Deutsches Institut für Bautechnik
DIBt

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Approval body for construction products and types of construction
Bautechnisches Prüfamt
An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-19/0401 of 26 February 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Pakon - Trittschallboxen HQW
Product family to which the construction product belongs	Dowels for structural joints under static and quasi-static loading
Manufacturer	Pakon AG Bahnhofstraße 33 8867 NIEDERURNEN SCHWEIZ
Manufacturing plant	Pakon AG M 20 Areal, Wasterkingerweg 2 8193 Eglisau-Hüntwangen SCHWEIZ
This European Technical Assessment contains	20 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	ETAG 030, Part 1 version April 2013, used as EAD according to Article 66 Paragraph 3 Regulation (EU) No 305/2011

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Specific Part

1 Technical description of the product

The impact sound box HQW consists of three functional units sound insulation box, bearing element and sleeve with gantry steel plate. The bearing element (hollow steel profile) is approved in the variants of galvanized steel and stainless steel. The impact sound box HQW is approved in the types HQW-60/40 and HQW-60/60.

The detailed product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the Product is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the Product of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Resistance	Annex C1 and Annex C2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	class A1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with ETAG 030, Part 1 the applicable European legal act is: [2003/639/EC(EU)].

The system(s) to be applied is (are): [2+]

In addition, with regard to reaction to fire for products covered by this ETAG the applicable European legal act is: Decision 96/603/EC

The system to be applied is: [4]

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

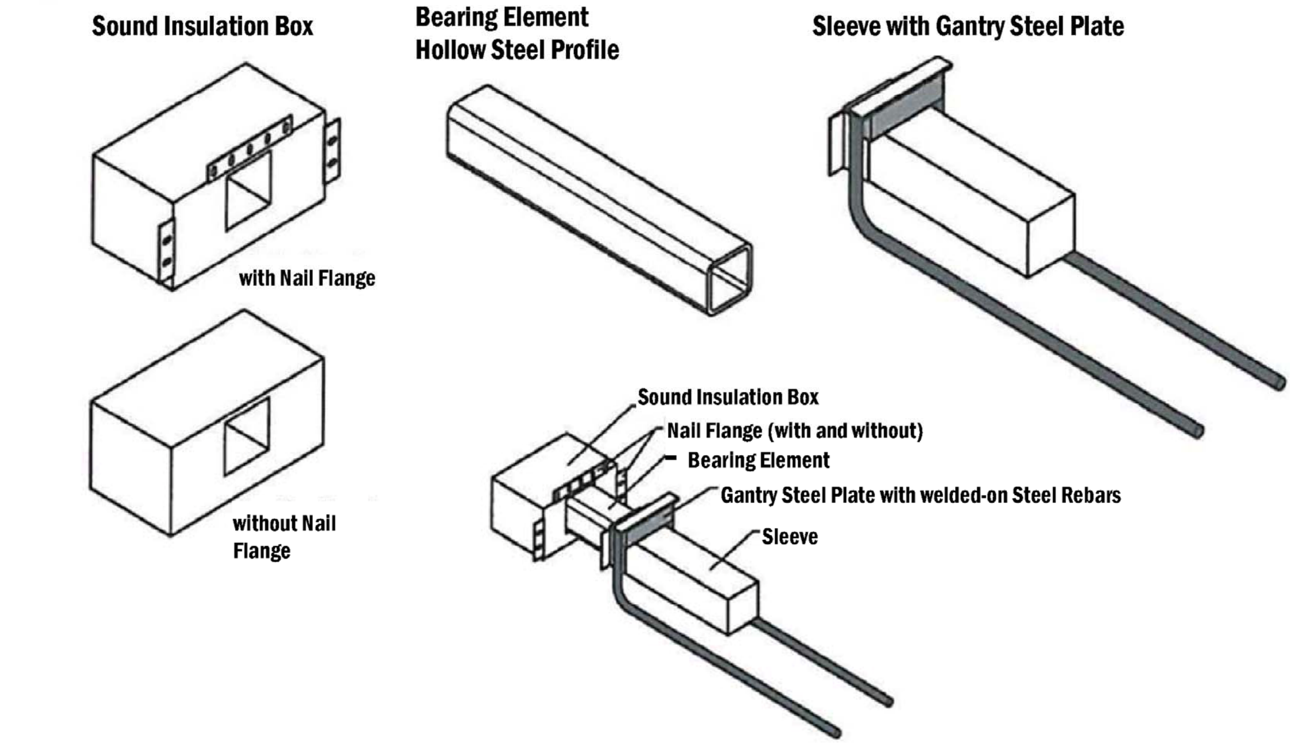
Issued in Berlin on 26 February 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

