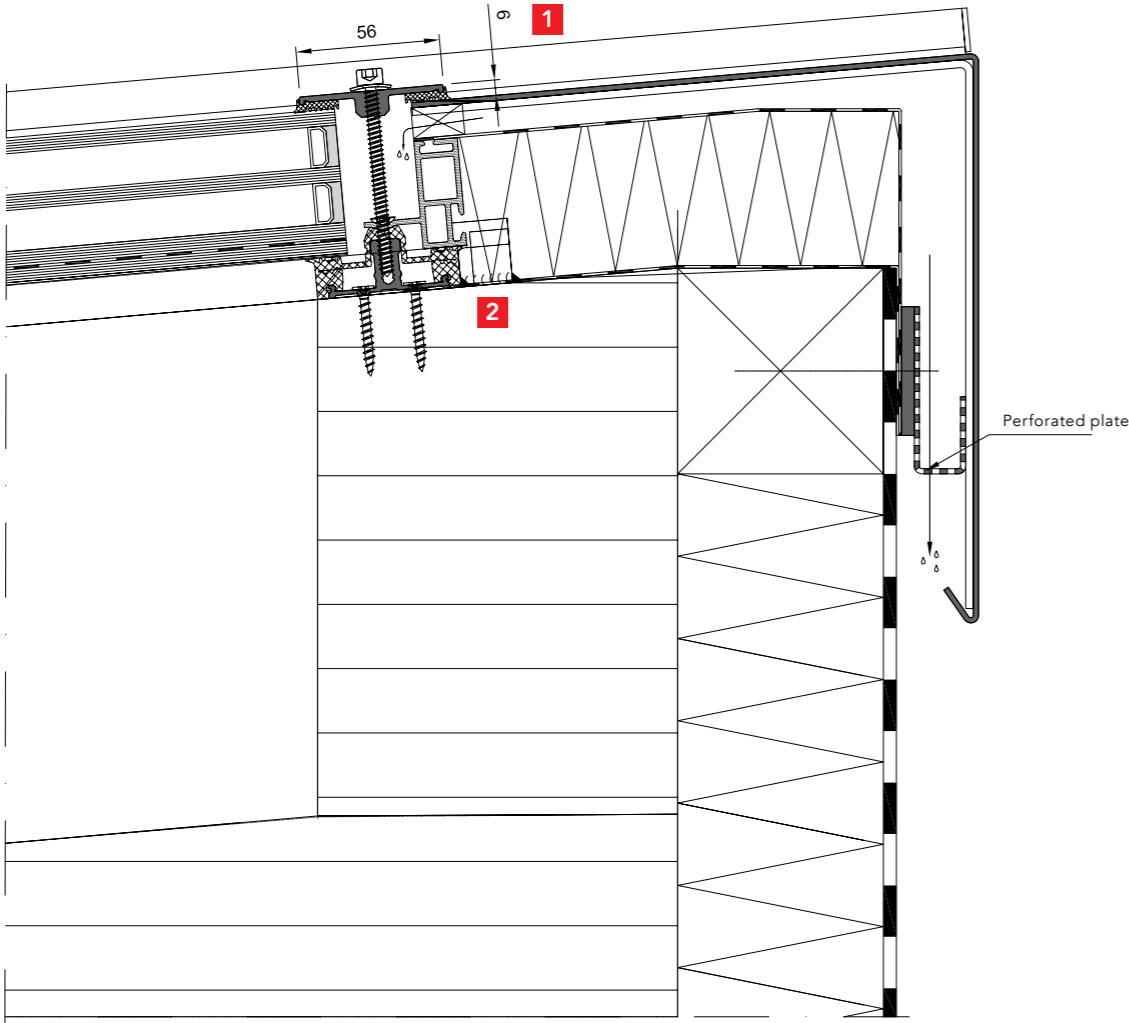
1 Pressure equalisation via the spacer and perforated sheet in the verge pressings

2 Vapour-tight sealing of the area between transition, gasket and film

100 mm

Verge section

56

2

5 15

57

1

80

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 < 10°

100 mm

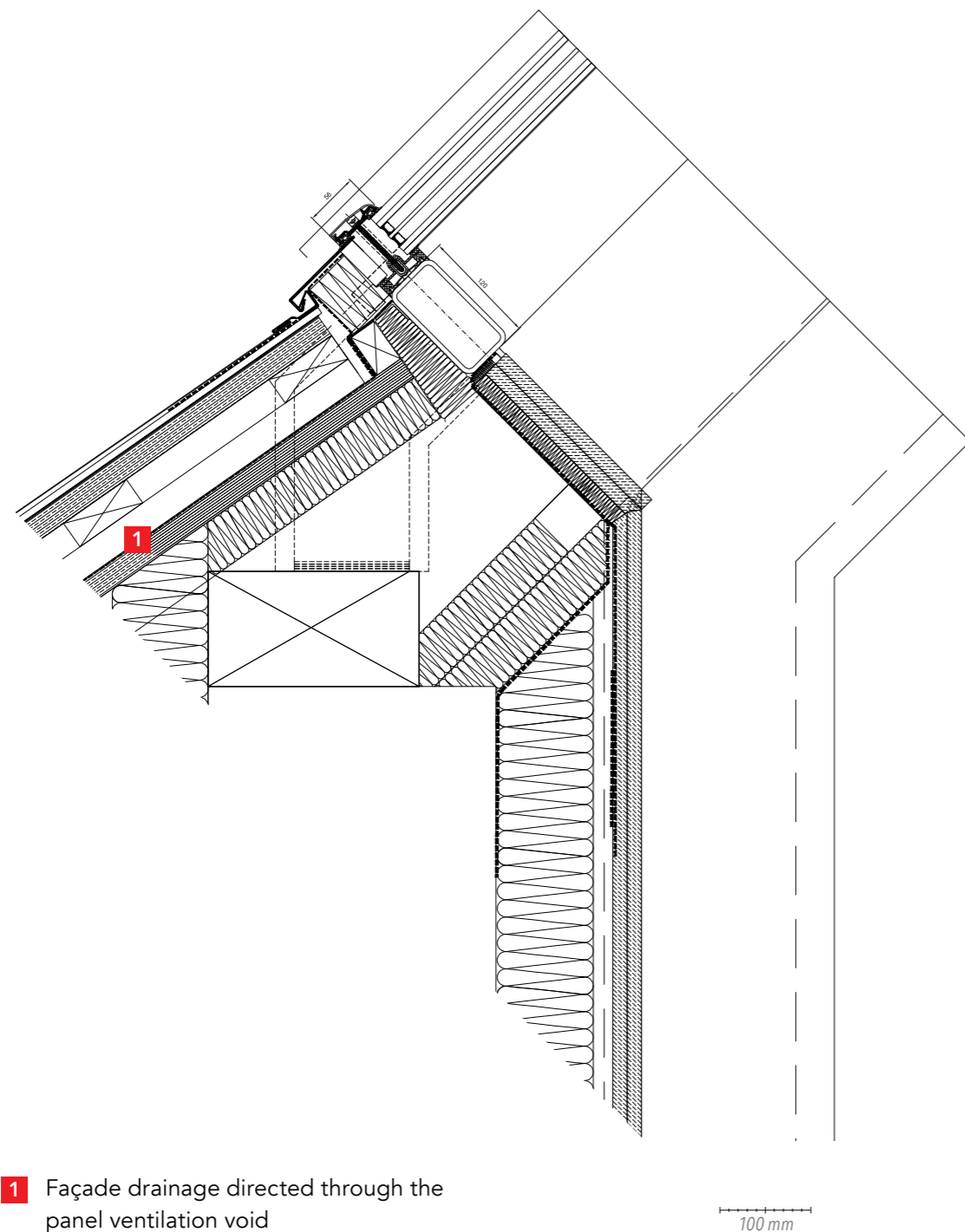# ROSSAUER LÄNDE | VIENNA

Information

- **Country:**
  Austria

- **Owner:**
  Astral Handelsgesellschaft mbH

- **Architect:**
  Guntram Lill, Linz

- **Execution glass roof:**
  Metallbau Heidenbauer GmbH & Co KG

- **RAICO system / area:**
  THERM$^+$ S-I 56 mm
  Roof glazing: 140 m²

- **Photos:**
 Martin Steinkellner

Vertical section roof glazing
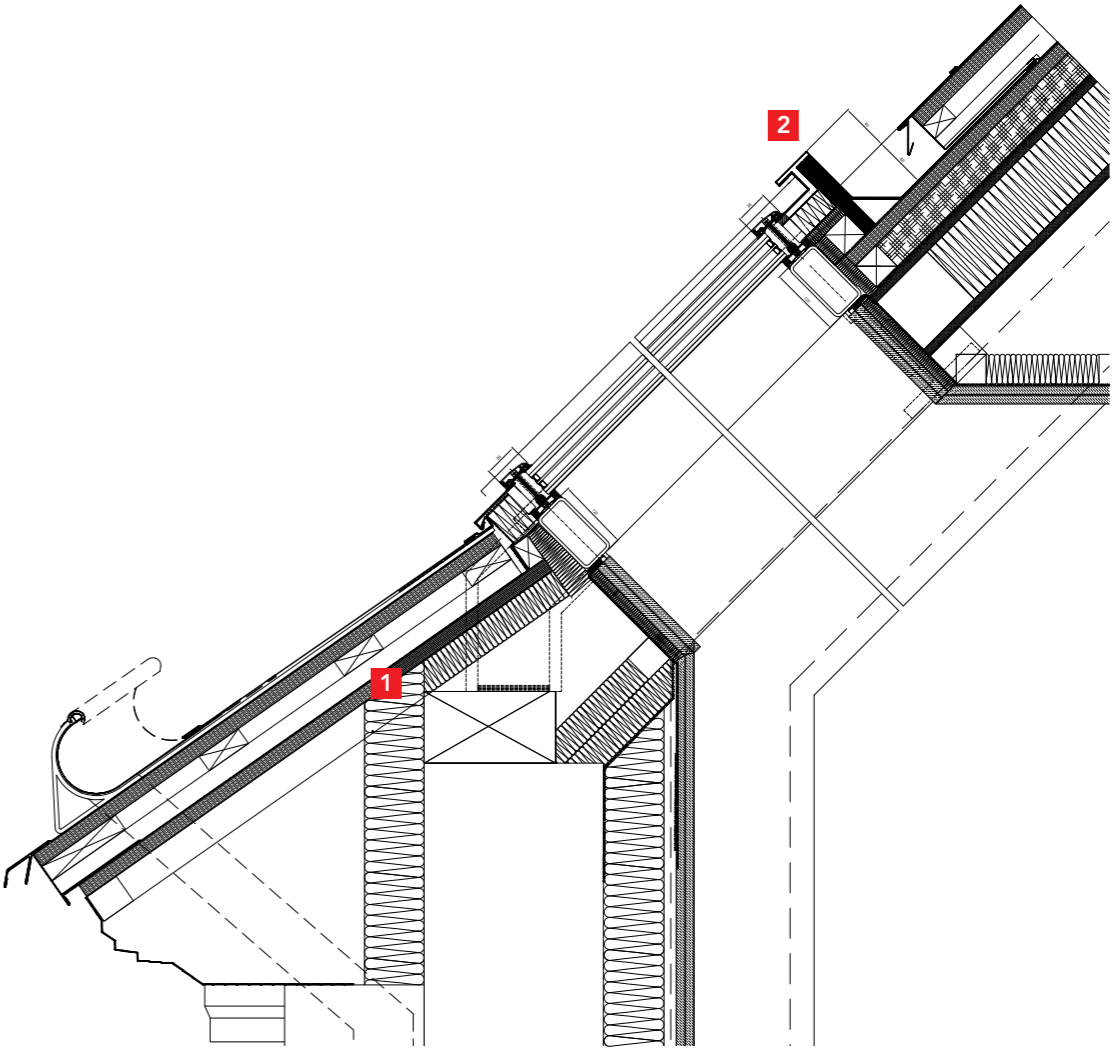
1 Façade drainage directed through the panel ventilation void

