RAICO

GLASS ROOF

SKI | LIGHT | SOLUTION

Application example: Ecole Advancia, Paris
Photo: ©Nicolas Grosmond

www.raico.com

ALU | STEEL | TIMBER – DIVERSITY OF MATERIALS

Aluminium façade

Steel façade

Steel façade

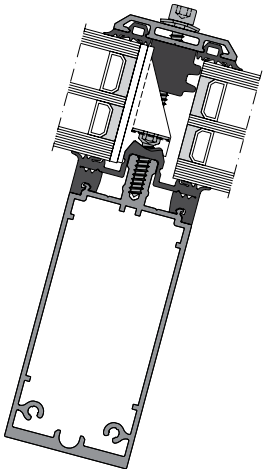
Timber façade

FOREWORD

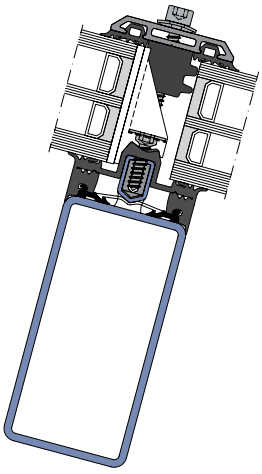
Visions in glass

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, FS-I and H-I are at the architects' and planners' disposal.

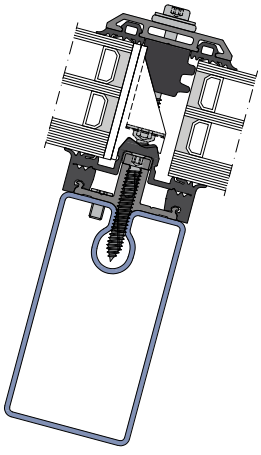
Based on our experience as leading manufacturer in this industry, we offer variously proven solutions with which the most challenging plannings can be reliably realized. Our special glazing and sealing technology enables a secure and simple realization for all constructions and roof shapes with an inclination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



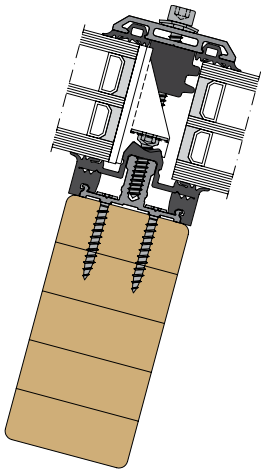
THERM$^+$ A-I



THERM$^+$ S-I



THERM$^+$ FS-I



THERM$^+$ H-I

OVERVIEW OF
PROJECTS

The mullion-transom systems THERM^{+} A-I, S-I, FS-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.

Stephan Liebl, Dillingen

ADAC ZENTRALE
MUNICH

Location
Munich, Germany

Owner
ADAC Allgemeiner Deutscher Automobil-Club e. V., Munich

Architecture
Sauerbruch Hutton Architekten, Berlin

Fabricator
Josef Gartner GmbH, Gundelfingen

RAICO system
Façade and glass roof: THERM^{+} S-I

Special features
Special mullion gasket:
system width 66 mm
Transom gasket:
system width 76 mm

Glazed area in the roof
2.300 m²

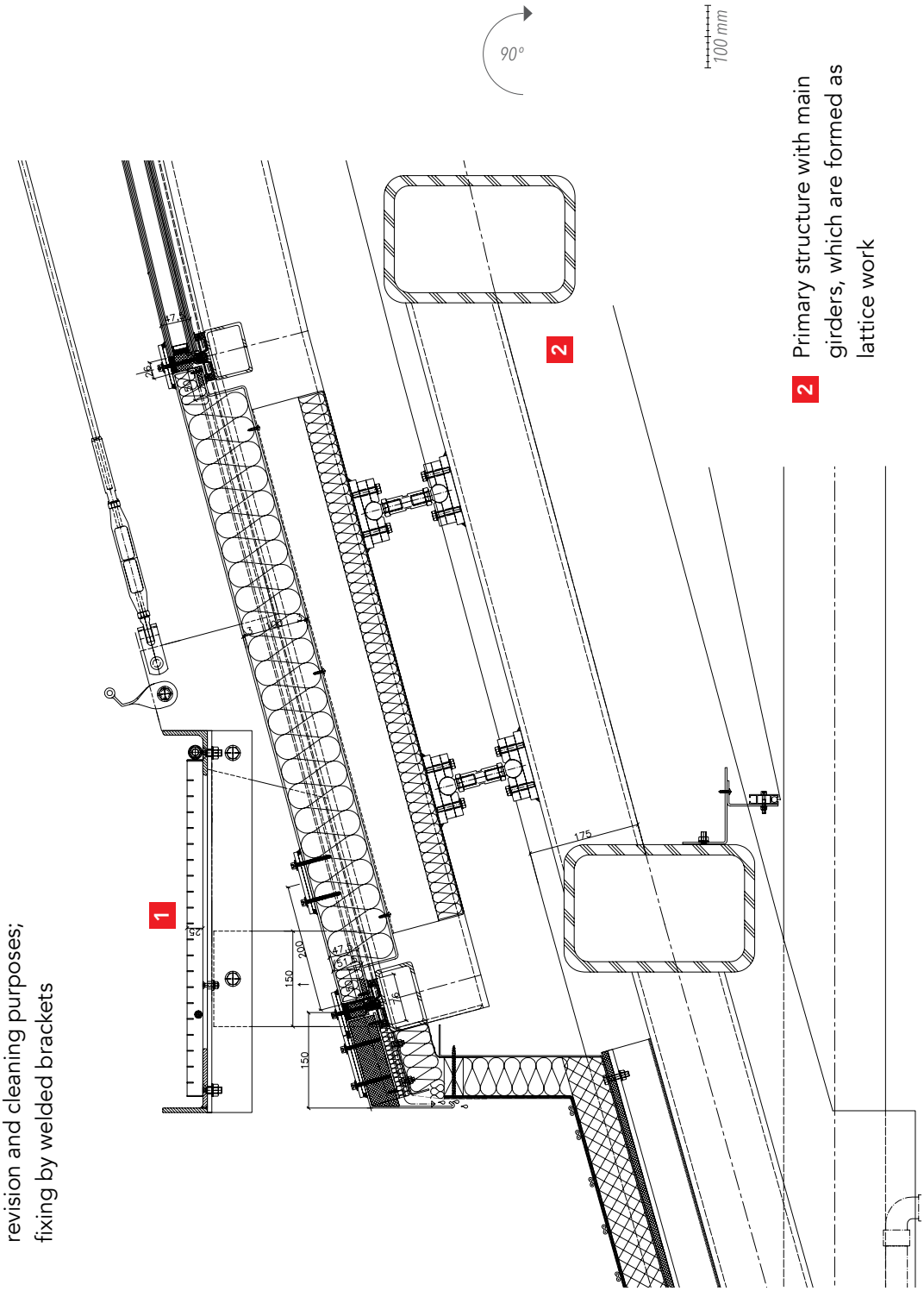
Award
2013 – Best Tall Building Europe
Award of Excellence

Stephan Liebl, Dillingen

Stephan Liebl, Dillingen

Stephan Liebl, Dillingen

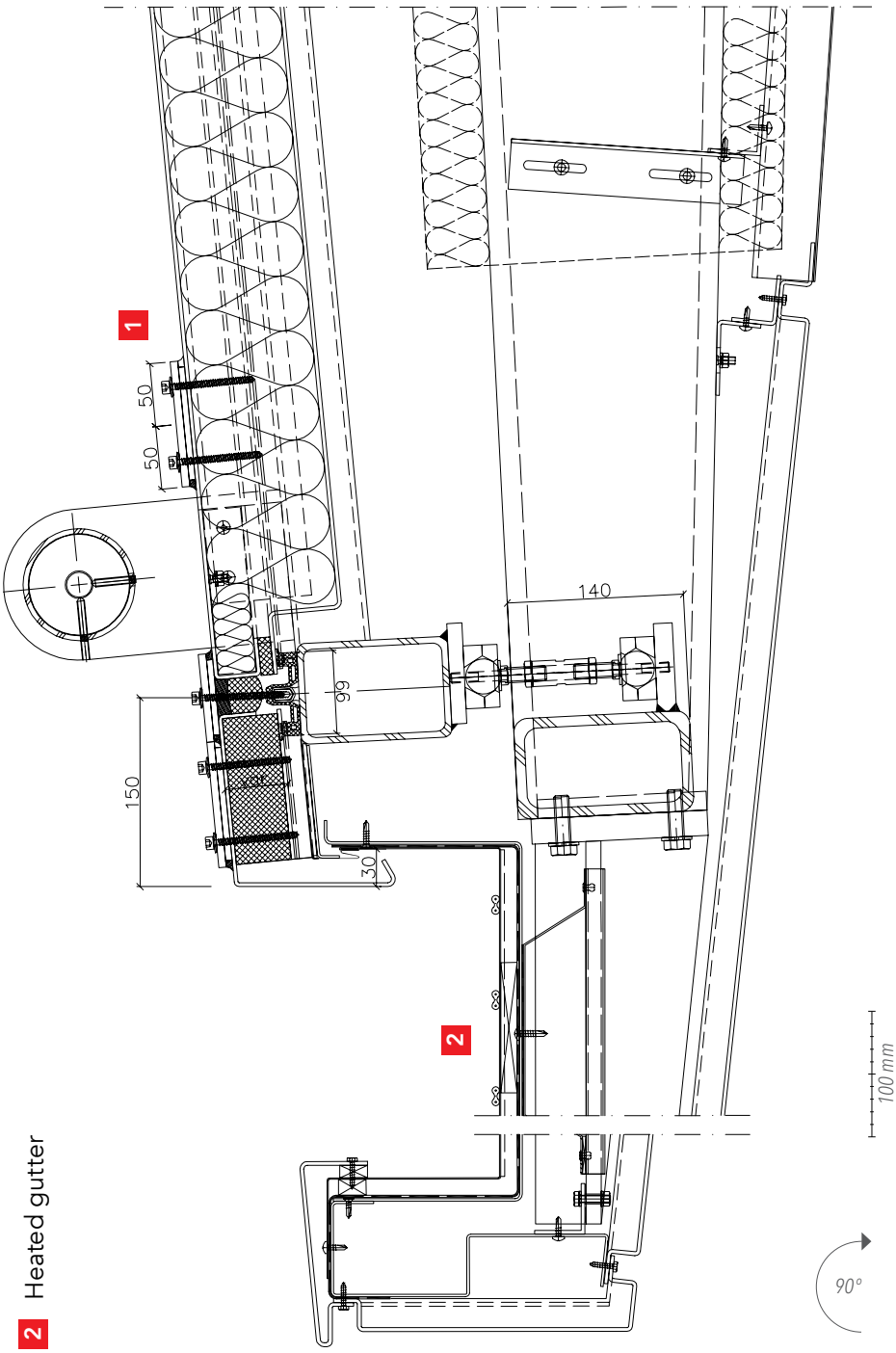
Detail of the eaves with drainage in heated gutter



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

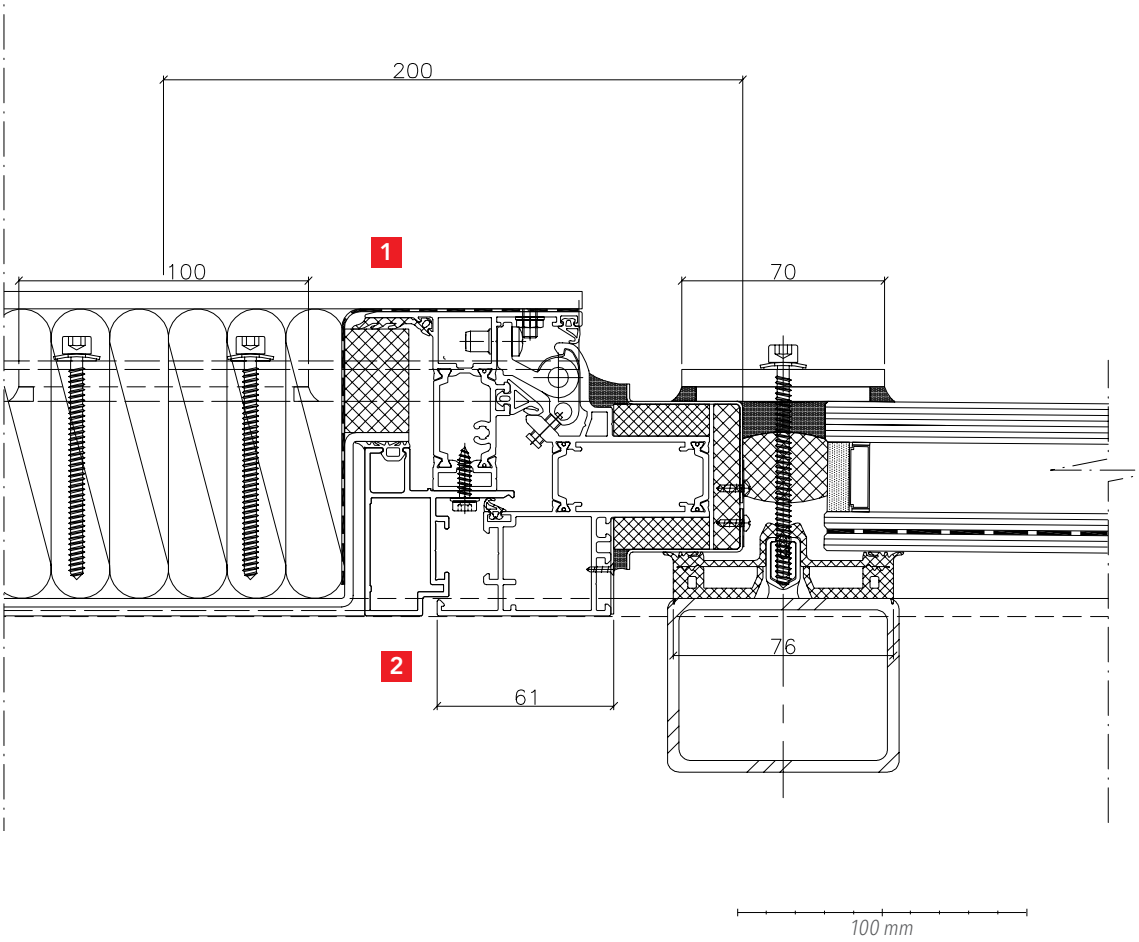
Roof overhang with connection to heated gutter



