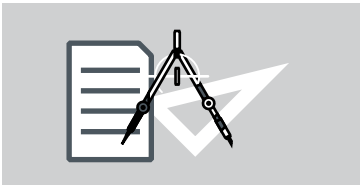
Solar products

Design aid
Mounting rails for
Schüco MSE 200 mounting system Europe



SCHÜCO

Planning aid - Mounting rails for Schüco MSE 200 mounting system - Europe •
Version 01 • 03-2010 • Art. No. 259 712

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List of contents

1. General

This design aid serves as an overview of the calculations in accordance with DIN 1055, valid since 01.01.2007, for Schüco MSE 200 mounting rails.

The tables for calculating the span widths in accordance with DIN 1055 can be found in the appendix, parts 1 to 4. The span width tables for all existing mounting rails are based on the following parameters:

- Standard: DIN 1055, part 4 and part 5, 2005.
- Angle of pitch: 10° - 60°.
- Distance between mounting rails: 0.40 m to 1.60 m.
- Roof types: Mono-pitch, gable and hipped roofs.
- Roof area: Areas H and I.
- Snow loads:
  Part 1: 0.65 kN/m² to 1.10 kN/m².
  Part 2: 1.3 kN/m².
  Part 3: increased snow load from 1 to 10 kN/m²

  The formation of snow drifts is not taken into account.
- Wind loads: Part 1: q_w = 0.65 / 0.8 / 0.9 / 1.4 kN/m²,
  Part 2: q_w = 0.65 / 0.8 / 0.9 / 1.4 kN/m²,
  Part 3: q_w = 0.65 / 0.8 / 0.9 / 1.4 kN/m²,
  Part 4: q_w = 0.5 / 1 / 1.5 / 2 kN/m².
- Dead load: $g \leq 0.20$ kN/m².
- Investigation of the following load combinations (LFK) is based on DIN 1055-100:
  LFK 1: $g + s + 0.6 \cdot w_d$
  LFK 2: $g + 0.5 \cdot s + w_d$
  LFK 3: $0.5 \cdot g + w_s$
  g = Dead load
  s = Snow load
  w_d = Wind load (pressure)
  w_s = Wind load (negative wind load)
- Structural system:
  Three-field span with equal field lengths L.

2. Definition of load

DIN 1055 also has an effect on the dimensioning and design of load-bearing components of solar energy systems (mounting rails).

This document serves as a basis for design.

3. Calculation of dimensions

The length of the mounting rails as supplied is 6180 mm.

Cutting the mounting rail (per row of modules) =
22 mm + [number of modules × (module width W +
21 mm)]

Example:

Number of modules	6 modules
Arrangement	Portrait, adjacent in a single row
Module size	L = 1495 mm, W = 1001 mm
Cutting length	22 + [6 × (1001 mm + 21 mm)] = 6154 mm
No. of mounting rails required	2

Retaining clips and module clips:

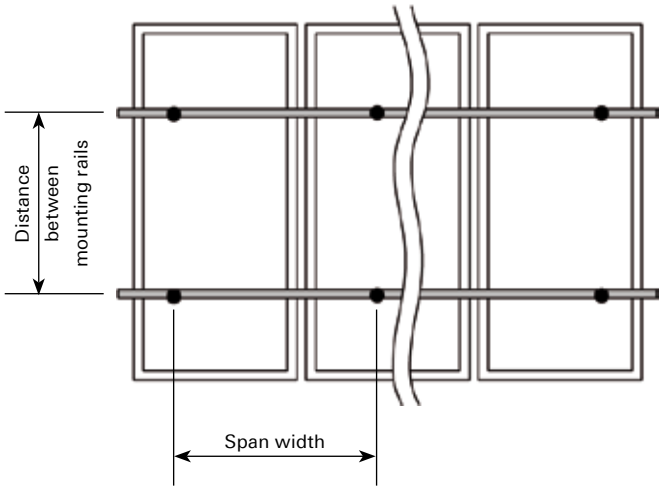
End retaining clips	4 per row of modules
Intermediate retaining clips	2 × (no. of modules - 1)

4. Calculation of span widths

Calculation of site-specific factors

- Calculate snow loads in accordance with country-specific data.

- Calculate wind loads in accordance with country-specific data.



Calculation of span widths based on the location

1. Select the mounting rail.
   Example: BP 085 S mounting rail.

2. Apply the calculated snow load.
   Example: Snow load s_k = 0.85 kN/m².

3. Select the roof pitch class
   (See appendix for tables).
   Example: Roof pitch class 1 (10° - 34°).

4. Apply the calculated wind load.
   Example: Wind load q = 0.65 kN/m².

5. Select the distance between the mounting rails.
   Example:
   Distance between the mounting rails = 1.00 m
   Calculated span width = 0.80 m.

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Appendix part 1 - Span widths for snow loads up to 1.1 kN/m²

1. → **BP 085 S mounting rail**
Art. No. 259 721

4. → 3. →

Typical snow load 0.65 kN/m²

Distance between mounting rails [m]	Roof pitch class 1 (10°-34°) Typical wind load q [kN/m²]				Roof pitch class 2 (35°-44°) Typical wind load q [kN/m²]				Roof pitch class 3 (45°-60°) Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.39	1.36	1.33	1.06	1.45	1.39	1.31	1.05	1.50	1.36	1.29	1.04
0.60	1.13	1.11	1.08	0.86	1.18	1.14	1.07	0.86	1.23	1.11	1.05	0.85
0.80	0.98	0.96	0.94	0.75	1.02	0.98	0.93	0.74	1.06	0.96	0.91	0.73
1.00	0.88	0.86	0.84	0.67	0.92	0.88	0.83	0.66	0.95	0.86	0.81	0.65
1.20	0.80	0.79	0.77	0.61	0.84	0.80	0.76	0.61	0.87	0.78	0.74	0.60
1.40	0.74	0.73	0.71	0.56	0.77	0.74	0.70	0.56	0.80	0.73	0.69	0.55
1.60	0.69	0.68	0.66	0.53	0.72	0.69	0.65	0.52	0.75	0.68	0.64	0.52