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

ROSSAUER LÄNDE | VIENNA

Interface with roof cladding at the head

1 Façade drainage directed through the panel ventilation void

100 mm

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

100 mm
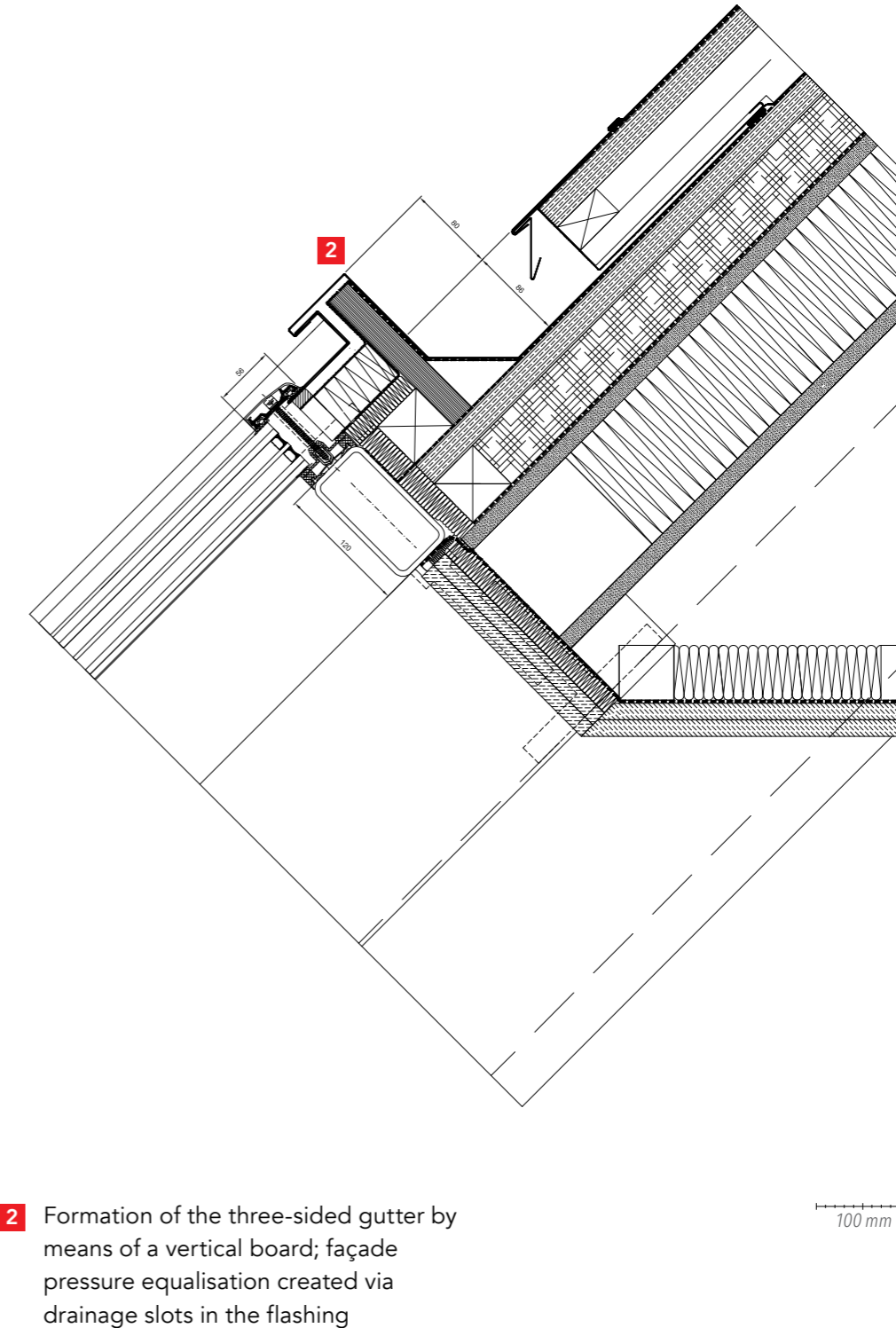
HOFGUT STERNEN | Breitnau
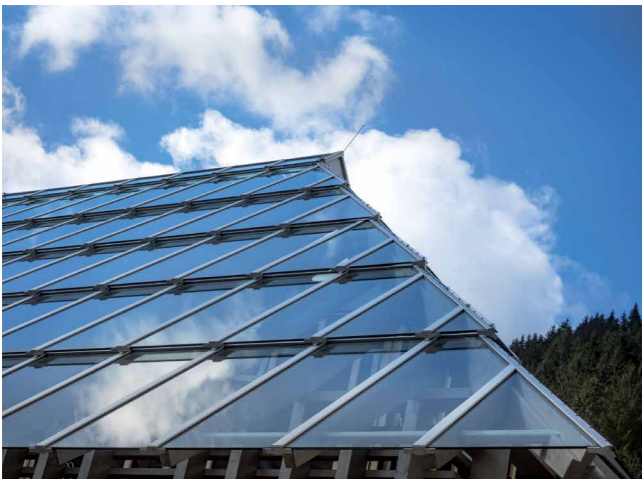
Information

- **Country:**
  Germany

- **Owner:**
  Hofgut Sternen GmbH –
  Family Drubba, Breitnau

- **Architect:**
  Werkgruppe Lahr Architekten

- **Construction management:**
  Faller[3] – Dipl.-Ing. (FH) Jochen Faller,
  Breitnau

- **Execution glass roof:**
  Holzbau Amann GmbH, Weilheim-Bannholz;
  Ridge capping cooperation with
  Baier GmbH, Renchen-Ulm

- **RAICO system:**
  THERM$^+$ H-I 76 mm

- **Special features:**
  Hip roof

- **Photos:**
 Granacher, RAICO

Glazed opening ridge capping panels
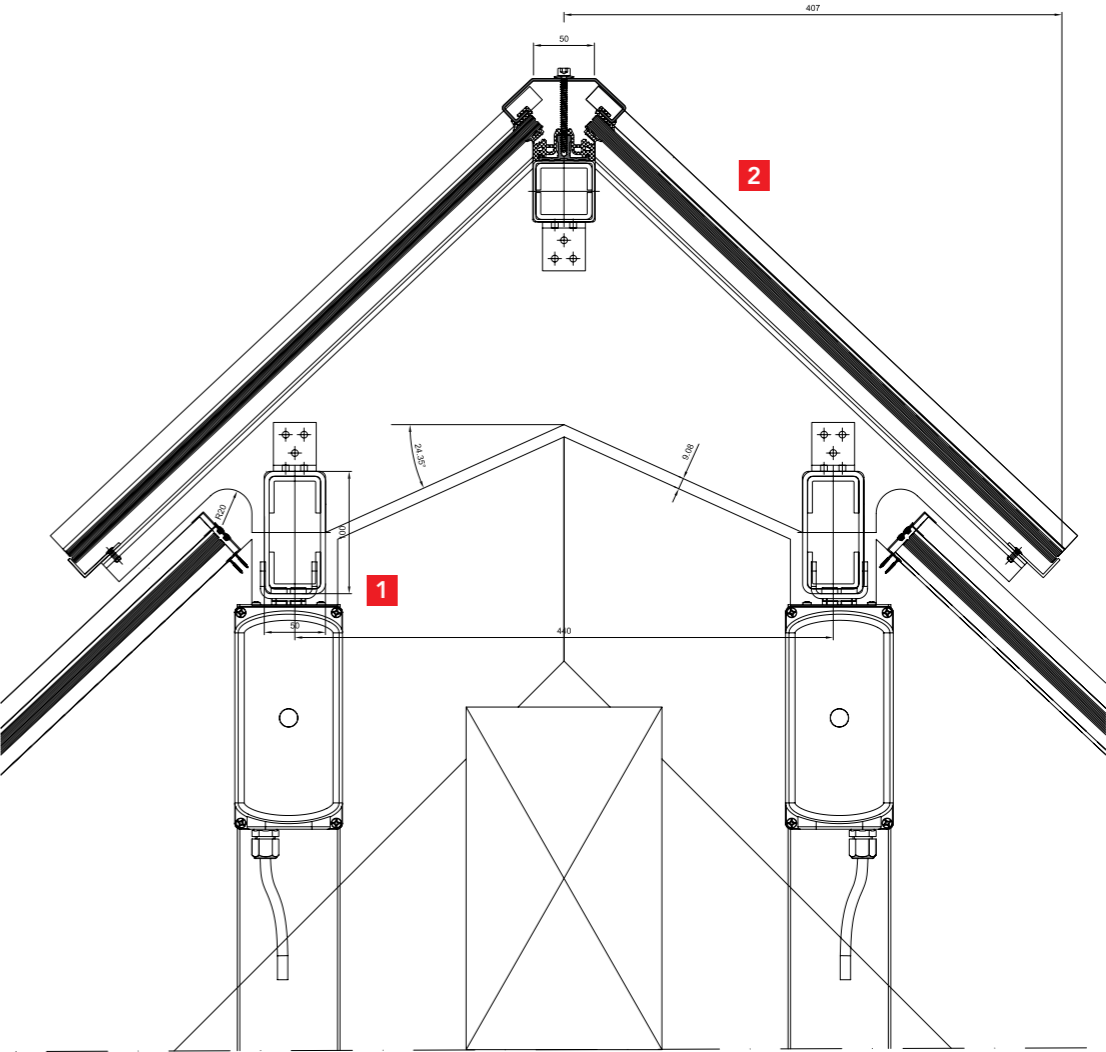
1 The glazed ridge capping panels can be
opened by the use of linear motor drives;
quantity determined from static
calculations

2 Cold glazing in the overhead area:
Use laminated safety glass panes from
partially pre-stressed glass (residual
carrying capacity)

100 mm

HOFGUT STERNEN | Breitnau

Overlapping glazing panes
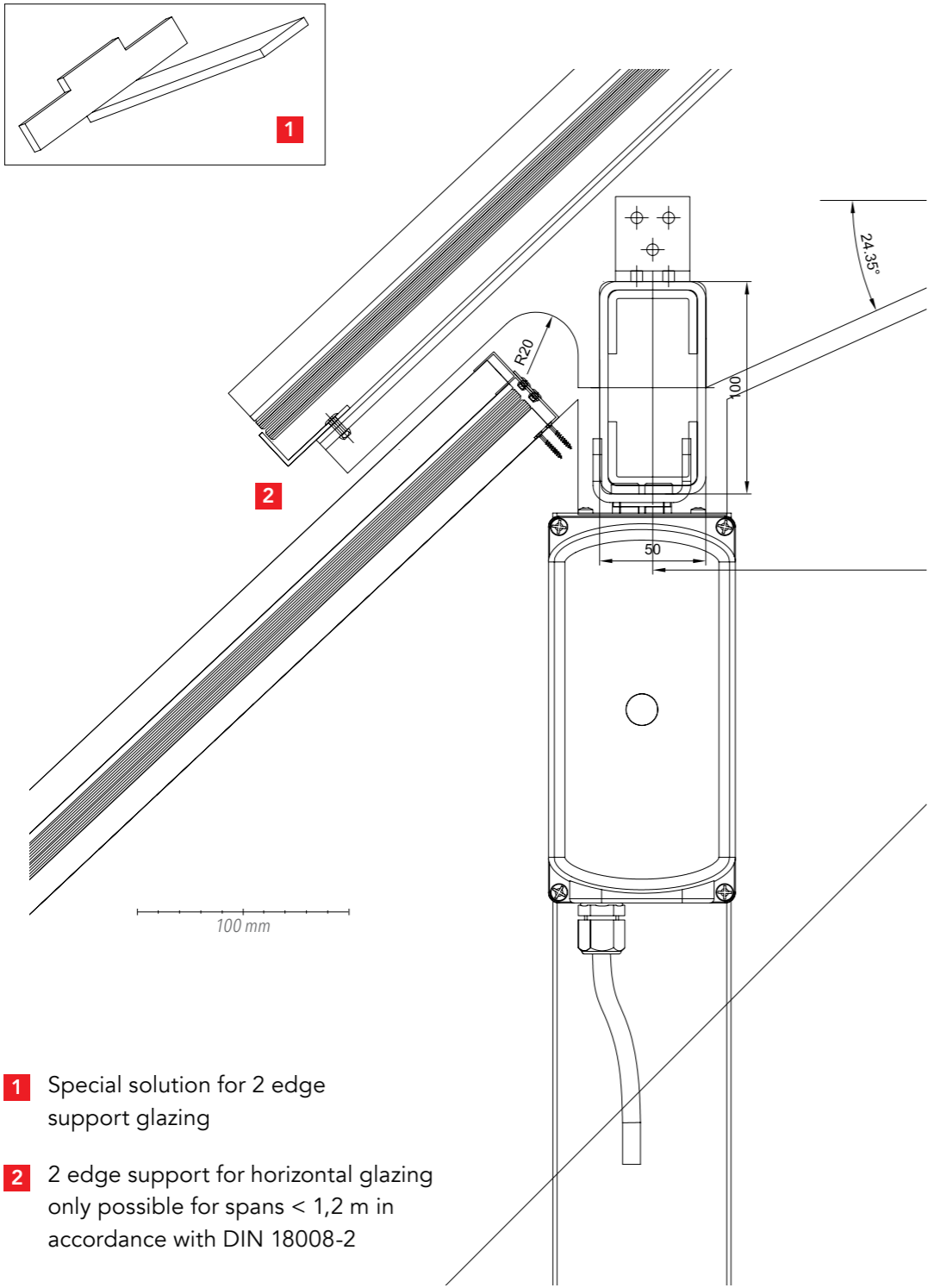
1 Special solution for 2 edge support glazing

