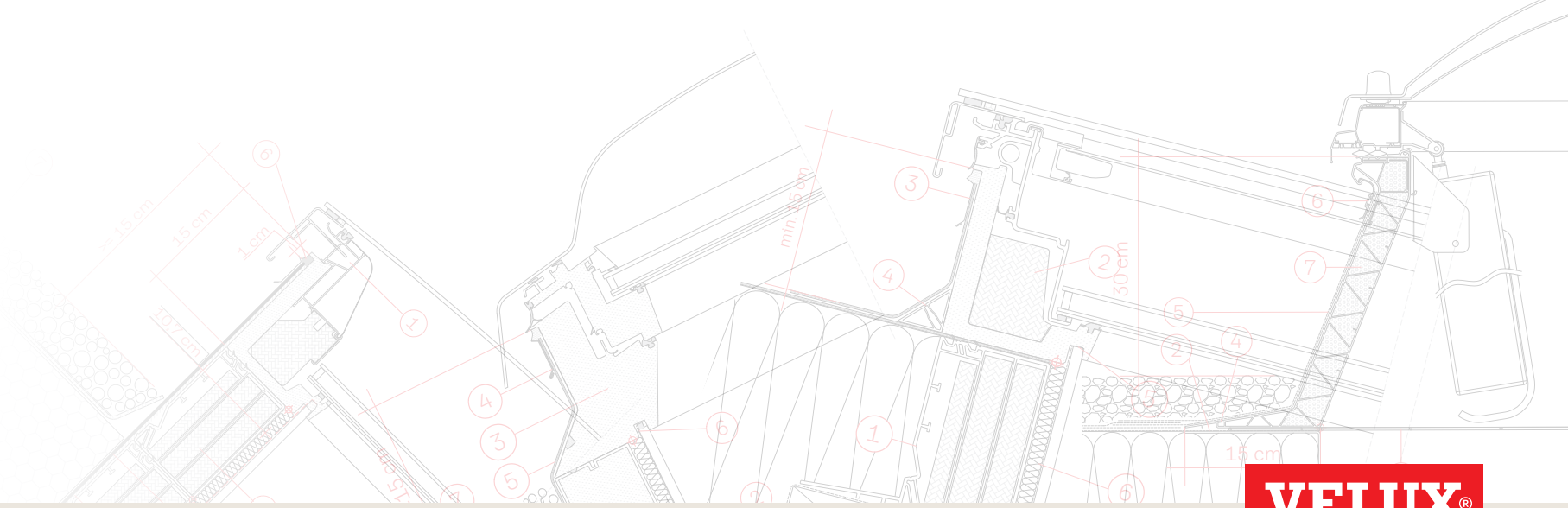


Design Guide

Flat roof

Design Guide

01/ Basics

Basics

1.1 Basic design rules

1.2 Basic daylight needs

1.3 Daylight recommendations

1.4 Daylight distribution

1.5 Daylight performance

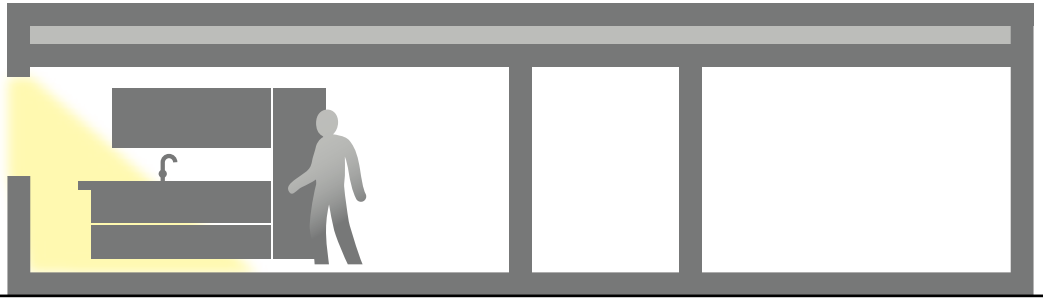
1.6 Rooflight organization

1.7 Daylight Visualizer

1.8 Flat roof windows

1.1 /Basic design rules

Optimal indoor climate design under flat roof



Max. dayligted area
from facade window 3,5 m

No sufficient daylight

light

Air exchange in the room 1.5× per hour

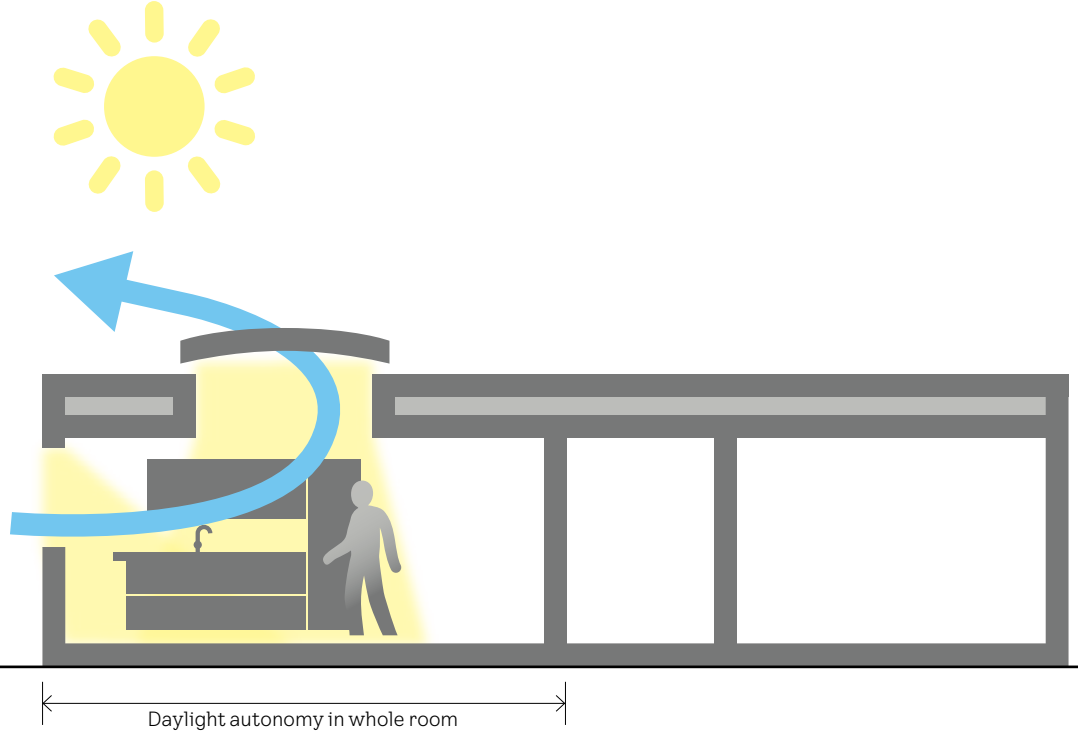
ventilation

Cramped, dark space

comfort

1.1 /Basic design rules

Optimal indoor climate design under flat roof



Modern solutions:
targeted top light
to the work area

light

Air exchange
in the room
2.5× per hour

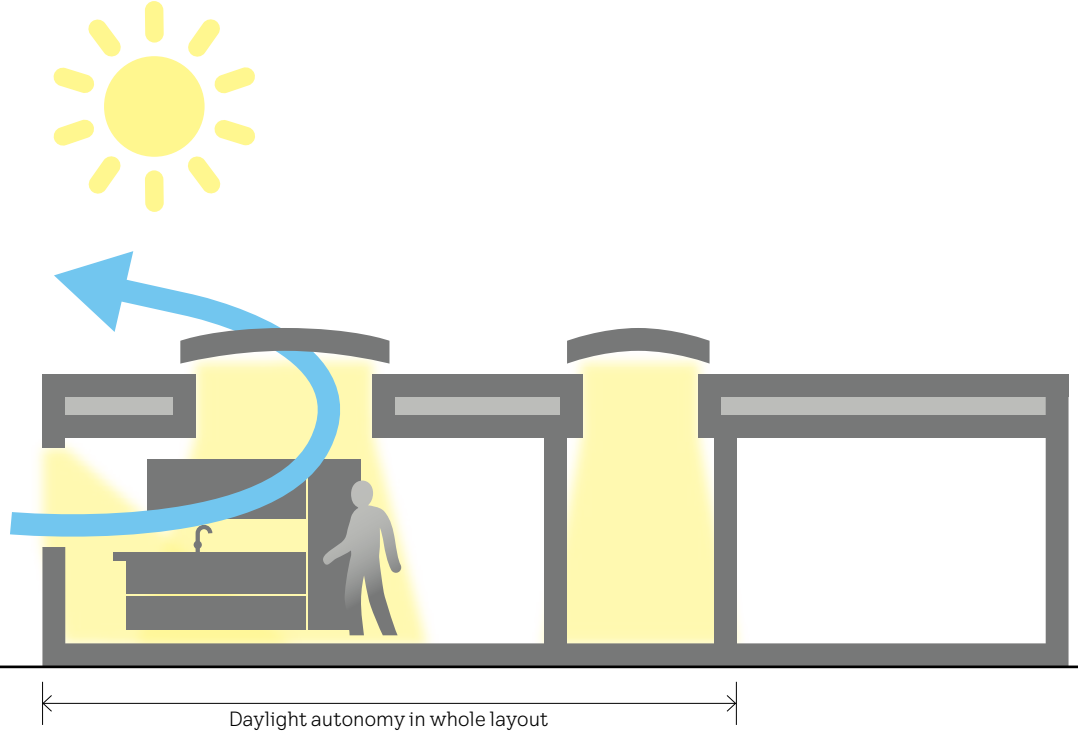
ventilation

Great visual
impression, great-
er psychological
well-being

comfort

1.1 /Basic design rules

Optimal indoor climate design under flat roof



Targeted illumination of all interior spaces

light

Air exchange in the room 2.5× per hour

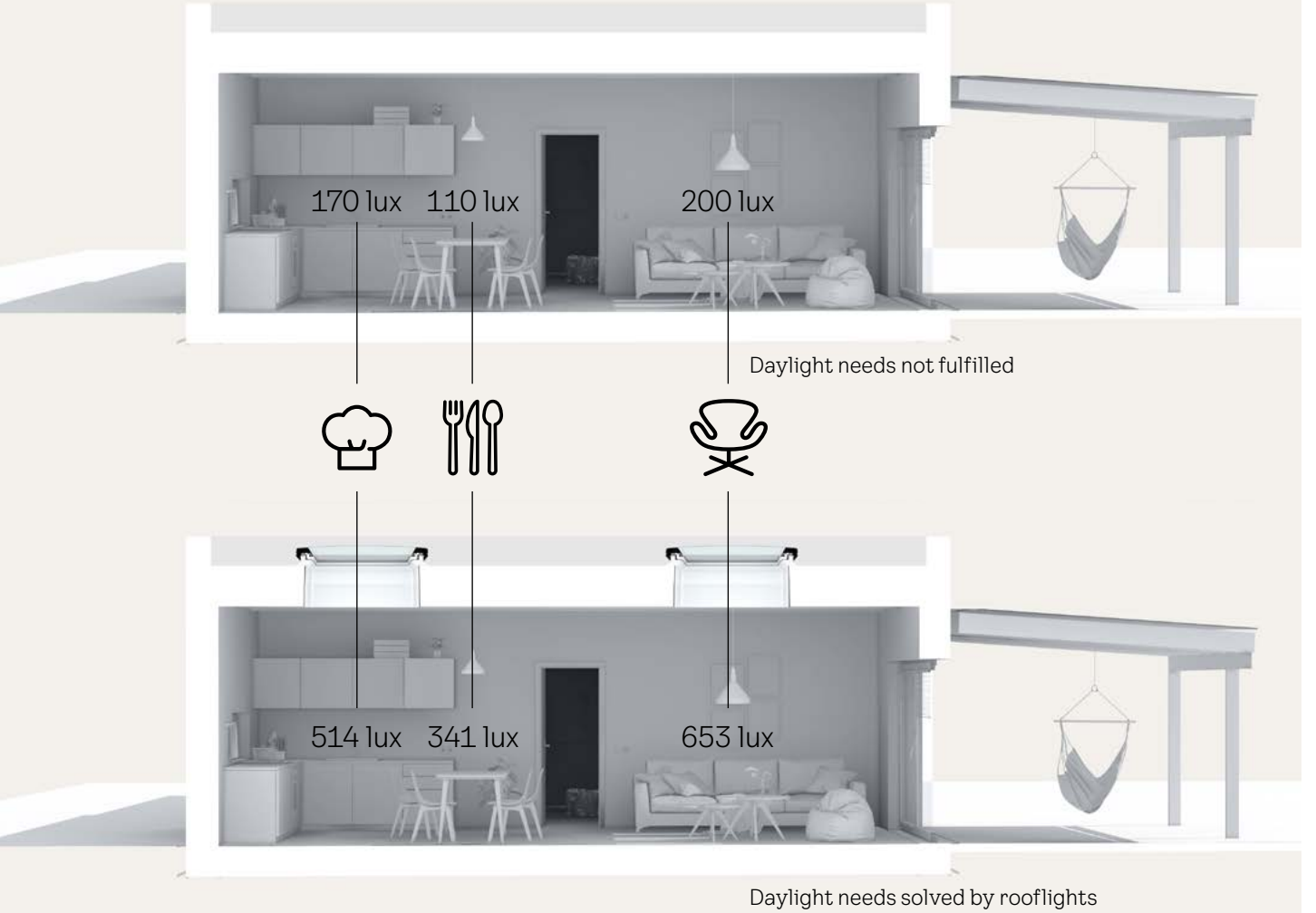
ventilation

No need for artificial lighting during the day

comfort

1.2 /Basic daylight needs

Daylight needs fulfilled by targeted daylight through the roof



Daylight needs:

Working desk
kitchen
500 lux

Dining
dining room
300 lux

Reading
living room
500 lux

1.3 /Daylight recommendation

European Standard for daylight in buildings EN 17037

The European Standard for daylight in buildings recommends that a a certain amount of daylight (300, 500 or 750 lux) is available for 50% of daylight hours during the year, over 50% of the relevant work plane area.

These requirements can be evaluated with climate-based annual simulations (method 2), or daylight factor simulations (with daylight factor targets corresponding to illuminance values) (method 1).

*

Country	Capital	D 300 lx	D 500 lx	D 750 lx
Turkey	Ankara	1,60%	2,60%	3,90%
Bulgaria	Sofia	1,60%	2,70%	4,00%
Romania	Bucharest	1,60%	2,70%	4,10%
Croatia	Zagreb	1,80%	2,90%	4,40%
Slovenia	Ljubljana	1,80%	2,90%	4,40%
Hungary	Budapest	1,70%	2,80%	4,10%
Slovakia	Bratislava	1,80%	3,10%	4,60%
Czech R.	Prague	2,00%	3,40%	5,00%
Poland	Warsaw	2,00%	3,40%	5,10%
UK	London	2,10%	3,50%	5,30%
Lithuania	Vilnius	2,00%	3,30%	4,90%
Latvia	Riga	2,20%	3,70%	5,50%
Estonia	Tallinn	2,20%	3,70%	5,50%

EN 17037 recommendations for daylight availability

Target illuminance (lux) or daylight factor levels

50% of daylight hours during the year

50% of the relevant work plane area

Method 1.

Target daylight factor levels for daylight factor simulations

*

2.1%
United Kingdom (LOW)

3.5%
United Kingdom (MEDIUM)

5.3%
United Kingdom (HIGH)

Method 2.

Target illuminance (lux) levels for climate-based annual simulations

300 lux
(LOW)

500 lux
(MEDIUM)

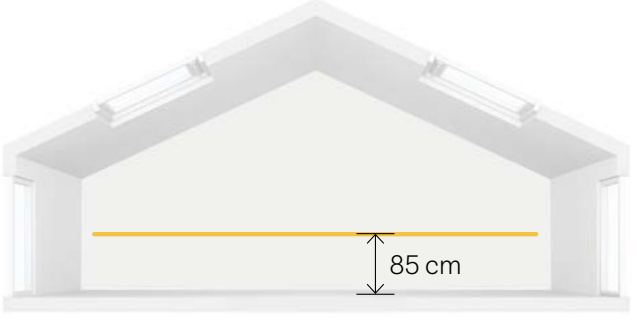
750 lux
(HIGH)

1.3 /Daylight recommendations

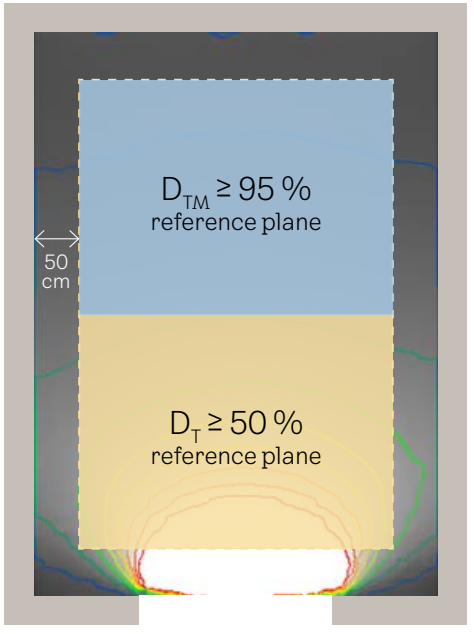
Criteria for daylight provision

D_T Target daylight factor
≥ 50 % reference plane

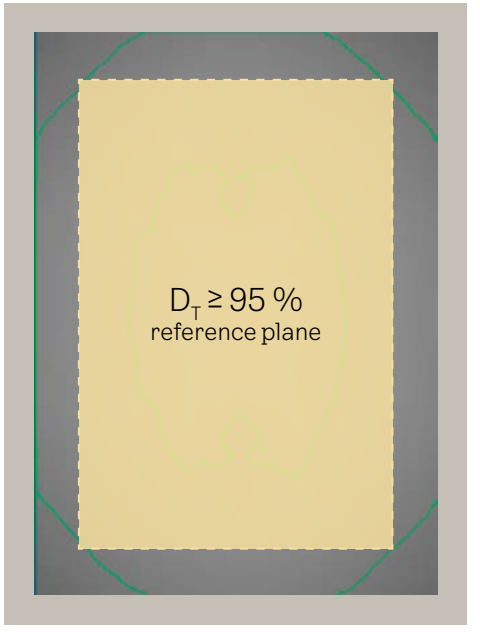
D_{TM} Minimum target daylight factor
≥ 95 % reference plane



Reference plane



Interiors with opening in vertical and slope.

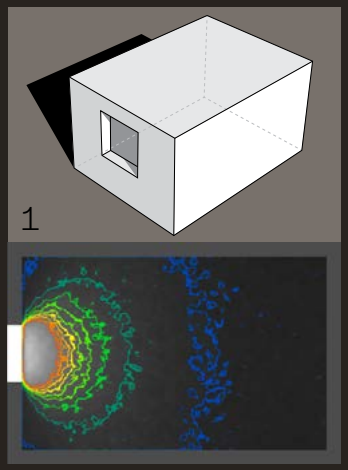


Interiors with a nearly horizontal opening.

All daylight calculations in the Flat Roof Design Guide were made with CVP flat roof windows.

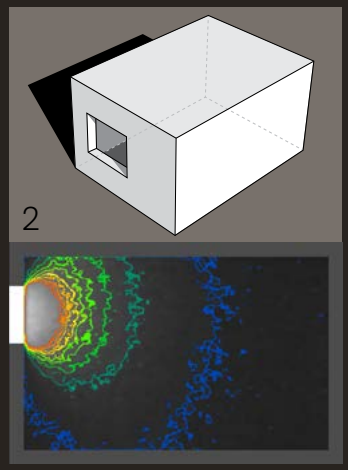
1.3 /Daylight recommendations

Daylight factor comparison for 3 rooms with 10% glazing to floor area ratio



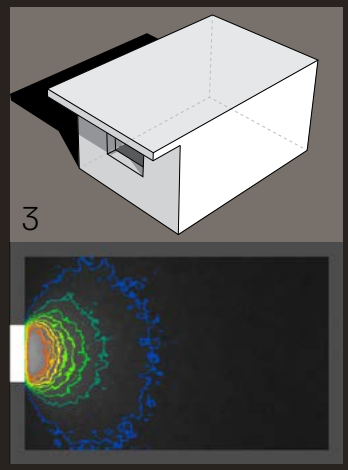
Median
Daylight Factor
1.41%

Equivalent lux
196 lux



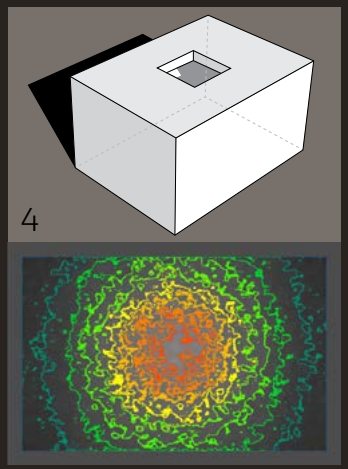
Median
Daylight Factor
1.00%

Equivalent lux
139 lux



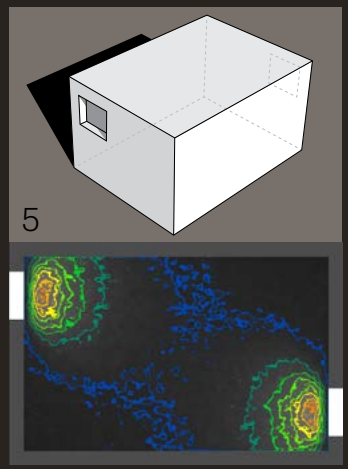
Median
Daylight Factor
1.06%

Equivalent lux
147 lux



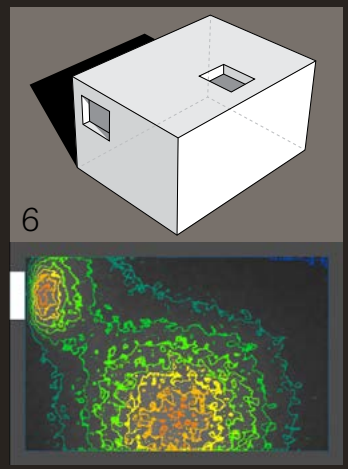
Median
Daylight Factor
7.16%

Equivalent lux
995 lux



Median
Daylight Factor
1.48%

Equivalent lux
205 lux

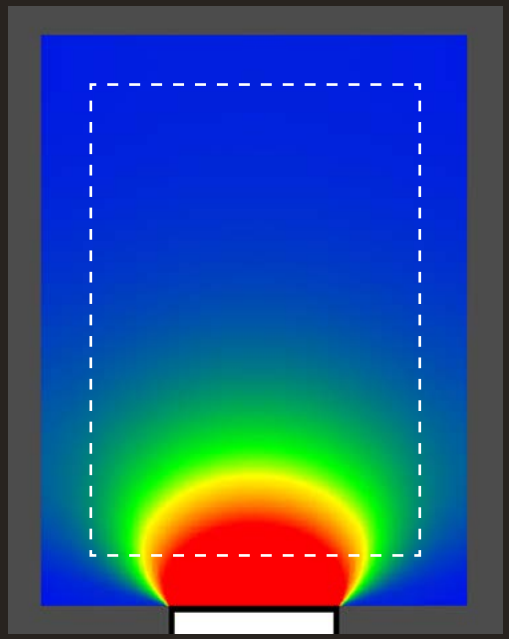


Median
Daylight Factor
3.86%

Equivalent lux
536 lux

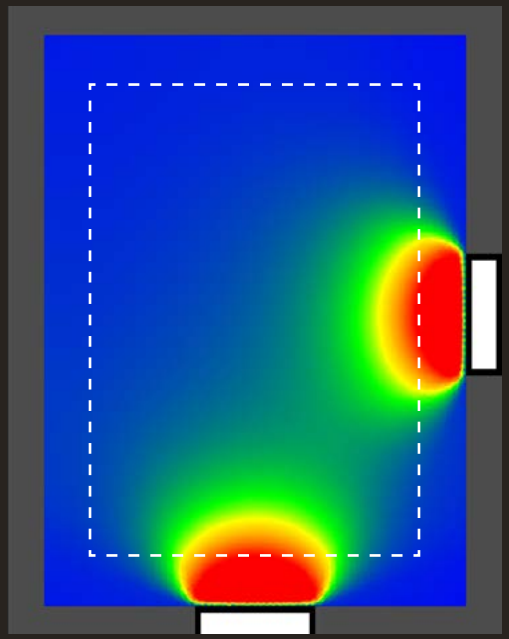
1.3 /Daylight recommendations

Daylight factor comparison for 3 rooms with 10% glazing to floor area ratio



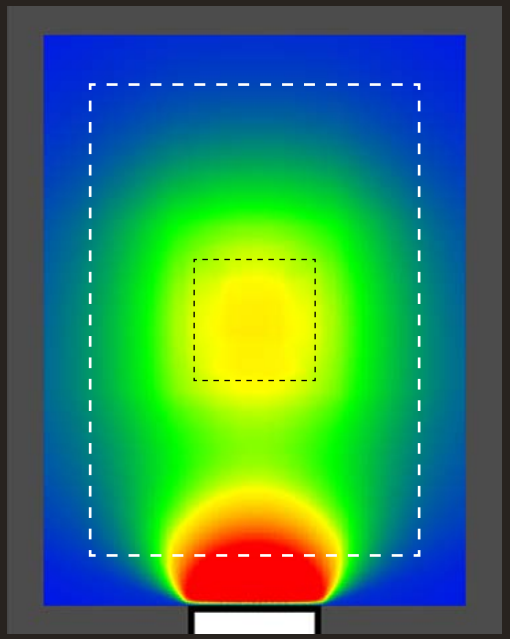
10% glazing to floor area ratio
distributed on one facade

Median daylight factor (DF) = 0.99%
Below EN 17037 recommendation



10% glazing to floor area ratio
distributed on two facades

Median daylight factor (DF) = 1.22%
Below EN 17037 recommendation



10% glazing to floor area ratio
distributed on one facade and the roof

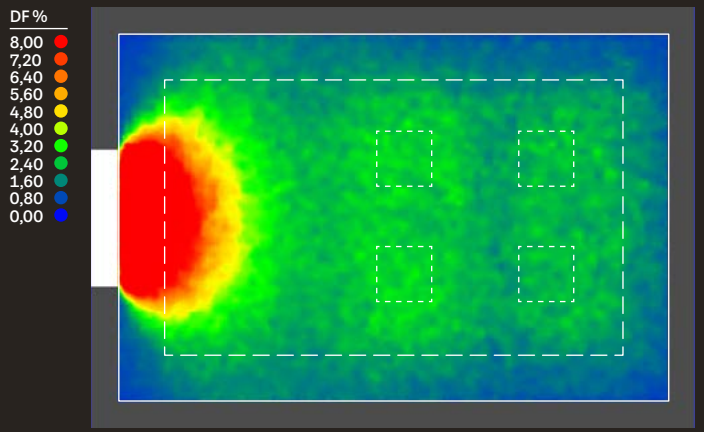
Median daylight factor (DF) = 3.05%
Above EN 17037 recommendation

