Type Test Report

Egcosono SP

Impact sound insulation box Egcosono SP

T 22/006/351 | 18.05.2022

issued by: LBV Landesamt für Bauen und Verkehr, Cottbus/Germany

(Translation of the original German version by MAX FRANK Group - not approved by LBV)

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Cottbus, 18.05.2022

TYPE TEST REPORT
No. T 22/006/351

Subject of the type test:	Impact sound insulation box Egcosono SP
Applicant:	Max Frank GmbH & Co. KG Mitterweg 1 94339 Leiblfing
Set-up of the type statics:	Max Frank GmbH & Co. KG Mitterweg 1 94339 Leiblfing
Period of validity:	**30.06.2027**

This test report comprises 7 pages and the documents listed in section 1.

1. Test templates

1.1. Application for type approval dated 24/03/2022

1.2. Type statics

1.2.1. 16 pages Static calculation (Rev. 02) "Load-bearing capacity of an Egcosono sound insulation box" according to Eurocode taking into account the NA Germany of Max Frank GmbH & Co. KG dated 17.05.2022

1.3. Egcosono SP data sheets for

1.3.1.	Egcosono SP	Egcosono SP dated 25/03/2022	1 page
1.3.2.	Egcosono SPV	Egcosono SPV dated 25/03/2022	1 page
1.3.3.	Egcosono SPH	Egcosono SPH dated 28/03/2022	1 page
1.3.4.	Egcosono SPL	Egcosono SPL dated 28/03/2022	1 page
1.3.5.	Egcosono SP reinforcement cage	Egcosono BESP2 from 30/03/2022	1 page
1.3.6.	Egcosono SP reinforcement cage	Egcosono BESP3 from 30/03/2022	1 page
1.3.7.	Reinforcement cage Egcosono SP	Egcosono BESP4 from 28/03/2022	1 page
1.3.8.	Egcosono SP reinforcement cage	Egcosono BESP5 from 30/03/2022	1 page

2. Structural engineering principles

The applicable technical building regulations, in particular:

/1/ DIN EN 1992-1-1:2011-01

/2/ DIN EN 1992-1-1/NA:2013-04

/3/ DIN 488-1 and -3:2009-08

/4/ DIN 1045-2:2008-08

/5/ General technical approval/general type approval No. Z-16.8-468 from 18/05/2021

Further specialised literature, in particular:

/6/ Concrete calendar 2007, part 2, page 342 and following

3. Building materials and load assumptions

3.1. Building materials

- Normal concrete ≥ C 20/25
- Reinforcing steel B 500
- Elastomer EPDM according to /5/

3.2. Load assumptions

The impact sound insulation boxes may only be used inside the building in stair landings and flights with predominantly static effects in accordance with /2/. It should be noted that the stair components may have a maximum length of 9 m along the impact sound insulation box axis with a maximum temperature difference of ±10°C. If these boundary conditions are observed, the actions on the impact sound insulation box supports must not cause any higher design internal forces than the design internal forces specified in sections 5.10 to 5.12 in the vertical and, if applicable, horizontal direction. The effect of normal forces is not covered by this type test.

4. Test result

The documents listed under item 1 were reviewed for structural stability in accordance with the BbgBauVorlV of November 7, 2016, last amended by Article 3 of the Regulation of March 31, 2021, and the BbgBauPrüfV of September 10, 2008, last amended by the Regulation of August 24, 2021, of the State of Brandenburg as part of the building supervisory process. Taking into account the review comments in Section 5, it is confirmed that the submitted calculations are complete and accurate and comply with the applicable technical building regulations. Other requirements under building codes or other governmental regulations were not part of the review.

5. Test comments

5.1. This test report confirms the correctness and completeness of the verifications in the ultimate limit state under predominantly static loads. Verifications in the serviceability limit state were not submitted for testing.

5.2. The structural verifications and data sheets for the Egcosono SP impact sound insulation box listed in sections 1.2 to 1.3 were checked with regard to the following criteria .

- Compliance with material requirements and component geometry in accordance with /1/, section 4 in conjunction with /2/
- Compliance with the maximum bar spacing in accordance with /1/, Section 8.2 in conjunction with /2/
- Determination of the minimum bending roll diameter of the reinforcement in accordance with /1/, Section 8.3 (2) in conjunction with /2/, Tables NA. 8.1 a) and b)
- Verification of tensile reinforcement according to /6/ in conjunction with /1/ and /2/
- Verification of anchorage lengths in accordance with /1/, Section 8.4 in conjunction with /2/
- Verification of the compression strut in the compression-tension node according to /6/ in conjunction with /1/ and /2/
- Verification of shear force reinforcement according to /6/ in conjunction with /1/ and /2/

- Verification of the overlap length of the longitudinal reinforcement Ø = 8, 10, 12 mm in accordance with /1/, Section 8.7.3 in conjunction with /2/
- Verification of the minimum and maximum longitudinal reinforcement in accordance with /1/, Section 9.2.1.1 in conjunction with /2/
- Verification of shear force reinforcement in accordance with /1/, Section 9.2.2 (5), (6) and (8) in conjunction with /2/
- Verification of centrally loaded, unreinforced elastomeric bearings made of EPDM according to /5/
- Verification of bearing pressure for concrete support ≥ C 20/25

For all requirements not listed, e.g. sound insulation, load transmission in masonry and suspension of loads in the stair flight or stair landing slab, object-related structural engineering verifications must be carried out and submitted to the test engineer responsible for structural stability for inspection.

5.3. The Egcosono SP impact sound insulation box with a standard height of 150 mm (clear height), a support width of 254 mm (clear width) and a support depth of 154 mm (clear depth) is used as a stair and landing support. In addition to the insulation box with the standard dimensions, there is also an Egcosono SP L (large) impact sound insulation box with double the support width of 508 mm (clear width). The components on both sides of the Egcosono SP impact sound insulation box (wall and landing or stair flight slab) must be statically verified in accordance with /1/ in conjunction with /2/. The distance between the wall and the landing or staircase slab must not exceed 50 mm.