2. →

Typical snow load 0.85 kN/m²

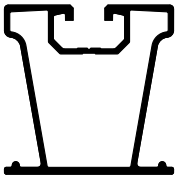
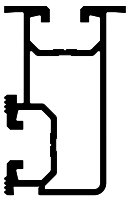
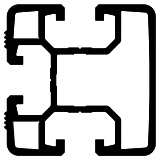
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°) Typical wind load q [kN/m²]				Roof pitch class 2 (35°-44°) Typical wind load q [kN/m²]				Roof pitch class 3 (45°-60°) Typical wind load
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65
0.40	1.28	1.26	1.25	1.06	1.35	1.32	1.31	1.05	1.50
0.60	1.04	1.03	1.02	0.86	1.10	1.08	1.07	0.86	
0.80	0.90	0.89	0.88	0.75	0.95	0.93	0.92		
1.00	0.80	0.79	0.79	0.67	0.85	0.83			
1.20	0.73	0.72	0.72	0.61	0.78				
1.40	0.68	0.67	0.66	0.56					
1.60	0.64	0.63							

5. →

Appendix part 1

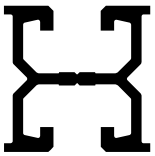
Span width tables

Snow loads: 0.65 / 0.85 / 1.10 kN/m²
Wind loads: 0.65 / 0.80 / 0.90 / 1.40 kN/m²

Mounting rail cross section	Description	Art. No.	Use
	BP 085 S	259 721	Vertical installation, horizontal installation; cruciform installation, e.g. on a roof with trapezoidal corrugations
	BP 170 V	259 722	Vertical installation; cruciform installation in conjunction with BP 165 H
	BP 165 H	259 723	Horizontal installation; cruciform installation in conjunction with BP 170 V
	BP 130 S	259 724	Vertical installation; horiztonal installation; cruciform installation
	BP 160 S	259 725	Vertical installation; horiztonal installation; cruciform installation

Appendix part 1 - Span widths for snow loads up to 1.1 kN/m²

BP 085 S mounting rail
Art. No. 259 721



Typical snow load 0.65 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.39	1.36	1.33	1.06	1.45	1.39	1.31	1.05	1.50	1.36	1.29	1.04
0.60	1.13	1.11	1.08	0.86	1.18	1.14	1.07	0.86	1.23	1.11	1.05	0.85
0.80	0.98	0.96	0.94	0.75	1.02	0.98	0.93	0.74	1.06	0.96	0.91	0.73
1.00	0.88	0.86	0.84	0.67	0.92	0.88	0.83	0.66	0.95	0.86	0.81	0.65
1.20	0.80	0.79	0.77	0.61	0.84	0.80	0.76	0.61	0.87	0.78	0.74	0.60
1.40	0.74	0.73	0.71	0.56	0.77	0.74	0.70	0.56	0.80	0.73	0.69	0.55
1.60	0.69	0.68	0.66	0.53	0.72	0.69	0.65	0.52	0.75	0.68	0.64	0.52

Typical snow load 0.85 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.28	1.26	1.25	1.06	1.35	1.32	1.31	1.05	1.50	1.36	1.29	1.04
0.60	1.04	1.03	1.02	0.86	1.10	1.08	1.07	0.86	1.23	1.11	1.05	0.85
0.80	0.90	0.89	0.88	0.75	0.95	0.93	0.92	0.74	1.06	0.96	0.91	0.73
1.00	0.80	0.79	0.79	0.67	0.85	0.83	0.82	0.66	0.95	0.86	0.81	0.65
1.20	0.73	0.72	0.72	0.61	0.78	0.76	0.75	0.61	0.87	0.78	0.74	0.60
1.40	0.68	0.67	0.66	0.56	0.72	0.70	0.70	0.56	0.80	0.73	0.69	0.55
1.60	0.64	0.63	0.62	0.53	0.67	0.66	0.65	0.52	0.75	0.68	0.64	0.52

Typical snow load 1.10 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.17	1.15	1.14	1.06	1.24	1.22	1.21	1.05	1.45	1.36	1.29	1.04
0.60	0.95	0.94	0.93	0.86	1.01	1.00	0.99	0.86	1.18	1.11	1.05	0.85
0.80	0.82	0.81	0.81	0.75	0.88	0.86	0.85	0.74	1.02	0.96	0.91	0.73
1.00	0.74	0.73	0.72	0.67	0.78	0.77	0.76	0.66	0.91	0.86	0.81	0.65
1.20	0.67	0.66	0.66	0.61	0.72	0.70	0.70	0.61	0.83	0.78	0.74	0.60
1.40	0.62	0.61	0.61	0.56	0.66	0.65	0.65	0.56	0.78	0.73	0.69	0.55
1.60	0.58	0.57	0.57	0.53	0.62	0.61	0.60	0.52	0.72	0.68	0.64	0.52

Appendix part 1 - Span widths for snow loads up to 1.1 kN/m²

BP 170 V mounting rail
Art. No. 259 722
The BP 170 V mounting rail must only be used for vertical installation on the roof. Only the vertical loads have been taken into account in the calculation of the span widths.
Cruciform installation is possible in conjunction with BP 165 H.