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

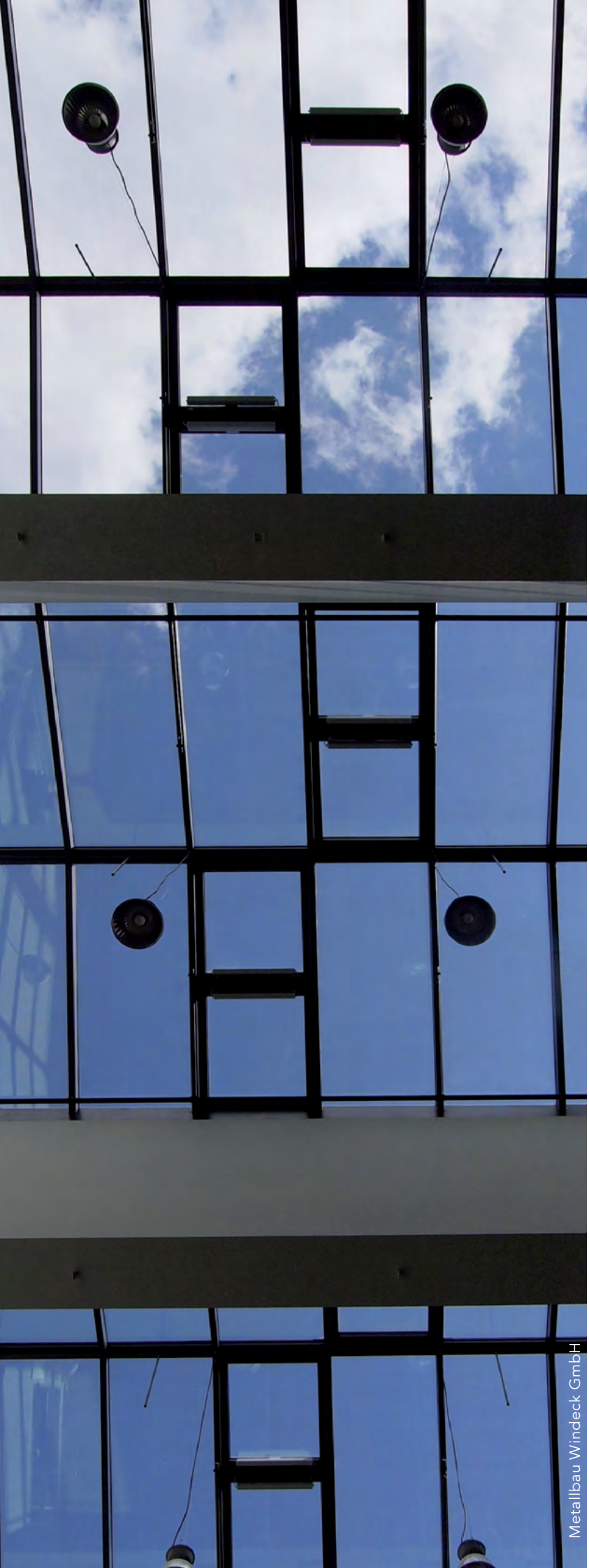
2 Heated gutter

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 m²



CITY CUBE
BERLIN

Location
Berlin, Germany

Owner
Messe Berlin GmbH

Architecture
Code Unique Architekten, Dresden

Fabricator
Metallbau Windeck GmbH

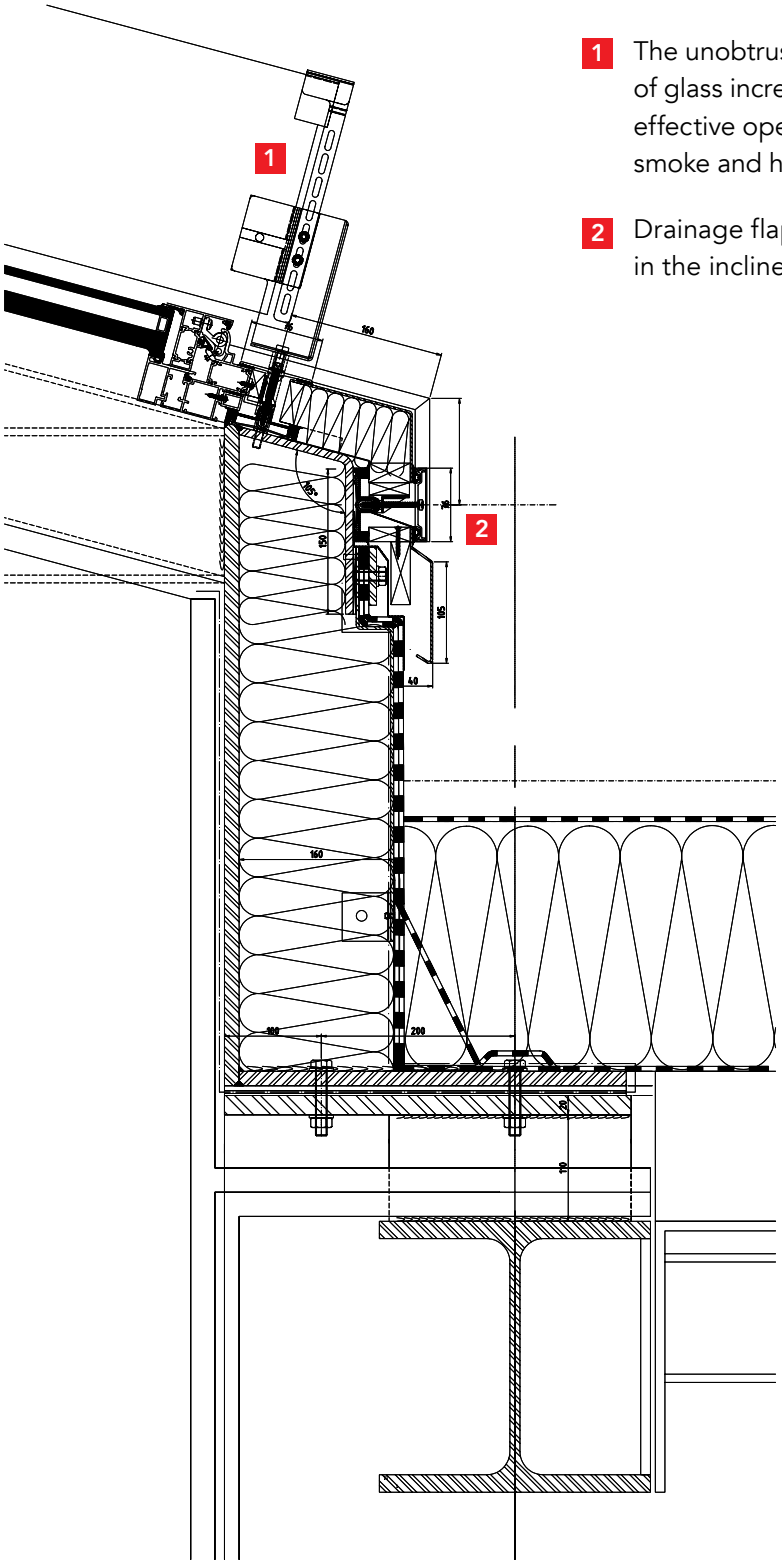
RAICO systems
Glass roof: THERM^{+} 76 S-I
Rooflight window: WING 105 DI

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

Metallbau Windeck GmbH


CityCube Berlin
Metallbau Windeck GmbH

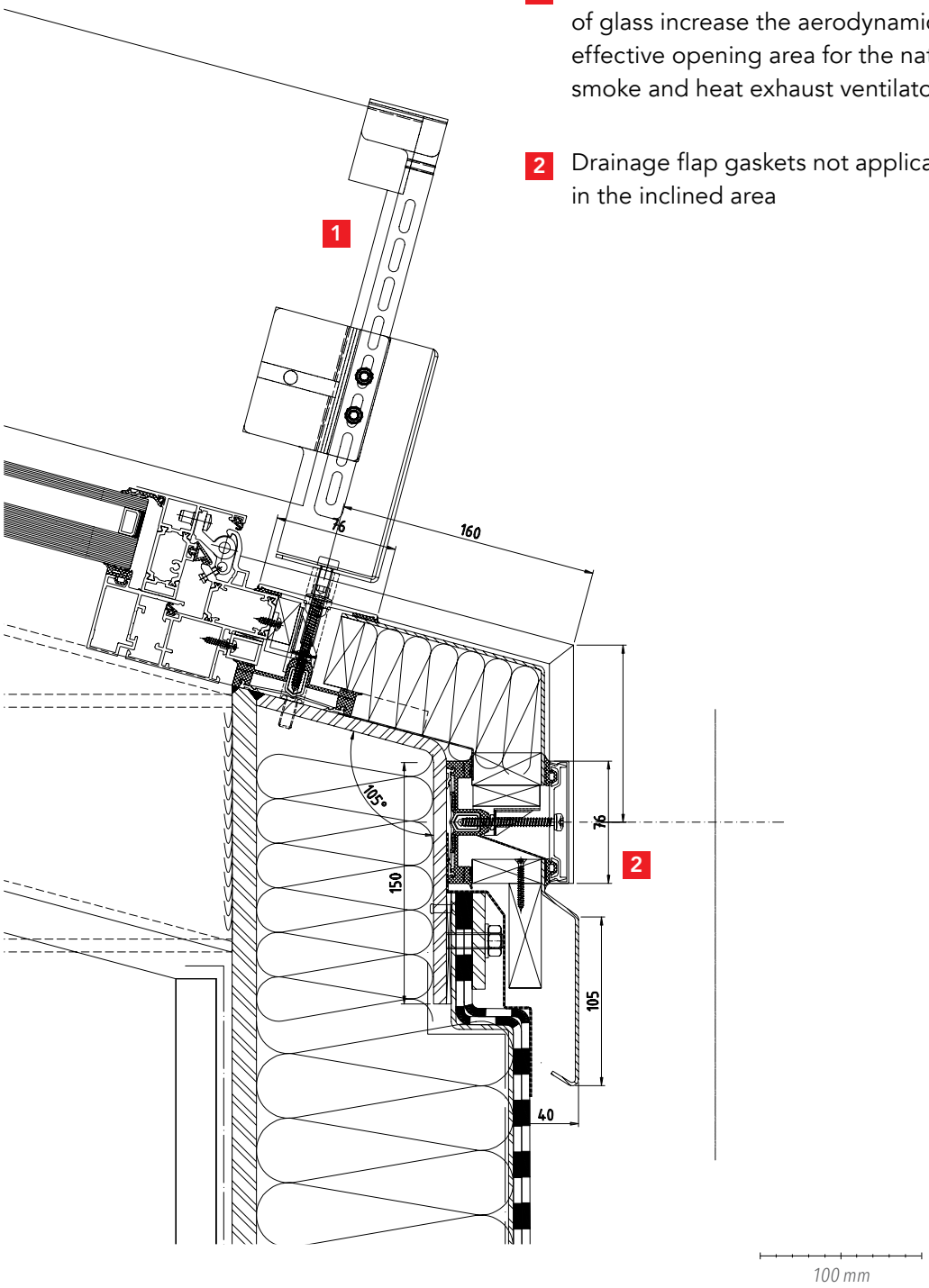
Eaves with drainage using the base gasket with flap in the vertical area



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

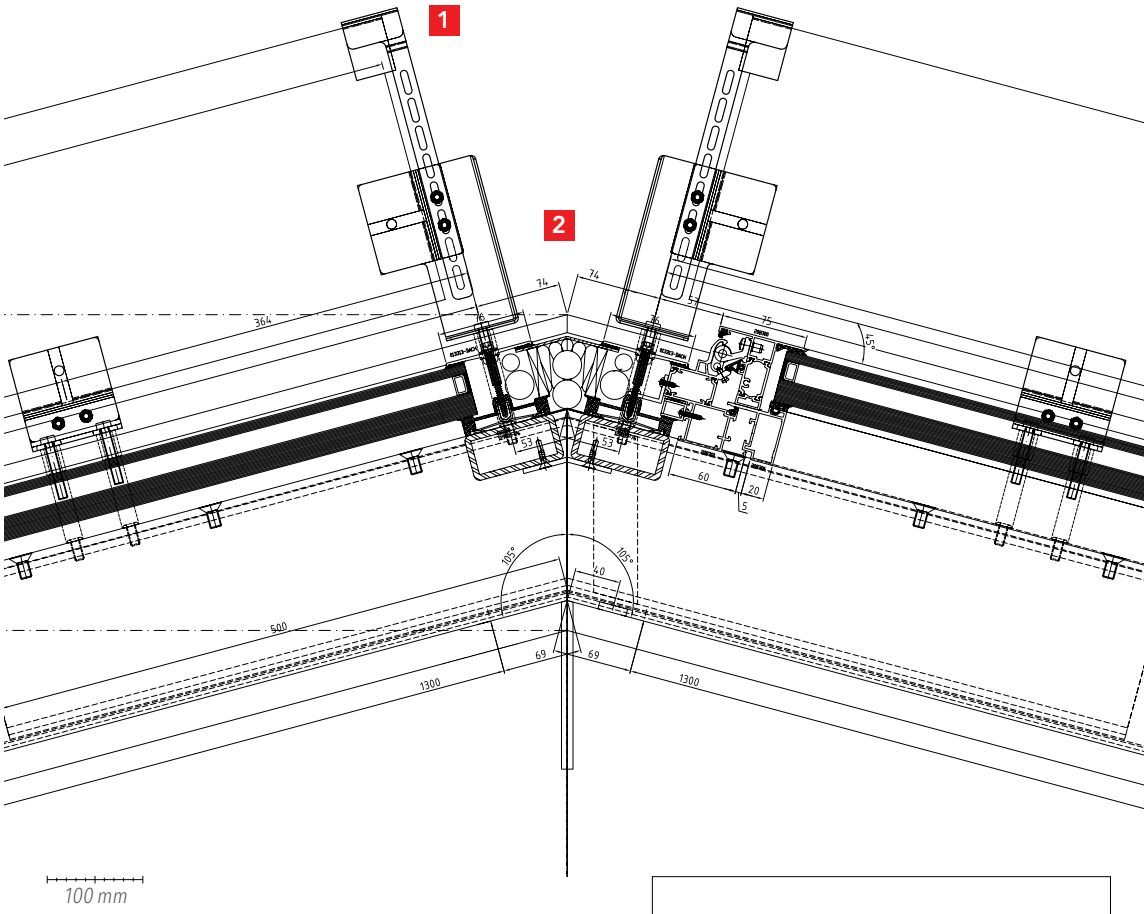
Eaves with drainage using the base gasket with flap in the vertical area

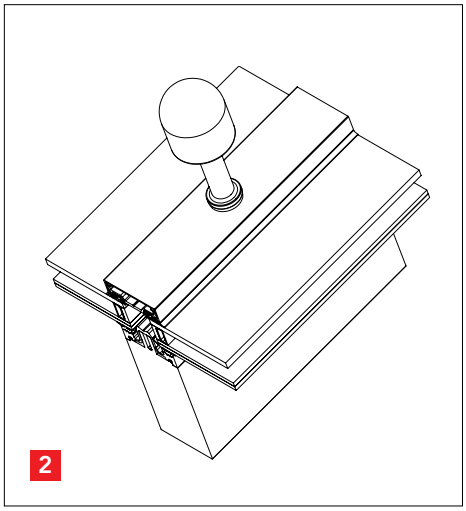


1 The unobtrusive wind deflectors made of glass increase the aerodynamic effective opening area for the natural smoke and heat exhaust ventilator

2 Drainage flap gaskets not applicable in the inclined area

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

ALGENTECHNIKUM TUM

OTTOBRUNN

Location
Ottobrunn, Germany

Owner
Airbus Group

Architecture
OBERMEYER Planen + Beraten GmbH

Fabricator
Roschmann Konstruktionen aus Stahl und Glas GmbH, Gersthofen

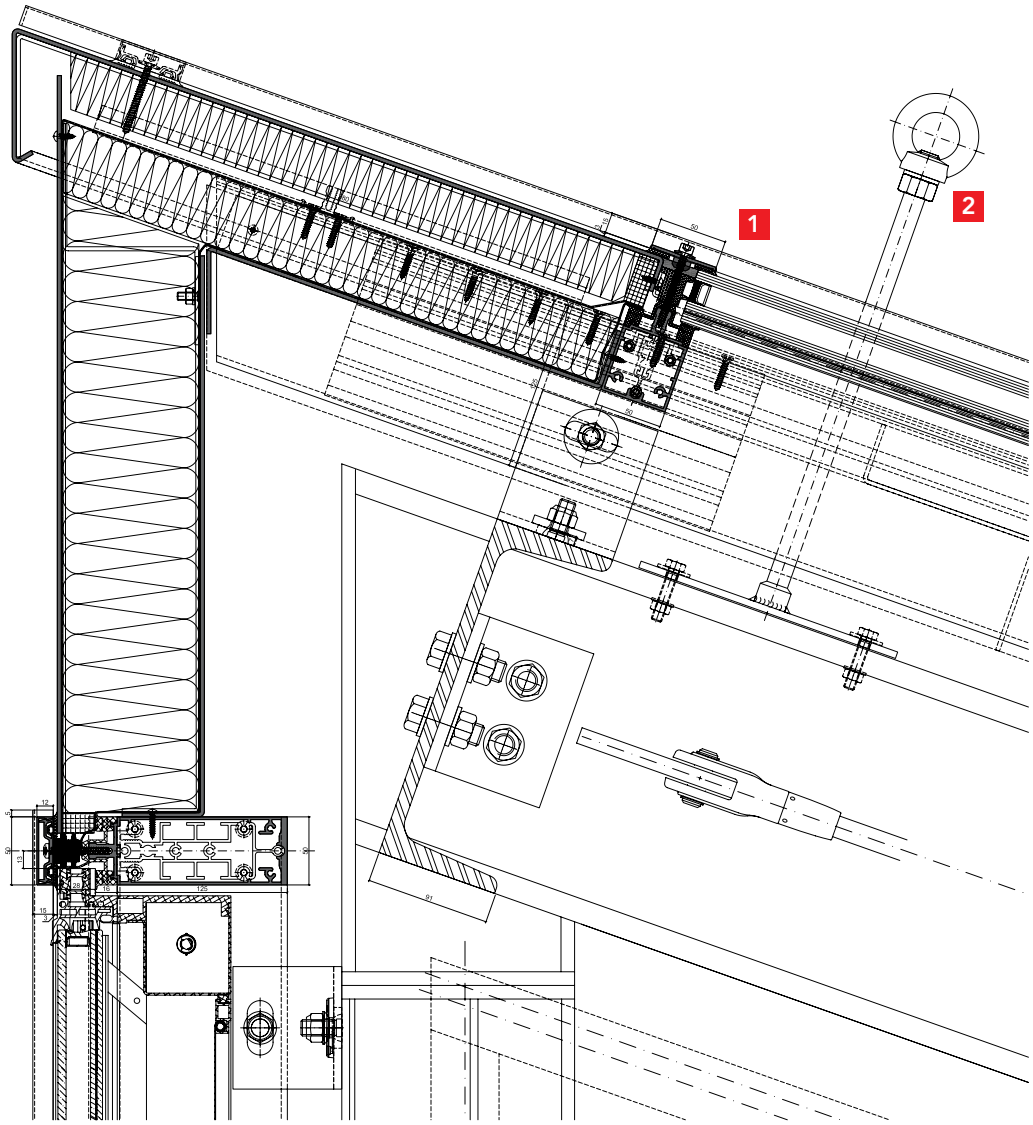
RAICO system
Façade and glass roof: THERM^{+} 56 A-I


