egcobox®

the individual cantilever
connection system

New heat insulation
0.031 W(m*K)

technologies for the construction industry

FRANK®

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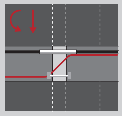
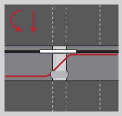
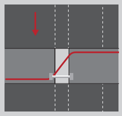
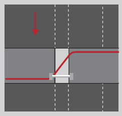
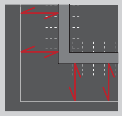
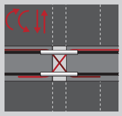
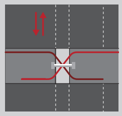
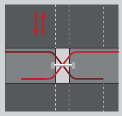
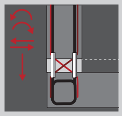
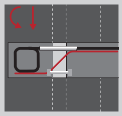
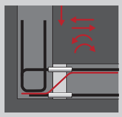
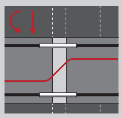
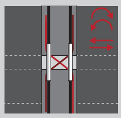
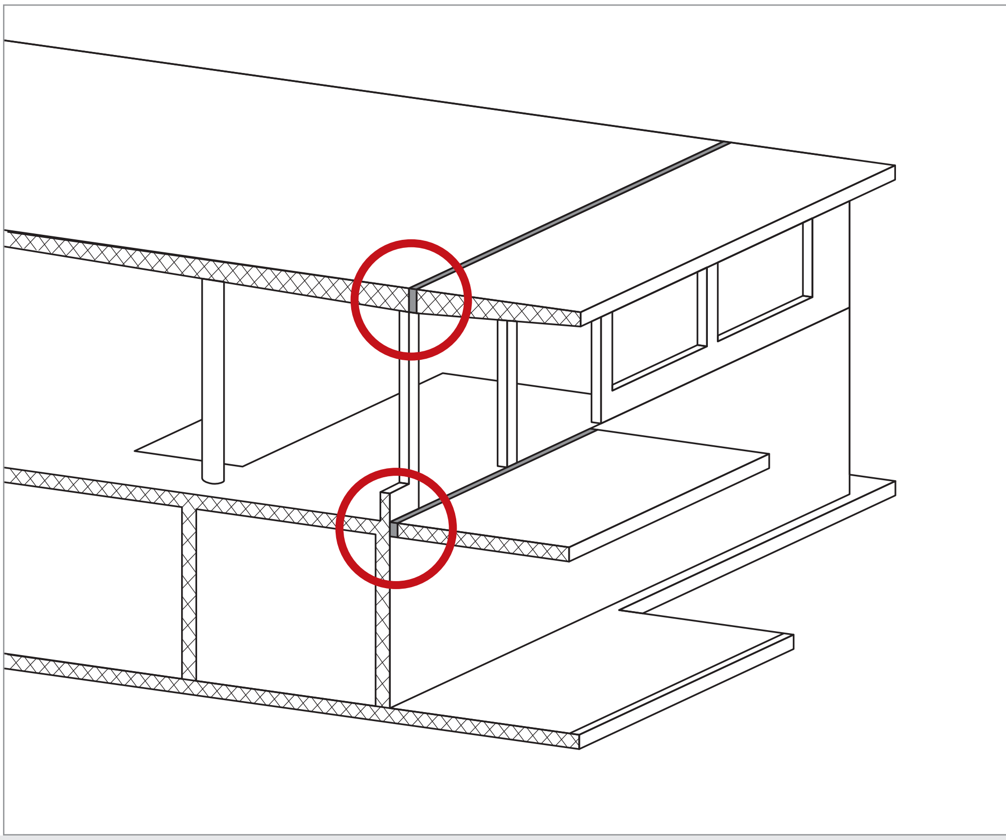
egcobox® | typelist

Page	Product	Element Type	Slab Height	Application
12-13 14	**Egcobox Mz-D-C35** **Egcobox Mz-D-C30**	Standard elements to transfer bending moments and shear forces	160-250 mm	
15	**Egcobox Mz-G**	Standard elements to transfer bending moments and shear forces	160-250 mm	
16-17	**Egcobox Vz-D**	Shear force elements to transfer only shear forces	160-250 mm	
18	**Egcobox Vz-DK**	Short elements to transfer shear forces	160-250 mm	
19 20	**Egcobox Mz-DK-Eck C35** **Egcobox Mz-DK-Eck C30**	Elements for corners	160-250 mm	
21 22	**Egcobox Mz± C35** **Egcobox Mz± C30**	Elements for changing loads (positive and negative moments and shear forces)	160-250 mm	
23	**Egcobox Vz-D±**	Shear force elements for changing loads (positive and negative shear forces)	160-250 mm	
24	**Egcobox Vz-DK±**	Short elements to transfer shear forces with changing loads	160-250 mm	
25	**Egcobox A**	Elements for roof parapets	160-250 mm	
26	**Egcobox O**	Elements for cantilevered brackets	160-250 mm	
27	**Egcobox F**	Elements for upstands	160-250 mm	
28-29	**Egcobox S**	Elements for cantilevered beams	400-500 mm	
30-31	**Egcobox W**	Elements for cantilevered (room-high) shear walls		

In modern architecture cantilevers are often used as construction feature. To prevent thermal bridging, insulated cantilever connection systems have been introduced. These approved systems incorporate quality connection components and integrated thermal insulation materials, thus allowing designers to comply with both the structural stability and thermal insulation regulations.

The **Egcobox** is approved in the following countries:

- **Austria**
- **Czech Republic**
- **Germany**
- **Hungary**
- **Netherlands**
- **Poland**
- **Slovakia**
- **UK**



Static equilibrium is maintained with a framework of steel reinforcement penetrating generally 60 to 80 mm thick thermal insulation material. This ensures that the complete structural component (e. g. a balcony) is fully integrated into the building frame. An already approved system is the individual cantilever connection system **Egcobox**.

The distinctive feature of this system is the use of continuous reinforcement without a welded joint. A stainless steel sleeve is placed over the rebar in the component joint where it is protected against corrosion. This annular gap between the sleeve and the rebar is then injected with an epoxy resin to provide a corrosion proof joint.

Egcobox with its continuous reinforcing steel bars has decisive advantages over conventional systems:

- **Consistant material properties of the reinforcement between the two components to be joined**
- **Reduced vertical deformations of the cantilever**

Three-dimensional thermal simulation models demonstrate how **Egcobox** works and prove that the system meets all energy and hygiene requirements of the official thermal insulation regulations.

Another decisive advantage of the **Egcobox** system is its versatility. In addition to our extensive range of standard elements, we can offer bespoke solutions. **Egcobox** can be adapted to suit the dimensions of individual constructions, which means that designers do not have to “design around” standardized elements.

Egcobox elements are available to form the majority of cantilevered concrete units:

- **Egcobox** Mz and Vz for balconies and exterior corridors
- **Egcobox** W for walls
- **Egcobox** A and F for roof parapets
- **Egcobox** can be used for special shapes

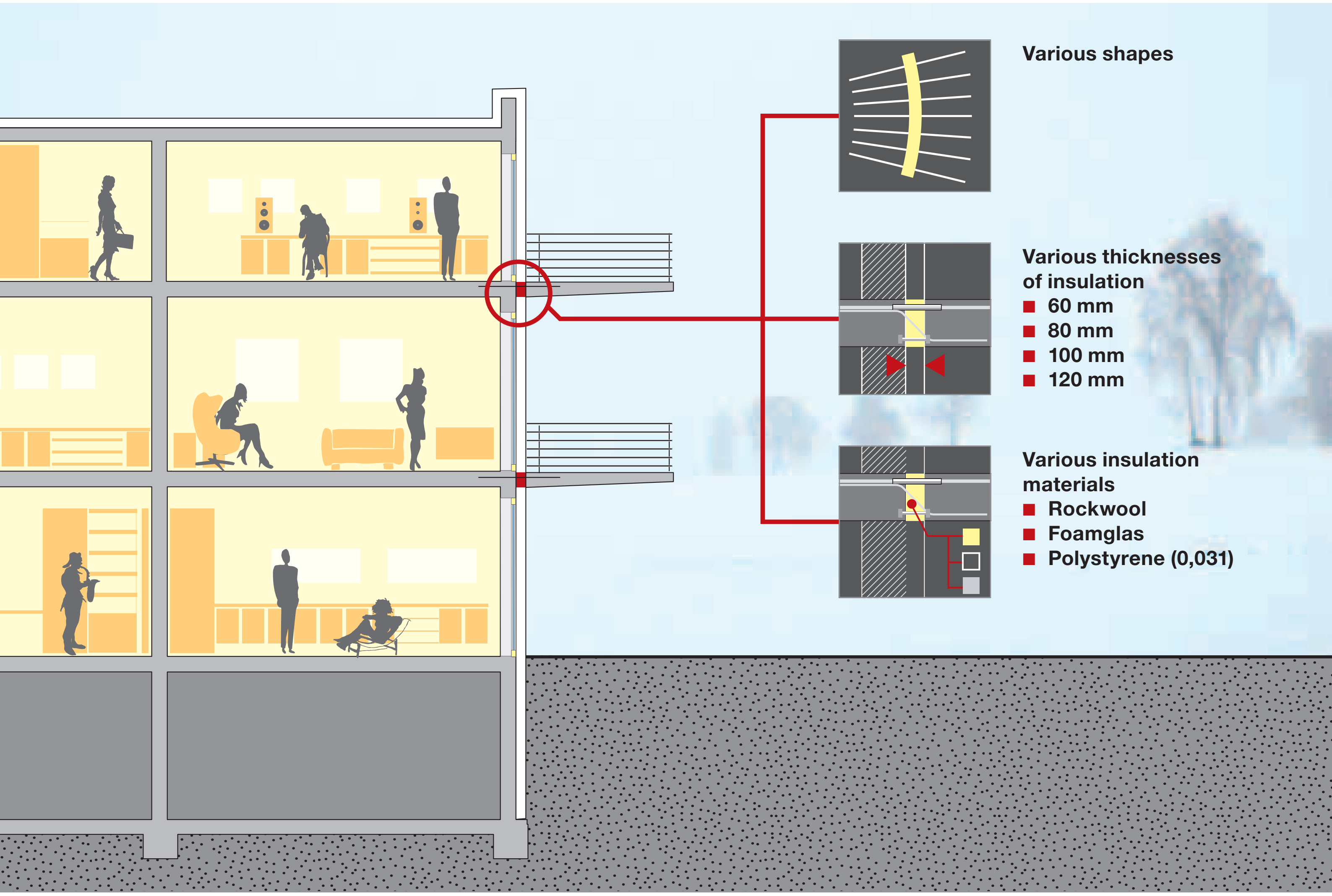
Special shapes of the **Egcobox**:

- **Egcobox** for curved balconies
- **Egcobox** for diagonal balconies
- **Egcobox** for corbels

The heat insulated cantilever connection system Egcobox provides a perfect combination of static safety and ideal heat insulation.

The **Egcobox** is the result of long lasting experience in this field.
The **Egcobox**-System was developed in 1980 in Switzerland and has continuously been upgraded to meet current legislation.
Egcobox is currently used in most European countries and enjoys great popularity with contractors and engineers.

- The cantilever connection system made out of reinforcing steel with stainless steel as a corrosion protection and fire resistance class R90 provides an ideal static system with a concurrent optimal heat insulation.
- Because of the combination of different materials, a continuous rebar together with a high heat insulation value is possible.
- The system **Egcobox** stands out because of its very simple and rational installation.



Steel grade of tension, pressure and shear force bars

All reinforcement steel is to Grade BSt 500 S. This unique system with its continuous steel reinforcement bars (protected by a resin injected stainless steel sleeve) offers permanent corrosion protection and ensures that the reinforcement between the connected components has the same material properties.

The continuous reinforcement also helps to reduce the cantilever deflection.

Protection against corrosion

1st protective coating:
The stainless steel sleeve protects the injection resin against mechanical damage. The stainless steel sleeve also provides very good resistance against chemical attack because of the high molybdenum content.

2nd protective coating:
The annulus between the sleeve and the steel reinforcement is filled with a two component resin which is injected under high pressure. This provides excellent corrosion protection to the reinforcement through the insulated area.