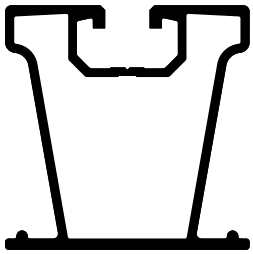
Typical snow load 0.65 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.89	2.62	2.46	1.95	2.90	2.61	2.44	1.94	2.86	2.57	2.42	1.92
0.60	2.37	2.14	2.00	1.30	2.38	2.12	1.99	1.30	2.34	2.10	1.97	1.30
0.80	2.06	1.75	1.60	1.00	2.06	1.75	1.60	1.00	2.03	1.75	1.60	1.00
1.00	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80
1.20	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65
1.40	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55
1.60	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50

Typical snow load 0.85 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.66	2.62	2.46	1.95	2.90	2.61	2.44	1.94	2.86	2.57	2.42	1.92
0.60	2.17	2.14	2.00	1.30	2.38	2.12	1.99	1.30	2.34	2.10	1.97	1.30
0.80	1.88	1.75	1.60	1.00	2.06	1.75	1.60	1.00	2.03	1.75	1.60	1.00
1.00	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80
1.20	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65
1.40	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55
1.60	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50

Typical snow load 1.10 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.42	2.40	2.39	1.95	2.90	2.61	2.44	1.94	2.86	2.57	2.42	1.92
0.60	1.97	1.96	1.95	1.30	2.38	2.12	1.99	1.30	2.34	2.10	1.97	1.30
0.80	1.71	1.75	1.60	1.00	2.06	1.75	1.70	1.00	2.03	1.75	1.60	1.00
1.00	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80
1.20	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65
1.40	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55
1.60	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50

Appendix part 1 - Span widths for snow loads up to 1.1 kN/m²

BP 165 H mounting rail
Art. No. 259 723
The BP 165 H mounting rail must only be used as a horizontal mounting rail for cruciform installation.
Cruciform installation is possible in conjunction with BP 170 V.



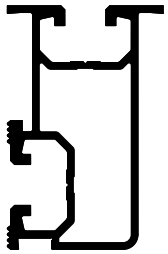
Typical snow load 0.65 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.68	2.65	2.62	2.17	2.80	2.74	2.68	2.15	3.01	2.76	2.61	2.12
0.60	2.19	2.16	2.14	1.65	2.28	2.24	2.18	1.65	2.47	2.25	2.13	1.65
0.80	1.90	1.87	1.85	1.20	1.98	1.94	1.89	1.20	2.14	1.95	1.84	1.20
1.00	1.70	1.67	1.60	1.00	1.77	1.73	1.60	1.00	1.92	1.74	1.60	1.00
1.20	1.55	1.50	1.30	0.80	1.61	1.50	1.30	0.80	1.75	1.50	1.30	0.80
1.40	1.43	1.30	1.10	0.70	1.49	1.30	1.10	0.70	1.62	1.30	1.10	0.70
1.60	1.34	1.10	1.00	0.60	1.40	1.10	1.00	0.60	1.40	1.10	1.00	0.60

Typical snow load 0.85 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.47	2.43	2.41	2.17	2.59	2.55	2.52	2.15	2.93	2.76	2.61	2.12
0.60	2.01	1.99	1.97	1.65	2.11	2.08	2.06	1.65	2.40	2.25	2.13	1.65
0.80	1.74	1.72	1.71	1.20	1.83	1.80	1.78	1.20	2.07	1.95	1.84	1.20
1.00	1.56	1.54	1.53	1.00	1.64	1.61	1.59	1.00	1.85	1.74	1.60	1.00
1.20	1.42	1.40	1.30	0.80	1.49	1.50	1.30	0.80	1.69	1.50	1.30	0.80
1.40	1.32	1.30	1.10	0.70	1.38	1.30	1.10	0.70	1.57	1.30	1.10	0.70
1.60	1.15	1.10	1.00	0.60	1.20	1.10	1.00	0.60	1.40	1.10	1.00	0.60

Typical snow load 1.10 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.26	2.23	2.22	2.14	2.39	2.36	2.33	2.15	2.77	2.70	2.61	2.12
0.60	1.84	1.82	1.81	1.65	1.95	1.92	1.91	1.65	2.26	2.21	2.13	1.65
0.80	1.59	1.58	1.57	1.20	1.69	1.66	1.65	1.20	1.96	1.91	1.84	1.20
1.00	1.42	1.41	1.40	1.00	1.51	1.49	1.47	1.00	1.75	1.71	1.60	1.00
1.20	1.25	1.25	1.25	0.80	1.30	1.30	1.30	0.80	1.60	1.50	1.30	0.80
1.40	1.10	1.10	1.10	0.70	1.10	1.10	1.10	0.70	1.48	1.30	1.10	0.70
1.60	0.90	0.90	0.90	0.60	1.00	1.00	1.00	0.60	1.20	1.10	1.00	0.60

Appendix part 1 - Span widths for snow loads up to 1.1 kN/m²

BP 130 S mounting rail
Art. No. 259 724



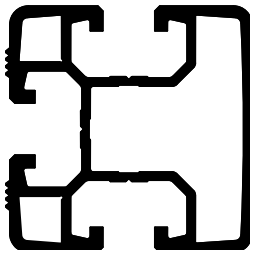
Typical snow load 0.65 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.14	2.11	2.10	1.90	2.22	2.18	2.16	1.88	2.44	2.36	2.24	1.84
0.60	1.75	1.73	1.71	1.55	1.81	1.78	1.76	1.53	1.99	1.93	1.83	1.50
0.80	1.51	1.49	1.48	1.34	1.57	1.54	1.53	1.32	1.72	1.67	1.58	1.30
1.00	1.35	1.34	1.32	1.10	1.40	1.38	1.37	1.10	1.54	1.49	1.42	1.10
1.20	1.23	1.22	1.21	0.90	1.28	1.26	1.25	0.90	1.41	1.36	1.29	0.90
1.40	1.14	1.13	1.12	0.80	1.18	1.16	1.15	0.80	1.30	1.26	1.20	0.80
1.60	1.07	1.05	1.05	0.70	1.11	1.09	1.08	0.70	1.22	1.18	1.12	0.70

Typical snow load 0.85 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.96	1.94	1.93	1.87	2.05	2.02	2.00	1.88	2.31	2.26	2.23	1.84
0.60	1.60	1.58	1.57	1.52	1.67	1.65	1.64	1.53	1.88	1.84	1.82	1.50
0.80	1.39	1.37	1.36	1.32	1.45	1.43	1.42	1.32	1.63	1.60	1.58	1.30
1.00	1.24	1.23	1.22	1.10	1.29	1.28	1.27	1.10	1.46	1.43	1.41	1.10
1.20	1.13	1.12	1.11	0.90	1.18	1.17	1.16	0.90	1.33	1.30	1.29	0.90
1.40	1.05	1.04	1.03	0.80	1.09	1.08	1.07	0.80	1.23	1.21	1.19	0.80
1.60	0.98	0.97	0.96	0.70	1.02	1.01	1.00	0.70	1.15	1.13	1.11	0.70