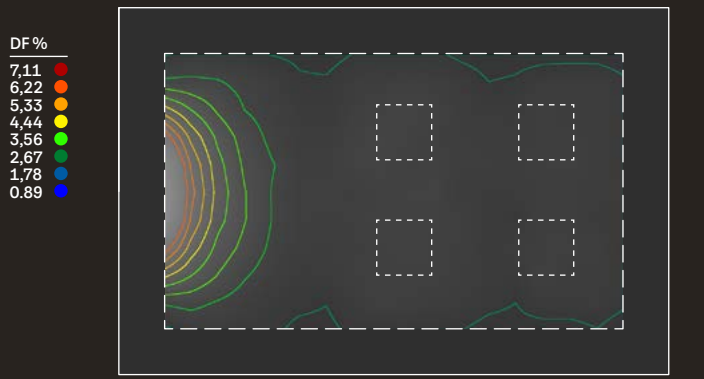
Top light offer best daylight distribution to fulfill Daylight Standard

1.4 /Daylight distribution / size

Rooflight size impact to daylight distribution

4x rooflight 600/600

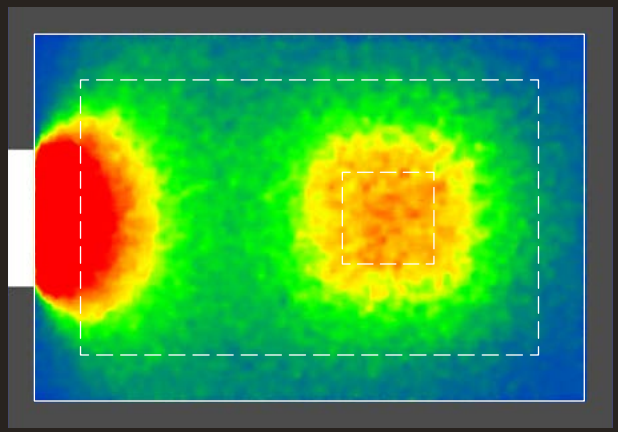


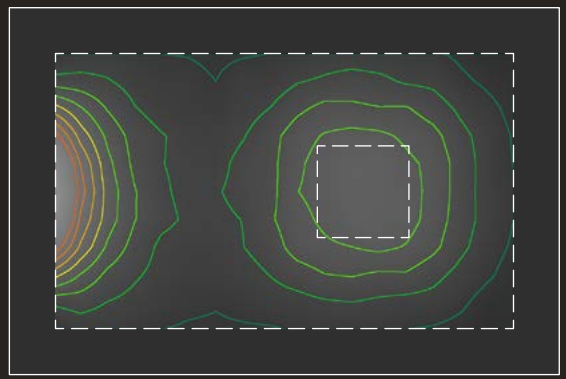


EN17037

F_{plane},% ≥ 50% (median)	DT	2.16 DF[%]	322 lux
F_{plane},% ≥ 95%	DTM	1.64 DF[%]	244 lux

1x rooflight 1000/1000





EN17037

F_{plane},% ≥ 50% (median)	DT	2.65 DF[%]	395 lux
F_{plane},% ≥ 95%	DTM	1.57 DF[%]	235 lux

One big rooflight provides more daylight than more small ones

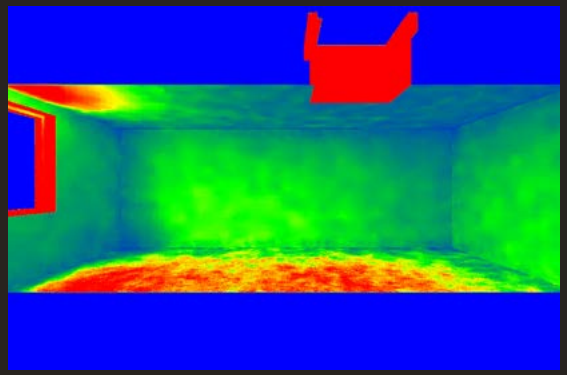
1.5 /Daylight performance / lining shape

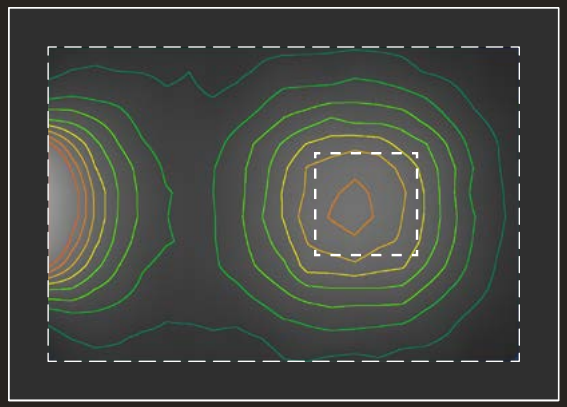
Lining shape influence daylight distribution

LUX
500
450
400
350
300
250
200
150
100
50
0

DF %
7,11
6,22
5,33
4,44
3,56
2,67
1,78
0.89

Narrow lining

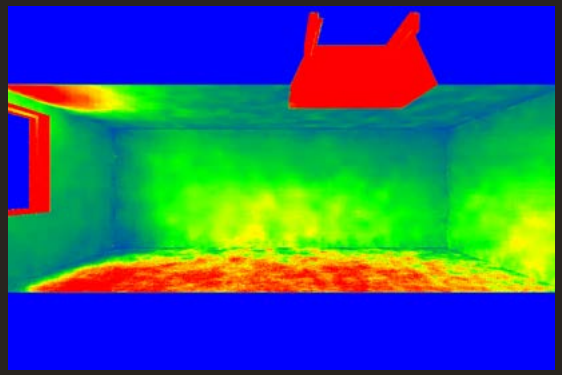


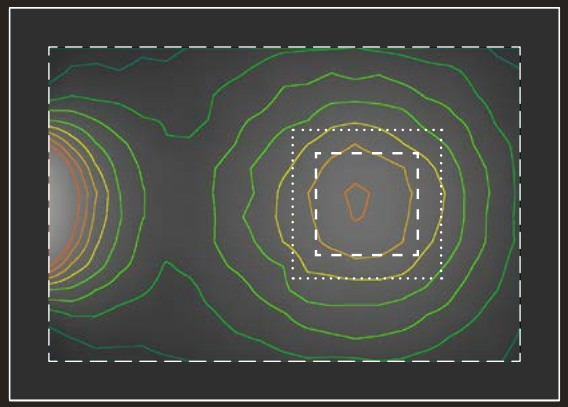


EN17037

F_{plane},% ≥ 50% (median)	DT	2.15 DF[%]	321 lux
F_{plane},% ≥ 95%	DTM	1.12 DF[%]	167 lux

Open lining





EN17037

F_{plane},% ≥ 50% (median)	DT	3.31 DF[%]	493 lux
F_{plane},% ≥ 95%	DTM	1.66 DF[%]	248 lux

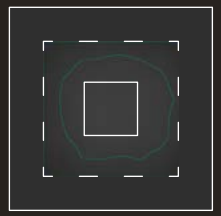
Open lining 25° improvement is 34% on F_{plane} median

1.5 /Daylight performance of rooflights / sizes

Explore how big area is daylighted by different rooflight sizes

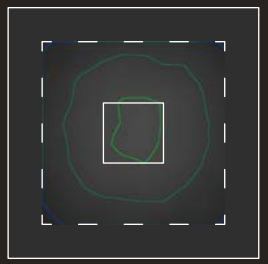
Group 1 – min. DT 1,6

(see table on page 10)



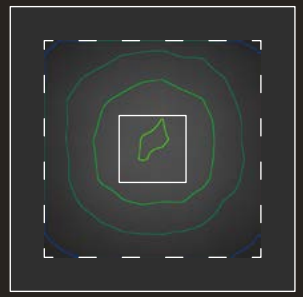
Rooflight 80/80 – room 3.00 x 3.00 m

F_{plane},% ≥ 95%	DT	1.70 DF[%]	Pass (231 lux)



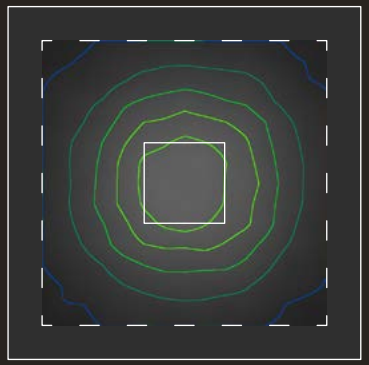
Rooflight 90/90 – room 3.70 x 3.70 m

F_{plane},% ≥ 95%	DT	1.65 DF[%]	Pass (224 lux)



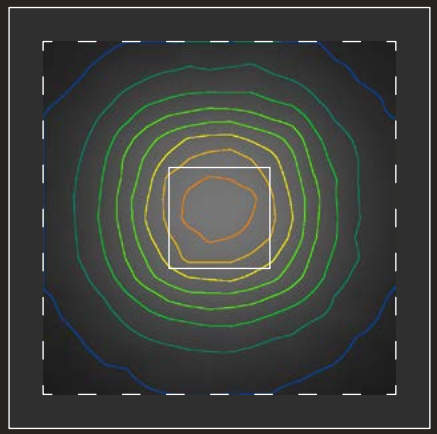
Rooflight 100/100 – room 4.20 x 4.20 m

F_{plane},% ≥ 95%	DT	1.70 DF[%]	Pass (232 lux)



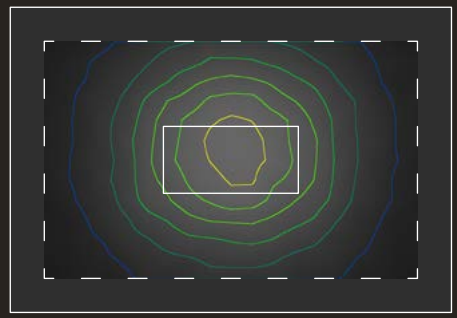
Rooflight 120/120 – room 5.20 x 5.20 m

F_{plane},% ≥ 95%	DT	1.64 DF[%]	Pass (223 lux)



Rooflight 150/150 – room 6.20 x 6.20 m

F_{plane},% ≥ 95%	DT	1.70 DF[%]	Pass (231 lux)



Rooflight 200/100 – room 6.50 x 4.50 m

F_{plane},% ≥ 95%	DT	1.61 DF[%]	Pass (219 lux)

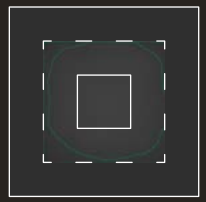
* Interiors with a nearly horizontal opening has to fulfill target daylight factor DT ≥ 95 % reference plane.

1.5 /Daylight performance of rooflights / sizes

Explore how big area is daylighted by different rooflight sizes

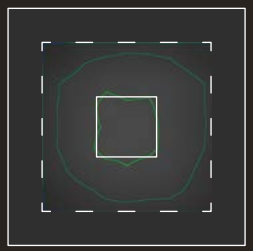
Group 2 – min. DT 1,8

(see table on page 10)



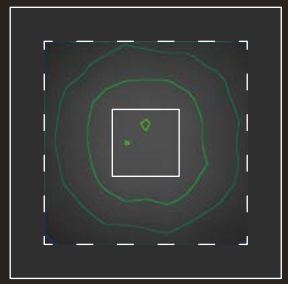
Rooflight 80/80 – room 2.80 x 2.80 m

F_{plane},% ≥ 95%	DT	1.97 DF[%]	Pass (268 lux)



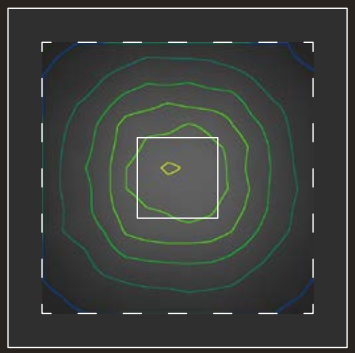
Rooflight 90/90 – room 3.50 x 3.50 m

F_{plane},% ≥ 95%	DT	1.87 DF[%]	Pass (255 lux)



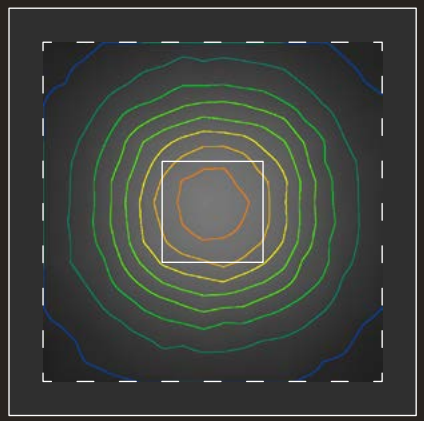
Rooflight 100/100 – room 4.00 x 4.00 m

F_{plane},% ≥ 95%	DT	1.89 DF[%]	Pass (257 lux)



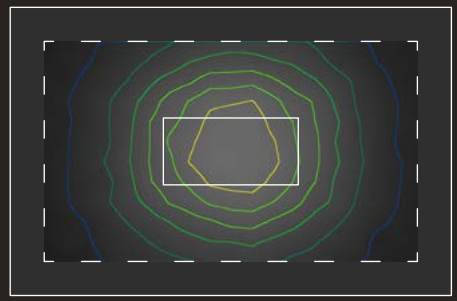
Rooflight 120/120 – room 5.00 x 5.00 m

F_{plane},% ≥ 95%	DT	1.85 DF[%]	Pass (251 lux)



Rooflight 150/150 – room 6.00 x 6.00 m

F_{plane},% ≥ 95%	DT	1.90 DF[%]	Pass (258 lux)



Rooflight 200/100 – room 6.50 x 4.25 m

F_{plane},% ≥ 95%	DT	1.87 DF[%]	Pass (254 lux)

* Interiors with a nearly horizontal opening has to fulfill target daylight factor DT ≥ 95 % reference plane.

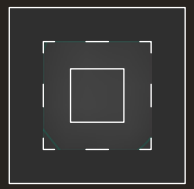
1.5 /Daylight performance of rooflights / sizes

Explore how big area is daylighted by different rooflight sizes

Group 3 – min. DT 2

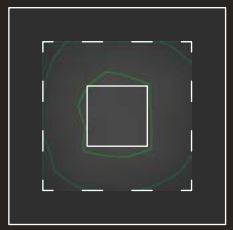
(see table on page 10)

DF %
7,11
6,22
5,33
4,44
3,56
2,67
1,78
0.89



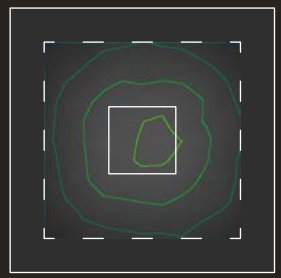
Rooflight 80/80 – room 2.60 x 2.60 m

F_{plane},% ≥ 95%	DT	2.06 DF[%]	Pass (281 lux)



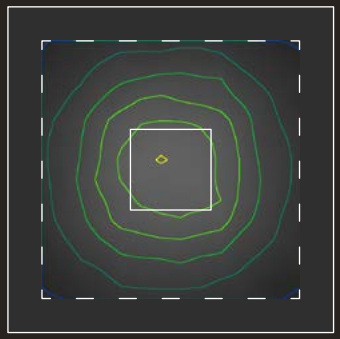
Rooflight 90/90 – room 3.20 x 3.20 m

F_{plane},% ≥ 95%	DT	2.05 DF[%]	Pass (279 lux)



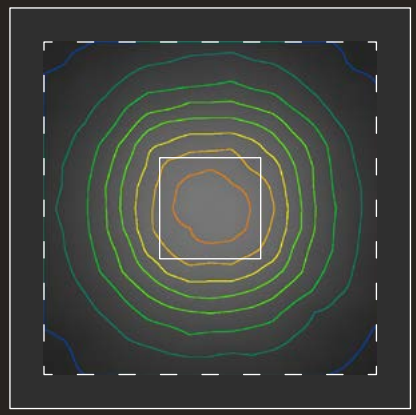
Rooflight 100/100 – room 3.90 x 3.90 m

F_{plane},% ≥ 95%	DT	2.04 DF[%]	Pass (277 lux)



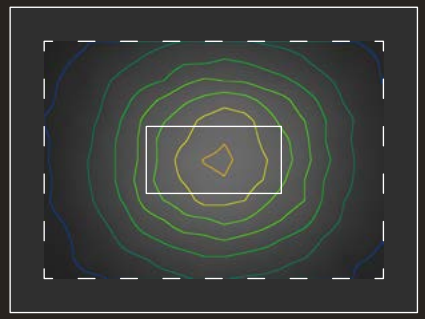
Rooflight 120/120 – room 4.80 x 4.80 m

F_{plane},% ≥ 95%	DT	2.03 DF[%]	Pass (276 lux)



Rooflight 150/150 – room 5.90 x 5.90 m

F_{plane},% ≥ 95%	DT	2.09 DF[%]	Pass (285 lux)



Rooflight 200/100 – room 6.00 x 4.50 m

F_{plane},% ≥ 95%	DT	2.00 DF[%]	Pass (272 lux)

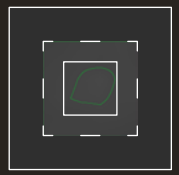
* Interiors with a nearly horizontal opening has to fulfill target daylight factor DT ≥ 95 % reference plane.

1.5 /Daylight performance of rooflights / sizes

Explore how big area is daylighted by different rooflight sizes

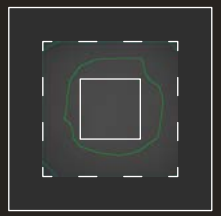
Group 4 – min. DT 2.2

(see table on page 10)



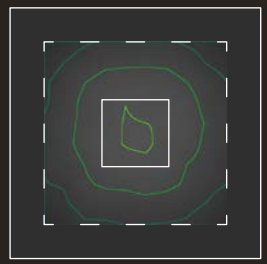
Rooflight 80/80 – room 2.40 x 2.40 m

F_{plane},% ≥ 95%	DT	2.48 DF[%]	Pass (337 lux)



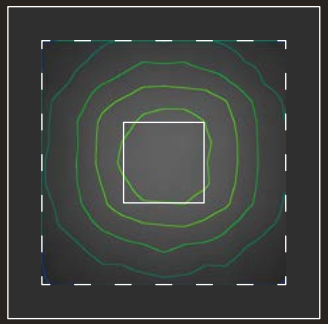
Rooflight 90/90 – room 3.00 x 3.00 m

F_{plane},% ≥ 95%	DT	2.37 DF[%]	Pass (322 lux)



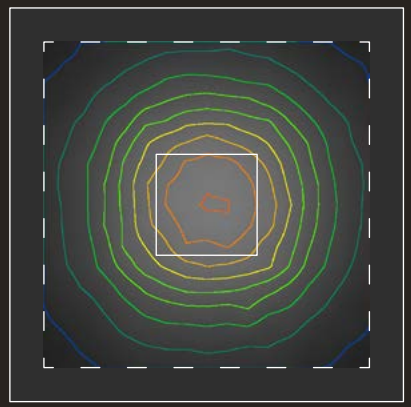
Rooflight 100/100 – room 3.70 x 3.70 m

F_{plane},% ≥ 95%	DT	2.20 DF[%]	Pass (299 lux)



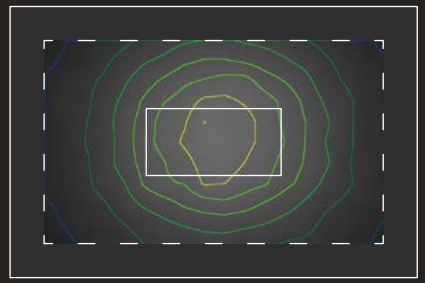
Rooflight 120/120 – room 4.60 x 4.60 m

F_{plane},% ≥ 95%	DT	2.27 DF[%]	Pass (309 lux)



Rooflight 150/150 – room 5.80 x 5.80 m

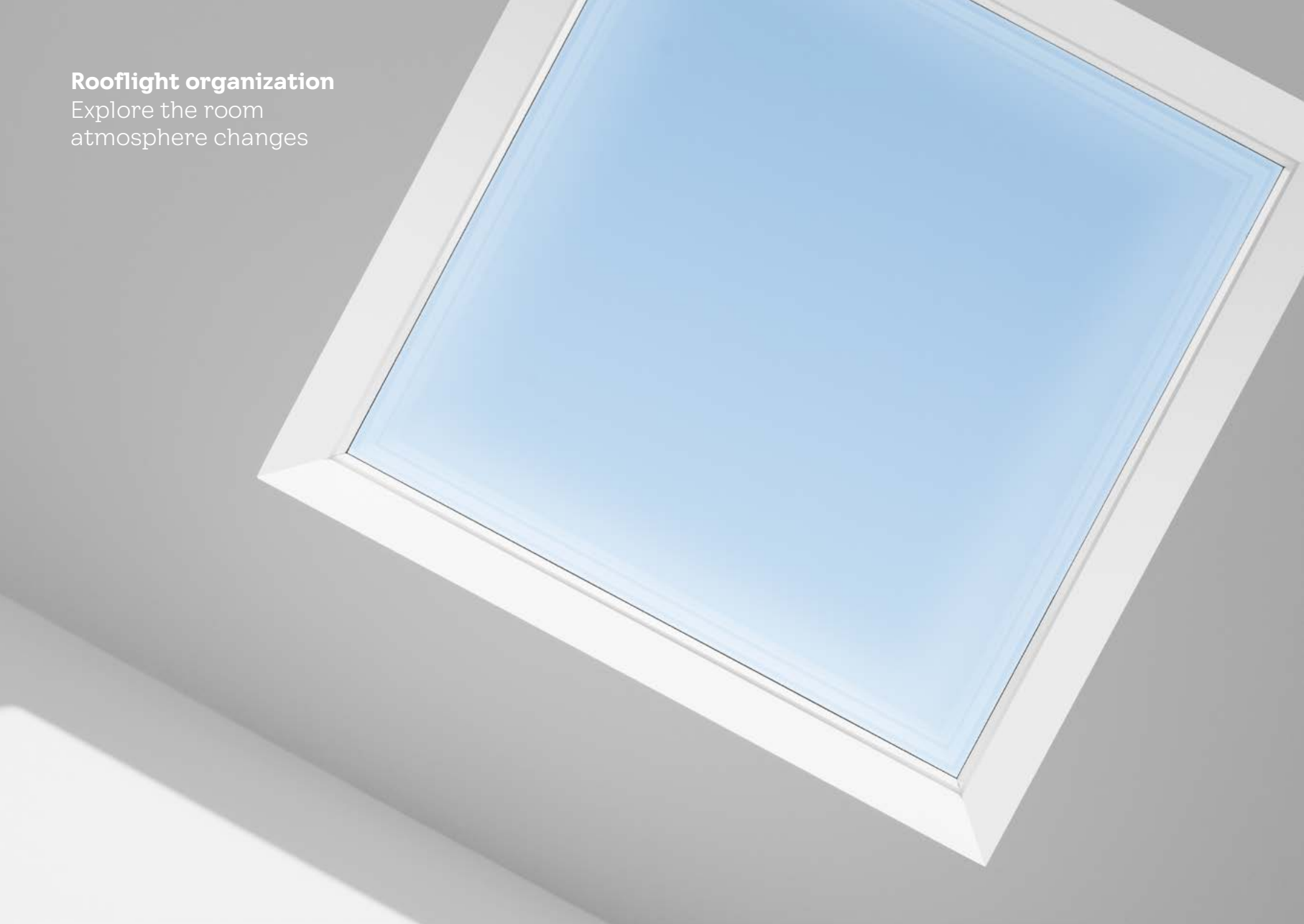
F_{plane},% ≥ 95%	DT	2.22 DF[%]	Pass (301 lux)



Rooflight 200/100 – room 6.00 x 4.00 m

F_{plane},% ≥ 95%	DT	2.25 DF[%]	Pass (305 lux)

* Interiors with a nearly horizontal opening has to fulfill target daylight factor DT ≥ 95 % reference plane.