TU München/Heddergott


TU München/Heddergott

TU München/Heddergott

Ridge detail at interface with vertical façade

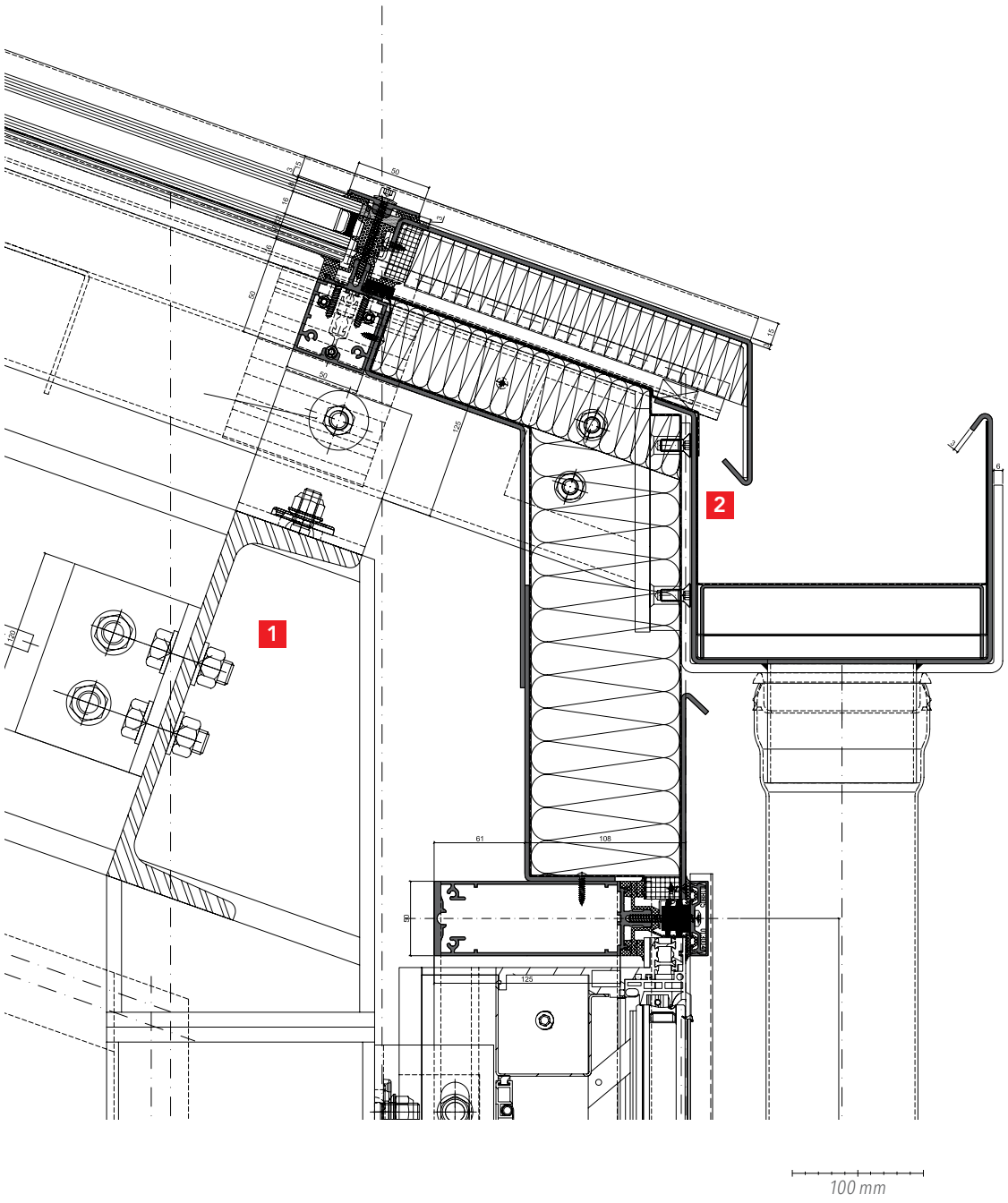


100 mm

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

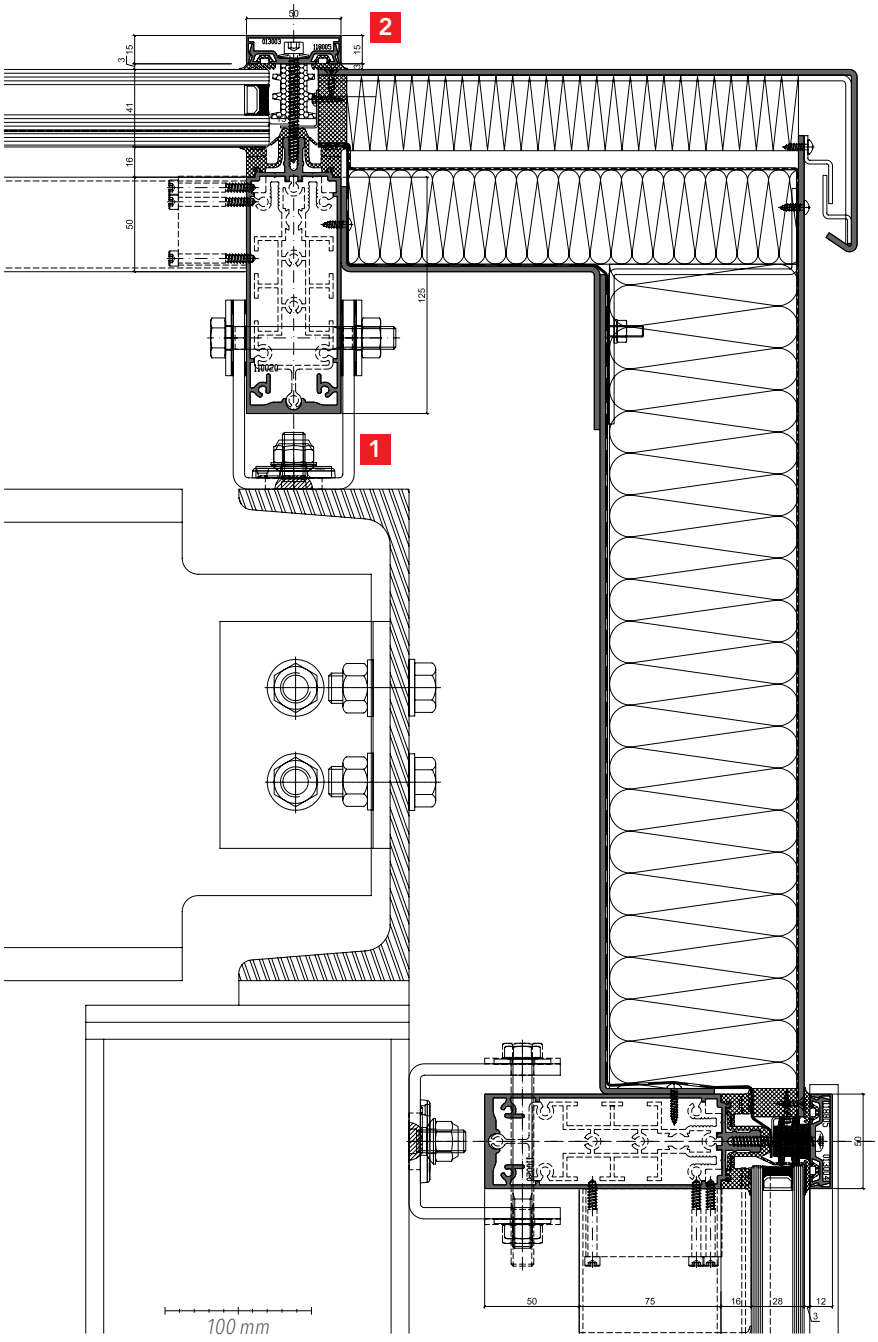
Eaves drainage via mullion gasket



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^{+} 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/Christian Vorhofer

EGGER HEADQUARTER
TYROL

Location
Tyrol, Austria

Owner
Fritz EGGER GmbH & Co. OG,
St. Johann in Tyrol

Architecture
Bruno Moser, architekturWERKSTATT,
Breitenbach

Fabricator
Holzbau Saurer, Höfen

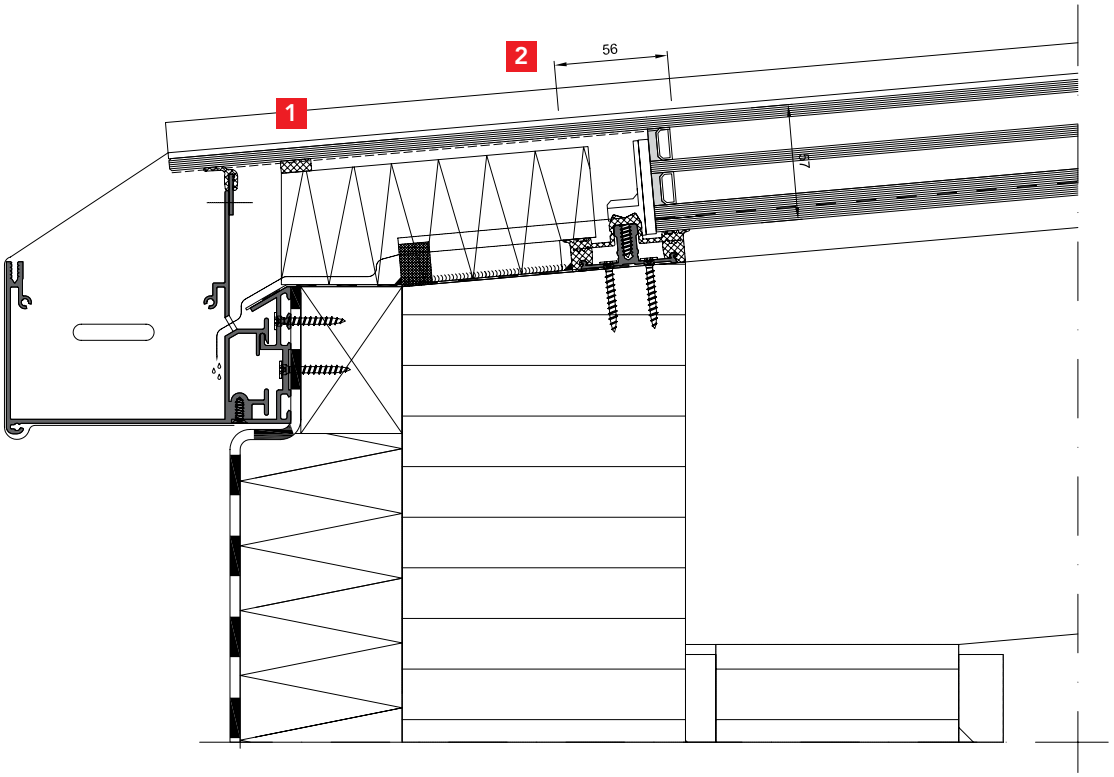
RAICO system
Glass roof: THERM^{+} 56 H-I

Award
2017 – best architects 17 award

EGGER/Christian Vorhofer

EGGER/Christian Vorhofer

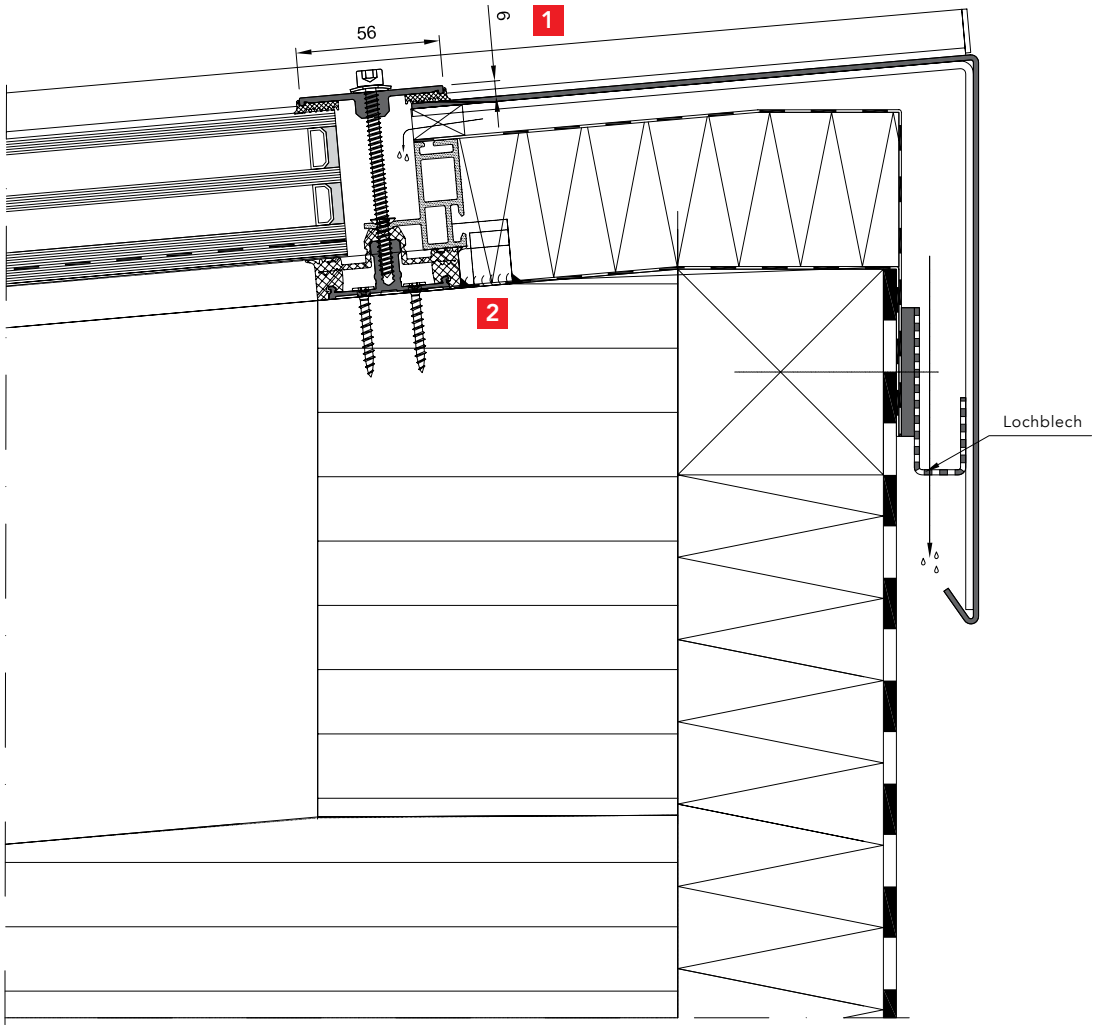
Eaves detail with drainage into aluminium gutter profile