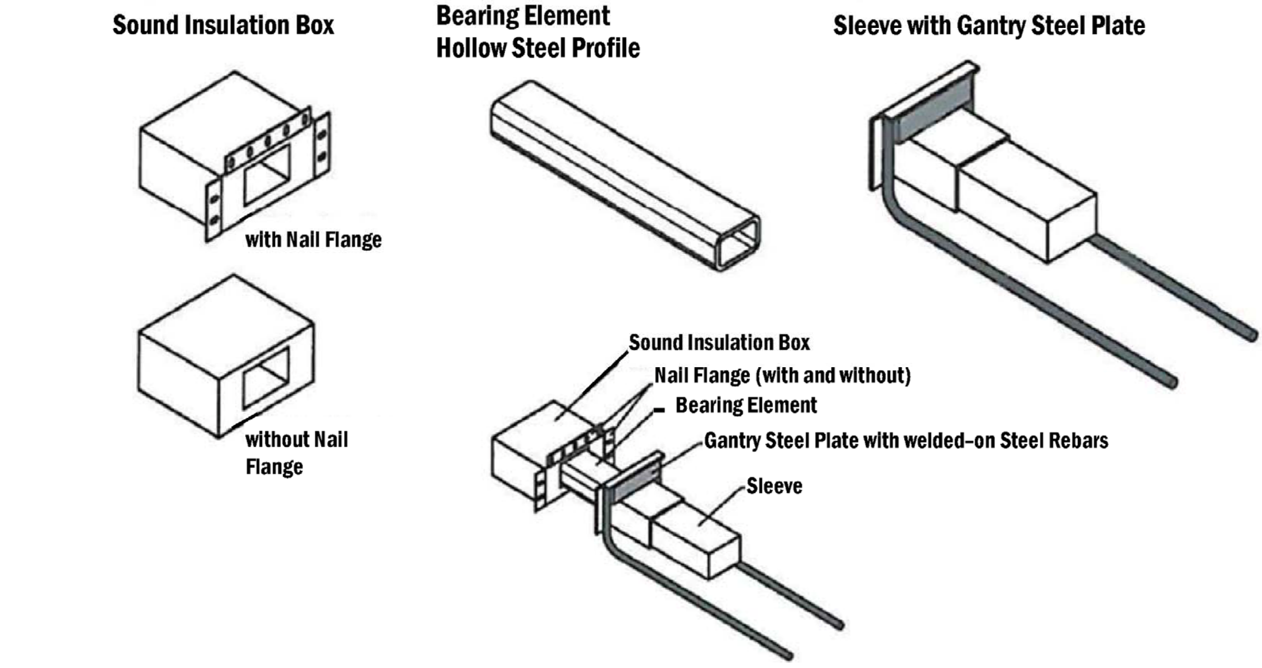
beglaubigt:
Schüler

Deutsches Institut für Bautechnik DIBt

HQW 60 / 60

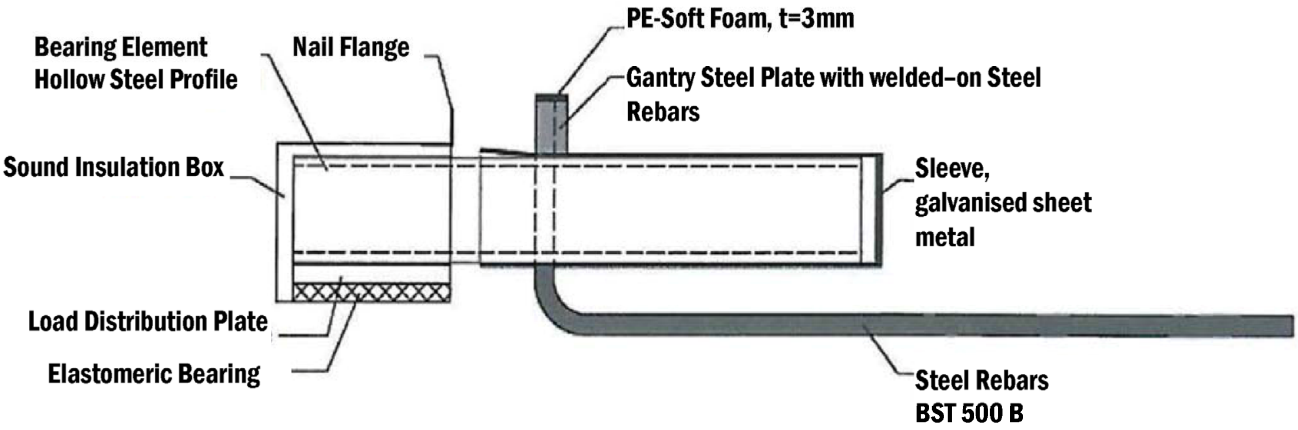


HQW 60 / 40

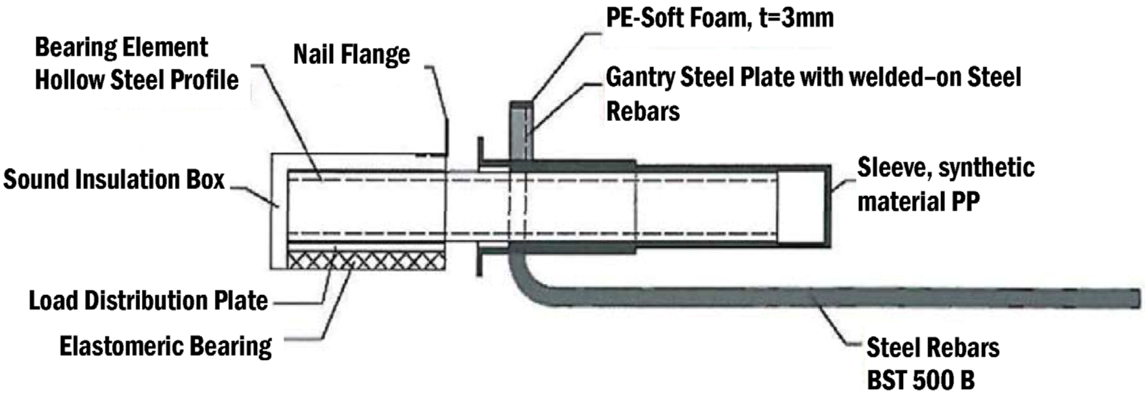


Pakon – Trittschallbox HQW	Annex A1
Product Specification System Overview	

HQW 60/60 (Sleeve, galvanised sheet metal)

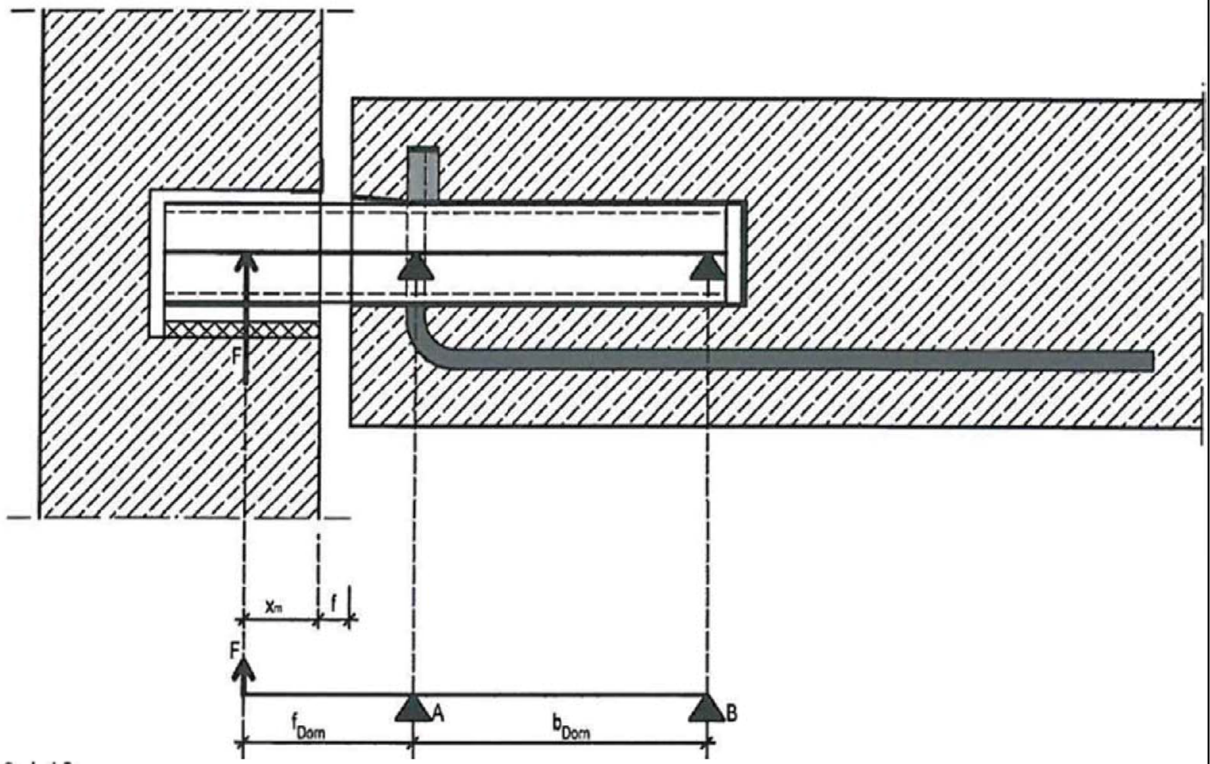


HQW 60/60 and HQW 60/40 (Sleeve, syntethic)