Rooflight organization
Explore the room
atmosphere changes

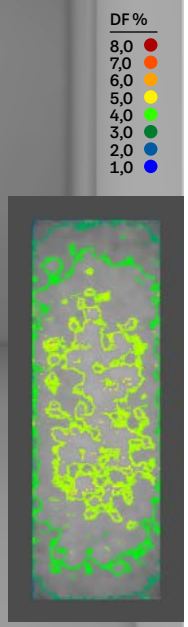
1.6 /Rooflight organization

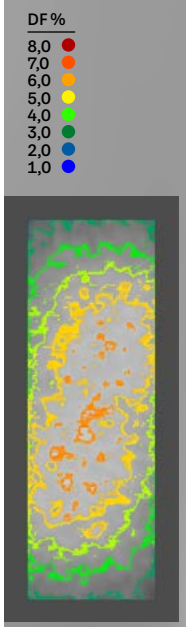
Influence atmosphere and daylight distribution

<

Space size: 1,6×5 m

Size of the flat roof
window 3× 80×80 cm



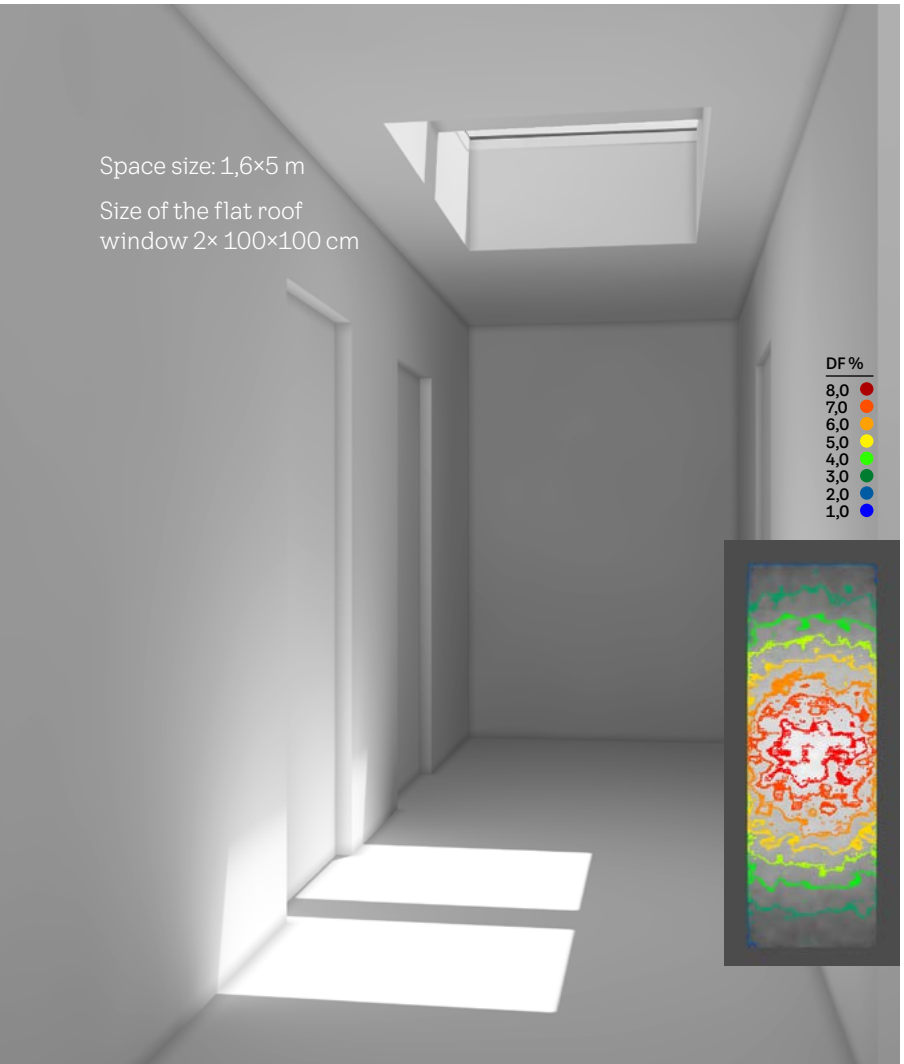


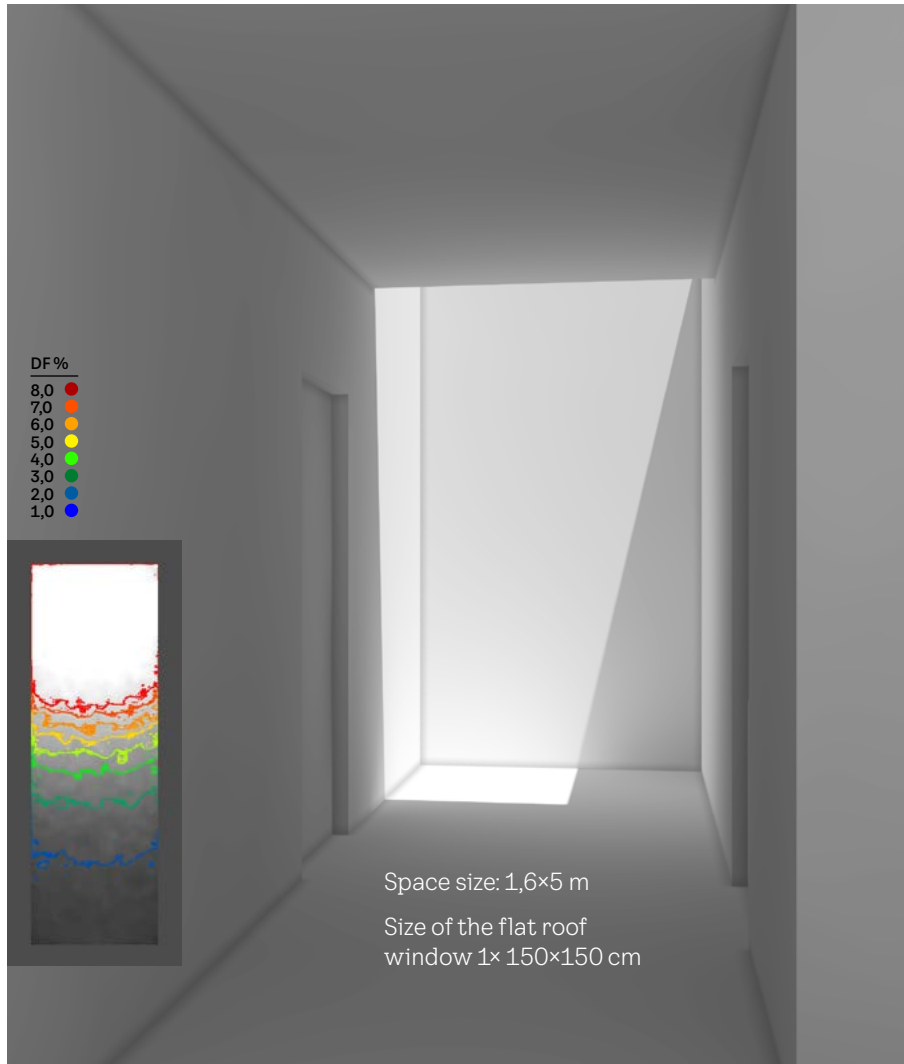
Space size: 1,6×5 m

Size of the flat roof
window 2× 100×100 cm

1.6 /Rooflight organization

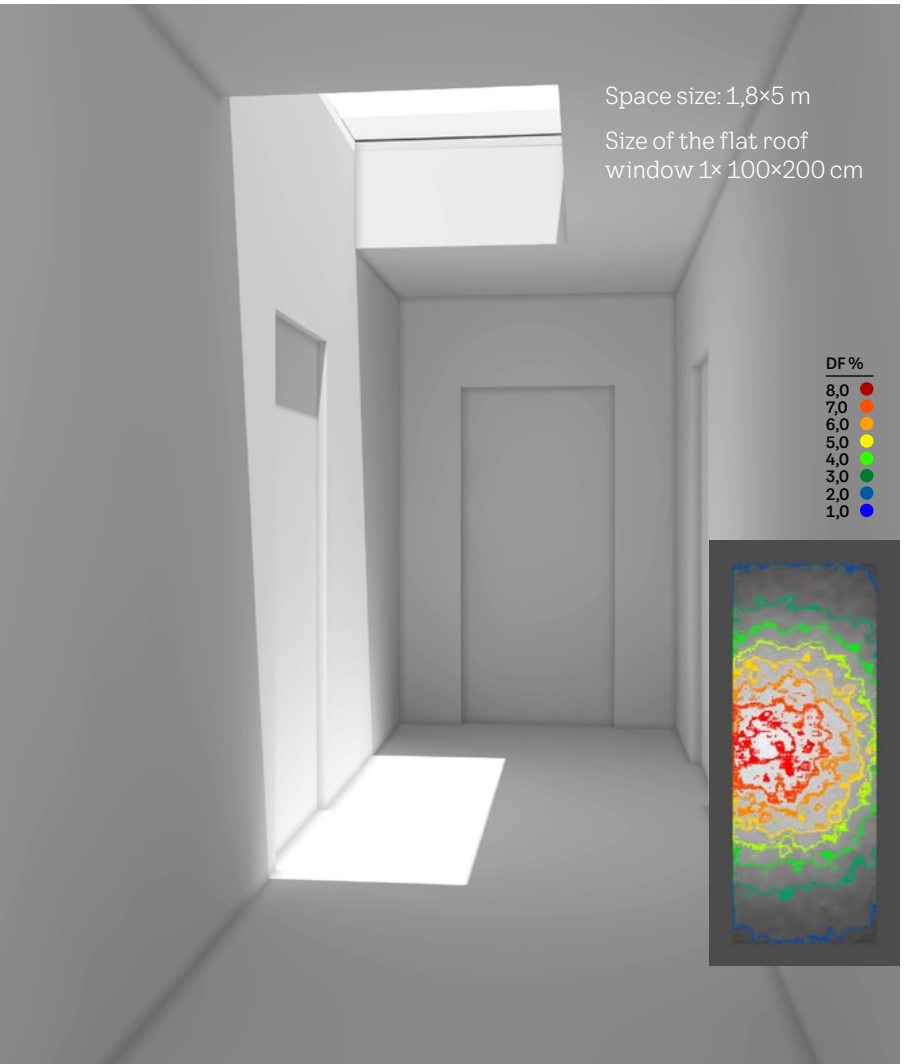
Influence atmosphere and daylight distribution

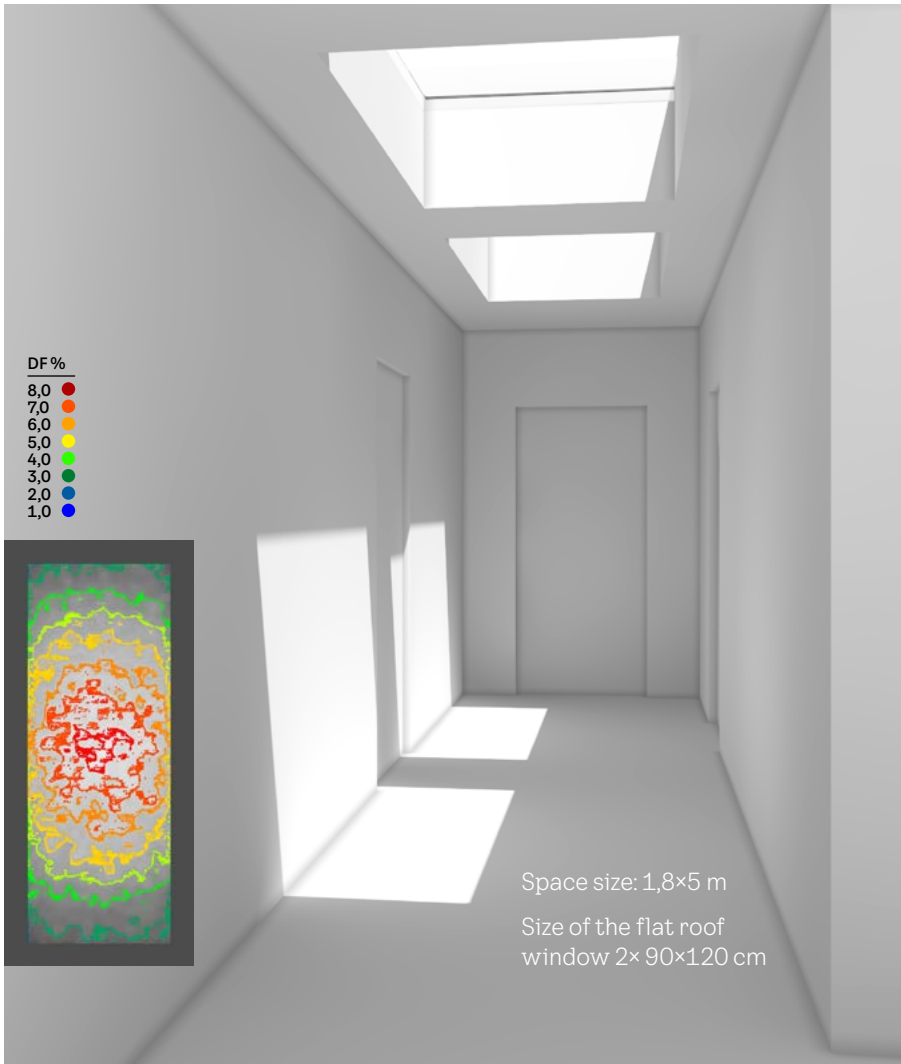




1.6 /Rooflight organization

Influence atmosphere and daylight distribution



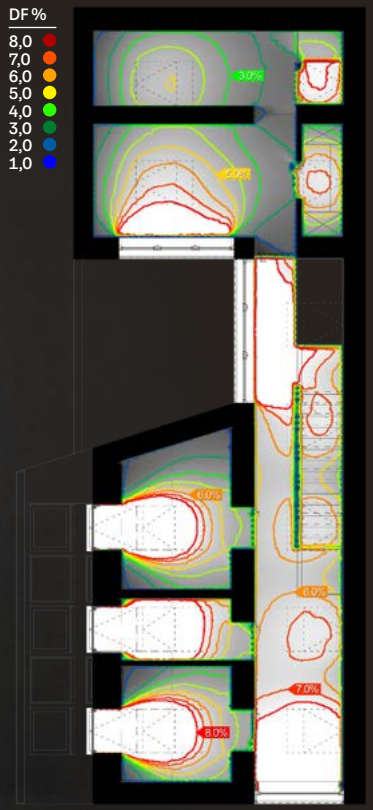


1.7 /Daylight Visualizer

Professional natural lighting simulation tool

The VELUX Daylight Visualizer is a professional natural lighting simulation tool that helps analyze the daylight conditions of buildings. The program aims to help professionals visualize, predict, and document the level of natural light during the day before the building is built.

Free download



VELUX Daylight Visualizer

Photo: Adam Mørk

1.8 /Flat roof windows

Range

New Generation

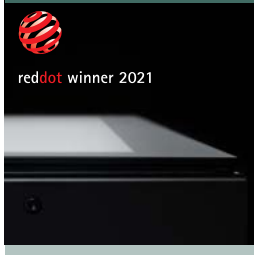
Curved glass rooflight

Top performer with CurveTech

- Maximum daylight area
- Excellent energy performance
- State-of-the art design
- Excellent sound reduction
- Clear view and drainage with CurveTech

CFU / CVU | ISU 1093

New Generation



Flat glass rooflight

Daylight, design and aesthetics

- Maximum daylight area
- Excellent energy performance
- State-of-the art design
- Excellent sound reduction

CFU / CVU | ISU 2093

Dome with glazing

Advanced dome solution

- Good daylight area
- Good energy performance
- Classic design
- Good sound reduction

CFP / CVP | ISD

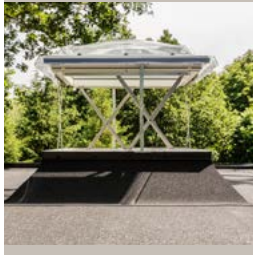
Dome

Without glazing. For uninhabited rooms and buildings

- Basic daylight area
- Basic energy performance

CFJ / CVJ | ISJ

Special function – flat roof solution



Smoke ventilation

Dome with glazing

Smoke ventilation with double glazed insulating glass unit, providing comfort for the users of the building.

CSP | ISD

Roof exit

Dome with glazing

Roof exit with double glazed insulating glass unit. Opens up to 60° for easy exit and excellent sound reduction.

CXP | ISD

Learn more about VELUX roofligt portfolio here:

1.8 /Flat roof windows

Dimension table

mm	height 600	800	900	1000	1200	1500	2000
width 600	CFU CFJ CVU CVJ CFP CVP **060060**		CFU CFJ CVU CVJ **090060**				CFU CVU Available from September 2023 **200060**
width 800		CFU CFJ CVU CVJ CFP CVP **080080**				CFU CVU Available from September 2023 **150080**	
width 900	CFP CVP **060090**		CFU CFJ CVU CVJ CFP CVP **090090**		CFU CFJ CVU CVJ **120090**		
width 1000				CFU CFJ CVU CVJ CFP CSP CVP CXP **100100**		CFU CFJ CVU CVJ **150100**	CFU CFJ CVU CVJ **200100**
width 1200			CFP CXP CVP **090120**		CFU CFJ CVU CVJ CFP CSP CVP CXP **120120**	CFU CVU Available from September 2023 **150120**	
width 1500				CFP CVP **100150**		CFU CFJ CVU CVJ CFP CVP **150150**	

CFP, CVP, CXP – the rectangular format must be installed the shorter side along the slope of the roof. On all vented rectangular sizes the window opens on the short side.

CFU, CVU, CFJ, CVJ – the rectangular format must be installed the longer side along the slope of the roof. On all vented rectangular sizes, the window opens on the long side.

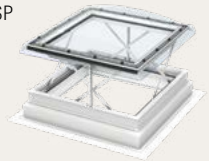
Curved glass rooflight CFU/CVU

Flat glass rooflight CFU/CVU

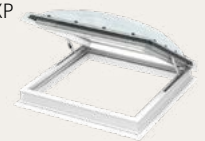
Dome with glazing CFP/CVP

Dome CFJ/CVJ

Smoke vent with glazing CSP



Roof exit with glazing CXP



02/ Rooms

Rooms

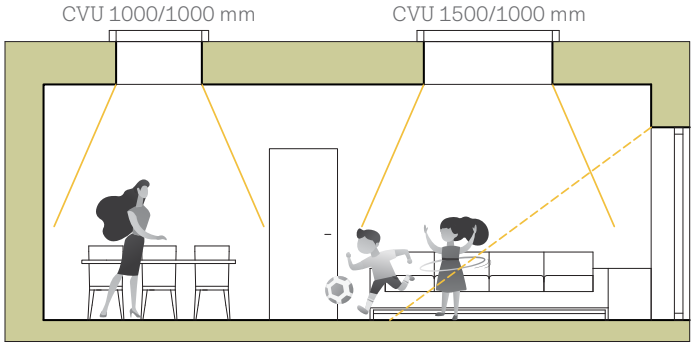

Living room
The lighting
recommendation
is 500 LUX

Living room
The lighting recommendation
is 500 LUX

Architect: Elkiær + Ebbeskov Arkitekter APS, Lotte Elkiær and Ane Ebbeskov
Photo: STAMERS KONTOR

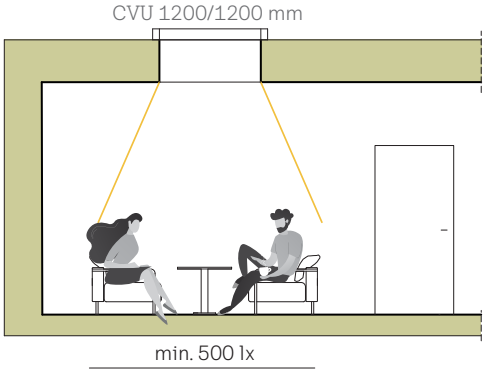
2.1 /Living room

Rooflights in central position
for daylight autonomy



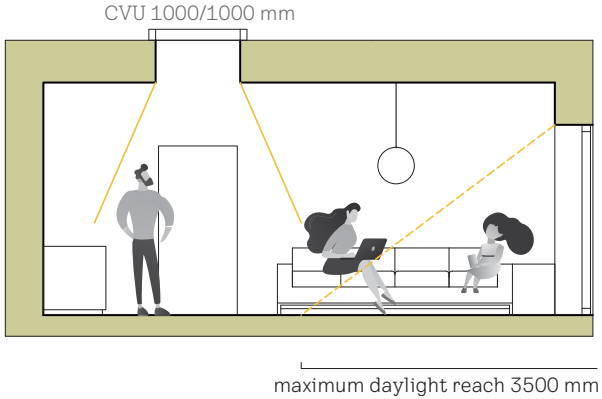
2.1 /Living room

Targeted daylight – living area



2.1 /Living room

Rooflights in depth of the room

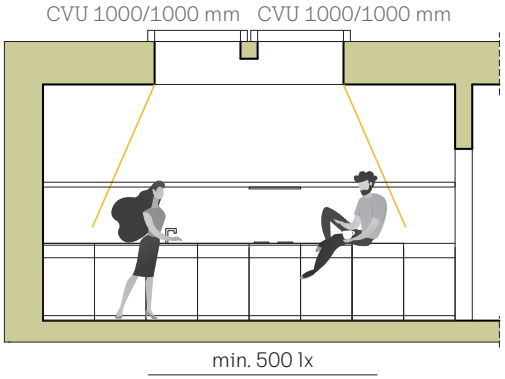


Kitchen
The lighting recommendation for food preparation is 500 LUX, for dining 300 LUX is recommended.

Architect: Elkiær + Ebbeskov Arkitekter APS, Lotte Elkiær and Ane Ebbeskov
Photo: STAMERS KONTOR

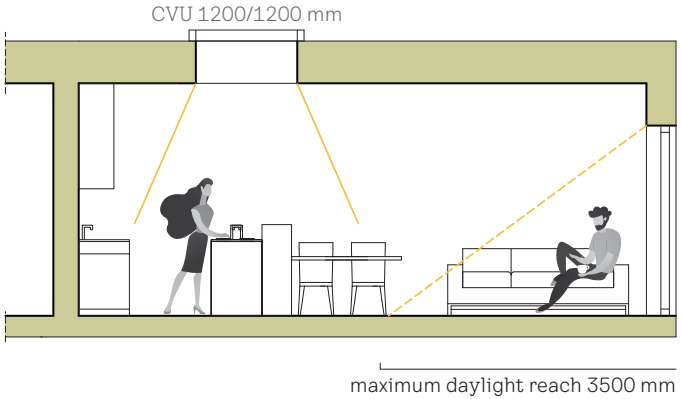
2.2 /Kitchen

Targeted daylight – above kitchen desk



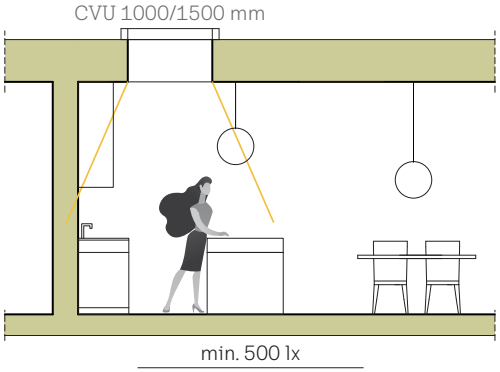
2.2 /Kitchen

Targeted daylight – above kitchen island



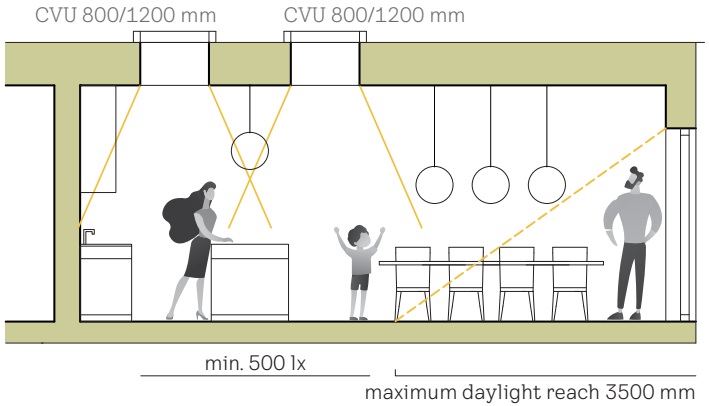
2.2 /Kitchen

Targeted daylight – between kitchen and kitchen island



2.2 /Kitchen

Targeted daylight – between kitchen and dining table



2.2 /Kitchen

Targeted daylight – above dining table

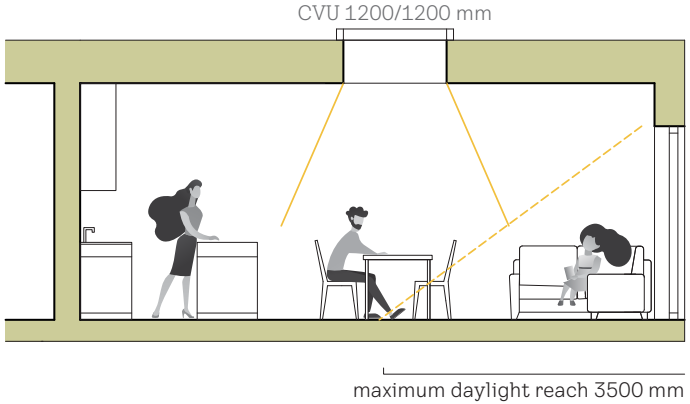
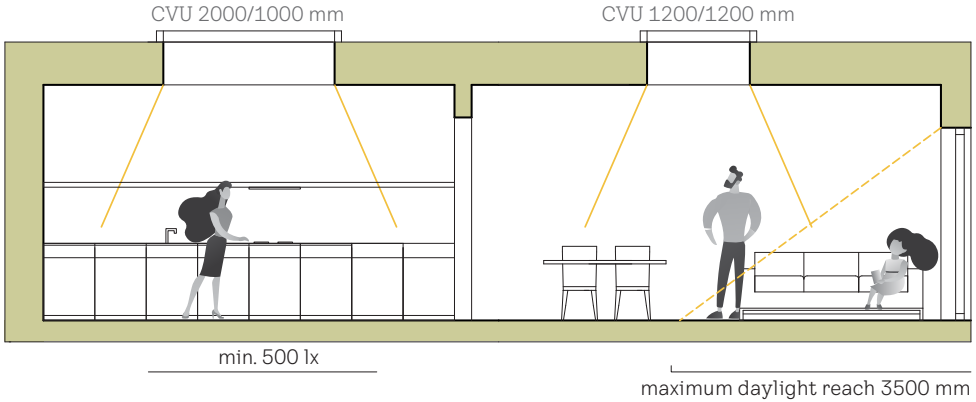



Photo: STAMERS KONTOR

2.2 /Kitchen

Rooflights in central position – daylight autonomy

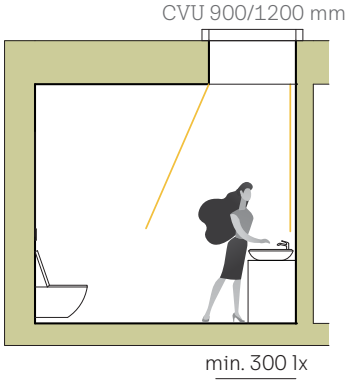


Bathroom
Recommended daylight level 300 lx

Photo: Magnum Haus Vollholzdesign

2.3 /Bathroom

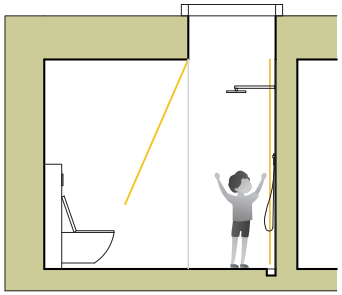
Targeted daylight – sink



2.3 /Bathroom

Targeted daylight – shower

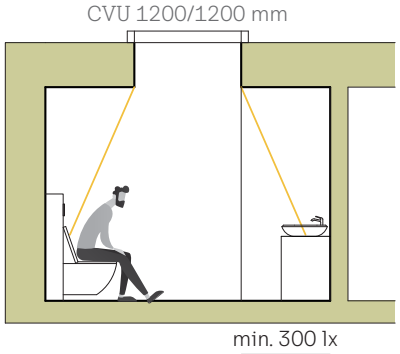
CVU 1000/1000 mm



Photographer: Niklas Hart

2.3 /Bathroom

Rooflight in central position



Bathroom
Rooflight in central position

Architect: KAMKAB!NET | Radim Horák, Hana Horáková
Photographer: Pavel Barták

Architect: Juri Troy architects
Photographer: Lukas Schaller

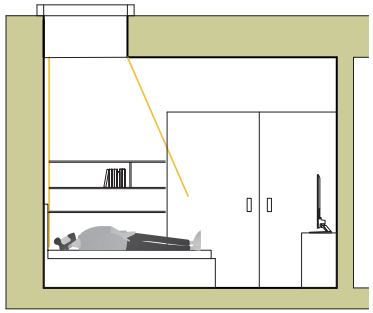
Bathroom
Rooflight in central position

Bedroom
Daylight need 300 lx

2.4 /Bedroom

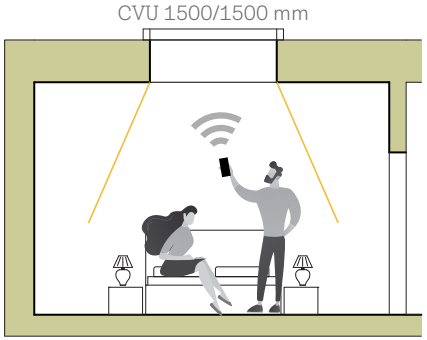
Daylight above the bed

CVU 900/1200 mm



2.4 /Bedroom

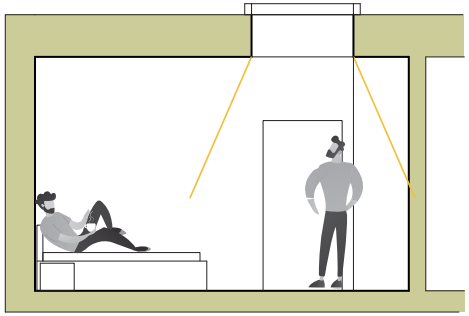
Rooflights in central position



2.4 /Bedroom

Rooflights in depth of the room

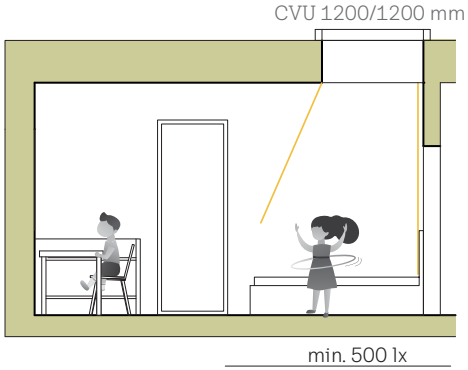
CVU 1200/1200 mm



3,5 m from the façade additional source of daylight is required


Kids room
Daylight need 500 lx

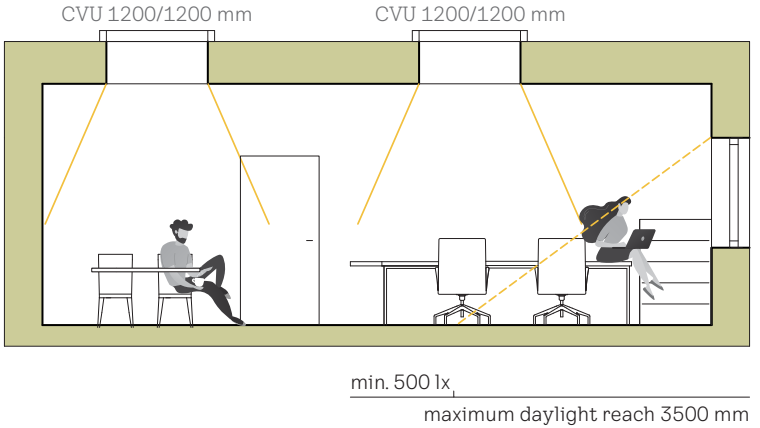
2.5 /Kids room



Home Office
Daylight need 500 lx

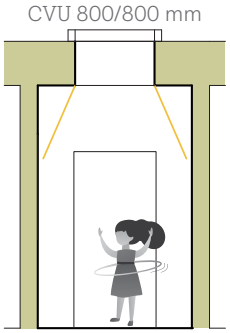
2.6 /Home Office

Targeted light



Corridor
Daylight need 100 lx

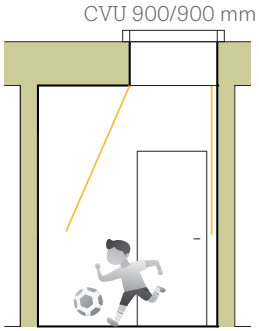
2.7 /Corridor




Architect: Franz Karner, Arch. Dipl.Ing. Dr.techn.
Photographer: Patricia Weisskirchner


