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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

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
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:	

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.

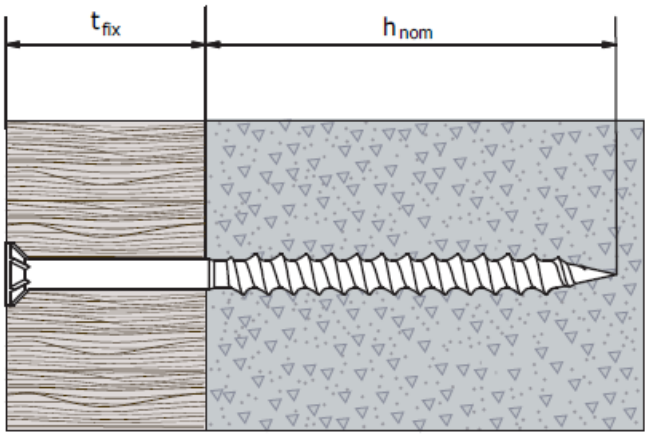
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

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

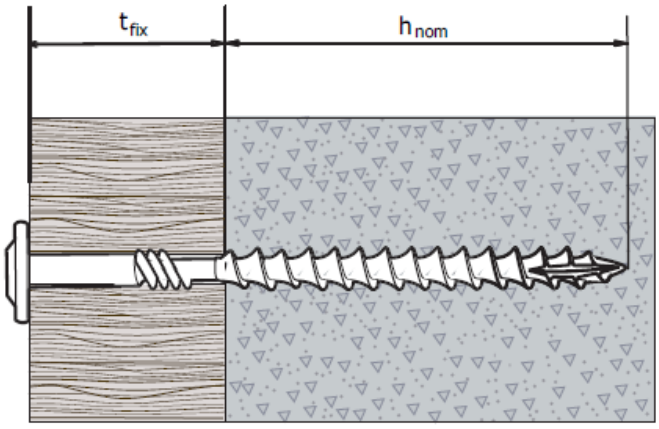
Issued in Copenhagen on 2020-06-02 by

Thomas Bruun
Managing Director, ETA-Danmark

Lightweight concrete screw HL after installation



HL-C

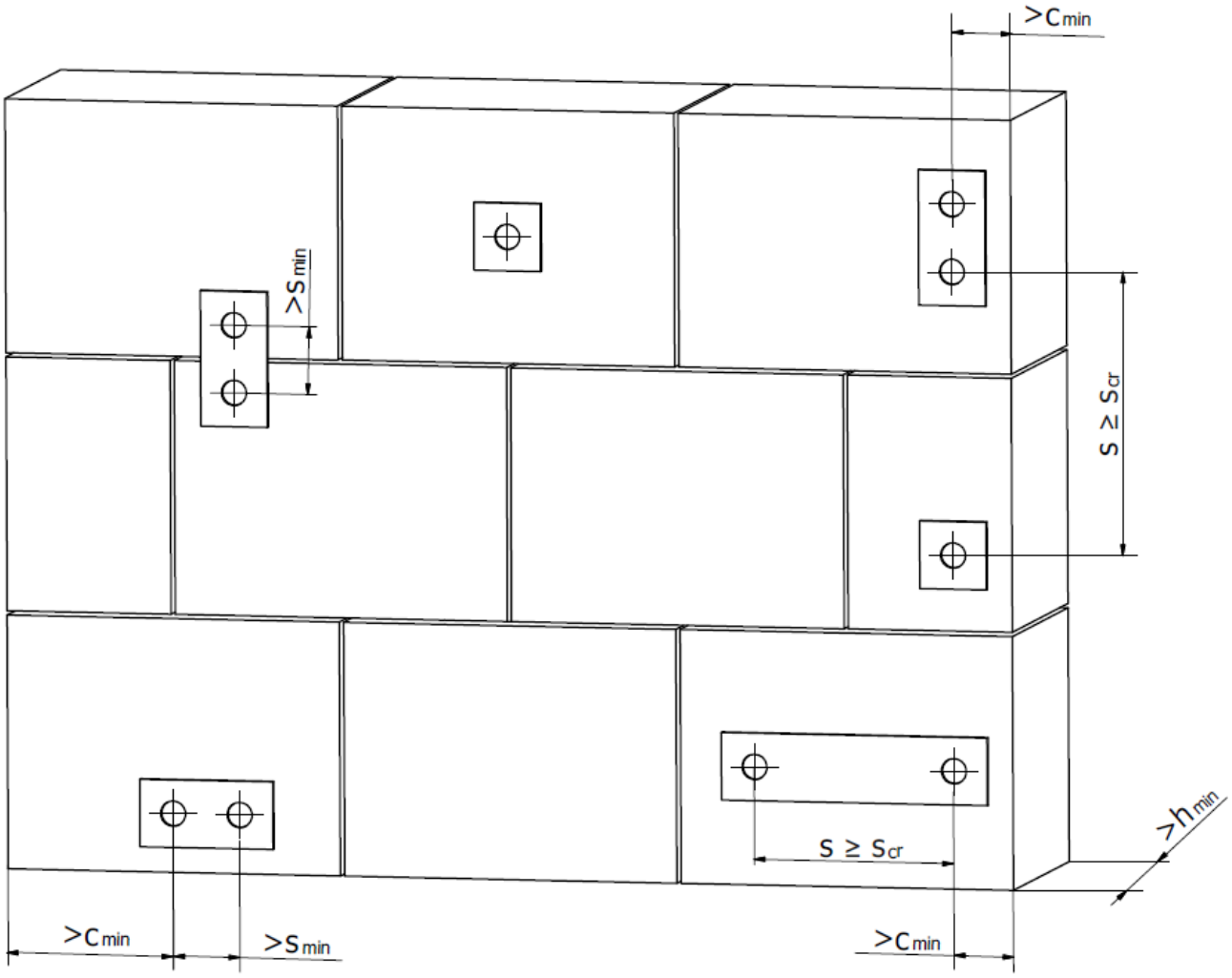


HL-W

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

Lightweight concrete screw HL **Product description** Installed condition	**Annex A1** of European Technical Assessment ETA-20/0335

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	**Annex A2** of European Technical Assessment ETA-20/0335
Product description Installed condition	

Table A1: Materials and Types

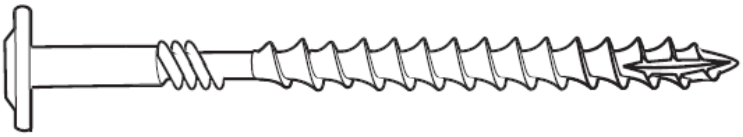
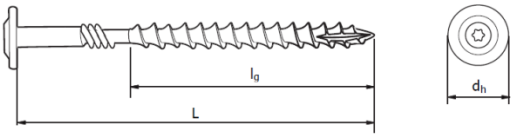
Material		
Hardened carbon steel – zinc plated. Steel grade SAE 1022		
Type	**Size**	**Design**
HL-C	8	
HL-W	10	

Table A2: Anchor dimensions and head marking

Anchor size and type			**HL-C 8**	**HL-W 10**
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

Head Marking

HL-C: -
HL-W: ESSVE



Lightweight concrete screw HL	**Annex A2** of European Technical Assessment ETA-20/0335
Product description Materials, types and dimensions	

Specifications of intended use