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

Hip rafter detail
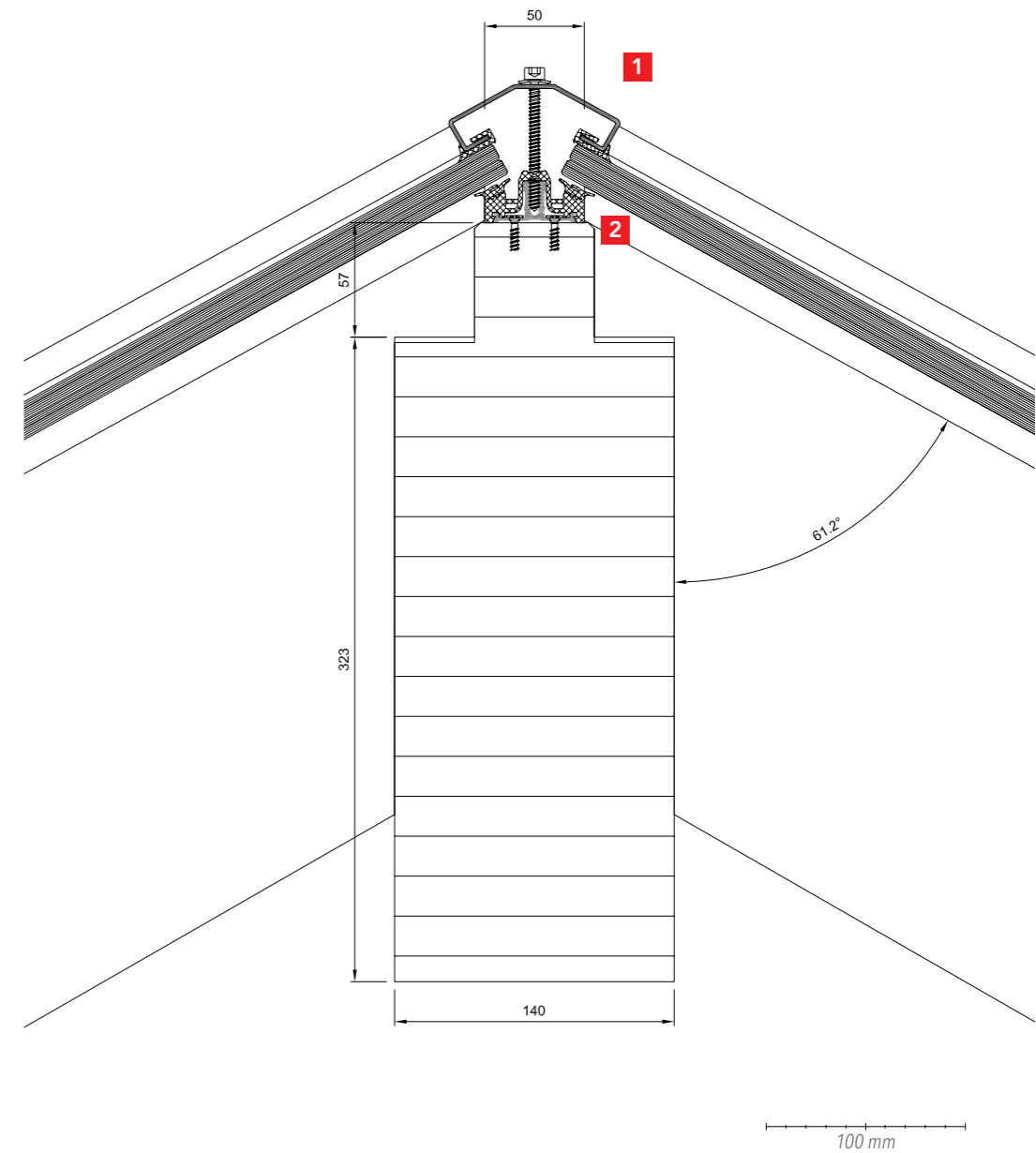
1 Polygonal slope > 5° (per side) possible for roof inclination > 10°

**2** Polygonal interior gasket available as the system solution for angles between 0 – 90°

ERNST & YOUNG | Kirchberg
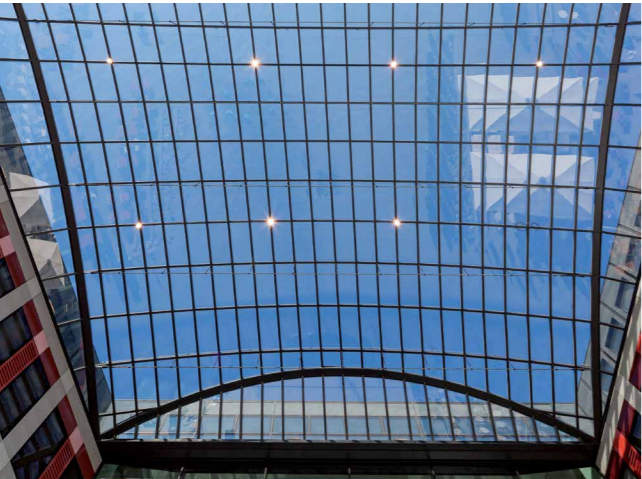
Information

- **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 system/area:**
  THERM$^+$ S-I 60 mm / roof: 1.290 m²

- **Special features:**
  Due to cold glazing no requirements to
  thermal protection / structural-physical
  properties of the construction

- **Photos:**
  Bellapart

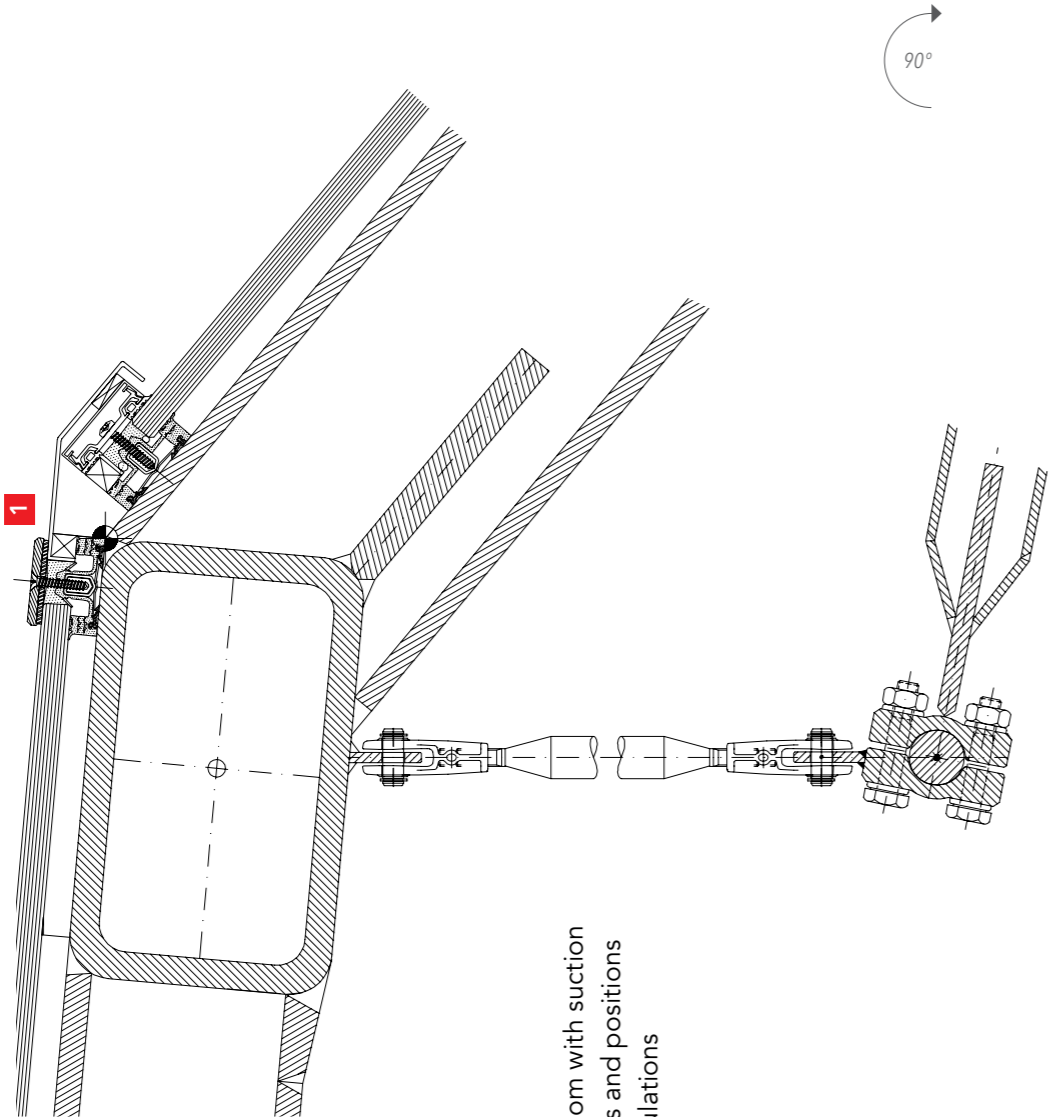## Section detail to hip rafter at eaves
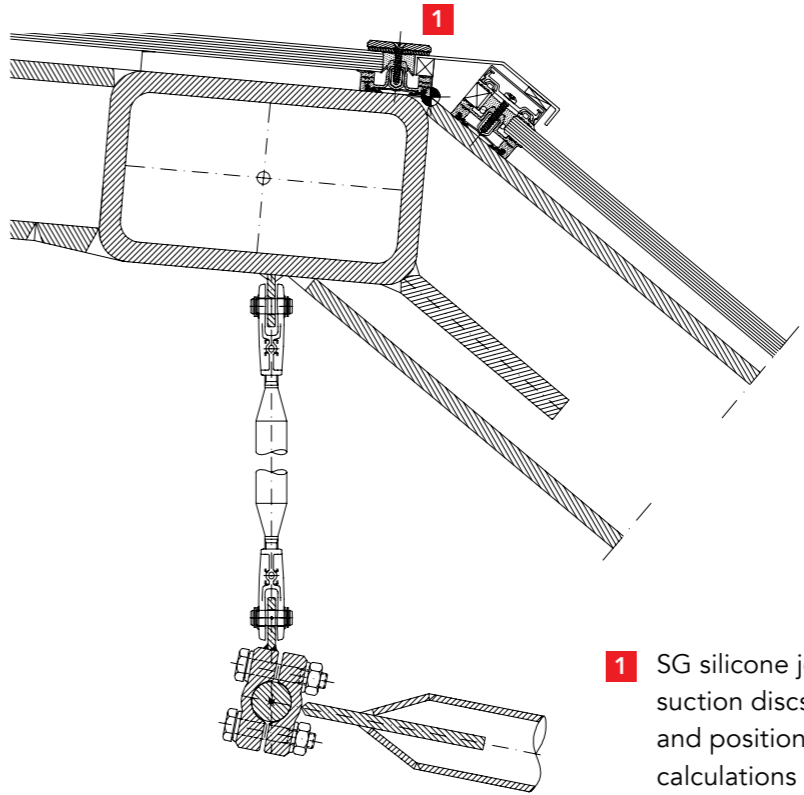
1 SG silicone joint in the transom with
suction discs; suction disc quantities
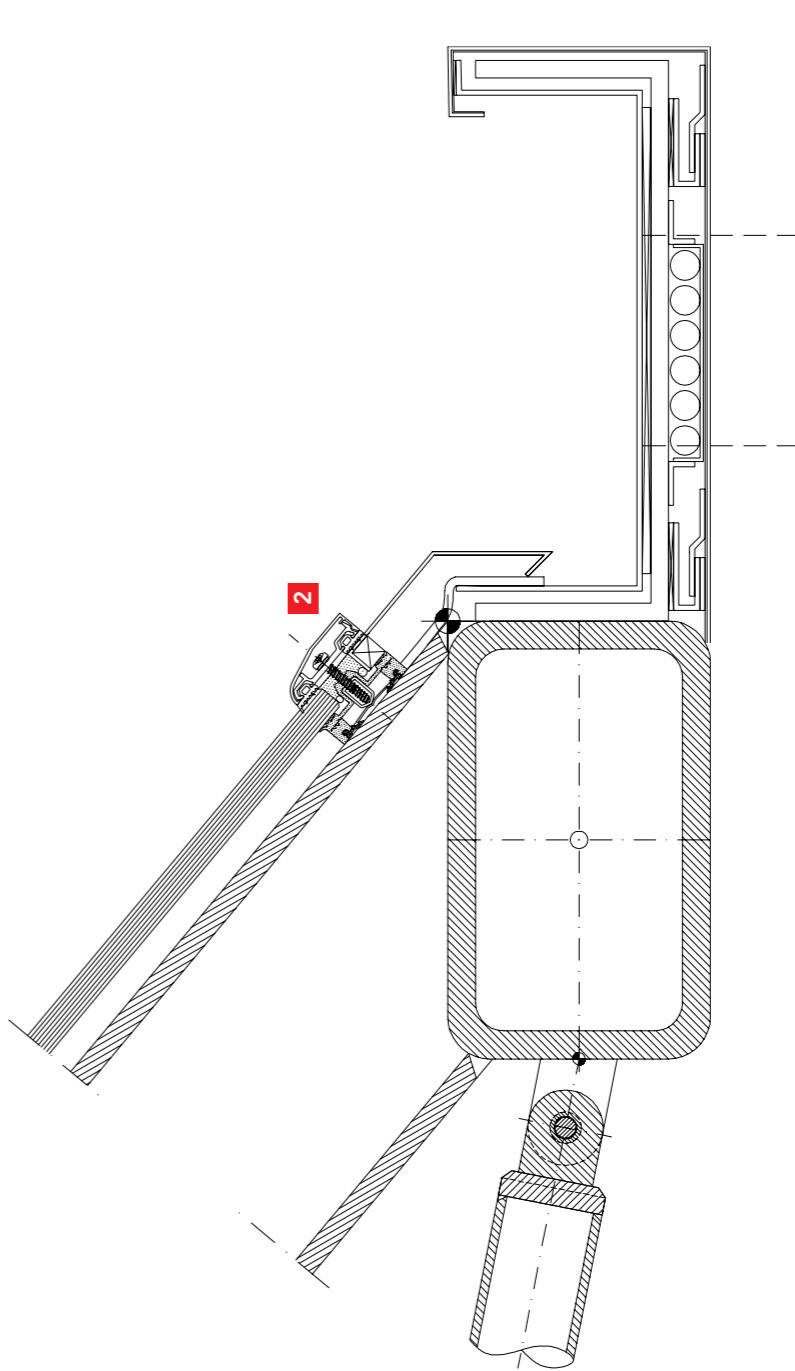and positions determined with static
calculations
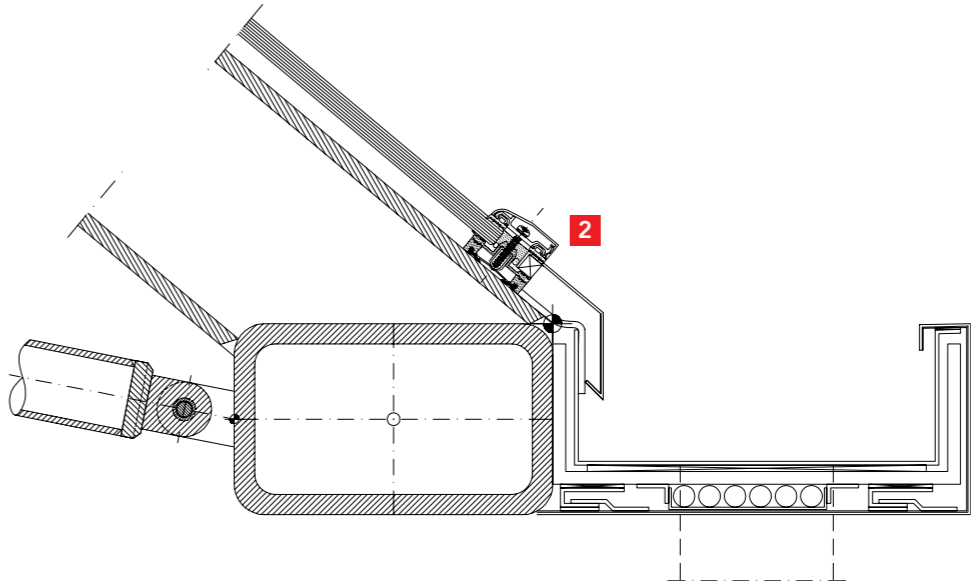
2 Chamfered cover cap profile
applicable for roof inclination > 25°
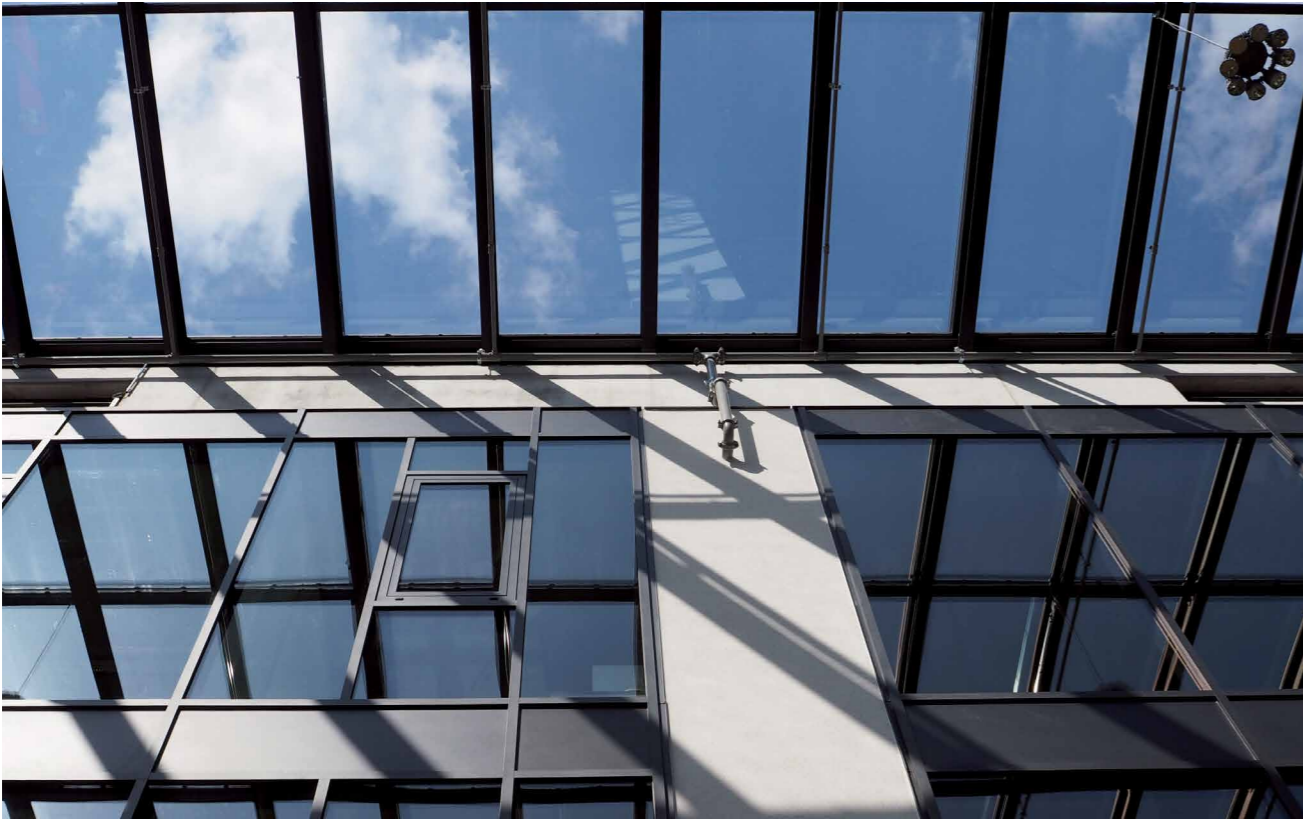
Transition flat roof / hip