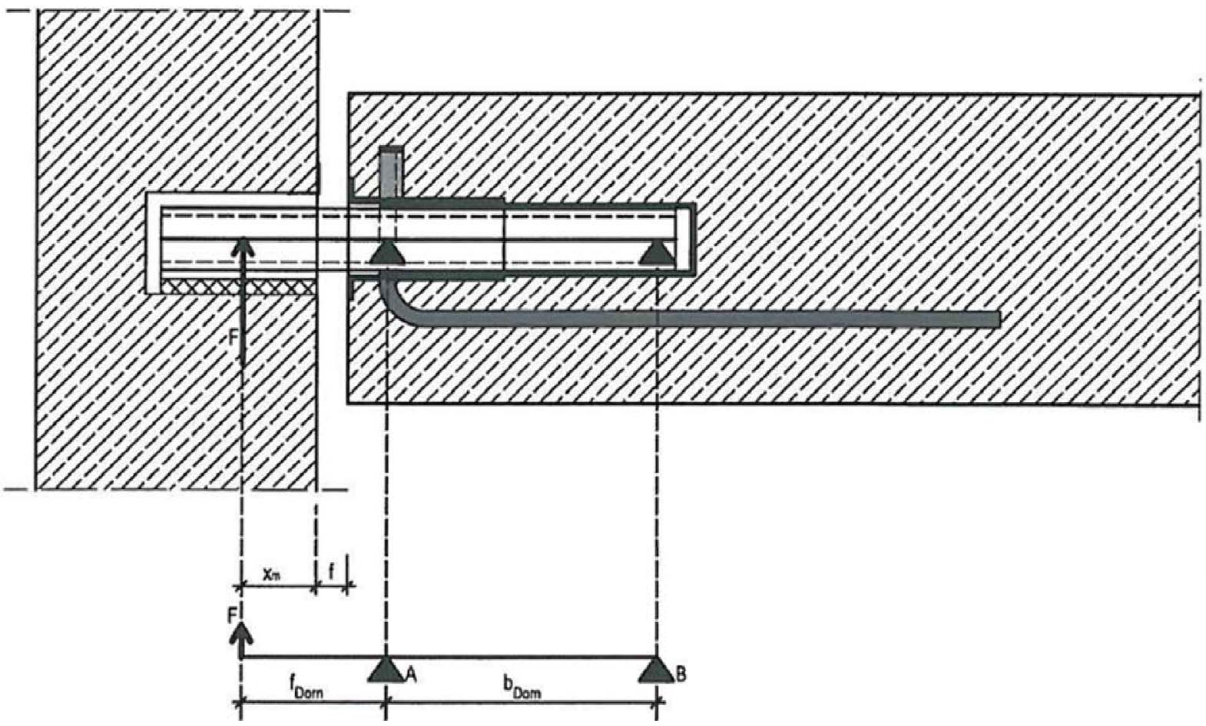


Pakon – Trittschallbox HQW	Annex A2
Product Specification Materials	

HQW 60 / 60

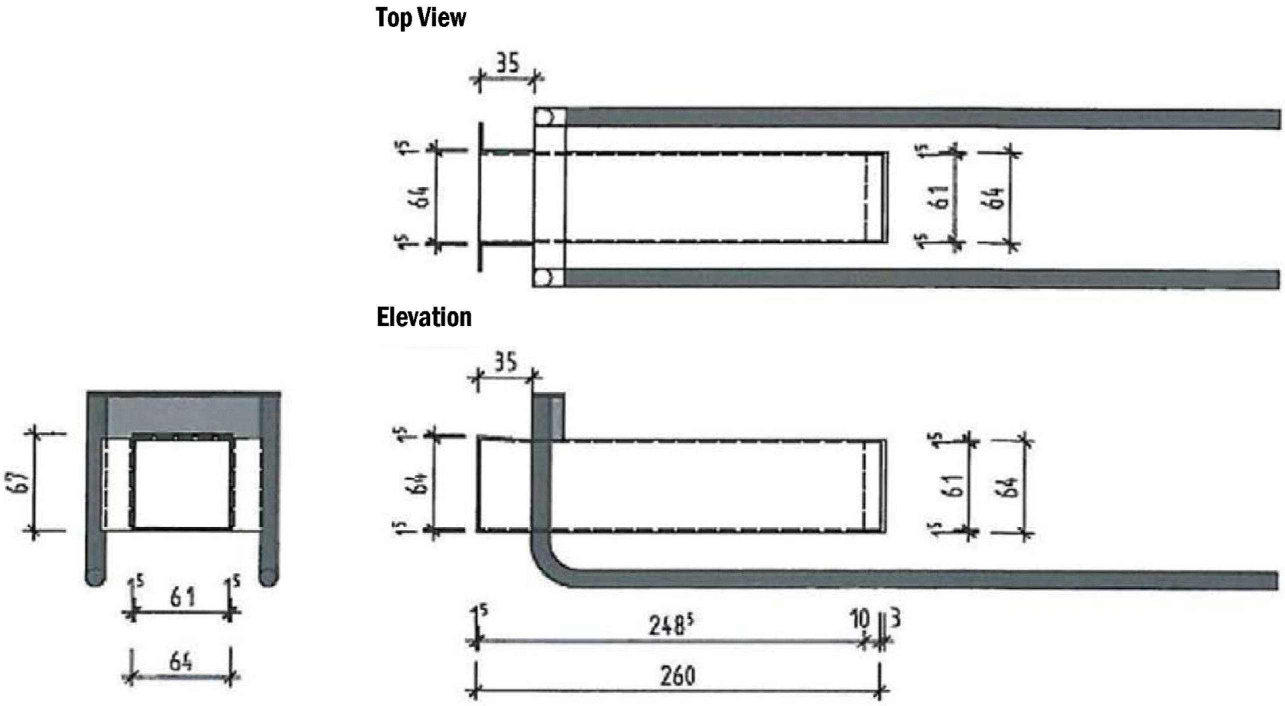


HQW 60 / 40

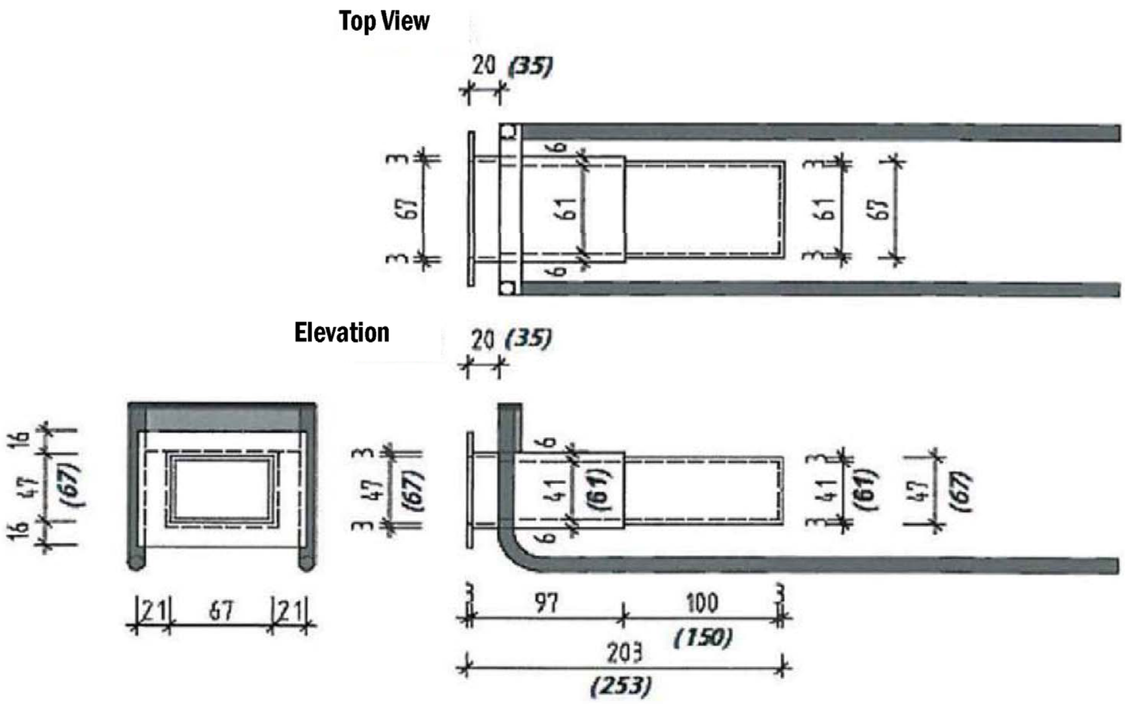


Pakon – Trittschallbox HQW	Annex A3
Product Specification Statical System	

Sleeve with Gantry Steel Plate for HQW 60/60 (Sleeve, galvanised sheet metal)



Sleeve (synthetic) for HQW 60/40 and HQW 60/60 (values in brackets)



Pakon – Trittschallbox HQW	Annex A4
Product Specification Dimensions and Designation of Sleeve with Gantry Steel Plate	