Photographer: Andrea Segliani

2.7 /Corridor

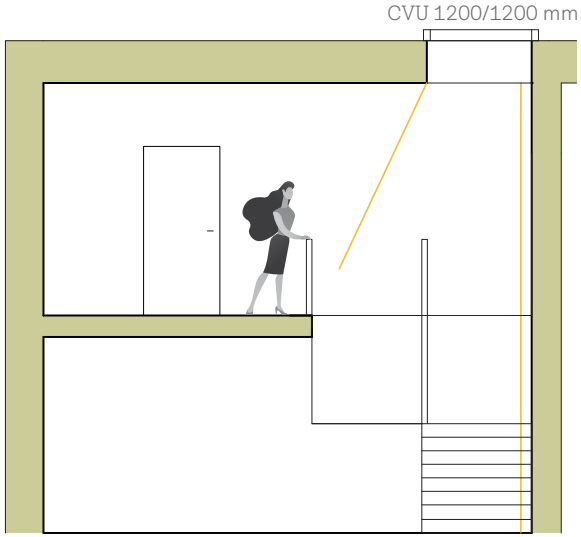


Staircase
Daylight need 100 lx

Photographer: Niklas Hart

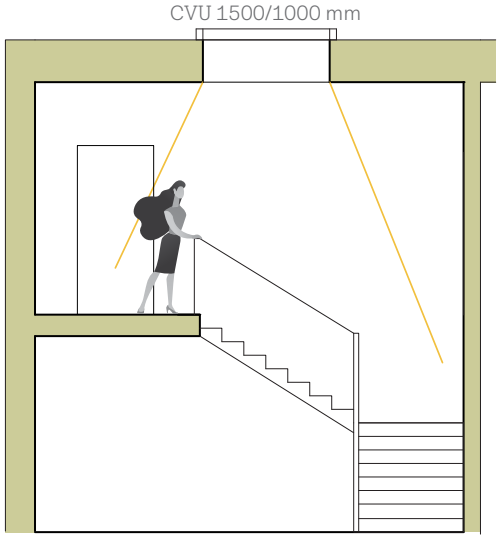
2.8 /Staircase

Functional light



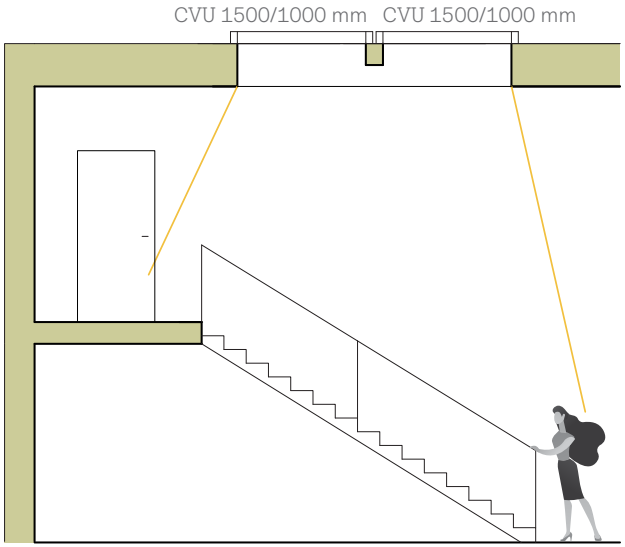
2.8 /Staircase

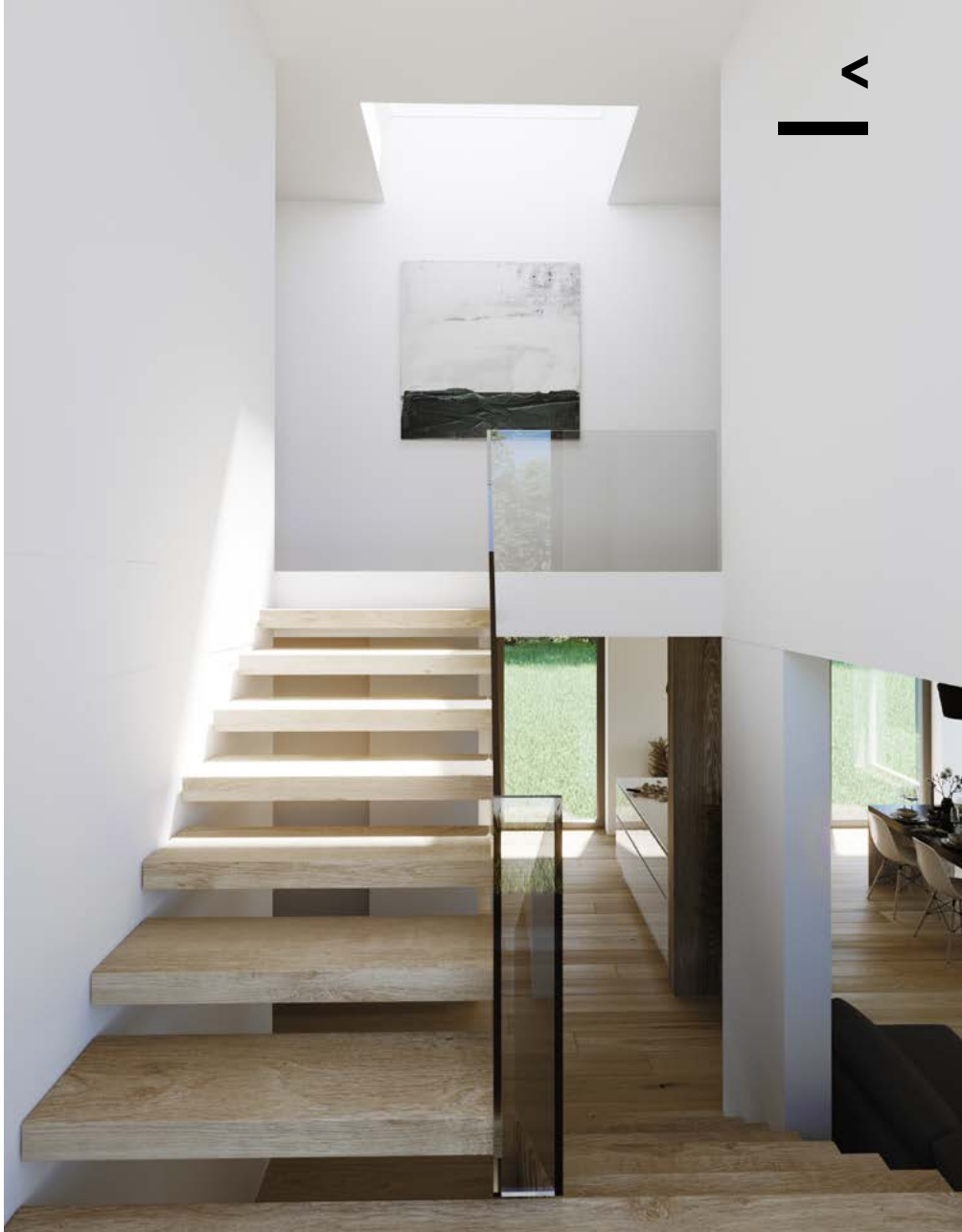
Functional light – both floors day-lit



2.8 /Staircase

Effect light





Public and commercial
Design optimal light conditions

Photographer: Adam Mørk

2.9 /Public and commercial

Rooflight organization

Deep spaces must be illuminated with multiple rooflights to have optimal daylight distribution

Villa in Küssnacht am Rigi, Switzerland

Architect: Alex Burger
Photographer: Sabrina Scheja

Using symmetrical or asymmetrical organization changes room atmosphere

School in Santander, Spain

Photographer: Torben Eskerod

2.9 /Public and commercial

Rooflight organization

Deep spaces must be illuminated with multiple rooflights to have optimal daylight distribution

School in Santander, Spain

Photographer: Torben Eskerod

Using symmetrical or asymmetrical organization changes room atmosphere

Kindergarten Neufeldt, Austria

Architect: SOLID architecture
Photographer: Kurt Kuball

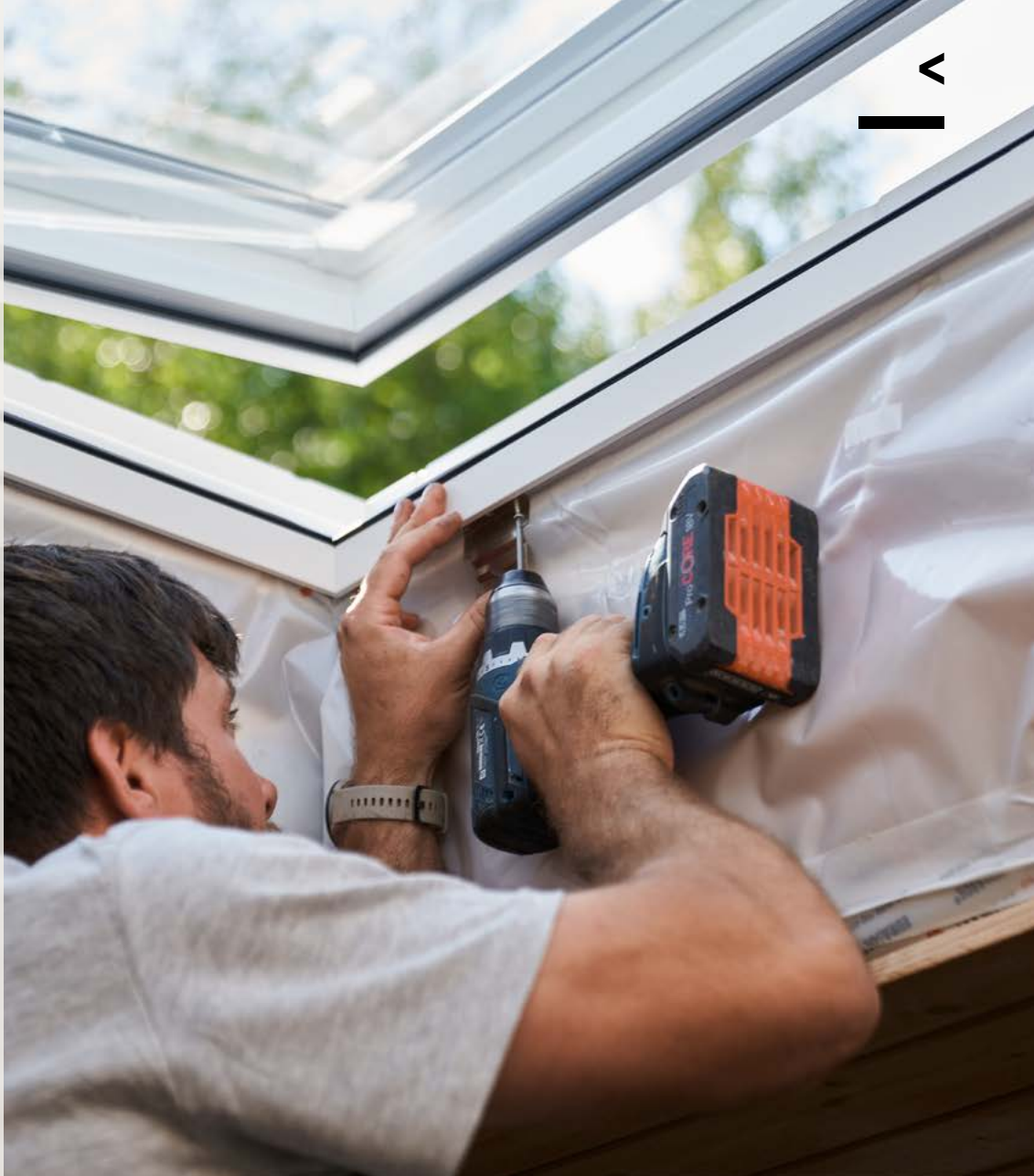
2.9 /Public and commercial

Rooflight line in inner position

Design Werck, Denmark

Architect: SOLID architecture
Photographer: Torben Eskerod

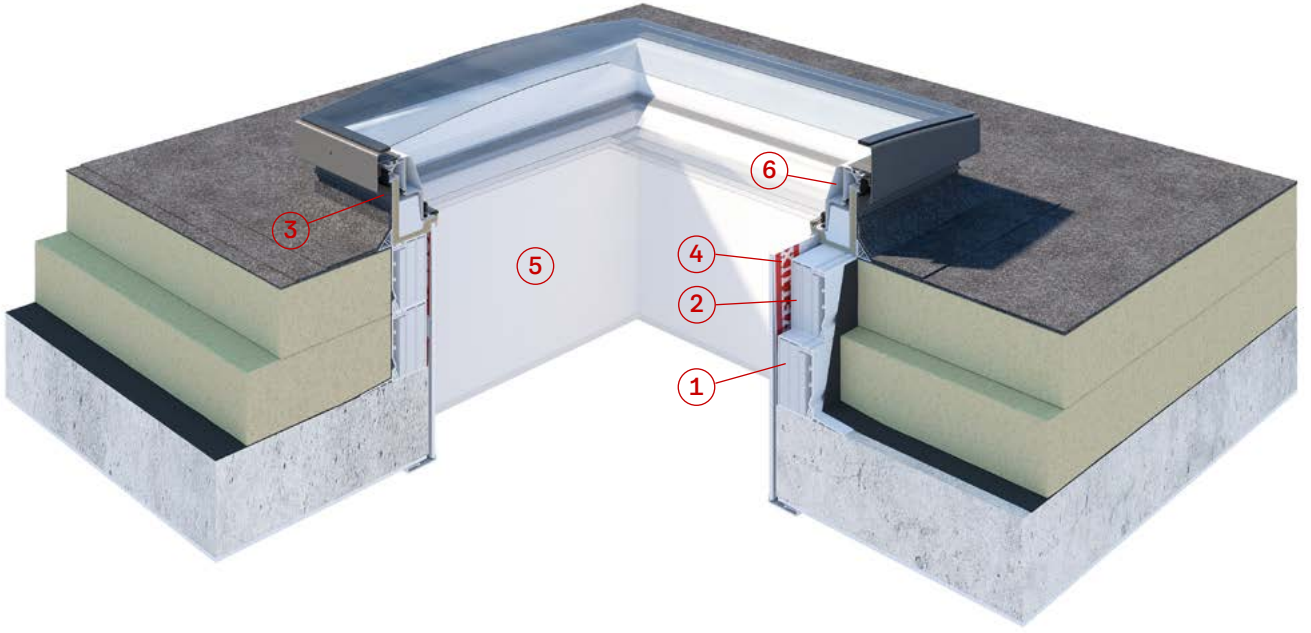
03/ Technical solutions



Technical solutions

3.1 / VELUX system – flat roof windows

Installation accessories



6 **Anti-heat blind** (MSU)

Blackout blind (DSU)

1 **Extension frame with flange** (ZCU 0015)

height 160 mm

2 **Extension frame** (ZCU 1015)

max 3 pc.
height 160 mm

3 **Securing kit** (ZZZ 210U)

4 **Vapour barrier collar** (BBX)

5 **Lining** (LSF 2000)

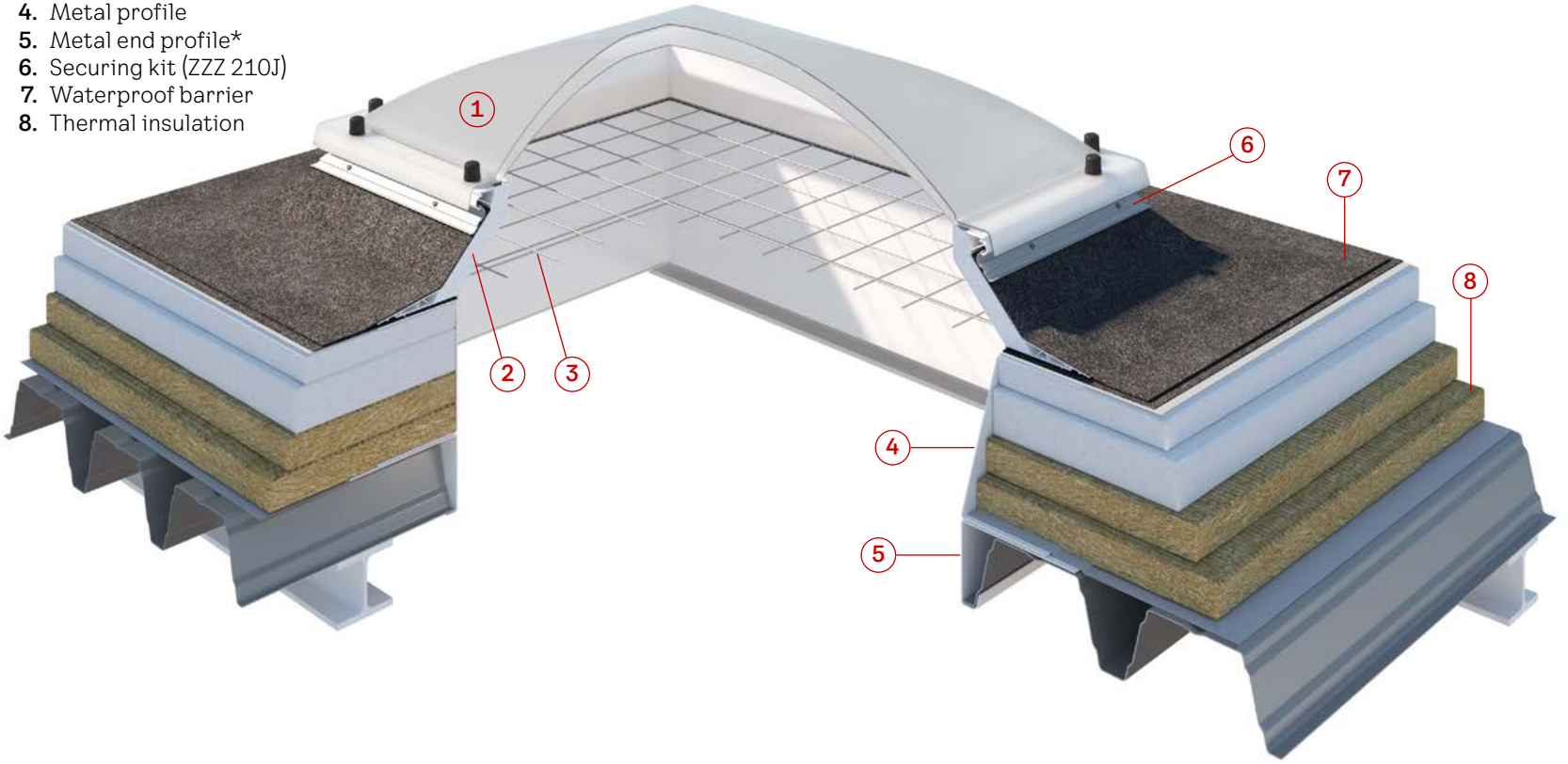
max. heigh 700 mm

Learn more about the products here:

3.2 /Roof structure overview

Trapezoidal plate + Dome (CFJ+ISJ)

1. Dome skin (ISJ)
2. Fixed based unit (CFJ)
3. Fall through grid (ZZZ 257)
4. Metal profile
5. Metal end profile*
6. Securing kit (ZZZ 210J)
7. Waterproof barrier
8. Thermal insulation

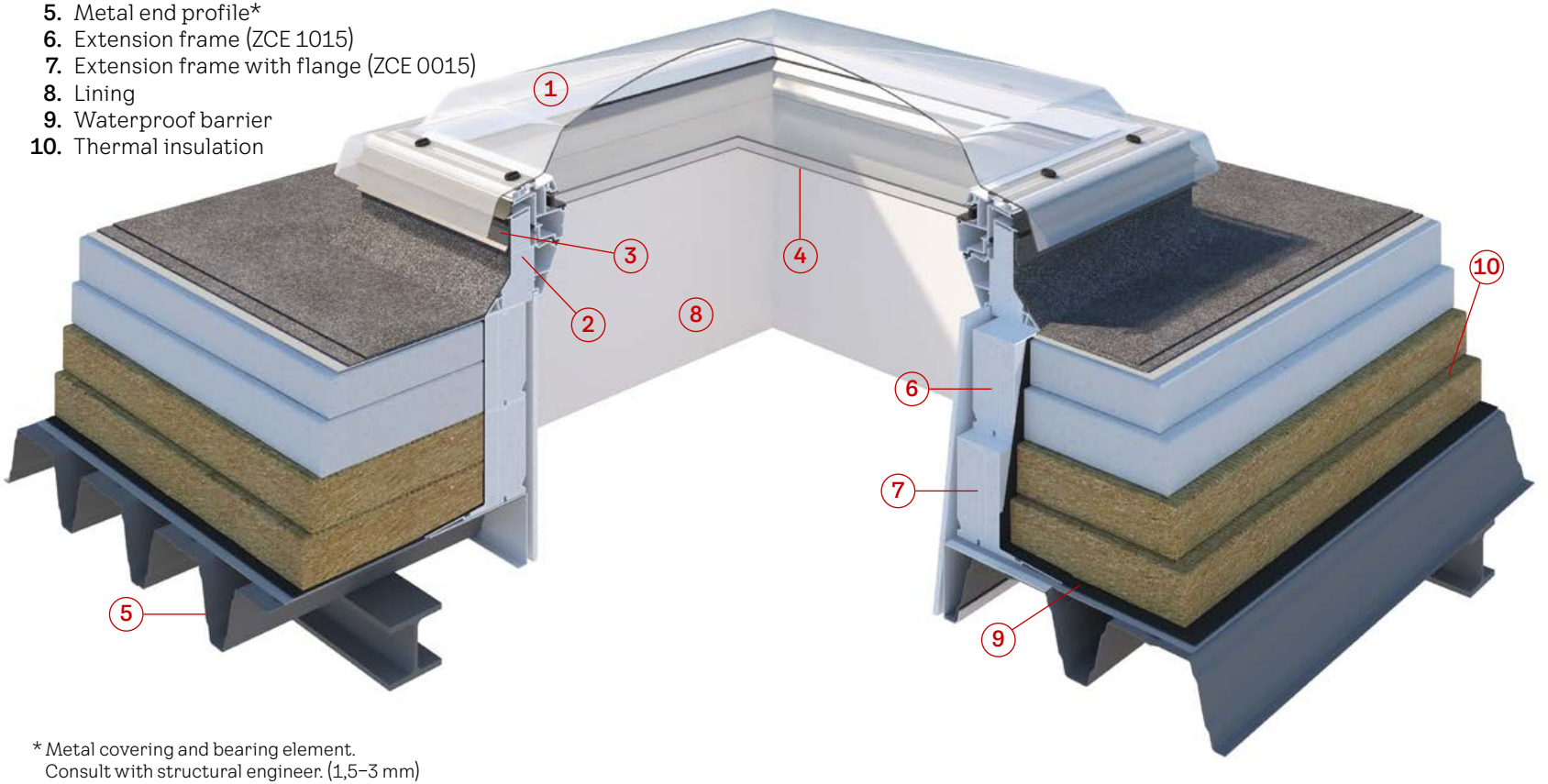


* Metal covering and bearing element.
Consult with structural engineer. (1,5–3 mm)

3.2 /Roof structure overview

Trapezoidal plate + Dome with glazing (CFP/CVP + ISD)

1. Clear dome (ISD)
2. Base unit (CVP/CFP)
3. Securing kit (ZZZ 210)
4. Double glazing
5. Metal end profile*
6. Extension frame (ZCE 1015)
7. Extension frame with flange (ZCE 0015)
8. Lining
9. Waterproof barrier
10. Thermal insulation