90°

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

Eaves with drainage in gutter

90°

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

LOHN-AG.DE AG | Baden-Baden

Information

- **Country:**
  Germany

- **Owner:**
  lohn-ag.de AG

- **Architect:**
  Kühnl + Schmidt;
  Dipl.-Ing. Freie Architekten BDA, Karlsruhe

- **Processor:**
  FREYLER Metallbau GmbH, Kenzingen

- **RAICO systems / area:**
  THERM$^+$ S-I / roof: 270 m²
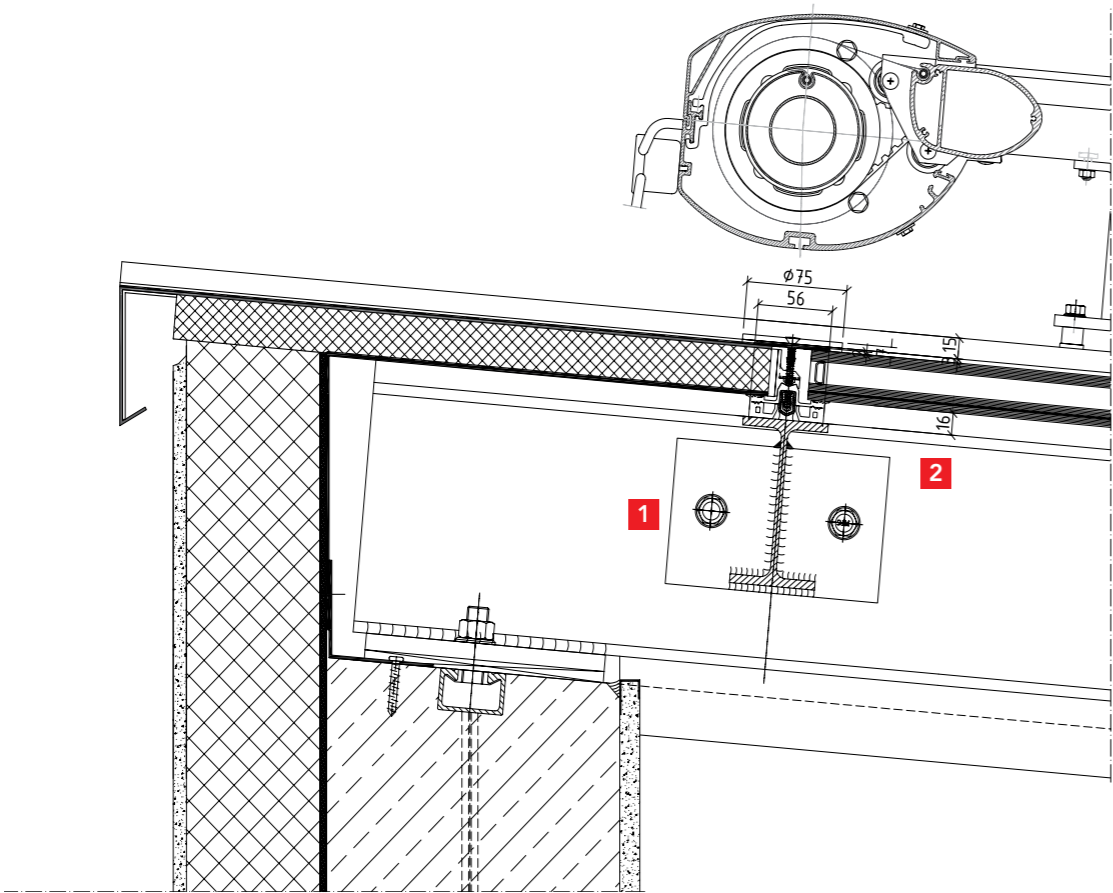 FRAME$^+$ 75 WI
  FRAME$^+$ DI

- **Photos:**
  Heinz Heister

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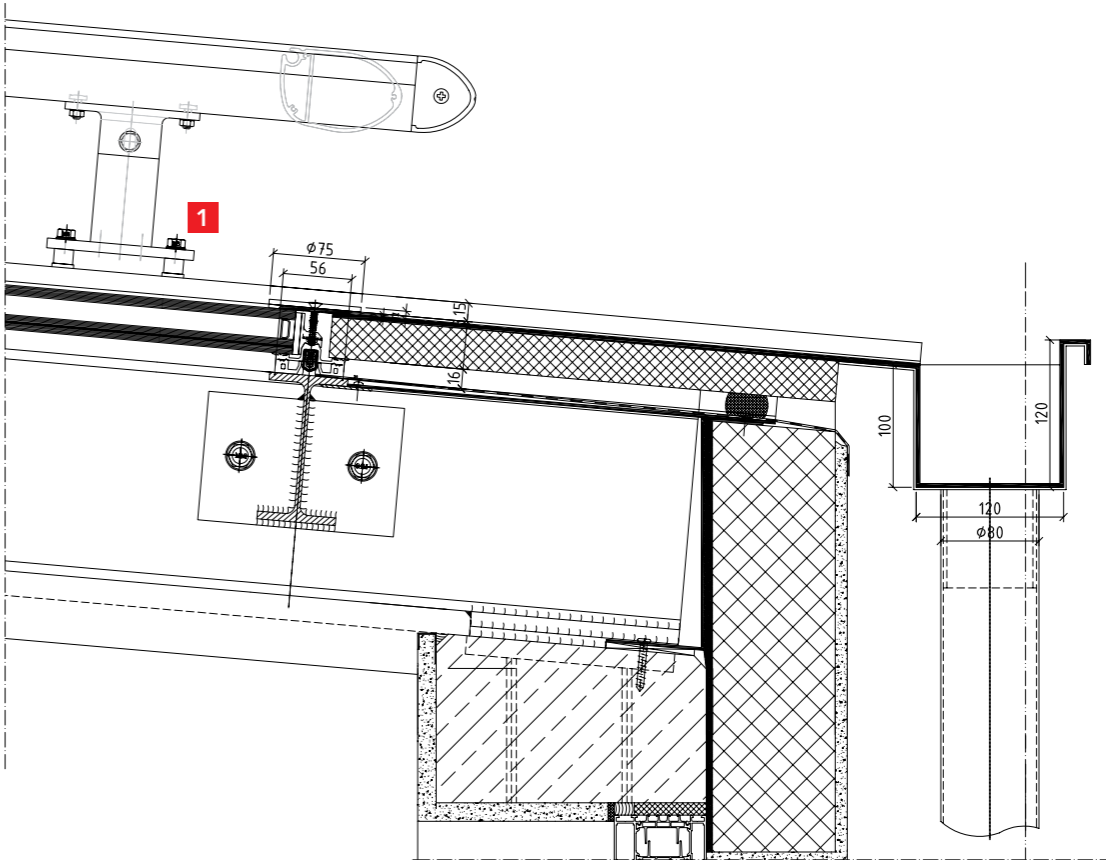
1 Solar shading system attached to glazed
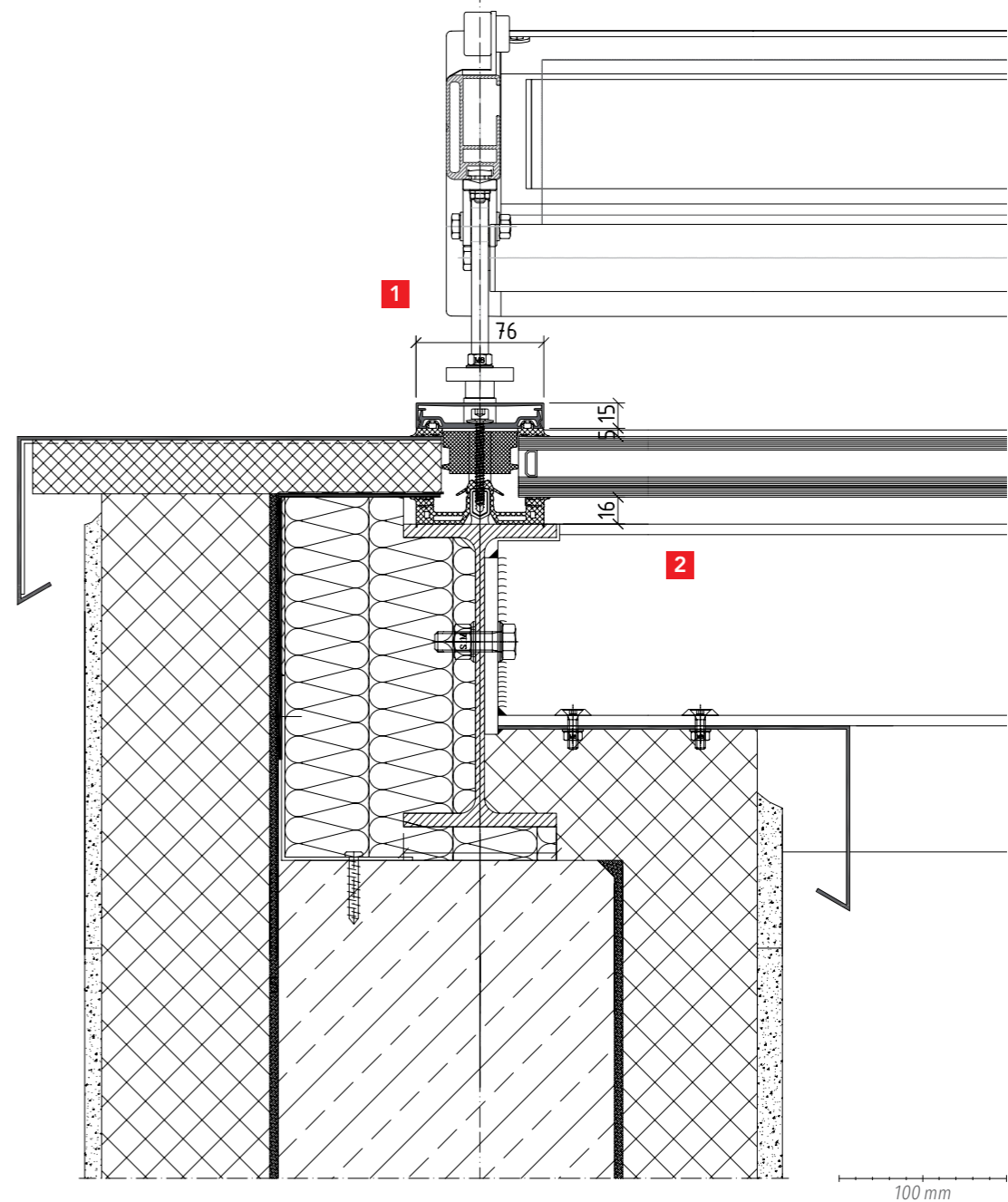roof with RAICO fittings, tested with
a roof inclination of 2° from horizontal