Anchorages 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 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.

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
Single anchor and anchor group				
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
Single anchor and anchor group			
Minimum spacing	s_{min}	[mm]	100
Characteristic spacing	s_{cr}	[mm]	3 h_{ef}
Minimum edge distance	c_{min}	[mm]	100

Installation instructions

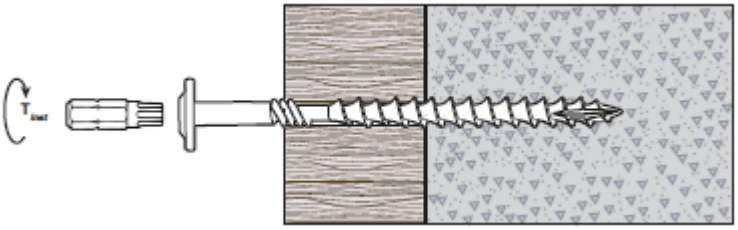
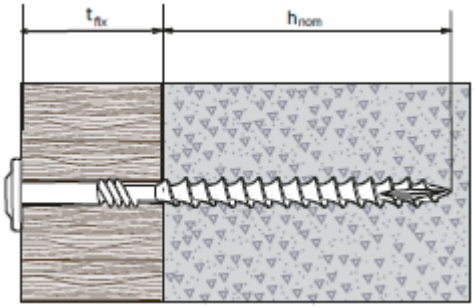
1.		The lightweight concrete screw HL should be installed directly into the base material without pre-drilling. If the fixture material is made of timber it should not be pre-drilled either. Anchor should be installed in the base material with a rotary screwdriver power tool without impact setting.
2.		The installation is complete once the screw head is flush with the fixture surface. 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.

Table C1: Base materials

Base material	**Picture**	**Dimensions L×W×H** [mm]	**Minimum compressive strength f_b** [MPa]	**Bulk density class** [kg/m³]
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	γ_{Ms} [1)]		1,5	1,5

[1)] In absence of other national regulations

Lightweight concrete screw HL	**Annex C1** of European Technical Assessment ETA-20/0335
Performance 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	ρ [kg/m³]	375	
Compressive strength	$f_b \geq$ [N/mm²]	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	γ_M	[-]	2,0[1)]	

[1)] 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	γ_M	[-]	2,0[1)]	