5.4. The impact sound insulation box may be used in ambient conditions that can be assigned to exposure class XC 1 in accordance with /1/, Table 4.1 in conjunction with /2/, Table NA.E.1.

5.5. The nominal dimension of the concrete cover is

- for the upper reinforcement $c_{nom,2}$ = 20 mm
- for the lower reinforcement $c_{nom,1}$ = 20 mm
- for the reinforcement in the support pocket to the rear $c_{nom,3}$ = 22 mm
- for the reinforcement in the support pocket to the sides $c_{nom,4}$ = 43 mm

5.6. The impact sound insulation box must be arranged in such a way that good bond conditions can be assumed for all reinforcing steel in the box in accordance with /1/, Figure 8.2, taking into account /2/, NCI to 8.4.2, Figure 8.2.

5.7. The tensile reinforcement in the area of the impact sound insulation box must not be staggered.

5.8. The longitudinal reinforcement of the impact sound insulation boxes must be overlapped with the same reinforcement from the slab cut. The verification of the tensile force cover line from the start of this overlapping joint must be carried out using object-related structural engineering verifications.

5.9. The length of the stirrups (longitudinal reinforcement) Ø = 8, 10, 12 mm is 62.5 cm if the verification of the overlap length is complied with, unless otherwise verified by the structural engineer.

5.10. The reinforcement required as a result of the stair flight or stair landing slab section sizes and the existing offset moment in the stair flight or stair landing slab must be determined on a project-specific basis and the structural analyses must be submitted to the structural safety test engineer responsible for the construction project for review.

5.11. The fire and sound insulation verifications must be conducted on a project-specific basis.

5.12. The shear load-bearing capacity of the Egcosono SP impact sound insulation boxes was verified for the element types listed in the tables. The stair flight and stair landing panels consist of at least a normal concrete of concrete strength class C 20/25.

Element type Egcosono	Concrete strength class	Number of tension rods n_Z	Diameter of the tension rods $Ø_{s,Z}$ [mm]	Number of shear force brackets n_Q	Diameter of the shear force bracket $Ø_{s,Q}$ [mm]	Absorbable shear force V_{Rd} [kN]
SP	C 20/25	2	8	5	8	38,9
		3				57,3
		5				75,8
		5				87,4
		2	10			47,4
		3				70,3
		4				87,4
		5				87,4
		2	12			55,9
		3				83,2
		4				87,4

Element type Egcosono	Concrete strength class	Number of tension rods n_Z	Diameter of the tension rods $Ø_{s,Z}$ [mm]	Number of shear force brackets n_Q	Diameter of the shear force bracket $Ø_{s,Q}$ [mm]	Absorbable shear force V_{Rd} [kN]
SP	C 25/30	2	8	5	8	45,1
		3				66,5
		5				87,4
		5				87,4
		2	10			55,0
		3				81,6
		4				87,4
		5				87,4
		2	12			64,9
		3				87,4
		4				87,4

Element type Egcosono	Concrete strength class	Number of tension rods n_z	Diameter of the tension rods $Ø_{s,Z}$ [mm]	Number of shear force brackets n_Q	Diameter of the shear force bracket $Ø_{s,Q}$ [mm]	Absorbable shear force V_{Rd} [kN]
SP	C 30/37	2	8	5	8	50,9
		3				75,1
		5				87,4
		5				87,4
		2	10			62,1
		3				87,4
		4				87,4
		5				87,4
		2	12			73,2
		3				87,4
		4				87,4

5.13. When using the Egcosono SP impact sound insulation box with four or five tension rods, it must be ensured that the maximum grain diameter of the concrete d_g ≤ is 16 mm.

5.14. For the Egcosono SP L (large) impact sound insulation box, the same concrete strength as for the Egcosono SP insulation boxes in Section 5.12 and doubling the number of tension rods and shear force stirrups results in shear forces V_{Rd} that are twice as high as for the standard Egcosono SP box.

5.15. In addition to the absorbable shear forces shown in Section 5.12, special impact sound insulation boxes can also be subjected to uplift forces (type Egcosono SP V-) and horizontal loads (type Egcosono SP H±). The load-bearing capacity of these special impact sound insulation boxes was verified for the element types listed in the table. The stair flight and stair landing panels consist of at least a normal concrete of concrete strength class C 20/25.

Element type Egcosono	Concrete strength class	Number of tension rods n_z	Diameter of the tension rods $Ø_{s,Z}$ [mm]	Number of hangers n_Q	Diameter of the shear force bracket $Ø_{s,Q}$ [mm]	Absorbable force V_{Rd} [kN]
SP V-	≥ C 20/25	≥ 2	8	5	8	- 23,8
SP H±		≥ 2				± 23,8

5.16. With a maximum absorbable shear force of V_{Rd} = 87.42 kN, this results in a maximum support pressure of σ_{max} = 3.8 N/mm2 under the elastomeric bearings, which can be absorbed by a support structure made of at least C 20/25. If a support structure made of a material other than this, e.g. masonry, is used, the local pressure must be verified on an object-specific basis.

5.17. The respective application conditions for the Egcosono impact sound insulation box must be worked out and specified in detail in the approval planning for a building project.

6. Building documents required for the building application in individual cases

6.1. Pages 1 to 7 of this type test report.

6.2. Test templates 1.3 - Egcosono SP, data sheets for the corresponding impact sound insulation box

6.3. The necessary local adjustments, taking into account the fulfilment of the conditions of this test report.

7. General provisions

7.1. The type-approved building documents for the test object exempt the building supervisory authority from the obligation to re-examine the test object from a structural point of view in the case of structures requiring approval. Irrespective of this, there is still an obligation to check the conformity of the construction work on the basis of the principles and results of the tested documents.