100 mm

Ridge detail

Ø 75
56
1,15
16

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
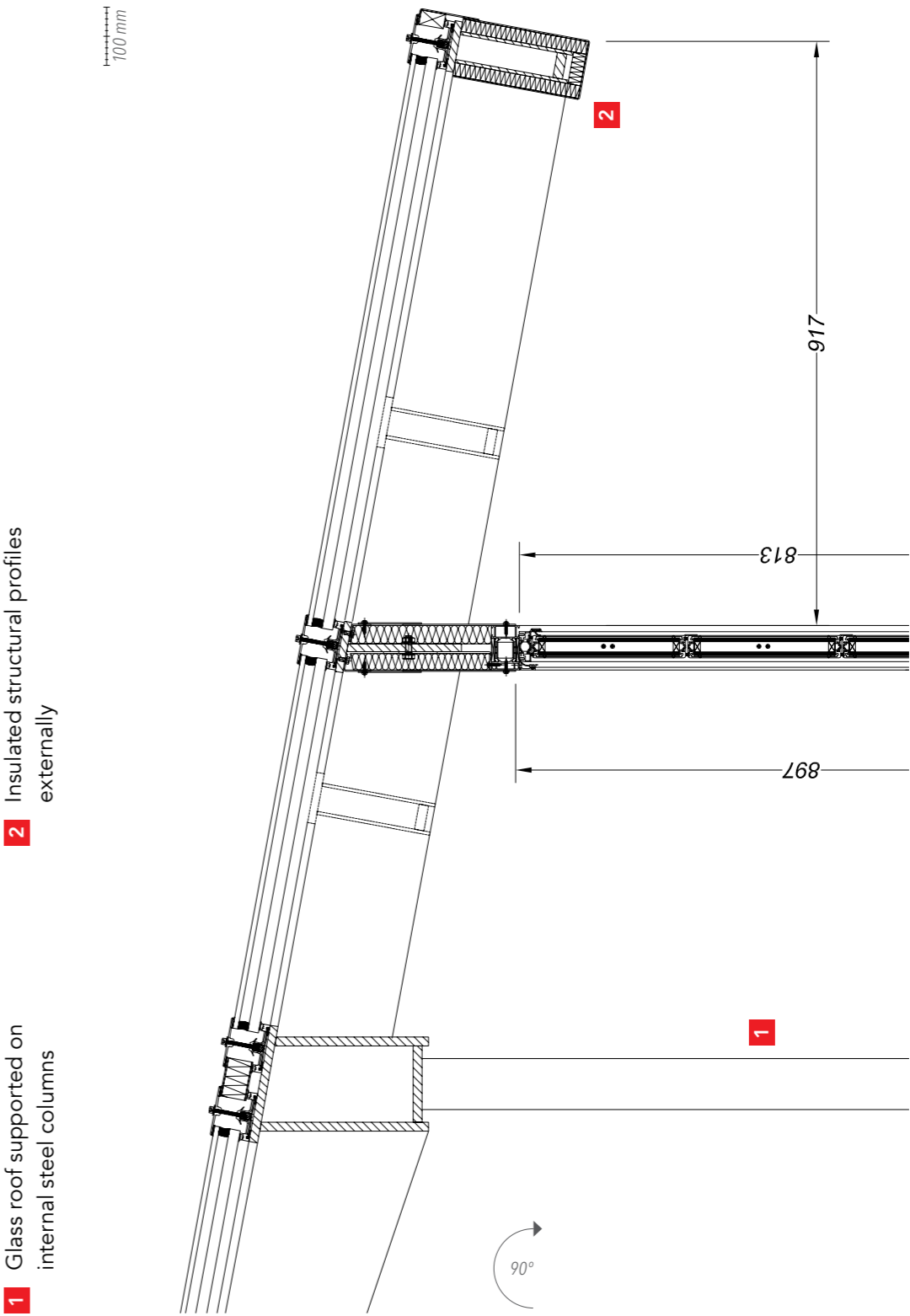
100 mm

Verge Flashing

76
5,15
16

100 mm

1 Sun protection device my 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

JOHNSON CONTROLS | Hanover
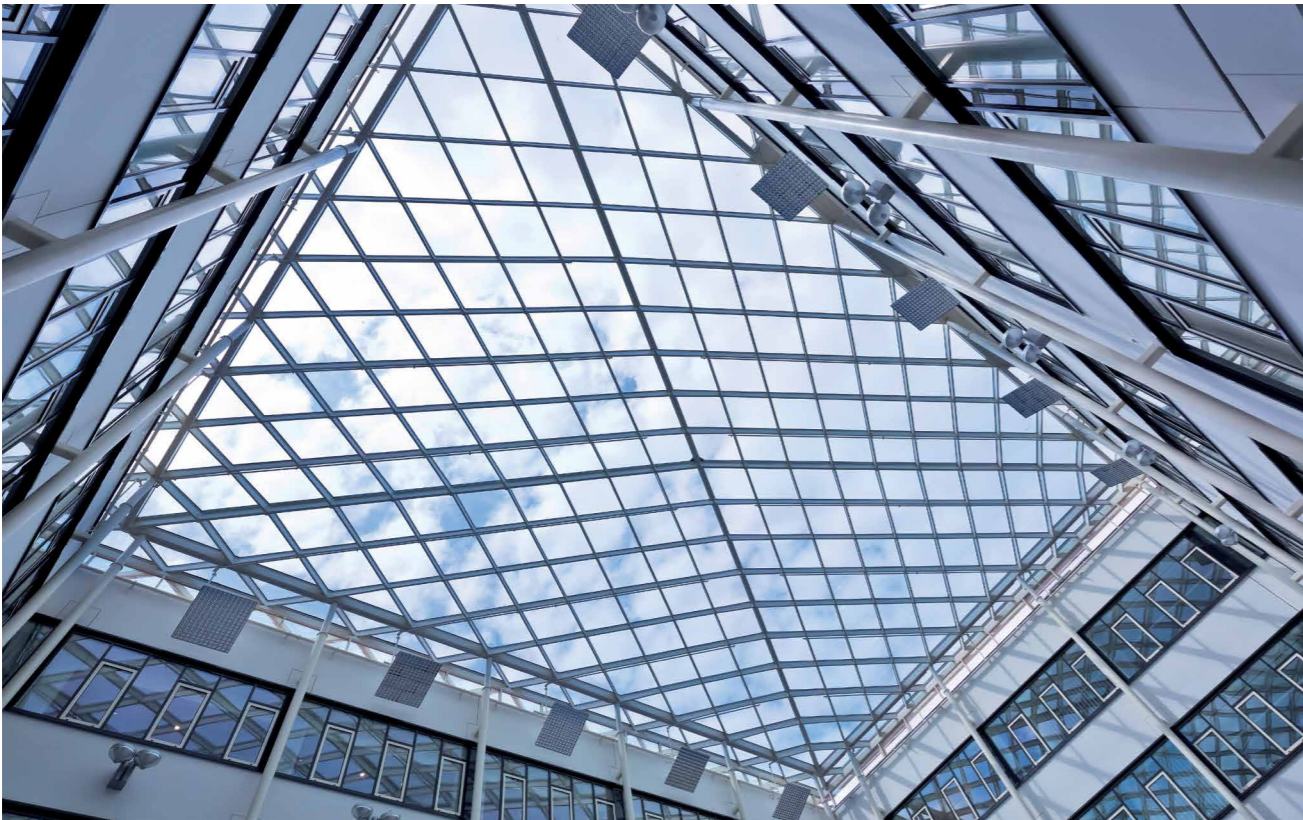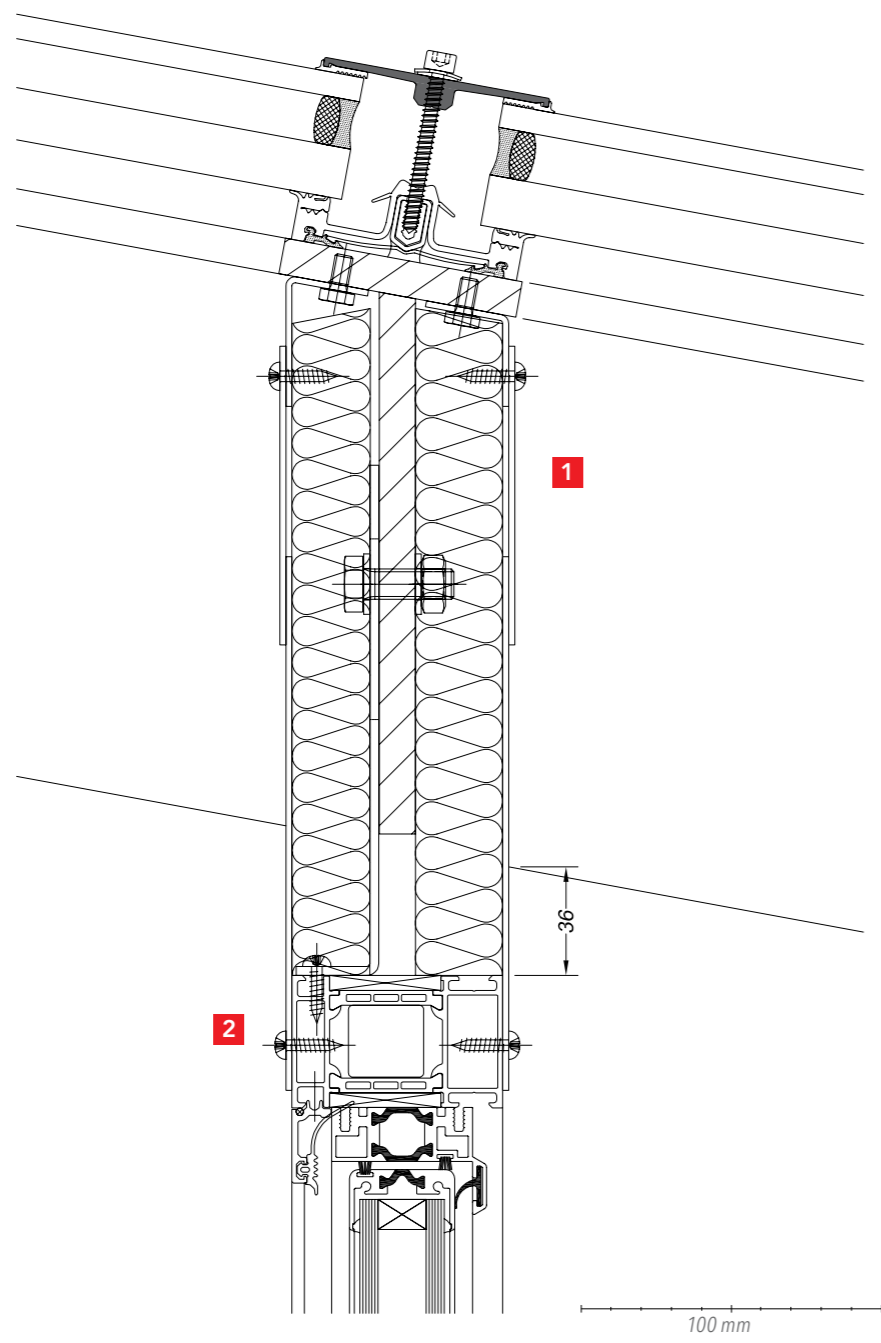

