BUILDING COMMON GROUND MAX FRANK®

ICC-ES Evaluation Report

Egcobox®

Egcobox® M / V / MM±

Load bearing thermal insulating elements which form a thermal break between balconies and internal floor

ICC: ESR-5212 | December 2023

tested by: ICC EVALUATION SERVICE®

ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-5212

Issued December 2023

Subject to renewal December 2024

DIVISION: 03 00 00 — CONCRETE **Section: 03 15 00 — Concrete Accessories**	**REPORT HOLDER: MAX FRANK GmbH & Co. KG** BUILDING COMMON GROUND MAX FRANK	**EVALUATION SUBJECT: EGCOBOX**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018 and 2015 *International Building Code*® (IBC)
- 2021, 2018 and 2015 *International Residential Code*® (IRC)

Property evaluated:

- Structural
- Fire resistance

2.0 USES

The Egcobox is a load bearing assembly used as a thermal break to minimize thermal bridging when connecting external reinforced concrete slabs to internal reinforced concrete slabs. The Egcobox Type V is intended to transfer shear forces. The Egcobox Type M is intended to transfer bending moments, or a combination of bending moments and shear forces.

3.0 DESCRIPTION

3.1 General:

The Egcobox is an assembly composed of reinforcing bars and an insulating layer of mineral wool with thickness of 80 mm (3.15 inch specified with an additional M) or 120 mm (4.72 inch specified with an addition XL). A plastic cover in the upper and lower part is installed for avoiding the mineral wool to be exposed to external elements. The Egcobox type depends on internal forces to be transferred through the joint and is intended for connecting reinforced concrete slabs. The Egcobox transmits forces to the adjacent concrete slab by reinforcing bars bonding and concrete surface pressure. It also can be used for transmitting loads at height offsets.

3.2 Egcobox Types V, V±, M and M±.

The Egcobox is available in four different types:

3.2.1 Egcobox Type V: Type V is used to resist shear forces in one direction. Type V consists of steel shear reinforcing bars and the compression reinforcing bars with a transverse set-on steel end plate. The steel shear reinforcing bars are embedded in the concrete and pass through the insulation layer and the compression reinforcing bars bear against the concrete outside of the insulation layer. See Figure 1A for depictions of Egcobox Type V. Shear reinforcing bars shape can be loop-ended or z-shaped as shown in Figure 2A and 2B, respectively. Egcobox Type V are available in two options VM and VXL.

3.2.2 Egcobox Type V±: Type V± is used to resist shear forces in both directions. Type V± consists of steel shear reinforcing bars and the compression reinforcing bars with a transverse set-on steel end plate. The steel shear reinforcing bars are embedded in the concrete and pass through the insulation layer and the compression reinforcing bars bear against the concrete outside of the insulation layer. See Figure 1B for depictions of Egcobox Type V±. Egcobox Type V± are available in two options VM± and VXL±.

3.2.3 Egcobox Type M: Type M is used to resist negative bending moments and shear forces in one direction. Type M consists of steel tension reinforcing bars, steel shear reinforcing bars and the compression reinforcing bars with a transverse set-on steel end plate. The tension and shear steel reinforcing bars are embedded in the concrete and pass through the insulation layer. The compression reinforcing bars bear against the concrete outside of the insulation layer. See Figure 1C for depictions of Egcobox Type M. Egcobox Type M are available in two options MM and MXL.

3.2.4 Egcobox Type M±: Type M± is used to resist positive and negative bending moments and shear forces in both directions. Type M± consists of steel tension reinforcing bars, steel shear reinforcing bars and the compression reinforcing bars. The tension, compression and shear steel reinforcing bars are embedded in the concrete and pass through the insulation layer. See Figure 1D for depictions of Egcobox Type M±. Egcobox Type M± are available in two options MM± and MXL±.

3.3 Materials

The Egcobox consist of the following materials:

3.3.1 Steel Reinforcing Bars:

Tension and compression reinforcing bars consist of either a stainless steel bar or a stainless steel bar factory-welded on each end to a carbon steel bar. The stainless steel portion of the factory-welded bar is located in the insulating layer with a minimum length of 100 mm (3.94 in.) extending on each side of the insulation layer. See Figure 3A, 3B, 5A, 5B and 5C for depictions of tension and compression reinforcing bar configurations, and Table 1, Table 3, Table 4 and Figure 6 for requirements of tension and compression reinforcing bars.

Shear reinforcing bars consist of either a stainless steel bar or a stainless steel bar factory-welded on each end to a carbon steel bar. The stainless steel portion of the factory-welded bar is located in the insulating layerwith a minimum length of 100 mm (3.94 in.) extending on each side of the insulation layer. See Figure 4A and 4B for depictions of shear reinforcing bar configurations, and Table 2, Table 4 and Figure 6 for requirements of shear reinforcing bars.

Compression reinforcing bars either consist of stainless steel bar welded to a steel end plate on each end or a straight bar end.

3.3.1.1 Stainless Steel Bars:

Stainless steel bars comply with EN10088-1, material no.1.4362 or 1.4482 or equivalent ASTM A955 having a minimum yield strength of 700 N/mm² (101,526 psi) or stainless steel Grade S690 having a minimum yield strength of 690 N/mm² (100,080 psi).

Stainless steel transverse set-on steel end plate complies with EN10088-1 S235 or equivalent ASTM A955 having a minimum yield strength of 235 N/mm² (34,084 psi).

3.3.1.2 Carbon Steel Bars:

Carbon steel bars comply with DIN-488-1 B500B or equivalent ASTM A615 / A706 having a minimum yield strength of 500 N/mm² (72,520 psi).