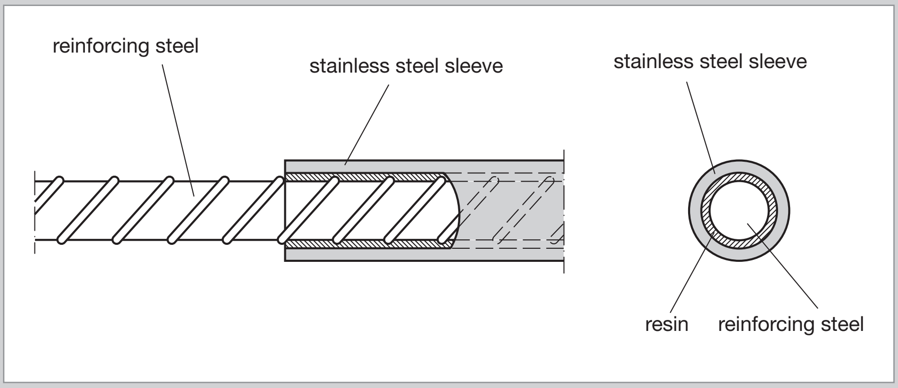
Design

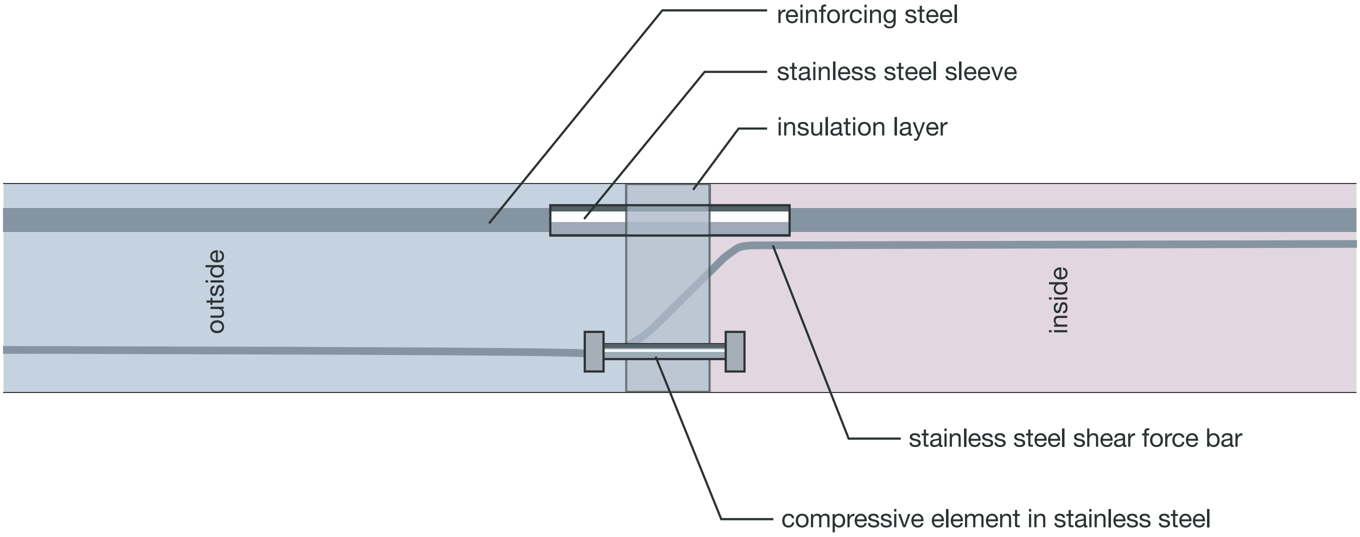
The **Egcobox** meets the requirements of the following guidelines:

- BS 8110
- DIN 1045-1
- EC 2

Continuous rebar

- Reinforcement steel BSt 500 S
- Stainless steel sleeve
- 2 mm injection area filled with a two component resin as corrosion protection





Heat insulating materials:

Material	Width	Heat insulation value	
Polystyrene	60 - 120 mm*	0.031 W/mk	Standard
Rockwool	60 - 120 mm	0.040 W/mk	Optional
Styrofoam	60 - 120 mm	0.036 W/mk	Optional
Foamglass	60 - 120 mm	0.040 W/mk	Optional

*standard thickness supplied 80 mm

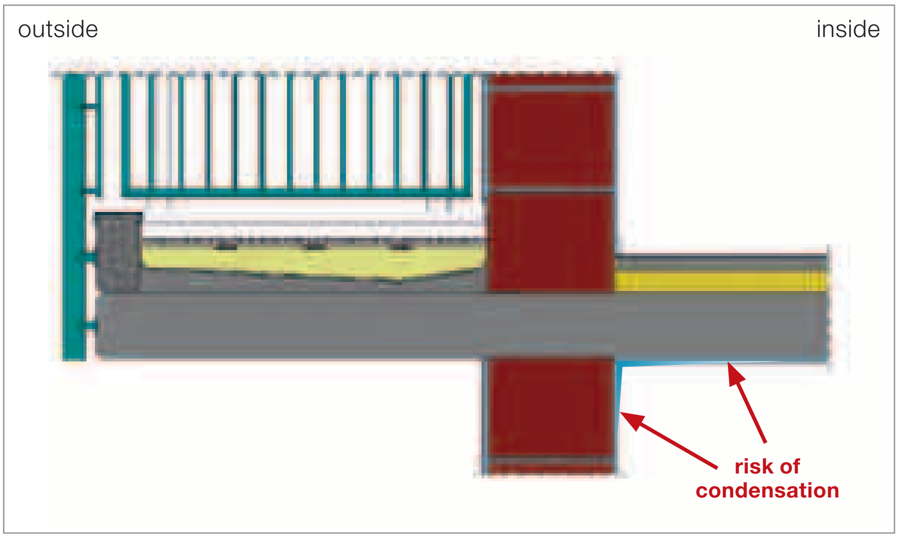
The standard insulation body consists of 80 mm thick Polystyrene.
Alternatively all combinations given in the table above are available.
A plastic cover applied at the top and at the bottom of the insulation, protects the insulation material during and after the installation.

Thermal bridges

In the area of thermal bridges of the external envelope, heat can be much easier transferred to the outside, than in other parts of the building.

Thermal bridges are the result of e. g. cantilevered units. These kind of elements cause:

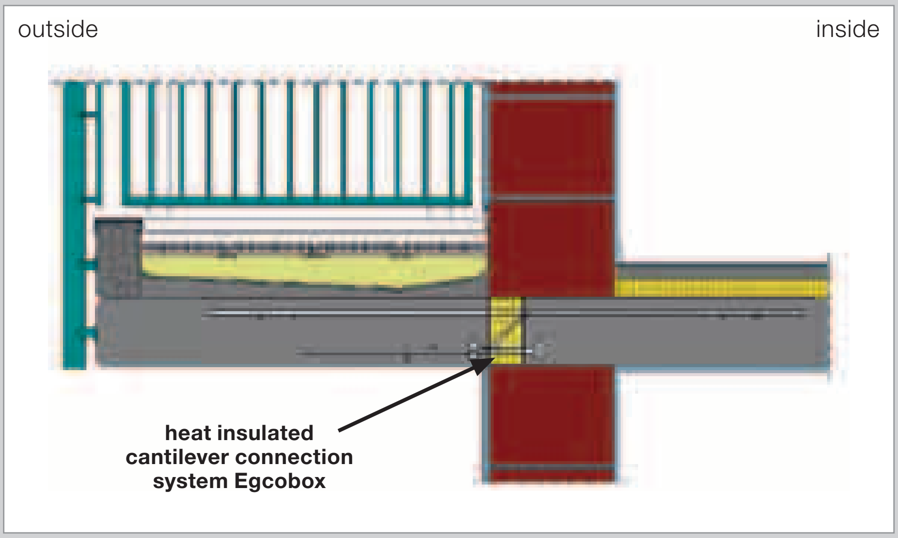
- Increased energy consumption
- Endangering of the substance of the structure (structural damage)
- Risk of condensation and moisture



a) Continuous reinforced concrete slab without Egcobox

Especially nowadays, with increasing heating costs, it is important to take heat insulation into account when designing a building. Not only the energy consumption, but also the hygienic thermal protection plays an important role. If the surface temperature on the inside walls is less than 12 °C – 13 °C, moisture will form on the surface of the element to create condensation. The waterdroplets soak through the plaster and the brickwork. Not only unsightly mould spots but also lasting damages to the plaster and the wallpaper are caused by a continuous penetration of dampness on the inside wall.

Stagnant areas on the inside surface of the wall provide a good cultural medium for moisture. This forms small microscopic spores which are spread all over the inside of the building by the air circulation and when inhaled they can cause physical health problems.



b) **With** the heat insulated cantilever connection system **Egcobox**

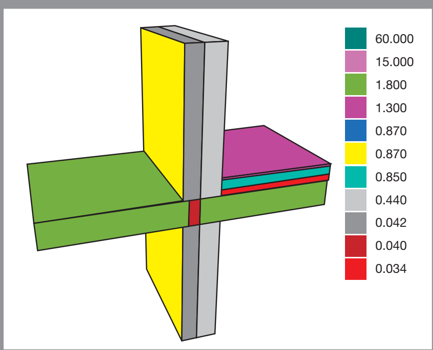
Egcobox as the problem solver when meeting thermal bridges

The reasons why conventionally designed cantilevers, i. e. with a continuous concrete slab, cause thermal bridges can be geometrical and substantial:

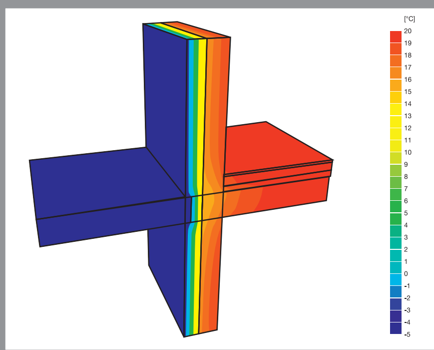
Geometrical thermal bridges always result when the outside surface of a building unit is much greater than its inside surface, i.e. by cantilevers. This is the so called cooling fin effect.

Substantial thermal bridges, i.e. brickwork walls with an integral reinforced concrete column, produce a heat loss through the column that can be much greater than that through the brickwork.

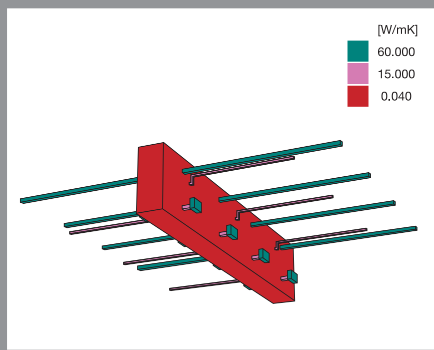
The **Egcobox** can provide an ideal solution. With 80 mm insulation and a framework of reinforcing steel, the structural thermal bridge can be eliminated at the planning stage of the building.



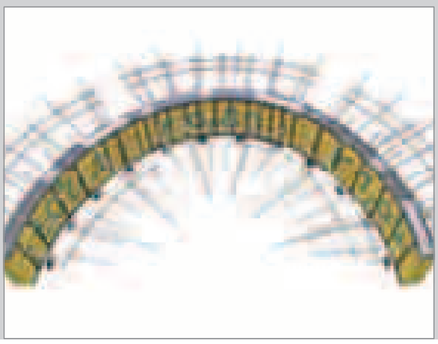
Static

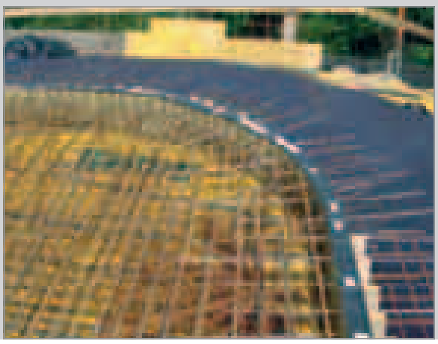


Section

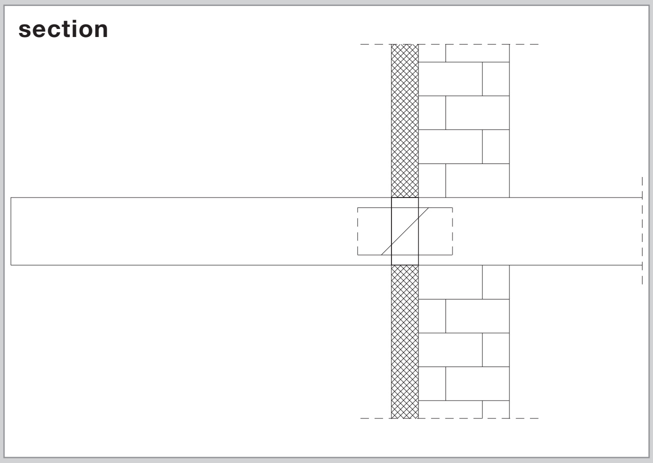


Isometric

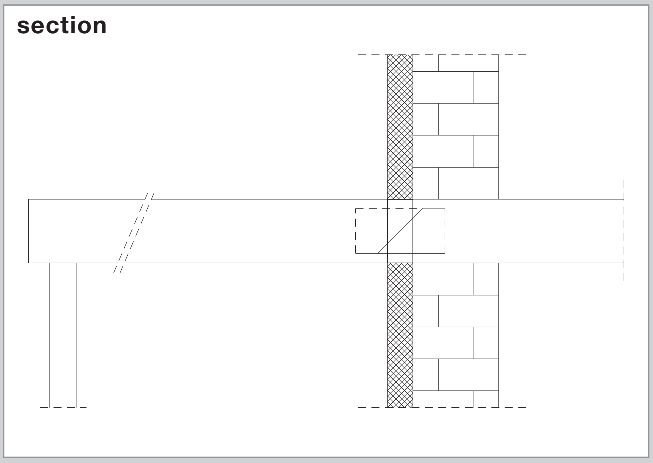




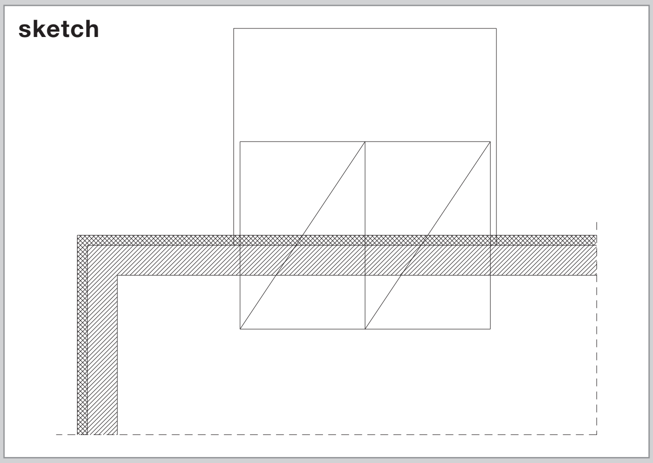
Egcobox Mz-D



Egcobox Vz-D

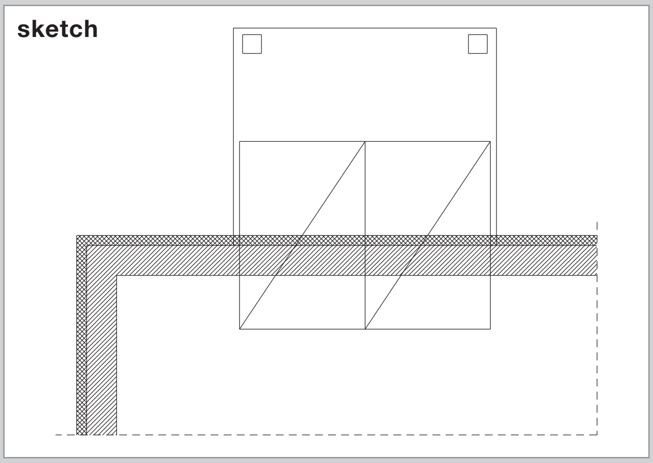


Egcobox Mz-D



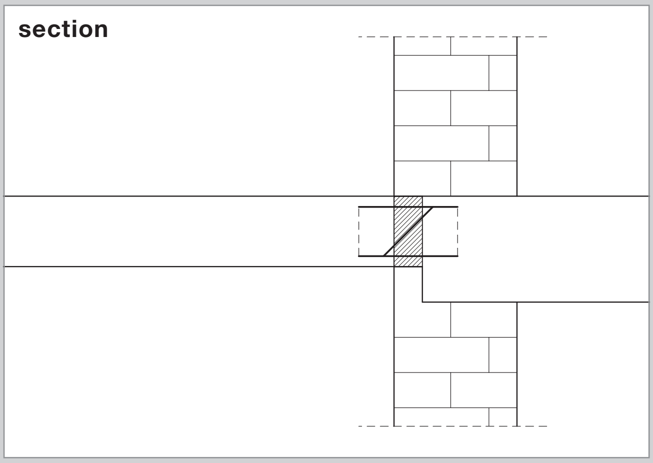
Example: cantilever, heat insulated balcony