Information

- **Country:**
  Germany

- **Owner:**
  Johnson Controls

- **Architect:**
  Schulze und Partner Architekten

- **Execution glass roof:**
  Metallbau Burckhardt GmbH

- **RAICO system / area:**
  THERM$^+$ S-I 76 mm / roof: 525 m²

- **Special features:**
  Glass roof in pyramid form

- **Photos:**
 Johnson Controls

Eaves with overhanging roof

100 mm

917

813

897

90°

2 Insulated structural profiles externally

1 Glass roof supported on internal steel columns

Transition glass roof / apron

1
2
36

100 mm

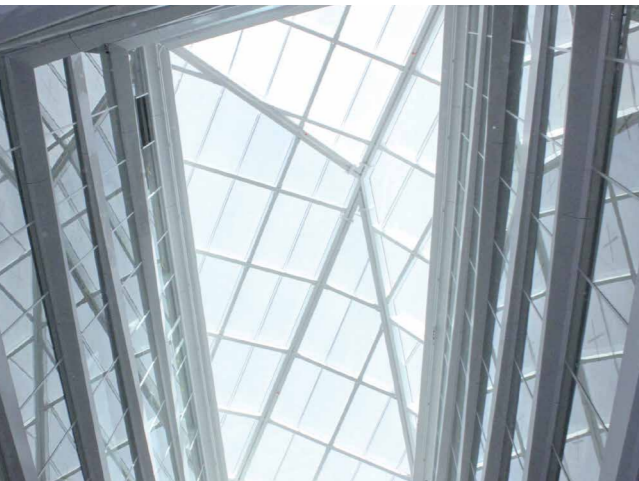**1** T profile provides separation between interior and exterior climate with insulation on both sides

2 Apron with integrated ventilation plates

Perimeter profile with column supports

76
1
41
180
14
252
10,5°
148
2

100 mm
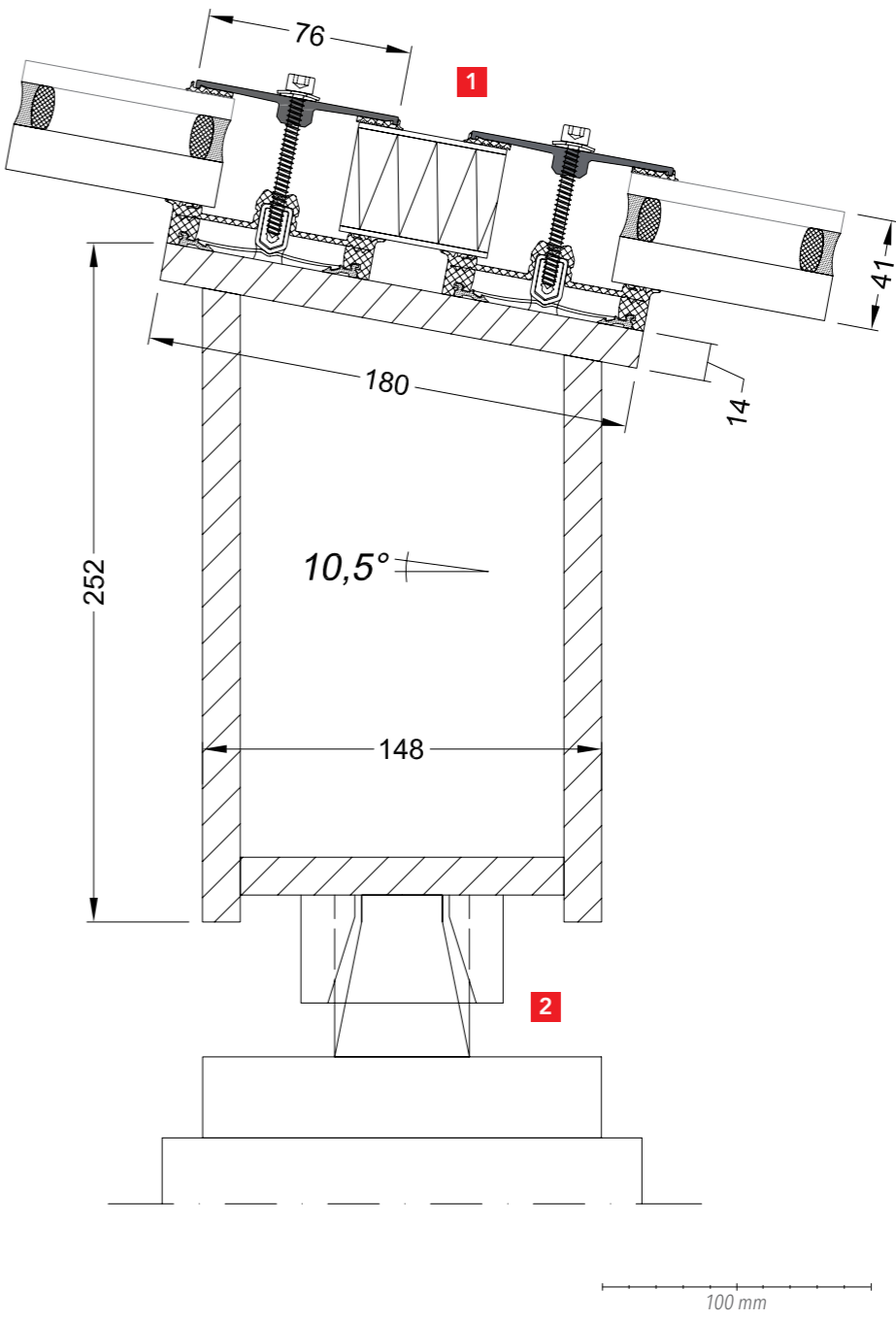
1 Double system on box section to avoid thermal stress conditions to glazing

2 Supporting steel columns

MÄSTERHUSET | Stockholm

Information

- **Country:**
  Sweden

- **Owner:**
  Pembroke Real Estate

- **Architect:**
  Ivar Tengbom

- **Processor:**
  Scheldebouw B. V., Heerlen
  Netherlands

- **RAICO system:**
  THERM$^+$ A-I

- **Special features:**
  Complete roof in SG2 without
  additional mechanical suction
 securing devices

- **Photos:**
  Scheldebouw B. V.

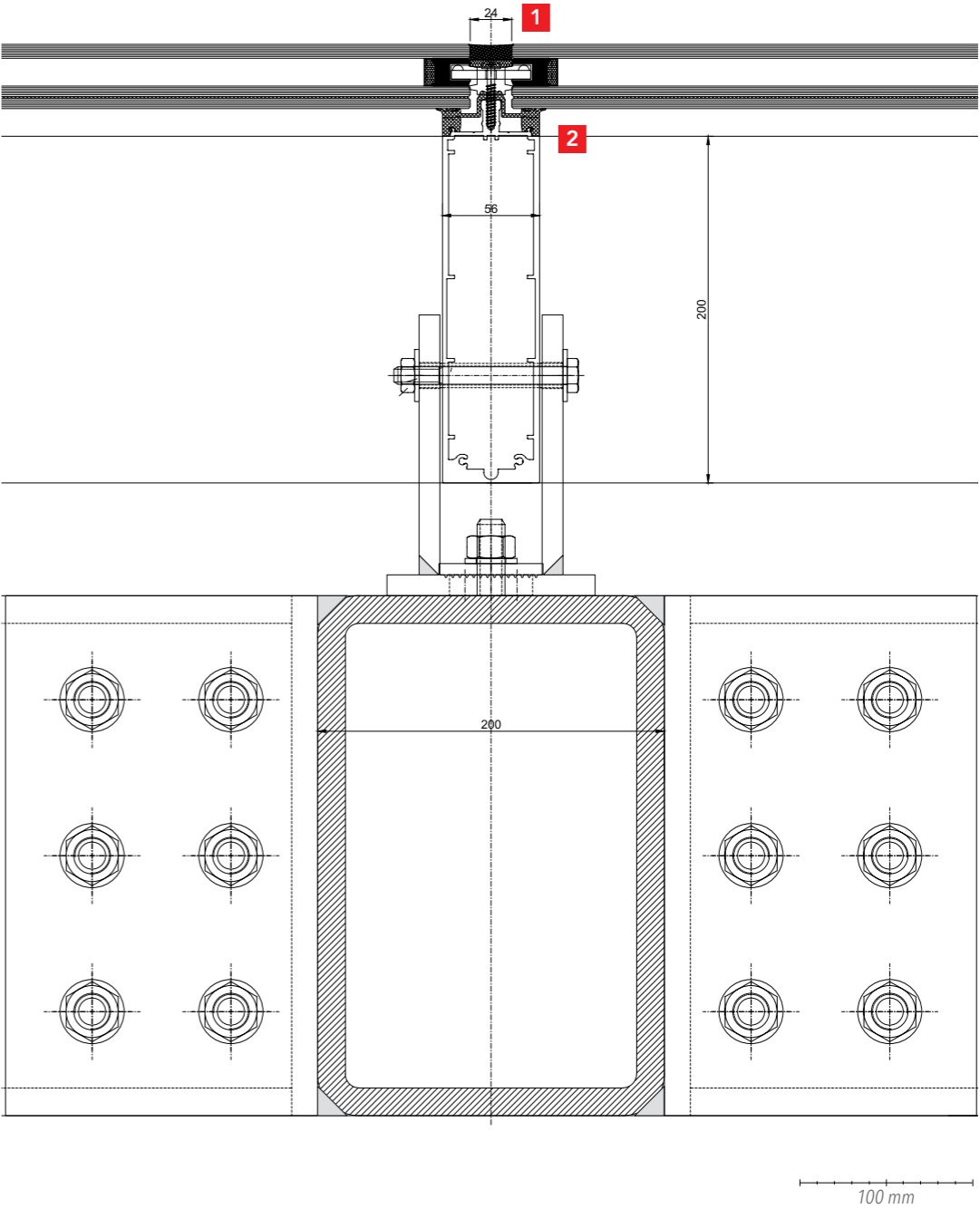## Hip rafter using SG detail

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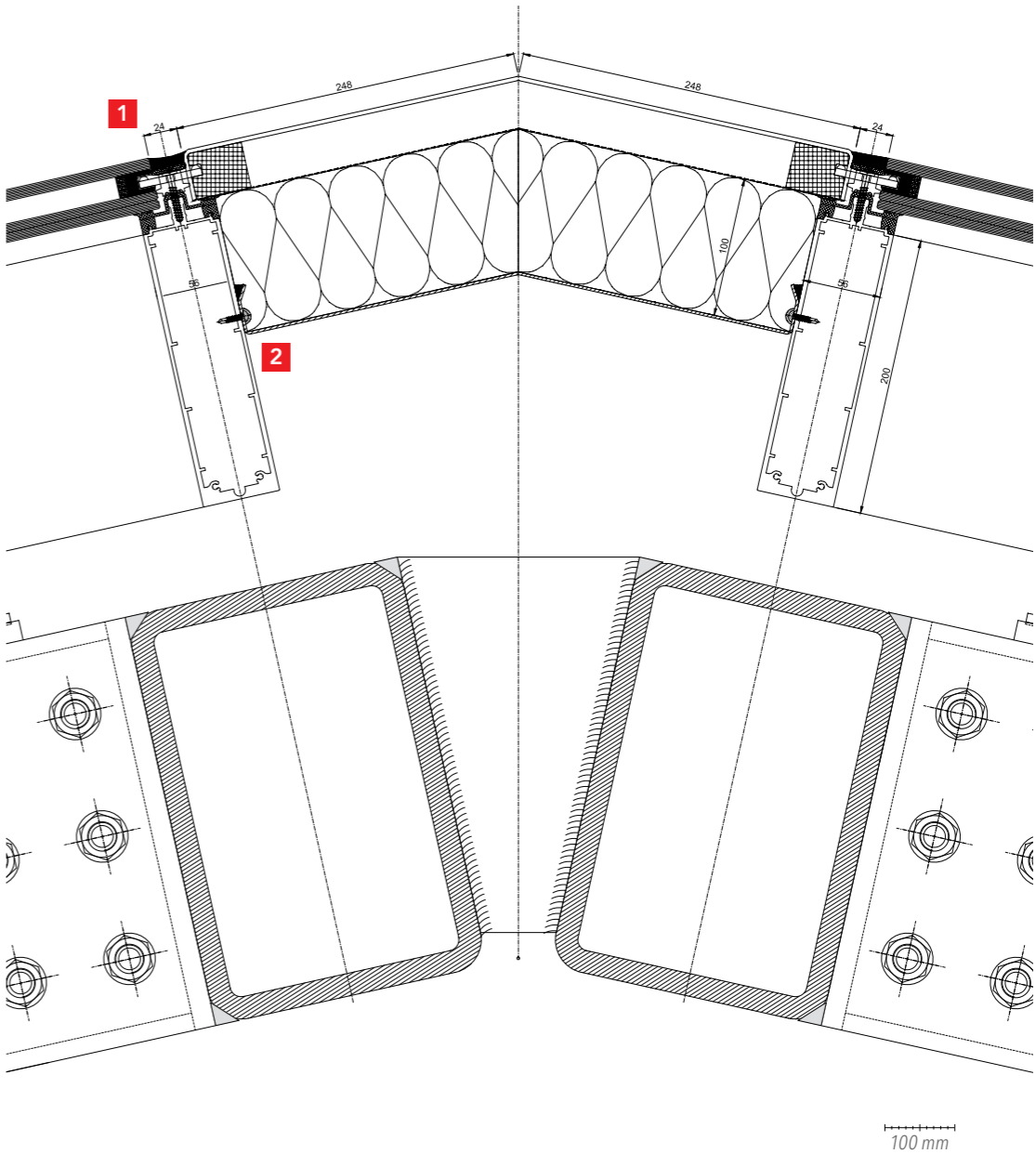
1 The outer heat soak tested tempered safety glass to be minimum 8 mm thick due to the minimum thickness of the silicone joint