3.3.1.3 Welded Bar Connections:

Factory-welded bar connections are flash butt-welded using process 24 according to EN ISO 17660-1 and comply with AWS D1.4/D1.4M *Structural Welding Code-Reinforcing Steel* and Section 1705.3.1 of the IBC.

3.3.2 Thermal insulation material:

Thermal insulation material consists of mineral wool according to EN 13162 with CE mark, classified as Euro Class A1 according to EN 13501-1. The mineral wool insulation has a smoke-developed index of 450 or less and a flame spread index of 25 or less, based on testing in accordance with ASTM E84.

3.3.3 Plastic cover

The function of the plastic cover is to protect the insulation element from damage. The plastic cover does not contribute to the load bearing capacity of the load bearing element.

3.4 Concrete

The Egcobox must be used with normal-weight concrete complying with ACI 318 and having a minimum compressive strength, f'_c, of 20 N/mm² (2900 psi).

4.0 DESIGN AND INSTALLATION

4.1 Design: Design of reinforced concrete floor slabs and reinforced concrete balconies must comply with ACI 318.

Structural analysis of the Egcobox must be performed using strut and tie models according to Figures 7A, 7B, 7C, 7D and 7E. Design calculations for controlling limit states including bending moment, shear, tension in steel reinforcing bars, concrete edge failure and bearing resistance must be in accordance with Table 4, Table 5, and Figure 6.

Design calculations for bending deformations and rotation of Egcobox joints must be calculated in accordance with procedures in Table 6.

4.2 Installation: Egcobox must be installed in accordance with this evaluation report and the manufacturer's installation instructions. If there is a conflict, this evaluation report governs. IBC code requirements for special inspection of reinforcement including Section 1705.1.1, Section 1705.3.1 and Table 1705.3 of the IBC must be followed. See Figure 8 for manufacturer's installation instructions.

4.3 Fire resistance: The Egcobox assemblies installed with minimum concrete slab thickness of 160 mm (6.3 in.) achieve a 2-hour fire-resistance-rated construction based on fire testing in conformance with EN 13501-2, EN 1365-2 and ASTM E119.

5.0 CONDITIONS OF USE

The Egcobox described in this report comply with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Design of reinforced concrete floor slabs and balconies must comply with ACI 318 and the applicable code.

5.2 Design and installation of the Egcobox must be in accordance with this evaluation report and the manufacturer's installation instructions. If there is a conflict, the most restrictive governs.

5.3 Project site special inspection must conform to Section 1705.1.1, Section 1705.3.1 and Table 1705.3 of the IBC and applicable portions of ACI 318 as noted in Table 1705.3 of the IBC.

5.4 The Egcobox may be used in structures assigned to Seismic Design Categories (SDC) A – F.

5.5 Dynamic actions causing fatigue are outside the scope of this evaluation report.

5.6 Thermal resistance is outside the scope of this evaluation report.

5.7 Impact sound insulation properties are outside the scope of this evaluation report.

5.8 Construction documents prepared or reviewed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed specifying the Egcobox must indicate compliance with this evaluation report and applicable codes and must be submitted to the code official for approval.

6.0 EVIDENCE SUBMITTED

Data in accordance with ICC-ES Acceptance Criteria for Load Bearing Thermal Break Assemblies Installed Between Concrete Balconies and Concrete Floors (AC464), dated June 2017 and editorially revised February 2023.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5212) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 In addition, the Egcobox types are identified with the product name, the size of the insulation layer, the moment bearing load level, the shear force bearing load level, the concrete cover, the height of the connecting element, the fire resistance rating and the insulation material (SW for mineral wool).

7.3 The report holder's contact information is the following:

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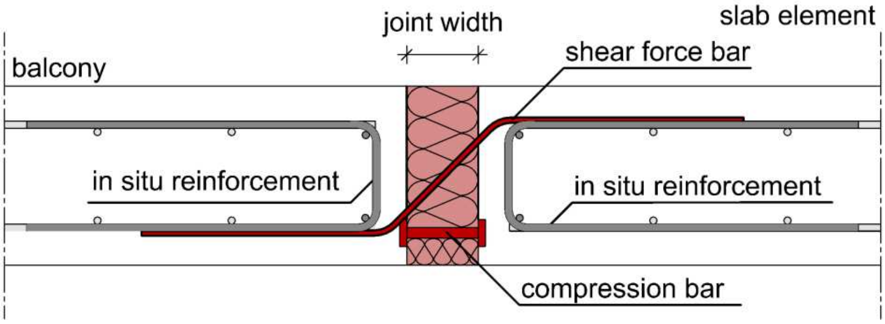


