

# Masonry – reinforced concrete

## Construction materials

### Building material Schöck Sconnex® type M

Approval	Approval Z-17.1-709 and Z-17.1-749
Lightweight concrete	The compressive strength of the lightweight concrete, tested based on BS EN 12390-3 on cubes with an edge length of approx. 40 mm must bear 30 N/mm <sup>2</sup> and in the centre at least 35 N/mm <sup>2</sup>
Insulating material	Polystyrene hard foam (WLG 035, building material class B1)

### Schöck Sconnex® type M: Connecting structural elements

The thermal insulation element may be used in masonry made from the following materials:

- Solid sand lime bricks, sand lime building blocks, lime-sand precision blocks (percentage perforation  $\leq 15\%$ ) and plan elements as per DIN V 106 or BS EN 771-2 in combination with DIN 20000-402 of crushing strength class  $\geq 12$  or solid bricks as per DIN 105-100 or BS EN 771-1 in combination with DIN 20000-401 of crushing strength class  $\geq 12$
- Standard masonry mortar of Mortar Group IIa or III or thin-bed mortar as per BS EN 998-2 in combination with DIN 20000-412 or DIN V 18580

## Schöck Sconnex® type M



### Schöck Sconnex® type M

Load-bearing, water-repellent thermal insulation element for the avoidance of thermal bridges in masonry walls and footings. The element transfers primarily compressive forces.

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## Installation cross sections

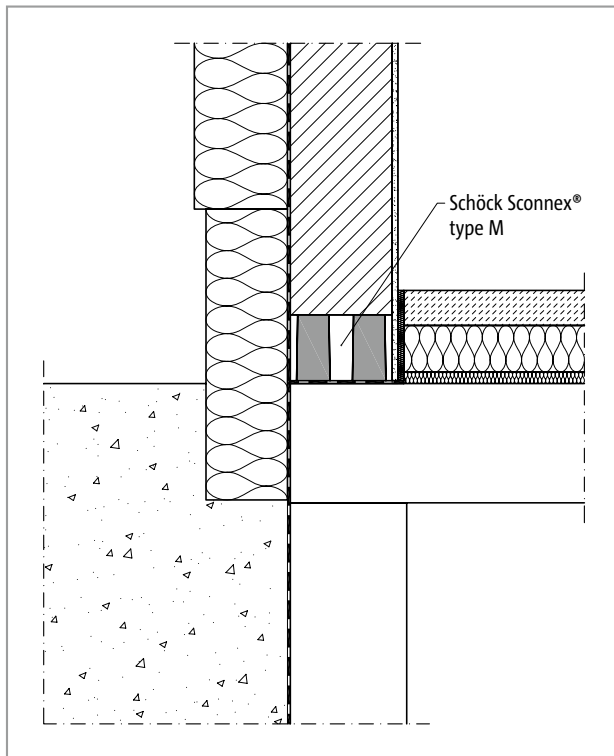


Fig. 149: Schöck Sconnex® type M: Installation condition for external thermal insulation composite system