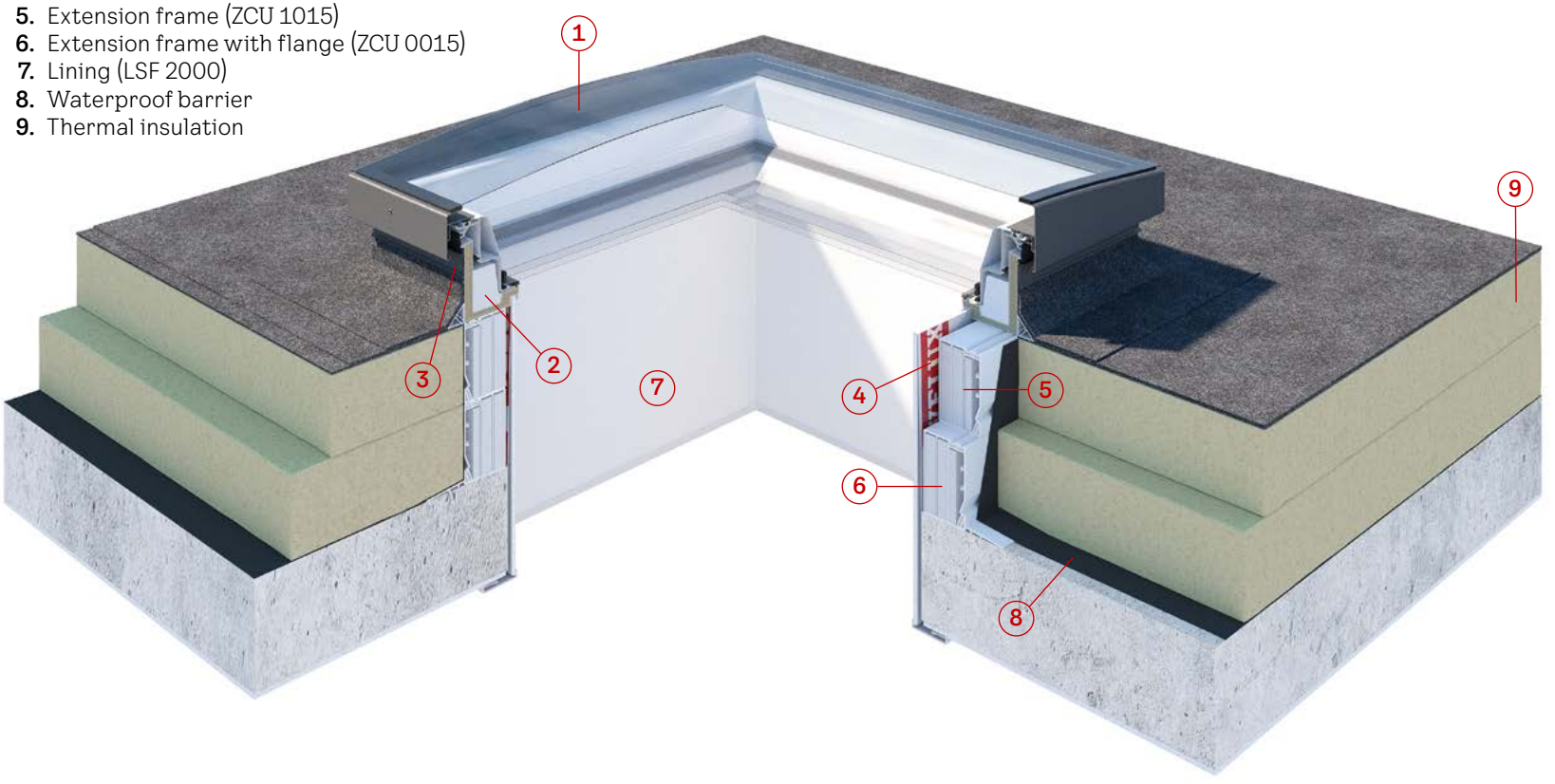


* Metal covering and bearing element.
Consult with structural engineer. (1,5–3 mm)

3.2 /Roof structure overview

Concrete structure + glass rooflight (CFU/CVU + ISU)

1. Curved glass top unit (ISU 1093)
2. Electrically vented base unit (CVU)
3. Securing kit (ZZZ 210U)
4. Vapour barrier collar (BBX)*
5. Extension frame (ZCU 1015)
6. Extension frame with flange (ZCU 0015)
7. Lining (LSF 2000)
8. Waterproof barrier
9. Thermal insulation

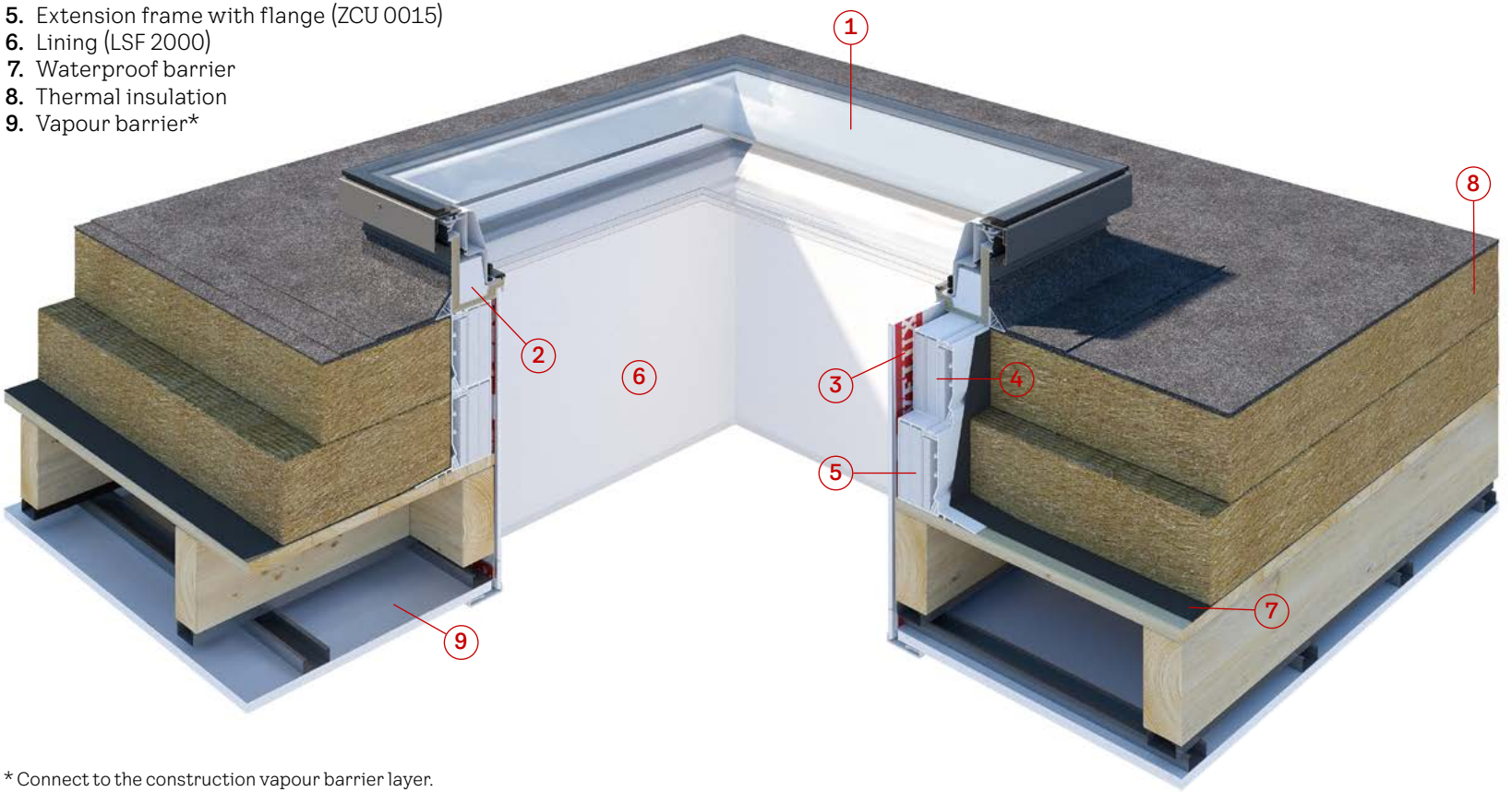


* Connect to the construction vapour barrier layer.

3.2 /Roof structure overview

Wooden structure + glass rooflight (CFU/CVU + ISU)

1. Flat glass top unit (ISU 2093)
2. Electrically vented base unit (CVU)
3. Vapour barrier collar (BBX)*
4. Extension frame (ZCU 1015)
5. Extension frame with flange (ZCU 0015)
6. Lining (LSF 2000)
7. Waterproof barrier
8. Thermal insulation
9. Vapour barrier*

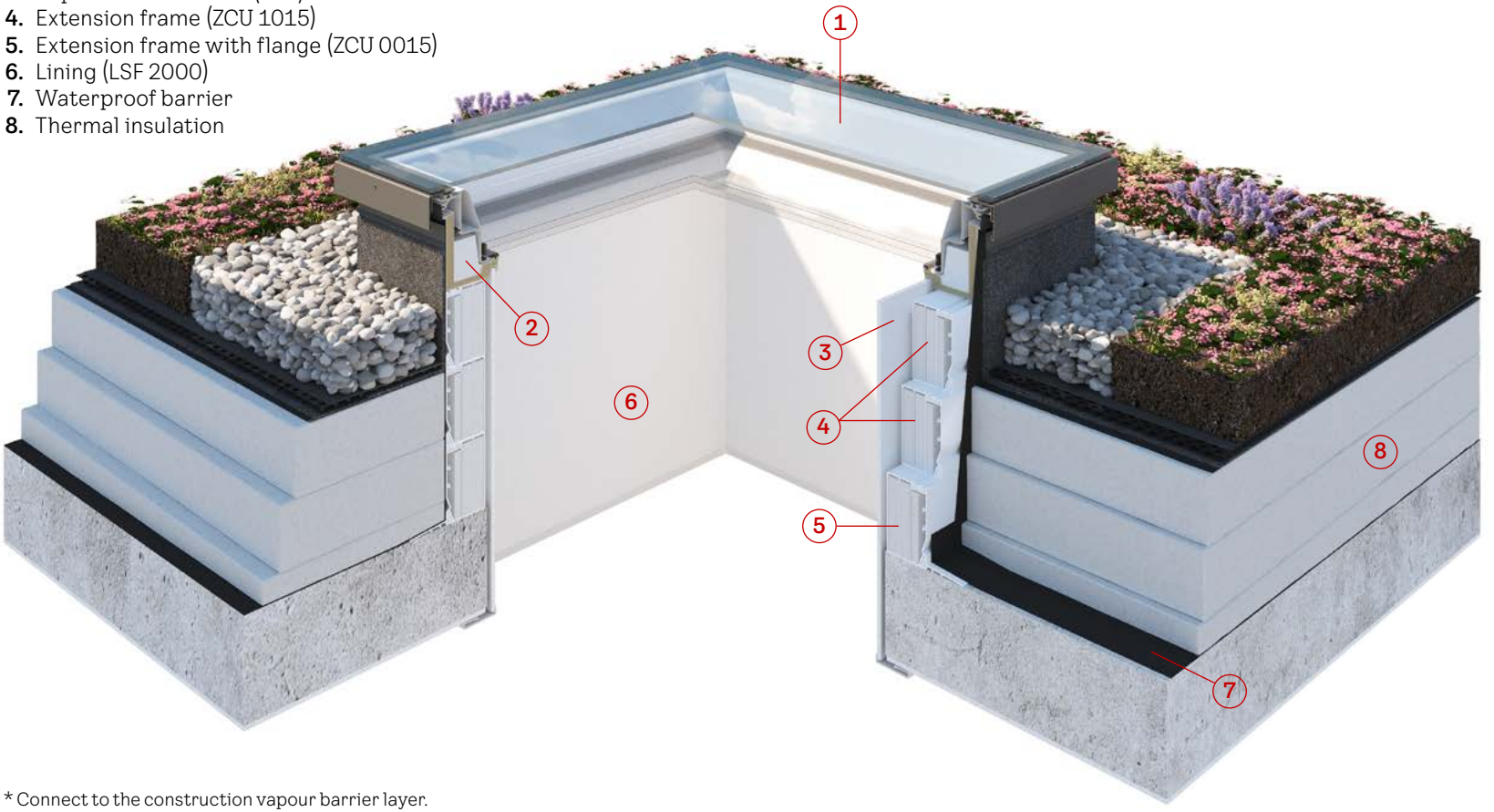


* Connect to the construction vapour barrier layer.

3.2 /Roof structure overview

Green roof, concrete structure + glass rooflight (CFU/CVU + ISU)

1. Flat glass top unit (ISU 2093)
2. Electrically vented base unit (CVU)
3. Vapour barrier collar (BBX)*
4. Extension frame (ZCU 1015)
5. Extension frame with flange (ZCU 0015)
6. Lining (LSF 2000)
7. Waterproof barrier
8. Thermal insulation

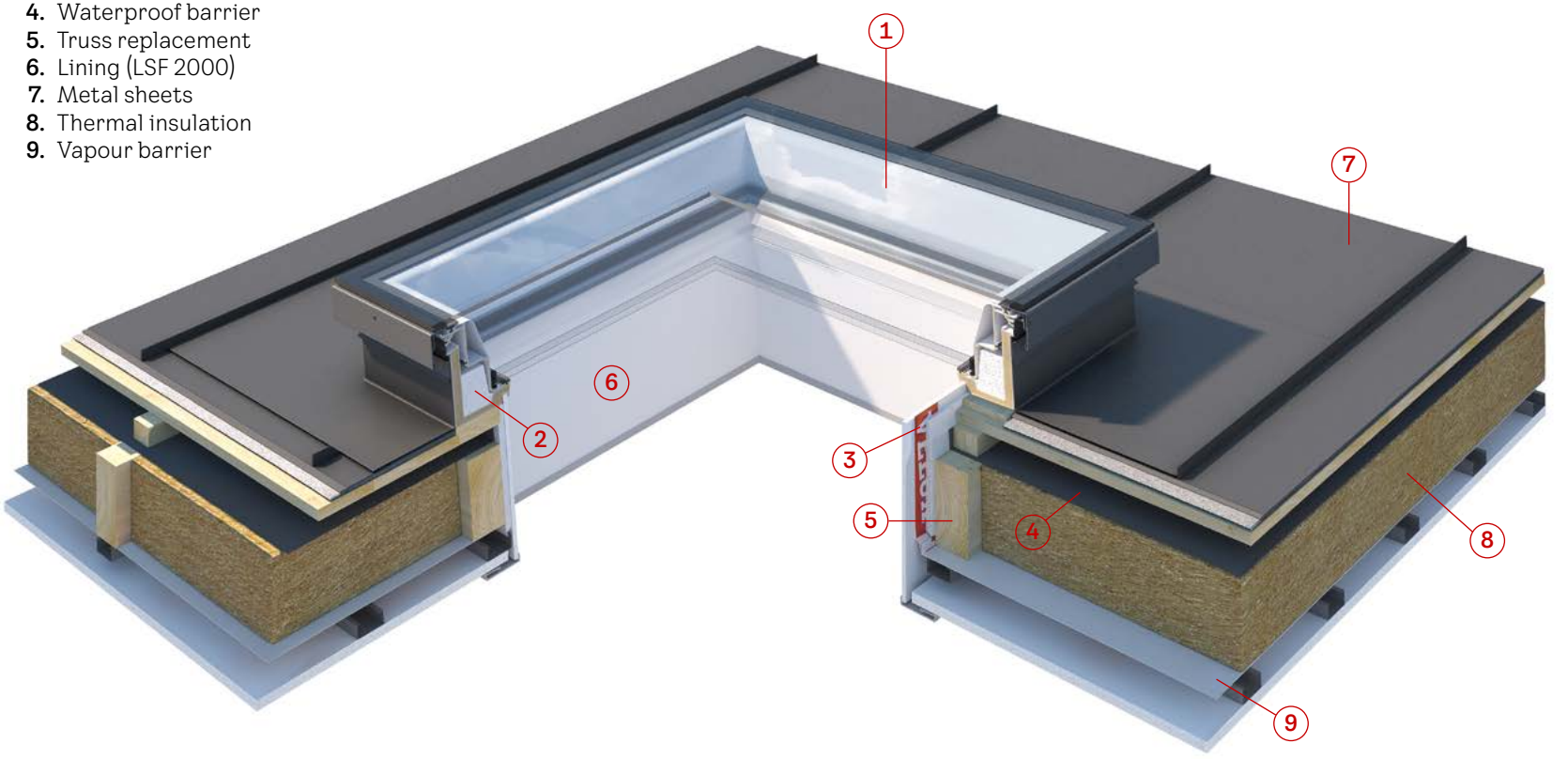


* Connect to the construction vapour barrier layer.

3.2 /Roof structure overview

Wooden structure, metal sheets + glass rooflight (CFU/CVU + ISU)

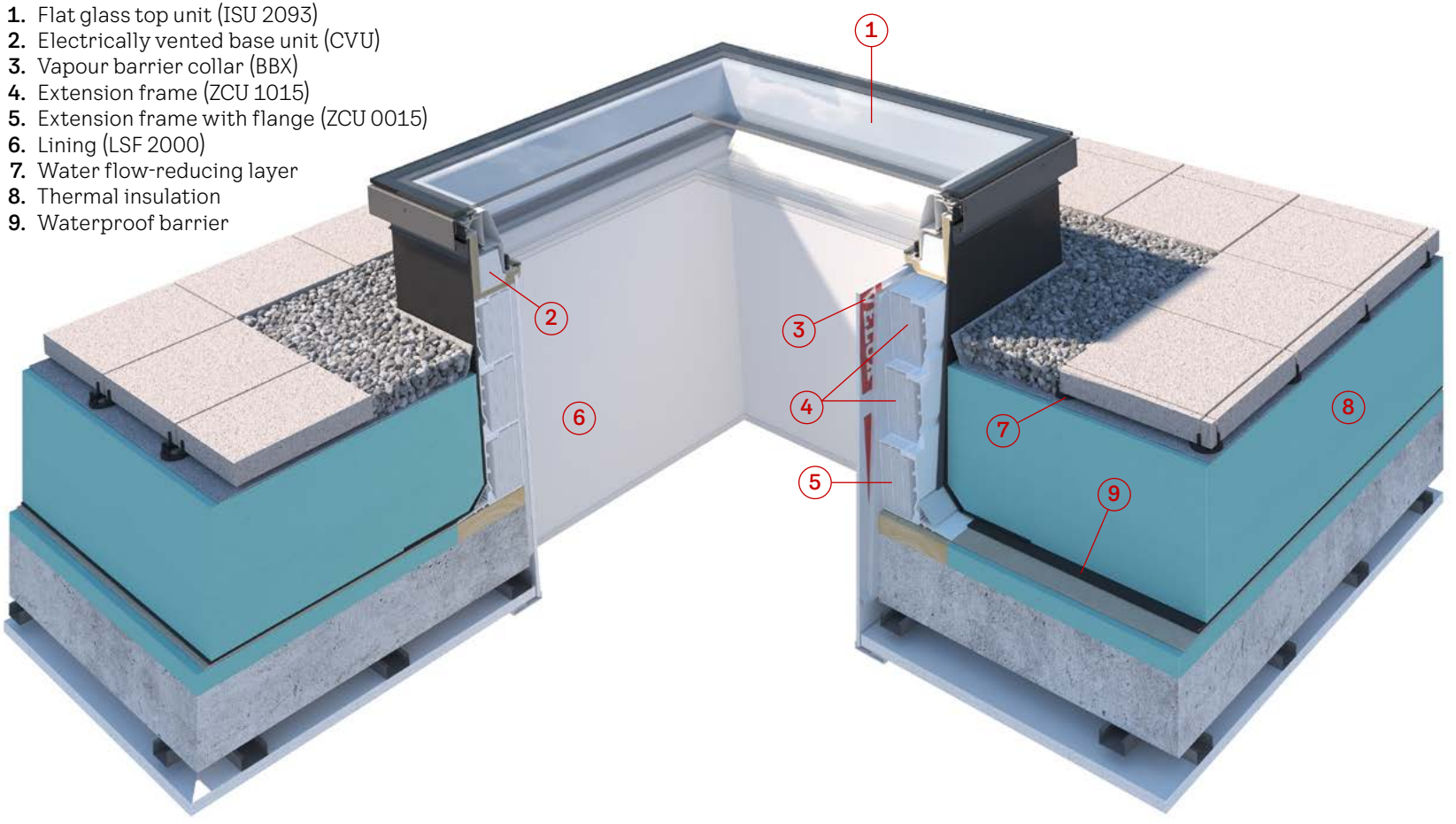
1. Flat glass top unit (ISU 2093)
2. Electrically vented base unit (CVU)
3. Vapour barrier collar (BBX)
4. Waterproof barrier
5. Truss replacement
6. Lining (LSF 2000)
7. Metal sheets
8. Thermal insulation
9. Vapour barrier



3.2 /Roof structure overview

Concrete structure + glass rooflight (CFU/CVU + ISU)

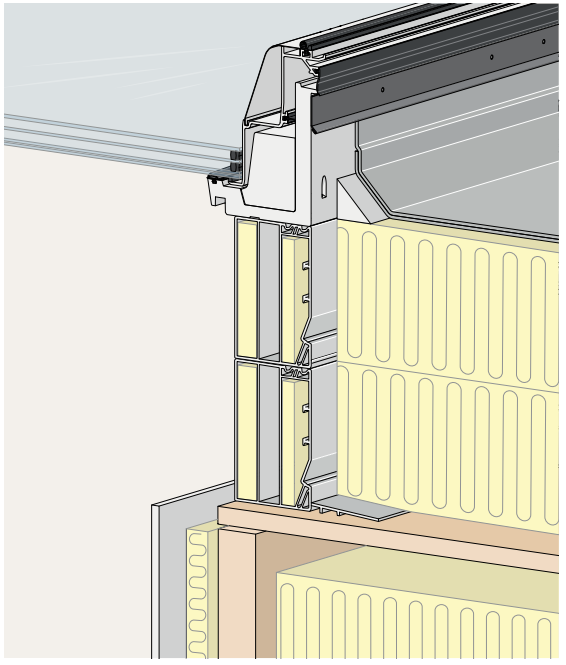
1. Flat glass top unit (ISU 2093)
2. Electrically vented base unit (CVU)
3. Vapour barrier collar (BBX)
4. Extension frame (ZCU 1015)
5. Extension frame with flange (ZCU 0015)
6. Lining (LSF 2000)
7. Water flow-reducing layer
8. Thermal insulation
9. Waterproof barrier

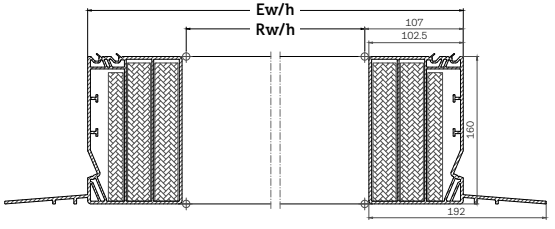


3.3 /Extension frames

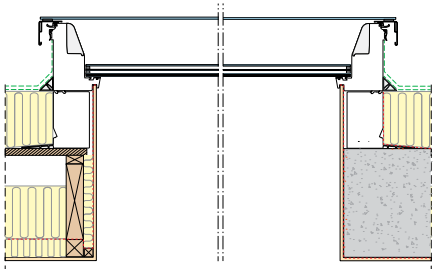
VELUX system / on site made extension frames

VELUX system extension frames

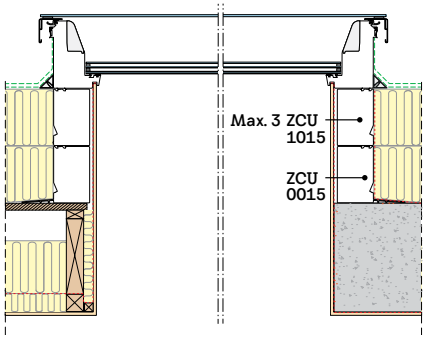




VELUX insulated extension frame ZCU 1015 height: 160 mm
ZCU 0015 height: 160 mm

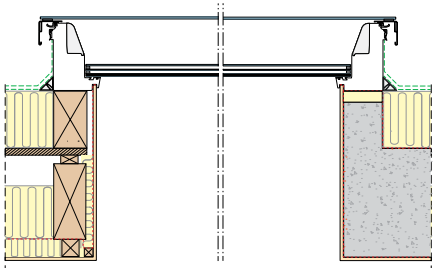


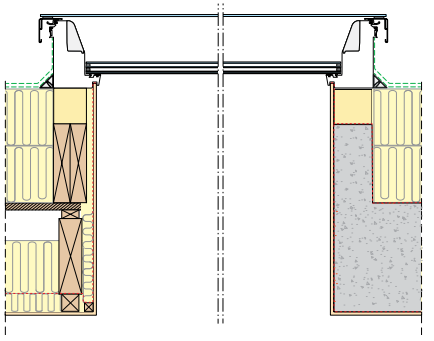
ZCU 0015



ZCU 0015+ ZCU 1015

On site made extension frames



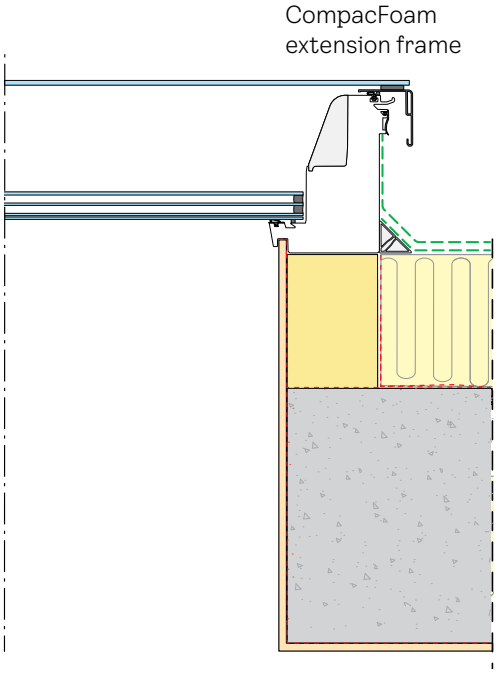


Wooden extension frame

Concrete extension frame

3.3 /Extension frames

On site made extension frames







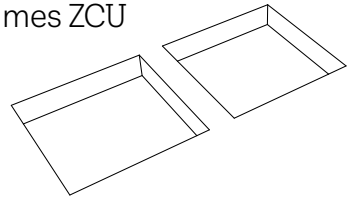


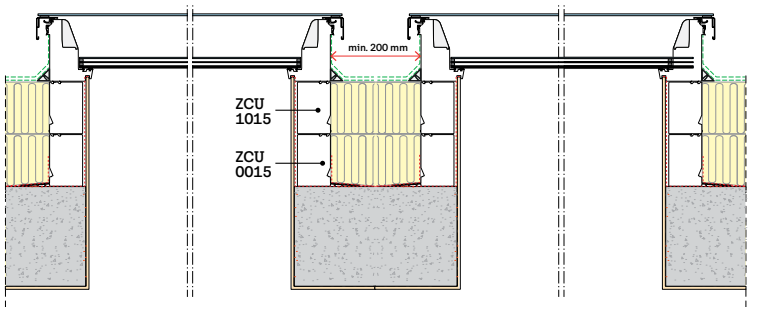


3.4 /Rooflights combination

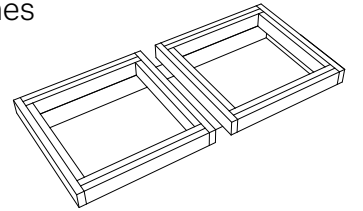
VELUX system / on side made extension frames