2 Panel has to be vapour-tight sealed internally

## Eaves detail with interface to vertical opening vent

1 SG joint width of 24 mm

2 Pressed aluminium eaves panel fitted with drainage slots

90°
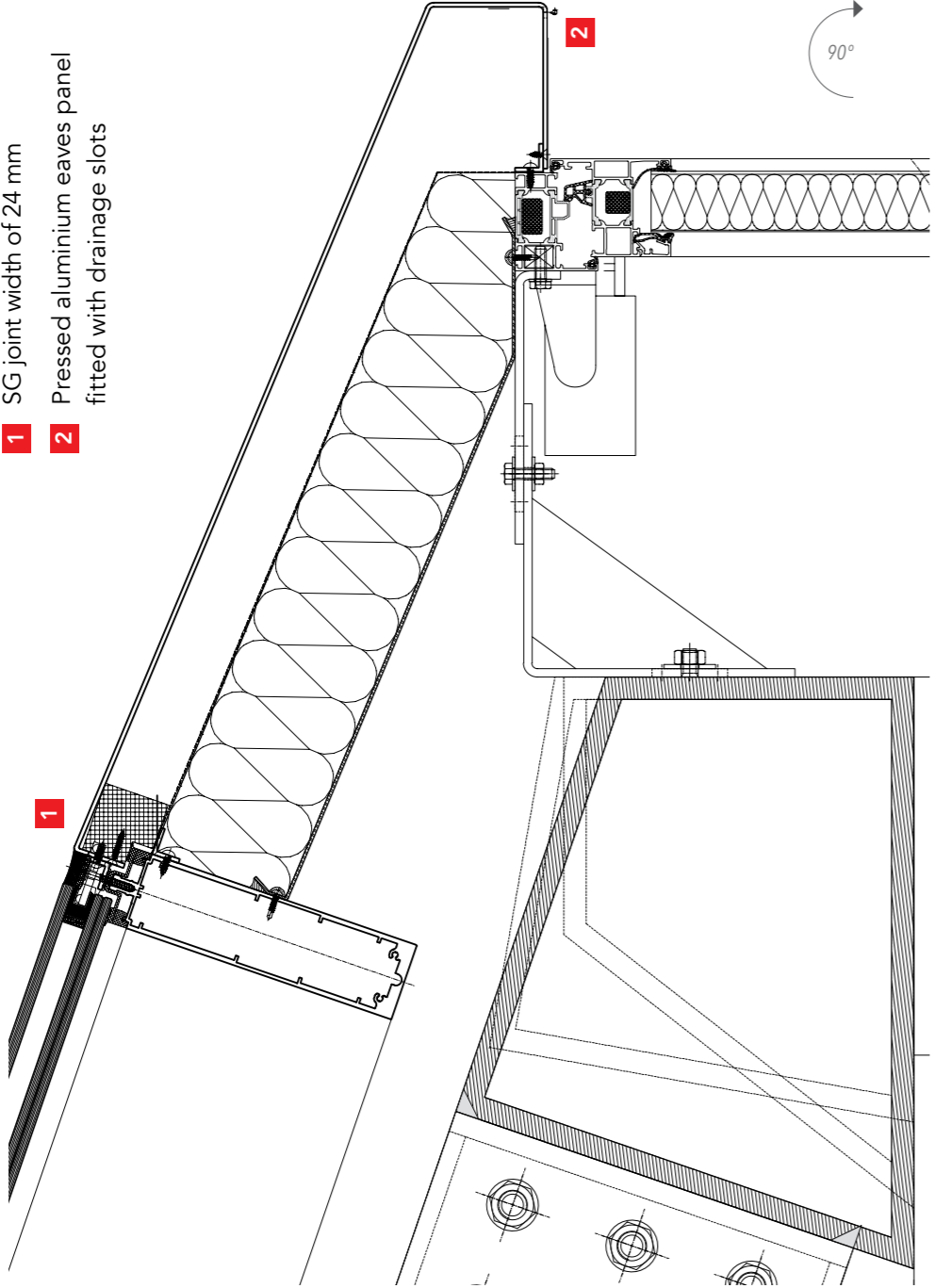
Detail showing rafter connection to the primary supporting structure

24

1

2

56

200

200

100 mm

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
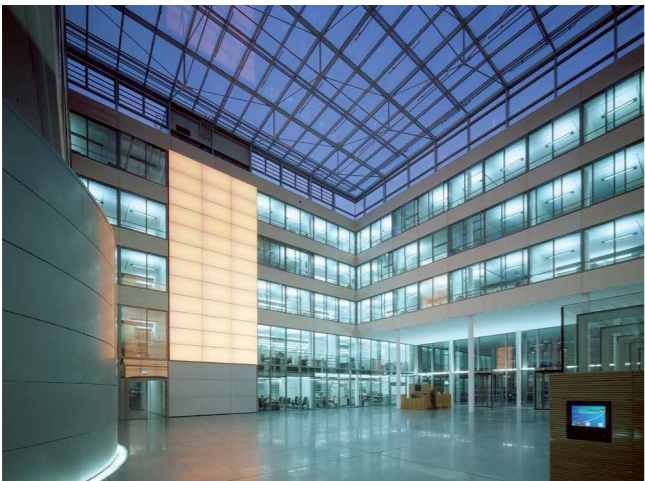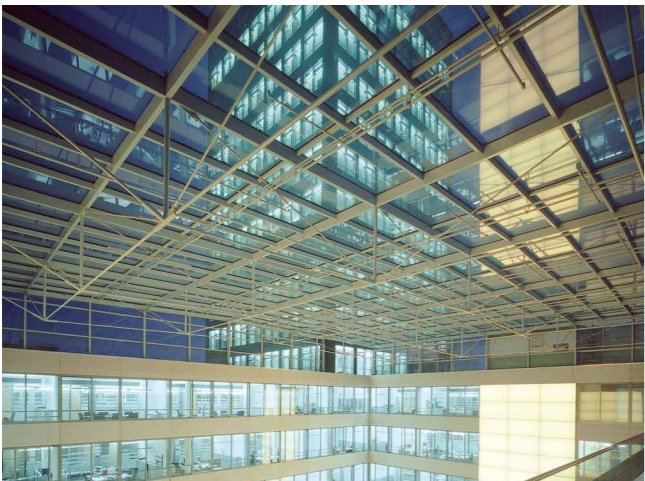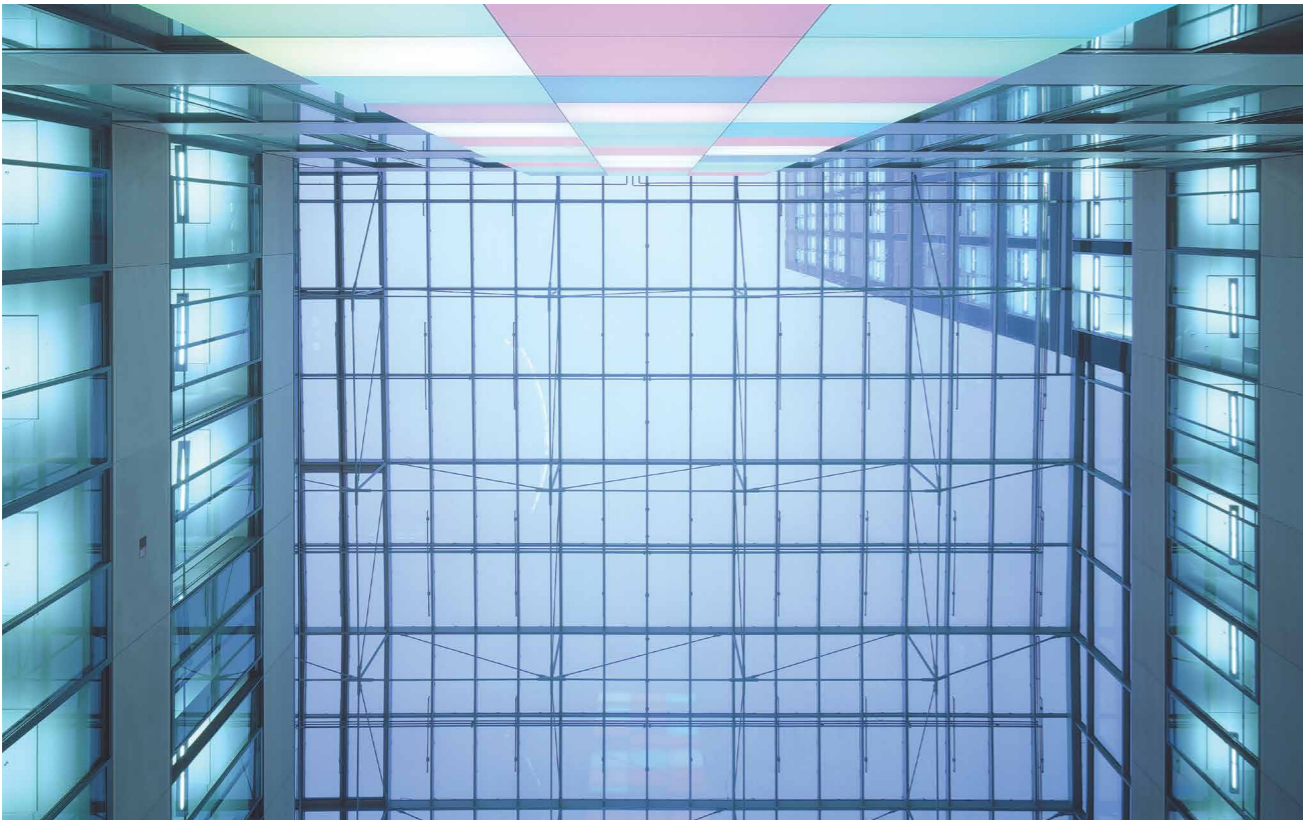
STADTWERKE | Bochum