Typical snow load 1.10 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.79	1.77	1.77	1.72	1.88	1.86	1.85	1.79	2.17	2.13	2.11	1.84
0.60	1.46	1.45	1.44	1.40	1.54	1.52	1.51	1.46	1.77	1.74	1.72	1.50
0.80	1.26	1.25	1.25	1.21	1.33	1.32	1.31	1.26	1.53	1.51	1.49	1.30
1.00	1.13	1.12	1.11	1.10	1.19	1.18	1.17	1.10	1.37	1.35	1.33	1.10
1.20	1.03	1.02	1.02	0.90	1.09	1.07	1.07	0.90	1.25	1.23	1.21	0.90
1.40	0.95	0.95	0.94	0.80	1.00	0.99	0.99	0.80	1.16	1.14	1.12	0.80
1.60	0.89	0.88	0.88	0.70	0.94	0.93	0.92	0.70	1.08	1.06	1.05	0.70

Appendix part 1 - Span widths for snow loads up to 1.1 kN/m²

BP 160 S mounting rail
Art. No. 259 725



Typical snow load 0.65 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.61	2.56	2.46	2.03	2.72	2.55	2.45	2.02	2.71	2.53	2.43	1.99
0.60	2.13	2.09	2.07	1.66	2.22	2.17	2.05	1.64	2.34	2.12	2.00	1.62
0.80	1.84	1.81	1.79	1.43	1.92	1.88	1.77	1.42	2.02	1.83	1.74	1.40
1.00	1.65	1.62	1.60	1.28	1.72	1.68	1.59	1.27	1.81	1.64	1.55	1.25
1.20	1.50	1.48	1.46	1.17	1.57	1.54	1.45	1.16	1.65	1.50	1.42	1.14
1.40	1.39	1.37	1.35	1.08	1.45	1.42	1.34	1.07	1.53	1.39	1.31	1.06
1.60	1.30	1.28	1.27	1.01	1.36	1.33	1.25	1.01	1.43	1.30	1.23	0.99

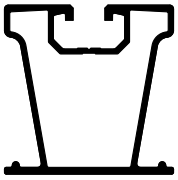
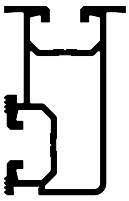
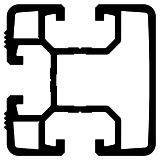
Typical snow load 0.85 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.40	2.36	2.34	2.03	2.52	2.48	2.45	2.02	2.71	2.53	2.43	1.99
0.60	1.96	1.93	1.91	1.66	2.06	2.02	2.00	1.64	2.34	2.12	2.00	1.62
0.80	1.69	1.67	1.65	1.43	1.78	1.75	1.73	1.42	2.02	1.83	1.74	1.40
1.00	1.51	1.49	1.48	1.28	1.59	1.57	1.55	1.27	1.81	1.64	1.55	1.25
1.20	1.38	1.36	1.35	1.17	1.46	1.43	1.41	1.16	1.65	1.50	1.42	1.14
1.40	1.28	1.26	1.25	1.08	1.35	1.32	1.31	1.07	1.53	1.39	1.31	1.06
1.60	1.20	1.18	1.17	1.01	1.26	1.24	1.22	1.01	1.43	1.30	1.23	0.99

Typical snow load 1.10 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.19	2.17	2.15	2.03	2.33	2.30	2.27	2.02	2.71	2.53	2.43	1.99
0.60	1.79	1.77	1.76	1.66	1.90	1.87	1.85	1.64	2.21	2.12	2.00	1.62
0.80	1.55	1.53	1.52	1.43	1.65	1.62	1.61	1.42	1.91	1.83	1.74	1.40
1.00	1.38	1.37	1.36	1.28	1.47	1.45	1.44	1.27	1.71	1.64	1.55	1.25
1.20	1.26	1.25	1.24	1.17	1.34	1.32	1.31	1.16	1.56	1.50	1.42	1.14
1.40	1.17	1.16	1.15	1.08	1.24	1.22	1.21	1.07	1.45	1.39	1.31	1.06
1.60	1.09	1.08	1.07	1.01	1.16	1.15	1.13	1.01	1.35	1.30	1.23	0.99

Appendix part 2

Span width tables

Snow load: 1.30 kN/m²
Wind loads: 0.65 / 0.80 / 0.90 / 1.40 kN/m²

Mounting rail cross section	Description	Art. No.	Use
	BP 085 S	259 721	Vertical installation, horizontal installation; cruciform installation, e.g. on a roof with trapezoidal corrugations
	BP 170 V	259 722	Vertical installation; cruciform installation in conjunction with BP 165 H
	BP 165 H	259 723	Horizontal installation; cruciform installation in conjunction with BP 170 V
	BP 130 S	259 724	Vertical installation; horiztonal installation; cruciform installation
	BP 160 S	259 725	Vertical installation; horiztonal installation; cruciform installation

Appendix part 2 - Span widths for snow loads of 1.3 kN/m²

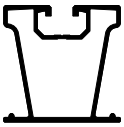
BP 085 S mounting rail
Art. No. 259 721

Typical snow load 1.30 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.10	1.09	1.08	1.04	1.18	1.16	1.15	1.05	1.39	1.36	1.29	1.04
0.60	0.90	0.89	0.88	0.85	0.96	0.95	0.94	0.86	1.13	1.11	1.05	0.85
0.80	0.78	0.77	0.76	0.74	0.83	0.82	0.81	0.74	0.98	0.96	0.91	0.73
1.00	0.69	0.69	0.68	0.66	0.74	0.73	0.72	0.66	0.88	0.86	0.81	0.65
1.20	0.63	0.63	0.62	0.60	0.68	0.67	0.66	0.61	0.80	0.78	0.74	0.60
1.40	0.58	0.58	0.57	0.56	0.63	0.62	0.61	0.56	0.74	0.72	0.69	0.55
1.60	0.55	0.54	0.54	0.52	0.59	0.58	0.57	0.52	0.69	0.68	0.64	0.52

BP 170 V mounting rail
Art. No. 259 722
The BP 170 V mounting rail must only be used for vertical installation on the roof. Only the vertical loads have been taken into account in the calculation of the span widths.
Cruciform installation is possible in conjunction with BP 165 H.