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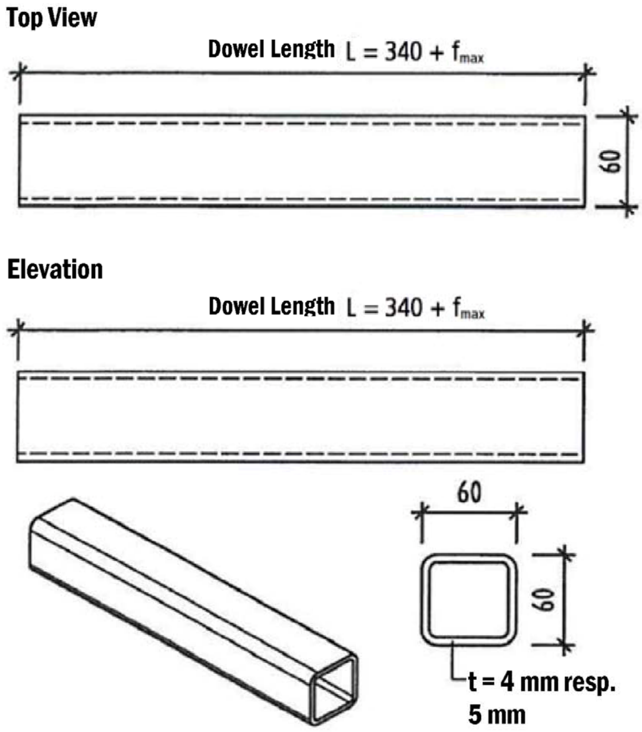
HQW 60 / 60

Bearing Element Hollow Steel Profile



Material: S 275 galvanised
S 355 galvanised

Stainless Steel: 1.4301, 1.4404, 1.4571 – S 275 resp. S 355

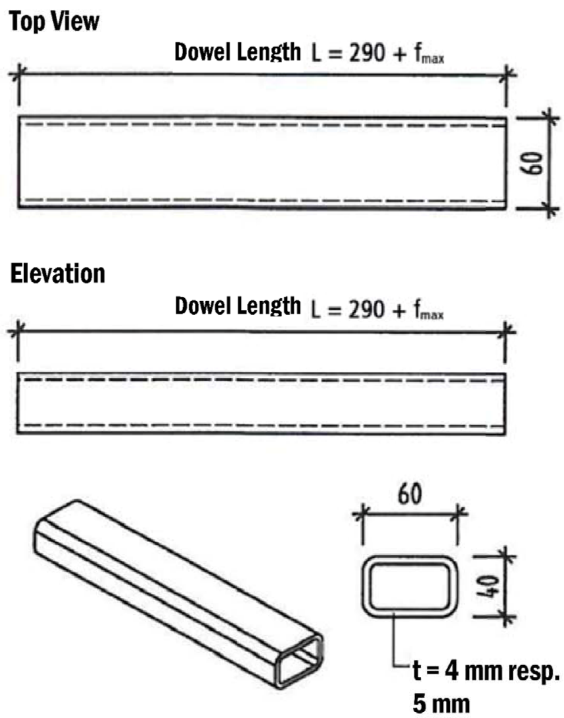
Designations:

HQW 60/60/4, S275, L=xxx – Stainless Steel
HQW 60/60/4, S355, L=xxx – Stainless Steel
HQW 60/60/4, S275, L=xxx – Stainless Steel
HQW 60/60/5, S355, L=xxx – Stainless Steel
HQW 60/60/4, S275, L=xxx – galvanised
HQW 60/60/4, S355, L=xxx – galvanised
HQW 60/60/4, S275, L=xxx – galvanised
HQW 60/60/5, S355, L=xxx – galvanised

Please find the Length L with the corresonding width of expansion joint in the table of Annex C

HQW 60 / 40

Bearing Element Hollow Steel Profile



Material: S 275 galvanised
S 355 galvanised

Stainless Steel: 1.4301, 1.4404, 1.4571 – S 275 resp. S 355

Designations:

HQW 60/60/4, S275, L=xxx – Stainless Steel
HQW 60/60/4, S355, L=xxx – Stainless Steel
HQW 60/60/4, S275, L=xxx – Stainless Steel
HQW 60/60/5, S355, L=xxx – Stainless Steel
HQW 60/60/4, S275, L=xxx – galvanised
HQW 60/60/4, S355, L=xxx – galvanised
HQW 60/60/4, S275, L=xxx – galvanised
HQW 60/60/5, S355, L=xxx – galvanised

Please find the Length L with the corresonding width of expansion joint in the table of Annex C

Pakon – Trittschallbox HQW	Annex A5
Product Specification Dimensions and Designation of the Bearing Element	

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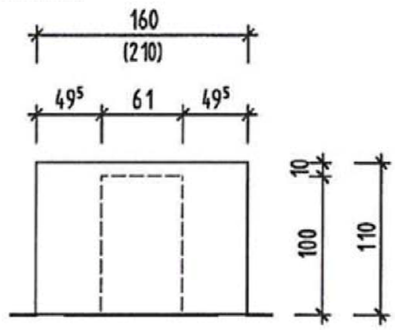
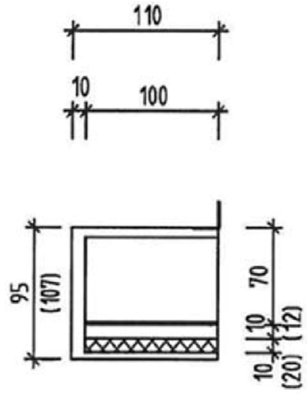
Sound Insulation Box 10 for HQW 60/60
Sound Insulation Box 20 for HQW 60/60 (values in brackets)

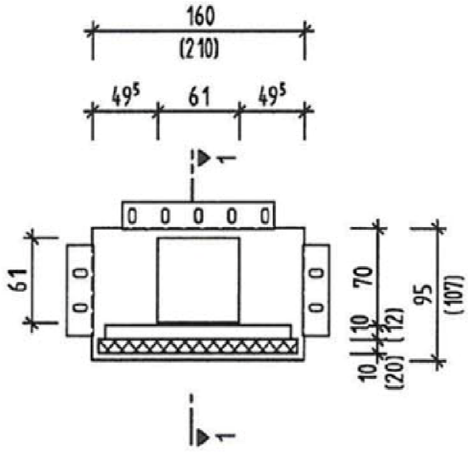
Top View



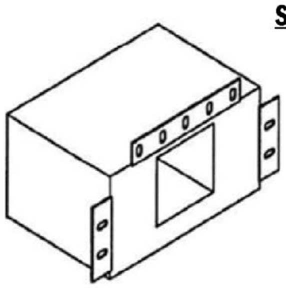
Section 1-1



Elevation

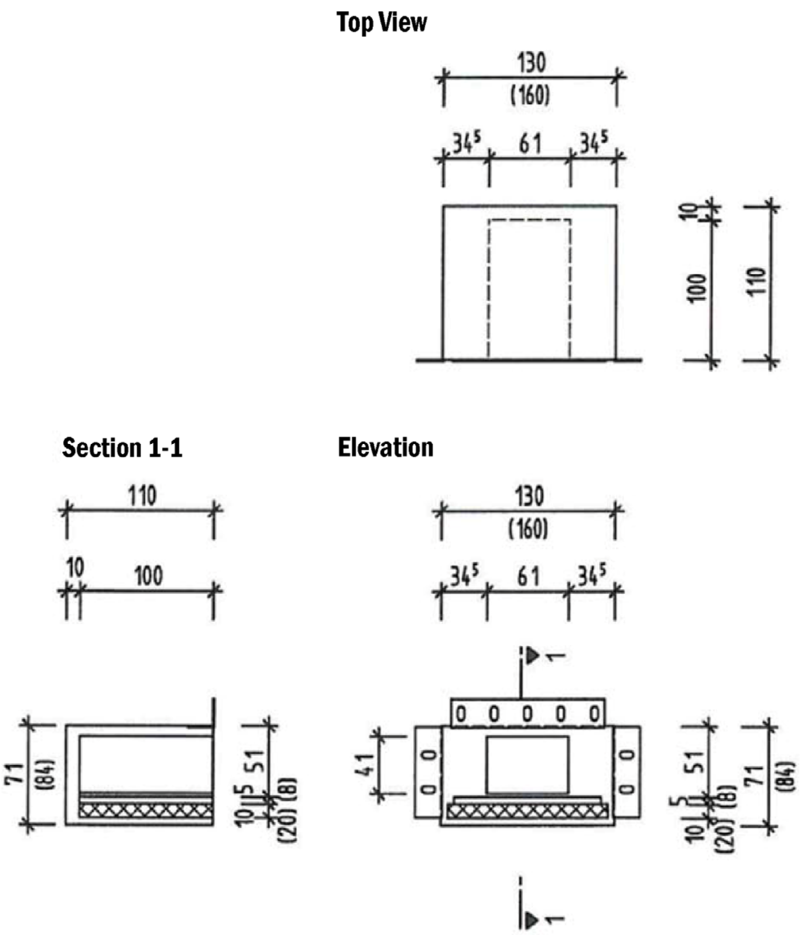


Sound Insulation Box 10 = 10 mm Thickness of elastomeric bearing
Sound Insulation Box 20 = 20 mm Thickness of elastomeric bearing