FIGURE 1A—EGCOBOX TYPE V

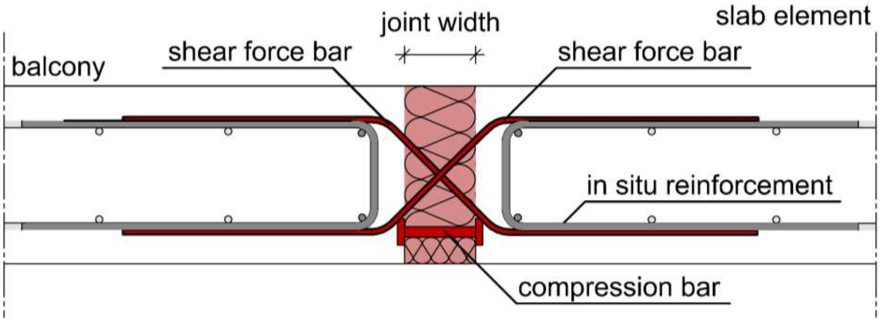


FIGURE 1B—EGCOBOX TYPE V ±

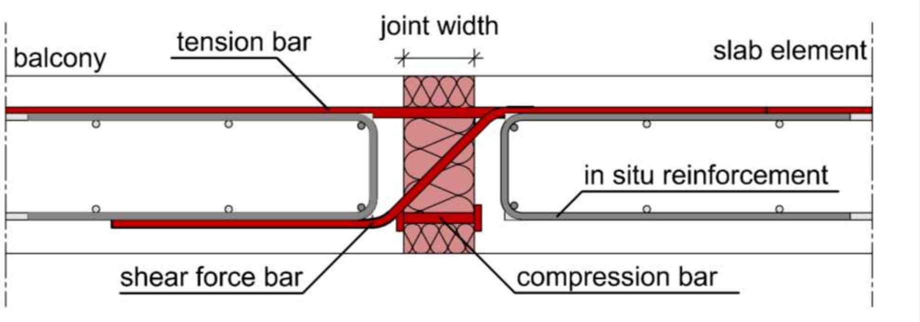


FIGURE 1C—EGCOBOX TYPE M

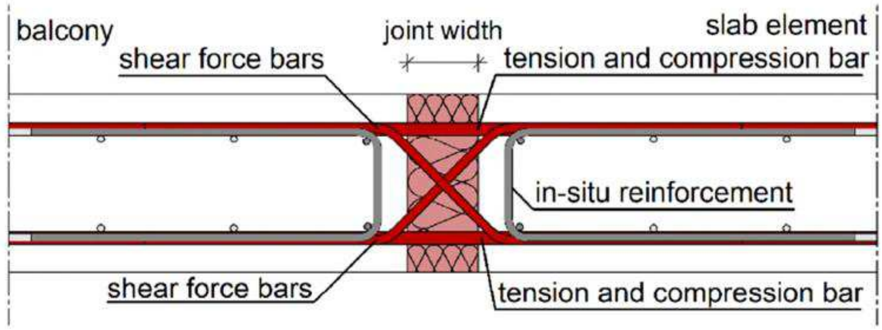


FIGURE 1D—EGCOBOX TYPE M±

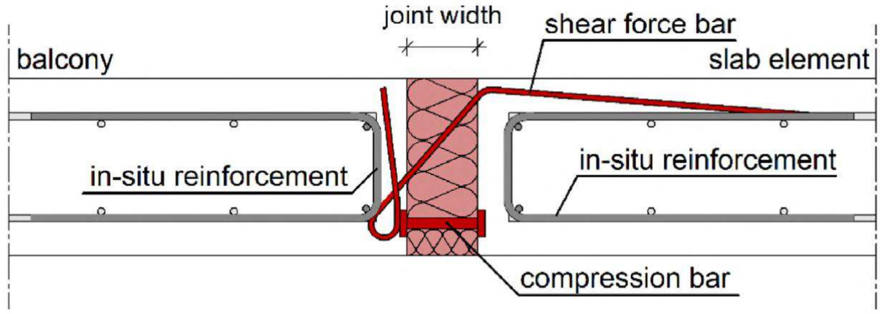


FIGURE 2A—EGCOBOX TYPE V – SHEAR FORCE BAR WITH LOOP

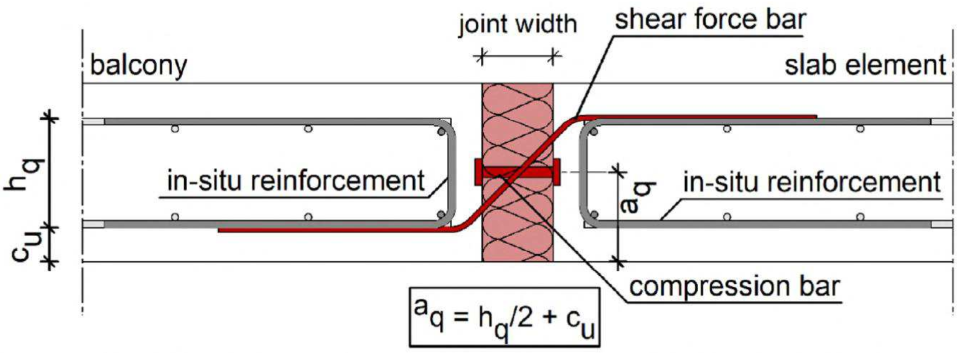


FIGURE 2B— SHEAR FORCE CONNECTION WITH CENTRAL COMPRESSION BEARING

TABLE 1 — TENSION REINFORCEMENT SPECIFICATIONS

1. Tension reinforcement The tension reinforcement is made of bars in stainless steel that extends at least 100 mm (3.94 inches) at both ends in the adjacent concrete which may be butt welded at the ends to common reinforcing steel bars.		
Diameter	6 ≤ Ø ≤ 20 mm	(0.24 inches) ≤ Ø ≤ (0.79 inches)
Number per meter	n ≥ 2 / meter (h ≤ 300 mm) n ≥ 4 / meter (h > 300 mm)	(h ≤ 11.81 inches) (h > 11.81 inches)
Axial edge distance	$s_{Z,r}$ ≥ 50 mm	($s_{Z,r}$ ≥ 1.97 inches)
Axial distance	$s_{Z,i}$ ≥ 20 mm + Ø	($s_{Z,i}$ ≥ 0.79 inches + Ø)

