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Authorised and notified according  
to Article 29 of the Regulation (EU)  
No 305/2011 of the European  
Parliament and of the Council of 9  
March 2011

MEMBER OF EOTA



## European Technical Assessment ETA-20/0335 of 2020/06/02

### I General Part

**Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S**

**Trade name of the construction product:**

Lightweight concrete screw HL

**Product family to which the above construction product belongs:**

Screw anchor for autoclaved aerated concrete and lightweight aggregate concrete

**Manufacturer:**

ESSVE Produkter AB  
Esbogatan 14  
SE-164 74 Kista  
Tel. +46 (0)8 623 61 00  
Internet [www.essve.se](http://www.essve.se)

**Manufacturing plant:**

ESSVE manufacturing plants

**This European Technical Assessment contains:**

18 pages including 13 annexes which form an integral part of the document

**This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:**

EAD 330424-00-0604; Screw anchor for autoclaved aerated concrete and lightweight aggregate concrete

**This version replaces:**

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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## **II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT**

### **1 Technical description of product and intended use**

#### **Technical description of the product**

ESSVE Lightweight concrete screw HL is a lightweight concrete screw made of galvanized steel. The anchor is screwed directly into the base material without pre-drilling.

An illustration of the product is given in Annex A.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment.

The anchors are intended to be used with embedment depth given in Annex B, Table B1. The intended use specifications of the product are detailed in the Annex B1.

### **2 Specification of the intended use in accordance with the applicable EAD**

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

The provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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 Characteristics of product**

##### **Mechanical resistance and stability (BWR 1):**

The essential characteristics are detailed in the Annex from C1 to C7.

##### **Safety in case of fire (BWR 2):**

The screws are made from steel classified as **Euroclass A1** in accordance with the provisions of Commission Delegated Regulation 2016/364 and EC decision 96/603/EC, amended by EC Decision 2000/605/EC

#### **3.2 Methods of assessment**

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 has been made in accordance with EAD 330424-00-0604; Screw anchor for autoclaved aerated concrete and lightweight aggregate concrete.

## **4 Assessment and verification of constancy of performance (AVCP)**

### **4.1 AVCP system**

According to the decision 96/582/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

## **5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD**

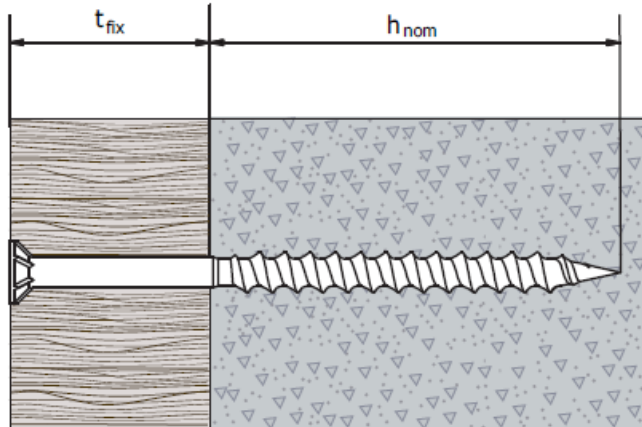
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2020-06-02 by