Egcobox Vz-D



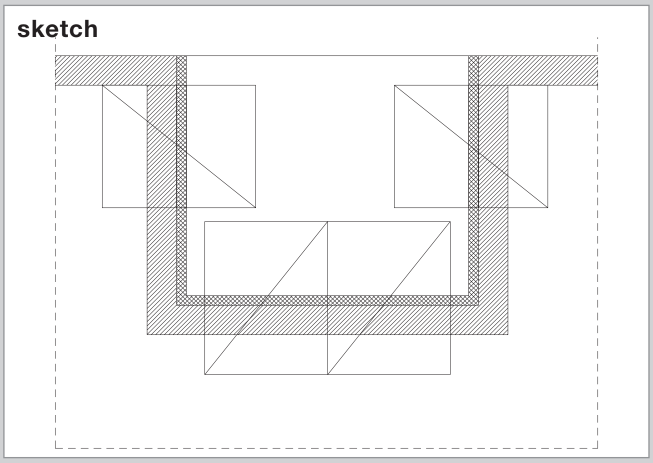
Example: supported, heat insulated balcony

Egcobox Mz-D



Example: differing thicknesses of balcony and ceiling slab

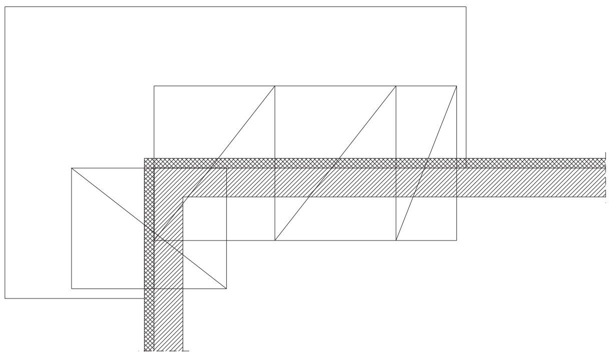
Egcobox Vz-D



Example: three-sided support, heat insulated balcony

Egcobox Mz-DK Eck

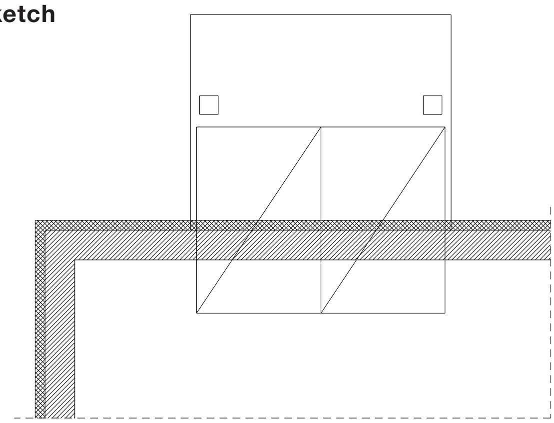
sketch



balcony corner consisting of corner elements right + left

Egcobox Vz±

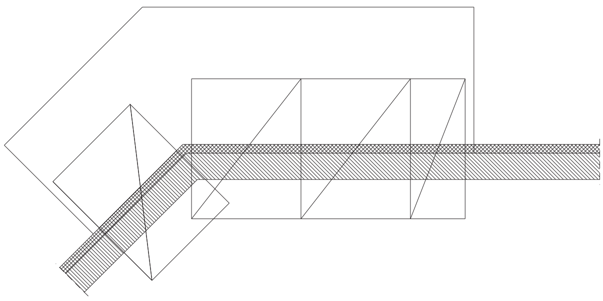
sketch



balcony slab with changing shear loads

Egcobox Mz-D Eck

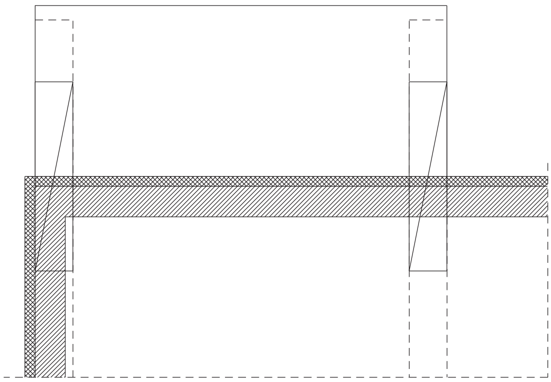
sketch



all angles are possible with two corner elements

Egcobox S

sketch

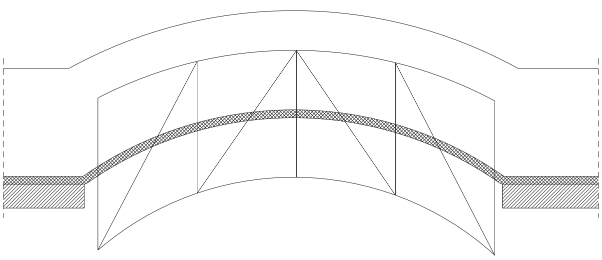


balcony slab with main beams

Egcobox special elements are specifically made for each requirement

arched Egcobox special elements

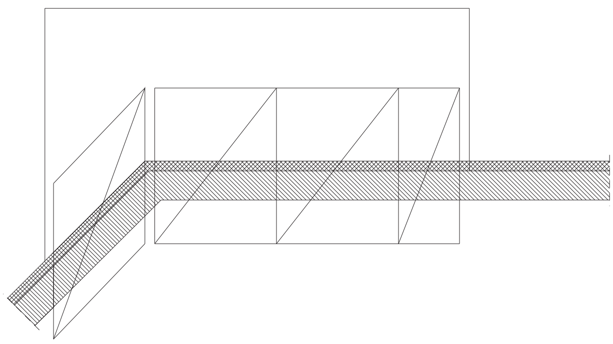
sketch



element with insulation adapted to a certain radius

sloping Egcobox special element

sketch



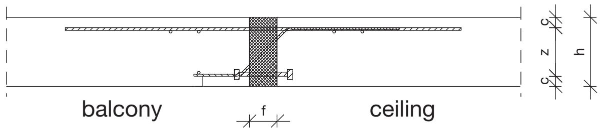
element with rebars parallel to the reinforcement on site

Technical Values

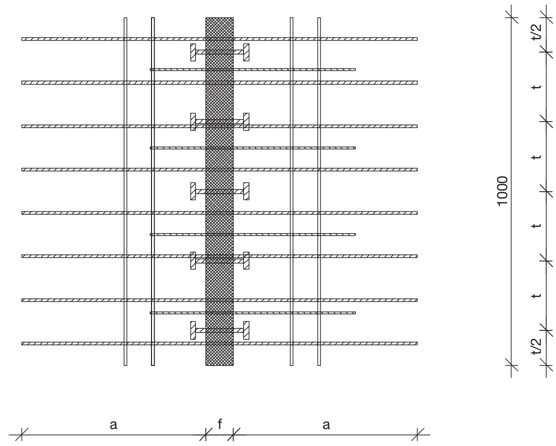
slab thickness: h = 160 – 250 mm

joint width: f = 80 mm

(other measurements on request)



Concrete cover C35



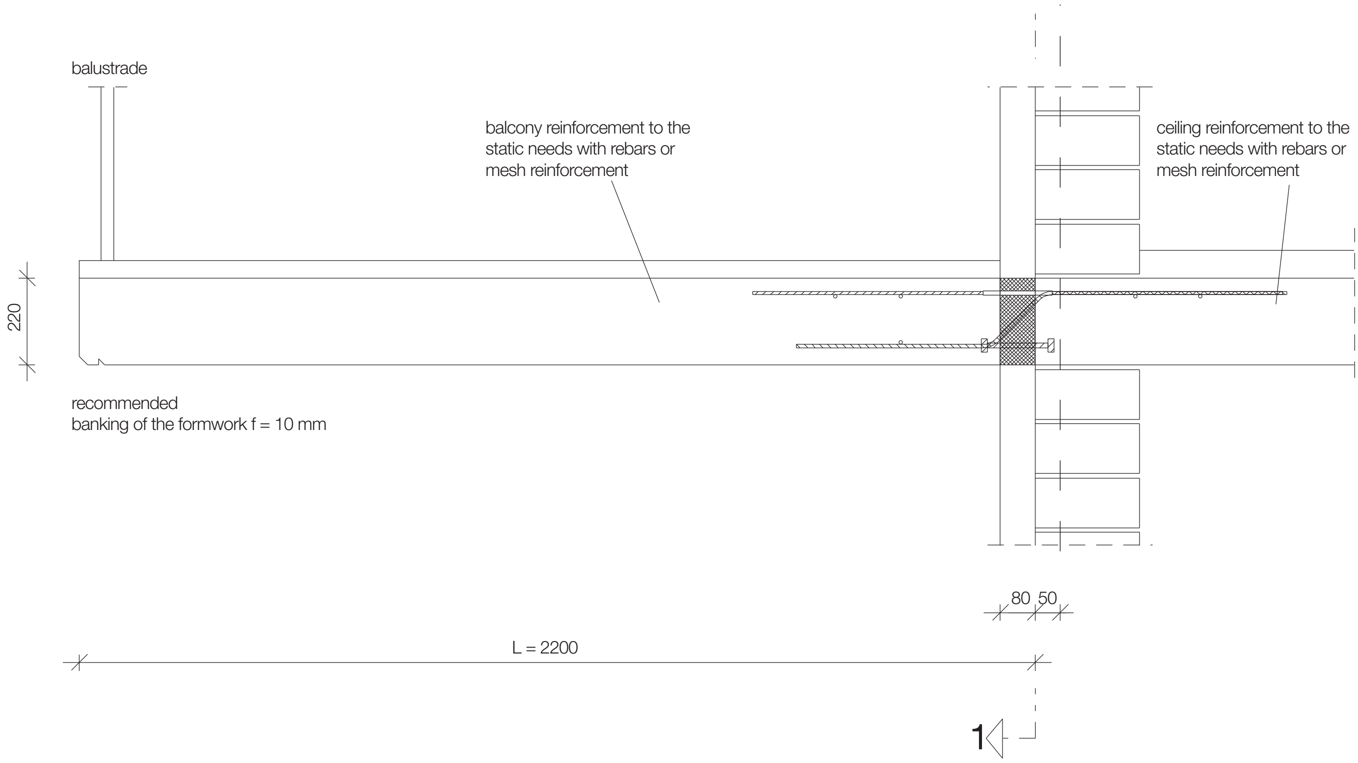
Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

Egcobox type	Mz1-D C35	Mz2-D C35	Mz3-D C35	Mz4-D C35	Mz5-D C35	Mz6-D C35	Mz7-D C35	Mz8-D C35	Mz9-D C35
connection height	design moment $M_{R,d}$ in kNm/m (characteristic moment in kNm/m)								
160 mm	7.1	17.5	21.8	25.5	29.3	34.2	39.1	45,1	47,0
	5.0	12.3	15.3	17.9	20.6	24.0	27.5	31,7	33,0
170 mm	7.9	19.8	24.8	28.9	33.4	38.9	44.5	51,3	53,4
	5.6	13.9	17.4	20.3	23.4	27.3	31.2	36,0	37,5
180 mm	8.8	22.0	27.7	32.4	37.4	43.6	49.8	57,5	59,8
	6.2	15.4	19.5	22.7	26.2	30.6	35.0	40,3	42,0
190 mm	9.7	24.2	30.7	35.8	41.4	48.3	55.2	63,7	66,3
	6.8	17.0	21.5	25.1	29.1	33.9	38.7	44,7	46,5
200 mm	10.5	26.4	33.7	39.3	45.4	53.0	60.6	69,8	72,7
	7.4	18.5	23.6	27.6	31.9	37.2	42.5	49,0	51,0
210 mm	11.4	28.6	36.6	42.7	49.4	57.7	65.9	76,0	79,1
	8.0	20.1	25.7	30.0	34.7	40.5	46.3	53,4	55,5
220 mm	12.2	30.9	39.6	46.1	53.5	62.4	71.3	82,2	85,6
	8.6	21.7	27.8	32.4	37.5	43.8	50.0	57,7	60,1
230 mm	13.1	33.1	42.5	49.6	57.5	67.1	76.6	88,4	92,0
	9.2	23.2	29.8	34.8	40.3	47.1	53.8	62,0	64,6
240 mm	14.0	35.3	45.5	53.0	61.5	71.7	82.0	94,6	98,4
	9.8	24.8	31.9	37.2	43.2	50.3	57.5	66,4	69,1
250 mm	14.8	37.5	48.4	56.5	65.5	76.4	87.4	100,8	104,9
	10.4	26.3	34.0	39.6	46.0	53.6	61.3	70,7	73,6
	design shear force $V_{R,d}$ in kN/m (characteristic shear force in kN/m)								
	34.8	34.8	52.2	52.2	52.2	52.2	52.2	52.2	52.2
	24.4	24.4	36.6	36.6	36.6	36.6	36.6	36.6	36.6
V1	61.9	61.9	92.8	92.8	92.8	92.8	92.8	92.8	92.8
	43.4	43.4	65.1	65.1	65.1	65.1	65.1	65.1	65.1
V2	-	-	120.8	120.8	120.8	120.8	120.8	120.8	120.8
			84.7	84.7	84.7	84.7	84.7	84.7	84.7
reinforcement									
element length [mm]	1000	1000	1000	1000	1000	1000	1000	1000	1000
tensile bars	7 Ø 6	5 Ø 12	6 Ø 12	7 Ø 12	6 Ø 14	7 Ø 14	8 Ø 14	10 Ø 14	10 Ø 14
lenght of tensile bars [mm]	740	1340	1340	1340	1520	1520	2060	2060	2060
pressure elements	3 Ø 10	5 Ø 12	4 Ø 16	6 Ø 14	5 Ø 16	6 Ø 16	7 Ø 16	10 Ø 14	10 Ø 16
shear force bars	4 Ø 6	4 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6
shear force bars V1	4 Ø 8	4 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8
shear force bars V2	-	-	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10