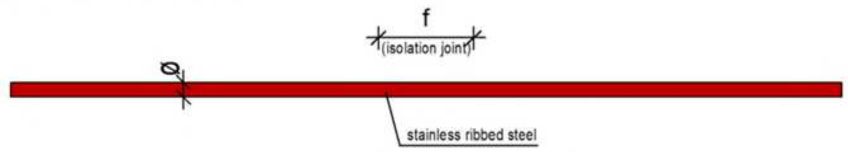


FIGURE 3A—TENSION BAR VERSION 1 - STAINLESS STEEL

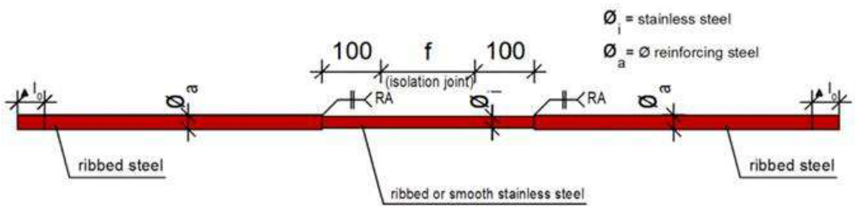


FIGURE 3B— TENSION BAR VERSION 2 – WELDED STAINLESS STEEL AND CARBON SEEL

TABLE 2 — SHEAR REINFORCEMENT SPECIFICATIONS

2. Shear force reinforcement

The shear force reinforcement is either made of bars in stainless steel along its entire length or butt welded to common reinforcing steel.

$R_{e,nom}$ = 500 MPa (72,518 psi)		
Diameter	6 ≤ Ø ≤ 14 mm	(0.24 inches) ≤ Ø ≤ (0.55 inches)
Number per meter	n ≥ 2 / meter (h ≤ 300 mm) n ≥ 4 / meter (h > 300 mm)	
Axial edge distance/Axial distance	$s_{Q,r}/s_{Q,i}$ ≥ 6 Ø (6 < Ø ≤ 12 mm)	($s_{Q,r}/s_{Q,i}$ ≥ 6 Ø (0.24 inches) ≤ Ø ≤ (0.47 inches))
Axial edge distance/Axial distance	$s_{Q,r}/s_{Q,i}$ ≥ 7 Ø (Ø ≤ 14 mm)	($s_{Q,r}/s_{Q,i}$ ≥ 7 Ø (Ø ≤ 0.55 inches))
Mandrel diameter	D ≥ 6 Ø (6 < Ø ≤ 12 mm) D ≥ 10 Ø (Ø ≤ 14 mm)	(D ≥ 6 Ø (6 < Ø ≤ 0.47 inches) (D ≥ 10 Ø (Ø ≤ 0.55 inches)
Bends start point	2 Ø inside the concrete	
Inclination	30° ≤ α ≤ 60°	

$R_{e,nom}$ = 700 MPa (101,526 psi)		
Diameter	6 ≤ Ø ≤ 10 mm	(0.24 inches) ≤ Ø ≤ (0.39 inches)
Number per meter	n ≥ 2 / meter (h ≤ 300 mm) n ≥ 4 / meter (h > 300 mm)	
Axial edge distance/Axial distance	$s_{Q,r}/s_{Q,i}$ ≥ 48 mm (Ø = 6 mm)	($s_{Q,r}/s_{Q,i}$ ≥ 1.98 inches) (Ø = 0.24 inch)
Axial edge distance/Axial distance	$s_{Q,r}/s_{Q,i}$ ≥ 60 mm (Ø = 8 mm)	($s_{Q,r}/s_{Q,i}$ ≥ 2.36 inches) (Ø = 0.31 inch)
Axial edge distance/Axial distance	$s_{Q,r}/s_{Q,i}$ ≥ 72 mm (Ø = 10 mm)	($s_{Q,r}/s_{Q,i}$ ≥ 2.83 inches) (Ø = 0.39 inch)
Mandrel diameter	D ≥ 6 Ø	(D ≥ 6 Ø)
Bends start point	2 Ø inside the concrete	
Inclination	30° ≤ α ≤ 60°	