7.2. The type test does not release the building owner from the obligation to obtain a building permit or authorisation in accordance with other legal regulations for each building project requiring approval.

7.3. This type test report may only be reproduced in its entirety and not in extracts.

7.4. The period of validity can be revoked by the Bautechnisches Prüfamt in Cottbus if the underlying approvals lose their validity, technical building regulations are significantly changed or new technical findings argue against the continued validity of the type approval.

7.5. The extension of the period of validity can be applied for if all the conditions on which the type test was based have been passed and the type test report is still valid.

7.6. The type test takes into account the currently valid building regulations.

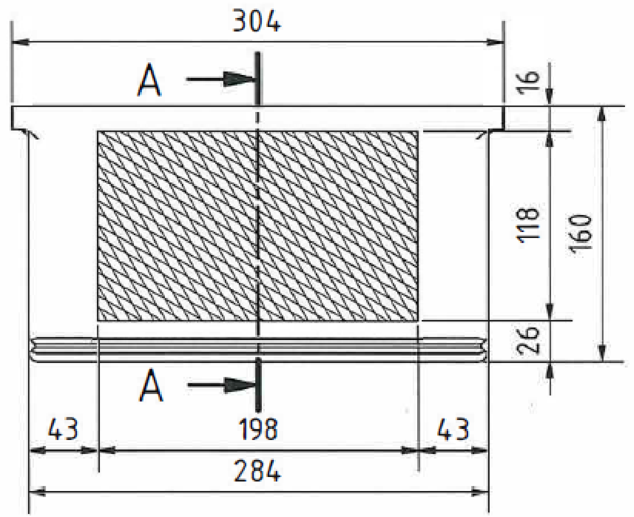
7.7. If significant changes occur before the expiry of the validity period of the type test report (e.g. in terms of structural design, with regard to the type of use or within the structural engineering principles listed in Section 2), the applicant must notify the Building Inspection Office immediately. The Building Inspection Office will then decide how to proceed.

7.8. This type test report is issued without prejudice to the rights of third parties.

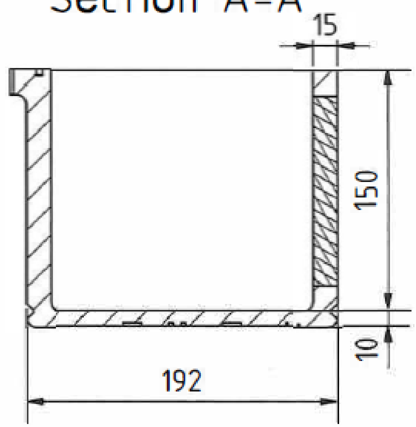
On behalf of

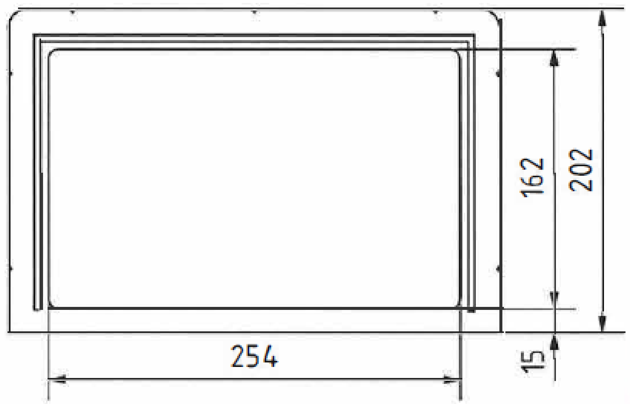
Dipl.-Ing. S. Neumann

Durch Vergleichsrechnung geprüft



Section A-A





Egcosono SP				
Reinforcement		Concrete quality / V_{Rd} [kN]		
Quantity	d_s	C20/25	C25/30	C30/37
2	8	38.9	45,1	50,9
3	8	57,3	66,5	75,1
4	8	75,8	87,4	87,4
5	8	87,4	87,4	87,4
2	10	47,4	55,0	62,1
3	10	70,3	81,6	87,4
4	10	87,4	87,4	87,4
5	10	87,4	87,4	87,4
2	12	55,9	64,9	73,2
3	12	83,2	87,4	87,4
4	12	87,4	87,4	87,4

name: Egcosono SP	
scale: 1 : 4	unit: mm
drawn: BW	date: 25.03.2022
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Datum / Bearbeiter: 18.05.2022 i.A. [signature]