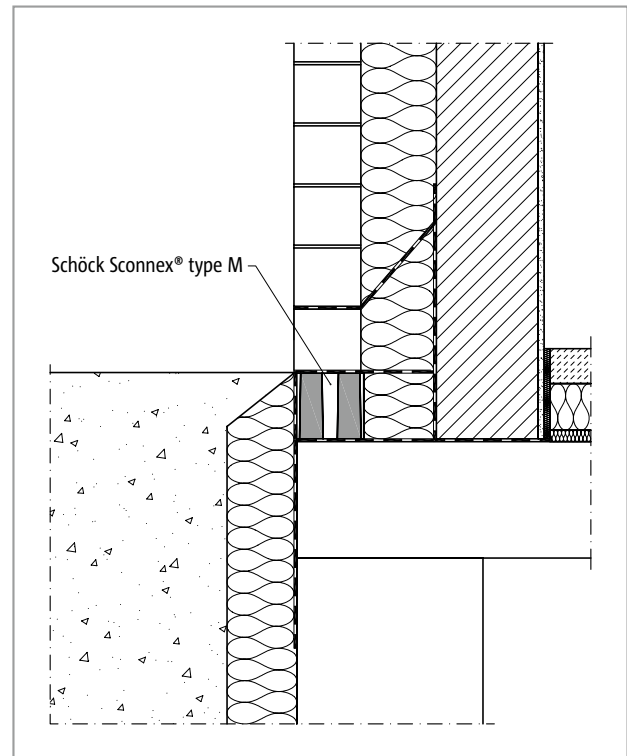


Fig. 150: Schöck Sconnex® type M: Connection with double-leaf masonry

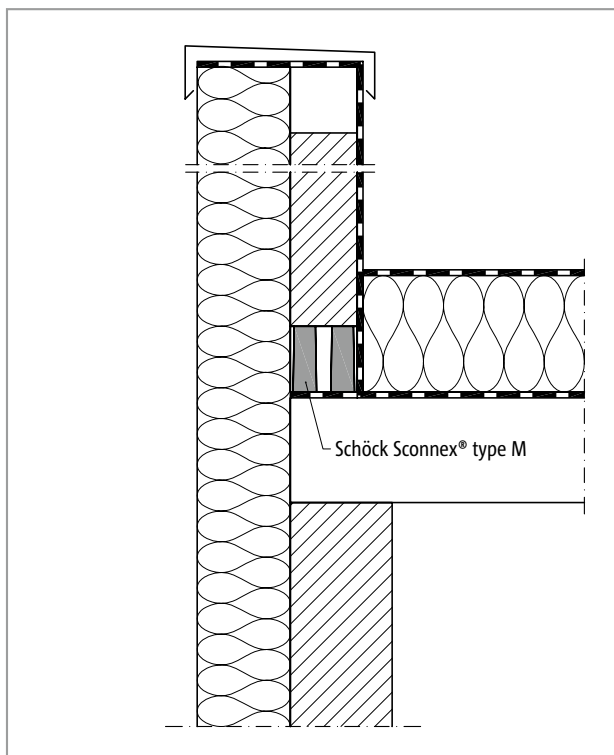


Fig. 151: Schöck Sconnex® type M: Installation condition in a parapet

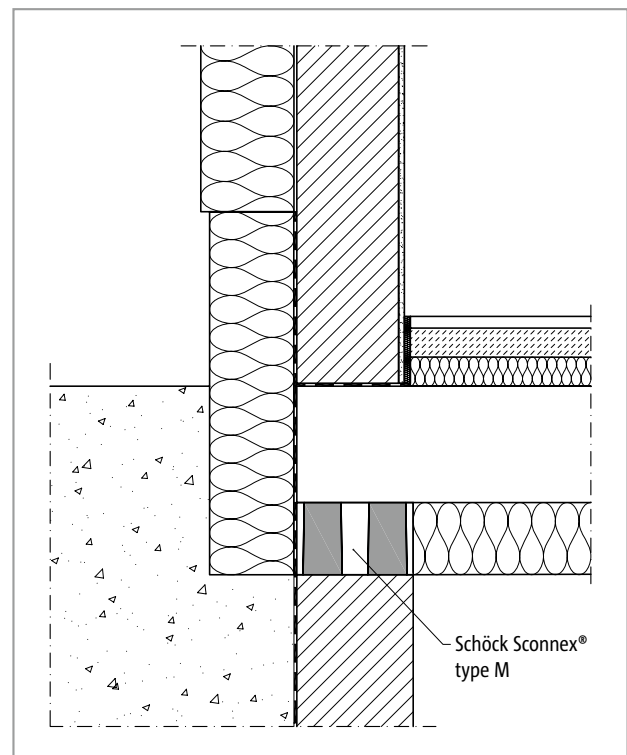


Fig. 152: Schöck Sconnex® type M: Installation condition below the basement floor

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## Installation cross sections

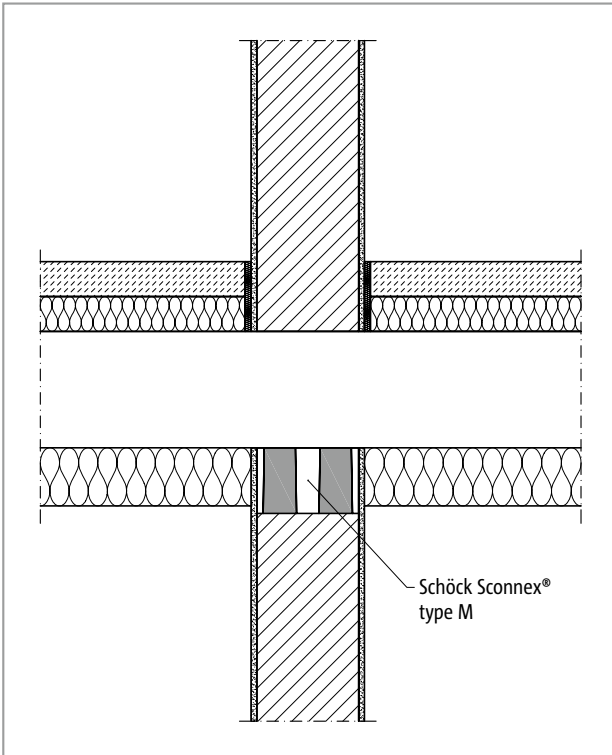


Fig. 153: Schöck Sconnex® type M: Installation condition with interior wall and under-slab installation