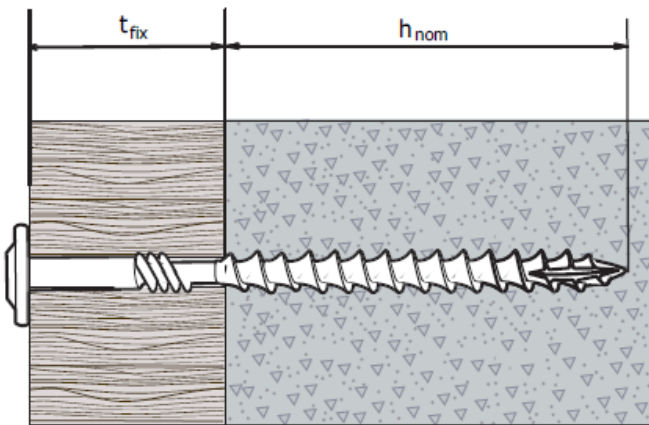


Thomas Bruun  
Managing Director, ETA-Danmark

**Lightweight concrete screw HL after installation**



**HL-C**



**HL-W**

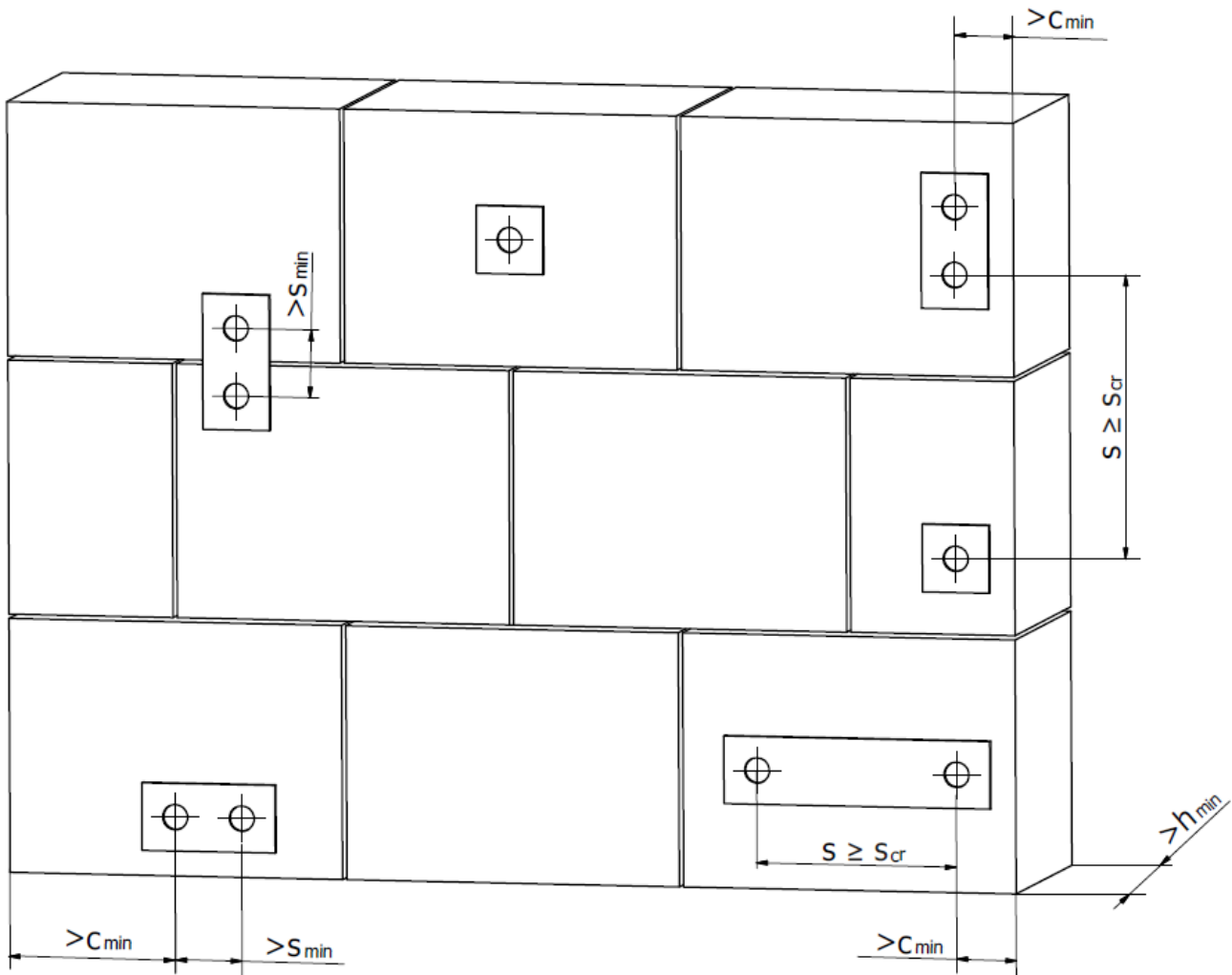
$h_{nom}$  = Nominal embedment depth  
 $t_{fix}$  = Fixture thickness