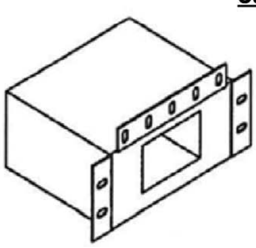


Pakon – Trittschallbox HQW	Annex A6
Product Specification Dimensions and Designation of the Sound Insulation Box HQW 60/60	

Sound Insulation Box 10 for HQW 60/40
Sound Insulation Box 20 for HQW 60/40 (values in brackets)



Sound Insulation Box 10 = 10 mm Thickness of elastomeric bearing
Sound Insulation Box 20 = 20 mm Thickness of elastomeric bearing



Pakon – Trittschallbox HQW	Annex A7
Product Specification Dimensions and Designation of the Sound Insulation Box HQW 60/40	

Installation

The dowel connector HQW consists of a rectangular hollow steel profile which is running in a sleeve on one side and is supported inside a sound insulation box on the other side of the expansion joint. The sleeve is connected to a steel plate with welded-on steel reinforcement bars. All components are manufactured separately in the factory and assembled on the construction site.
There are several combinations of the HQW building part components shown in Annex A1. In general the HQW dowel system is based on two different hollow steel profiles 60/40 mm and 60/60 mm with wall thicknesses of 4 mm or 5 mm. See also Annex A5.
The sound insulation box, which has to be embedded in a concrete or masonry wall, is available with 10 mm and 20 mm thick elastomer bearings. For a uniform load distribution, a steel plate is arranged between dowel and elastomer bearing inside the box. For installation the box can be placed directly on plane concrete surfaces. In case of masonry walls a mortar bed or a concrete layer is needed for placing the sound insulation box.
The running sleeve is a two-piece synthetic or a one-piece steel component. The sleeve is connected to a gantry steel plate with welded-on steel rebars which serve as supplementary reinforcement.

General dimensions, distances and in-situ steel reinforcement:

The minimum slab thickness is 160 mm for HQW 60/40 respectively 200 mm for HQW 60/60. The regular concrete covers are 20 mm for HQW 60/40 and 35 mm for HQW 60/60. Smaller concrete covers can be chosen in accordance with the exposure classes and the corresponding regulations within EN 1992-1-1, whereas higher concrete covers lead to an increase of the calculational widths of joint and have to be considered along with a reduction of the design resistance values given in Annexes C1 and C2. Further minimum distances are stated in Annex B2.
The HQW dowel system requires in-situ steel reinforcement. In Annexes B4 to B7 the reinforcement positions and the amount of the in-situ reinforcement is given. The steel reinforcement positions 1 to 3 are vertical u-bars. Pos.1 has to be placed perpendicular to the expansion joint next to the supplementary reinforcement of the prefabricated dowel system with a clear distance of 20 mm each. Pos.2 must be placed in parallel with the expansion joint within Pos.1. Also Pos.3 is placed parallel to the expansion joint within Pos.1 near the end of the sleeve.

Pakon – Trittschallbox HQW	Annex B1
Intended Use Specification	

Installation

HQW 60/40 - Dimensions, Distances and In-Situ Steel Reinforcement

			HQW 60/40
slab thickness	h		≥160 mm
concrete cover	c_v		20 mm
axial edge distance	a_R		≥ max [0,75 h ≤ 200 mm; 170 mm]
horizontal axial dowel distance	a_D		≥ max [1,5 h ≤ 400 mm; 320 mm]
vertical edge distance	e		≥60 mm
distance to zero point of slab deformation	a_T	10 mm elastomer	≤ 3 mm /($\varepsilon_S + \varepsilon_T$)
		20 mm elastomer	≤ 6 mm /($\varepsilon_S + \varepsilon_T$)
in-situ reinforcement	A_{sx}	Pos.1	2 x 3 Ø 10 mm
	A_{sy}	Pos.2	1 x 3 Ø 10 mm
	A_{sy}	Pos.3	1 x 2 Ø 10 mm

HQW 60/60 - Dimensions, Distances and In-Situ Steel Reinforcement

			HQW 60/60
slab thickness	h		≥200 mm
concrete cover	c_v		35 mm
axial edge distance	a_R		≥ max [0,75 h ≤ 300 mm; 200 mm]
horizontal axial dowel distance	a_D		≥ max [1,5 h ≤ 600 mm; 340 mm]
vertical edge distance	e		ε 70 mm
distance to zero point of slab deformation	a_T	10 mm elastomer	≤ 3 mm /($\varepsilon_S + \varepsilon_T$)
		20 mm elastomer	≤ 6 mm /($\varepsilon_S + \varepsilon_T$)
in-situ reinforcement	A_{sx}	Pos.1	2 x 3 Ø 12 mm
	A_{sy}	Pos.2	1 x 3 Ø 12 mm
	A_{sy}	Pos.3	1 x 2 Ø 12 mm

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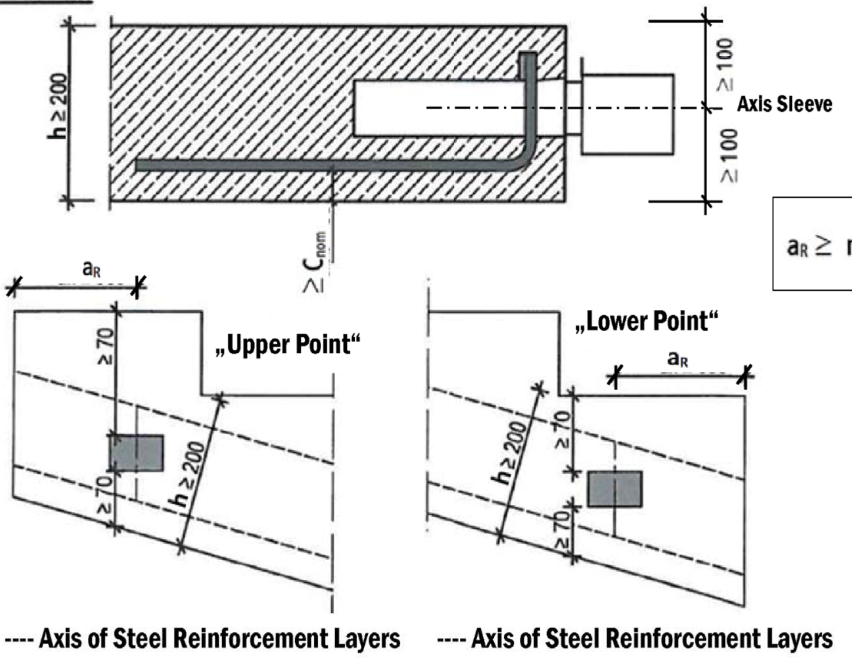
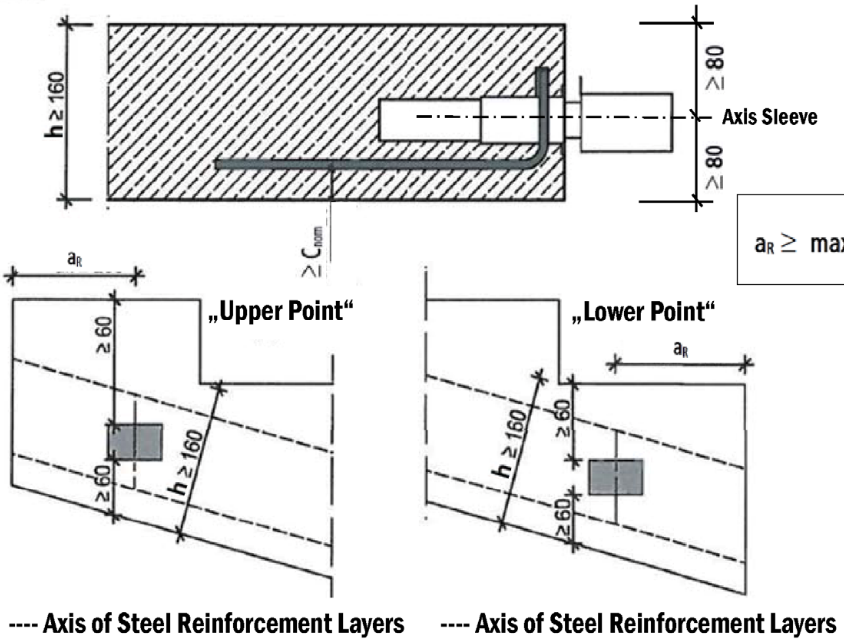
HQW 60 / 60