[1)] In absence of other national regulations

Base material type: Autoclaved aerated concrete AAC 2,5

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

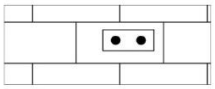
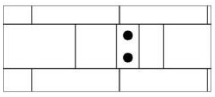
Configuration		with c ≥	with s ≥	**Lightweight concrete screw HL**			
				HL-C 8		**HL-W 10**	
				$\alpha_{g,N}$	N_{Rk}^{g}	$\alpha_{g,N}$	N_{Rk}^{g}
		[mm]	[mm]	[/]	[kN]	[/]	[kN]
II: anchors placed parallel to horizontal joint		c_{min}	s_{min}	2,0	1,8	1,75	3,5
⊥: anchors placed perpendicular to horizontal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

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

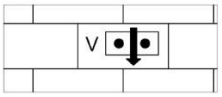
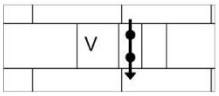
Configuration		with c ≥	with s ≥	**Lightweight concrete screw HL**			
				HL-C 8		**HL-W 10**	
				$\alpha_{g,V}$	V_{Rk}^{g}	$\alpha_{g,V}$	V_{Rk}^{g}
		[mm]	[mm]	[/]	[kN]	[/]	[kN]
II: anchors placed parallel to horizontal joint		c_{min}	s_{min}	2,0	3,0	2,0	6,0
⊥: anchors placed perpendicular to horizontal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

Table C9: Displacements

Lightweight concrete screw HL	h_{nom}	Tension load			Shear load		
		N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
	[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[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

Base material type: Autoclaved aerated concrete AAC 4

Table C10: Description of the brick

Brick Type		**Autoclaved aerated concrete AAC 4**
Bulk density	ρ [kg/m³]	575
Compressive strength	$f_b \geq$ [N/mm²]	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	γ_M	[-]	2,0[1)]	

[1)] 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	γ_M	[-]	2,0[1)]	

[1)] In absence of other national regulations

Base material type: Autoclaved aerated concrete AAC 4

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

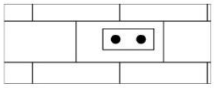
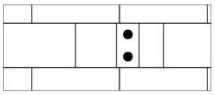
Configuration		with c ≥	with s ≥	Lightweight concrete screw HL			
				HL-C 8		HL-W 10	
				$\alpha_{g,N}$	N_{Rk}^{g}	$\alpha_{g,N}$	N_{Rk}^{g}
		[mm]	[mm]	[/]	[kN]	[/]	[kN]
II: anchors placed parallel to horizontal joint		c_{min}	s_{min}	2,0	4,0	1,75	5,25
⊥: anchors placed perpendicular to horizontal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

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

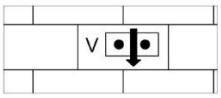
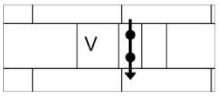
Configuration		with c ≥	with s ≥	Lightweight concrete screw HL			
				HL-C 8		HL-W 10	
				$\alpha_{g,V}$	V_{Rk}^{g}	$\alpha_{g,V}$	V_{Rk}^{g}
		[mm]	[mm]	[/]	[kN]	[/]	[kN]
II: anchors placed parallel to horizontal joint		c_{min}	s_{min}	2,0	4,0	2,0	7,0
⊥: anchors placed perpendicular to horizontal joint							

Table C16: Displacements

Lightweight concrete screw HL	h_{nom}	Tension load			Shear load		
		N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
	[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
HL-C 8	100	0,71	0,259	0,259	0,71	0,820	1,230
HL-W 10	160	1,07	0,128	0,159	1,25	2,403	3,605

Base material type: Lightweight aggregate concrete LAC 5

Table C17: Description of the brick

Brick Type		**Lightweight aggregate concrete LAC 5**
Bulk density	ρ [kg/m³]	850
Compressive strength	$f_b \geq$ [N/mm²]	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	γ_M	[-]	2,5[1)]

[1)] 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	γ_M	[-]	2,5[1)]

[1)] In absence of other national regulations

Base material type: Lightweight aggregate concrete LAC 5

Table C21: Characteristic resistance in tension of group with two anchors - N_{Rk}^{g}

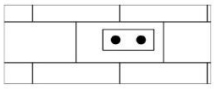
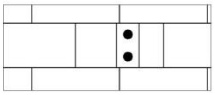
Configuration		with c ≥	with s ≥	**Lightweight concrete screw HL**	
				HL-W 10	
				$\alpha_{g,N}$	N_{Rk}^{g}
		[mm]	[mm]	[/]	[kN]
II: anchors placed parallel to horizontal joint		c_{min}	s_{min}	1,6	8,0
⊥: anchors placed perpendicular to horizontal joint					

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

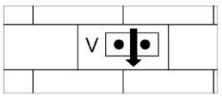
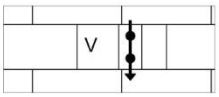
Configuration		with c ≥	with s ≥	**Lightweight concrete screw HL**	
				HL-W 10	
				$\alpha_{g,V}$	V_{Rk}^{g}
		[mm]	[mm]	[/]	[kN]
II: anchors placed parallel to horizontal joint		c_{min}	s_{min}	1,95	8,78
⊥: anchors placed perpendicular to horizontal joint					

Table C23: Displacements

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