**Lightweight concrete screw HL**

**Product description**  
 Installed condition

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**Lightweight concrete screw HL after installation**




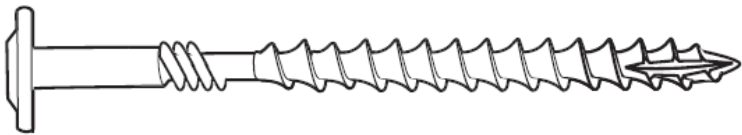
- $h_{min}$  = Minimum thickness of member
- $S_{min}$  = Minimum spacing
- $S_{cr}$  = Spacing for ensuring transmission of the characteristic resistance of a single fastener
- $C_{min}$  = Minimum edge distance

**Lightweight concrete screw HL**

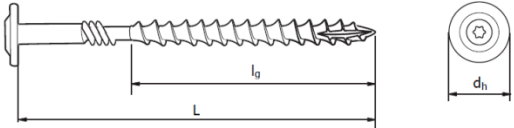
**Product description**  
Installed condition

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**Table A1: Materials and Types**

Material		
Hardened carbon steel – zinc plated. Steel grade SAE 1022		
Type	Size	Design
HL-C	8	
HL-W	10	

**Table A2: Anchor dimensions and head marking**

Anchor size and type			HL-C 8	HL-W 10	Head Marking
Nominal diameter	$d_{nom}$	[mm]	8	10	
Length	L	[mm]	180-240	185-210	
Diameter of head	$d_h$	[mm]	12	21,5	
Thread length	$L_g$	[mm]	100	160	

**Lightweight concrete screw HL**

**Product description**  
Materials, types and dimensions

**Annex A2**  
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**Specifications of intended use**

**Anchorage subjected to:**

- Static, quasi static load.

**Base materials:**

- Solid autoclaved aerated concrete AAC 2,5 to AAC 4 according to EN 771-4:2011+A1:2015.
- Solid lightweight aggregate concrete LAC 5 according to EN 771-3:2011+A1:2015.
- The characteristic resistance of the anchor is also valid for solid AAC / LAC bricks of larger sizes and/or higher compressive strength than those given in this ETA.
- Job-site tests in tension on solid base material members (EN 771-3 or EN 771-4) are permitted when done in accordance with EOTA Technical Report TR 051, where  $N_{Rk1} = 0,5 N_1 \leq N_{Rk,ETA}$ , with  $N_1$  = mean value of the five smallest measured values at the ultimate load

**Use conditions (Environmental conditions):**

- The anchor may be used in structures subject to dry internal conditions.
- Base temperature range in service condition -40°C to +80°C.

**Design:**

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Anchorages under static and quasi-static actions can be designed in accordance with EOTA TR 054, Edition April 2016.
- Verifiable calculation notes and drawings are prepared taking into account of the load to be anchored. The position of the anchor is indicated on the design drawings.

**Installation:**

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on the site.
- Anchor installation in accordance with the manufacturer’s specifications and drawings using the appropriate tools.
- Installation in joints is not allowed.
- Verify before installing the anchor to ensure that the strength class of the base material in which the anchor is to be placed is in the range given and is not lower than that of the base material to which the characteristic loads apply for.
- Anchor installation ensuring the specified nominal embedment depth  $h_{nom}$ .
- Keeping of the edge distance and spacing to the specified values without minus tolerances.