Information

- **Country:**
  Germany

- **Owner:**
  Stadtwerke Bochum GmbH

- **Architect:**
  Gatermann & Schossig Cologne

- **Execution glass roof:**
  Bender GmbH & Co. KG

- **RAICO system:**
  THERM$^+$ Steel

- **Photos:**
  Rainer Rehfeld

Eaves with gutter
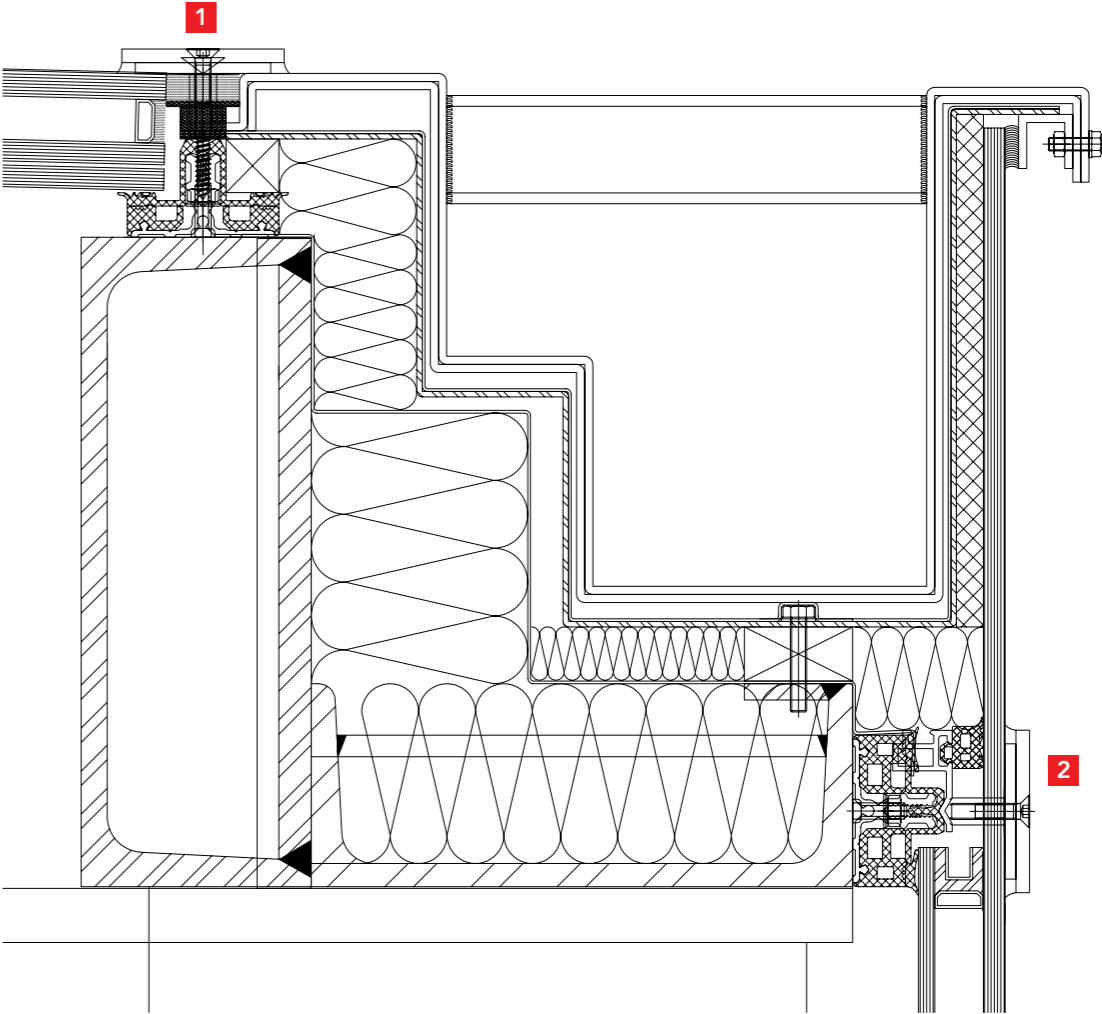
1 SG joint with suction disc;
flush transition into gutter

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

Glass to glass corner detail creating glass verge
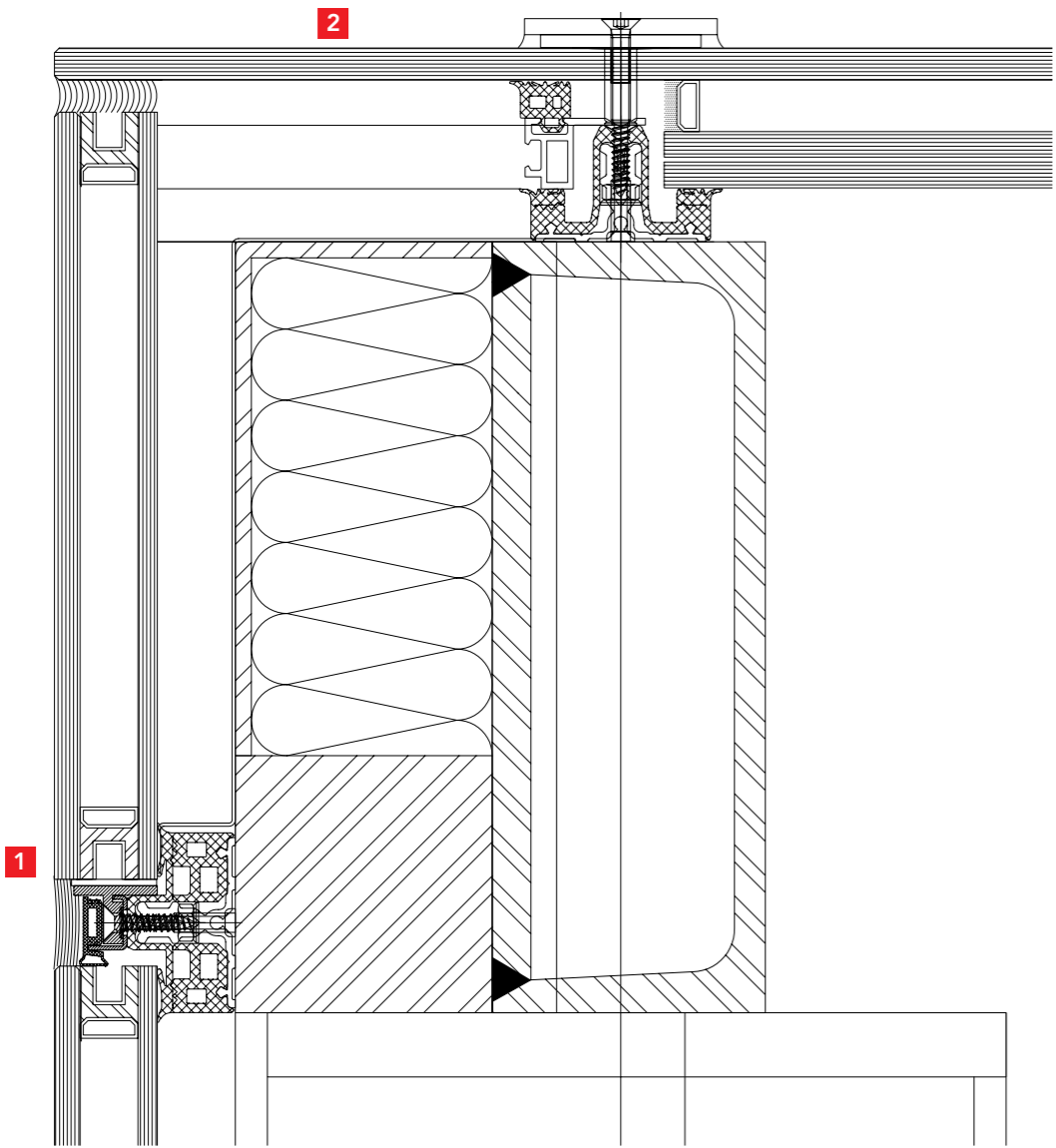
1 Glass panes secured with concealed "toggles"; these locate into a special U profile in the glass edge seal

2 Recommendation: Apply enamel frit to the stepped edge width; glass panes secured with concealed "toggles"
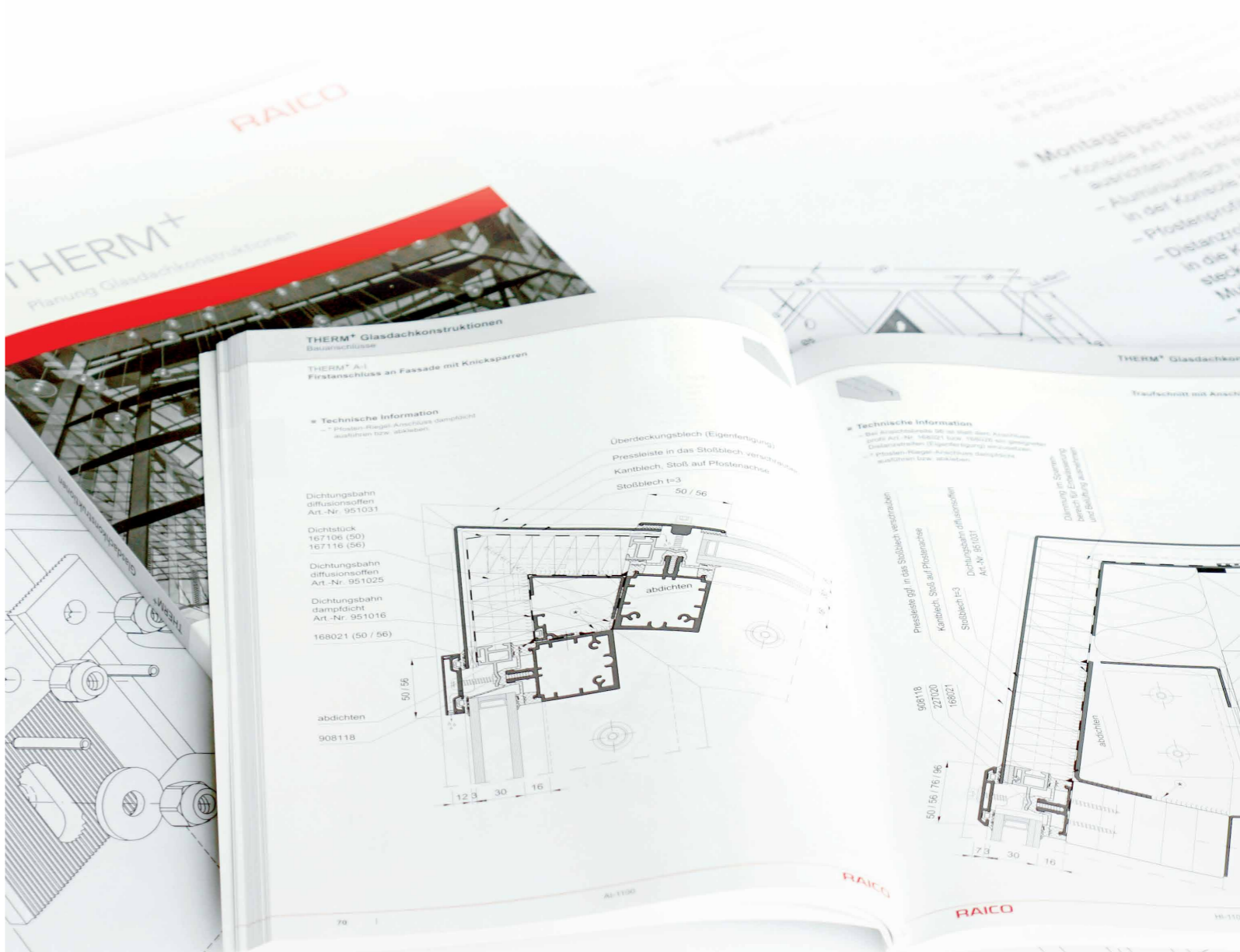
... you will find in our planning manual!

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 website at www.raico.com. For printed versions of the planning manual, please contact your local RAICO consultant.

THE PROFESSIONALS' PROFILE
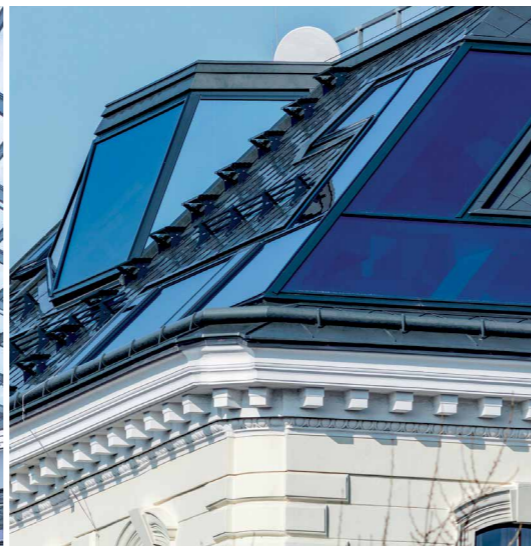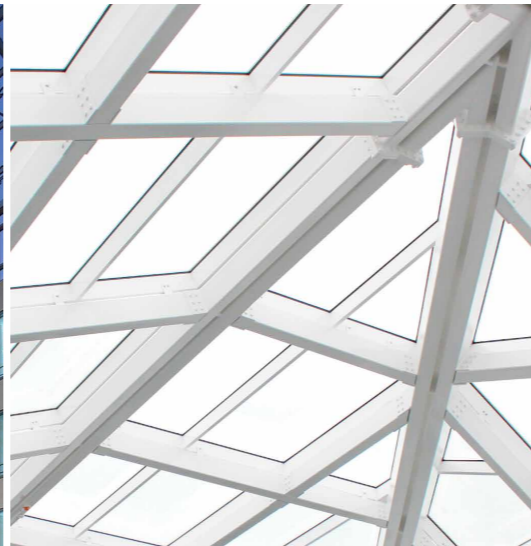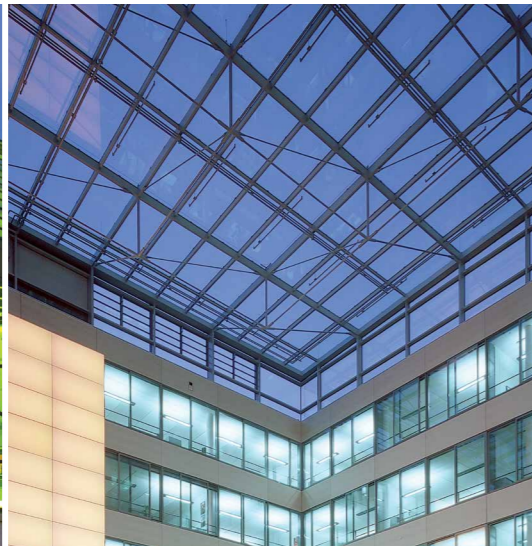
RAICO

RAICO Bautechnik GmbH
info@raico.com
Pfaffenhausen, DE

RAICO Austria
info.at@raico.com

RAICO Swiss GmbH
info.ch@raico.com
Aarau, CH

RAICO France S.à.r.l.
info.fr@raico.com
Entzheim, FR

RAICO UK
info.uk@raico.com
Gosport, UK

RAICO East
info.ru@raico.com
Moskau, RU

RAICO Pacific
info.au@raico.com
Canberra, AU

www.raico.com