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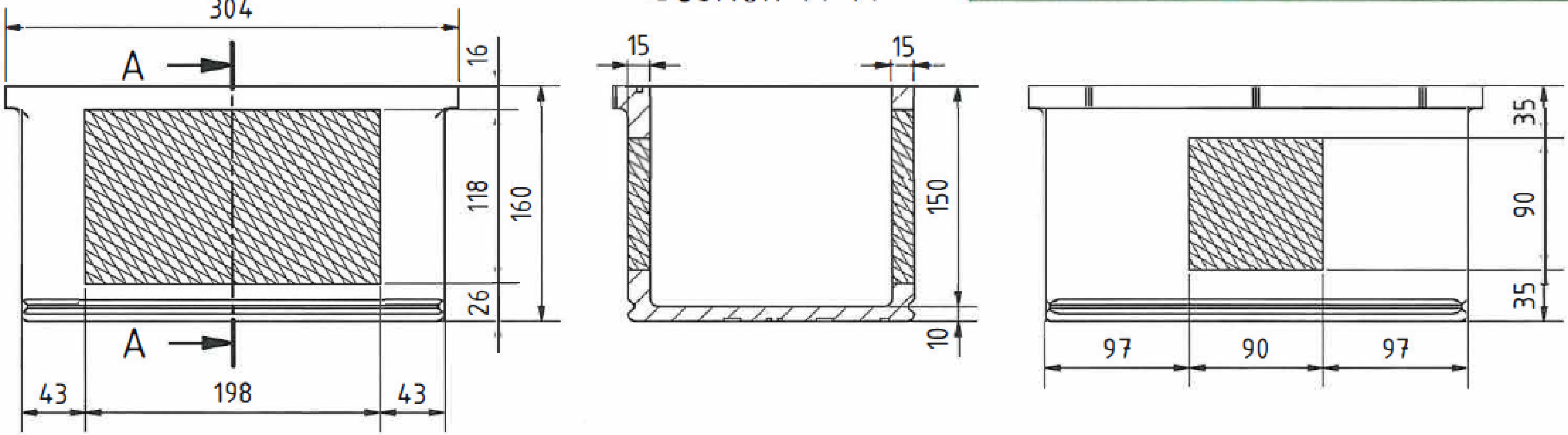
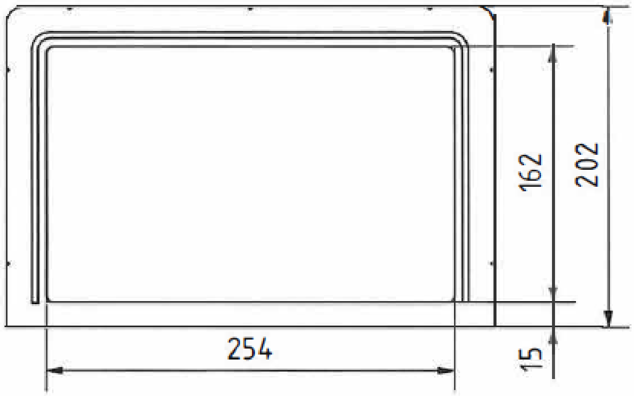
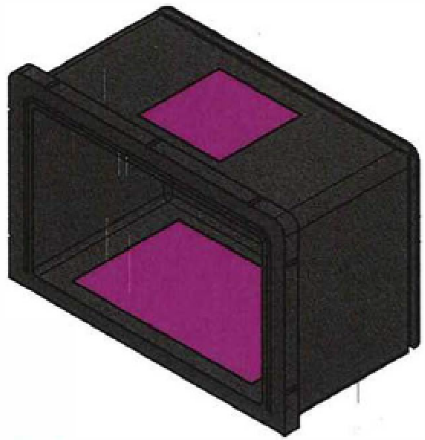
Section A-A







Egcosono SPV				
Reinforcement		Concrete quality / V_{Rd} [kN]		
Quantity	d_s	C20/25	C25/30	C30/37
2	8	38,9/-23,8	45,1/-23,8	50,9/-23,8
3	8	57,3/-23,8	66,5/-23,8	75,1/-23,8
4	8	75,8/-23,8	87,4/-23,8	87,4/-23,8
5	8	87,4/-23,8	87,4/-23,8	87,4/-23,8
2	10	47,4/-23,8	55/-23,8	62,1/-23,8
3	10	70.3/-23,8	81,6/-23,8	87,4/-23,8
4	10	87,4/-23,8	87,4/-23,8	87,4/-23,8
5	10	87,4/-23,8	87,4/-23,8	87,4/-23,8
2	12	55,9/-23,8	64,9/-23,8	73,2/-23,8
3	12	83,2/-23,8	87,4/-23,8	87,4/-23,8
4	12	87,4/-23,8	87,4/-23,8	87,4/-23,8

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Datum / Bearbeiter: 18.05.22 i.A. [signature]

name: Egcosono SPV	
scale: 1 : 4	unit: mm
drawn: BW	date: 25.03.2022

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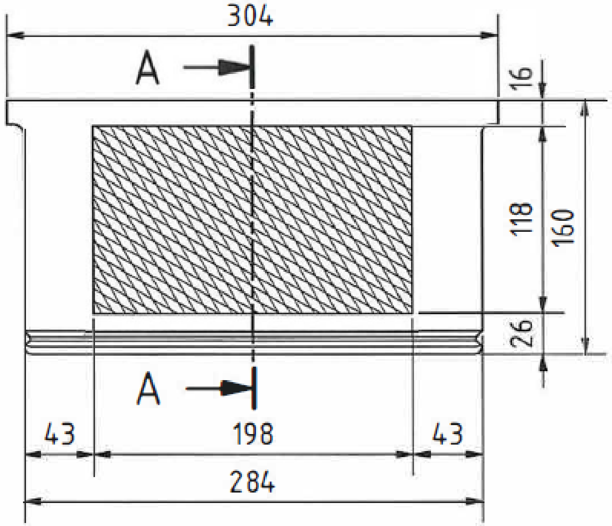
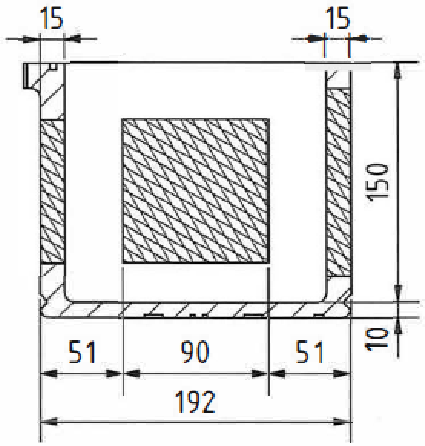
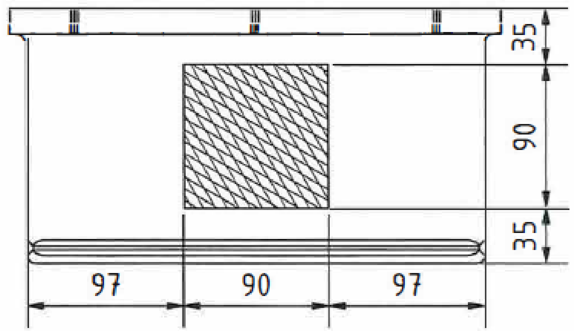
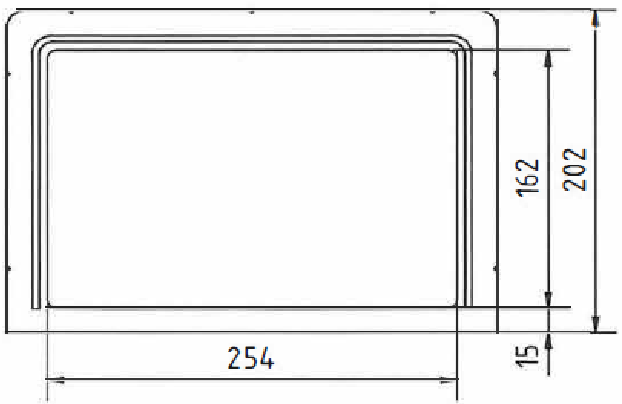
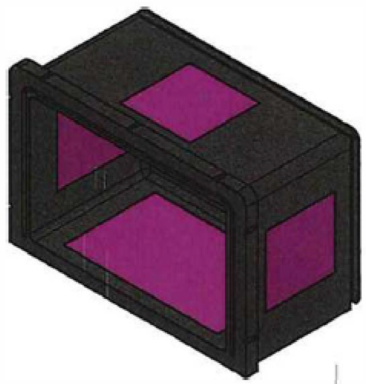