<b>Lightweight concrete screw HL</b>	<b>Annex B1</b> of European Technical Assessment ETA-20/0335
<b>Intended use</b> Specifications	

**Table B1:** Installation data

Lightweight concrete screw HL			Anchor size and type	
			HL-C 8	HL-W 10
Nominal embedment depth	$h_{nom}$	[mm]	100	160
Effective anchorage depth	$h_{ef}$	[mm]	86	150
Thickness of the fixture	$t_{fix}$	[mm]	80-140	25-50
Screw recess	/	/	TX30	TX40

**Table B2:** Minimum thickness of member, spacing and edge distance in AAC

Lightweight concrete screw HL			Anchor size and type	
			HL-C 8	HL-W 10
Minimum thickness of member	$h_{min}$	[mm]	150	200
<b>Single anchor and anchor group</b>				
Minimum spacing	$s_{min}$	[mm]	80	100
Characteristic spacing	$s_{cr}$	[mm]	3 $h_{ef}$	
Minimum edge distance	$c_{min}$	[mm]	80	100

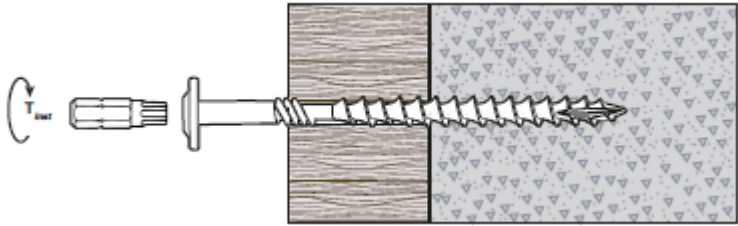
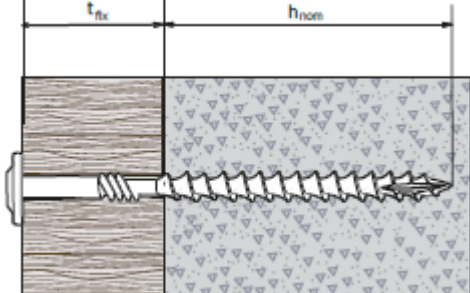
**Table B3:** Minimum thickness of member, spacing and edge distance in LAC

Lightweight concrete screw HL			Anchor size and type	
			HL-W 10	
Minimum thickness of member	$h_{min}$	[mm]	190	
<b>Single anchor and anchor group</b>				
Minimum spacing	$s_{min}$	[mm]	100	
Characteristic spacing	$s_{cr}$	[mm]	3 $h_{ef}$	
Minimum edge distance	$c_{min}$	[mm]	100	

Lightweight concrete screw HL

Intended use  
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**Installation instructions**




<p>1.</p>		<p>The lightweight concrete screw HL should be installed directly into the base material without pre-drilling. If the fixture material is made of timber it should not be pre-drilled either.</p> <p>Anchor should be installed in the base material with a rotary screwdriver power tool without impact setting.</p>
<p>2.</p>		<p>The installation is complete once the screw head is flush with the fixture surface.</p> <p>Note! If the screw is over-torqued at this point it risks damaging the base material in such a way that the load capacity of the anchor is lost. Use a low speed gear to minimize the risk of over-tightening the anchor.</p>

**Lightweight concrete screw HL**

**Intended use**  
Installation instructions

**Annex B3**  
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**Table C1:** Base materials

Base material	Picture	Dimensions L×W×H [mm]	Minimum compressive strength $f_b$ [MPa]	Bulk density class [kg/m <sup>3</sup> ]
Autoclaved aerated concrete AAC 2,5 acc. to EN 771-4		150×200×600	2,5	375 ± 25
		200×200×600		
Autoclaved aerated concrete AAC 4 acc. to EN 771-4		150×200×600	4,0	575 ± 25
		200×200×600		
Lightweight aggregate concrete LAC 5 acc.to EN 771-3		190×190×590	5,0	850 ± 85


**Table C2:** Characteristic bending resistance

Lightweight concrete screw HL			Anchor size and type	
			HL-C 8	HL-W 10
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	25	40
Partial safety factor	$\gamma_{Ms}^{1)}$		1,5	1,5