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

Monopitch ridge detail

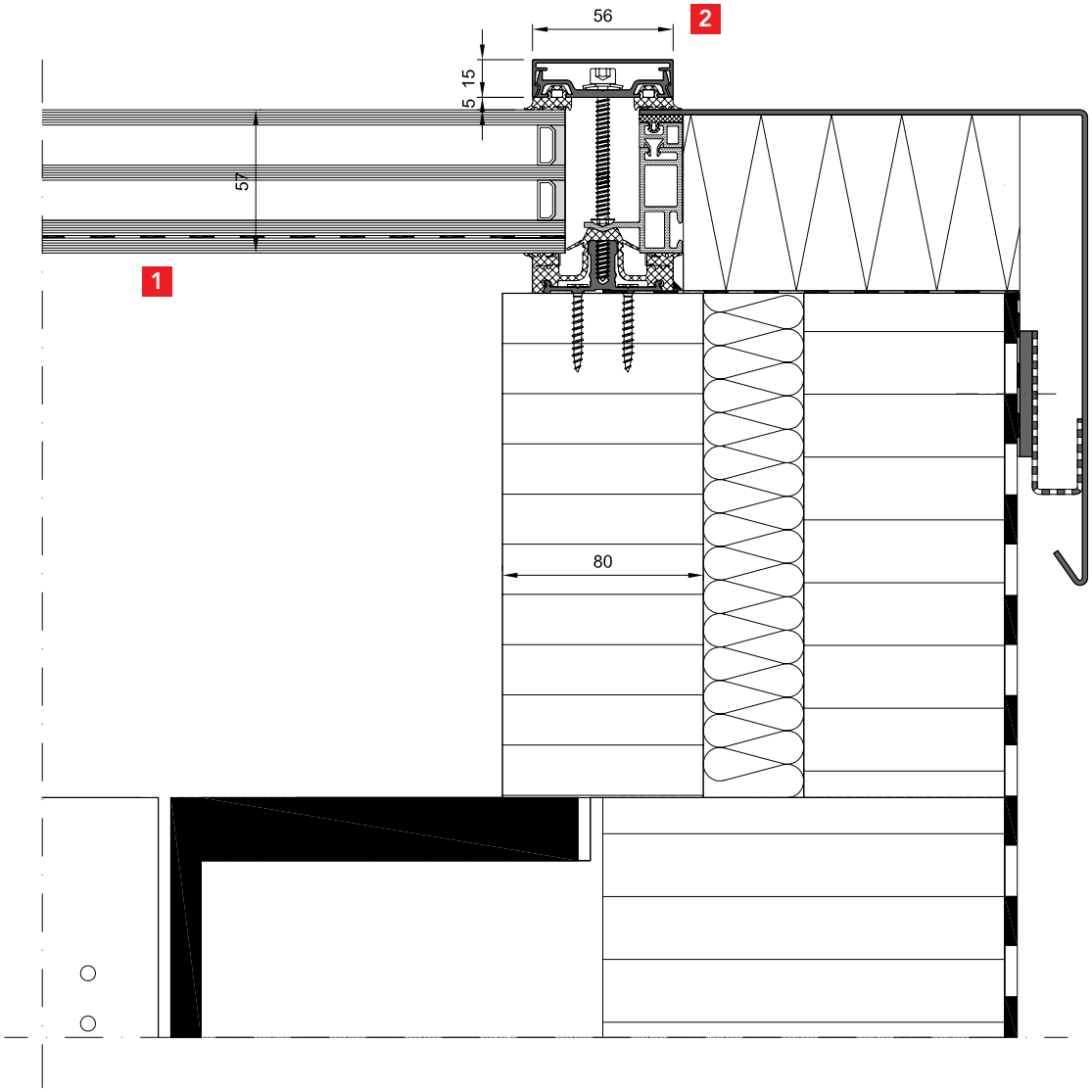


100 mm

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

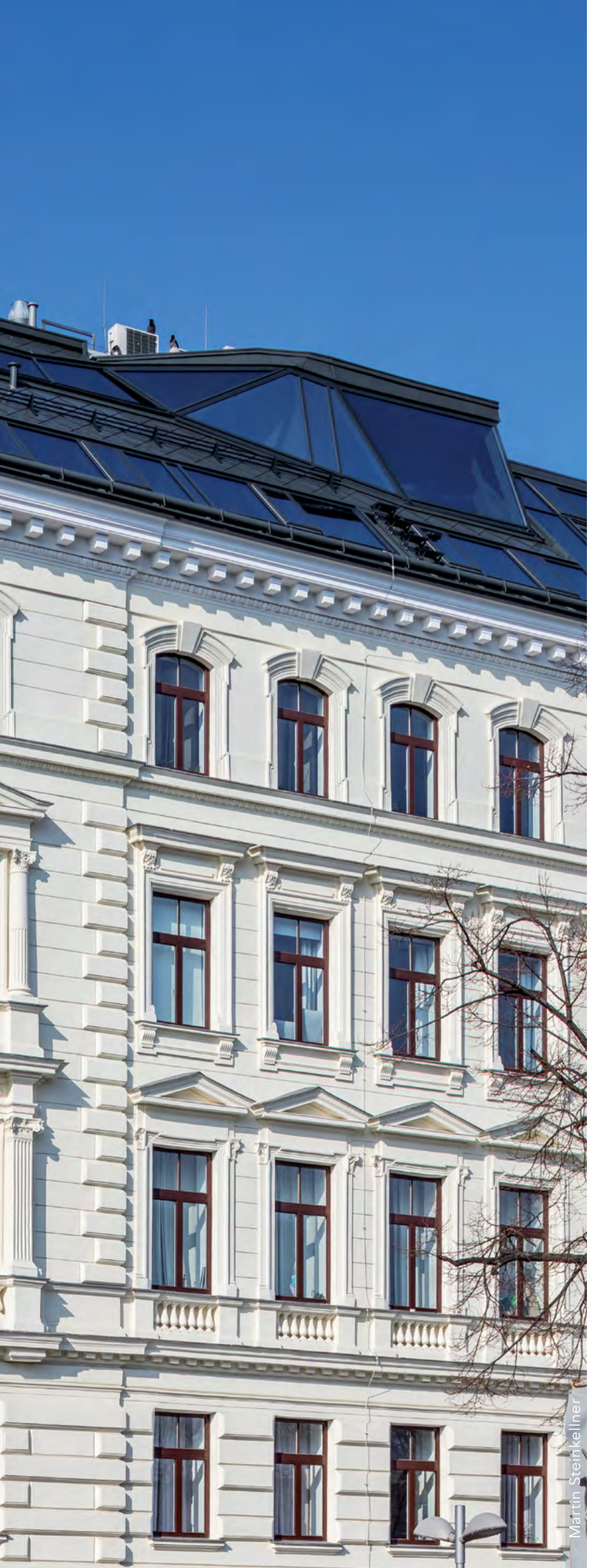
Verge section



100 mm

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°



Martin Steinkellner

ROSSAUER LÄNDE

VIENNA

Location
Vienna, Austria

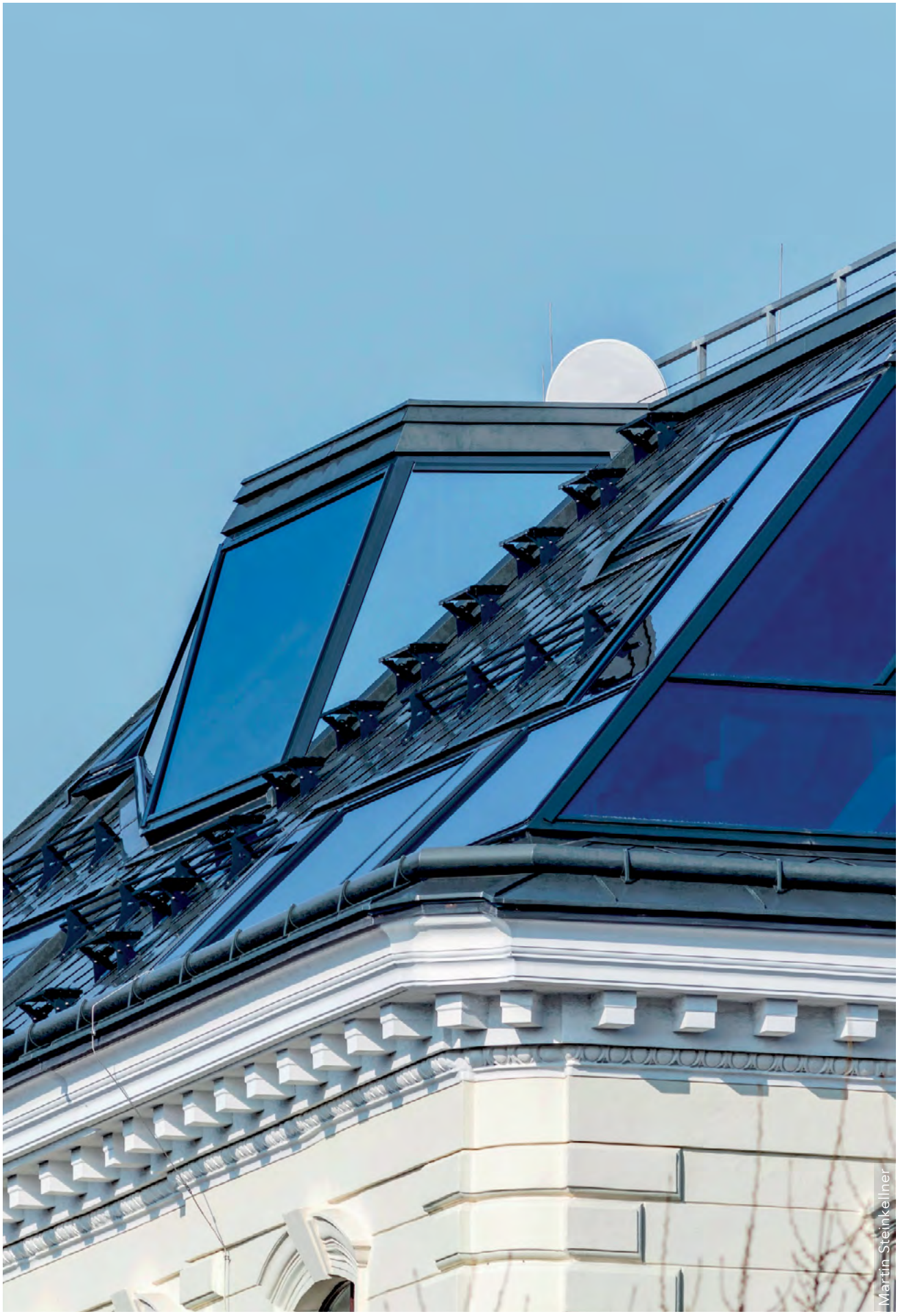
Owner
Astral Handelsgesellschaft mbH

Architecture
Guntram Lill, Linz

Fabricator
Metallbau Heidenbauer GmbH & Co. KG

RAICO system
Glass roof: THERM^{+} 56 S-I

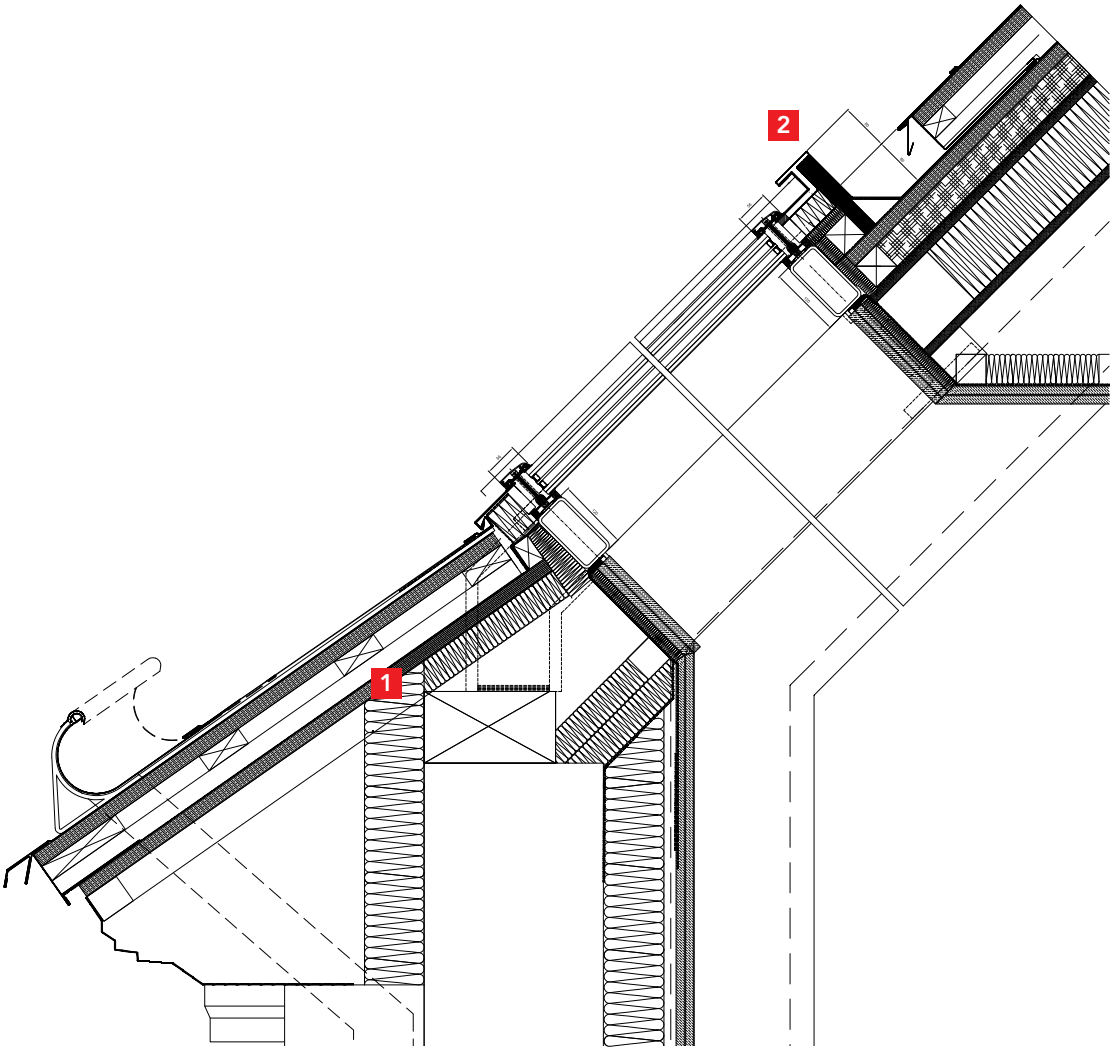
Glazed area in the roof
140 m^2



Martin Steinkellner

Martin Steinkellner

Vertical section roof glazing

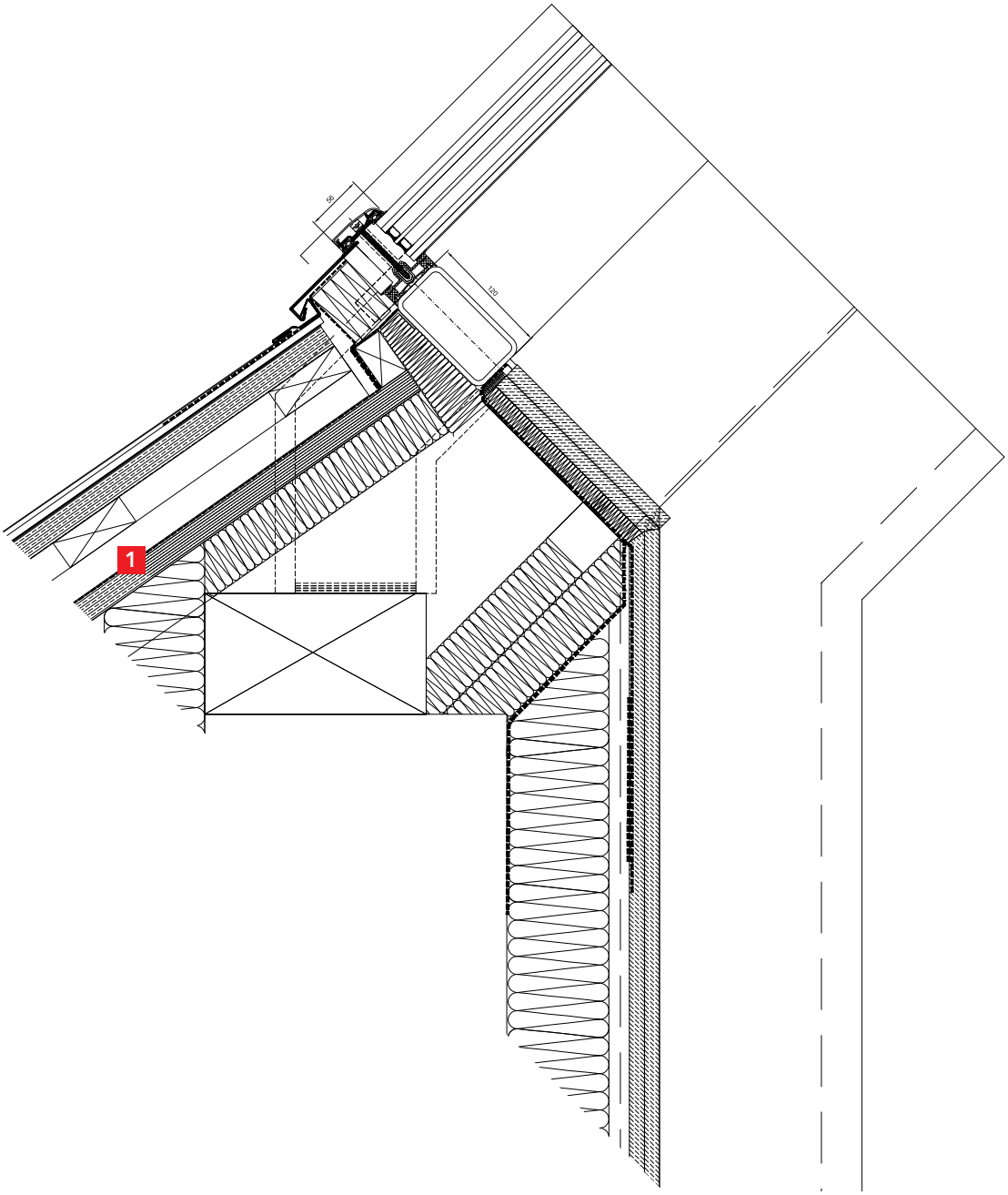


100 mm

1 Façade drainage directed through the panel ventilation void

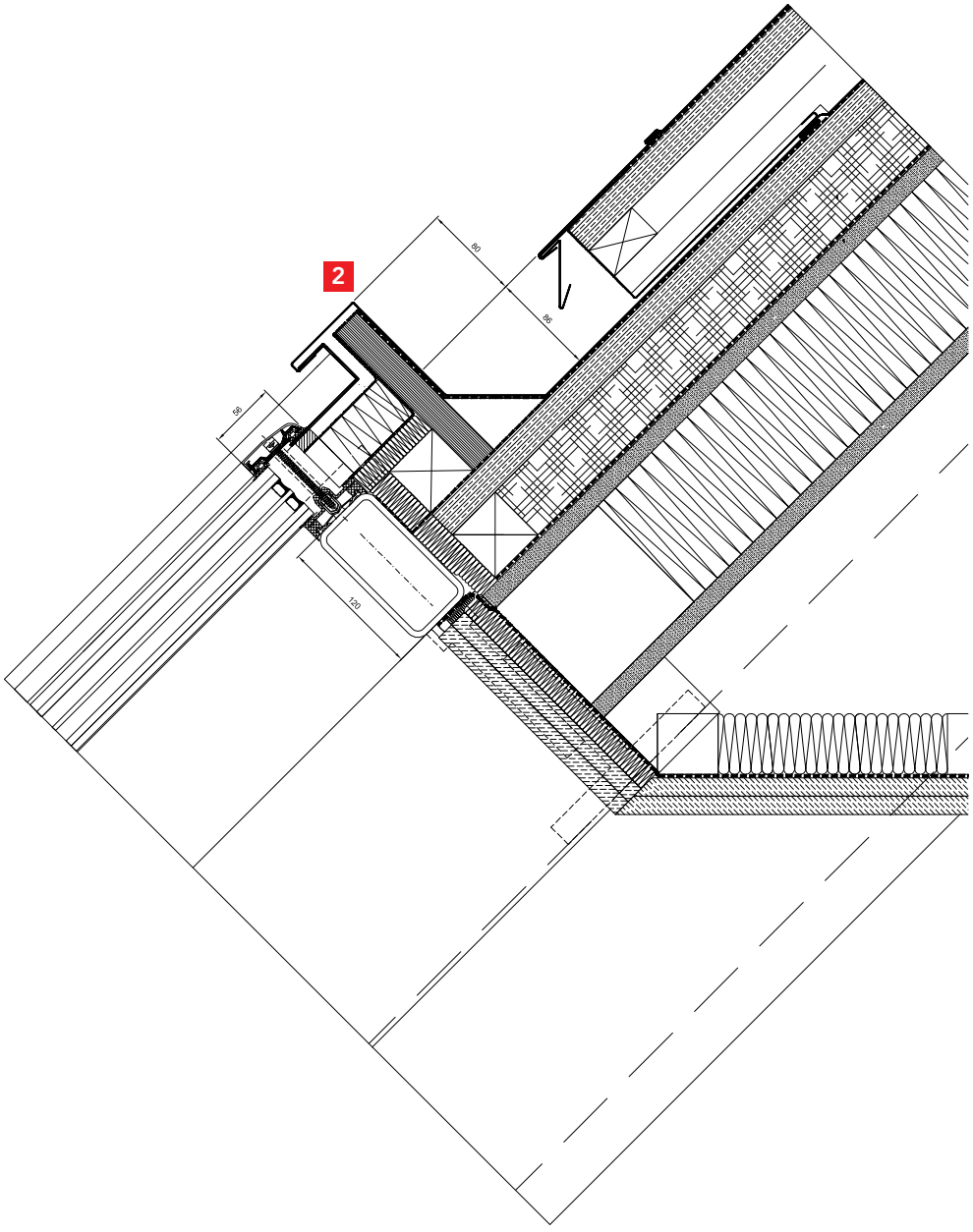
2 Formation of the three-sided gutter by means of a vertical board; façade pressure equalisation created via drainage slots in the flashing

Interface with roof cladding at the head



1 Façade drainage directed through the panel ventilation void

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

Location
Breitnau, Germany

Owner
Hofgut Sternen GmbH – Fam. Drubba

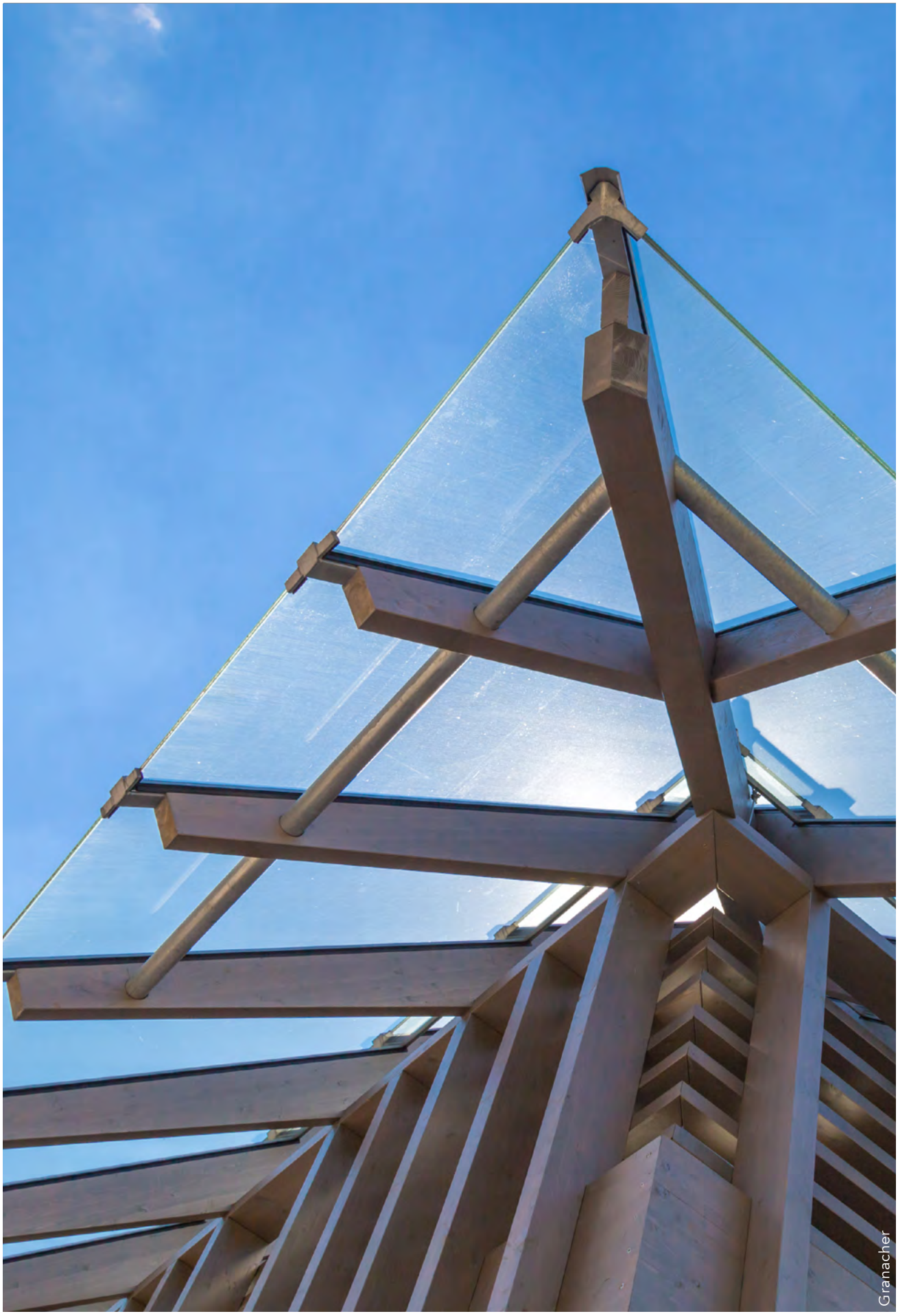
Architecture
Werkgruppe Lahr Architekten