Section A-A









Egcosono SPH							
Reinforcement		Concrete quality					
Quantity	d_s	C20/25		C25/30		C30/37	
		$V_{Rd,v}$ [kN]	$V_{Rd,h}$ [kN]	$V_{Rd,v}$ [kN]	$V_{Rd,h}$ [kN]	$V_{Rd,v}$ [kN]	$V_{Rd,h}$ [kN]
2	8	38,9/-23,8		45,1/-23,8		50,9/-23,8	
3	8	57,3/-23,8		66,5/-23,8		75,1/-23,8	
4	8	75,8/-23,8		87,4/-23,8		87,4/-23,8	
5	8	87,4/-23,8		87,4/-23,8		87,4/-23,8	
2	10	47,4/-23,8		55/-23,8		62,1/-23,8	
3	10	70,3/-23,8	±23,81	81,6/-23,8	±23,81	87,4/-23,8	±23,81
4	10	87,4/-23,8		87,4/-23,8		87,4/-23,8	
5	10	87,4/-23,8		87,4/-23,8		87,4/-23,8	
2	12	55,9/-23,8		64,9/-23,8		73,2/-23,8	
3	12	83,2/-23,8		87,4/-23,8		87,4/-23,8	
4	12	87,4/-23,8		87,4/-23,8		87,4/-23,8	

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Prüfbericht-Nr.: T221006 13-S1

Datum / Bearbeiter: 18.05.2022

name: Egcosono SPH	
scale: 1 : 4	unit: mm
drawn: BW	date: 28.03.2022
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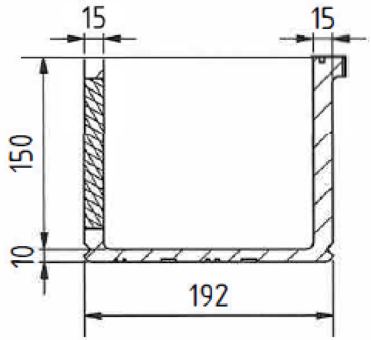
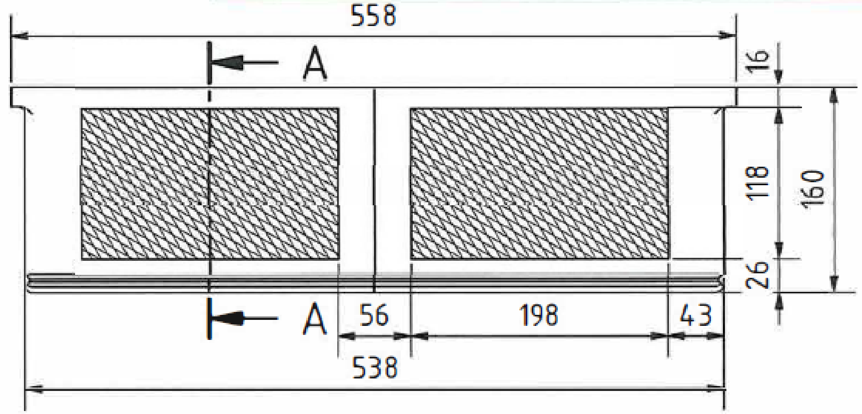
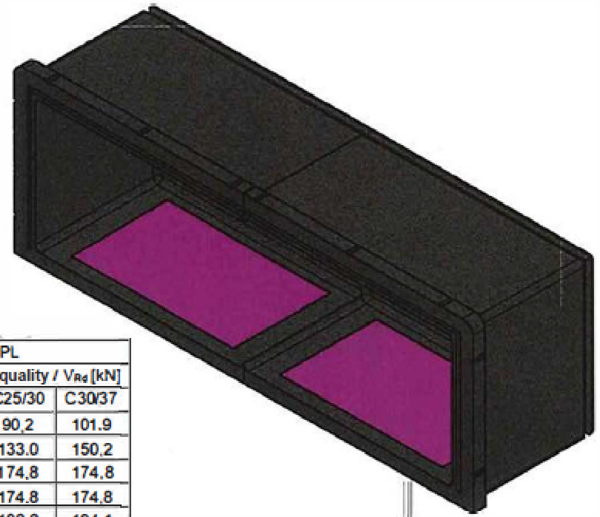
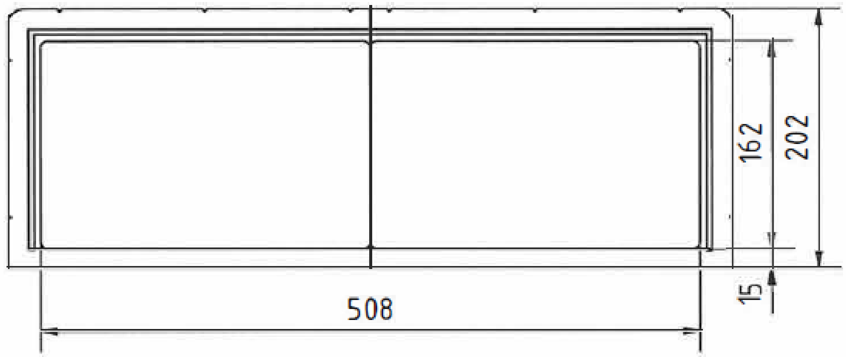
Section A-A