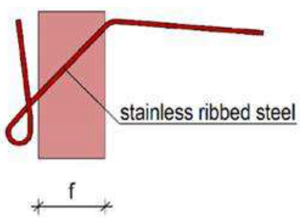


FIGURE 4A—SHEAR FORCE BAR VERSION 1 - STAINLESS STEEL LOOP

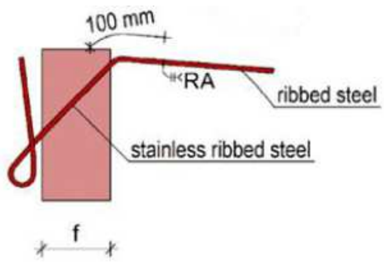


FIGURE 4B—SHEAR FORCE BAR VERSION 2 – BUTT - WELDED LOOP

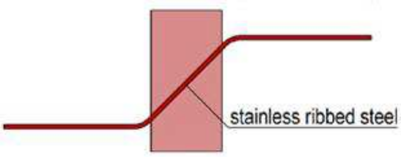


FIGURE 4C—SHEAR FORCE BAR VERSION 3 - STAINLESS STEEL Z-SHAPED

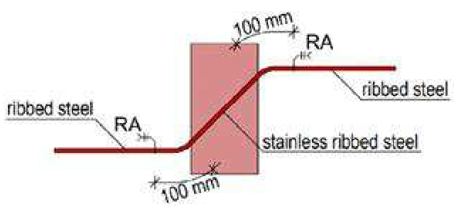


FIGURE 4D—SHEAR FORCE BAR VERSION 4 - BUTT - WELDED Z-SHAPED

TABLE 3 — COMPRESION REINFORCEMENT SPECIFICATIONS

3. Compression bar in stainless steel with a transverse set-on steel end plate or straight bar end. The compression bars are either made of stainless steel along its entire length with a transverse set-on stainless steel end plate or anchored by bond as a straight bar which may be butt welded at the ends to common reinforcing steel bars.		
Diameter	6 ≤ Ø ≤ 20 mm	(0.24 inch) ≤ Ø ≤ (0.79 inch)
Steel plate welded to compression bar.		
length/width/thickness	35/35/8 mm	(1.38/1.38/0.31 inches)
Number per meter	n ≥ 2 / meter (h ≤ 300 mm) n ≥ 4 / meter(h > 300 mm)	(h ≤ 11.81 inches) (h > 11.81 inches)
Axial edge distance	$s_{D,r} \geq 50$ mm	($s_{D,r} \geq 1.97$ inches)
Axial distance	$s_{D,i} \geq 80$ mm	($s_{D,i} \geq 3.15$ inches)

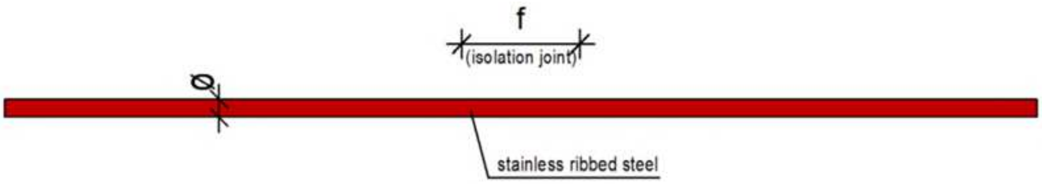


FIGURE 5A—COMPRESSION BAR VERSION 1 - STAINLESS STEEL

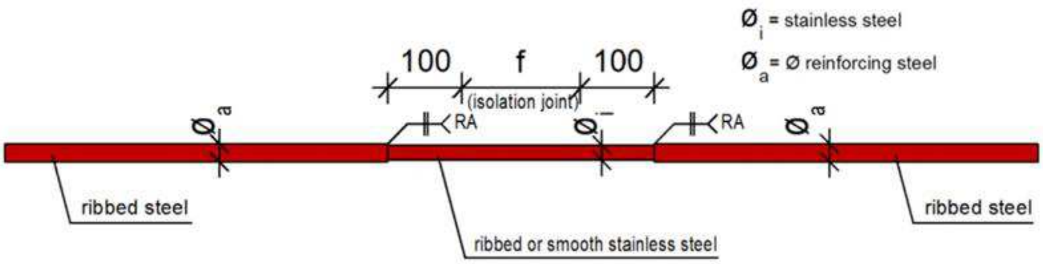


FIGURE 5B—COMPRESSION BAR VERSION 2 – WELDED STAINLESS STEEL AND CARBON SEEL

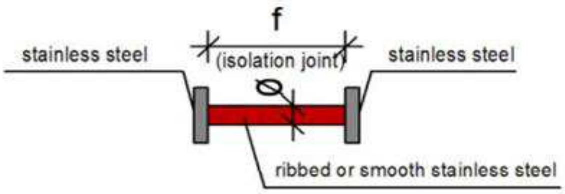


FIGURE 5C—COMPRESSION BAR VERSION 5 – STAINLESS STEEL WITH COMPRESSION PLATES ON BOTH SIDES

TABLE 4 — GEOMETRIC BOUNDARY CONDITIONS

bar type	bar diameter ø	maximum axial distance $s_{Z,i}$ / $s_{D,i}$ / $s_{Q,i}$	minimum axial distance $s_{Z,i}$ / $s_{D,i}$ / $s_{Q,i}$	minimum axial edge distance $s_{Z,r}$ / $s_{D,r}$ / $s_{Q,r}$	min. number per meter of connec-tor	$c_{u,Qk}$	$c_{o,Qk}$
[-]	[mm] ([in])	[mm] ([in])	[mm] ([in])	[mm] ([in])	[ ]	[mm] ([in])	
tension bars	6 – 20 (0.24 - 0.79)	500 (h ≤ 300 mm) 250 (h > 300 mm) (19.69 (h ≤ 11.81)) (9.84 (h > 11.81))	20 + ø (0.79 + ø)	50 (1.97)	4	acc.to ACI 318	
shear force bars f_{yk} = 500 N/mm²	6 (0.24)	500 (h ≤ 300 mm) 250 (h > 300 mm) (19.69 (h ≤ 11.81)) (9.84 (h > 11.81))	36 (1.42)	36 (1.42)	4	17,5 (0.69)	10 (0.39)
	8 (0.32)		48 (1.89)	48 (1.89)			
	10 (0.39)		60 (2.36)	60 (2.36)			
	12 (0.47)		72 (2.83)	72 (2.83)			
	14 (0.55)		98 (3.86)	98 (3.86)			
shear force bars f_{yk} = 700 N/mm²	6 (0.24)	500 (h ≤ 300 mm) 250 (h > 300 mm) (19.69 (h ≤ 11.81)) (9.84 (h > 11.81))	48 (1.89)	48 (1.89)	4	17,5 (0.69)	10 (0.39)
	8 (0.32)		60 (2.36)	60 (2.36)			
	10 (0.39)		72 (2.83)	72 (2.83)			
compression bearing	6 – 20 (0.24 - 0.79)	500 (h ≤ 300 mm) 250 (h > 300 mm) (19.69 (h ≤ 11.81)) (9.84 (h > 11.81))	80 (3.15)	50 (1.97)	4	17,5 (0.69)	/