Fabricator
Holzbau Amann GmbH, Weilheim-Bannholz; Ridge capping cooperation with Baier GmbH, Renchen-Ulm

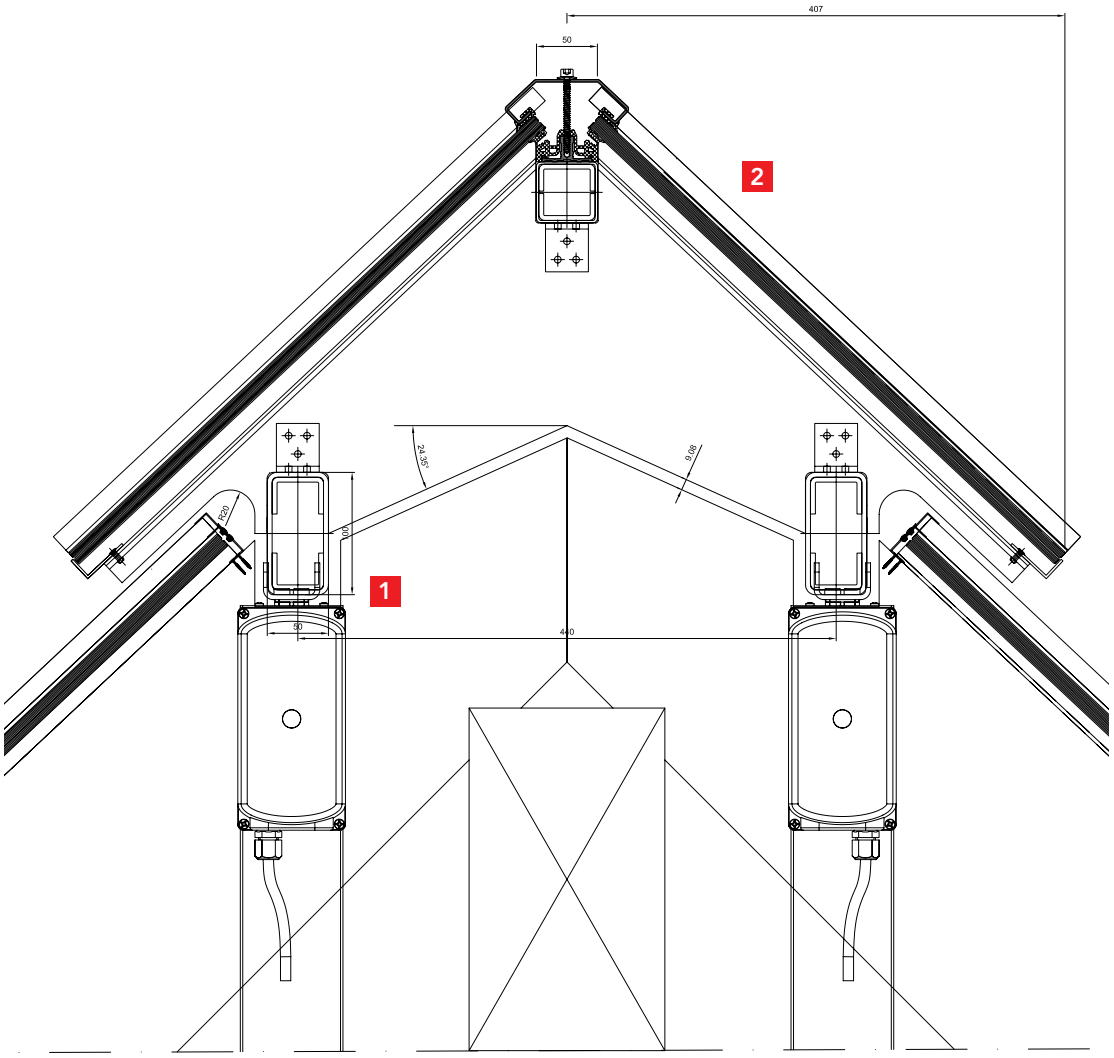
RAICO system
Glass roof: THERM^{+} 76 H-I


Steigenhaus
Granacher


Granacher


Granacher

Glazed opening ridge capping panels

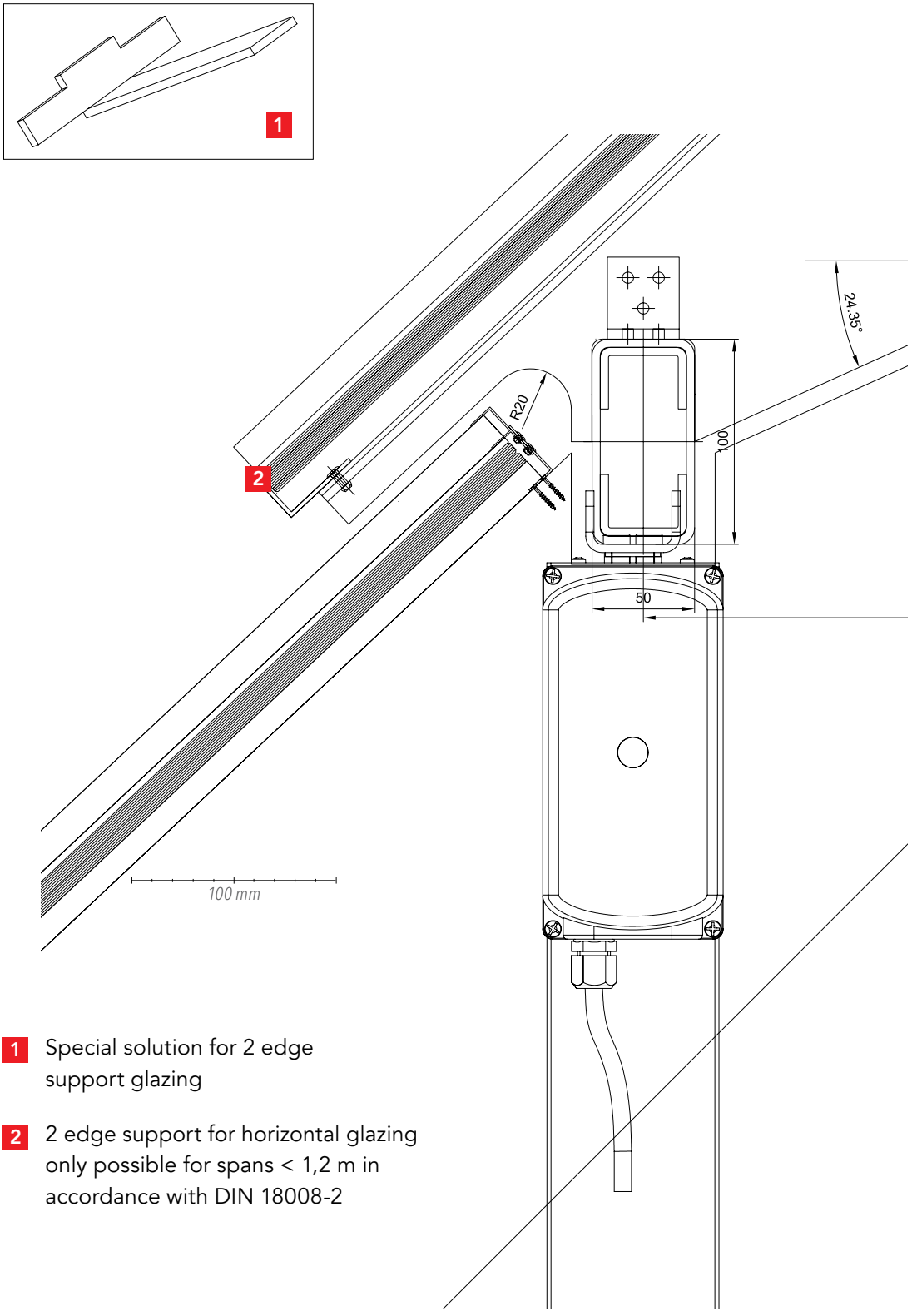


100 mm

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)

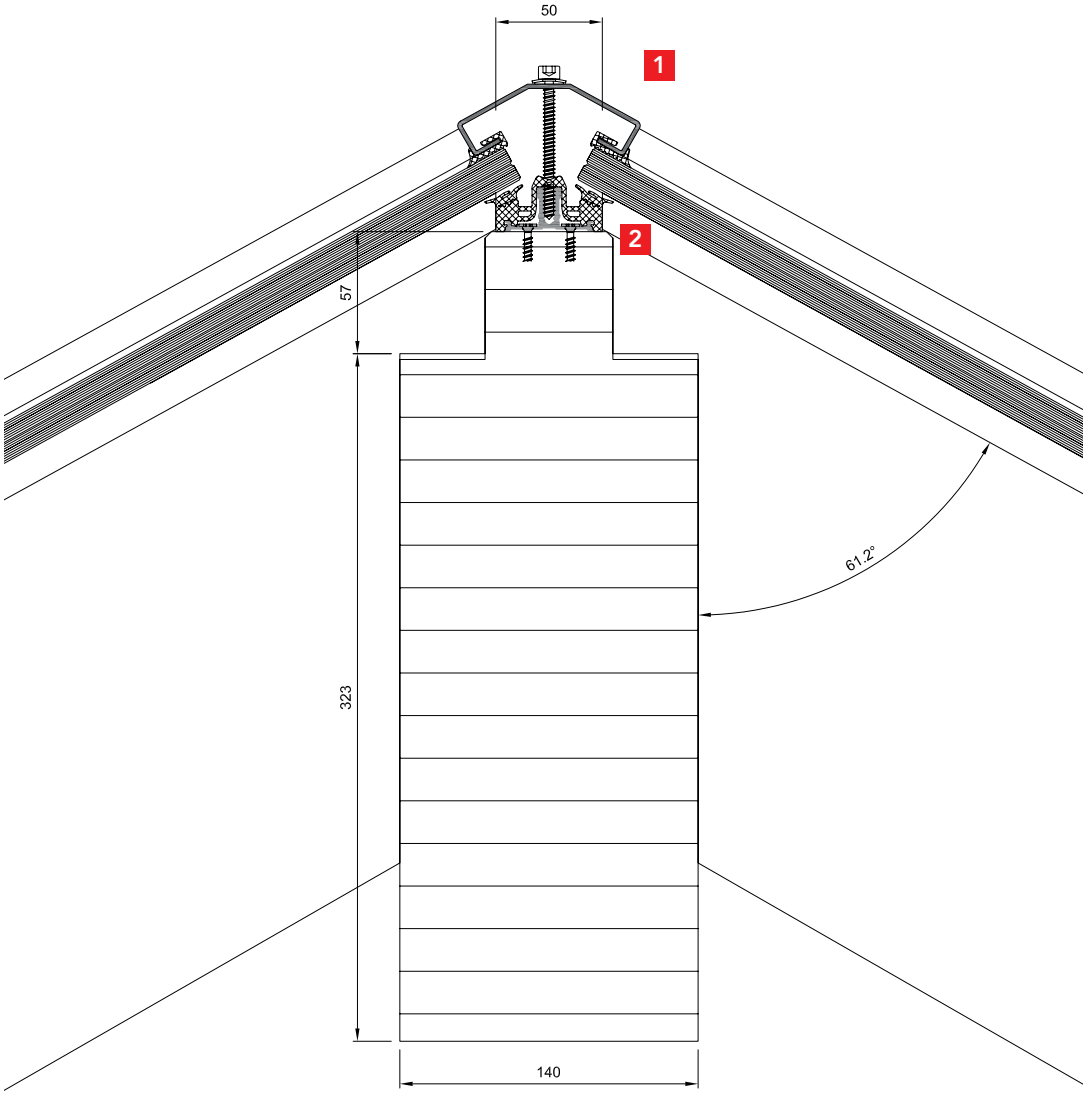
Overlapping glazing panes



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°

Bellapart

ERNST & YOUNG
KIRCHBERG

Location
Kirchberg, Luxembourg

Owner
Kirchberg Property Company S.C.A.

Architecture
Sauerbruch Hutton Architekten, Berlin

Fabricator
Bellapart, SAU Edifici Free Minds,
Les Preses (Girona / ES)

RAICO system
Glass roof: THERM^{+} 60 S-I

Glazed area in the roof
1.290 m^2

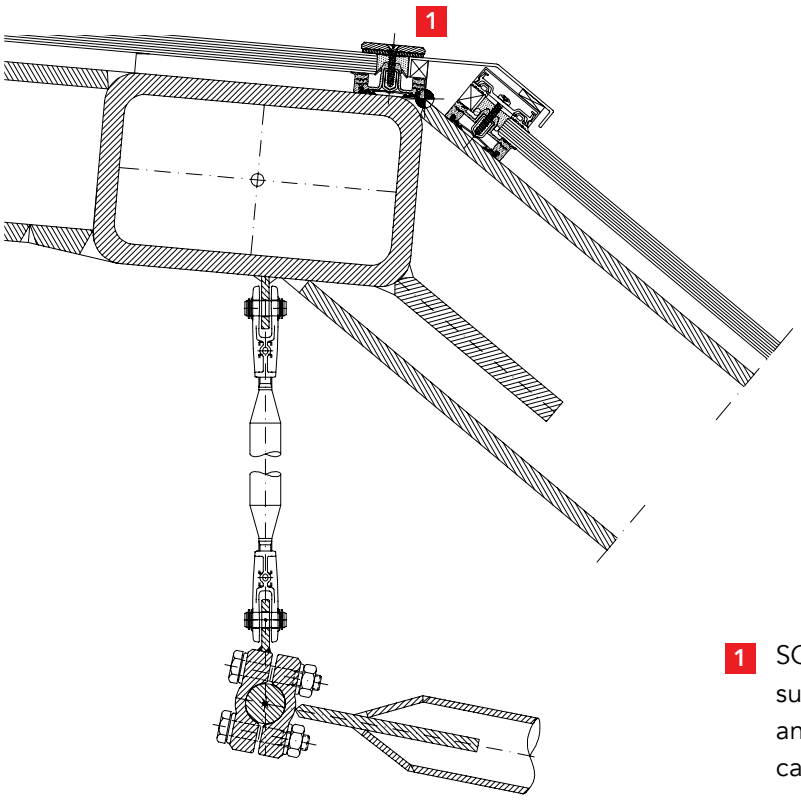
Special features
Due to cold glazing no requirements to thermal protection / structural-physical properties of the construction


EY
Bellapart


EY
KENNEDY
Hines
Bellapart

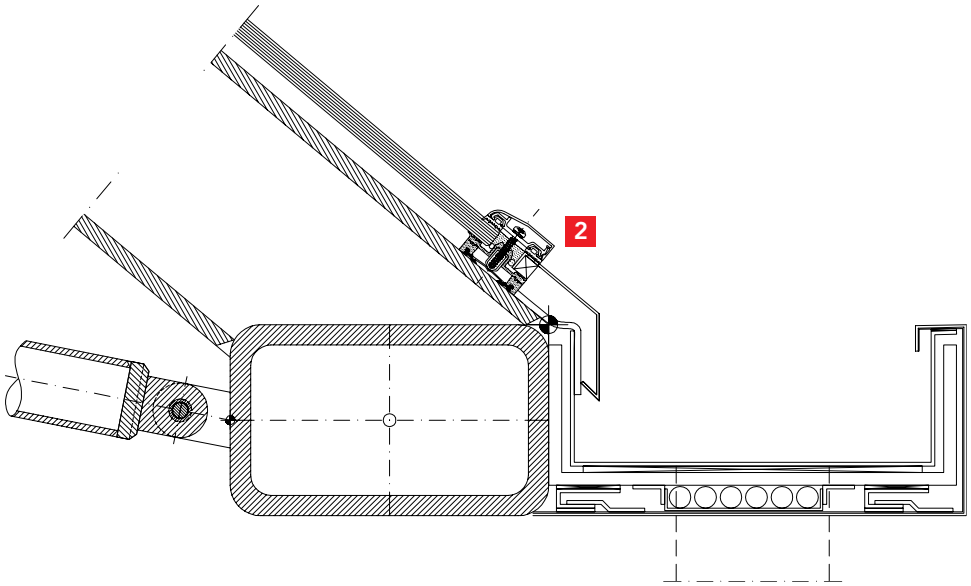

EY
Bellapart

Vertical section roof glazing

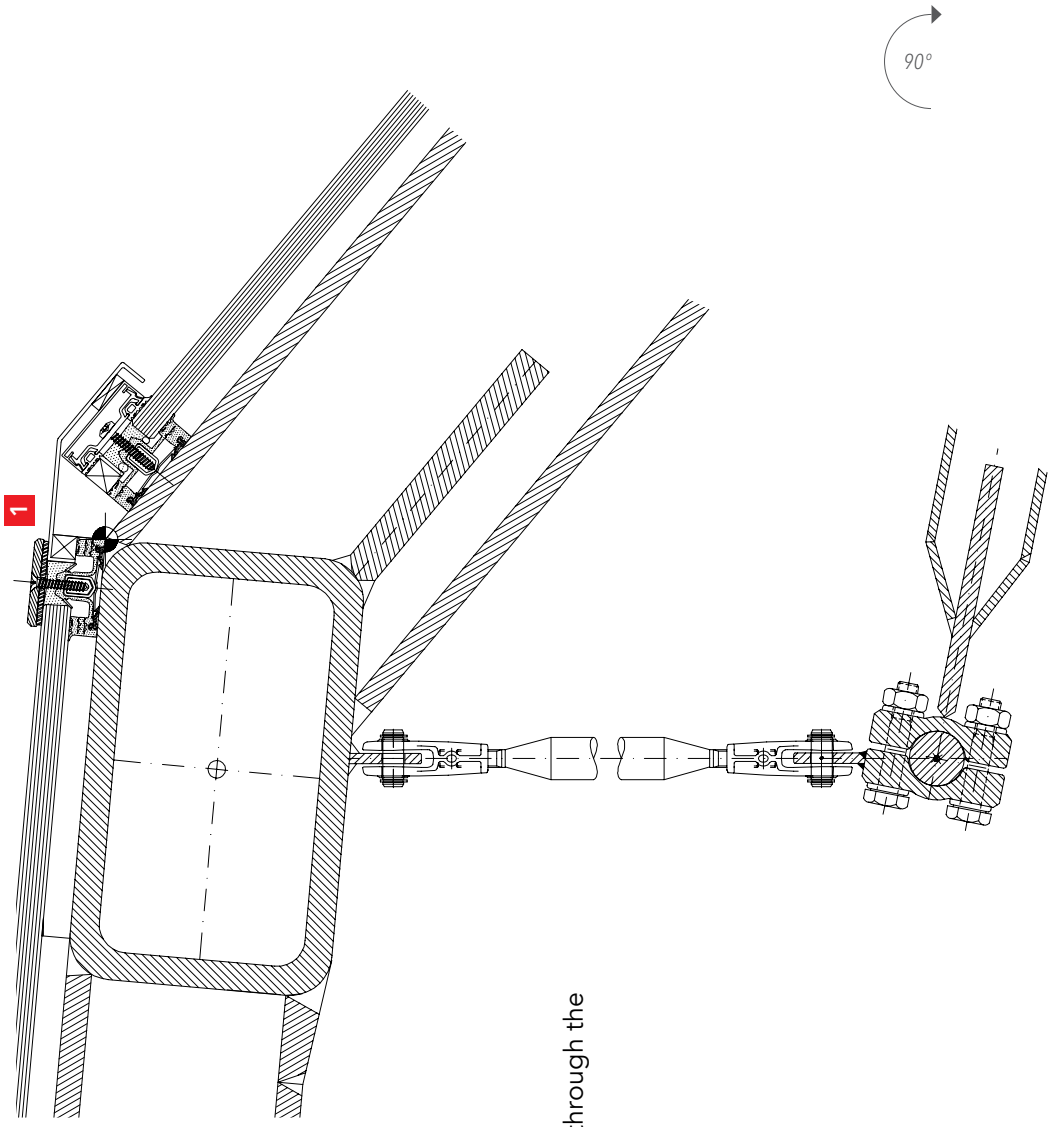


1 SG silicone joint in the transom with suction discs; suction disc quantities and positions determined with static calculations