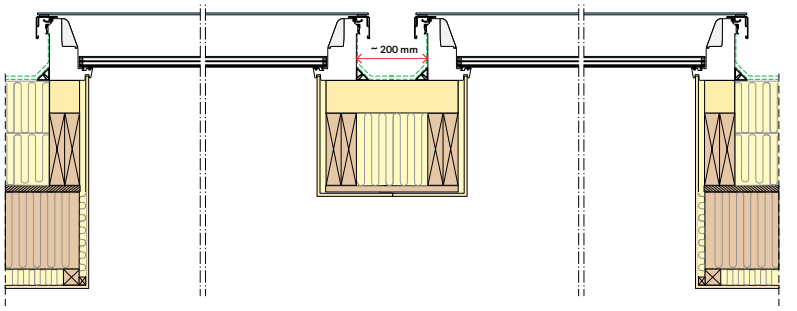
1. VELUX system extension frames ZCU





2. On site made extension frames

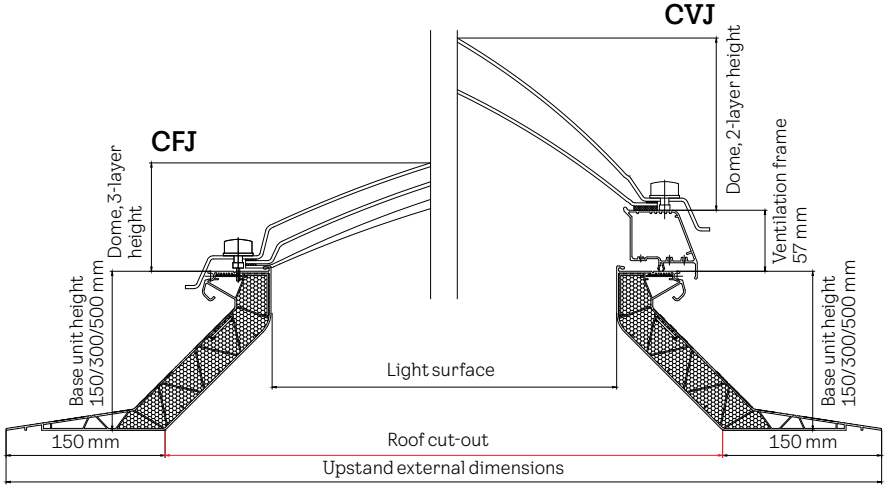




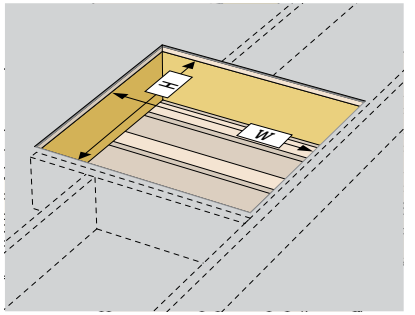
3.5 /Flat roof windows

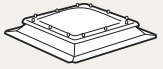
Dimension tables roof cut-out

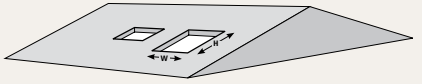
Dome



roof cut-out







Size code CFJ/CVJ	Roof cut-out W mm	Roof cut-out H mm	Upstand external dimensions mm (W x H)	Light surface mm (W x H)	Dome, 2/3-layer height mm
060060	600	600	900×900	400×400	137
080080	800	800	1100×1100	600×600	177
090060	900	600	1200×900	700×400	177
090090	900	900	1200×1200	700×700	197
100100	1000	1000	1300×1300	800×800	217
120090	1200	900	1500×1200	1000×700	197
120120	1200	1200	1500×1500	1000×1000	268
150100	1500	1000	1800×1300	1300×800	217
150150	1500	1500	1800×1800	1300×1300	328
200100	2000	1000	2300×1300	1800×800	217

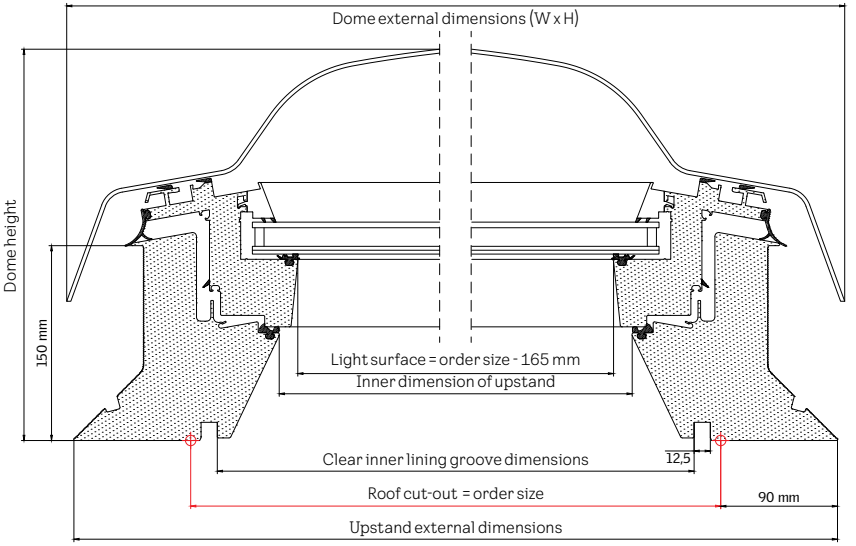
0–15°

Available also in size 200x100 with 15 cm upstand only.

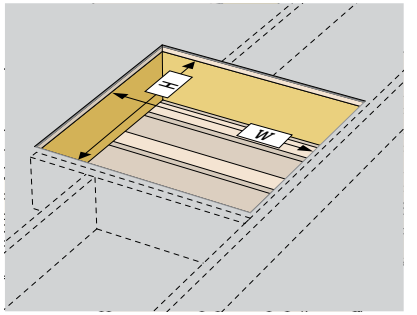
3.5 /Flat roof windows

Dimension tables roof cut-out

Dome with glazing



roof cut-out



Size code CFP/CVP	Roof cut-out W mm	Roof cut-out H mm	Upstand External dimensions mm (W x H)	Light Inner lining Groove size mm (W x H)	Light surface mm (W x H)
060060	600–610	600–610	780×780	559×559	435×435
080080	800–810	800–810	980×980	759×759	635×635
060090	600–610	900–910	780×1080	559×859	435×735
090090	900–910	900–910	1080×1080	859×859	735×735
090120	900–910	1200–1210	1080×1380	859×1159	735×1035
100100	1000–1010	1000–1010	1180×1180	959×959	835×835
100150	1000–1010	1500–1510	1180×1680	959×1459	835×1335
120120	1200–1210	1200–1210	1380×1380	1159×1159	1035×1035
150150	1500–1510	1500–1510	1680×1680	1459×1459	1335×1335

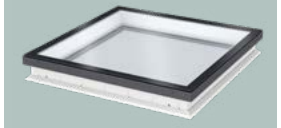
0–15°

3.5 /Flat roof windows

Dimension tables roof cut-out

New Generation

Flat glass rooflight



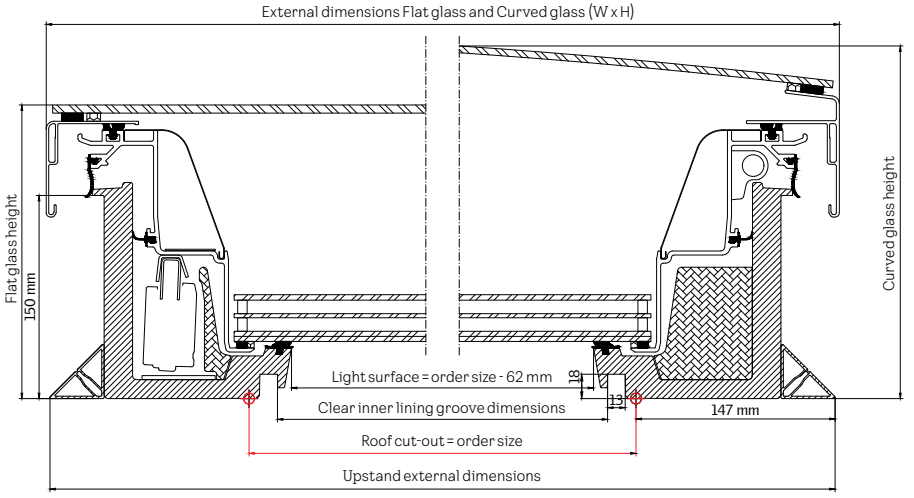
Curved glass rooflight

Flat glass
ISU 2093

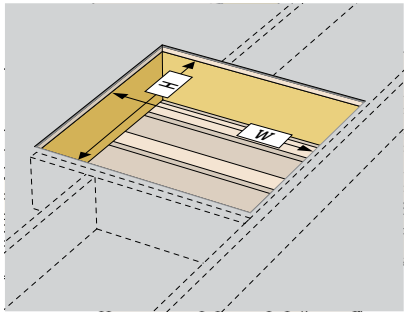
2–15°

Curved glass
ISU 1093

0–15°



roof cut-out



Size code CFU/CVU	Roof cut-out W mm	Roof cut-out H mm	Upstand external dimensions mm (W x H)	Light surface mm (W x H)	Inner lining Groove size mm (W x H)
060060	600–610	600–610	893×893	538×538	559×559
080080	800–810	800–810	1093×1093	738×738	759×759
090060	900–910	600–610	1193×893	835×538	859×559
090090	900–910	900–910	1193×1193	835×835	859×859
100100	1000–1010	1000–1010	1293×1293	938×938	959×959
120090	1200–1210	900–910	1493×1193	1138×835	1159×859
120120	1200–1210	1200–1210	1493×1493	1138×1138	1159×1159
150080*	1500–1510	800–810	1793×1093	1438×738	1459×759
150100	1500–1510	1000–1010	1793×1293	1438×938	1459×959
150120*	1500–1510	1200–1210	1793×1493	1438×1138	1459×1159
150150	1500–1510	1500–1510	1793×1793	1438×1438	1459×1459
200060*	2000–2010	600–610	2293×893	1938×538	1959×559
200100	2000–2010	1000–1010	2293×1293	1938×938	1959×959

* Available from September 2023

Lining
Design of lining make final room design

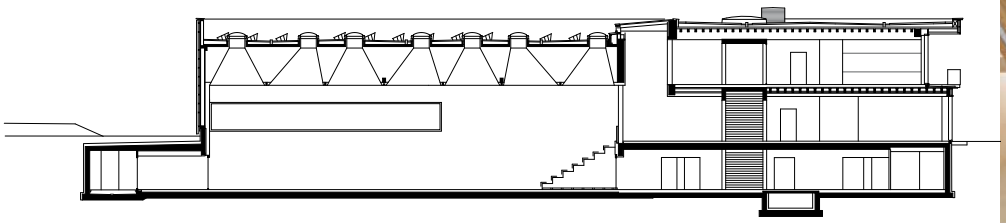
Photographer: Adam Mørk

3.6 /Lining and lining shapes

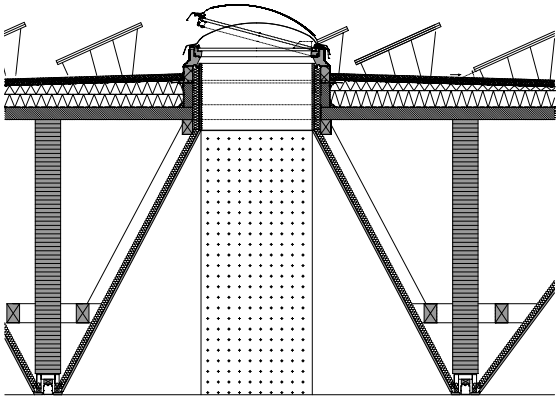
Suspended ceiling solutions

Multi-Purpose Hall in Klaus, Austria

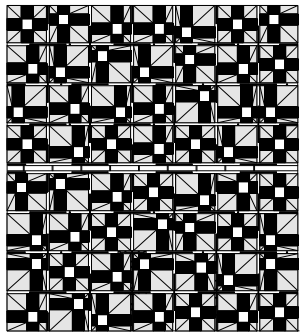
Architect: Dietcrich | Untertifaller Architekten, Austria
Photographer: Patricia Weisskirchner



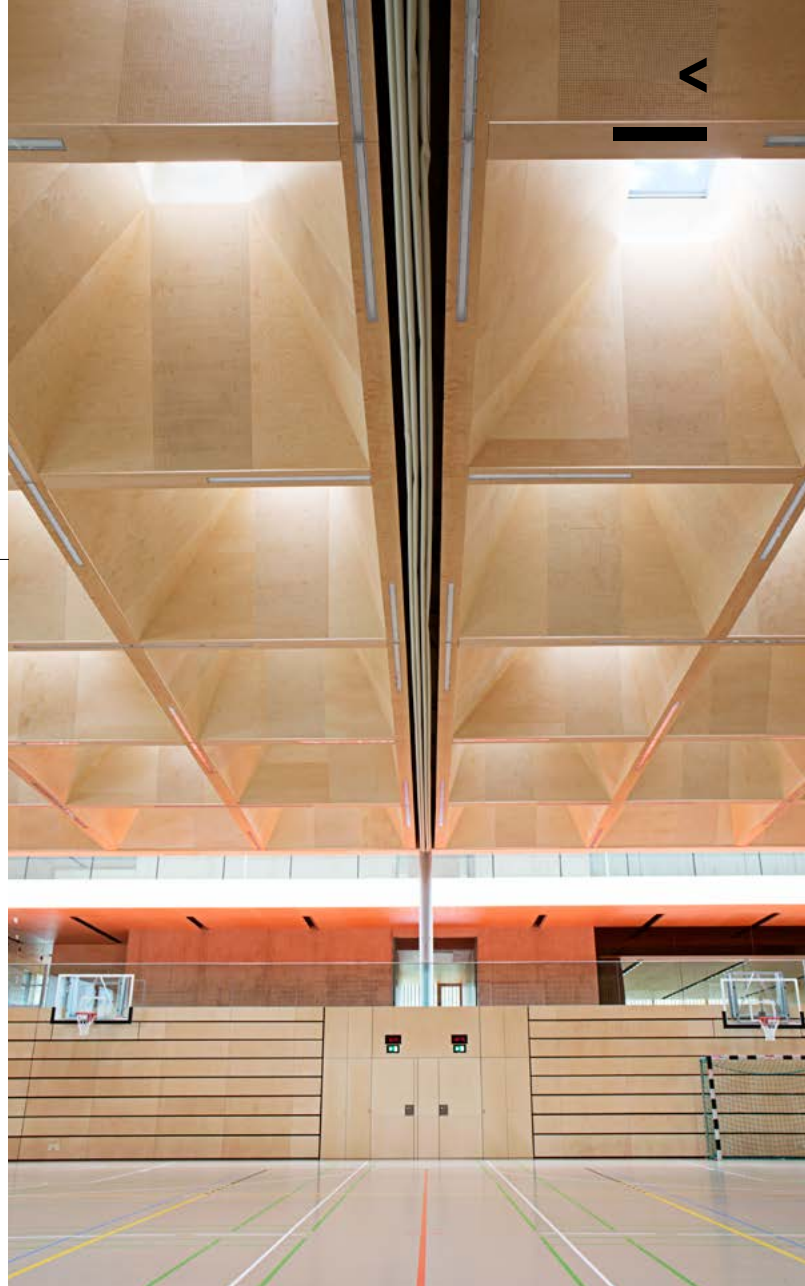
Prefabricated open light shafts



Detail of a light shaft



Overview plan of the ceiling

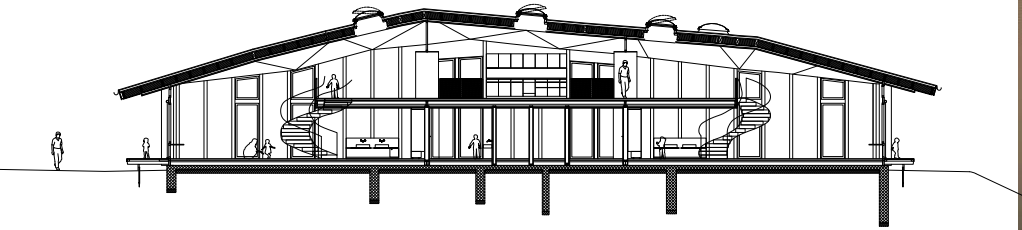


3.6 /Lining and lining shapes

Suspended ceiling solutions

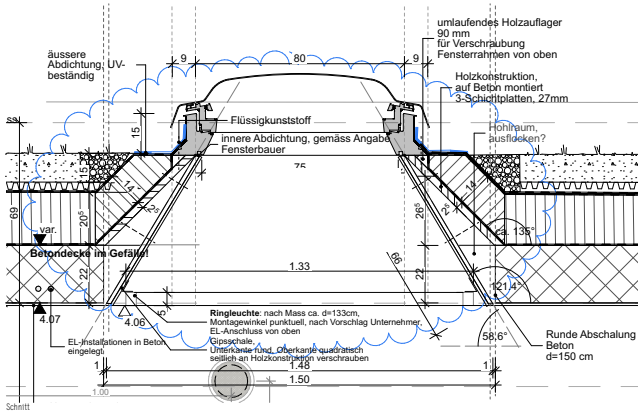
A Kindergarten in Rotkreuz, Switzerland

Architect: Melk Nigg Architects, Switzerland
Photographer: Melk Nigg, Kasia Jackowska



A Kindergarten in Rotkreuz, Switzerland

Architect: Melk Nigg Architects, Switzerland
Photographer: Melk Nigg, Kasia Jackowska

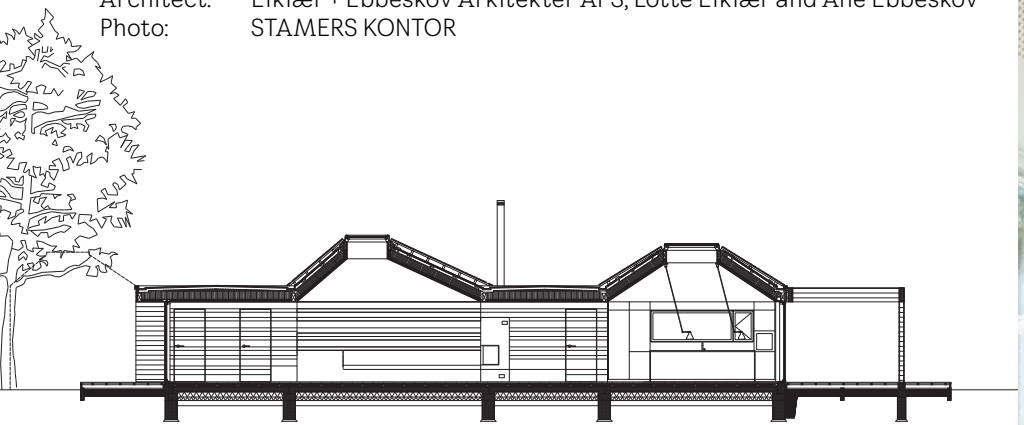


3.6 /Lining and lining shapes

Open ceiling solution

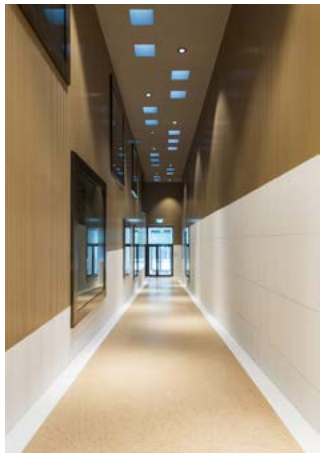
Summer huse, Rørvig, Dänemark

Architect: Elkiær + Ebbeskov Arkitekter APS, Lotte Elkiær and Ane Ebbeskov
Photo: STAMERS KONTOR



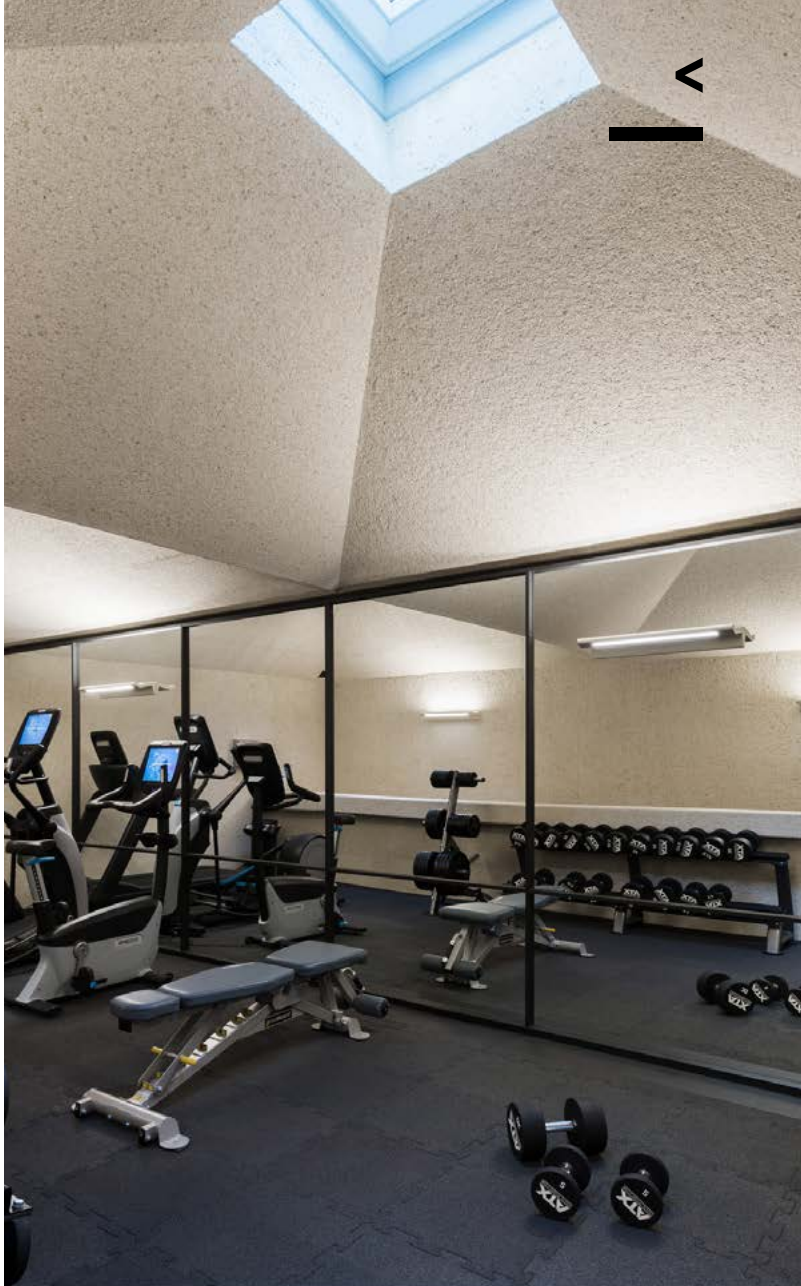
3.6 /Lining and lining shapes

Open ceiling solution



Apartment building in Kloten, Switzerland

Architect: Züst Gübeli Bambetti



3.6 /Lining and lining shapes

LSF 2000 – VELUX system lining

Efficient finish

Designed to make installation of flat roof windows more efficient, the VELUX lining for flat roof windows includes PVC panels, vapour barrier (BBX) and facings.
The VELUX Lining for windows installed in roofs with pitches between 0–5° can be used with all VELUX flat roof windows.