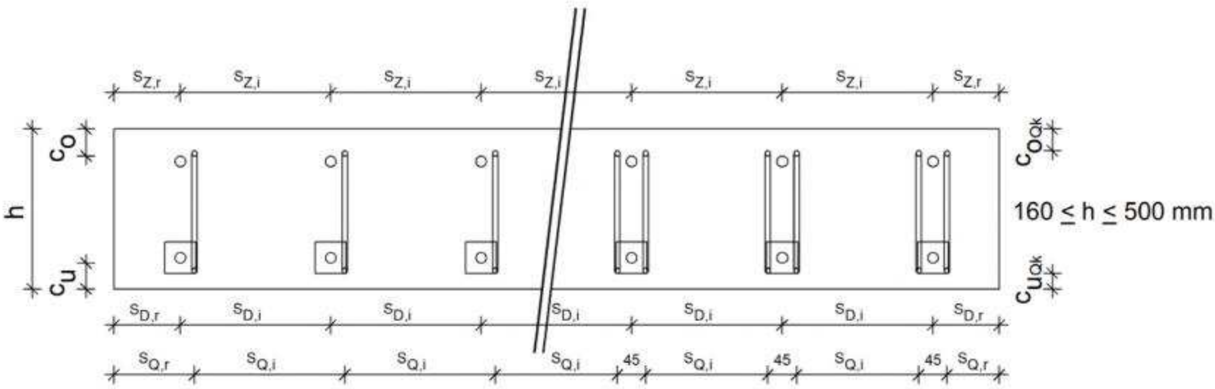


FIGURE 6— GEOMETRIC BOUNDARY CONDITIONS

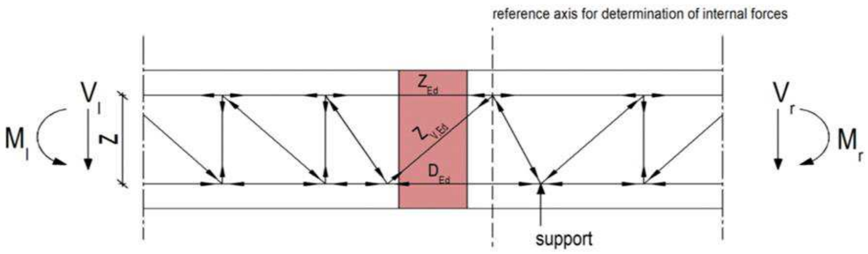


FIGURE 7A—EGCOBOX TYPE M- MOMENT AND SHEAR FORCE CONNECTION – STATIC SYSTEM

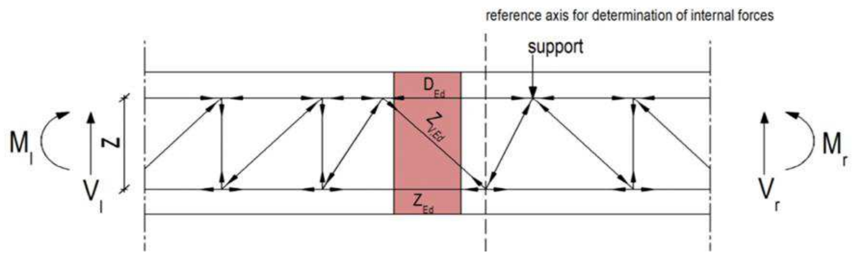


FIGURE 7B—EGCOBOX TYPE M±- MOMENT AND SHEAR FORCE CONNECTION – STATIC SYSTEM FOR LIFTING MOMENTS AND SHEAR FORCES

Note for figures 7A and 7B:

Egcobox type M and M± inner forces:

$$D_{Ed} = M / z_E$$
$$Z_{V,Ed} = V_{Ed} / \sin\alpha$$
$$Z_{Ed} = D_{Ed} - V_{Ed} / \tan\alpha$$

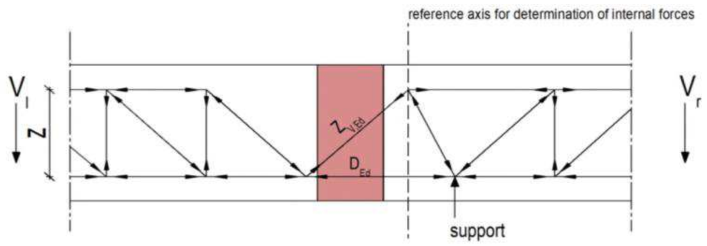


FIGURE 7C—EGCOBOX TYPE V - SHEAR FORCE CONNECTION – STATIC SYSTEM

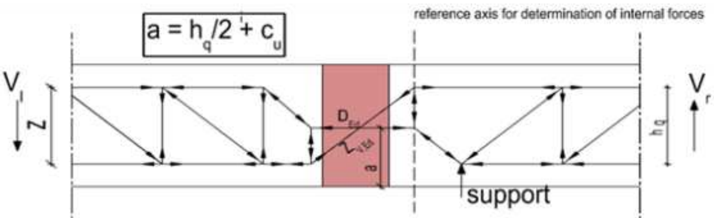


FIGURE 7D—EGCOBOX TYPE V - SHEAR FORCE CONNECTION WITH CENTRAL COMPRESSION BEARING – STATIC SYSTEM

Note for figures 7C, 7D and 7E:

Egcobox type V and V± inner forces:

$$Z_{V,Ed} = V_{Ed} / \sin\alpha$$
$$D_{Ed} = V_{Ed} / \tan\alpha$$

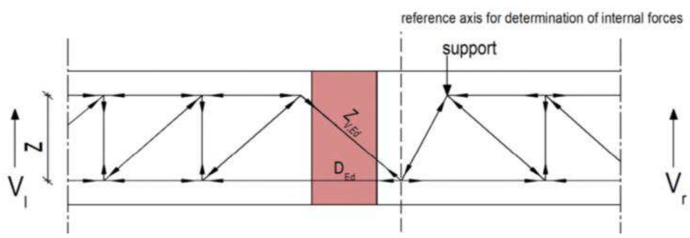


FIGURE 7E—EGCOBOX TYPE V - SHEAR FORCE CONNECTION – STATIC SYSTEM FOR LIFTING FORCES

TABLE 5 — EGCOBOX DESIGN EQUATIONS

1) Tension reinforcement

a) steel capacity of the reinforcement bar

$$Z_{R,cal,i} = \pi\, d_z{}^2 / 4 \cdot R_{p,0.2}$$

2) Shear force reinforcement

a) steel capacity of the reinforcement bar

$$Z_{R,Vs,cal,i} = \pi\, d_Q^2 / 4 \cdot R_{p,0.2}$$

3) Compression bar in stainless steel with a transverse set-on steel end plate

a) buckling capacity of compression bar

$$L_{cr} = 0.5\, f$$

$\underline{\lambda} = 4\, L_{cr} \cdot R_{p,0.2}^{0.5} / (d\, \pi\, E^{0.5})$ with E=150.000 MPa

$$\varphi = 0.5\,(1 + 0.34\,(\underline{\lambda} - 0.20) + \underline{\lambda}^2)$$

$$\chi = 1 / (\varphi + (\varphi^2 - \underline{\lambda}^2)^{0.5}) \leq 1.0$$

$$B_{R,cal,i} = \chi\, \pi \cdot d_D^2 / 4 \cdot R_{p,0.2}$$

4) Interfacing concrete plate

a) concrete capacity of partially surface pressure under steel end plate of compression bar

$D_{R,cal,i} = 4.0 \cdot k_x \cdot k_e \cdot \sqrt{f_{c,cube}} \cdot A_c / 1000$ (Nominal value) with $A_c = b_D\, h_D$

$$k_e = 2.165 + e/100 \leq 4.5$$

$k_x = 0{,}65 + e/2400 \leq 1{,}0$ with $k_x \neq 1.0$ in case of height offset

$$e = 1000\, mm / n_D\ (e = 39.37\, inches / n_D)$$

b) maximum shear force capacity of the concrete slab

$$V_{R,lim,cal} = k_v\ b\ z / (\cot\theta + \tan\theta) \cdot 0.75\, f_{c,cyl}$$

$$\cot\theta = 1.2 / [1 - (V_{R,cal,cc} / V_{Ed})]$$

$$kv = \begin{cases} 0.25 \text{ for } \cot\theta \leq 1.2 \\ 0.175 + 0.0625\, \cot\theta \text{ for } 1.2 < \cot\theta < 2.0 \\ 0.30 \text{ for } \cot\theta \geq 2.0 \end{cases}$$

$$V_{R,cal,cc} = 0.24\, f_{c,cube}{}^{1/3} \cdot b \cdot z$$

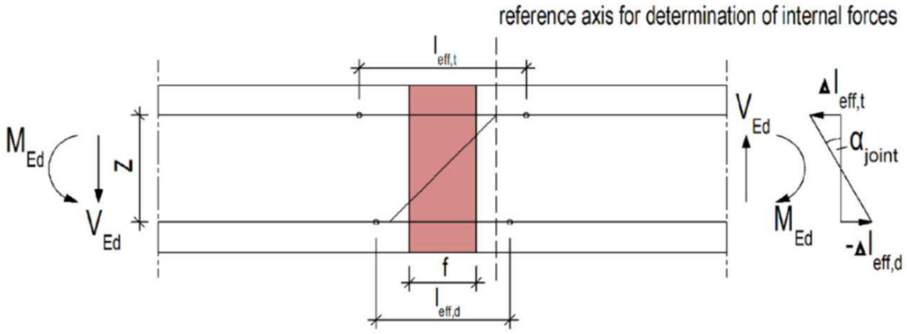
$$z = \min \begin{cases} 0.9\, d \\ \max \begin{cases} d - 2\, c_{nom} \\ d - c_{nom} - 30\, mm \end{cases} \end{cases}$$

$$d = h - d_z/2 - c_{nom}$$

$R_{p,0.2}$	Steel yield strength
c_{nom}	Planning dimension of the concrete cover
d_D	Diameter compression bars
d_Q	Diameter shear force bars
d_z	Diameter tension bars

TABLE 6 — EGCOBOX DEFORMATIONS

The rotation of the slab connection can be determined from the elastic strain of the tension bar $\Delta l_{eff,t}$ and of compression bar $\Delta l_{eff,D}$ according to the following figure.



Model for calculating the rotational deformation.