C20/25, c = 35 mm (BSt 500 S = ordinary steel), γ = 1.425 to get the characteristic static forces

Calculation sample Mz-D-C35



Ultimate loads to BS 8110:

Dead weight of the concrete	1.4 * 220 mm * 25 kN/m³	=	7.70 kN/m²
Flooring	1.4 * 0.75 kN/m²	=	1.05 kN/m²
Live load	1.6 * 5.00 kN/m²	=	<u>8.00 kN/m²</u>
		=	16.75 kN/m²
Dead weight of the balustrade	1.4 * 0.70 kN/m	=	0.98 kN/m
Horizontal load applied to the balustrade in 1.10 m height	1.6 * 0.74 kN/m	=	1.18 kN/m

Bending moments and shear forces at section 1-1:

$$m_{E,d} = \frac{16.75\ kN/m^2 * (2.25\ m)^2}{2} + 1.18\ kN/m * 1.10\ m + 0.98\ kN/m * 2.25\ m = \underline{45.9\ kNm/m}$$

$$q_{E,d} = 16.75\ kN/m^2 * 2.12\ m + 0.98\ kN/m = \underline{36.5\ kN/m}$$

Choice of cantilever connection type for a slab with h = 220mm

Chosen type:	Mz4-D h = 220 mm
$M_{R,d}$ = 46.1 kNm/m	$V_{R,d}$ = 52.2 kN/m

Calculation of essential banking in [mm] to the table page 32 for approx. 50% live load (with characteristic loads)

$$m_{E,k} = \frac{11.25\ kN/m^2 * (2.25\ m)^2}{2} + 0.74\ kN/m * 1.10\ m + 0.70\ kN/m * 2.25\ m = \underline{30.9\ kNm/m}$$

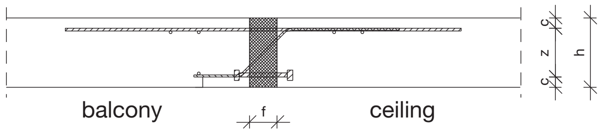
$$50\ \%\ of\ m_{q,k} = \frac{0.5 * 5.00\ kN/m^2 * (2.25\ m)^2}{2} = \underline{6.3\ kNm/m}$$

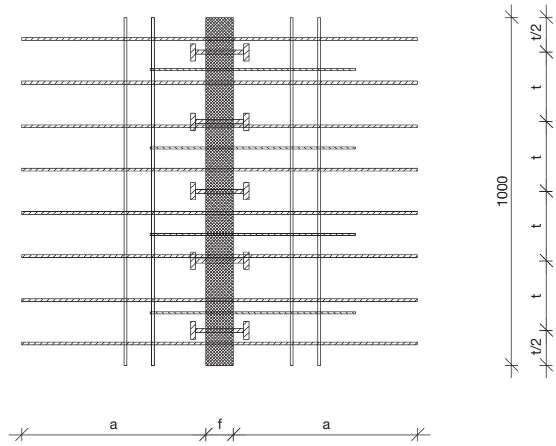
Banking factor for Mz4-D-C35 h = 220 mm from table page 32; k = 0.19

$$f = (30.9\ kNm/m - 6.3\ kNm/m) * 0.19 * 2.2\ m = \underline{10\ mm}\ (= 0.45\ \%)$$

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)





Concrete cover C30

Egcobox design table

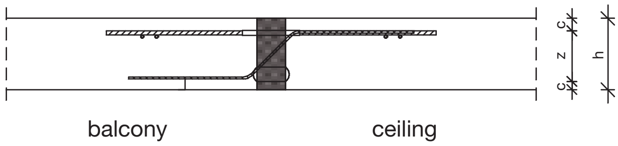
Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

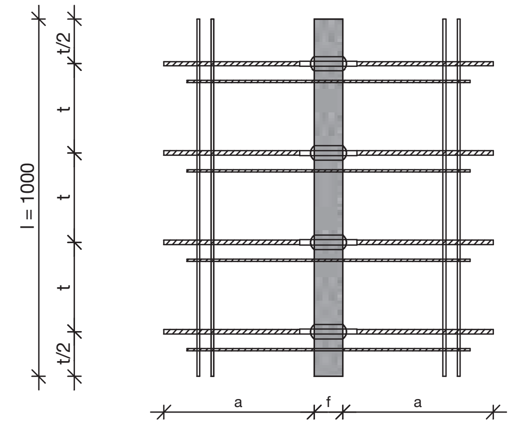
Egcobox type	Mz1-D C30	Mz2-D C30	Mz3-D C30	Mz4-D C30	Mz5-D C30	Mz6-D C30	Mz7-D C30	Mz8-D C30	Mz9-D C30
connection height	design moment $M_{R,d}$ in kNm/m (characteristic moment in kNm/m)								
160 mm	7.5	18.7	23.3	27.2	31.4	36.6	41.8	48.2	50.2
	5.3	13.1	16.4	19.1	22.0	25.7	29.3	33.8	35.2
170 mm	8.4	20.9	26.3	30.7	35.4	41.3	47.2	54.4	56.6
	5.9	14.6	18.4	21.5	24.8	29.0	33.1	38.2	39.7
180 mm	9.2	23.1	29.2	34.1	39.4	46.0	52.5	60.6	63.1
	6.5	16.2	20.5	23.9	27.6	32.2	36.9	42.5	44.2
190 mm	10.1	25.3	32.2	37.5	43.4	50.6	57.9	66.8	69.5
	7.1	17.8	22.6	26.3	30.5	35.5	40.6	46.8	48.8
200 mm	10.9	27.5	35.1	41.0	47.4	55.3	63.2	72.9	75.9
	7.7	19.3	24.7	28.8	33.3	38.8	44.4	51.2	53.3
210 mm	11.8	29.8	38.1	44.4	51.4	60.0	68.6	79.1	82.4
	8.3	20.9	26.7	31.2	36.1	42.1	48.1	55.5	57.8
220 mm	12.7	32.0	41.0	47.9	55.5	64.7	74.0	85.3	88.8
	8.9	22.4	28.8	33.6	38.9	45.4	51.9	59.9	62.3
230 mm	13.5	34.2	44.0	51.3	59.5	69.4	79.3	91.5	95.2
	9.5	24.0	30.9	36.0	41.7	48.7	55.7	64.2	66.8
240 mm	14.4	36.4	46.9	54.8	63.5	74.1	84.7	97.7	101.7
	10.1	25.6	32.9	38.4	44.6	52.0	59.4	68.5	71.3
250 mm	15.3	38.6	49.9	58.2	67.5	78.8	90.0	103.8	108.1
	10.7	27.1	35.0	40.8	47.4	55.3	63.2	72.9	75.9
	design shear force $V_{R,d}$ in kN/m (characteristic shear force in kN/m)								
	34.8	34.8	52.2	52.2	52.2	52.2	52.2	52.2	52.2
	24.4	24.4	36.6	36.6	36.6	36.6	36.6	36.6	36.6
V1	61.9	61.9	92.8	92.8	92.8	92.8	92.8	92.8	92.8
	43.4	43.4	65.1	65.1	65.1	65.1	65.1	65.1	65.1
V2	-	-	120.8	120.8	120.8	120.8	120.8	120.8	120.8
			84.7	84.7	84.7	84.7	84.7	84.7	84.7
reinforcement									
element length [mm]	1000	1000	1000	1000	1000	1000	1000	1000	1000
tensile bars	7 Ø 6	5 Ø 12	6 Ø 12	7 Ø 12	6 Ø 14	7 Ø 14	8 Ø 14	10 Ø 14	10 Ø 14
lenght of tensile bars [mm]	740	1340	1340	1340	1520	1520	2060	2060	2060
pressure elements	3 Ø 10	5 Ø 12	4 Ø 16	6 Ø 14	5 Ø 16	6 Ø 16	7 Ø 16	10 Ø 14	10 Ø 16
shear force bars	4 Ø 6	4 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6
shear force bars V1	4 Ø 8	4 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8
shear force bars V2	-	-	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10	5 Ø 10

C20/25, c = 30 mm (BSt 500 S = ordinary steel), γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)





Only available in an insulation thickness of 80 mm

Egcobox design table

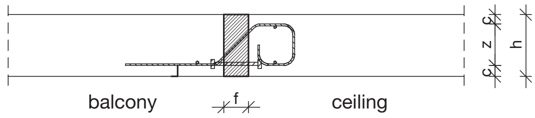
Insulation thickness 80 mm Polystyrene, other materials i. e. rockwool or foamglass available on request

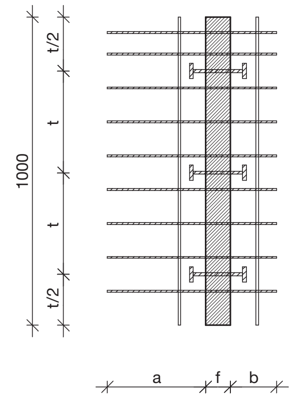
Egcobox type	Mz10-G-C30	Mz20-G-C30	Mz30-G-C35	Mz40-G-C35	Mz50-G-C35
connection height	design moment $M_{R,d}$ in kNm/m characteristic moment in kNm/m				
160 mm	8.3	12.7	15.0	18.7	22.4
	5.8	8.9	10.5	13.1	15.7
170 mm	9.3	14.2	16.9	21.2	25.4
	6.5	10.0	11.9	14.9	17.8
180 mm	10.2	15.8	18.9	23.6	28.3
	7.2	11.1	13.3	16.6	19.9
190 mm	11.2	17.3	20.9	26.1	31.3
	7.9	12.1	14.7	18.3	22.0
200 mm	12.2	18.8	22.8	28.5	34.2
	8.6	13.2	16.0	20.0	24.0
210 mm	13.2	20.4	24.8	31.0	37.2
	9.3	14.3	17.4	21.8	26.1
220 mm	14.2	21.9	26.8	33.5	40.1
	10.0	15.4	18.8	23.5	28.1
230 mm	15.2	23.4	28.7	35.9	43.1
	10.7	16.4	20.1	25.2	30.2
240 mm	16.2	25.0	30.7	38.4	46.1
	11.4	17.5	21.5	26.9	32.4
250 mm	17.1	26.5	32.7	40.8	49.0
	12.0	18.6	23.0	28.6	34.4
	design shear force $V_{R,d}$ in kN/m characteristic shear force in kN/m				
160 – 250 mm	34.8	34.8	52.2	52.2	52.2
	24.4	24.4	36.6	36.6	36.6
V1	61.9	61.9	92.8	92.8	92.8
	43.4	43.4	65.1	65.1	65.1
V2	-	-	120.8	120.8	120.8
			84.7	84.7	84.7
reinforcement					
element length [mm]	1000	1000	1000	1000	1000
tensile bars	8 Ø 6	7 Ø 8	4 Ø 12	5 Ø 12	6 Ø 12
lenght of tensile bars [mm]	740	900	1780	1340	1340
GDL (thrust hinge block)	4	4	5	6	7
shear force bars	4 Ø 6	4 Ø 6	6 Ø 6	6 Ø 6	6 Ø 6
shear force bars V1	4 Ø 8	4 Ø 8	6 Ø 8	6 Ø 8	6 Ø 8
shear force bars V2	-	-	5 Ø 10	5 Ø 10	5 Ø 10

C20/25, c = 30 mm (BSt 500 NR = stainless steel), c = 35 mm (BSt 500 S = ordinary steel) γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)