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

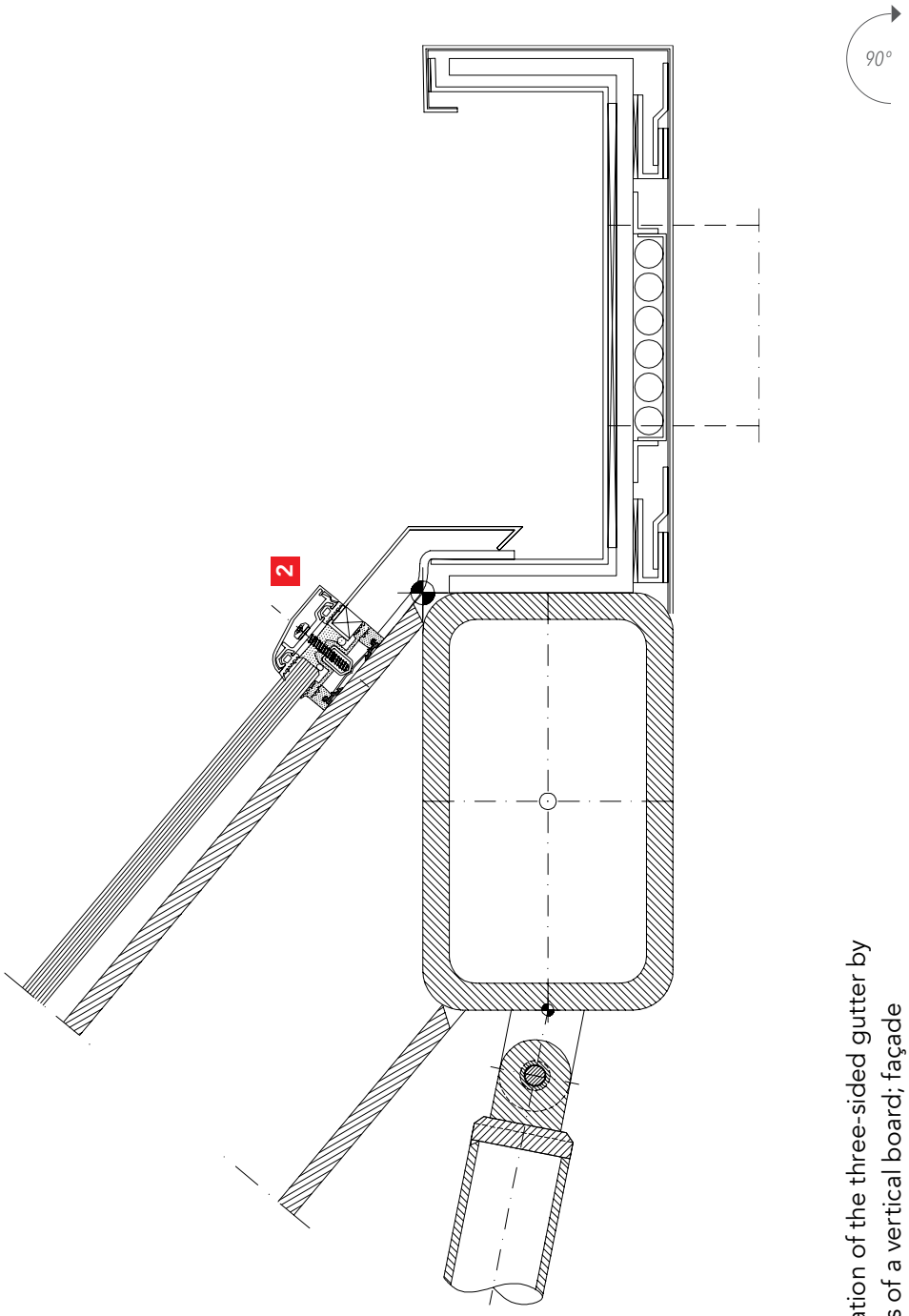


Transition flat roof / hip



1 Façade drainage directed through the panel ventilation void

Eaves with drainage in gutter



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


Heinz Heister

LOHN-AG.DE AG
BADEN-BADEN

Location
Baden-Baden, Germany

Owner
lohn-ag.de AG

Architecture
Kühnl + Schmidt;
Dipl.-Ing. Freie Architekten BDA, Karlsruhe

Fabricator
FREYLER Metallbau GmbH, Kenzingen

RAICO systems
Glass roof: THERM^{+} S-I
Window: FRAME^{+} 75 WI
Door: FRAME^{+} 75 DI

Glazed area in the roof
270 m²

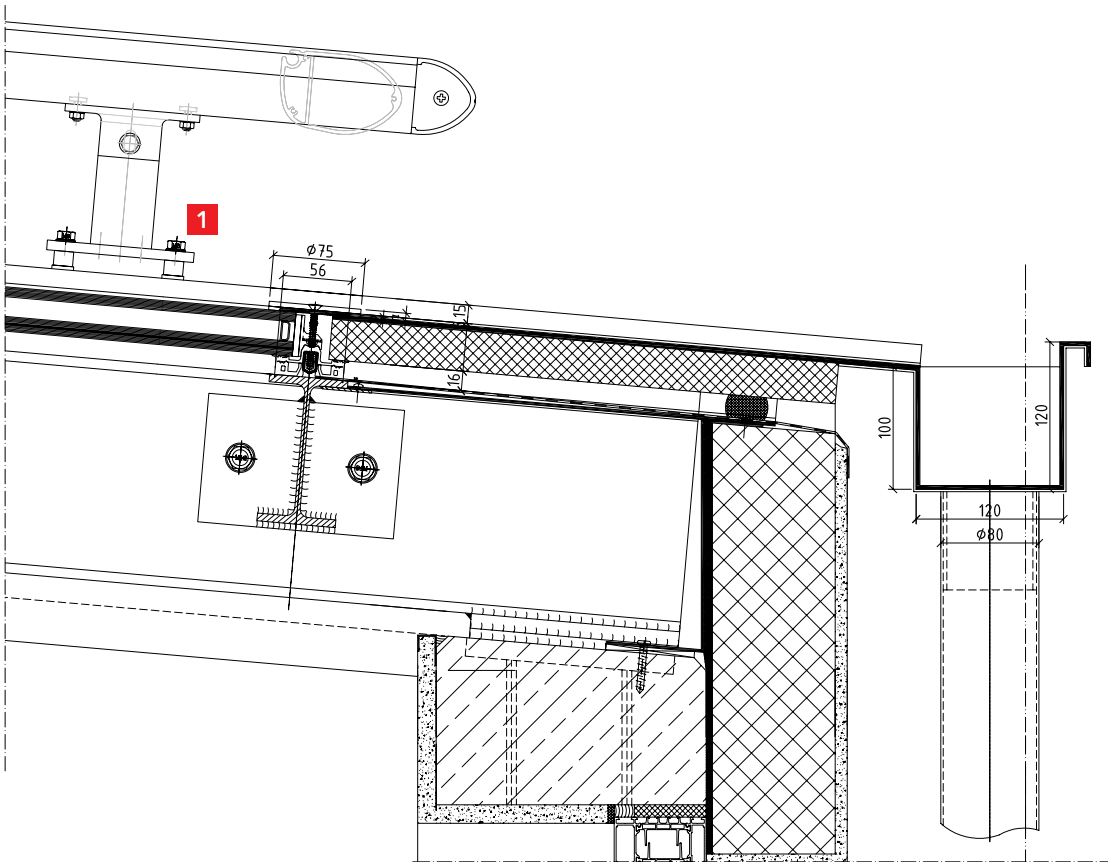
Award
2017 – „Beispielhaftes Bauen"
Baden Württemberg