$$a_R \geq \max \begin{cases} 0.75 \cdot h \leq 300 \text{ mm} \\ 200 \text{ mm} \end{cases}$$

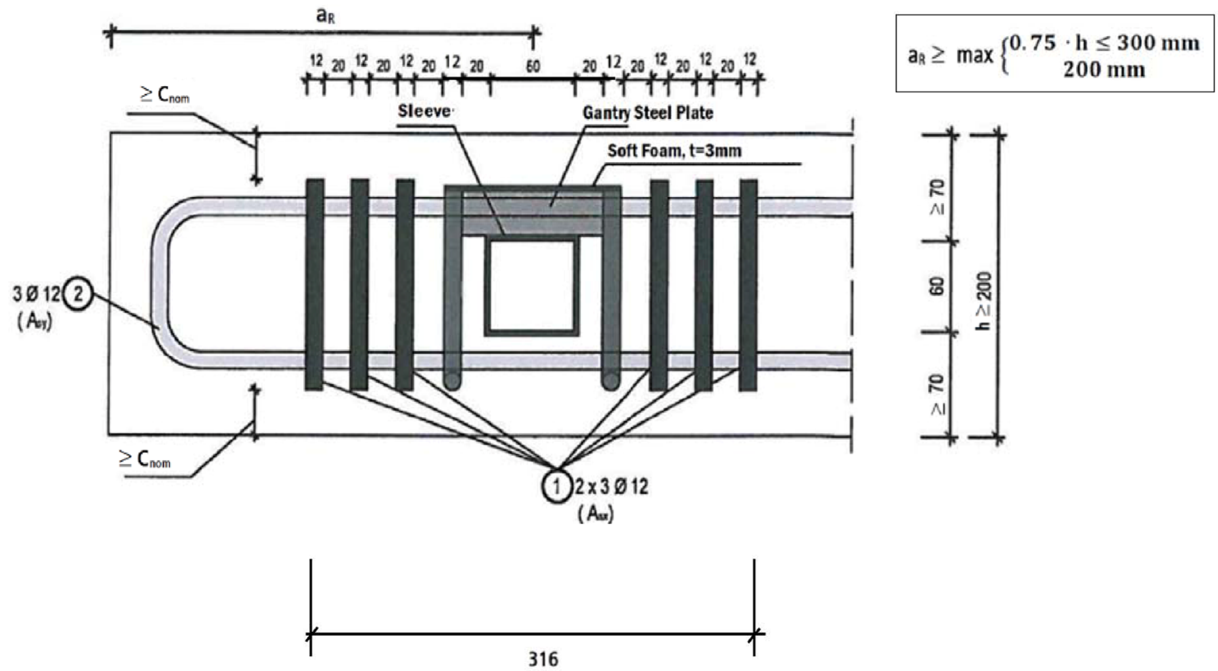
HQW 60 / 40



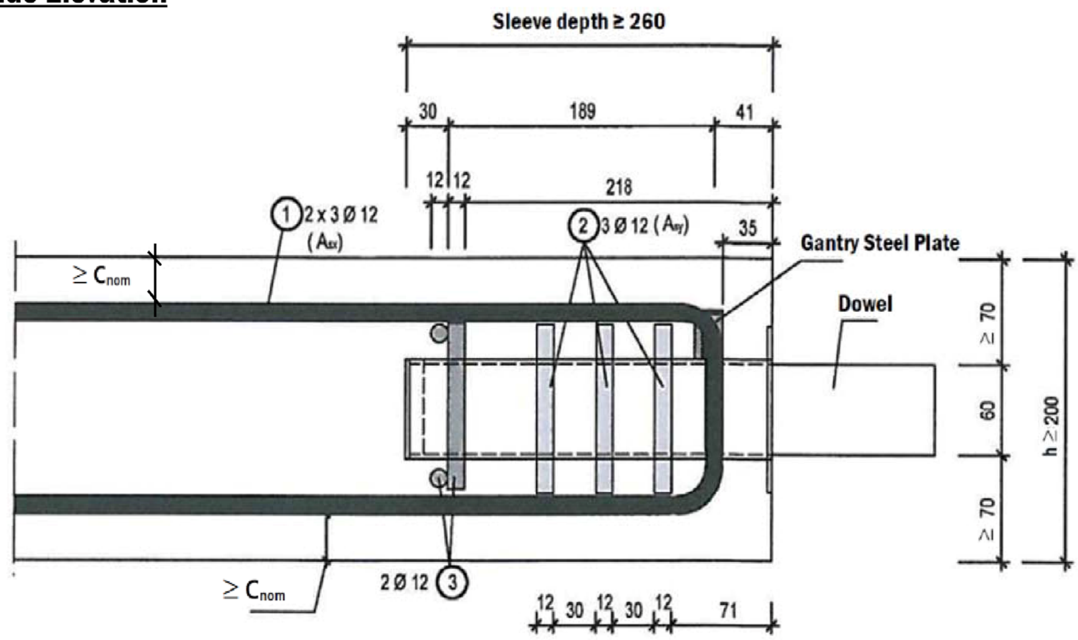
$$a_R \geq \max \begin{cases} 0.75 \cdot h \leq 200 \text{ mm} \\ 170 \text{ mm} \end{cases}$$