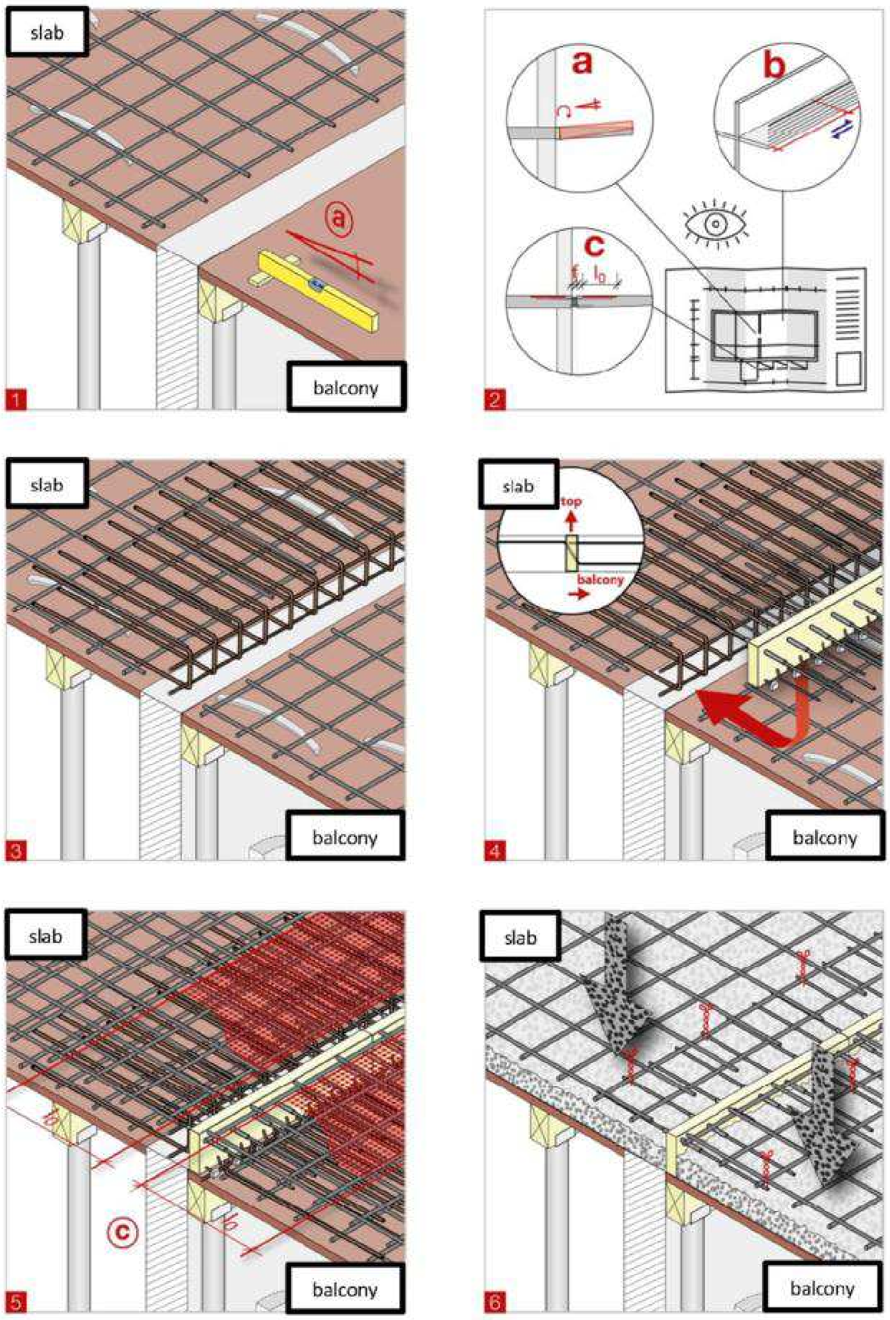
Tension bar / compression bar strain $\Delta l_{eff,t} = \sigma_t \sum_{n=1}^{3} \frac{l_{eff,t,n}}{E_n}$

Angle of rotation in the joint: $tan\,\alpha_{Fuge} = \frac{\Delta l_{eff,t} - \Delta l_{eff,D}}{z}$

Effective lengths $l_{eff,t,n}$ and $l_{eff,d,n}$ E-module E_n.

framework bar	$l_{eff,t,1}$ resp. $l_{eff,d,1}$	$l_{eff,t,2}$ resp. $l_{eff,d,2}$
	B500 NR or stainless ribbed steel [mm]	stainless steel [mm]
E-Modulus	E_1 = 160.000 N/mm² [1)]	E_2 = 170.000 N/mm²
tension bar versions 1 + 2	f + 2 · min(10 ø; 100 mm)	f + 2 · (10 ø + 100 mm)
compression bar versions 1 + 2 – compression bar	f + 2 · min(10 ø; 100 mm)	f + 2 · (10 ø + 100 mm)
compression bar version 5 – compression bar with compression plates on both sides	f	f

1) Higher E-Modulus is possible if ensured by factory test certificate.



1. Assembly of the lower in-situ reinforcement. Adjustment of the required raising.
2. Consideration of the required expansion joints, lap lengths and raising.

Consideration of the in-situ reinforcement regarding the requirement of the planner!

Take care of the correct height of the formwork!

3. Assembly of the in-situ edge reinforcement (if required).
4. Assembly of the Max Frank Egcobox-elements. Adjustment arrow-sign towards balcony-side.
5. Assembly of the in-situ tension-reinforcement (upper layer) and the remaining reinforcement of the balcony side.
6. Fixing of the tension bars of the element to the in-situ reinforcement. Pouring of the concrete.

The pouring process of the concrete has to be worked out evenly, to guarantee the correct position ot the Max Frank Egcobox-elements.
Take advise to use a fixation, to prevent a movement of the Egcobox-elements!

FIGURE 8—EGCOBOX INSTALLATION MANUAL (MPII)