Max. height 70 cm

3.6 /Lining and lining shapes

Narrow on site made lining

Photo: Andrea Segliani

Photo: Andrea Segliani

Smoke ventilation system
for flat roofs

3.7 /Smoke ventilation system

Flat roof Smoke ventilation system

CSP
Flat roof window with
pre-installed motor unit

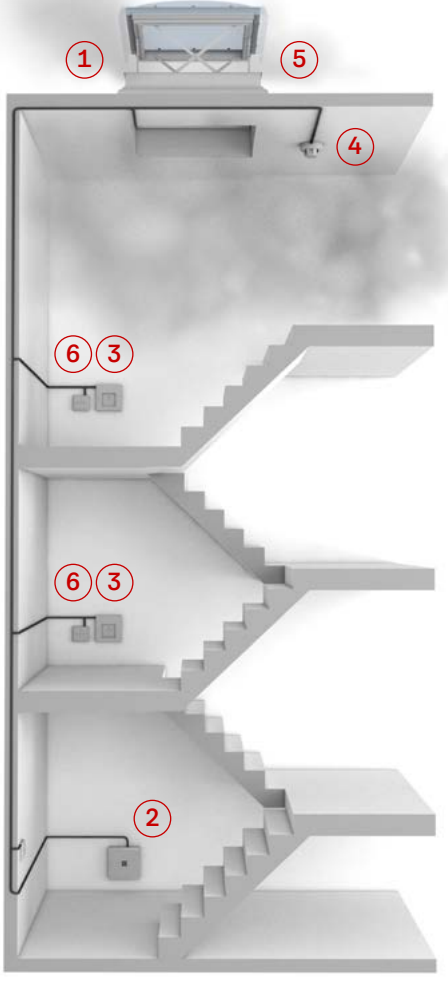
2 KFC 210
Control system

3 KFK 100
Break-glass point

4 KFA 100
Smoke detector

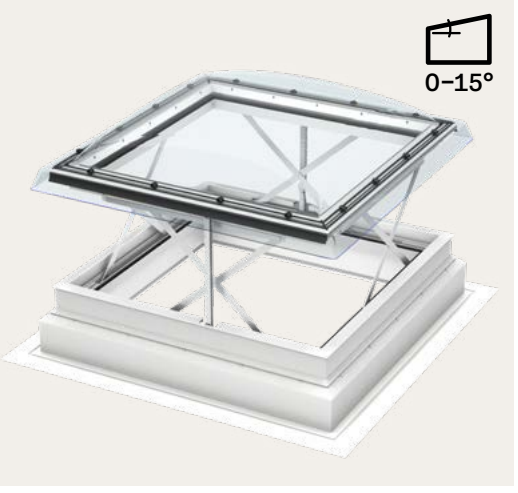
5 KLA 200
Rain sensor

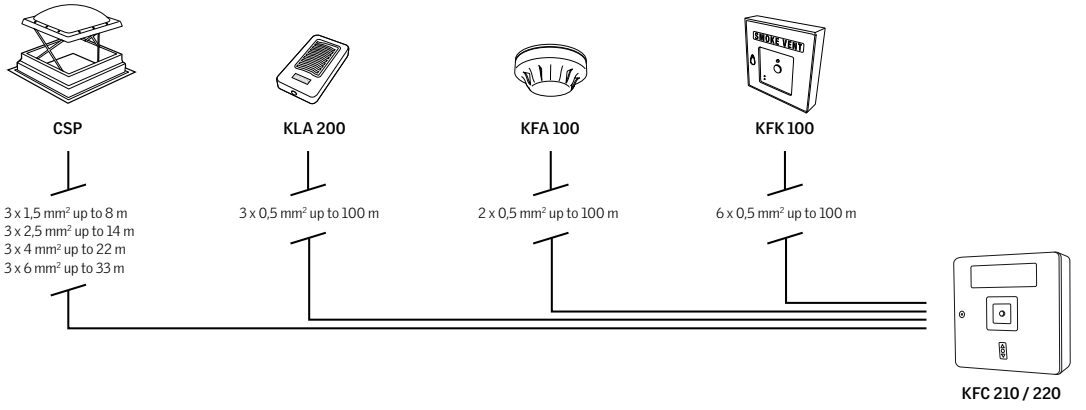
6 KFK 200
Ventilation switch



3.7 /Smoke ventilation system

CSP flat roof window with pre-installed motor unit





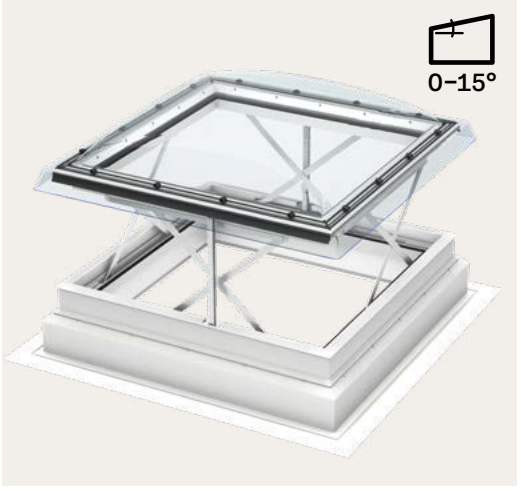
- Mains powered smoke ventilation window for flat roofs
- CE-marked in accordance with EN 60335-2-103
- Opening for smoke ventilation: 500 mm
- Opening for comfort ventilation: 150 mm
- Hidden lifting devices and motors
- Frame height: 300 mm
- Wear-resistant, high quality white PVC frame
- Low energy insulating glass unit
- Protective dome
- Maintenance-free surfaces

Available sizes and technical parameters

Smoke ventilation window CSP size (mm)	**100100** 1000 × 1000	**120120** 1200 × 1200
$U_{rc,ref\,300}$ (W/m²K)	0,99 ($A_{rc,ref300}$ = 3,4 m²)	
Reaction to fire	B-s1,d0	
Geometric area Av, m²	1.13	1.48
Aerodynamic free area Aa, m²	0.47	0.64

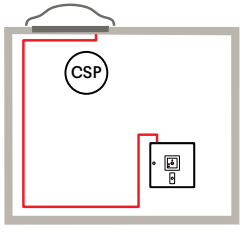
3.7 /Smoke ventilation system

CSP flat roof window with pre-installed motor unit



Required cabling

Min. cable gauge	Max. cable length
3 × 1,5 mm²	8 m
3 × 2,5 mm²	14 m
3 × 4 mm²	22 m
3 × 6 mm²	33 m



* For installation of the control system or control system units as well as for the preparation of cabling for connection of the motor unit is authorized only by eligible person (according to the currently valid decrees on the connection of heavy-current equipment). Initial commissioning as well as necessary periodic review is provided by a person commissioned by the manufacturer or fire engineer.

Smoke and heat exhaust system VELUX
Certification in accordance with EN 12 101-2:2003

EN 12 101-2	Flat roof window
operational reliability (Re)	Re 1 000 + 10 000
opening under load (SL)	SL 1000 (CSP) / SL 500 (CSP 120120)
low temperature (T)	T (-15)
resistance to heat (B)	B 300
reaction to fire	B-s1, d0

Family Hotel Amarin, Croatia

Architect: Studio up
Photographer: Robert Leš

3.7 /Smoke ventilation system

System elements

Control system KFX 210

Control system containing control unit with integrated fire alarm and ventilation switch, separate alarm fire switch and separate smoke sensor.

- Integrated backup power supply with capacity 72 hours
- For incorporation into masonry or with a frame for wall dimensions 368×353×99 mm
- Possibility of connection to superior alarm devices systems
- Primary power supply: 230 V AC/50 Hz (±10%)
- Power consumption: max 250 W

Control unit KFC 210

Control unit for 1 piece of roof window CSP

- Integrated backup power supply with capacity 72 hours
- Metal box for wall installation
- Dimensions 398x393x127 mm
- Weight including batteries 8.0 kg
- Possibility to connect to superior alarm systems
- Color: white (RAL 9016)
- Primary power supply: 230 V AC/50 Hz (±10%)
- Power consumption: max 250 W

Control unit KFC 220

Control unit for 2 pieces of roof window CSP

- Integrated backup power supply with capacity 72 hours
- Metal box for wall installation
- Dimensions 398x393x127 mm
- Weight including batteries 8.6 kg
- Possibility to connect to superior alarm systems
- Color: white (RAL 9016)
- Primary power supply: 230 V AC/50 Hz (±10%)
- Power consumption: max 500 W

3.7 /Smoke ventilation system

Additional elements of the system

VELUX break-glass point KFK 100

Switch for function activation smoke venting.

- Colour: grey (RAL 7047)
- Dimensions: 125x125x36 mm
- (WxHxD)
- Maximum 10 pcs switches can be mounted to 1 control unit VELUX
- Visual and acoustic indication correct function, error and alarm (only for inclined windows roofs).
- Connection (series) via six-wire cable by min. cross section 6x0,50 mm^2 up to 100 m

Smoke detector KFA 100

Smoke detector for timely fire detection

- Colour: white (RAL 9003)
- Dimensions: 50x100 mm (HxD) incl. sleeves.
- Maximum 10 pcs sensors can be mounted for 1 control unit VELUX
- Visual indication of activation.
- Connection (series) via two-core cable by min. cross section 2x0,50 mm^2 up to 100 m

Rain sensor KLA 200

Rain sensor for automatic closing VELUX windows with smoke ventilation in the rain if the windows are in comfortable ventilation.

- Colour: dark grey (NCS S 7500-N).
- Dimensions: 40x70x13 mm (WxHxD).
- Sensor does not perform its function in case the devices are under alarm
- Number of rain sensors depends on the number of control units
- Connection (series) via three-core cable by min. cross-section 3x0,50 mm^2 up to 100 m

Ventilation switch KFK 200

Wall switch allowing natural ventilation for everyday comfort.

- Colour: white (RAL 1013)
- Dimensions: 81x11x12 mm
- (WxHxD).
- Maximum 10 pcs switches can be mounted to 1 control unit VELUX
- Connection (series) via three-core cable by min. cross-section 3x0,50 mm^2 up to 100 m

Dentist clinic, Netherlands

Architect: WTS architecten
Photographer: Irene Kievit

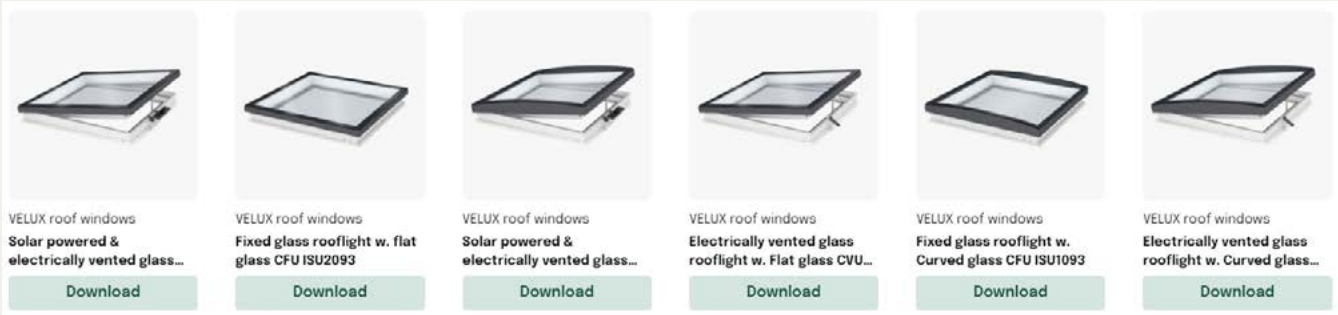
3.8 /Digital tools

Explore the VELUX BIM/CAD library

CAD/BIM objects

bimobject®

Download here

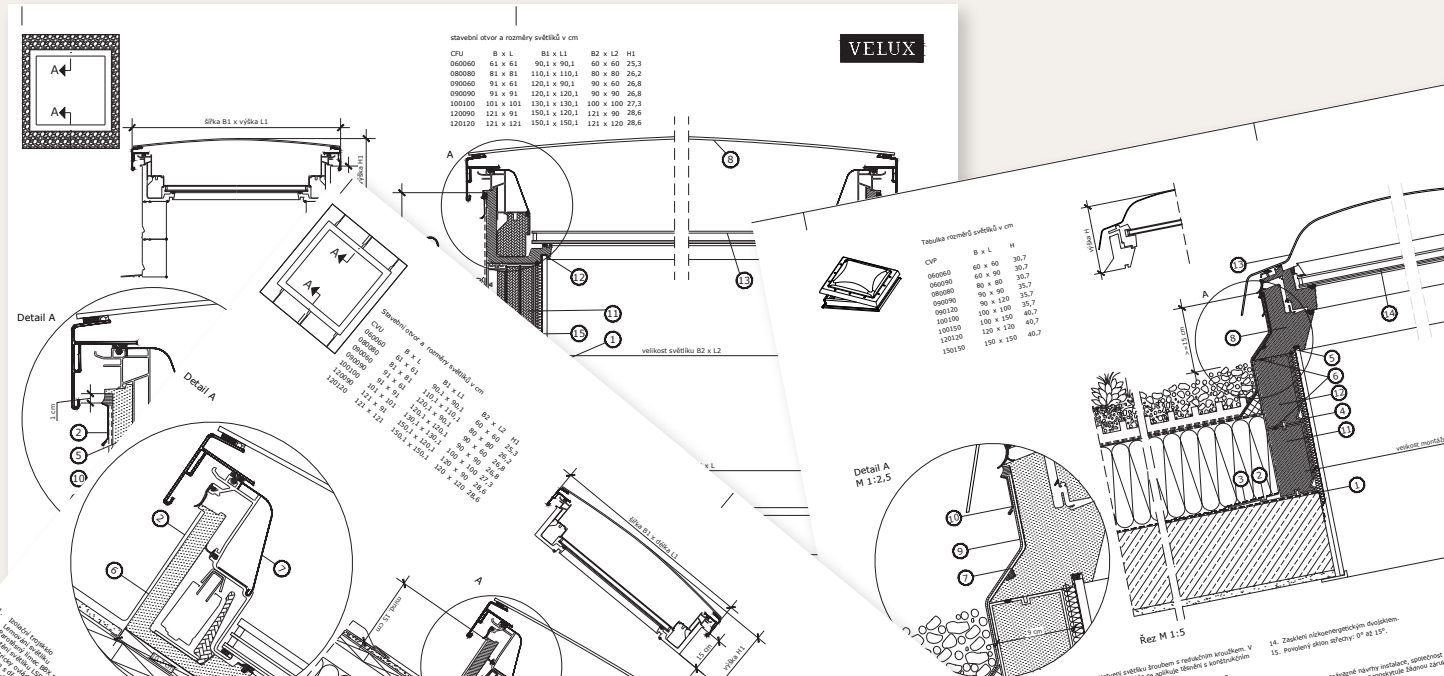


CAD installation drawings

AUTOCAD
2D CAD/PDF

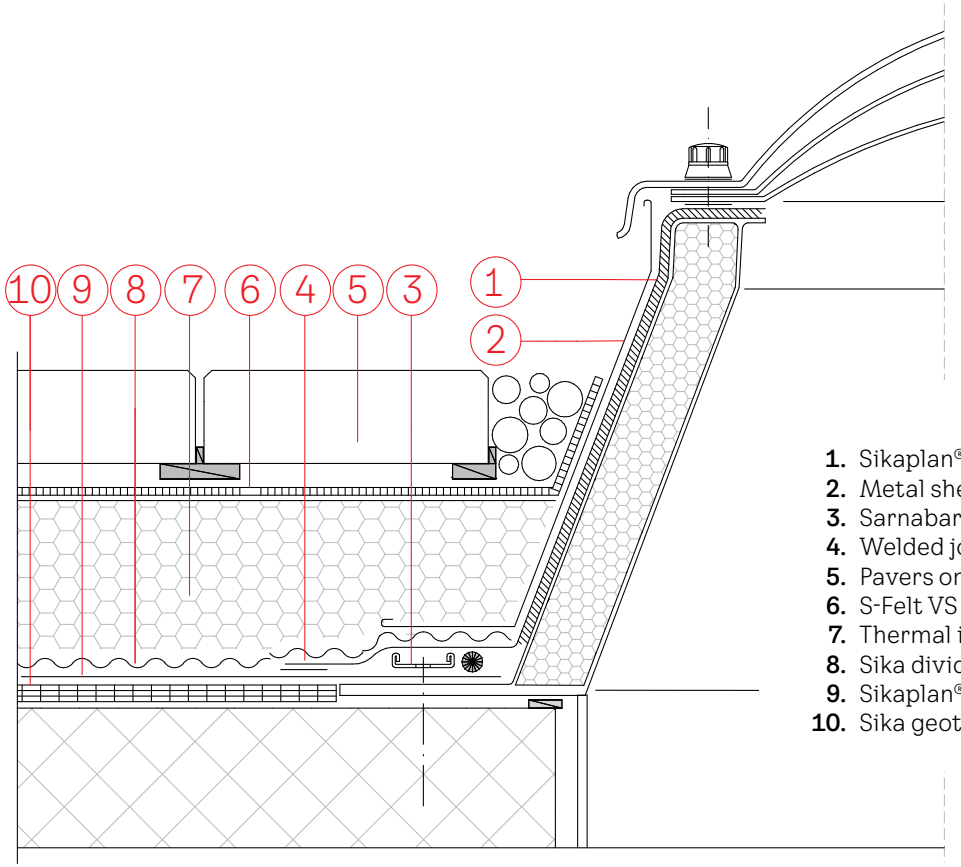
AUTODESK® AUTOCAD®

Download here



3.9 /Drawings / details

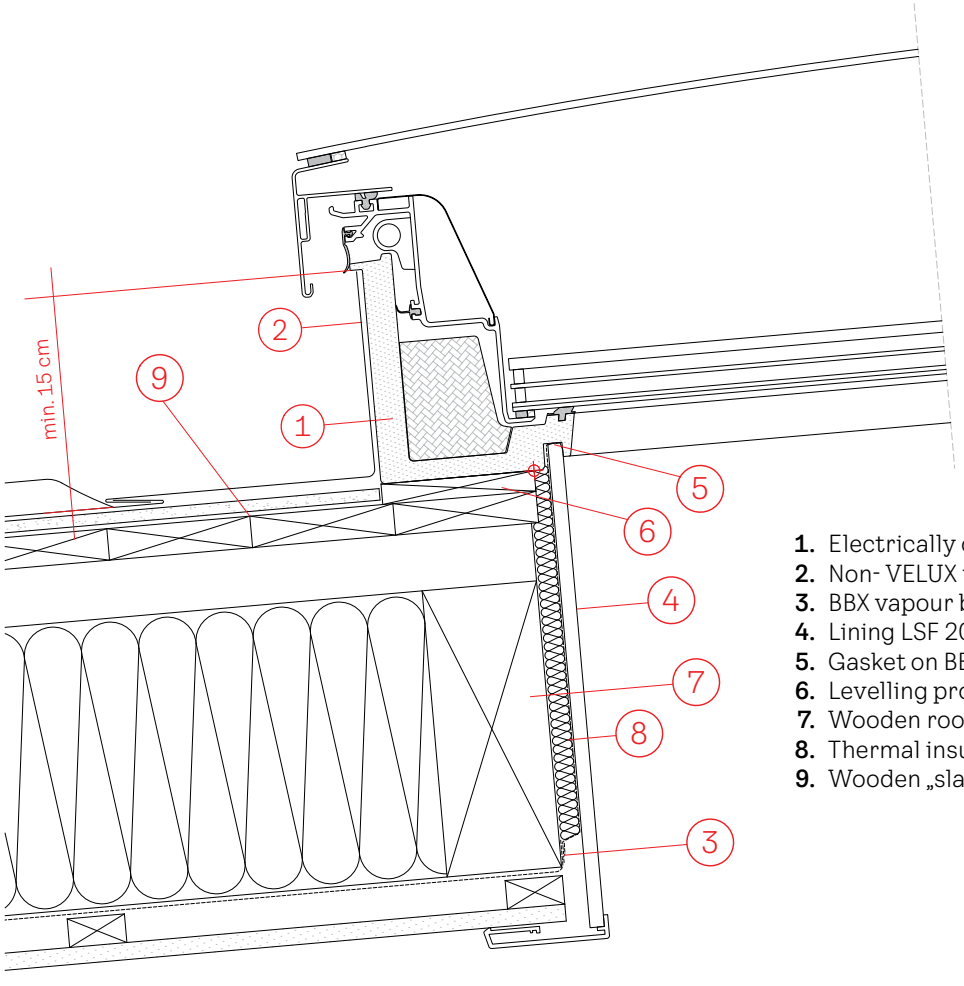
Dome, coating covering with a walking layer



1. Sikaplan®/Sarnafil® tape, glued
2. Metal sheet
3. Sarnabar rod with synthetic rope
4. Welded joint
5. Pavers on substructure
6. S-Felt VS 140 filter layer for inverted roof
7. Thermal insulation (approved by Sika-a), specified
8. Sika dividing layer (if necessery)
9. Sikaplan®/Sarnafil® membrans, freely laid
10. Sika geotextile, leveling layer

3.9 /Drawings / details

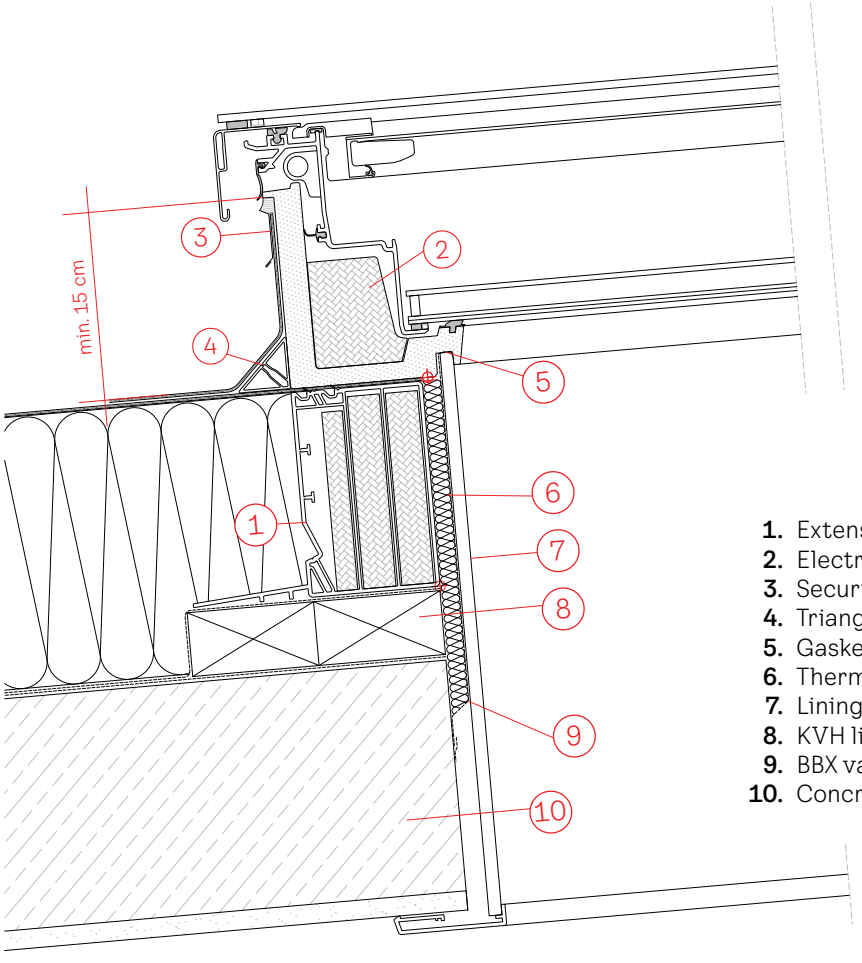
Curved glass rooflight, metal covering on the wooden roof structure



1. Electrically operated base CVU with curved glass
2. Non- VELUX flashing FRW
3. BBX vapour barrier collar connection to the vapour barrier
4. Lining LSF 2000
5. Gasket on BBX in window rebate
6. Levelling profile – wooden
7. Wooden roof structure-rafter with inter-roof insulation
8. Thermal insulation
9. Wooden „slap“ with ventilated gap

3.9 /Drawings / details

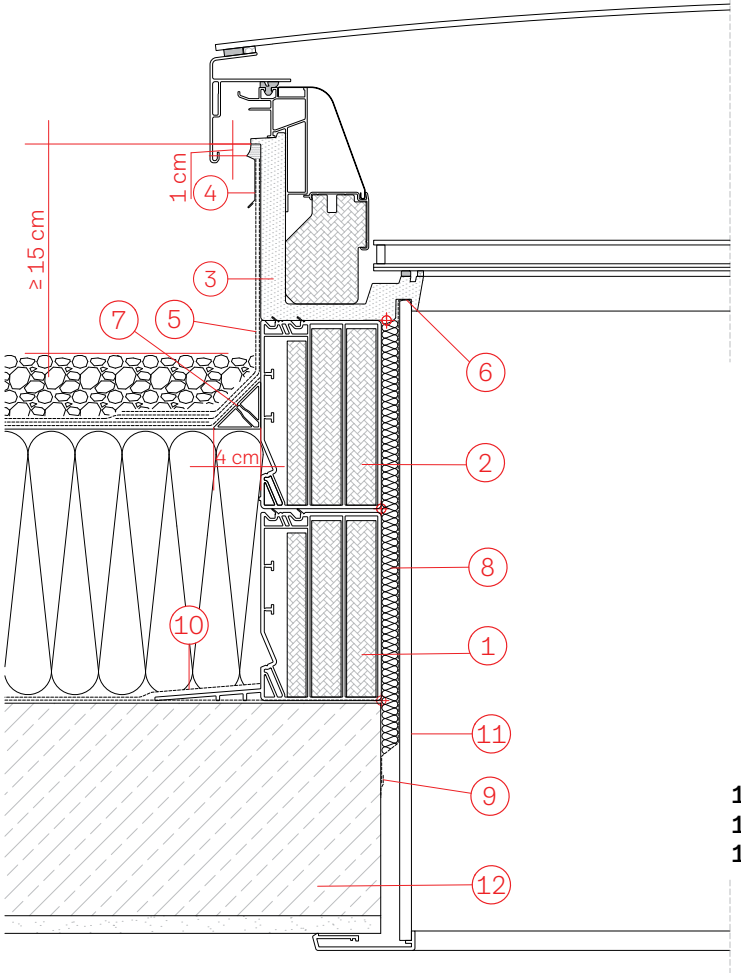
Flat glass rooflight with the extension frame, coating covering



1. Extension frame with flange ZCU 0015
2. Electrically operated rooflight base CVU with flat glass
3. Securing kit ZZZ 210U
4. Triangle list
5. Gasket on BBX in window rebate
6. Thermal insulation
7. Lining LSF 2000
8. KVH lifting profile
9. BBX vapour barrier collar
10. Concrete slab

3.9 /Drawings / details

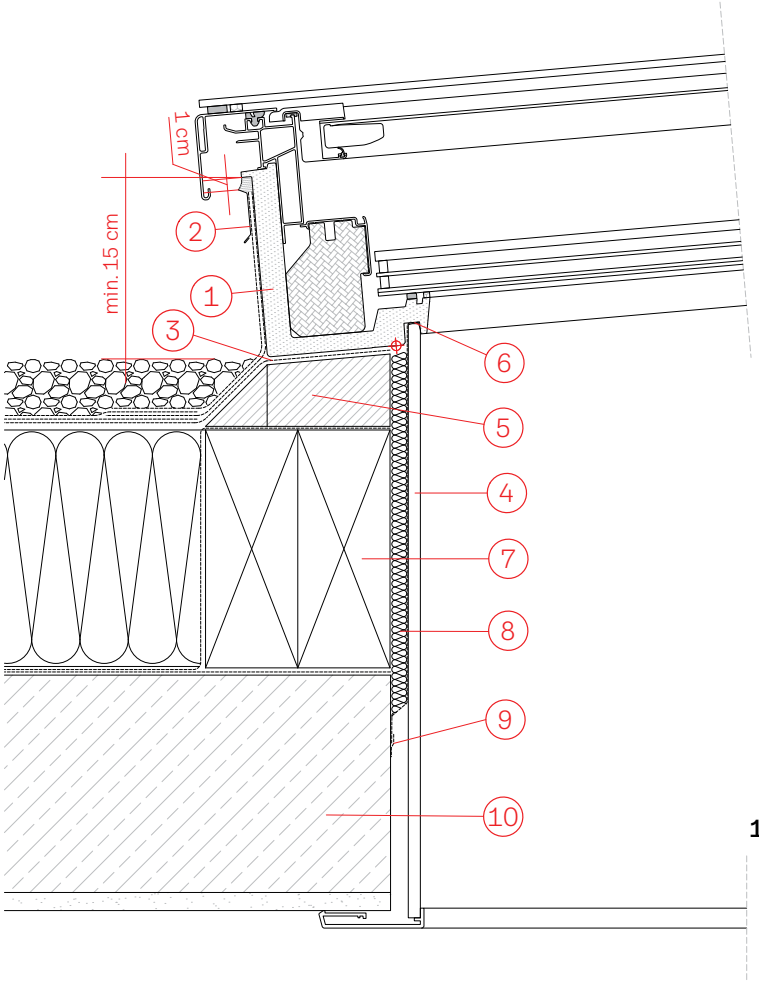
Curved glass rooflight, coating covering with the sand layer



1. Extension frame with flange ZCU 0015
2. Extension frame ZCU 1015 – max. 3 above each other
3. Non-opening rooflight base CFU with curved glass
4. Securing kit ZZZ 210U
5. Waterproofing
6. Gasket on BBX in window rebate
7. Triangle list
8. Thermal insulation
9. BBX vapour barrier collar connected to the concrete slab
10. Vapour barrier collar connected to the lifting frame
11. Lining LSF 2000
12. Concrete slab