Pakon – Trittschallbox HQW	Annex B3
Intended Use Installation Situation	

Front Elevation

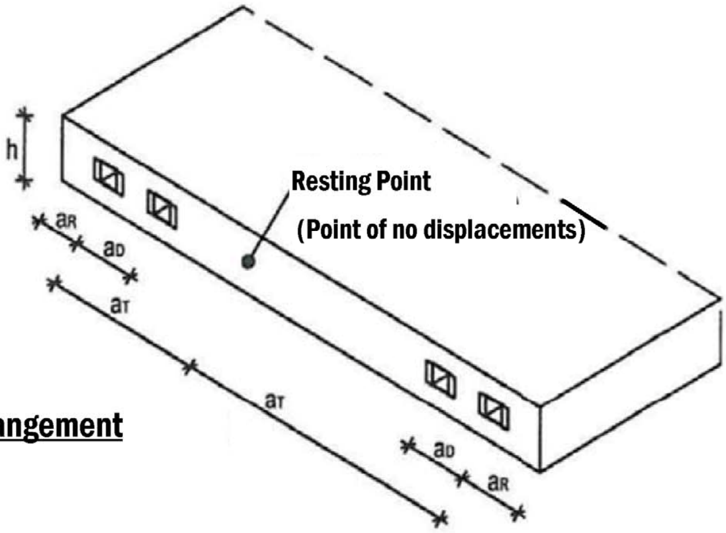


Side Elevation



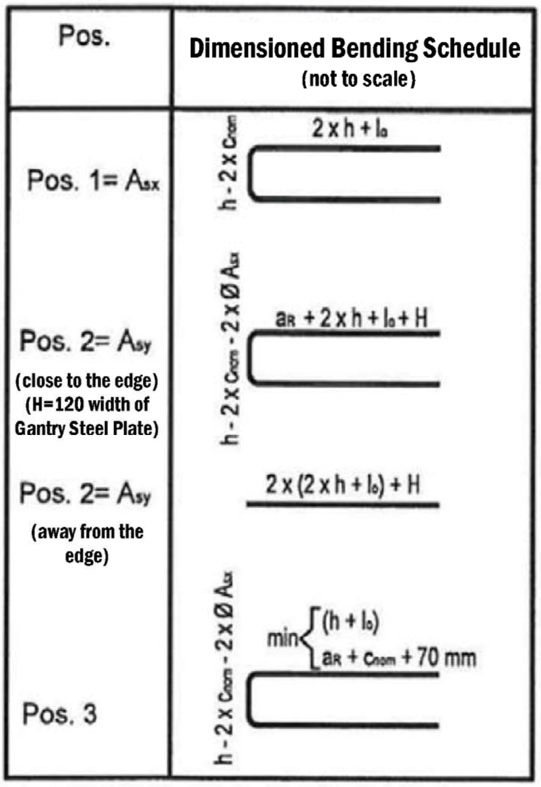
Pakon – Trittschallbox HQW	Annex B4
Intended Use In-Situ Steel Reinforcement HQW 60/60	

Element Arrangement



Bending Schedule

			HQW 60/60
slab thickness	h		≥200 mm
concrete cover	c_v		35 mm
axial edge distance	a_R		≥ max [0,75 h ≤ 300 mm; 200 mm]
horizontal axial dowel distance	a_D		≥ max [1,5 h ≤ 600 mm; 340 mm]
vertical edge distance	e		ε 70 mm
distance to zero point of slab deformation	a_T	10 mm elastomer	$\leq 3\text{ mm} / (\varepsilon_S + \varepsilon_T)$
		20 mm elastomer	$\leq 6\text{ mm} / (\varepsilon_S + \varepsilon_T)$
in-situ reinforcement	A_{sx}	Pos.1	2 x 3 Ø12 mm
	A_{sy}	Pos.2	1 x 3 Ø12 mm
	A_{sy}	Pos.3	1 x 2 Ø12 mm



Lap length with local steel reinforcement acc. to EN 1992-1-1

Pakon – Trittschallbox HQW	Annex B5
Intended Use Element Arrangement, Distances and In-Situ Steel Reinforcement HQW 60/60	

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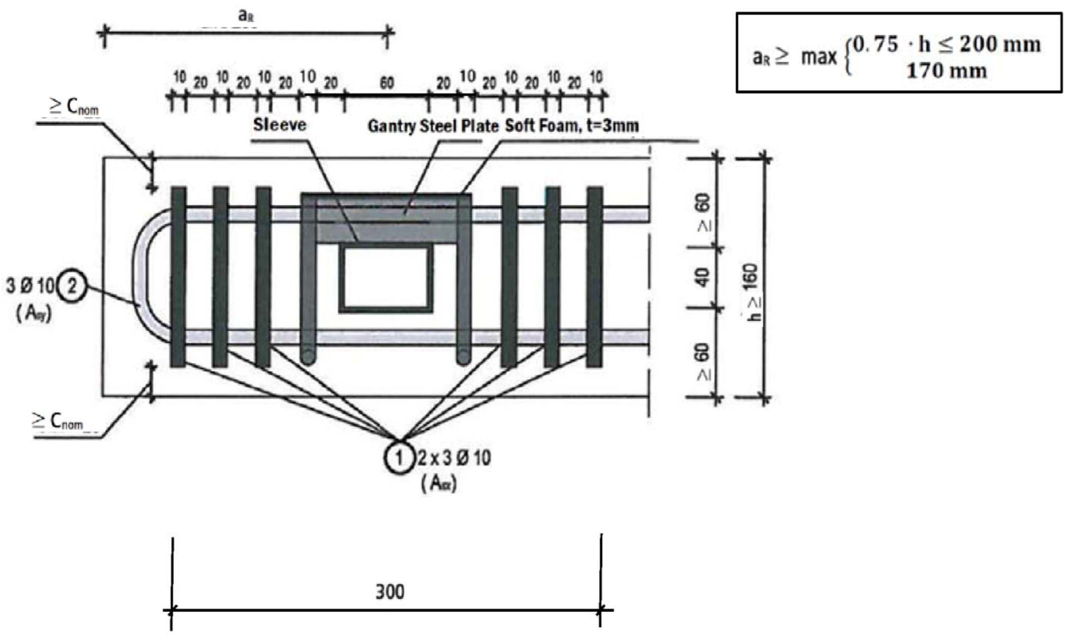
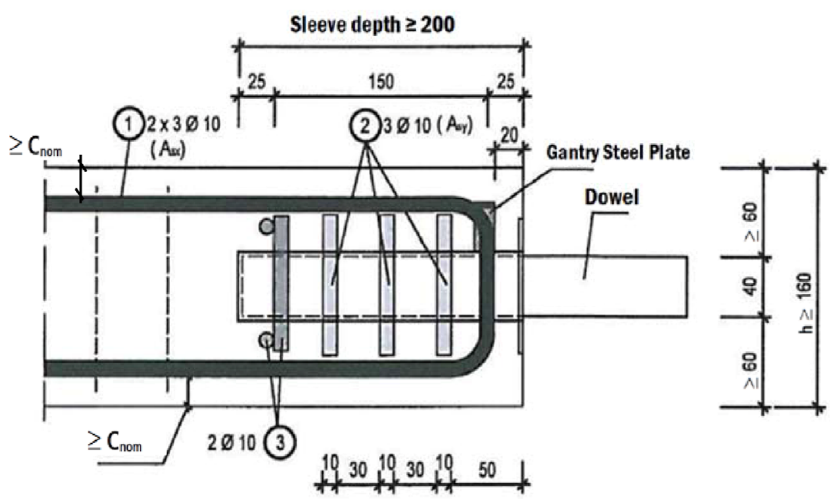
Front Elevation



Side Elevation



Pakon – Trittschallbox HQW	Annex B6
Intended Use In-Situ Steel Reinforcement HQW 60/40	

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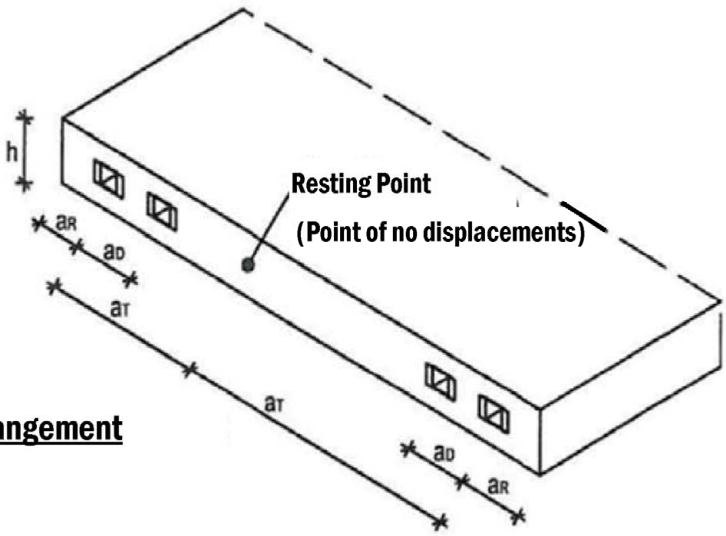
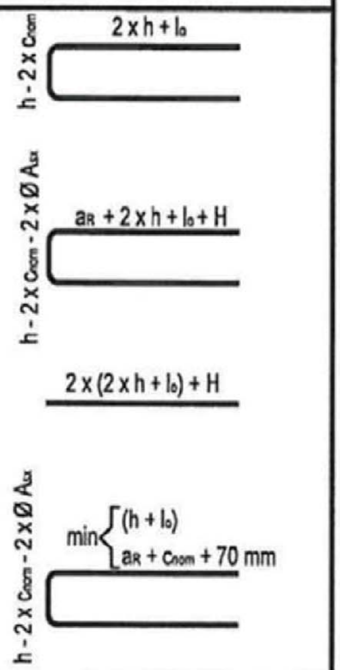