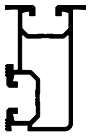
Typical snow load 1.30 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.27	2.25	2.24	1.95	2.67	2.61	2.44	1.94	2.86	2.57	2.42	1.92
0.60	1.85	1.84	1.83	1.30	2.18	2.12	1.99	1.30	2.34	2.10	1.97	1.30
0.80	1.60	1.75	1.60	1.00	1.88	1.75	1.60	1.00	2.03	1.75	1.60	1.00
1.00	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80	1.75	1.40	1.25	0.80
1.20	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65	1.45	1.20	1.05	0.65
1.40	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55	1.25	1.00	0.85	0.55
1.60	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50	1.10	0.90	0.80	0.50

BP 165 H mounting rail
Art. No. 259 723
The BP 165 H mounting rail must only be used as a horizontal mounting rail for cruciform installation.
Cruciform installation is possible in conjunction with BP 170 V.



Typical snow load 1.30 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.12	2.10	2.09	2.03	2.26	2.23	2.21	2.13	2.66	2.60	2.56	2.12
0.60	1.73	1.71	1.70	1.65	1.84	1.82	1.80	1.65	2.17	2.12	2.09	1.65
0.80	1.50	1.48	1.47	1.20	1.59	1.57	1.56	1.20	1.88	1.84	1.81	1.20
1.00	1.34	1.33	1.32	1.00	1.43	1.41	1.40	1.00	1.68	1.64	1.60	1.00
1.20	1.22	1.21	1.20	0.80	1.30	1.28	1.27	0.80	1.53	1.50	1.30	0.80
1.40	1.13	1.12	1.11	0.70	1.20	1.19	1.10	0.70	1.42	1.30	1.10	0.70
1.60	1.06	1.05	1.04	0.60	1.13	1.11	1.00	0.60	1.33	1.10	1.00	0.60

Appendix part 2 - Span widths for snow loads of 1.3 kN/m²



BP 130 S mounting rail
Art. No. 259 724

Typical snow load 1.30 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	1.68	1.67	1.66	1.62	1.78	1.76	1.75	1.69	2.08	2.04	2.02	1.84
0.60	1.37	1.36	1.35	1.32	1.45	1.44	1.43	1.38	1.69	1.67	1.65	1.50
0.80	1.19	1.18	1.17	1.14	1.25	1.24	1.23	1.20	1.47	1.44	1.43	1.30
1.00	1.06	1.05	1.05	1.10	1.12	1.11	1.10	1.10	1.31	1.29	1.28	1.10
1.20	0.97	0.96	0.96	0.90	1.02	1.01	1.01	0.90	1.20	1.18	1.16	0.90
1.40	0.90	0.89	0.89	0.80	0.95	0.94	0.93	0.80	1.11	1.09	1.08	0.80
1.60	0.84	0.83	0.83	0.70	0.89	0.88	0.87	0.70	1.04	1.02	1.01	0.70

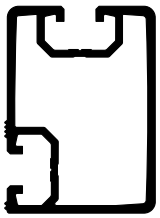
BP 160 S mounting rail
Art. No. 259 725

Typical snow load 1.30 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40	≤ 0.65	≤ 0.80	≤ 0.90	≤ 1.40
0.40	2.06	2.04	2.03	1.96	2.20	2.17	2.15	2.02	2.60	2.53	2.43	1.99
0.60	1.68	1.67	1.66	1.60	1.80	1.78	1.76	1.64	2.12	2.07	2.00	1.62
0.80	1.46	1.44	1.43	1.39	1.56	1.54	1.52	1.42	1.84	1.79	1.74	1.40
1.00	1.30	1.29	1.28	1.24	1.39	1.37	1.36	1.27	1.64	1.60	1.55	1.25
1.20	1.19	1.18	1.17	1.13	1.27	1.25	1.24	1.16	1.50	1.46	1.42	1.14
1.40	1.10	1.09	1.08	1.05	1.18	1.16	1.15	1.07	1.39	1.35	1.31	1.06
1.60	1.03	1.02	1.01	0.98	1.10	1.08	1.07	1.01	1.30	1.27	1.23	0.99

Appendix part 3

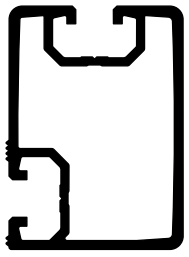
Span width tables

Snow loads: 1.0 / 1.5 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0 / 5.0 / 7.5 / 10.0 kN/m²
Wind loads: 0.5 / 1.0 / 1.5 / 2.0 kN/m²

Mounting rail cross section	Description	Art. No.	Use
	BP 215 S	259 726	Horiztonal installation, vertical installation, cruciform installation

Appendix part 3 - Span widths for snow loads up to 10 kN/m²

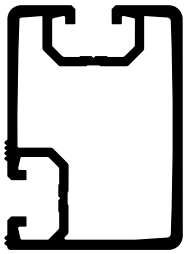
BP 215 S mounting rail
Art. No. 259 726
The specified span widths require the use of roof anchor pantile 13 or roof anchor pantile 13.1.