<sup>1)</sup> In absence of other national regulations

<b>Lightweight concrete screw HL</b>	<b>Annex C1</b> of European Technical Assessment ETA-20/0335
<b>Performance</b> Base material, characteristic bending resistance of the screw	

**Base material type: Autoclaved aerated concrete AAC 2,5****Table C3:** Description of the brick

Brick Type	Autoclaved aerated concrete AAC 2,5		
Bulk density	$\rho$ [kg/m <sup>3</sup> ]	375	
Compressive strength	$f_b \geq$ [N/mm <sup>2</sup> ]	2,5	
Code	EN 771-4		
Producer	e.g. Ytong Xella		
Brick dimensions	[mm]	150 × 200 × 600 200 × 200 × 600	

**Table C4:** Installation parameters

Lightweight concrete screw HL			HL-C 8	HL-W 10
Embedment depth	$h_{nom}$	[mm]	100	160
Effective anchorage depth	$h_{ef}$	[mm]	86	150
Minimum edge distance	$c_{min}$	[mm]	80	100
Characteristic spacing	$s_{cr}$	[mm]	3 $h_{ef}$	
Minimum spacing	$s_{min}$	[mm]	80	100
Installation method			without impact	

**Table C5:** Characteristic resistance in tension of single anchor -  $N_{Rk}$ 

Lightweight concrete screw HL			HL-C 8	HL-W 10
Embedment depth	$h_{nom}$	[mm]	100	160
Autoclaved aerated concrete AAC 2,5	$N_{Rk}$	[kN]	0,9	2,0
Partial safety factor	$\gamma_M$	[-]	2,0 <sup>1)</sup>	

<sup>1)</sup> In absence of other national regulations

**Table C6:** Characteristic resistance in shear of single anchor -  $V_{Rk}$ 

Lightweight concrete screw HL			HL-C 8	HL-W 10
Embedment depth	$h_{nom}$	[mm]	100	160
Autoclaved aerated concrete AAC 2,5	$V_{Rk}$	[kN]	1,5	3,0
Partial safety factor	$\gamma_M$	[-]	2,0 <sup>1)</sup>	

<sup>1)</sup> In absence of other national regulations

**Lightweight concrete screw HL****Performance Autoclaved aerated concrete AAC 2,5**

Description of a brick, installation parameters, characteristic resistances

**Annex C2**  
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**Base material type: Autoclaved aerated concrete AAC 2,5**

**Table C7:** Characteristic resistance in tension of group with two anchors -  $N_{Rk}^g$

Configuration		with $c \geq$ [mm]	with $s \geq$ [mm]	Lightweight concrete screw HL			
				HL-C 8		HL-W 10	
				$\alpha_{g,N}$ [/]	$N_{Rk}^g$ [kN]	$\alpha_{g,N}$ [/]	$N_{Rk}^g$ [kN]
II: anchors placed parallel to horizontal joint		$c_{min}$	$s_{min}$	2,0	1,8	1,75	3,5
⊥: anchors placed perpendicular to horizontal joint							

**Table C8:** Characteristic resistance in shear of group with two anchors -  $V_{Rk}^g$

Configuration		with $c \geq$ [mm]	with $s \geq$ [mm]	Lightweight concrete screw HL			
				HL-C 8		HL-W 10	
				$\alpha_{g,V}$ [/]	$V_{Rk}^g$ [kN]	$\alpha_{g,V}$ [/]	$V_{Rk}^g$ [kN]
II: anchors placed parallel to horizontal joint		$c_{min}$	$s_{min}$	2,0	3,0	2,0	6,0
⊥: anchors placed perpendicular to horizontal joint							

**Table C9:** Displacements


Lightweight concrete screw HL	$h_{nom}$ [mm]	Tension load			Shear load		
		N [kN]	$\delta_{N0}$ [mm]	$\delta_{N\infty}$ [mm]	V [kN]	$\delta_{V0}$ [mm]	$\delta_{V\infty}$ [mm]
HL-C 8	100	0,32	0,002	0,159	0,54	1,787	1,681
HL-W 10	160	0,71	0,018	0,159	1,07	2,543	3,815