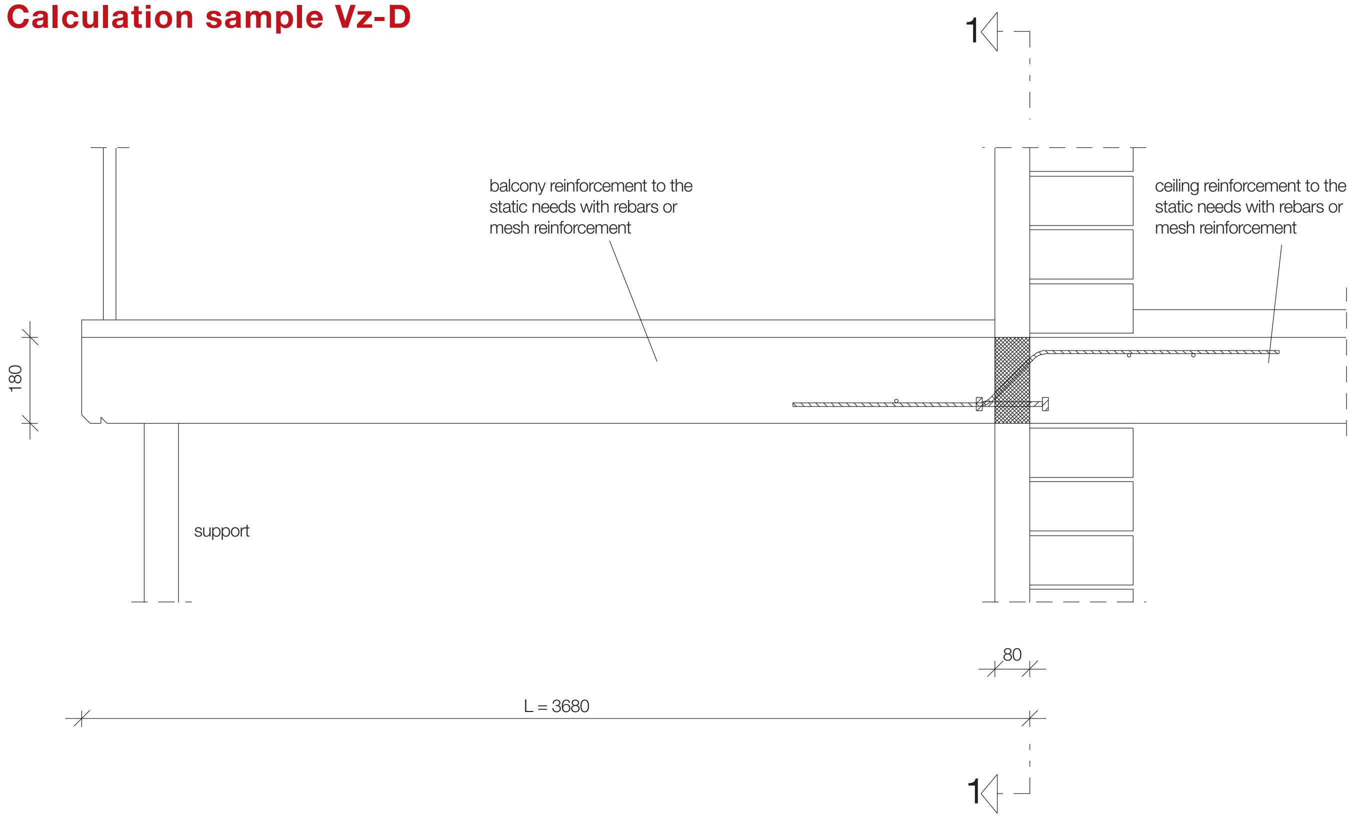
Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

Egcobox type	Vz1-D	Vz2-D	Vz3-D	Vz4-D	Vz5-D	Vz6-D	Vz7-D
	design shear force $V_{R,d}$ in kN/m characteristic shear force in kN/m						
160 - 250 mm	34.8 24.4	43.5 30.5	52.2 36.6	78.3 54.9	88.8 62.3	118.4 83.1	169.1 118.7
reinforcement							
element length [mm]	1000	1000	1000	1000	1000	1000	1000
pressure elements	2 Ø 10	2 Ø 10	2 Ø 10	3 Ø 10	3 Ø 10	4 Ø 10	4 Ø 12
shear force bars	4 Ø 6	5 Ø 6	6 Ø 6	9 Ø 6	6 Ø 8	8 Ø 8	7 Ø 10
b [mm]	150	150	150	150			
	hooked shear force bars at the ceiling side				straight shear force bars at the ceiling side		

C20/25, c = 30 mm (BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

Calculation sample Vz-D



Ultimate loads to BS 8110:

Dead weight of the concrete	1.4 * 180 mm * 25 kN/m^3	=	6.30 kN/m^2
Flooring	1.4 * 0.75 kN/m^2	=	1.05 kN/m^2
Live load	1.6 * 5.00 kN/m^2	=	8.00 kN/m^2
		=	15.35 kN/m^2

Shear forces at section 1-1:

$$q_{E,d} = \frac{15.35\ kN/m^2 * 3.6\ m}{2} = \underline{27.63\ kN/m}$$

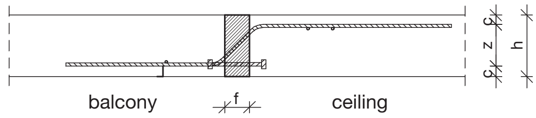
Choice of cantilever connection type for a slab with h = 180 mm

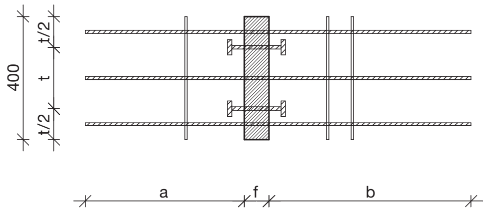
Chosen type: Vz1-D h = 180 mm

$V_{R,d}$ = 34.8 kN/m

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)





Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

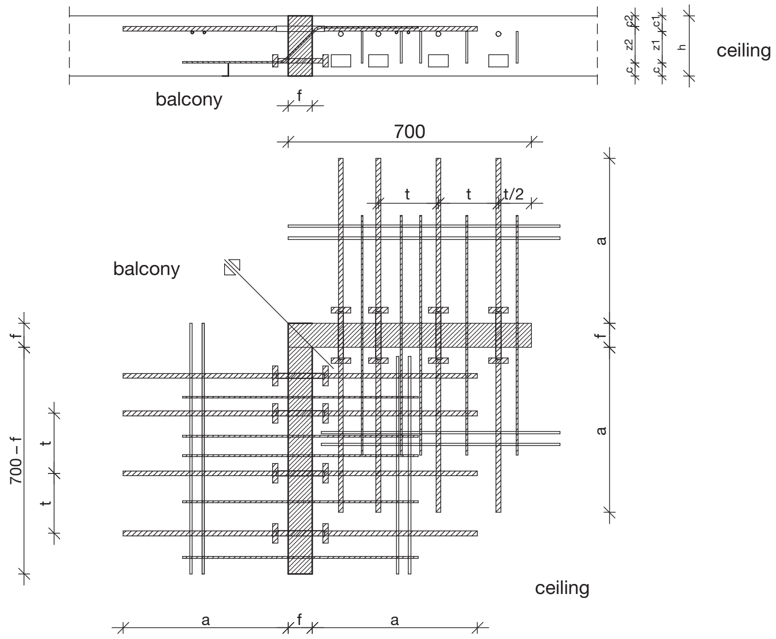
Egcobox type	Vz1-DK	Vz2-DK	Vz3-DK	Vz4-DK	Vz5-DK	Vz6-DK	Vz7-DK	Vz8-DK	Vz9-DK
	design shear force $V_{R,d}$ in kN/element characteristic shear force in kN/element								
160 - 250 mm	26.1 18.3	43.5 30.5	59.2 41.5	44.4 31.2	72.5 50.9	69.6 48.8	104.4 73.3	104.4 73.3	139.2 97.7
reinforcement									
element length [mm]	300	400	500	300	400	300	400	300	400
pressure elements	1 Ø 10	2 Ø 10	2 Ø 10	1 Ø 12	2 Ø 12	2 Ø 12	2 Ø 14	2 Ø 14	3 Ø 14
shear force bars	3 Ø 6	5 Ø 6	4 Ø 8	2 Ø 10	3 Ø 10	2 Ø 12	3 Ø 12	3 Ø 12	4 Ø 12

C20/25, c = 30 mm (BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

egcobox® | corner element **Mz-DK-Eck-C35**

Technical Value

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)



Concrete cover C35

Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

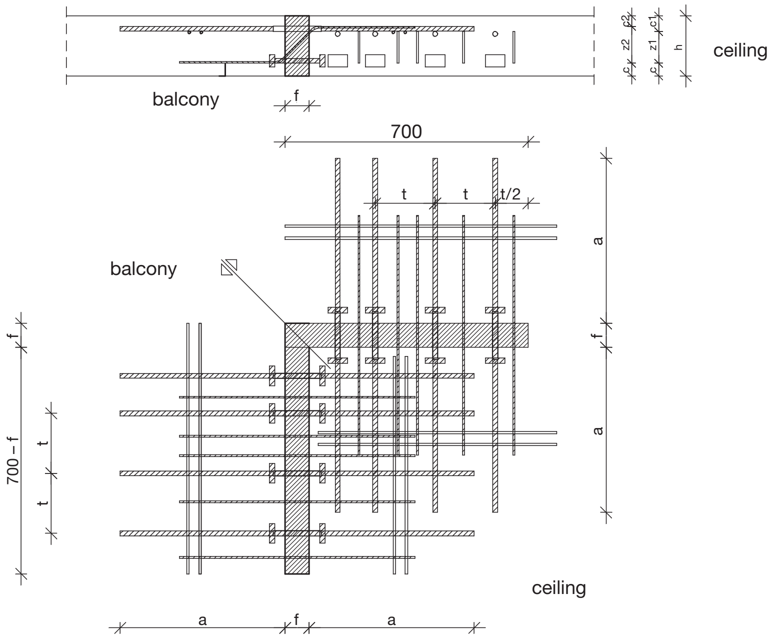
Egcobox type	Mz2-DK-Eck-C35	Mz3-DK-Eck-C35	Mz5-DK-Eck-C35
connection height	design moment $M_{R,d}$ in kNm/side (1st/2nd layer) characteristic moment in kNm/side (1st/2nd layer)		
160 mm	-	-	-
170 mm	15.8 / 12.3 11.1 / 8.6	27.0 / 20.6 18.9 / 14.5	-
180 mm	17.6 / 14.0 12.4/ 9.8	30.2 / 23.8 21.2/ 16.7	37.6 / 33.9 26.4/ 23.8
190 mm	19.4 / 15.8 13.6/ 11.1	33.5 / 27.0 23.5/ 18.9	42.1 / 38.4 29.5/ 26.9
200 mm	21.1 / 17.6 14.8/ 12.4	36.7 / 30.2 25.8/ 21.2	46.7 / 43.0 32.8/ 30.2
210 mm	22.9 / 19.4 16.1/ 13.6	39.9 / 33.5 28.0/ 23.5	51.2 / 47.5 35.9/ 33.3
220 mm	24.4 / 21.1 17.1/ 14.8	43.1 / 36.7 30.2/ 25.8	55.7 / 52.0 39.1/ 36.5
230 mm	26.5 / 22.9 18.6/ 16.1	46.3 / 39.9 32.5/ 28.0	60.3 / 56.6 42.3/ 39.7
240 mm	28.2 / 24.7 19.8/17.3	49.5 / 43.1 34.7/ 30.2	64.8 / 61.1 45.5/ 42.9
250 mm	30.0 / 26.5 21.1/ 18.6	52.8 / 46.3 37.1/ 32.5	69.3 / 65.6 48.6/ 46.0
	design shear force $V_{R,d}$ in kN/side (1st/2nd layer) characteristic shear force in kN/side (1st/2nd layer)		
160 bis 250 mm	46.4 32.6	96.6 67.8	96.6 67.8
reinforcement			
element length [mm]	500/580	620/700	620/700
tensile bars	2 x 4 Ø 12	2 x 7 Ø 12	2 x 7 Ø 14
length of tensile bars [mm]	1340	1780	2060
pressure bars	2 x 4 Ø 12 (with pressure plates)	2 x 5 Ø 16 (with pressure plates)	2x3 Ø14 + 2x4 Ø14 (with long pressure bars in corner)
shear force bars	2 x 3 Ø 8	2 x 4 Ø 10	2 x 4 Ø 10

C20/25, c = 35 mm (BSt 500 S = ordinary steel), γ = 1.425 to get the characteristic static forces
All egcobox elements are available with higher shear forces, if required.

Technical Value

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)

Concrete cover C30



Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

Egcobox type	Mz2-DK-Eck-C30	Mz3-DK-Eck-C30	Mz5-DK-Eck-C30
connection height	design moment $M_{R,d}$ in kNm/side (1st/2nd layer) characteristic moment in kNm/side (1st/2nd layer)		
160 mm	-	-	-
170 mm	16.7 / 13.1 11.7 / 9.2	28.6 / 22.2 20.1 / 15.6	-
180 mm	18.5 / 14.9 13.0 / 10.5	31.8 / 25.4 22.3 / 17.8	41.2 / 37.5 28.9 / 26.3
190 mm	20.3 / 16.7 14.2 / 11.7	35.1 / 28.6 24.6 / 20.1	45.8 / 42.0 32.1 / 29.5
200 mm	22.0 / 18.5 15.5 / 13.0	38.3 / 31.8 26.9 / 22.3	50.3 / 46.6 35.3 / 32.7
210 mm	23.8 / 20.3 16.7 / 14.2	41.5 / 35.1 29.1 / 24.6	54.8 / 51.1 38.5 / 35.9
220 mm	25.6 / 22.0 18.0 / 15.5	44.7 / 38.3 31.4 / 26.9	59.4 / 55.6 41.7 / 39.0
230 mm	27.4 / 23.8 19.2 / 16.7	47.9 / 41.5 33.6 / 29.1	63.9 / 60.2 44.8 / 42.2
240 mm	29.1 / 25.6 20.4 / 18.0	51.2 / 44.7 35.9 / 31.4	68.4 / 64.7 48.0 / 45.4
250 mm	30.9 / 27.4 21.7 / 19.2	54.4 / 47.9 38.2 / 33.6	73.0 / 69.2 51.2 / 48.6
	design shear force $V_{R,d}$ in kN/side (1st/2nd layer) characteristic shear force in kN/side (1st/2nd layer)		
160 bis 250 mm	46.4 / 46.4 32.6 / 32.6	96.6 / 96.6 67.8 / 67.8	96.6 / 96.6 67.8 / 67.8
reinforcement			
element length [mm]	500/580	620/700	620/700
tensile bars	2 x 4 Ø 12	2 x 7 Ø 12	2 x 7 Ø 14
length of tensile bars [mm]	1340	1780	2060
pressure bars	2 x 4 Ø 12 (with pressure plates)	2 x 5 Ø 16 (with pressure plates)	2x3 Ø14 + 2x4 Ø14 (with long pressure bars in corner)
shear force bars	2 x 3 Ø 8	2 x 4 Ø 10	2 x 4 Ø 10

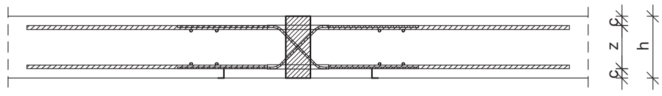
C20/25, c = 30 mm (BSt 500 S = ordinary steel), γ = 1.425 to get the characteristic static forces
All egcobox elements are available with higher shear forces, if required.