Typical snow load 1.00 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	3.01	2.90	2.63	2.28	3.22	3.04	2.61	2.26	3.71	3.12	2.57	2.24
0.60	2.46	2.36	2.15	1.86	2.61	2.48	2.13	1.85	3.04	2.55	2.10	1.83
0.80	2.13	2.05	1.86	1.61	2.26	2.15	1.85	1.60	2.63	2.21	1.82	1.58
1.00	1.90	1.83	1.66	1.30	2.02	1.92	1.65	1.30	2.35	1.97	1.63	1.30
1.20	1.74	1.67	1.52	1.10	1.84	1.75	1.51	1.10	2.14	1.80	1.48	1.10
1.40	1.61	1.55	1.40	0.90	1.71	1.62	1.39	0.90	1.99	1.67	1.37	0.90
1.60	1.50	1.45	1.31	0.80	1.60	1.52	1.30	0.80	1.86	1.56	1.28	0.80

Appendix part 3 - Span widths for snow loads up to 10 kN/m²

BP 215 S mounting rail
Art. No. 259 726
The specified span widths require the use of roof anchor pantile 13 or roof anchor pantile 13.1.



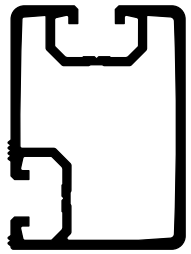
Typical snow load 1.50 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	2.58	2.51	2.44	2.28	2.77	2.67	2.57	2.26	3.34	3.12	2.57	2.24
0.60	2.11	2.05	1.99	1.86	2.26	2.18	2.10	1.85	2.73	2.54	2.10	1.83
0.80	1.83	1.77	1.73	1.61	1.96	1.88	1.82	1.60	2.36	2.20	1.82	1.58
1.00	1.63	1.59	1.54	1.30	1.75	1.69	1.63	1.30	2.11	1.97	1.63	1.30
1.20	1.49	1.45	1.41	1.10	1.60	1.54	1.48	1.10	1.93	1.80	1.48	1.10
1.40	1.38	1.34	1.30	0.90	1.48	1.42	1.37	0.90	1.78	1.66	1.37	0.90
1.60	1.29	1.25	1.22	0.80	1.38	1.33	1.28	0.80	1.67	1.56	1.28	0.80

Typical snow load 2.00 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	2.30	2.25	2.20	2.15	2.48	2.41	2.34	2.26	3.06	2.88	2.57	2.24
0.60	1.88	1.83	1.79	1.76	2.03	1.96	1.91	1.85	2.50	2.35	2.10	1.83
0.80	1.62	1.59	1.55	1.54	1.75	1.70	1.65	1.60	2.16	2.04	1.82	1.58
1.00	1.45	1.42	1.39	1.30	1.57	1.52	1.48	1.30	1.93	1.82	1.63	1.30
1.20	1.32	1.29	1.27	1.10	1.43	1.39	1.35	1.10	1.76	1.66	1.48	1.10
1.40	1.23	1.20	1.17	0.90	1.32	1.28	1.25	0.90	1.63	1.54	1.37	0.90
1.60	1.15	1.12	1.10	0.80	1.24	1.20	1.17	0.80	1.53	1.44	1.28	0.80

Typical snow load 2.50 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	2.09	2.05	2.01	1.98	2.27	2.21	2.16	2.10	2.84	2.70	2.57	2.24
0.60	1.71	1.67	1.64	1.61	1.85	1.80	1.76	1.72	2.32	2.20	2.10	1.83
0.80	1.48	1.45	1.42	1.40	1.60	1.56	1.52	1.49	2.00	1.90	1.82	1.58
1.00	1.32	1.30	1.27	1.30	1.43	1.40	1.36	1.30	1.79	1.70	1.63	1.30
1.20	1.20	1.18	1.16	1.10	1.31	1.27	1.24	1.10	1.64	1.55	1.48	1.10
1.40	1.12	1.09	1.07	0.90	1.21	1.18	1.15	0.90	1.51	1.44	1.37	0.90
1.60	1.04	1.02	1.00	0.80	1.13	1.10	1.08	0.80	1.42	1.35	1.28	0.80

Appendix part 3 - Span widths for snow loads up to 10 kN/m²

BP 215 S mounting rail
Art. No. 259 726
The specified span widths require the use of roof anchor pantile 13 or roof anchor pantile 13.1.



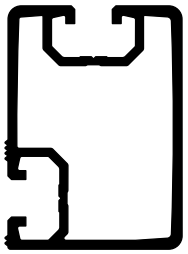
Typical snow load 3.00 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	1.93	1.90	1.87	1.84	2.10	2.05	2.01	1.97	2.66	2.54	2.44	2.24
0.60	1.58	1.55	1.53	1.50	1.71	1.68	1.64	1.61	2.17	2.07	1.99	1.83
0.80	1.36	1.34	1.32	1.30	1.48	1.45	1.42	1.39	1.88	1.79	1.72	1.58
1.00	1.22	1.20	1.18	1.30	1.33	1.30	1.27	1.30	1.68	1.60	1.54	1.30
1.20	1.11	1.09	1.08	1.10	1.21	1.18	1.16	1.10	1.53	1.46	1.40	1.10
1.40	1.03	1.01	1.00	0.90	1.12	1.10	1.07	0.90	1.42	1.36	1.30	0.90
1.60	0.96	0.95	0.93	0.80	1.05	1.02	1.00	0.80	1.33	1.27	1.22	0.80

Typical snow load 3.50 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	1.80	1.78	1.75	1.73	1.97	1.93	1.89	1.86	2.51	2.41	2.32	2.24
0.60	1.47	1.45	1.43	1.41	1.60	1.57	1.54	1.52	2.05	1.97	1.89	1.83
0.80	1.27	1.25	1.24	1.22	1.39	1.36	1.34	1.31	1.77	1.70	1.64	1.58
1.00	1.14	1.12	1.11	1.30	1.24	1.22	1.19	1.30	1.58	1.52	1.47	1.30
1.20	1.04	1.02	1.01	1.10	1.13	1.11	1.09	1.10	1.45	1.39	1.34	1.10
1.40	0.96	0.95	0.93	0.90	1.05	1.03	1.01	0.90	1.34	1.29	1.24	0.90
1.60	0.90	0.89	0.87	0.80	0.98	0.96	0.94	0.80	1.25	1.20	1.16	0.80