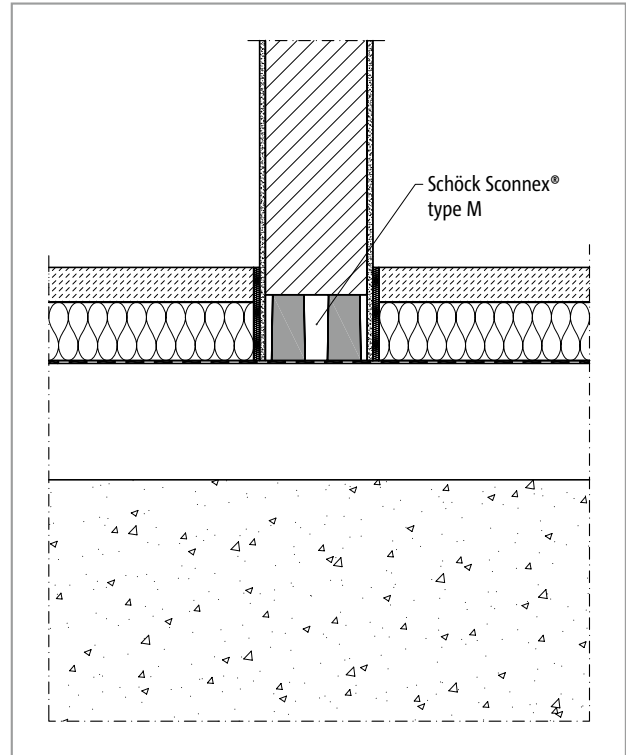


Fig. 154: Schöck Sconnex® type M: Installation condition with internal wall and foundation slab

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## Product selection | Type designations | Product description

### Schöck Sconnex® type M variants

The configuration of the Schöck Sconnex® type M can vary as follows:

- Main load-bearing level:
  - N1 (previously Novomur® light), N2 (previously Novomur®)
- Schöck Sconnex® height:
  - H = 113 mm
- Schöck Sconnex® length:
  - L = 750 mm; the fitting elements at least 250 mm – further information see Approval
- Schöck Sconnex® width:
  - B = 115, 150, 175, 200, 240 mm
- Generation: 1.0

### Type designation in planning documents

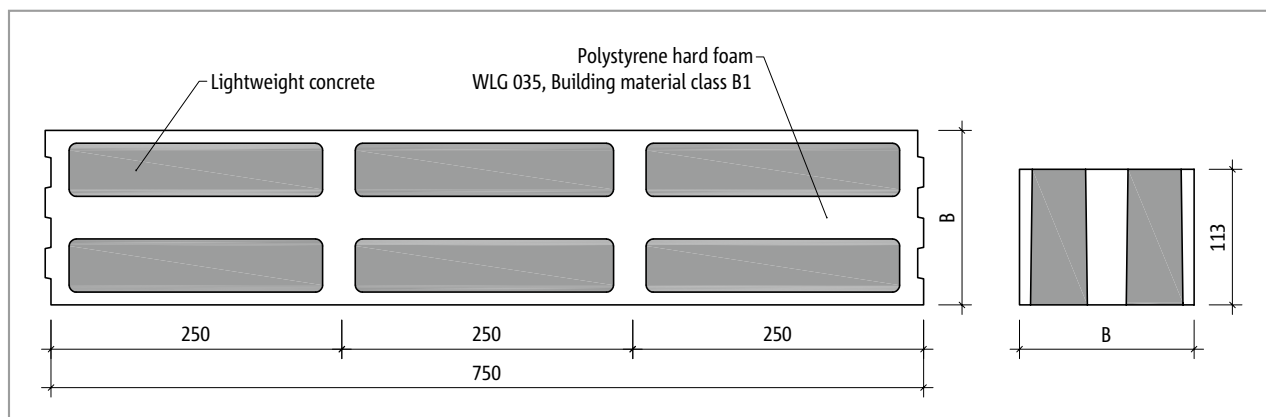
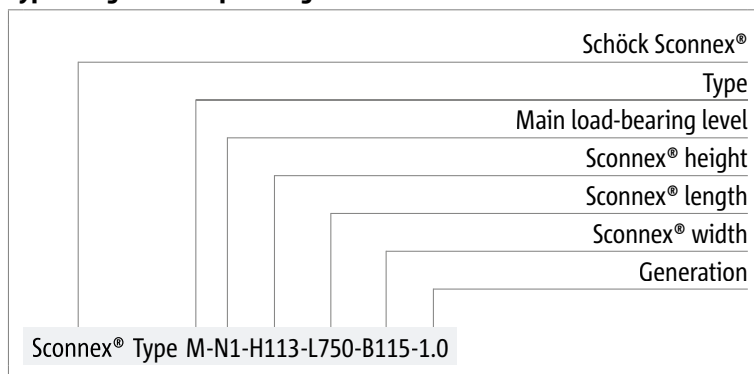