**Lightweight concrete screw HL**

**Performance Autoclaved aerated concrete AAC 2,5**  
Characteristic resistances, displacements

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**Base material type: Autoclaved aerated concrete AAC 4****Table C10:** Description of the brick

Brick Type	Autoclaved aerated concrete AAC 4		
Bulk density	$\rho$ [kg/m <sup>3</sup> ]	575	
Compressive strength	$f_b \geq$ [N/mm <sup>2</sup> ]	4	
Code	EN 771-4		
Producer	e.g. Ytong Xella		
Brick dimensions	[mm]	150 × 200 × 600 200 × 200 × 600	

**Table C11:** Installation parameters

Lightweight concrete screw HL			HL-C 8	HL-W 10
Embedment depth	$h_{nom}$	[mm]	100	160
Effective anchorage depth	$h_{ef}$	[mm]	86	150
Minimum edge distance	$c_{min}$	[mm]	80	100
Characteristic spacing	$s_{cr}$	[mm]	3 $h_{ef}$	
Minimum spacing	$s_{min}$	[mm]	80	100
Installation method			without impact	

**Table C12:** Characteristic resistance in tension of single anchor –  $N_{Rk}$ 

Lightweight concrete screw HL			HL-C 8	HL-W 10
Embedment depth	$h_{nom}$	[mm]	100	160
Autoclaved aerated concrete AAC 4	$N_{Rk}$	[kN]	2,0	3,0
Partial safety factor	$\gamma_M$	[-]	2,0 <sup>1)</sup>	

<sup>1)</sup> In absence of other national regulations

**Table C13:** Characteristic resistance in shear of single anchor –  $V_{Rk}$ 

Lightweight concrete screw HL			HL-C 8	HL-W 10
Embedment depth	$h_{nom}$	[mm]	100	160
Autoclaved aerated concrete AAC 4	$V_{Rk}$	[kN]	2,0	3,5
Partial safety factor	$\gamma_M$	[-]	2,0 <sup>1)</sup>	

<sup>1)</sup> In absence of other national regulations

**Lightweight concrete screw HL**

**Performance Autoclaved aerated concrete AAC 4**  
Description of a brick, installation parameters, characteristic resistances

**Annex C4**  
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**Base material type: Autoclaved aerated concrete AAC 4**

**Table C14:** Characteristic resistance in tension of group with two anchors –  $N_{Rk}^g$

Configuration		with $c \geq$ [mm]	with $s \geq$ [mm]	Lightweight concrete screw HL			
				HL-C 8		HL-W 10	
				$\alpha_{g,N}$ [/]	$N_{Rk}^g$ [kN]	$\alpha_{g,N}$ [/]	$N_{Rk}^g$ [kN]
II: anchors placed parallel to horizontal joint		$c_{min}$	$s_{min}$	2,0	4,0	1,75	5,25
⊥: anchors placed perpendicular to horizontal joint							

**Table C15:** Characteristic resistance in shear of group with two anchors –  $V_{Rk}^g$

Configuration		with $c \geq$ [mm]	with $s \geq$ [mm]	Lightweight concrete screw HL			
				HL-C 8		HL-W 10	
				$\alpha_{g,V}$ [/]	$V_{Rk}^g$ [kN]	$\alpha_{g,V}$ [/]	$V_{Rk}^g$ [kN]
II: anchors placed parallel to horizontal joint		$c_{min}$	$s_{min}$	2,0	4,0	2,0	7,0
⊥: anchors placed perpendicular to horizontal joint							

**Table C16:** Displacements

Lightweight concrete screw HL	$h_{nom}$ [mm]	Tension load			Shear load		
		N [kN]	$\delta_{N0}$ [mm]	$\delta_{N\infty}$ [mm]	V [kN]	$\delta_{V0}$ [mm]	$\delta_{V\infty}$ [mm]
	HL-C 8	100	0,71	0,259	0,259	0,71	0,820
HL-W 10	160	1,07	0,128	0,159	1,25	2,403	3,605