Typical snow load 4.00 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	1.70	1.68	1.65	1.63	1.85	1.82	1.79	1.76	2.38	2.30	2.22	2.15
0.60	1.38	1.37	1.35	1.33	1.51	1.49	1.46	1.44	1.94	1.87	1.81	1.75
0.80	1.20	1.18	1.17	1.15	1.31	1.29	1.26	1.24	1.68	1.62	1.57	1.52
1.00	1.07	1.06	1.04	1.30	1.17	1.15	1.13	1.30	1.50	1.45	1.40	1.30
1.20	0.98	0.97	0.95	1.10	1.07	1.05	1.03	1.10	1.37	1.32	1.28	1.10
1.40	0.90	0.89	0.88	0.90	0.99	0.97	0.95	0.90	1.27	1.23	1.18	0.90
1.60	0.85	0.84	0.82	0.80	0.92	0.91	0.89	0.80	1.19	1.15	1.11	0.80

Appendix part 3 - Span widths for snow loads up to 10 kN/m²

BP 215 S mounting rail
Art. No. 259 726
The specified span widths require the use of roof anchor pantile 13 or roof anchor pantile 13.1.



Typical snow load 5.00 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	1.53	1.52	1.50	1.48	1.68	1.65	1.63	1.61	2.18	2.11	2.05	2.00
0.60	1.25	1.24	1.22	1.21	1.37	1.35	1.33	1.31	1.78	1.72	1.67	1.63
0.80	1.08	1.07	1.06	1.05	1.18	1.17	1.15	1.14	1.54	1.49	1.45	1.41
1.00	0.97	0.96	0.95	0.94	1.06	1.04	1.03	1.02	1.38	1.33	1.30	1.26
1.20	0.88	0.87	0.86	0.86	0.97	0.95	0.94	0.93	1.26	1.22	1.18	1.15
1.40	0.82	0.81	0.80	0.79	0.89	0.88	0.87	0.86	1.16	1.13	1.09	1.06
1.60	0.76	0.75	0.75	0.74	0.84	0.82	0.81	0.80	1.09	1.05	1.02	1.00

Typical snow load 7.50 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	1.27	1.26	1.25	1.24	1.39	1.38	1.36	1.35	1.83	1.79	1.76	1.72
0.60	1.03	1.02	1.02	1.01	1.14	1.12	1.11	1.11	1.50	1.46	1.43	1.40
0.80	0.89	0.89	0.88	0.87	0.98	0.97	0.96	0.95	1.29	1.27	1.24	1.21
1.00	0.80	0.79	0.79	0.78	0.88	0.87	0.86	0.85	1.16	1.13	1.11	1.09
1.20	0.73	0.72	0.72	0.71	0.80	0.79	0.79	0.78	1.06	1.03	1.01	0.99
1.40	0.67	0.67	0.66	0.66	0.74	0.73	0.73	0.72	0.98	0.96	0.94	0.92
1.60	0.63	0.63	0.62	0.62	0.69	0.69	0.68	0.67	0.91	0.89	0.88	0.86

Typical snow load 10.00 kN/m²												
Distance between mounting rails [m]	Roof pitch class 1 (10°-34°)				Roof pitch class 2 (35°-44°)				Roof pitch class 3 (45°-60°)			
	Typical wind load q [kN/m²]				Typical wind load q [kN/m²]				Typical wind load q [kN/m²]			
	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00	≤ 0.50	≤ 1.00	≤ 1.50	≤ 2.00
0.40	1.10	1.10	1.09	1.08	1.21	1.21	1.20	1.19	1.61	1.59	1.56	1.53
0.60	0.90	0.89	0.89	0.88	0.99	0.98	0.98	0.97	1.32	1.29	1.27	1.25
0.80	0.78	0.77	0.77	0.76	0.86	0.85	0.84	0.84	1.14	1.12	1.10	1.08
1.00	0.69	0.69	0.69	0.68	0.77	0.76	0.75	0.75	1.02	1.00	0.98	0.97
1.20	0.63	0.63	0.63	0.62	0.70	0.69	0.69	0.68	0.93	0.91	0.90	0.89
1.40	0.59	0.58	0.58	0.58	0.65	0.64	0.64	0.63	0.86	0.85	0.83	0.82
1.60	0.55	0.55	0.54	0.54	0.60	0.60	0.59	0.59	0.80	0.79	0.78	0.76

Appendix part 4 - Proof of the structural stability of Schüco MSE 200 mounting rails (heavy duty)

Proof of structural stability

Schüco MSE 200 mounting rail

The

Structural Engineering
Dipl.-Ing. Günther Breder

Consulting engineer to the Chamber of Engineers in North Rhine-Westphalia (IK Bau NW)

Officially recognised specialist in sound and thermal insulation

- Structural planning - Building physics – Aluminium construction –

hereby certifies to

SCHÜCO

Schüco International KG

Karolinenstraße 1 -15, 33609 Bielefeld, Germany

that the Schüco MSE 200 mounting rail

has been proven structurally stable.

The structural calculation for the Schüco MSE 200 mounting rail comprises the proofs of maximum span widths for an aluminum load-bearing profile which will carry the solar collectors. The exact values and design loads will be found in the individual structural calculations. This proof applies to the construction of the system as per current instructions for horizontal/vertical on-roof installation.
Structural proof of the building substructure must be checked for each project.
Proof of structural stability of the aluminium load-bearing profile to carry the solar collectors on the above-named mounting system has been drawn up with reference to the following conditions:

- Mounting rail: BP 85 S / BP 165 H / BP 130 S / BP 160 S
- Standards: DIN 1055, part 4 and 5: 2005; DIN 4113-1/A1: 2002
- Pitch: 10° – 65° (divided into three roof pitch classifications)
- Distance between mounting rails: 0.40 – 1.60 m
- Roof shape: Mono-pitch roof, gabled roof, hipped roof
- Roof area: Areas H and I
- Snow load: Typical snow loads at ground level as specified by Schüco International KG (installation sites up to sea level ≤ + 1000 m)
  $s_{k1} \leq 0.65$ kN/m²
  $s_{k2} \leq 0.85$ kN/m²
  $s_{k3} \leq 1.10$ kN/m²
  $s_{k4} \leq 1.30$ kN/m²
  Accumulations of snow are not taken into account.
- Wind load: dynamic loading as specificied by SCHÜCO International KG:
  $q_{Wind1} \leq 0.65$ kN/m²
  $q_{Wind2} \leq 0.80$ kN/m²
  $q_{Wind3} \leq 0.90$ kN/m²
  $q_{Wind4} \leq 1.40$ kN/m²
- Dead load: $g \leq 0.20$ kN/m²

If a project-related structural analysis is required, this proof of structural stability should be used as a basis for calculation.