Fig. 155: Schöck Sconnex® type M: Dimensions

Schöck Sconnex® type M	N1	N2
Width B [mm]	Weight [kg]	
115	7.1	10.0
150	8.8	12.7
175	10.7	14.9
200	12.6	17.6
240	15.8	20.8

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## Design

### Normal force for masonry in combination with Schöck Sconnex® type M

$$n_{Rd,z} \text{ [kN/m]} = T \text{ (table value)} \cdot f_k \text{ [N/mm}^2\text{]}$$

Schöck Sconnex® type M	N1, N2
compressive strength for	Compressive strength class
	≥ 12
Masonry with	$f_k$ [N/mm <sup>2</sup> ]
Normal mortar of mortar group ≥ 5	2.6
Thin-bed mortar	3.1

Schöck Sconnex® type M				N1, N2						
Table value for				End bearing (fully supported floor $a/t = 1.0$ )					Intermediate bearing	
				Floor			Roofing			
				Floor span width $l_f$ [m]						
				≤ 4.5	5.0	5.5	6.0	≤ 6.0	≤ 6.0	
				T						
Wall height $h$ [m]	2.50	Wall thickness $t$ [cm]	11.5	36	36	36	36	21	36	
			15.0	57	57	57	51	28	57	
			17.5	71	71	67	59	33	71	
			20.0	80	80	77	68	37	80	
	2.75		11.5	32	32	32	32	21	32	
			15	54	54	54	51	28	54	
			17.5	69	69	67	59	33	69	
			20.0	77	77	77	68	37	77	
			24.0	99	99	92	81	45	99	
			3.0	24.0	-	-	-	-	45	96

### Notes on design

- Intermediate values may not be interpolated.
- Schöck Sconnex® type M is to be designed according to the simplified verification procedure as per BS EN 1996-3/NA.
- Schöck Sconnex® type M may be employed only in the lowest or highest course of the masonry.
- In accordance with the simplified calculation methods as per BS EN 1996-3/NA, NDP to 4.1 (1)P, a mathematical verification of the spatial stiffness may be dispensed with if, with buildings, the floors are implemented as stiff slabs or verified as sufficiently stiff ring beams and in the longitudinal and transverse directions of the building enough stiffened walls are present. Otherwise, the following described smaller shear load-bearing capacity is to be considered mathematically.
- If a shear verification of the walls is carried out as per BS EN 1996-1-1, A. 6.2, together with DIN EN 1996-1/NA, NCI to 6.2, then for  $V_{Rdlt}$  only 50% of the resultant values of the equation NA.19 or NA.24, at the most the resultant values with  $f_{vk}$  or  $f_{vt}$  with 0.2 N/mm<sup>2</sup>, are taken into account. The smaller value is relevant.
- With buildings in the earthquake Zones 2 and 3 as per DIN 4149-1:2005-04 walls with Schöck Sconnex® type M may not be considered for the reinforcing of buildings.
- For the determination of buckling length only one double-sided fixture of the walls may be taken into account.
- For masonry, which is loaded at right angles to its plane, tensile bending stresses must not be taken into account. If a mathematical verification of the acceptance of these loads is required, then a load-bearing action only perpendicular to the horizontal joints, free from tensile bending stresses, may be accepted.



## Fire protection

The technical fire protection requirements on walls are regulated in the §§ 26-30 MBO (Model Building Regulation (MBO)) together with MVV TB (Model Administrative Instructions Technical Building Regulations). These have been transferred into the (German) Federal state building regulations and can vary from each other.