Heinz Heister


lohn-ag.de
Heinz Heister


Hein Herster

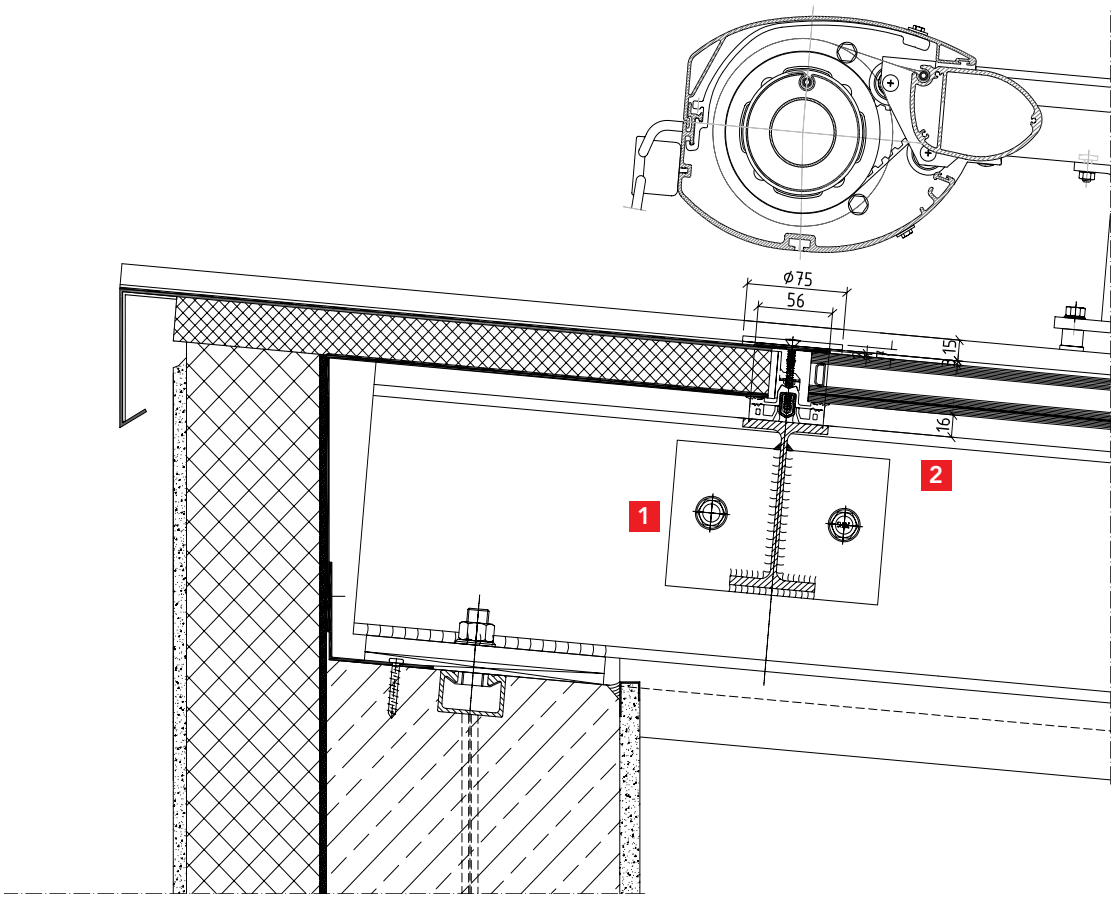
Eaves detail



100 mm

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

Ridge detail

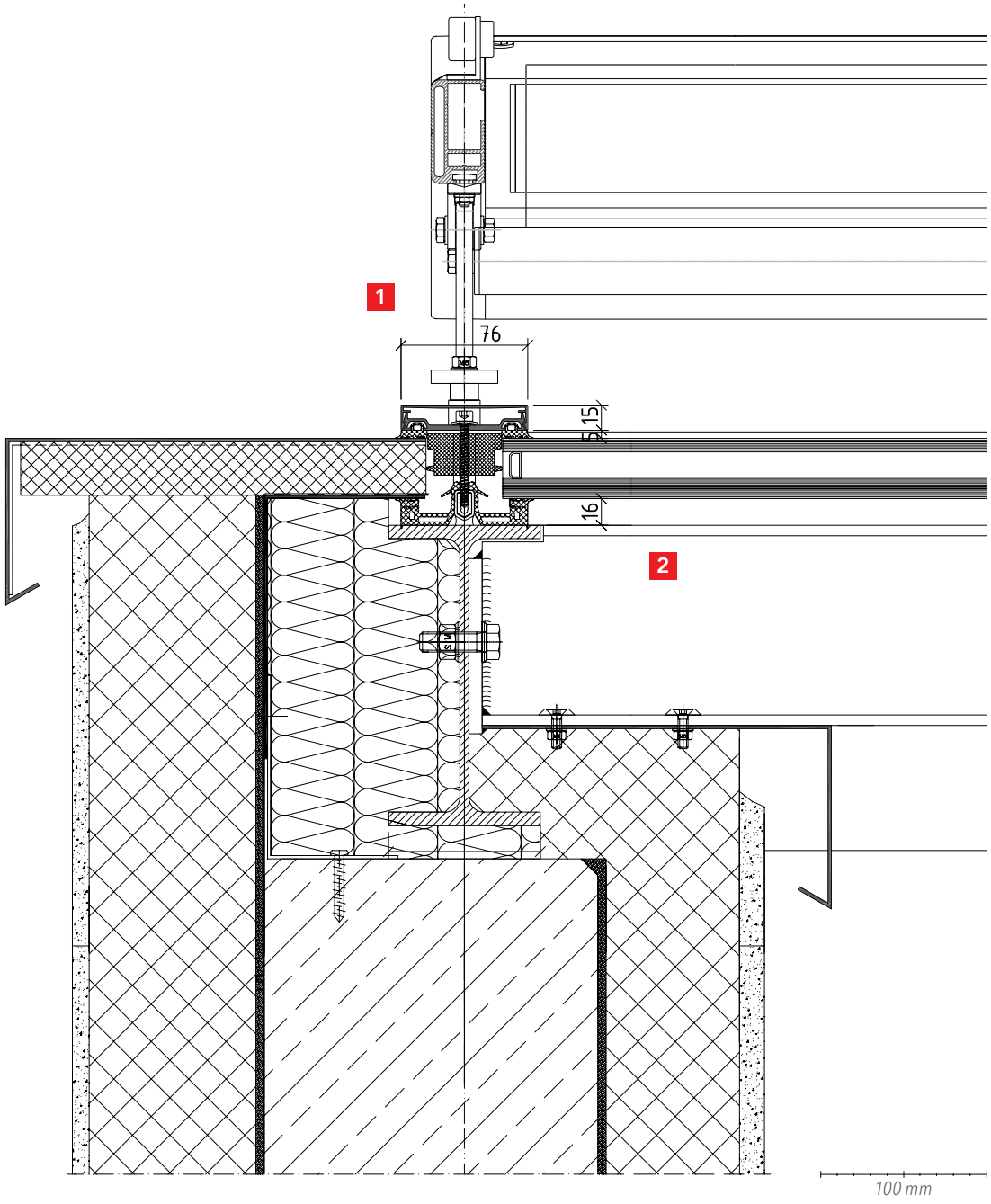


100 mm

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

Verge Flashing



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

Location
Hanover, Germany

Owner
Johnson Controls

Architecture
Schulze und Partner Architekten

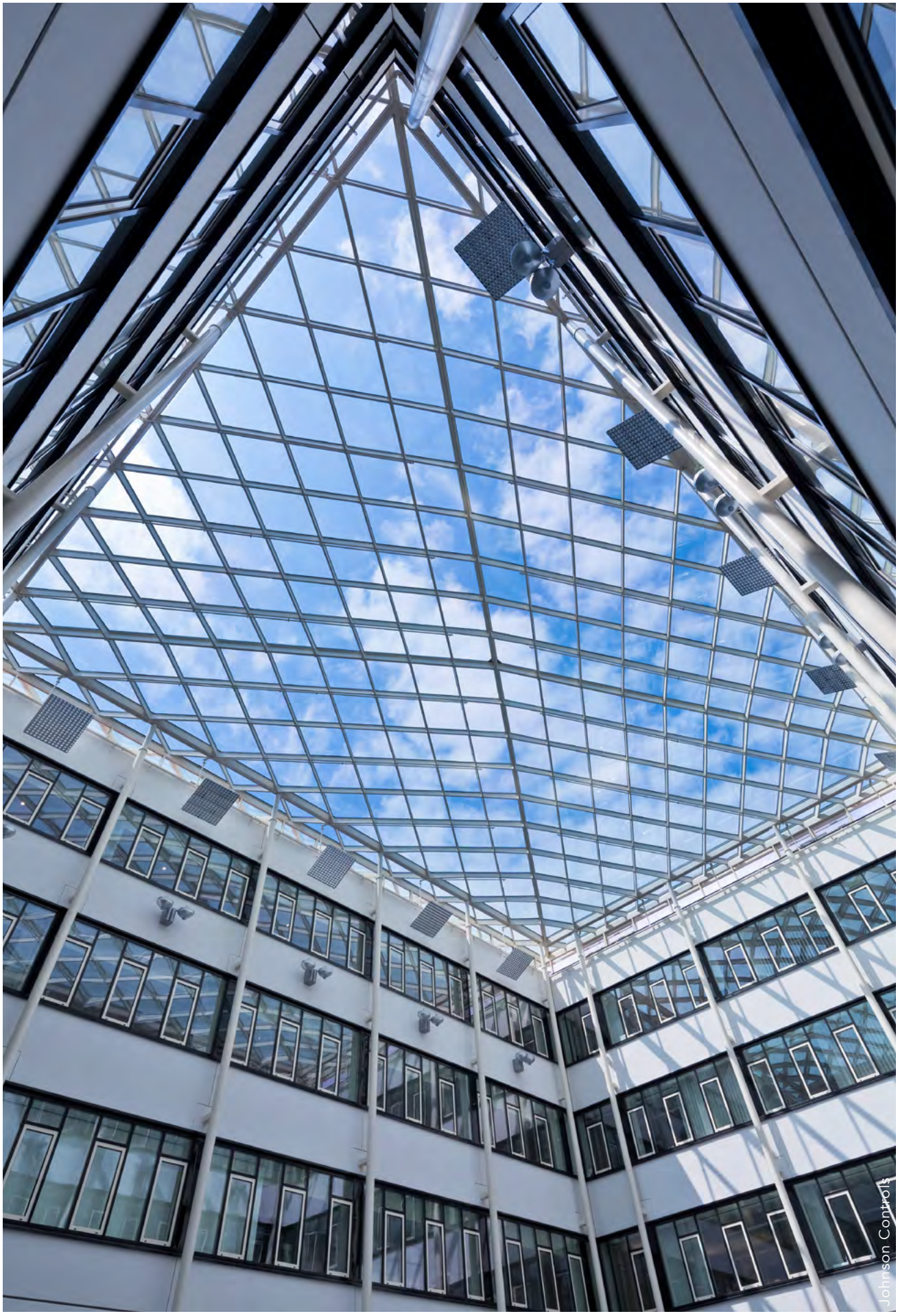
Fabricator
Metallbau Burckhardt GmbH

RAICO system
Glass roof: THERM^{+} 76 S-I

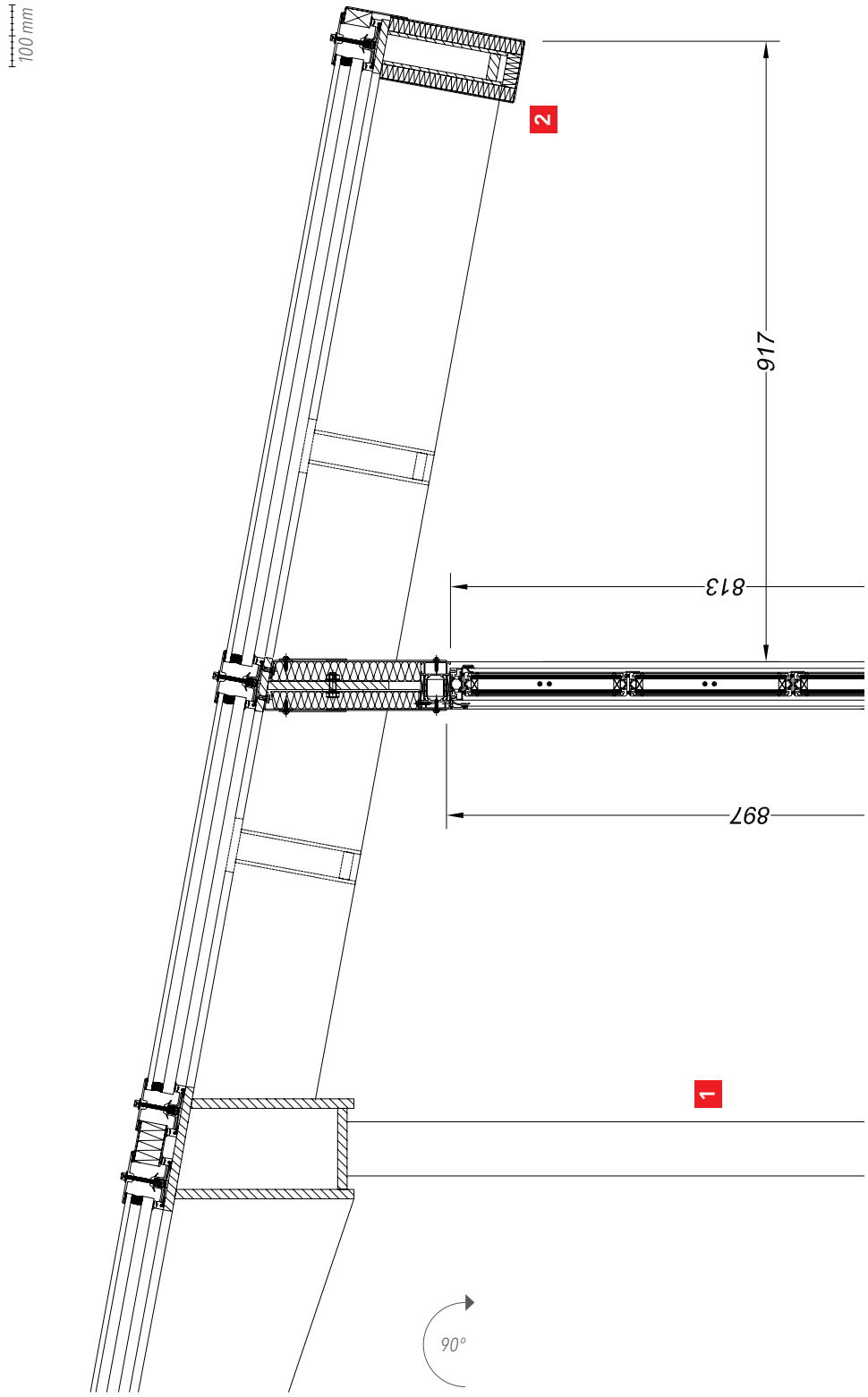
Glazed area in the roof
525 m²

Special features
Glass roof in pyramid form


Johnson Controls


Johnson Controls

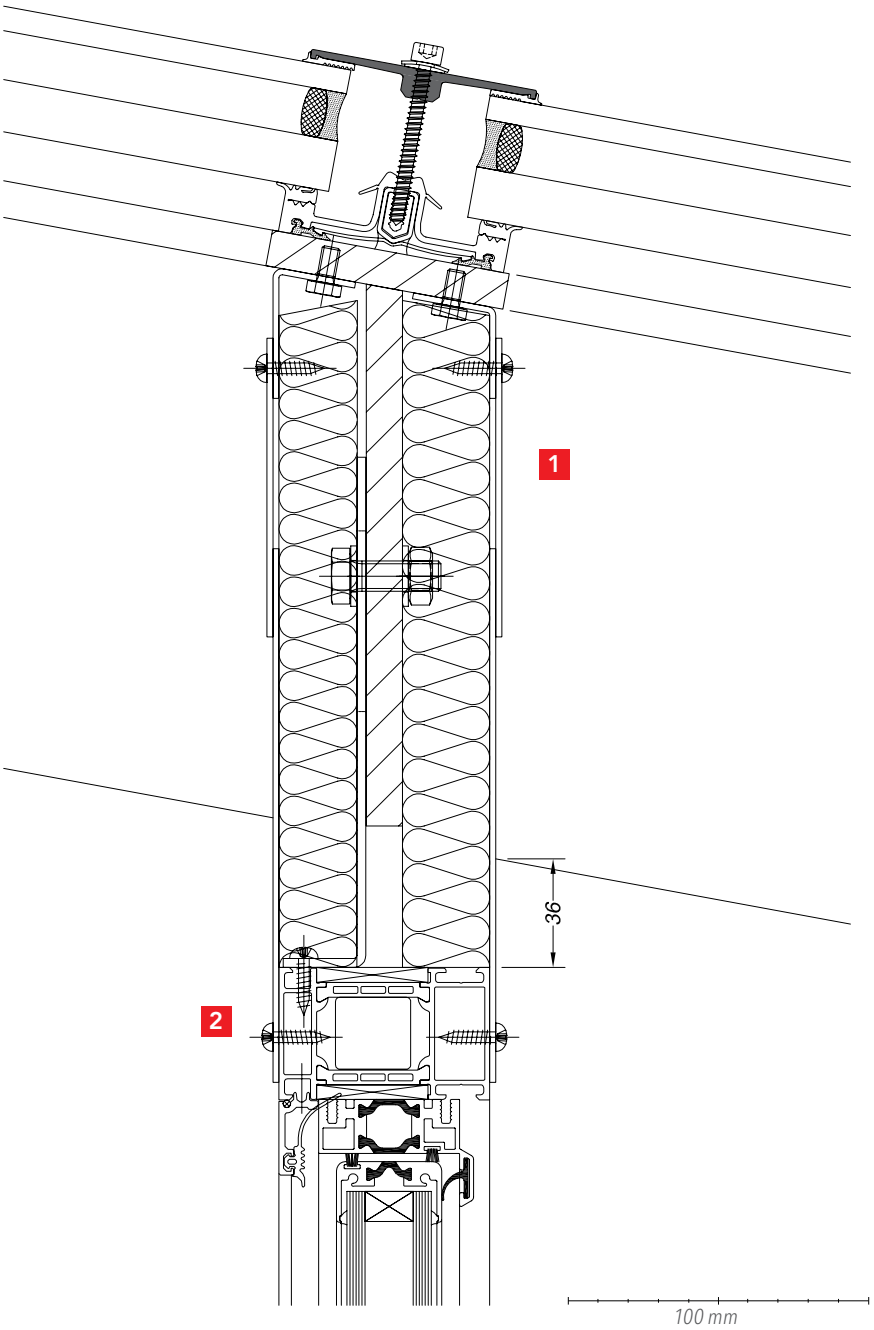
Eaves with overhanging roof



2 Insulated structural profiles externally

1 Glass roof supported on internal steel columns

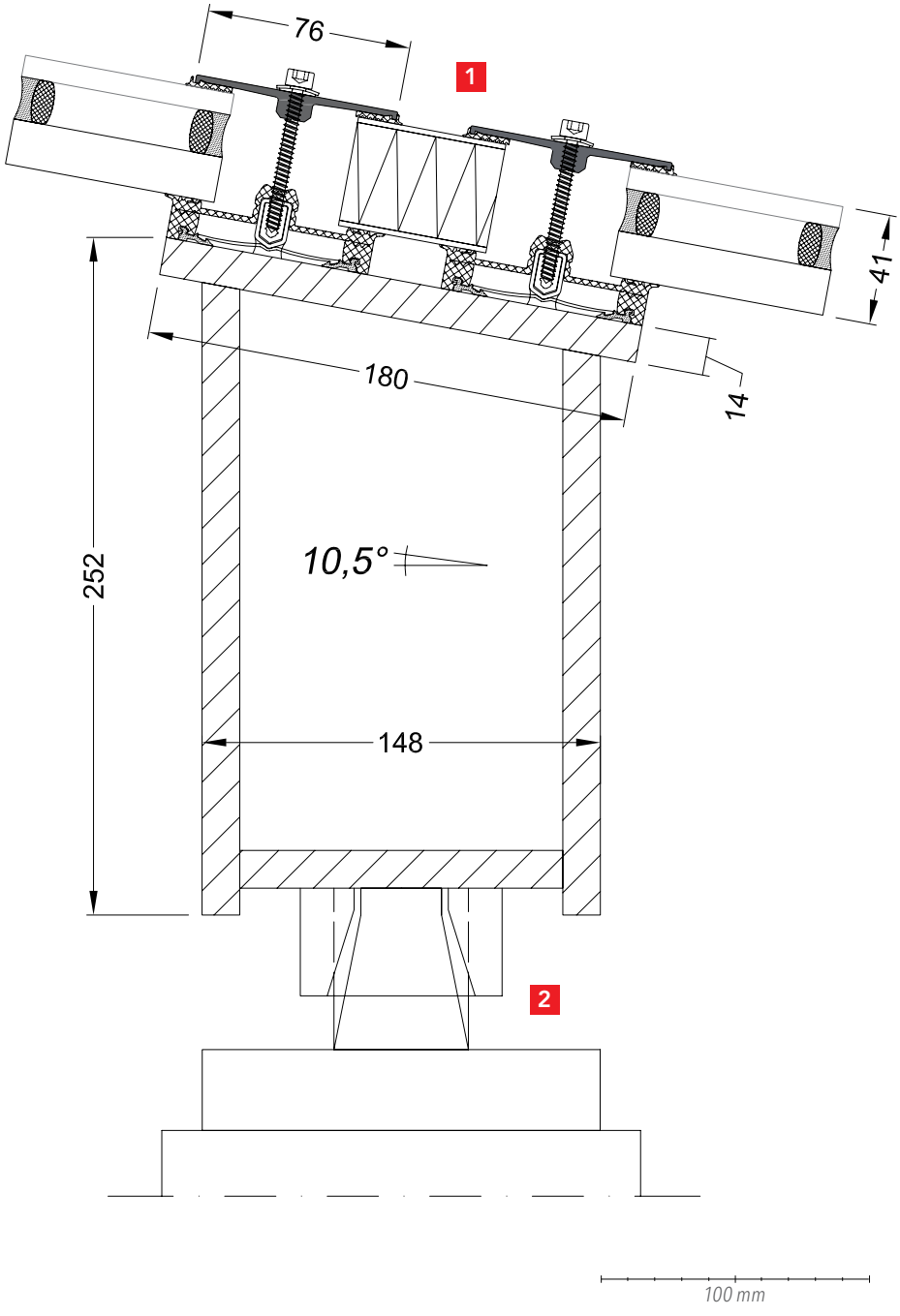
Transition glass roof / apron



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

2 Apron with integrated ventilation plates

Perimeter profile with column supports



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

2 Supporting steel columns

MÄSTERHUSET
STOCKHOLM

Location
Stockholm, Sweden

Owner
Pembroke Real Estate

Architecture
Ivar Tengbom

Fabricator
Scheldebouw B.V., Heerlen

RAICO system
Glass roof: THERM^{+} A-I

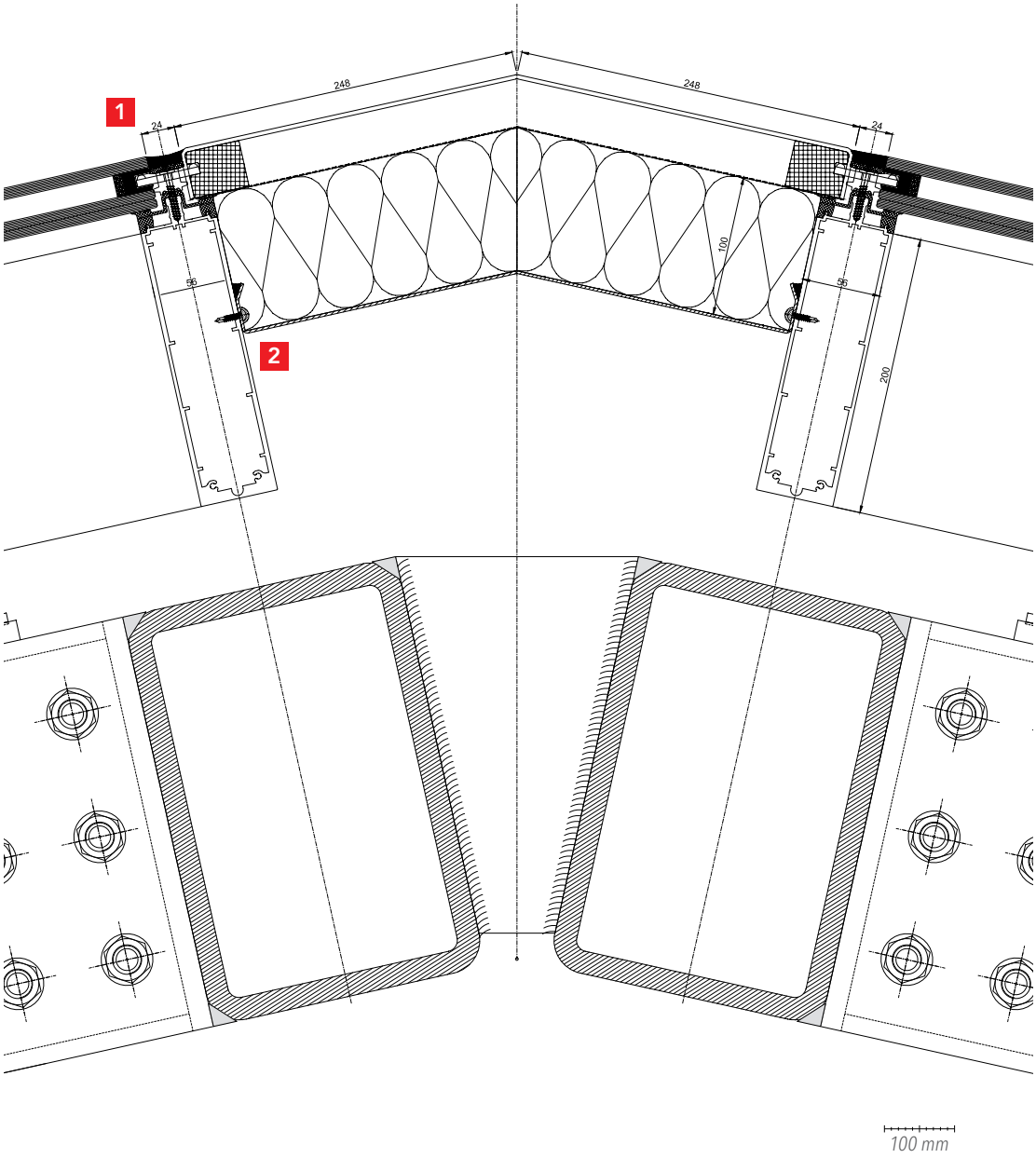
Special features
Complete roof in SG2 without additional mechanical suction securing devices

Award
LEED Platinum

Scheldebouw B.V.

Scheldebouw B.V.