**Lightweight concrete screw HL**

**Performance Autoclaved aerated concrete AAC 4**  
Characteristic resistances, displacements

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**Base material type: Lightweight aggregate concrete LAC 5****Table C17:** Description of the brick

Brick Type	Lightweight aggregate concrete LAC 5		
Bulk density	$\rho$ [kg/m <sup>3</sup> ]	850	
Compressive strength	$f_b \geq$ [N/mm <sup>2</sup> ]	5	
Code	EN 771-3		
Producer	e.g. Finja		
Brick dimensions	[mm]	190 × 190 × 590	

**Table C18:** Installation parameters

Lightweight concrete screw HL			HL-W 10
Embedment depth	$h_{nom}$	[mm]	160
Effective anchorage depth	$h_{ef}$	[mm]	150
Minimum edge distance	$c_{min}$	[mm]	100
Characteristic spacing	$s_{cr}$	[mm]	3 $h_{ef}$
Minimum spacing	$s_{min}$	[mm]	100
Installation method			without impact

**Table C19:** Characteristic resistance in tension of single anchor -  $N_{Rk}$ 

Lightweight concrete screw HL			HL-W 10
Embedment depth	$h_{nom}$	[mm]	160
Lightweight aggregate concrete LAC 5	$N_{Rk}$	[kN]	5,0
Partial safety factor	$\gamma_M$	[-]	2,5 <sup>1)</sup>

<sup>1)</sup> In absence of other national regulations

**Table C20:** Characteristic resistance in shear of single anchor -  $V_{Rk}$ 

Lightweight concrete screw HL			HL-W 10
Embedment depth	$h_{nom}$	[mm]	160
Lightweight aggregate concrete LAC 5	$V_{Rk}$	[kN]	4,5
Partial safety factor	$\gamma_M$	[-]	2,5 <sup>1)</sup>

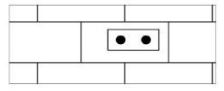
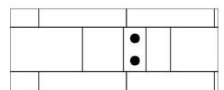
<sup>1)</sup> In absence of other national regulations

**Lightweight concrete screw HL**

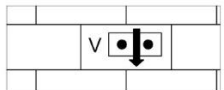
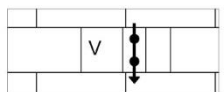
**Performance Autoclaved aerated concrete LAC 5**  
Description of a brick, installation parameters, characteristic resistances

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**Base material type: Lightweight aggregate concrete LAC 5****Table C21:** Characteristic resistance in tension of group with two anchors -  $N_{Rk}^g$ 

Configuration		with $c \geq$ [mm]	with $s \geq$ [mm]	Lightweight concrete screw HL	
				HL-W 10	
				$\alpha_{g,N}$ [°]	$N_{Rk}^g$ [kN]
II: anchors placed parallel to horizontal joint		$c_{min}$	$s_{min}$	1,6	8,0
⊥: anchors placed perpendicular to horizontal joint					

**Table C22:** Characteristic resistance in shear of group with two anchors -  $V_{Rk}^g$ 

Configuration		with $c \geq$ [mm]	with $s \geq$ [mm]	Lightweight concrete screw HL	
				HL-W 10	
				$\alpha_{g,V}$ [°]	$V_{Rk}^g$ [kN]
II: anchors placed parallel to horizontal joint		$c_{min}$	$s_{min}$	1,95	8,78
⊥: anchors placed perpendicular to horizontal joint					

**Table C23:** Displacements

Lightweight concrete screw HL	$h_{nom}$ [mm]	Tension load			Shear load		
		N [kN]	$\delta_{N0}$ [mm]	$\delta_{N\infty}$ [mm]	V [kN]	$\delta_{V0}$ [mm]	$\delta_{V\infty}$ [mm]
HL-W 10	160	1,43	0,325	0,325	1,28	2,268	3,402

Lightweight concrete screw HL

Performance Autoclaved aerated concrete LAC 5  
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