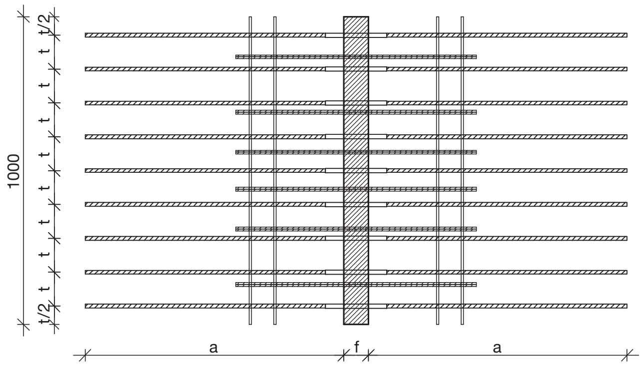
Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)

Concrete cover C35

for changing moments and shear forces





Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

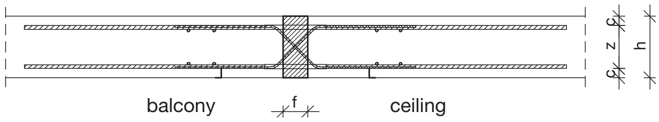
Egcobox type	Mz3 ± C35	Mz5 ± C35	Mz8 ± C35
connection height	design moment $M_{R,d}$ in kNm/m characteristic moment in kNm/m		
160 mm	± 23.0 ± 16.1	± 30.6 ± 21.5	± 45.8 ± 32.1
170 mm	± 26.0 ± 18.2	± 34.6 ± 24.3	± 51.9 ± 36.4
180 mm	± 28.9 ± 20.3	± 38.6 ± 27.1	± 57.9 ± 40.6
190 mm	± 31.9 ± 22.4	± 42.6 ± 29.9	± 63.9 ± 44.8
200 mm	± 34.8 ± 24.4	± 46.6 ± 32.7	± 69.9 ± 49.1
210 mm	± 37.8 ± 26.5	± 50.6 ± 35.5	± 76.0 ± 53.3
220 mm	± 40.7 ± 28.6	± 54.7 ± 38.4	± 82.0 ± 57.5
230 mm	± 43.7 ± 30.7	± 58.7 ± 41.2	± 88.0 ± 61.8
240 mm	± 46.6 ± 32.7	± 62.7 ± 44.0	± 94.1 ± 66.0
250 mm	± 49.6 ± 34.8	± 66.7 ± 46.8	± 100.1 ± 70.2
	design shear force $V_{R,d}$ in kN/m characteristic shear force in kN/m		
	± 46.4 ± 32.6	± 46.4 ± 32.6	± 46.4 ± 32.6
V1	± 77.4 ± 54.3	± 77.4 ± 54.3	± 77.4 ± 54.3
V2	± 120.8 ± 84.8	± 120.8 ± 84.8	± 120.8 ± 84.8
reinforcement			
element length [mm]	1000	1000	1000
tensile / pressure bars	2 x 6 Ø 12	2 x 6 Ø 14	2 x 9 Ø 14
length of tensile bars [mm]	1340	1520	2060
shear force bars	2 x 3 Ø 8	2 x 3 Ø 8	2 x 3 Ø 8
V1	2 x 5 Ø 8	2 x 5 Ø 8	2 x 5 Ø 8
V2	2 x 5 Ø 10	2 x 5 Ø 10	2 x 5 Ø 10

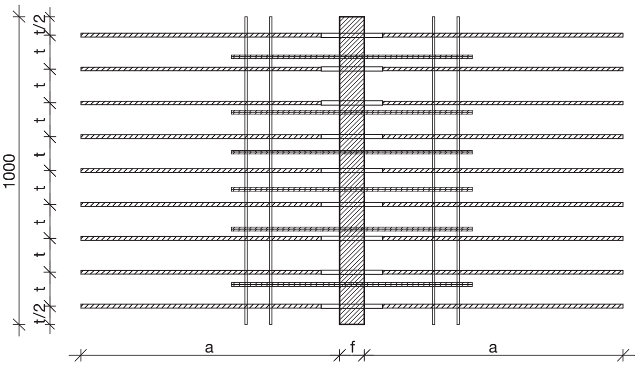
C20/25, c = 35 mm (BSt 500 S = ordinary steel), γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)

for changing moments and shear forces





Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

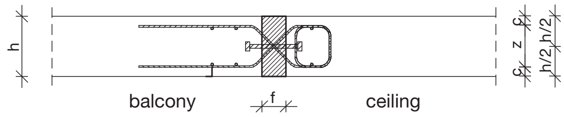
Egcobox type	Mz3 ± C30	Mz5 ± C30	Mz8 ± C30
connection height	design moment $M_{R,d}$ in kNm/m characteristic moment in kNm/m		
160 mm	± 26.0	± 34.6	± 51.9
	± 18.2	± 24.3	± 36.4
170 mm	± 28.9	± 38.6	± 57.9
	± 20.3	± 27.1	± 40.6
180 mm	± 31.9	± 42.6	± 63.9
	± 22.4	± 29.9	± 44.8
190 mm	± 34.8	± 46.6	± 69.9
	± 24.4	± 32.7	± 49.1
200 mm	± 37.8	± 50.6	± 76.0
	± 26.5	± 35.5	± 53.3
210 mm	± 40.7	± 54.7	± 82.0
	± 28.6	± 38.4	± 57.5
220 mm	± 43.7	± 58.7	± 88.0
	± 30.7	± 41.2	± 61.8
230 mm	± 46.6	± 62.7	± 94.1
	± 32.7	± 44.0	± 66.0
240 mm	± 49.6	± 66.7	± 100.1
	± 34.8	± 46.8	± 70.2
250 mm	± 52.5	± 70.7	± 106.1
	± 36.9	± 49.6	± 74.5
	design shear force $V_{R,d}$ in kN/m characteristic shear force in kN/m		
	± 46.4	± 46.4	± 46.4
	± 32.6	± 32.6	± 32.6
V1	± 77.4	± 77.4	± 77.4
	± 54.3	± 54.3	± 54.3
V2	± 120.8	± 120.8	± 120.8
	± 84.7	± 84.7	± 84.7
reinforcement			
element length [mm]	1000	1000	1000
tensile / pressure bars	2 x 6 Ø 12	2 x 6 Ø 14	2 x 9 Ø 14
length of tensile bars [mm]	1340	1520	2060
shear force bars	2 x 3 Ø 8	2 x 3 Ø 8	2 x 3 Ø 8
V1	2 x 5 Ø 8	2 x 5 Ø 8	2 x 5 Ø 8
V2	2 x 5 Ø 10	2 x 5 Ø 10	2 x 5 Ø 10

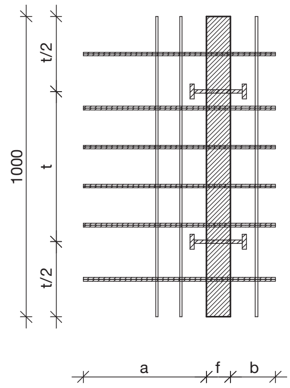
C20/25, c = 30 mm (BSt 500 S = ordinary steel), γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)

for changing shear forces





Egcobox design table

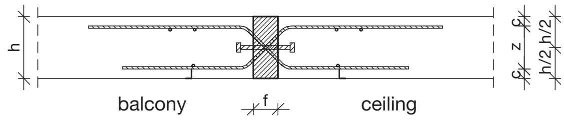
Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

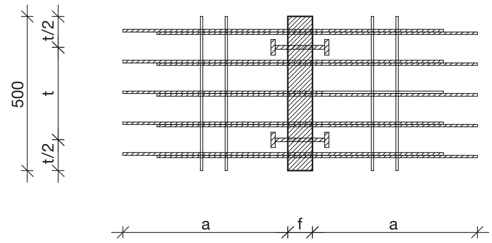
Egcobox type	Vz1-D±	Vz3-D±	Vz4-D±
	design shear force $V_{R,d}$ in kN/m characteristic shear force in kN/m		
160 - 250 mm	± 34.8 ± 24.4	± 52.2 ± 36.6	± 77.4 ± 54.3
reinforcement			
element length [mm]	1000	1000	1000
pressure elements	2 Ø 12	2 Ø 12	3 Ø 12
shear force bars	2 x 4 Ø 6	2 x 6 Ø 6	2 x 5 Ø 8
b [mm]	150	150	150

C20/25, c = 30 mm (BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 80 mm
(other measurements on request)





Egcobox design table

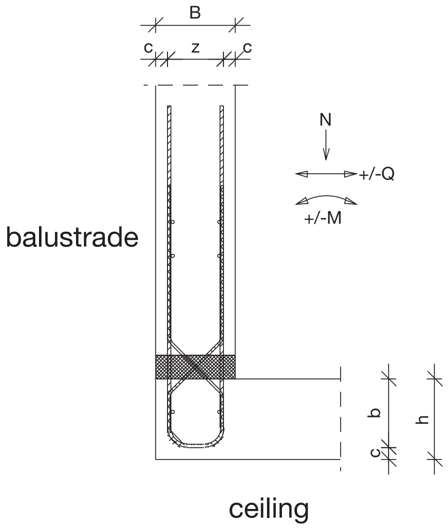
Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

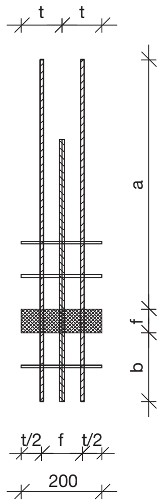
Egcobox type	Vz1-DK±	Vz2-DK±	Vz3-DK±	Vz4-DK±	Vz5-DK±	Vz6-DK±	Vz7-DK±	Vz8-DK±
	design shear force $V_{R,d}$ in kN/element characteristic shear force in kN/element							
160 - 250 mm	± 17.4 ± 12.2	± 30.9 ± 21.7	± 46.4 ± 32.6	± 77.4 ± 54.3	± 72.5 ± 50.9	± 133.2 ± 93.5	± 104.4 ± 73.3	± 208.7 ± 146.5
reinforcement								
element lenght [mm]	300	300	300	500	300	500	300	500
pressure elements	1 Ø 12	1 Ø 12	2 Ø 12	2 Ø 12	2 Ø 12	3 Ø 12	2 Ø 14	3 Ø 16
shear force bars	2 x 2 Ø 6	2 x 2 Ø 8	2 x 3 Ø 8	2 x 5 Ø 8	2 x 3 Ø 10	2 x 4 Ø 12	2 x 3 Ø 12	2 x 6 Ø 12

C20/25, c = 30 mm (BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 160 – 250 mm
thickness of
balustrade: B = 150 – 250 mm
joint width: f = 60 mm
(other measurements on request)





Egcobox design table

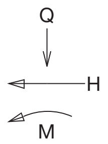
Insulation thickness 60 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

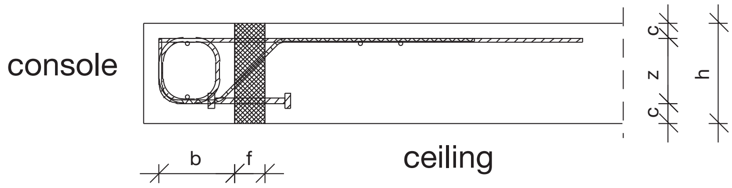
Egcobox type	A0	A1	A2
B	design moment $M_{R,d}$ in kNm/element characteristic moment in kNm/element		
160 mm	± 2.6 ± 1.8	± 4.4 ± 3.1	± 4.9 ± 3.4
170 mm	± 2.9 ± 2.0	± 4.9 ± 3.4	± 5.4 ± 3.8
180 mm	± 3.2 ± 2.2	± 5.4 ± 3.8	± 5.9 ± 4.1
190 mm	± 3.5 ± 2.5	± 5.8 ± 4.1	± 6.4 ± 4.5
200 mm	± 3.8 ± 2.7	± 6.3 ± 4.4	± 7.0 ± 4.9
210 mm	± 4.0 ± 2.8	± 6.8 ± 4.8	± 7.5 ± 5.3
220 mm	± 4.3 ± 3.0	± 7.3 ± 5.1	± 8.0 ± 5.6
230 mm	± 4.6 ± 3.2	± 7.7 ± 5.4	± 8.6 ± 6.0
240 mm	± 4.9 ± 3.4	± 8.2 ± 5.8	± 9.1 ± 6.4
250 mm	± 5.2 ± 3.6	± 8.7 ± 6.1	± 9.6 ± 6.7
	design shear force $V_{R,d}$ in kN/element charcateristic shear force in kN/element		
160 - 250 mm	± 8.7 ± 6.1	± 8.7 ± 6.1	± 17.4 ± 12.2
	design normal force $N_{R,d}$ in kN/element characteristic normal force in kN/element		
160 - 250 mm	± 20.0 ± 14.0	± 20.0 ± 14.0	± 10.0 ± 7.0
reinforcement			
element length [mm]	200	200	350
tensile/ pressure bars	± 2 ø 8 U-bars	± 3 ø 8 U-bars	± 3 ø 8 U-bars
shear force bars	± 1 ø 6 crossed bars	± 1 ø 6 crossed bars	± 2 ø 6 crossed bars
b [mm]	≥ 130	≥ 130	≥ 130

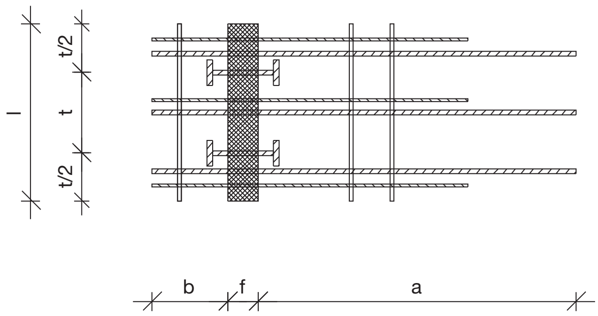
C20/25, c = 30 mm (BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 160 – 250 mm
joint width: f = 60 mm
(other measurements on request)