Egcosono SPL				
Reinforcement		Concrete quality / V_{Rd} [kN]		
Quantity	d_s	C20/25	C25/30	C30/37
2	8	77,8	90,2	101,9
3	8	114,6	133,0	150,2
4	8	151,5	174,8	174,8
5	8	174,8	174,8	174,8
2	10	94,7	109,9	124,1
3	10	140,6	163,1	174,8
4	10	174,8	174,8	174,8
5	10	174,8	174,8	174,8
2	12	111,8	129,7	146,5
3	12	166,4	174,8	174,8
4	12	174,8	174,8	174,8

Note: 2 reinforcement cages required!

geprüfte Unterlage gehört zum

Prüfbericht-Nr.: T22100613S1

Datum / Bearbeiter: 18.5.2022 i.A. [illegible]

name: Egcosono SPL	
scale: 1 : 5	unit: mm
drawn: BW	date: 28.03.2022
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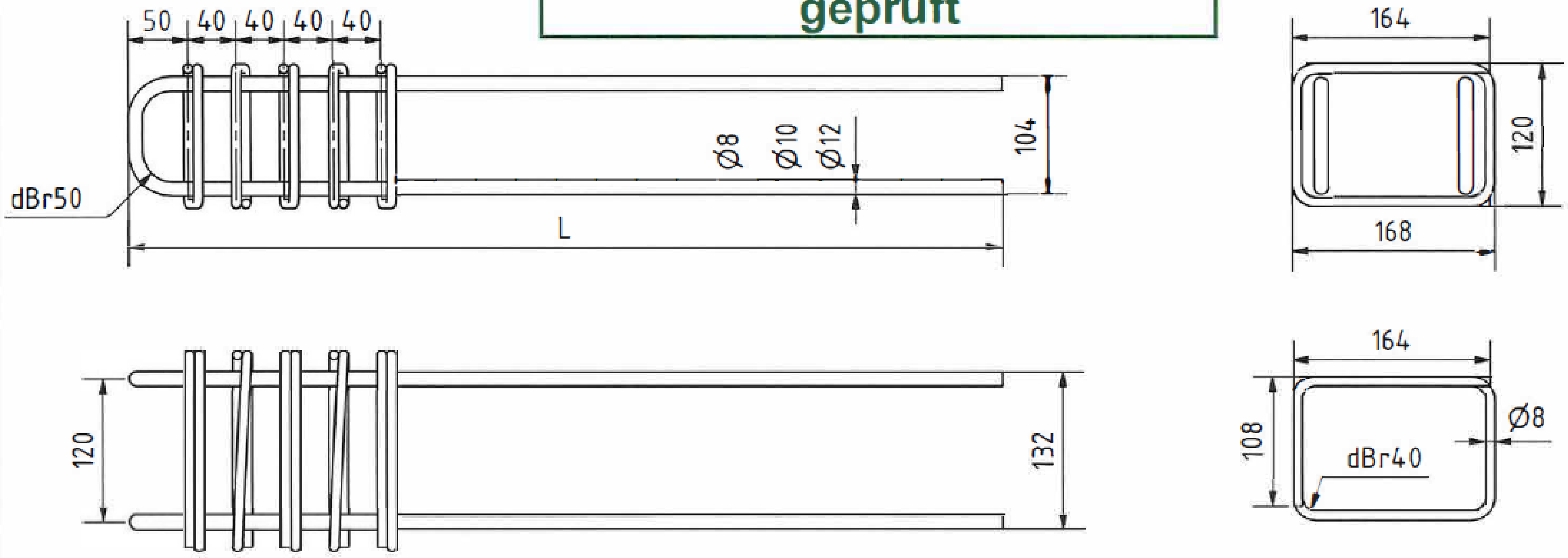

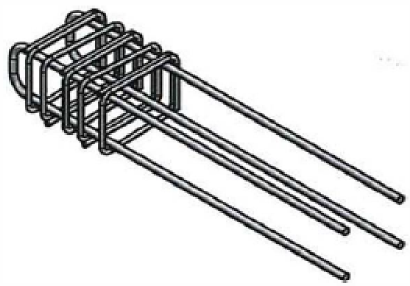

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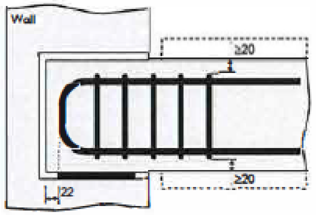
Prüfbericht-Nr.: T2210061351

Datum / Bearbeiter: 18.05.2022 i.A.