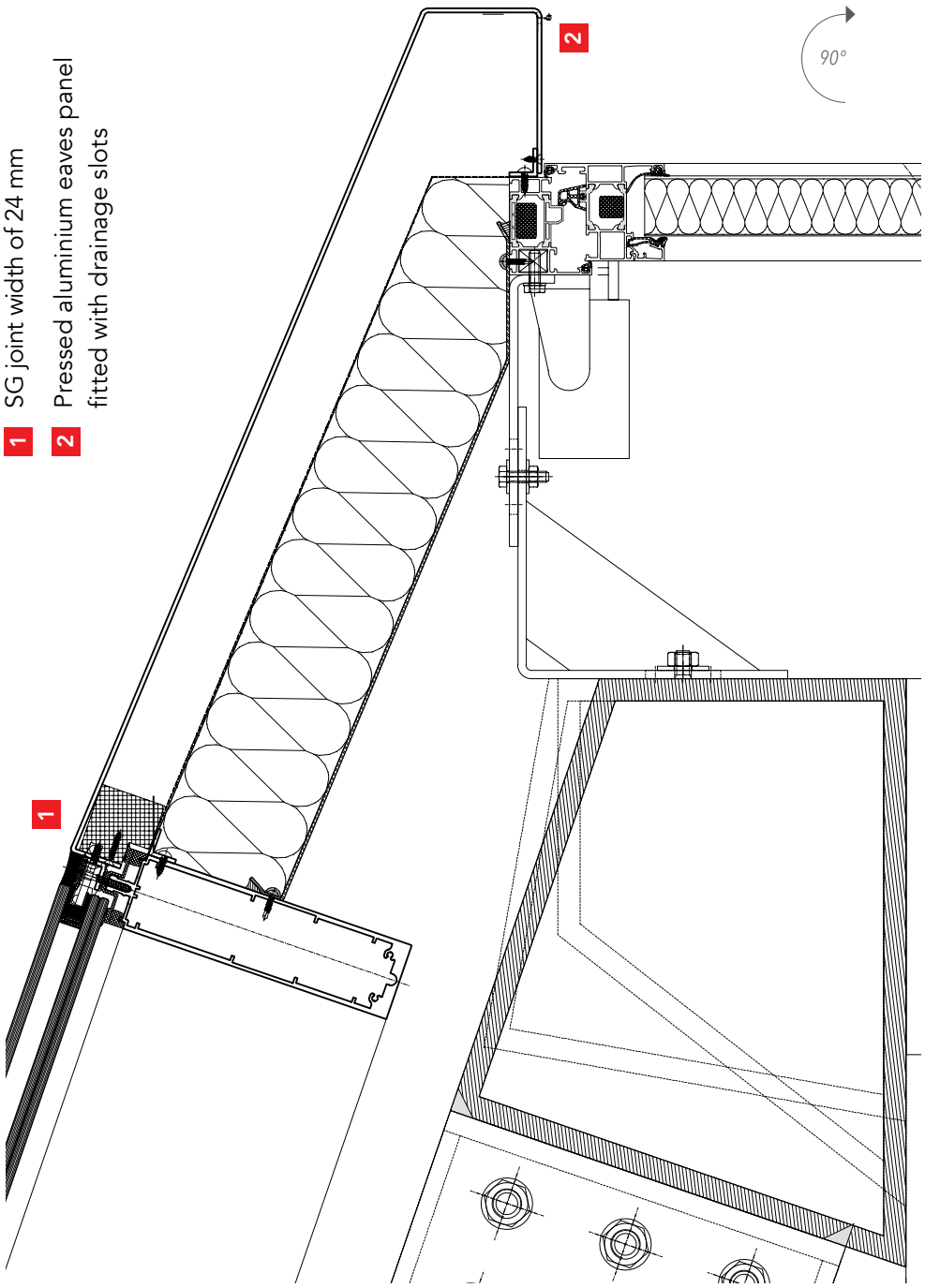
Hip rafter using SG detail



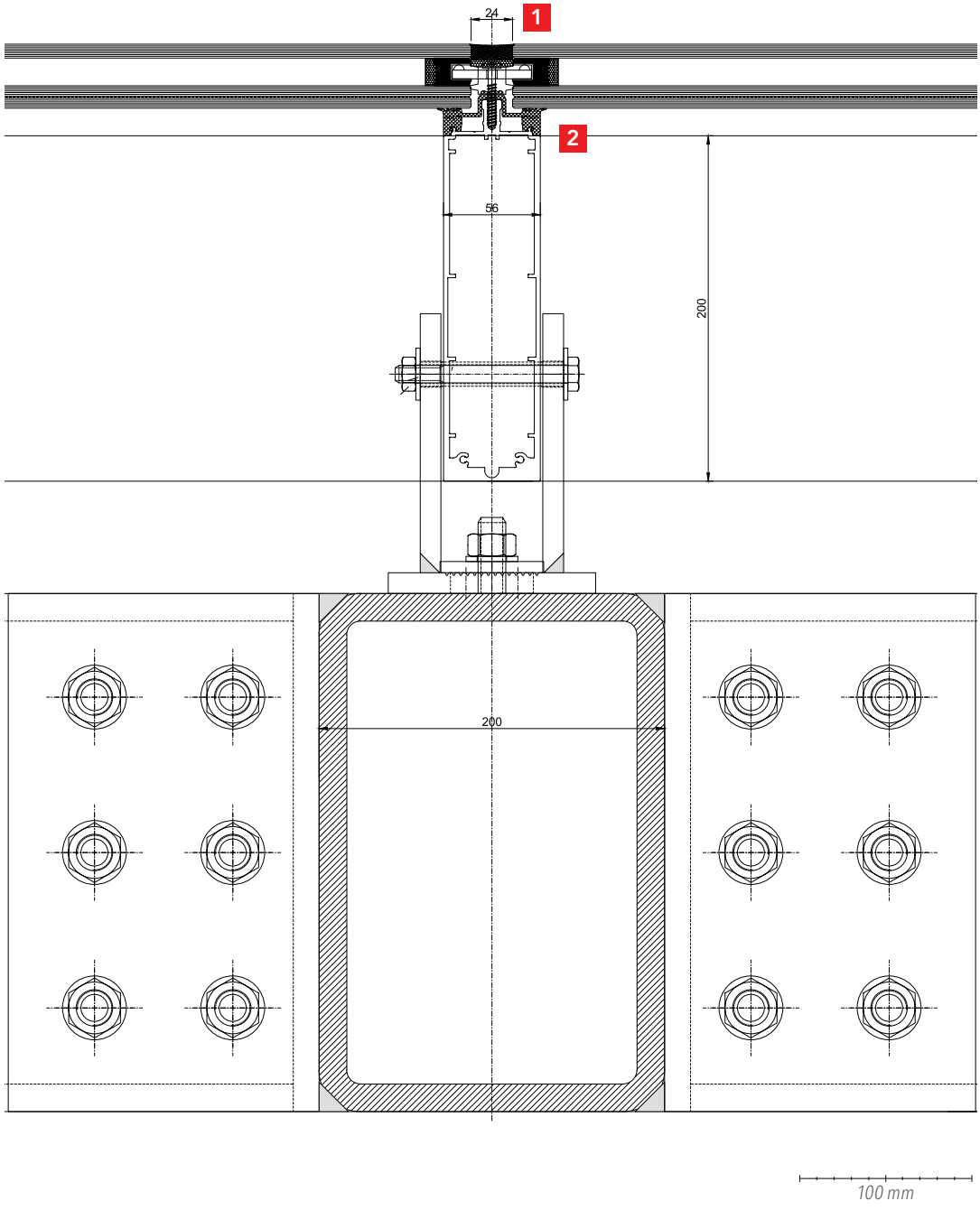
1 The outer heat soak tested tempered safety glass to be minimum 8 mm thick due to the minimum thickness of the silicone joint

2 Panel has to be vapour-tight sealed internally

Eaves detail with interface to vertical opening vent



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


Rainer Rehfeld

STADTWERKE
BOCHUM

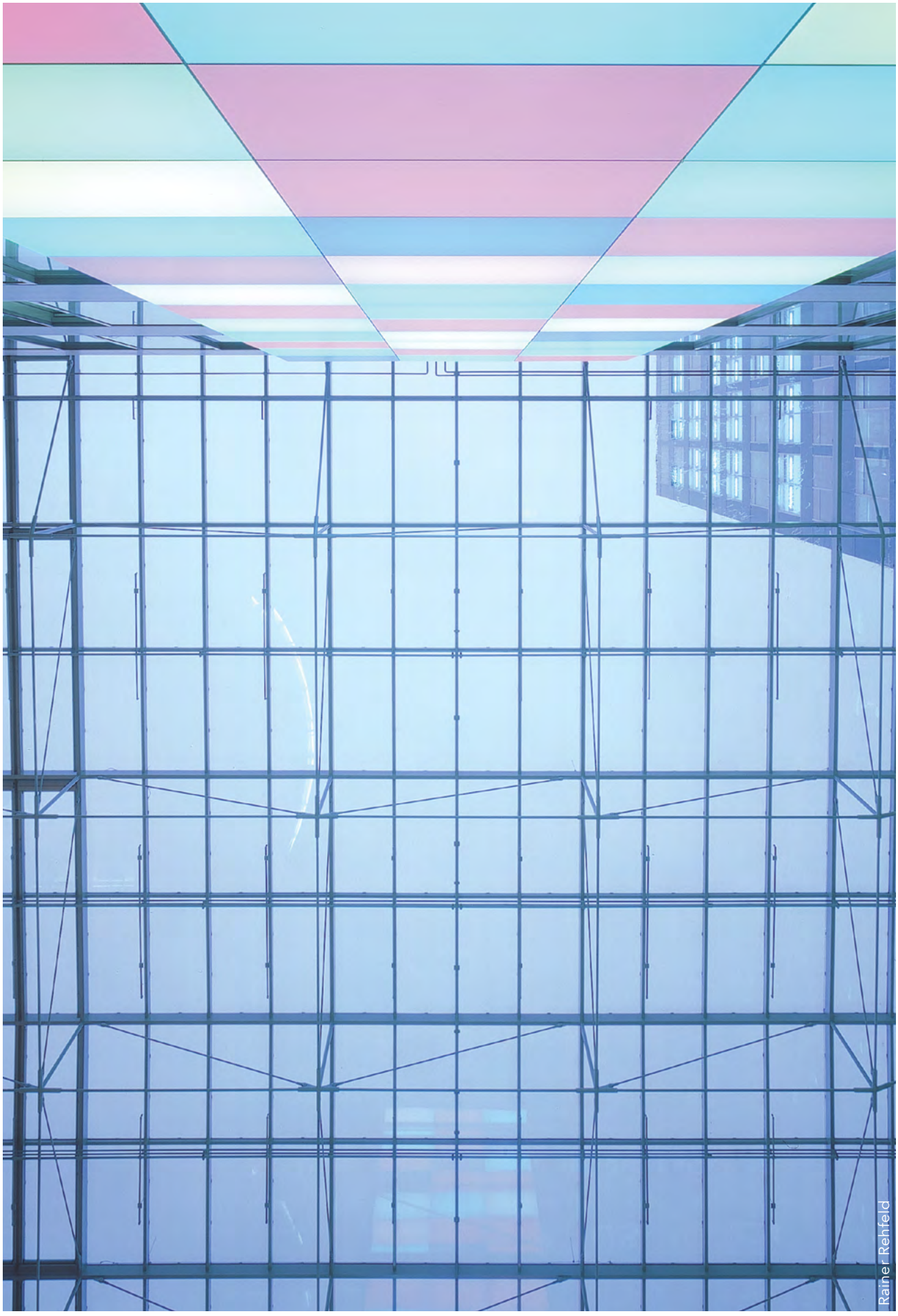
Location
Bochum, Germany

Owner
Stadtwerke Bochum GmbH

Architecture
Gatermann & Schlossig, Cologne

Fabricator
Bender GmbH & Co. KG

RAICO system
Glass roof: THERM^{+} S-I



Rainer Rehfeld

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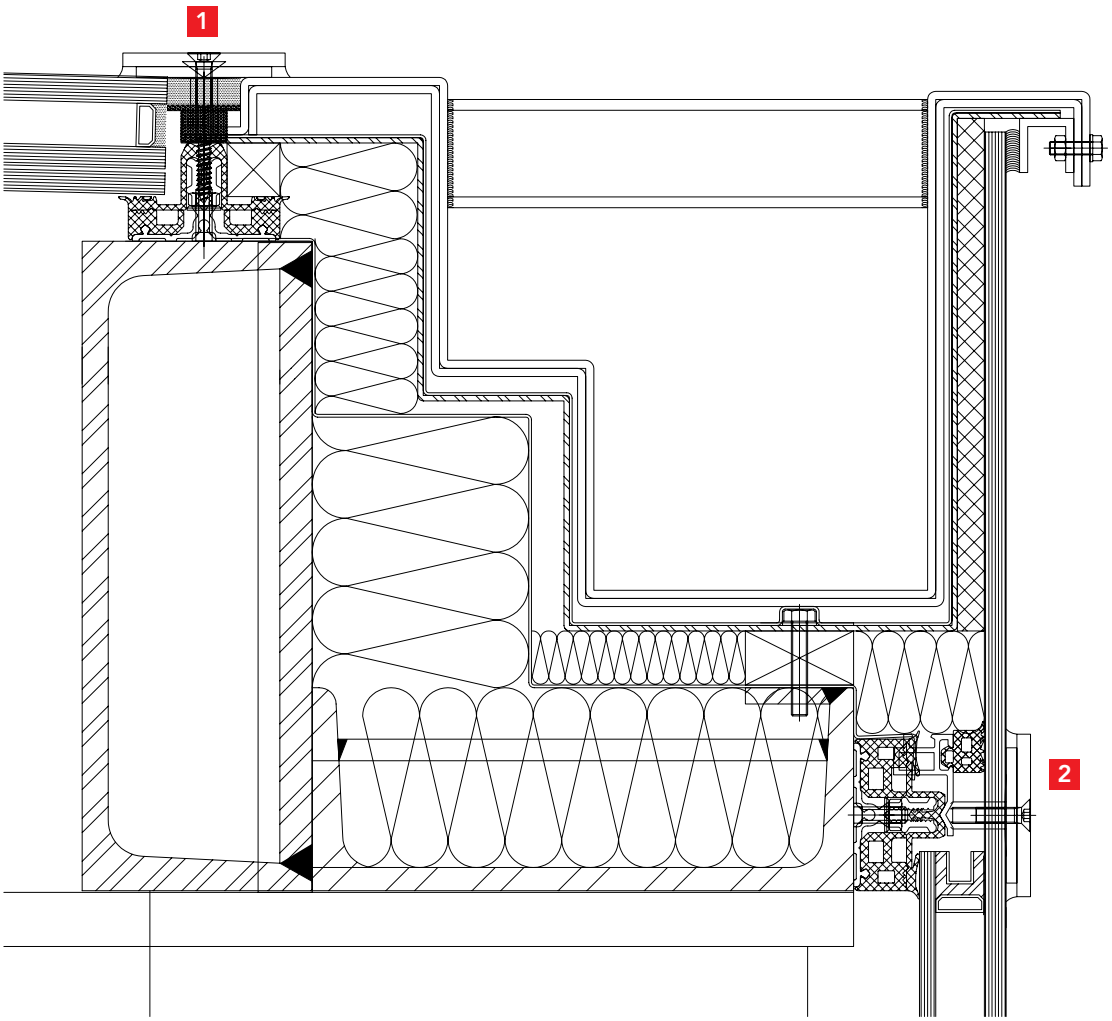
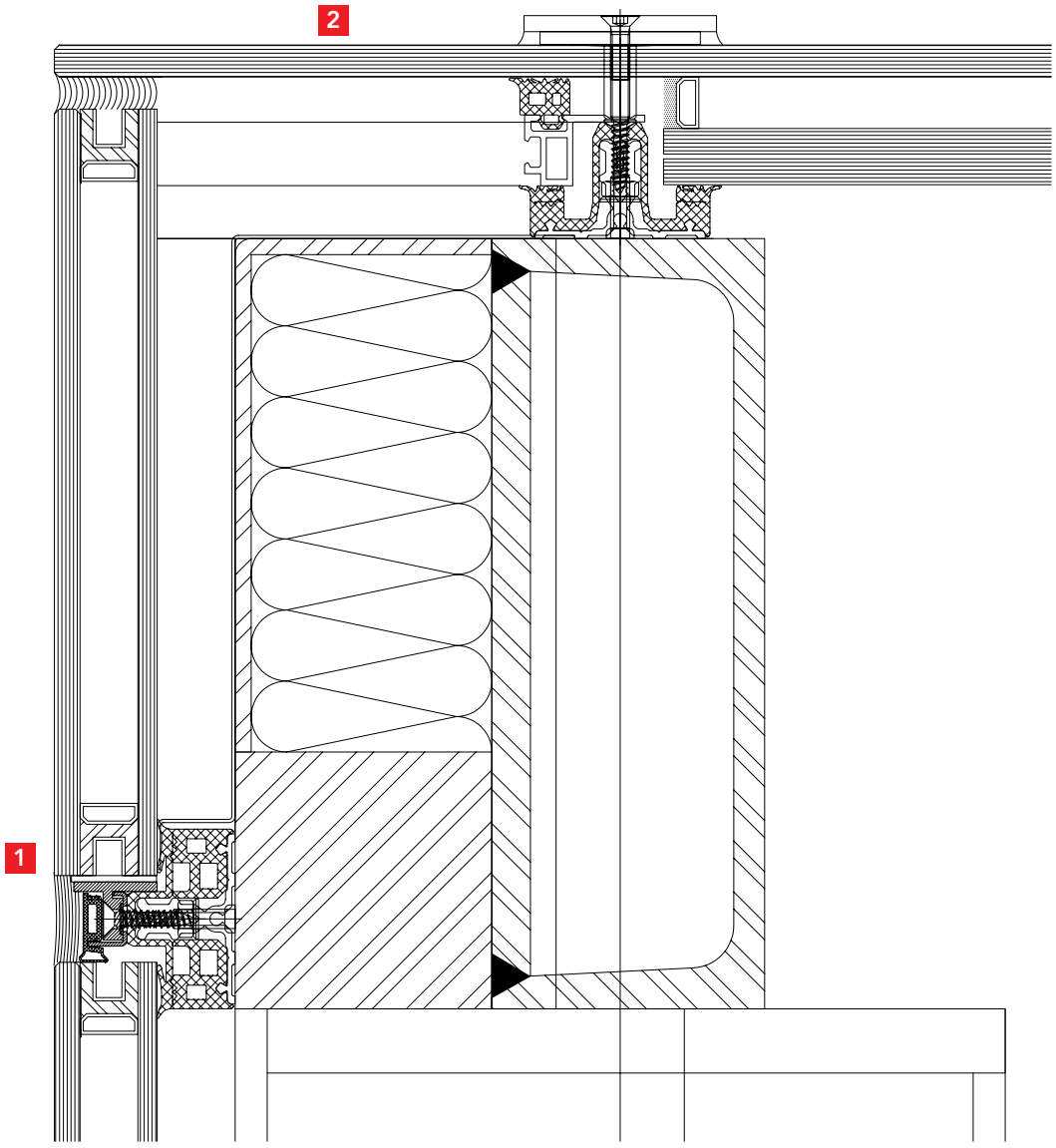
Eaves with gutter



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"

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