The demand for sufficiently long stability and duration of fire resistance depending on building class applies as general requirements. (§ 27 MBO)

“External walls are to be so configured that the spreading of a fire is limited for a sufficiently long time”. (§ 28.1 MBO)

Partition walls between utilization units and between utilization units and other rooms must have the fire resistance of the load-bearing and stiffening structural elements of the floor, however, at least fire retardant (F30). (§ 29.3 MBO)

### Application of Schöck Sconnex® type M with fire resistance classes REI 30 to REI 90

Other than in firewalls, the Schöck Sconnex® type M can also be incorporated in walls with fire protection requirements. Nevertheless, additional measures in accordance with Approval Z-17.1-709 / -749 are required.

The classification in the fire resistance classes REI 30 and REI 90 of room-enclosing walls according to BS EN 13501-2 resp. BS EN 1996-1-2 in conjunction with BS EN 1996-1-2/NA with the employment of Schöck Sconnex® type M remain in force if the incorporation is carried out as follows:

- Install elements within the floor structure so that the upper edge of the load-bearing thermal insulation element lies below the upper edge of the floor screed.
- Alternatively, rendering of both sides of the element with at least 15 mm thick plaster in accordance with BS EN 1996-1-2, Section 4.2 (1) or
- arrangement on both sides of at least 12.5 mm thick plasterboard firecheck strips as per DIN 18180 minimum element height.
- Alternatively, the rendering or the plasterboard firecheck strips can be replaced on one side by facing masonry.

The classification R 30 and R 90 of non-room-enclosing walls as per BS EN 13501-2 resp. BS EN 1996-1-2 in conjunction with BS EN 1996-1-2/NA is not lost with the incorporation of Schöck Sconnex® type M. Additional technical fire protection measures are not required.

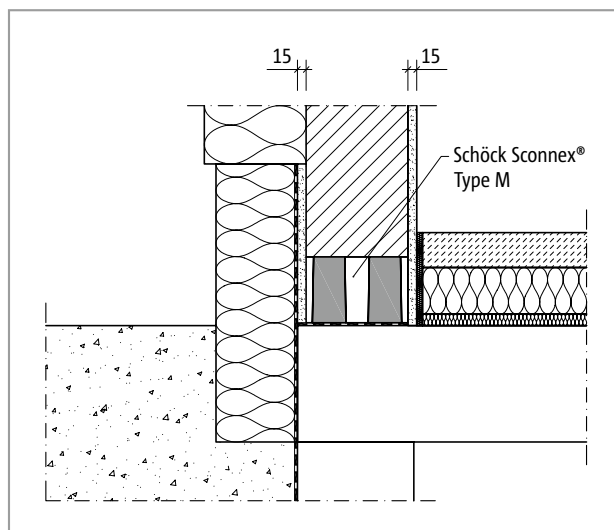


Fig. 156: Schöck Sconnex® type M: REI 30 or REI 90 configuration for technical fire protection integrity

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## Design example | Installation information

### Geometry:

Wall thickness:	$t = 17.5 \text{ cm}$
Clear height:	$h = 2.75 \text{ m}$
Floor span:	$l_f = 5.5 \text{ m}$
Masonry:	Sand-lime block compressive strength class 20, thin-bed mortar, external wall

### Verification in the ultimate limit state

Characteristic value of the compressive strength:

$$f_k = 6.3 \text{ N/mm}^2, \text{ see table page 118}$$

Selected: **Schöck Sconnex® type M-N2-H113-L750-B175-1.0**

Table value:  $T = 67$ , see table page 118

Load-bearing capacity:  $n_{Rd,z} = T \cdot f_k = 67 \cdot 6.3 \text{ N/mm}^2 = 422 \text{ kN/m}$

### **i** Notes

- Masonry is always to be implemented as single brick masonry.
- Schöck Sconnex® type M, according to its designation, is to be arranged with its top always upwards.
- Slots and recesses, which weaken the load-bearing cross-section are not permitted.
- Schöck Sconnex® type M may not be used one above the other to build a wall.
- According to DIN 18195-4 a sealing measure (foil) is required.
- The installation of Schöck Sconnex® type M in the outer leaf of double-leaf masonry may only take place protected against moisture.

### **i** Installation above the basement ceiling

- After the placing of the elements a sufficient time is to be waited until the mortar is sufficiently set for further work without hazarding the structural stability of the elements.
- Schöck Sconnex® type M is to be placed in a bed of ordinary mortar of mortar group IIa or III grating on each other.

### **i** Installation below the basement ceiling

- A full surface bedding of the floor on Schöck Sconnex® type M is to be ensured.
- Attention to DIN 18195 construction waterproofing.