Plug-in bracket	length L
Ø8, Ø10, Ø12	625 mm
L less than 625 mm as specified by the structural engineer	

name: Egcosono BESP2	
scale: 1 : 5	unit: mm
drawn: BW	date: 30.03.2022

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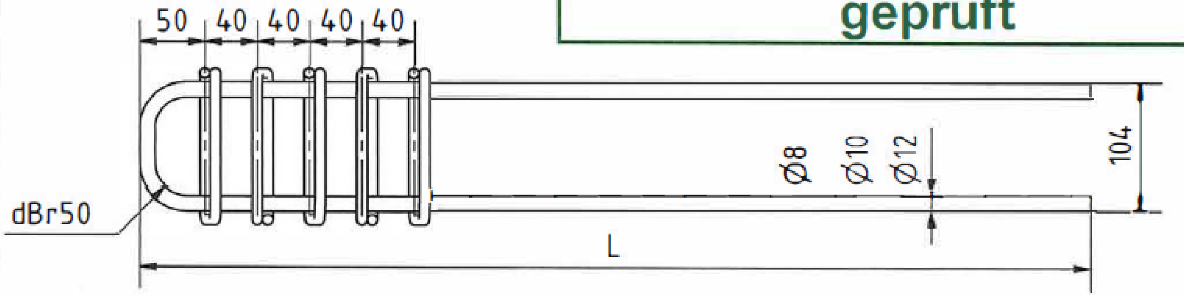
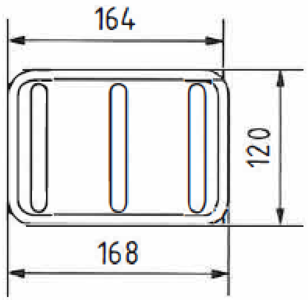
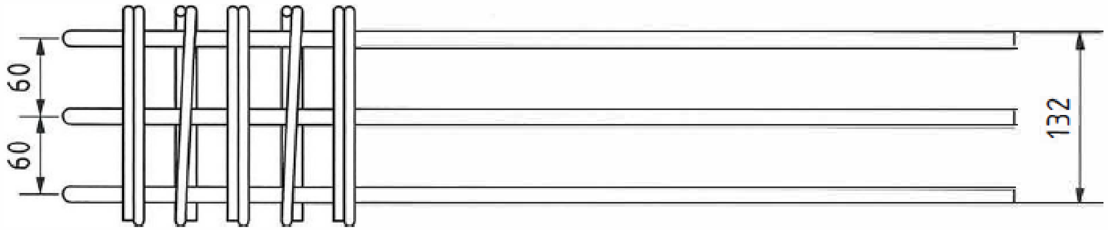
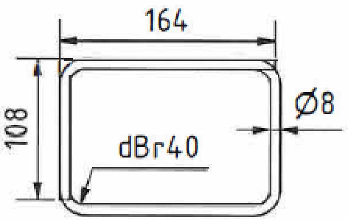




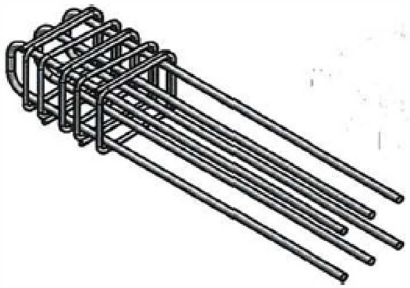


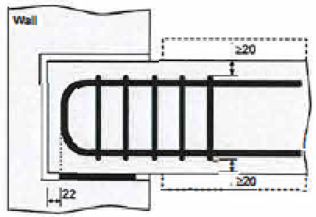


geprüfte Unterlage gehört zum

Prüfbericht-Nr.: T2210061351

Datum / Bearbeiter: 18.05.2022 i.A.





Plug-in bracket	length L
Ø8, Ø10, Ø12	625 mm
L less than 625 mm as specified by the structural engineer	

name: Egcosono BESP3	
scale: 1 : 5	unit: mm
drawn: BW	date: 30.03.2022
MAX FRANK BUILDING COMMON GROUND	

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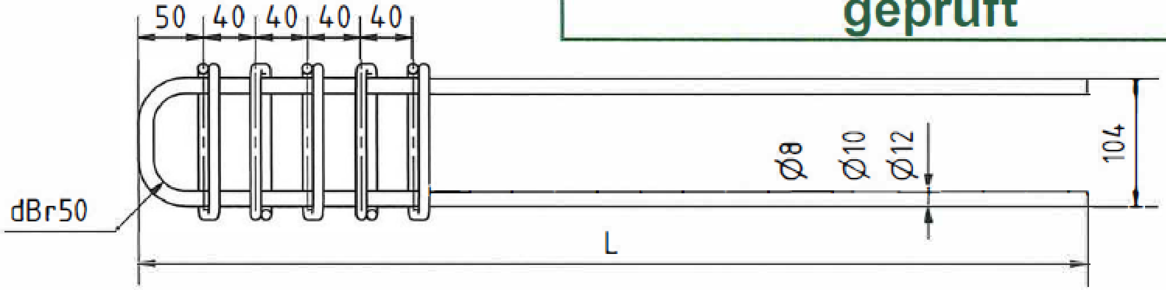
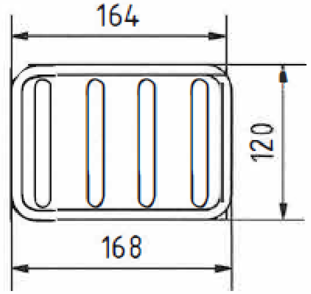
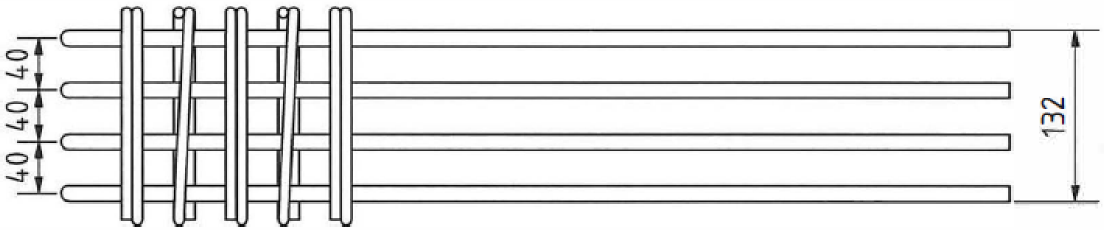
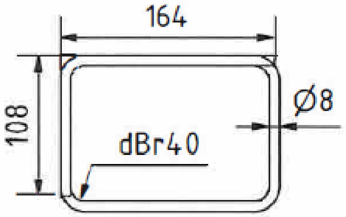
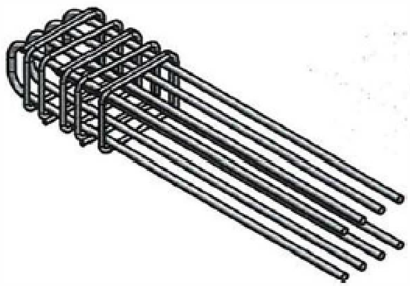
Durch Vergleichsrechnung geprüft