Bad Salzuflen, April 2010

INGENIEURKAMMER-BAU NORDRHEIN-WESTFALEN
BERATENDER INGENIEUR
100214

Appendix part 4 - Proof of the structural stability of Schüco MSE 200 mounting rails (portrait orientation)

Proof of structural stability

Schüco MSE 200 mounting rail
(portrait orientation)

The

Structural Engineering
Dipl.-Ing. Günther Breder

Consulting engineer to the Chamber of Engineers in North Rhine-Westphalia (IK Bau NW)

Officially recognised specialist in sound and thermal insulation

- Structural planning - Building physics – Aluminium construction –

hereby certifies to

SCHÜCO

Schüco International KG

Karolinenstraße 1 -15, 33609 Bielefeld, Germany

that the Schüco MSE 200 mounting rail

(portrait orientation)

has been proven structurally stable.

The structural calculation for the Schüco MSE 200 mounting rail (portrait orientation) comprises the proofs of maximum span widths for an aluminum load-bearing profile which will carry the solar collectors. The exact values and design loads will be found in the individual structural calculations. This proof applies to the construction of the system as per current instructions for vertical on-roof installation.
Structural proof of the building substructure must be checked for each project.
Proof of structural stability of the aluminium load-bearing profile to carry the solar collectors on the above-named mounting system has been drawn up with reference to the following conditions:

- Mounting rail: BP 170 V
- Standards: DIN 1055, part 4 and 5: 2005; DIN 4113-1/A1: 2002
- Pitch: 10° – 65° (divided into three roof pitch classifications)
- Distance between mounting rails: 0.40 – 1.60 m
- Roof shape: Mono-pitch roof, gabled roof, hipped roof
- Roof area: Areas H and I
- Snow load: Typical snow loads at ground level as specified by Schüco International KG (installation sites up to sea level ≤ + 1000 m)
  $s_{k1} \leq 0.65$ kN/m²
  $s_{k2} \leq 0.85$ kN/m²
  $s_{k3} \leq 1.10$ kN/m²
  $s_{k4} \leq 1.30$ kN/m²
  Accumulations of snow are not taken into account.
- Wind load: dynamic loading as specificied by SCHÜCO International KG:
  $q_{Wind1} \leq 0.65$ kN/m²
  $q_{Wind2} \leq 0.80$ kN/m²
  $q_{Wind3} \leq 0.90$ kN/m²
  $q_{Wind4} \leq 1.40$ kN/m²
- Dead load: $g \leq 0.20$ kN/m²

If a project-related structural analysis is required, this proof of structural stability should be used as a basis for calculation.

Bad Salzuflen, April 2010

INGENIEURKAMMER-BAU NORDRHEIN-WESTFALEN
BERATENDER INGENIEUR
100214

Proof of structural stability

Schüco MSE 200 mounting rail
(heavy duty)

The
Structural Engineering
Dipl.-Ing. Günther Breder

Consulting engineer to the Chamber of Engineers in North Rhine-Westphalia (IK Bau NW)

Officially recognised specialist in sound and thermal insulation

- Structural planning - Building physics – Aluminium construction –

hereby certifies to

SCHÜCO
Schüco International KG
Karolinenstraße 1 -15, 33609 Bielefeld, Germany

that the Schüco MSE 200 mounting rail

(heavy duty)

has been proven structurally stable.

The structural calculation for the Schüco MSE 200 mounting rail (heavy duty) comprises the proofs of maximum span widths for an aluminum load-bearing profile which will carry the solar collectors. The exact values and design loads will be found in the individual structural calculations. This proof applies to the construction of the system as per current instructions for horizontal/vertical on-roof installation.
Structural proof of the building substructure must be checked for each project.
Proof of structural stability of the aluminium load-bearing profile to carry the solar collectors on the above-named mounting system has been drawn up with reference to the following conditions:

- Mounting rail: BP 215 S
- Standards: DIN 1055, part 4 and 5: 2005; DIN 4113-1/A1: 2002
- Pitch: 10° – 65° (divided into three roof pitch classifications)
- Distance between mounting rails: 0.40 – 1.60 m
- Roof shape: Mono-pitch roof, gabled roof, hipped roof
- Roof area: Areas H and I
- Snow load: Typical snow loads at ground level as specified by Schüco International KG (installation sites up to sea level ≤ + 1000 m)
  $s_{k1} \leq 1.00$ kN/m² / $s_{k2} \leq 1.50$ kN/m² / $s_{k3} \leq 2.00$ kN/m² / $s_{k4} \leq 2.50$ kN/m²
  $s_{k5} \leq 3.00$ kN/m² / $s_{k6} \leq 3.50$ kN/m² / $s_{k7} \leq 4.00$ kN/m² / $s_{k8} \leq 5.00$ kN/m²
  $s_{k9} \leq 7.50$ kN/m² / $s_{k10} \leq 10.00$ kN/m²
  Accumulations of snow are not taken into account.
- Wind load: dynamic loading as specificied by SCHÜCO International KG:
  $q_{Wind1} \leq 0.50$ kN/m²
  $q_{Wind2} \leq 1.00$ kN/m²
  $q_{Wind3} \leq 1.50$ kN/m²
  $q_{Wind4} \leq 2.00$ kN/m²
- Dead load: $g \leq 0.20$ kN/m²

If a project-related structural analysis is required, this proof of structural stability should be used as a basis for calculation.

Bad Salzuflen, April 2010

INGENIEURKAMMER-BAU NORDRHEIN-WESTFALEN
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