Egcobox design table

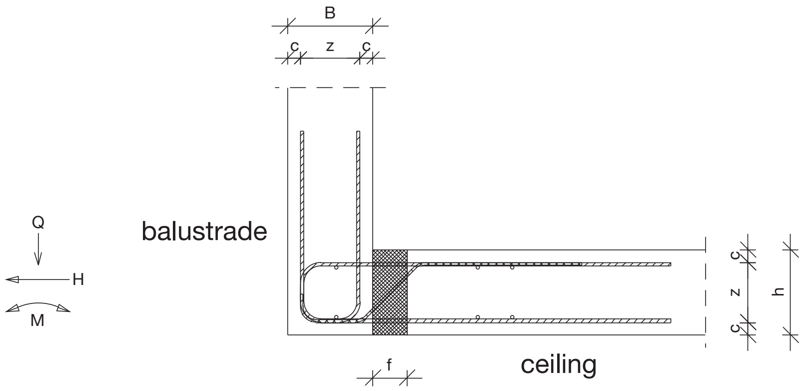
Insulation thickness 60 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

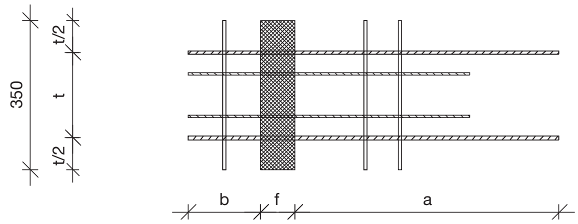
Egcobox type	O1	O2
h	design moment $M_{R,d}$ in kNm/element characteristic moment in kNm/element	
160 mm	3.9 2.7	9.6 6.7
170 mm	4.4 3.1	10.7 7.5
180 mm	4.8 3.4	11.8 8.3
190 mm	5.3 3.7	12.9 9.1
200 mm	5.8 4.1	14.0 9.8
210 mm	6.2 4.4	15.1 10.6
220 mm	6.7 4.7	16.2 11.4
230 mm	7.1 5.0	17.4 12.2
240 mm	7.6 5.3	18.5 13.0
250 mm	8.0 5.6	19.6 13.8
	design shear force $V_{R,d}$ in kN/element characteristic shear force in kN/element	
160 - 250 mm	26.1 18.3	26.1 18.3
	design horizontal force $H_{R,d}$ in kN/element characteristic horizontal force in kN/element	
160 - 250 mm	20.0 14.0	20.0 14.0
reinforcement		
element length [mm]	350	1000
tensile bars	3 Ø 8	6 Ø 8
pressure bars	2 Ø 10 (with pressure plates)	5 Ø 10 (with pressure plates)
shear force bars	3 Ø 6	3 Ø 6
b [mm]	≥ 125	≥ 125

C20/25, c = 30 mm (BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

Technical Value

slab thickness: h = 160 – 250 mm
thickness of
balustrade: B ≥ 130 mm
joint width: f = 60 mm
(other measurements on request)





Egcobox design table

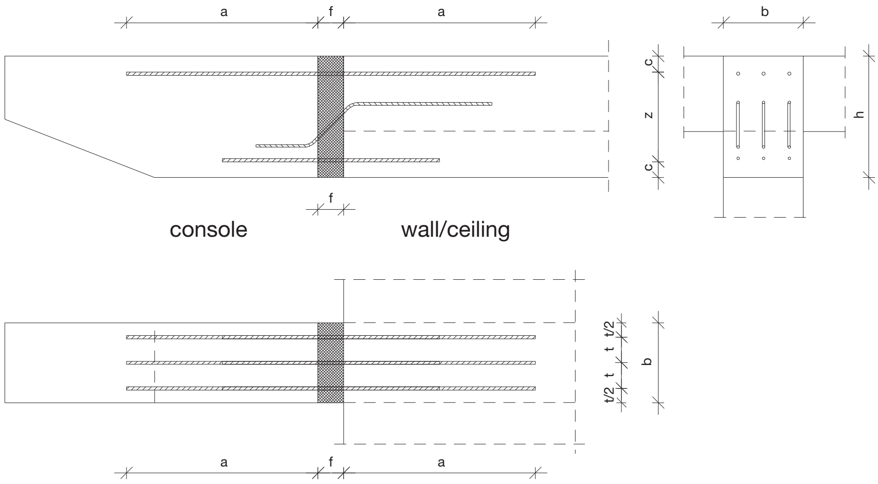
Insulation thickness 60 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

Egcobox type	F
connection height	design moment $M_{R,d}$ in kNm/element characteristic moment in kNm/element
160 mm	3.1 2.2
170 mm	3.4 2.4
180 mm	3.8 2.7
190 mm	4.1 2.9
200 mm	4.4 3.1
210 mm	4.8 3.4
220 mm	5.1 3.6
230 mm	5.4 3.8
240 mm	5.8 4.1
250 mm	6.1 4.3
	design shear force $V_{R,d}$ in kN/element characteristic shear force in kN/element
160 - 250 mm	17.4 12.2
	design horizontal force $H_{R,d}$ in kN/element characteristic horizontal force in kN/element
160 - 250 mm	10.0 7.0
reinforcement	
element length [mm]	350
tensile bars	2 Ø 8
pressure bars without pressure plates	2 Ø 8
shear force bars	2 Ø 6
b [mm]	≥ 100

Caution: To get the moment the smaller lever arm force (z) of the balustrade or ceiling should be taken.
C20/25, c = 30 mm (BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

Technical Values

slab thickness: h = 400 – 500 mm
joint width: f = 80 mm
(other measurements on request)



Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

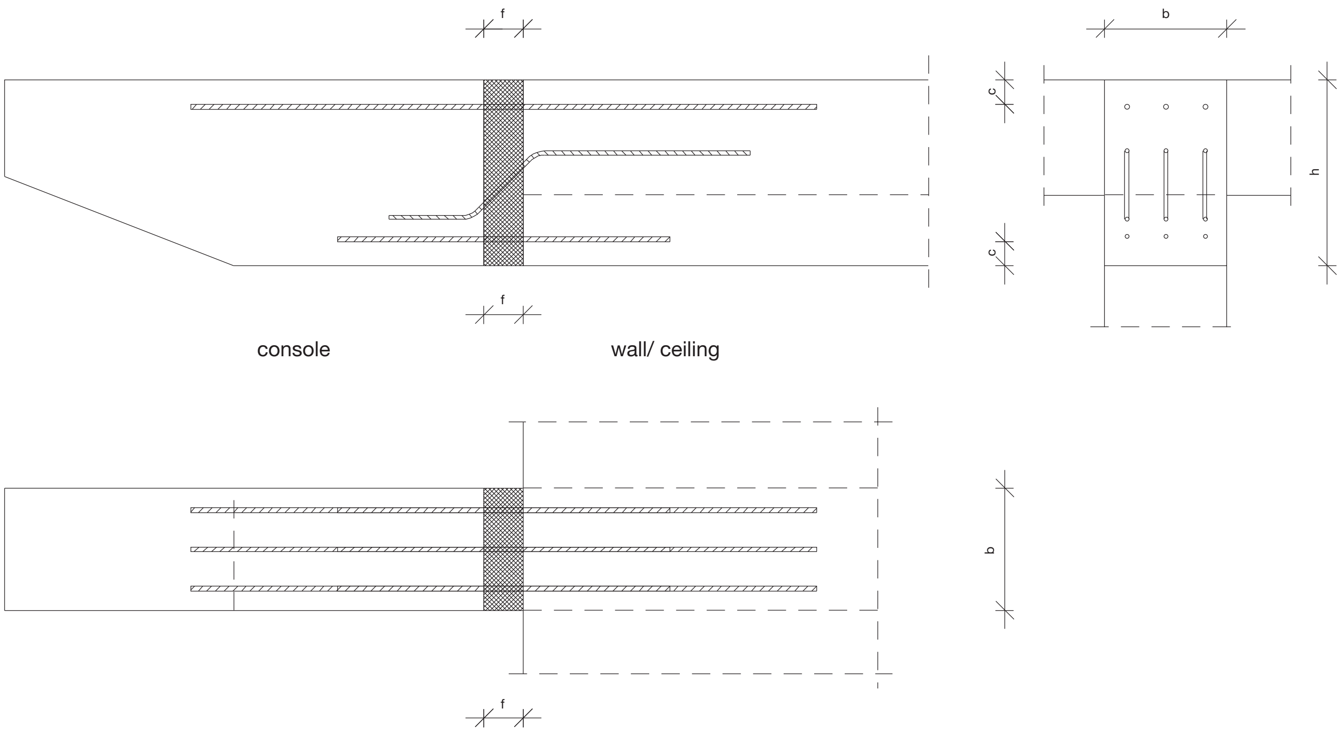
Egcobox type	S1	S2	S3	S4
	design moment $M_{R,d}$ in kNm/element characteristic moment in kNm/element			
400 mm	24.0 16.8	35.8 25.1	45.0 31.6	60.0 42.1
500 mm	31.5 22.1	47.1 33.1	59.2 41.5	78.9 55.4
	design shear force $V_{R,d}$ in kN/element characteristic shear force in kN/element			
400 - 500 mm	30.9 21.7	48.3 33.9	72.5 50.8	104.4 73.2
reinforcement				
element length [mm]	220	220	220	220
tensile bars	2 Ø 12	3 Ø 12	3 Ø 14	4 Ø 14
length of tensile bars [mm]	1940	1940	2070	2070
pressure bars without pressure plates	2 Ø 12	3 Ø 12	3 Ø 14	4 Ø 14
shear force bars	2 Ø 8	2 Ø 10	3 Ø 10	3 Ø 12

C20/25, c = 35 mm (BSt 500 S = ordinary steel), γ = 1.425 to get the characteristic static forces

Technical Values

Fax Transmission

joint width: f = 80 mm



Please complete your requirements and static forces in the table below

M	=		[kNm]	h	=		[mm]
V	=		[kN]	b	=		[mm]
N	=		[kN]	c	=		[mm]

☐ **enquiry** ☐ **order** ☐ **date:** ______________

Company/Contact: ______________

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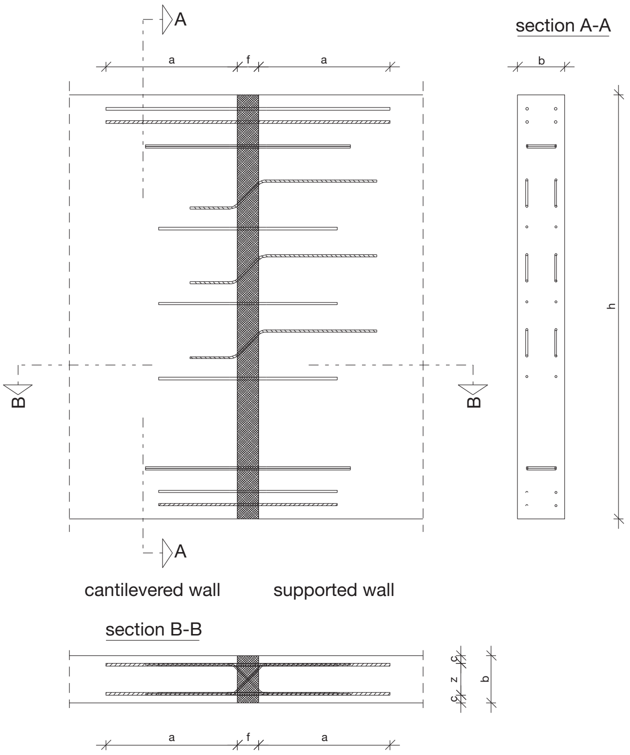
Technical Value

connection height h = 1500 – 2500 mm
connection width b = 150 – 250 mm
joint width: f = 80 mm
(other measurements on request)



Egcobox design table

Insulation thickness 80 mm Polystyrene, other thicknesses and materials i. e. rockwool or foamglass available on request

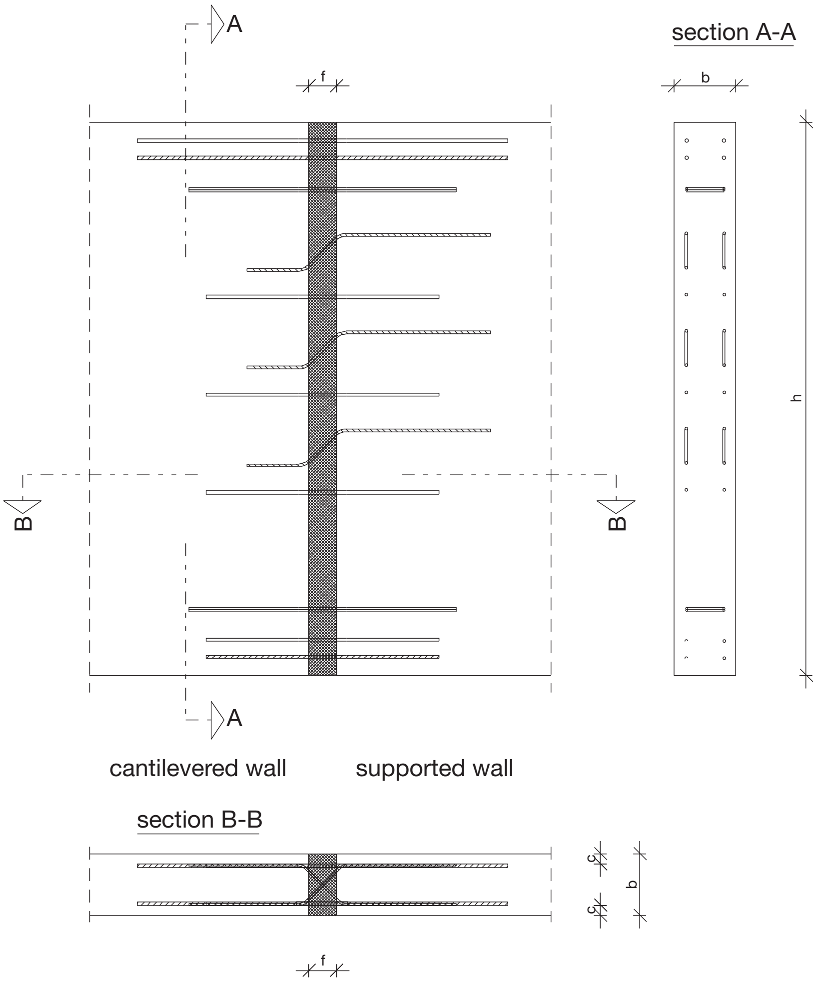
Egcobox type	W1	W2	W3	W4
	design moment $M_{R,d}$ in kNm/element characteristic moment in kNm/element			
1500 mm	127,8 89,7	235,6 165,3	336,6 236,2	260,0 182,5
2000 mm	168,1 118,0	303,9 217,5	453,0 317,9	350,0 245,6
2500 mm	214,8 150,7	395,9 277,8	586,2 411,4	452,9 317,8
	design shear force vertikal $V_{R,dV}$ in kN/element characteristic shear force in kN/element			
1500 - 2500 mm	61.9 43.4	96.6 67.8	144.9 101.7	208.7 146.5
	design shear force horizontal $V_{R,dH}$ in kN/element characteristic shear force in kN/element			
1500 - 2500 mm	± 17.4 ± 12.2	± 17.4 ± 12.2	± 17.4 ± 12.2	± 17.4 ± 12.2
reinforcement				
element height [mm]	200 - 250	200 - 250	200 - 250	200 - 250
tensile bars	4 Ø 10	4 Ø 12	6 Ø 12	6 Ø 12
length of tensile bars [mm]	1460	1780	1780	1780
pressure bars	6 Ø 10	6 Ø 12	9 Ø 12	9 Ø 12
shear force bars	4 Ø 8	4 Ø 10	6 Ø 10	6 Ø 12
shear force bars horizontal	2 x 2 Ø 6	2 x 2 Ø 6	2 x 2 Ø 6	2 x 2 Ø 6