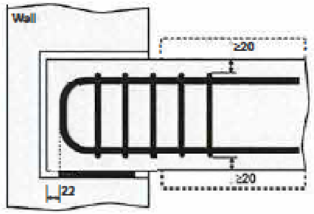




geprüfte Unterlage gehört zum

Prüfbericht-Nr.: T 2210061351

Datum / Bearbeiter: 13.05.2022 i.A.



Plug-in bracket	length L
Ø8, Ø10, Ø12	625 mm
L less than 625 mm as specified by the structural engineer	

name: Egcosono BESP4	
scale: 1 : 5	unit: mm
drawn: BW	date: 28.03.2022
MAX FRANK BUILDING COMMON GROUND	

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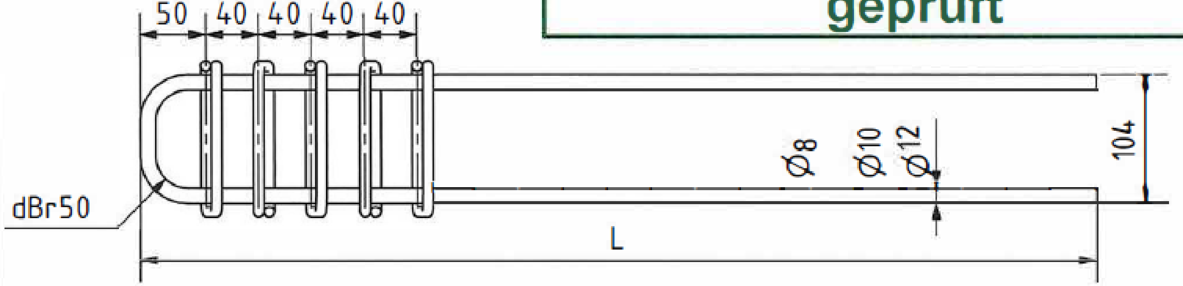
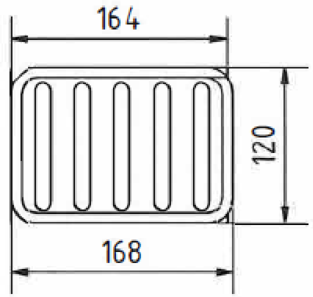
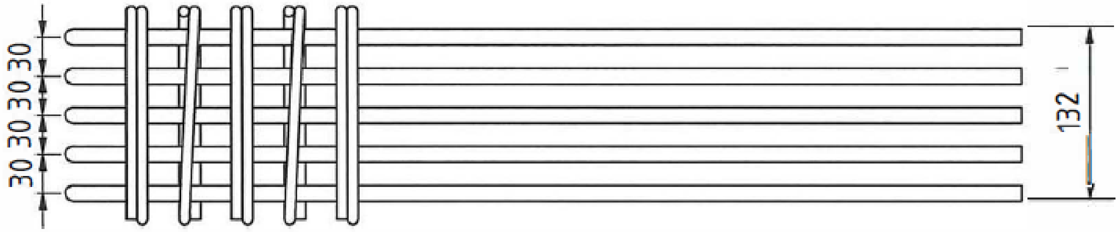
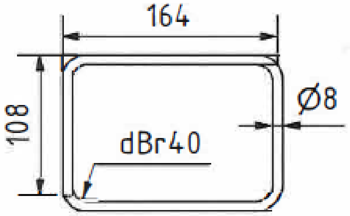
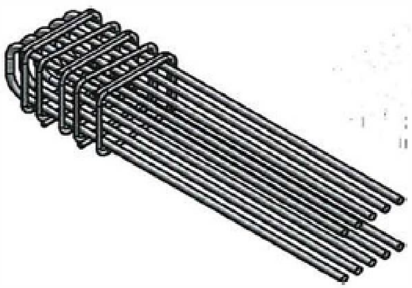
Durch Vergleichsrechnung geprüft







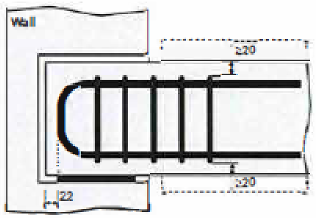




geprüfte Unterlage gehört zum

Prüfbericht-Nr.: T2210061351

Datum / Bearbeiter: 18.05.2022 i.A.



Plug-in bracket	length L
Ø8, Ø10, Ø12	625 mm
L less than 625 mm as specified by the structural engineer	

name: Egcosono BESPS	
scale: 1 : 5	unit: mm
drawn: BW	date: 30.03.2022
MAX FRANK BUILDING COMMON GROUND	

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