3.9 /Drawings / details

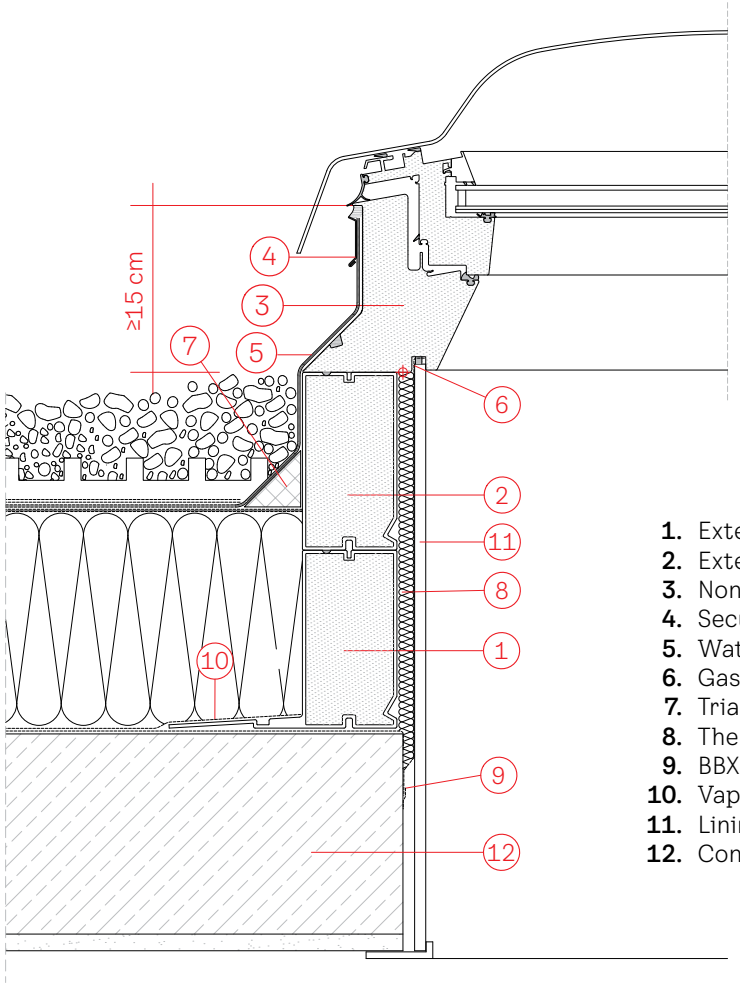
Flat glass rooflight on site made extension frame,
coating covering with the sand layer



1. Non-opening rooflight base CFU with flat glass
2. Securing kit ZZZ 210U
3. Waterproofing
4. Lining LSF 2000
5. Rooflight inclination 2–15°
6. Gasket on BBX in window rebate
7. KVH profile bringing out the rooflight at the level of the thermal insulation
8. Thermal insulation
9. BBX vapour barrier collar connected to the concrete slab
10. Concrete slab

3.9 /Drawings / details

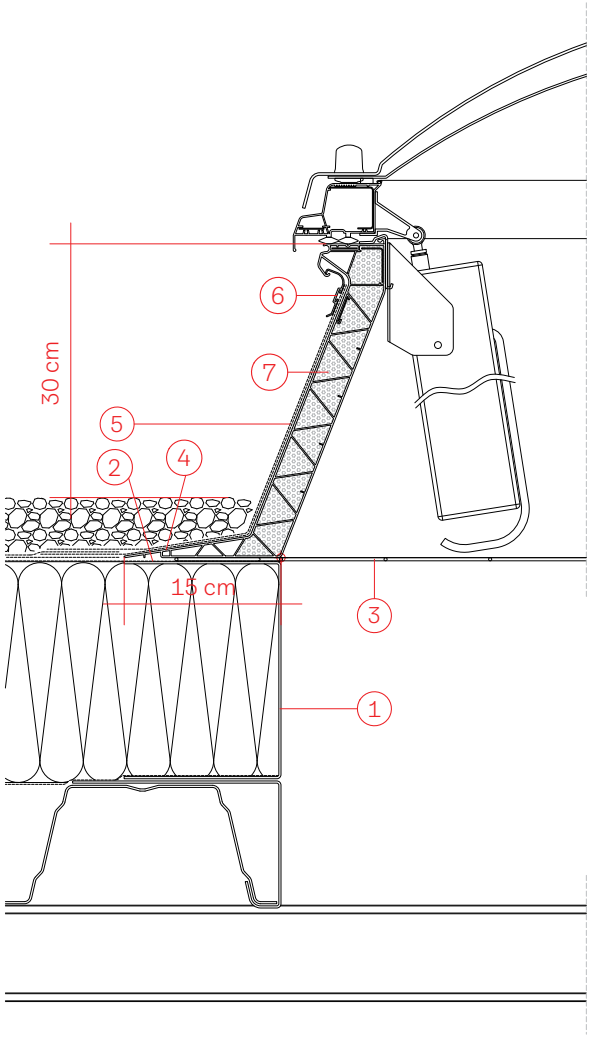
Dome with glazing with extension frame, green roof



1. Extension frame with flange ZCE 0015
2. Extension frame ZCE 1015 (max. 3 above each other)
3. Non-opening base with glazing CFP and dome ISD
4. Securing kit ZZZ 210
5. Waterproofing
6. Gasket on BBX in window rebate
7. Triangle list
8. Thermal insulation
9. BBX vapour barrier collar connected to the concrete slab
10. Vapour barrier collar connected to the lifting frame
11. Lining LSF 2000
12. Concrete slab

3.9 /Drawings / details

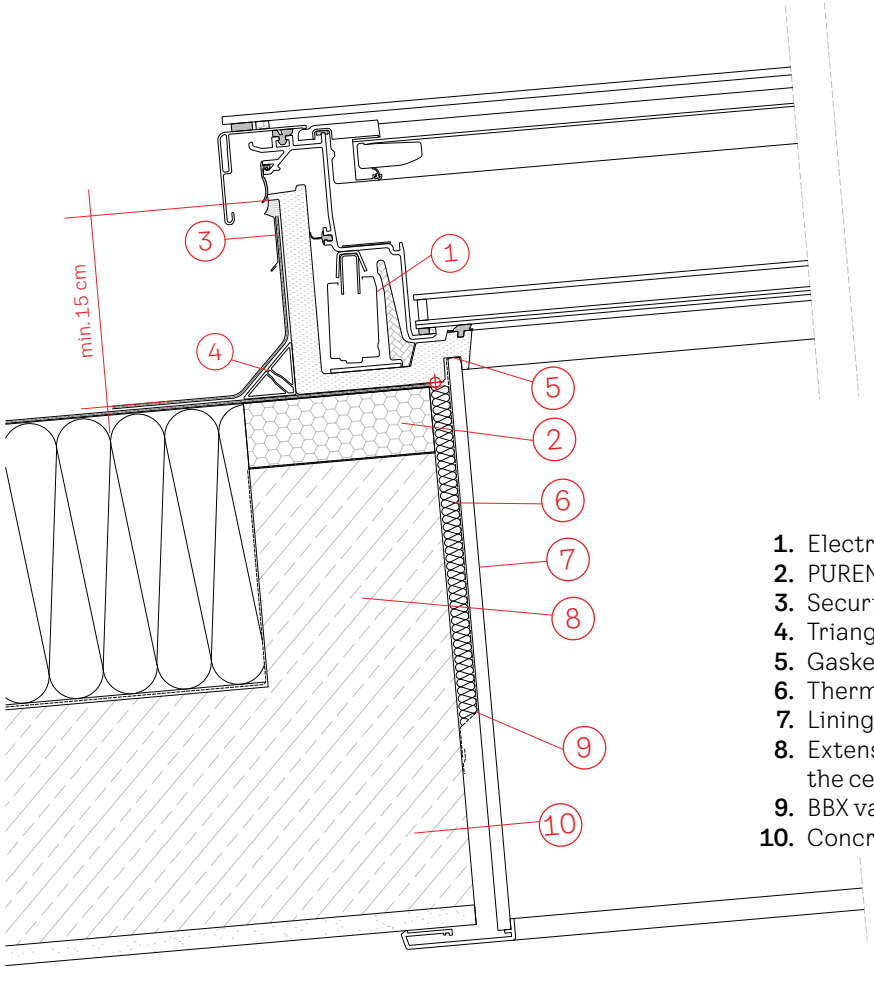
Dome, coating covering with the sand layer



1. Edge of the building envelope, supporting structures.
2. Single ply roof membrane up to the roof cut-out (OPTIONAL)
3. VELUX fall-through protection grid
4. Rooflight mounting flange
5. Roof waterproofing anchored to the skylight base
6. Securing kit – ZZZ 210J
7. Opening rooflight base (CVJ) FIX for easy and safe installation

3.9 /Drawings / details

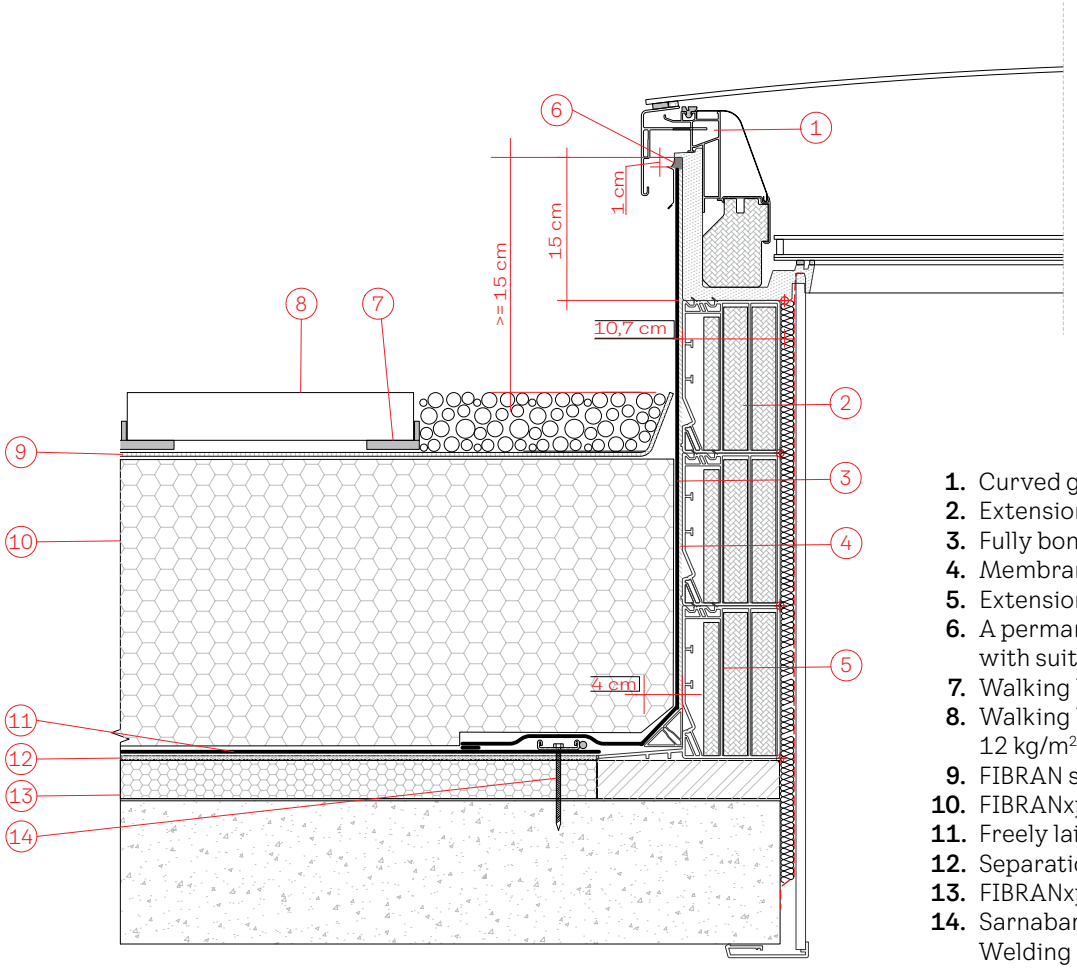
Flat glass rooflight with the extension frame from concrete, coating covering



1. Electrically operated rooflight base CVU + flat glass
2. PURENIT – thermal insulation
3. Securing kit ZZZ 210U
4. Triangle list
5. Gasket on BBX in window rebate
6. Thermal insulation
7. Lining LSF 2000
8. Extension – concrete monolith connected to the ceiling slab
9. BBX vapour barrier collar
10. Concrete slab

3.9 /Drawings / details

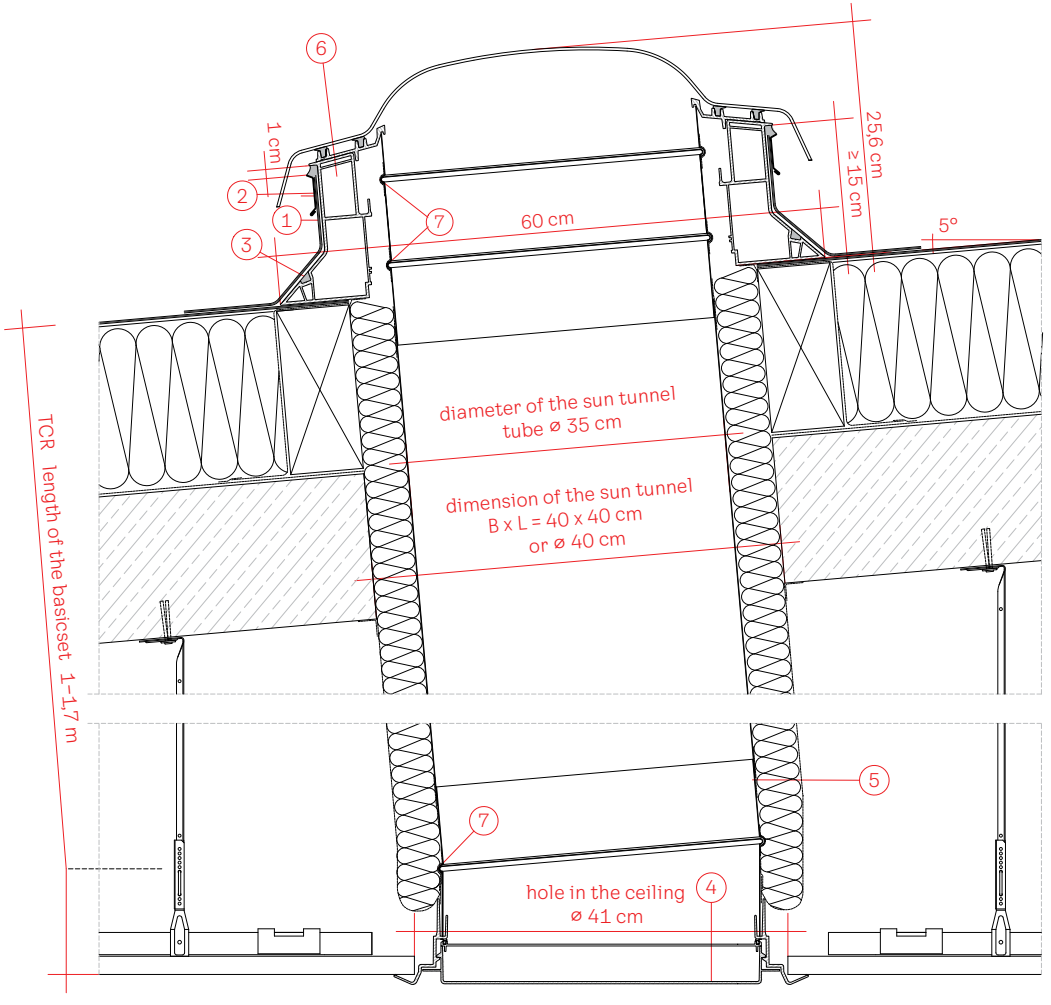
Flat glass rooflight, coating covering with a walking layer, Sika insulation



1. Curved glass rooflight
2. Extension frame ZCU 1015
3. Fully bonded membrane Sarnafil® TG 66
4. Membrane glue Sarnacol® T-660
5. Extension frame with flange ZCU 0015
6. A permanently elastic sealant, such as Sikaflex®-11 FC, with suitable pre-prepared surfaces
7. Walking board holder
8. Walking boards weighing at least 12 kg/m²/ for 10 mm XPS
9. FIBRAN skin SEAL
10. FIBRANxps 300-L thermal insulation
11. Freely laid membrane Sarnafil® TG 66
12. Separation layer S-Felt A 300
13. FIBRANxps INCLINE slope insulation
14. Sarnabar® in-line membrane fixing with Sarnafil® T Welding Cord for mechanically fixed membranes

3.9 /Drawings / details

Rigid sun tunnel for flat roofs

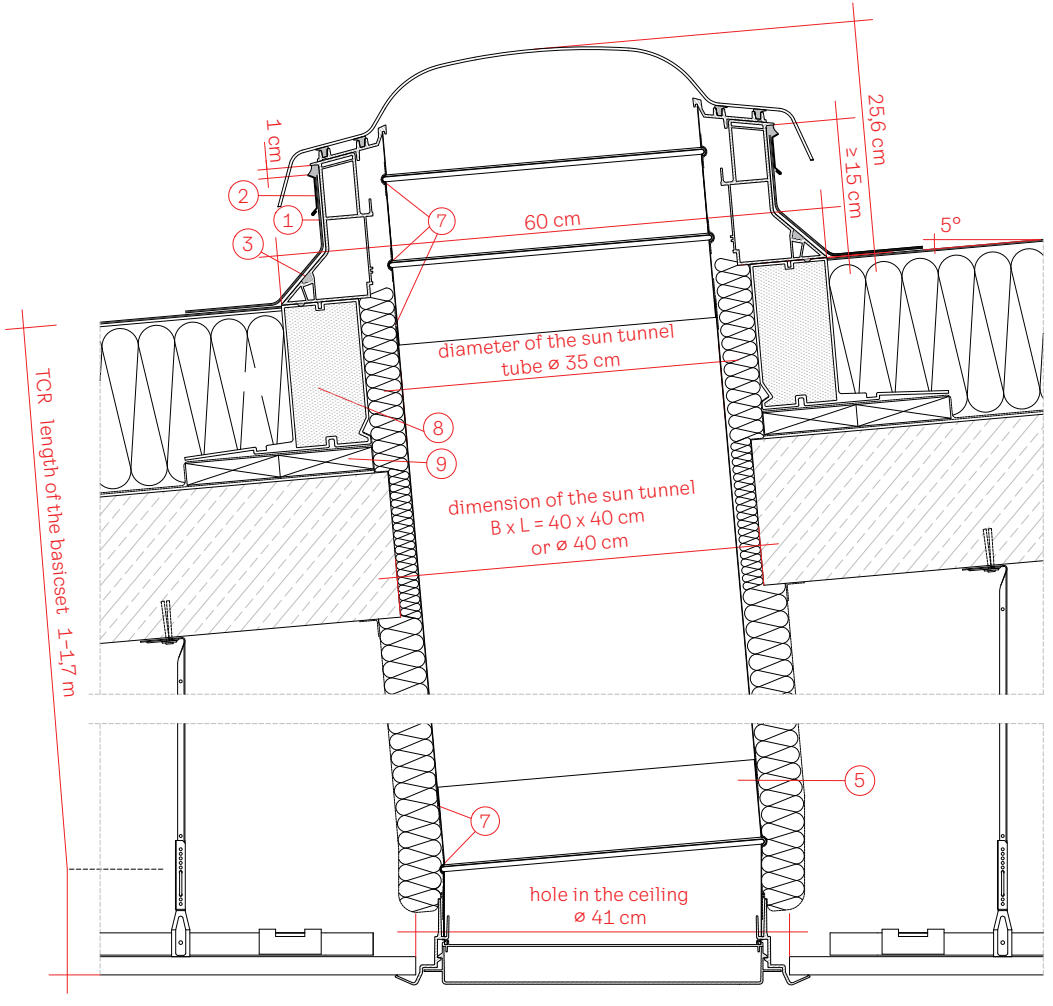


1. Pulling out and gluing the waterproofing to the frame of the sun tunnel
2. ZZZ 210 Securing kit
3. Anchoring of the sun tunnel with a bolt with a reduction ring. Sealant with structural silicone is applied at the installation point.
4. EdgeGlow diffuser (for better light diffusion)
5. Fixed tube – flat part with Flexi Loc system, for easy and quick assembly.
6. TCR fitting head – cuff in hardened PVC with acrylic dome
7. Re-jointing with aluminium tape.

Permissible roof pitch: 0° to 15°.

3.9 /Drawings / details

Rigid sun tunnel for flat roofs with extension frame

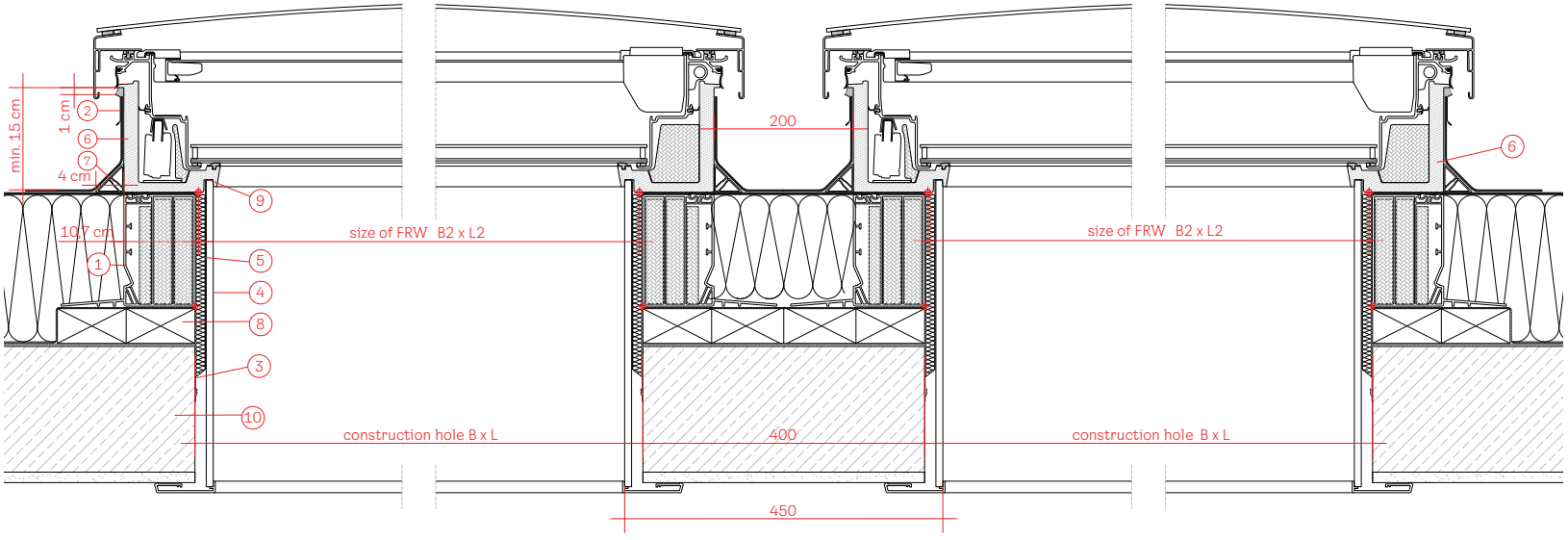


1. Pulling out and gluing the waterproofing to the frame of the sun tunnel
2. ZZZ 210 Securing kit
3. Anchoring of the sun tunnel with a bolt with a reduction ring. Sealant with structural silicone is applied at the installation point.
4. EdgeGlow diffuser (for better light diffusion)
5. Fixed tube – flat part with FLexi loc system, for easy and quick assembly.
6. TCR fitting head – cuff in hardened PVC with acrylic dome
7. Re-jointing with aluminium tape
8. Extension frame with flange ZCE 0015
9. Underlay part from KVH

Permissible roof pitch: 0° to 15°.

3.9 /Drawings / details

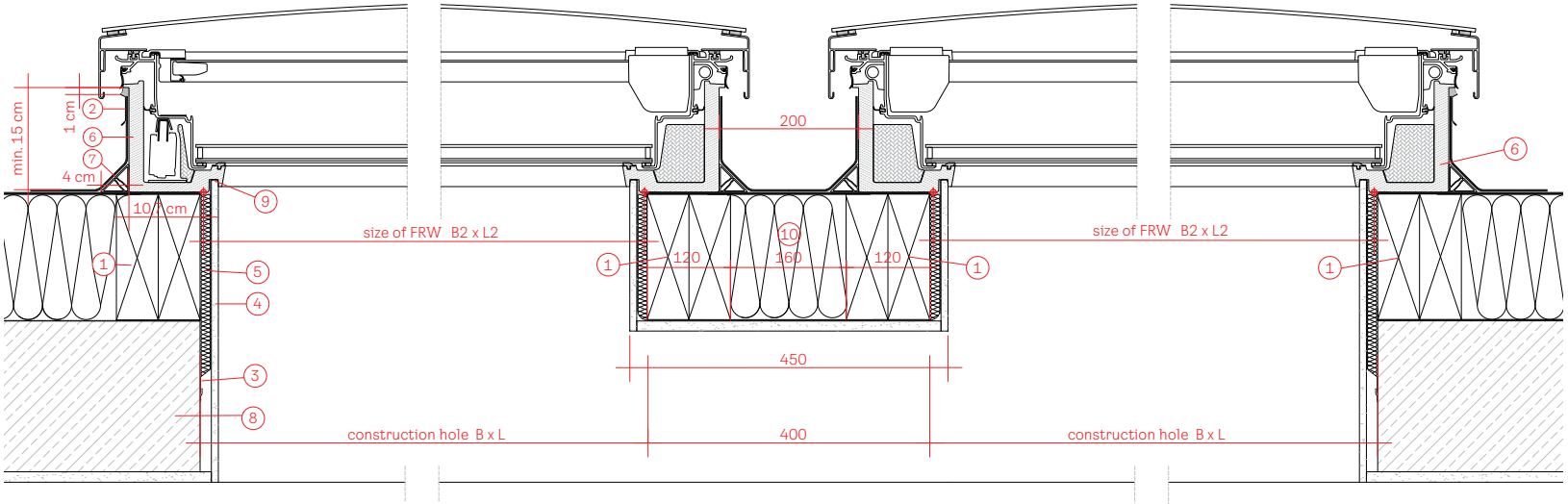
Standard combination of flat roof windows



1. Extension frame with flange ZCU 0015
2. Securing kit ZZZ 210U
3. BBX vapour barrier collar
4. Lining LSF 2000
5. Thermal insulation
6. Electrically operated CVU
7. Triangle list
8. KVH lifting profile
9. Gasket on BBX in window rebate
10. Concrete slab

3.9 /Drawings / details

Combination of flat roof windows



1. KVH profile 2x 60/180
2. Securing kit ZZZ 210U
3. BBX vapour barrier collar
4. Lining
5. Thermal insulation
6. Electrically operated CVU
7. Triangle list
8. Concrete slab
9. Gasket on BBX in window rebate
10. Thermal insulation – PUREN

Download all details in .zip

www.velux.com

Transforming Spaces