C20/25, c = 50 mm (BSt 500 S = ordinary steel, BSt 500 NR = stainless steel), γ = 1.425 to get the characteristic static forces

Technical values and design tables for heat insulated wall connections

Fax transmission

connection height: f = 80 mm
(other measurements on request)



Please complete your requirements and static forces in the table below:

M	=		[kNm]	h	=		[mm]
V	=		[kN]	b	=		[mm]
N	=		[kN]	c	=		[mm]

☐ **enquiry** ☐ **order** ☐ **date:** ____________

Company/Contact: ____________

Phone: ____________

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Banking of cantilever

A banking is recommendable for large cantilevers.
This can be established i.e. for the load case with 100 % of the dead loads and 30 – 50 % of the maximum live loads.

The following tables are given to make it easier to get the deflection caused by the cantilever connection system.

The deflection is calculated in mm.

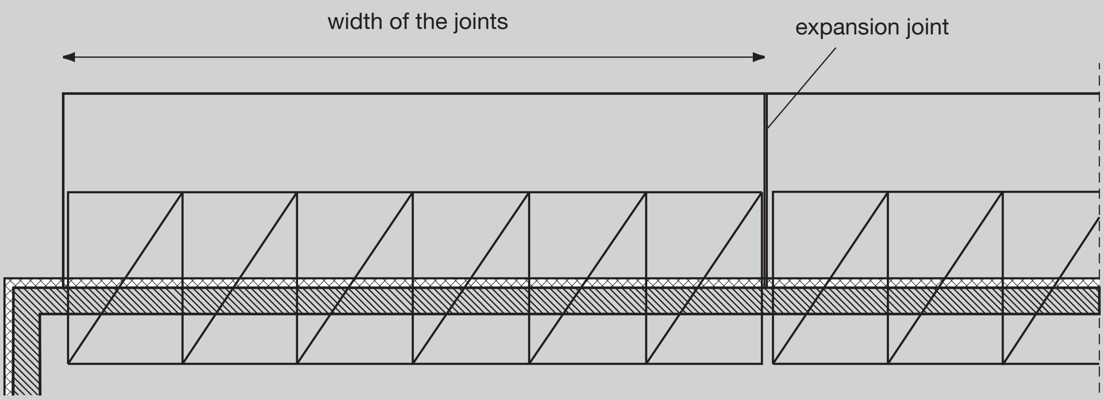
Egcobox type	Mz1-D	Mz2-D	Mz3-D	Mz4-D	Mz5-D	Mz6-D	Mz7-D	Mz8-D	Mz9-D
connection height									
160 mm	1.31	0.95	0.68	0.59	0.56	0.48	0.42	0.34	0.32
170 mm	1.06	0.76	0.54	0.46	0.44	0.37	0.33	0.27	0.25
180 mm	0.87	0.62	0.43	0.37	0.35	0.30	0.26	0.22	0.20
190 mm	0.73	0.52	0.36	0.31	0.29	0.25	0.22	0.18	0.17
200 mm	0.62	0.44	0.30	0.26	0.24	0.21	0.18	0.15	0.14
210 mm	0.53	0.37	0.26	0.22	0.21	0.18	0.15	0.13	0.12
220 mm	0.46	0.32	0.22	0.19	0.18	0.15	0.13	0.11	0.10
230 mm	0.40	0.28	0.19	0.17	0.16	0.13	0.12	0.10	0.09
240 mm	0.36	0.25	0.17	0.14	0.14	0.12	0.10	0.08	0.08
250 mm	0.32	0.22	0.15	0.13	0.12	0.10	0.09	0.07	0.07

banking factor k in [1/kN]
calculation of the deflection f in [mm] of the cantilever connection system based on the actual moment M

deflection f [mm] = M [kNm/m] x banking factor k [1/kN] x length of cantilever [m]

Acceptable gaps between the expansion joints

Egcobox type	Mz1-D	Mz2-D	Mz3-D	Mz4-D	Mz5-D	Mz6-D	Mz7-D	Mz8-D	Mz9-D
thickness of the insulation joint									
60 mm	7.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
≥ 80 mm	13.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0



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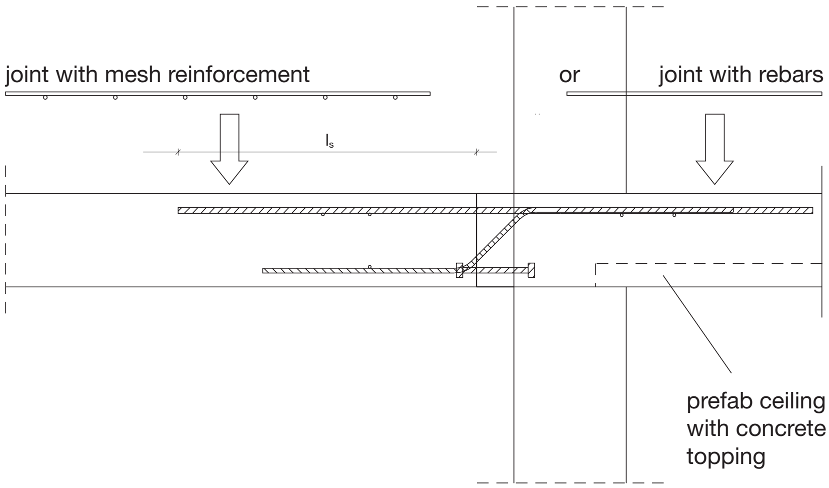
Instruction and installation details

- Both straight rebars and steel mesh are possible as starter bars.
- l_s has to be used for the lap length of the tensile bars.
  It is recommended to continue with the same reinforcement installed in the connection system.
- Edge reinforcement to the valid guidelines has to be installed at the butt end.
- Stirrups with at least diameter ds ≥ 6 mm, spacing s ≤ 250 mm respectively analogue to shear force reinforcement installed in the element and 2 longitudinal bars have to be installed at the butt end.



Banking of the cantilever

The deflection f on the edge of the cantilever caused by the connection system can be established with the table on page 32.
To take also the deflection caused by the expansion of the steel and the creep of concrete into account a banking of 15 to 20 mm is recommended for usual (1.5 – 2.0 m) cantilevers.

Length in-between

The lengths of the elements are given in the design tables. When installing the elements commence with the corner elements - if used (it is not allowed to cut these elements). Thereafter the normal elements can be installed, one next to the other until the required length is reached. Lengths in-between can be cut on site.

Expansion joint

If there is no additional reinforcement on site for limitation of cracks, expansion joints should be installed. The gaps between the expansions joints are dependant upon the elements and can be found in the table on page 32.

Technical support

Our engineers will find an optimal and economic solution for your needs. The preparation of the static records incl. the element drawings are free of charge.

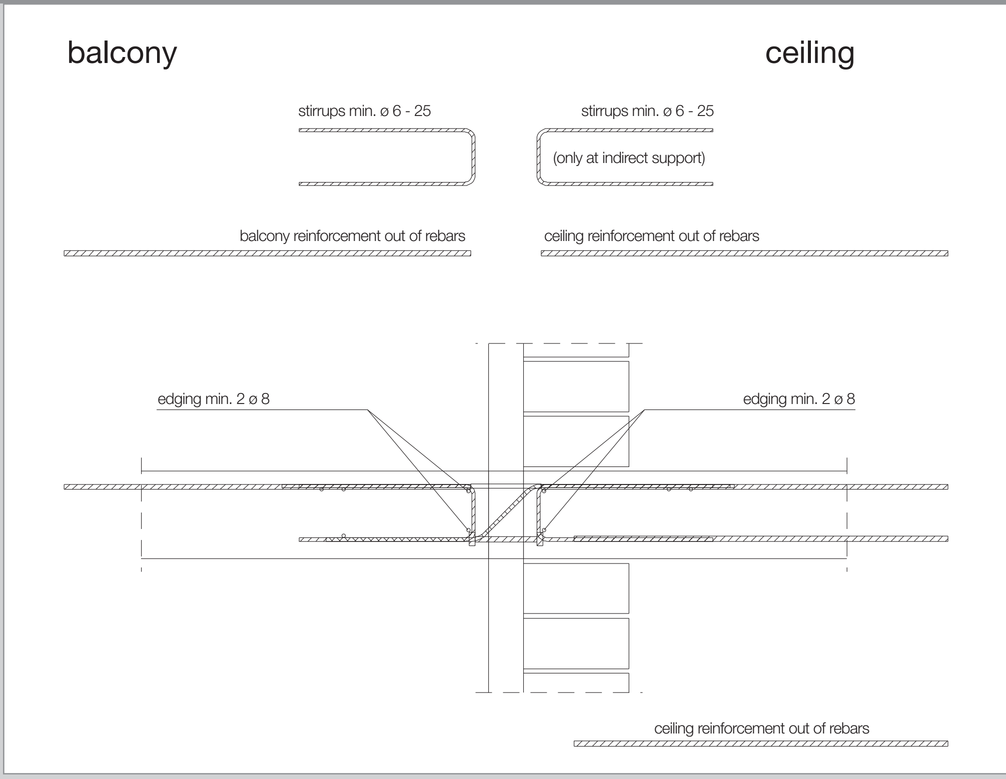
Custom products

In co-operation with our application technology special elements up to your requirements can be created with the following values:

- Thickness and height of the insulation
- Material of the insulation
- Centres and diameters of the reinforcement
- Static height
- Element length
- Special shapes etc.

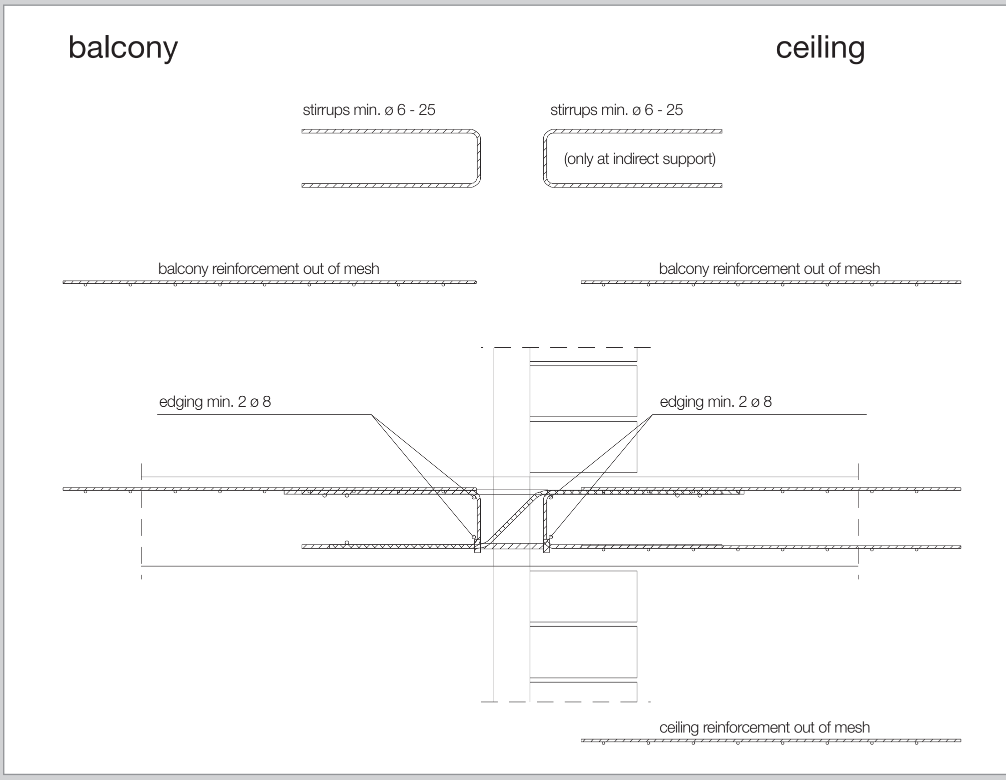
Installation

When installing the elements the right orientation has to be ensured. The elements are specially marked with arrows.



Starter bars with straight rebars

The elements are installed continuously and positioned onto the formwork before the lower reinforcement is installed.



Starter bars with steel mesh

Install the elements after the installation of lower reinforcement.

Photos: Max FRANK

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Castlelakes, Ireland

Amfiteater
Zilina, Slovakia

Project Bolzaneto
Genova, Italy

Grojecka
Warsaw, Poland

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