Element Arrangement

			HQW 60/40
slab thickness	h		≥160 mm
concrete cover	c_v		20 mm
axial edge distance	a_R		≥ max [0,75 h ≤ 200 mm; 170 mm]
horizontal axial dowel distance	a_D		≥ max [1,5 h ≤ 400 mm; 320 mm]
vertical edge distance	e		≥60 mm
distance to zero point of slab deformation	a_T	10 mm elastomer	$\leq 3\text{ mm} / (\varepsilon_S + \varepsilon_T)$
		20 mm elastomer	$\leq 6\text{ mm} / (\varepsilon_S + \varepsilon_T)$
in-situ reinforcement	A_{sx}	Pos.1	2 x 3 Ø 10 mm
	A_{sy}	Pos.2	1 x 3 Ø 10 mm
	A_{sy}	Pos.3	1 x 2 Ø 10 mm

Bending Schedule

Pos.	Dimensioned Bending Schedule (not to scale)
Pos. 1= A_{sx}	$2 \times h + l_0$; $h - 2 \times c_{nom}$
Pos. 2= A_{sy} (close to the edge) (H=120 width of Gantry Steel Plate)	$a_R + 2 \times h + l_0 + H$; $h - 2 \times c_{nom} - 2 \times Ø\, A_{sx}$
Pos. 2= A_{sy} (away from the edge)	$2 \times (2 \times h + l_0) + H$
Pos. 3	$\min \begin{cases} (h + l_0) \\ a_R + c_{nom} + 70\text{ mm} \end{cases}$; $h - 2 \times c_{nom} - 2 \times Ø\, A_{sx}$



Lap length with local steel reinforcement acc. to EN 1992-1-1

Pakon – Trittschallbox HQW	Annex B7
Intended Use Element Arrangement, Distances and In-Situ Steel Reinforcement HQW 60/40	

Overall Resistance Design Values V_{Rd} for HQW 60/60

HQW 60/60/4 with slab thickness h ≥ 200 mm and concrete cover c_v = 35 mm

width of joint [mm]	dowel length	S275 concrete class C20/25	S275 concrete class C25/30	S275 concrete class ≥ C30/37	S355 concrete class C20/25	S355 concrete class C25/30	S355 concrete class ≥ C30/37
10	350	44,9	44,9	44,9	55,9	58,0	58,0
20	360	41,8	41,8	41,8	53,9	54,0	54,0
30	370	38,9	38,9	38,9	50,2	50,2	50,2
40	380	36,2	36,2	36,2	46,8	46,8	46,8
50	390	33,8	33,8	33,8	43,6	43,6	43,6
60	400	31,5	31,5	31,5	40,6	40,6	40,6
70	410	29,4	29,4	29,4	37,9	37,9	37,9
80	420	27,5	27,5	27,5	35,5	35,5	35,5
90	430	25,8	25,8	25,8	33,3	33,3	33,3
100	440	24,3	24,3	24,3	31,4	31,4	31,4
110	450	23,0	23,0	23,0	29,7	29,7	29,7
120	460	21,8	21,8	21,8	28,2	28,2	28,2

HQW 60/60/5 with slab thickness h ≥ 200 mm and concrete cover c_v = 35 mm

width of joint [mm]	dowel length	S275 concrete class C20/25	S275 concrete class C25/30	S275 concrete class ≥ C30/37	S355 concrete class C20/25	S355 concrete class C25/30	S355 concrete class ≥ C30/37
10	350	54,3	54,3	54,3	55,9	62,9	69,2
20	360	50,6	50,6	50,6	53,9	60,7	65,3
30	370	47,0	47,0	47,0	52,1	58,6	60,7
40	380	43,8	43,8	43,8	50,4	56,5	56,5
50	390	40,8	40,8	40,8	48,8	52,6	52,6
60	400	38,0	38,0	38,0	47,2	49,0	49,0
70	410	35,4	35,4	35,4	45,8	45,8	45,8
80	420	33,1	33,1	33,1	42,8	42,8	42,8
90	430	31,1	31,1	31,1	40,2	40,2	40,2
100	440	29,3	29,3	29,3	37,9	37,9	37,9
110	450	27,7	27,7	27,7	35,8	35,8	35,8
120	460	26,3	26,3	26,3	34,0	34,0	34,0

Advices:
- Intermediate values may be determined by linear interpolation.
- The given concrete strengths are minimum requirements. For higher concrete strengths, the design values for the concrete strength C30/37 are valid.

concrete edge failure
steel failure

Pakon – Trittschallbox HQW

Performance
Load Bearing Capacity and Stability of Sound Insulation Box HQW 60/60

Annex C1

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Overall Resistance Design Values V_{Rd} for HQW 60/40

HQW 60/40/4 with slab thickness h ≥ 160 mm and concrete cover c_v = 20 mm

width of joint [mm]	dowel length [mm]	S275 concrete class C20/25	S275 C25/30	S275 ≥ C30/37	S355 concrete class C20/25	S355 C25/30	S355 ≥ C30/37
10	300	31,3	31,3	31,3	40,4	40,4	40,4
20	310	28,6	28,6	28,6	36,9	36,9	36,9
30	320	26,2	26,2	26,2	33,8	33,8	33,8
40	330	24,0	24,0	24,0	31,0	31,0	31,0
50	340	22,0	22,0	22,0	28,4	28,4	28,4
60	350	20,3	20,3	20,3	26,2	26,2	26,2
70	360	18,7	18,7	18,7	24,2	24,2	24,2
80	370	17,4	17,4	17,4	22,4	22,4	22,4
90	380	16,2	16,2	16,2	20,9	20,9	20,9
100	390	15,2	15,2	15,2	19,6	19,6	19,6
110	400	14,3	14,3	14,3	18,4	18,4	18,4
120	410	13,5	13,5	13,5	17,4	17,4	17,4

HQW 60/40/5 with slab thickness h ≥ 160 mm and concrete cover c_v = 20 mm

width of joint [mm]	dowel length [mm]	S275 concrete class C20/25	S275 C25/30	S275 ≥ C30/37	S355 concrete class C20/25	S355 C25/30	S355 ≥ C30/37
10	300	37,6	37,6	37,6	40,4	45,5	48,5
20	310	34,3	34,3	34,3	38,6	43,5	44,3
30	320	31,3	31,3	31,3	37,0	40,4	40,4
40	330	28,6	28,6	28,6	35,5	37,0	37,0
50	340	26,3	26,3	26,3	33,9	33,9	33,9
60	350	24,2	24,2	24,2	31,2	31,2	31,2
70	360	22,3	22,3	22,3	28,8	28,8	28,8
80	370	20,7	20,7	20,7	26,7	26,7	26,7
90	380	19,3	19,3	19,3	24,9	24,9	24,9
100	390	18,1	18,1	18,1	23,3	23,3	23,3
110	400	17,0	17,0	17,0	21,9	21,9	21,9
120	410	16,0	16,0	16,0	20,7	20,7	20,7

Advices:
- Intermediate values may be determined by linear interpolation.
- The given concrete strengths are minimum requirements. For higher concrete strengths, the design values for the concrete strength C30/37 are valid.

concrete edge failure
steel failure

Pakon – Trittschallbox HQW	Annex C2
Performance Load Bearing Capacity and Stability of Sound Insulation Box HQW 60/60	