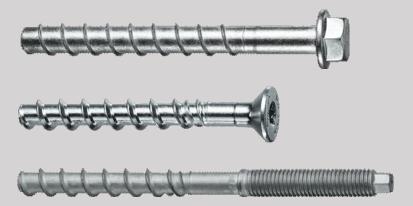


EXAMPLE DESIGN CALCULATIONS

HUS4 screw in solid masonry

UPDATE: Oct-25





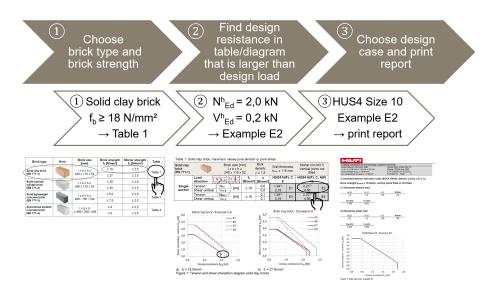
HUS4 in masonry in accordance with ETA 23/0936 (13.05.2025) and TR 054 (July 2022) – Example calculations of resistances to static and quasi-static loading, status 10-2025

This document provides pre-calculated design resistance data to static or quasi-static loading in accordance with TR 054 of July 2022 for Hilti screw anchor HUS4 Size 8 and Size 10 based on ETA 23/0936 (13.05.2025). It is the responsibility of the user to derive the loads on each screw and compare with the given resistances. In accordance with ETA 23/0936 anchorage may be subject to static or quasi-static loading. Note that only resistance data is given in the reports.

Approval no	Application / loading condition	Authority / Laboratory	Date of issue
ETA 23/0936	Static and quasi-static, Fire	DIBt, Berlin	13-05-2025

- HUS4 Size 8 h_{nom} = 60 mm and HUS4 Size 10 h_{nom} = 75 mm
- For tension, shear and combined tension and shear loads

Please select base material in the table below ① to be guided to Table 1 to Table 4 with the design resistances of the respective material. Find the design resistance in Table 1 to Table 4 and in case of interaction of tension and shear loads also in Figure 1 to Figure 4 ② to find the applicable design example. With a click you will be guided to the design example and can print the report ③.



Brick type	Brick	Brick size [mm]	Brick strength f _b [N/mm²]	Mortar strength f _m [N/mm²]	Table	
Solid clay brick		lxbxh≥	≥ 18	≥ 2,5	Table 1	
(EN 771-1)		240 x 115 x 52	≥ 27	≥ 2,5	Table I	
Solid calcium		lxbxh≥	≥ 20	≥ 2,5	T-51- 0	
silicate brick (EN 771-2)		240 x 115 x 52	≥ 30	≥ 2,5	Table 2	
Solid lightweight concrete brick		lxbxh≥	≥ 5,0	≥ 2,5	Table 3	
(EN 771-3)		498 / 150 / 199	≥ 7,5	≥ 2,5	rable 3	
Autoclaved aerated concrete brick (EN 771-4)		l x b x h ≥ 499 / 240 / 249	≥ 4	≥ 2,5	Table 4	
			≥ 6	≥ 2,5	Table 4	





HUS4 in masonry in accordance with ETA 23/0936 (13.05.2025) and TR 054 (July 2022) – Example calculations of resistances to static and quasi-static loading, status 10-2025

Design resistance

Please click on applicable resistance data (Example E1 to E8) for report



For interaction of shear and tension, see interaction diagram. $\beta_N + \beta_V \le 1,2$ with $\beta_N = N_{Ed} / N_{Rd} \le 1,0$ and $\beta_V = V_{Ed} \ | \ / \ V_{Rd} \ | \ \le 1,0$

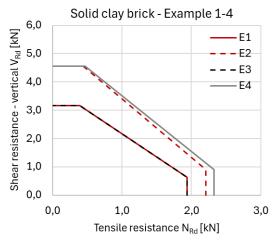
Upper limit max tensile utilization: N_{Rd} and $0.2 \cdot V_{Rd} \parallel$ Upper limit max shear utilization: $0.2 \cdot N_{Rd}$ and $V_{Rd} \parallel$

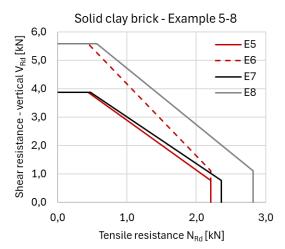
Table 1: Solid clay brick, maximum values pure tension and pure shear

Solid clay brick (EN 771-1)		Brick size [n l x b x h ≥ 240 x 115 x	: (Bulk density p ≥ 1,5	Wall thick h _{min} ≥ 115		Mortar min M Vertical joints or not filled	filled
	Load direction		f _b [N/mm²]	σ [N/mm²]	HUS4 H(1 8	F), C	HUS4 H(F), C, 10	A(F)
Single	Tension	N _{Rd} [kN]	≥ 18	0,0	1,94 ¹⁾	E1	2,212)	E2
anchor	Shear vertical	V _{Rd ∥}	0	0,0	3,16		4,56	
	Tension	N _{Rd} [kN]	≥ 18	0,1	1,94 ¹⁾	E3	2,321)	E4
	Shear vertical	V _{Rd}	2 10	0,1	3,16	LJ	4,56	L4
	Load	ad No V		σ	HUS4 H(F), C		HUS4 H(F), C,	A(F)
	direction L		[N/mm ²]	[N/mm ²]	8		10	
Single	Tension	N _{Rd}	≥ 27	0,0	2,212)	ГЕ	2,212)	E6
anchor	Shear vertical	V _{Rd ∥} [kN]	221	0,0	3,88	E5	5,60	⊏0
	Tension	N _{Rd} [kN]	≥ 27	0,1	2,361)	E 7	2,821)	ΕQ
	Shear vertical	V _{Rd ∥} [KN]	< Z1	0,1	3,88	E7	5,60	E8

¹⁾ Governing failure mode: Pull-out of the anchor or Brick breakout

For tension load: If pull-out of one brick is the governing failure mode, the resistance is increased if larger brick size or compression on wall is present. Upper limit of resistance is the resistance associated with the failure modes pull-out of the anchor or brick breakout.





a) $f_b = 18 \text{ N/mm}^2$ b) $f_b = 27 \text{ N/mm}^2$

Figure 1: Tension and shear interaction diagram solid clay bricks

²⁾ Governing failure mode: Pull-out of one brick



HUS4 in masonry in accordance with ETA 23/0936 (13.05.2025) and TR 054 (July 2022) -Example calculations of resistances to static and quasi-static loading, status 10-2025

Design resistance

Please click on applicable resistance data for report



For interaction of shear and tension, see interaction diagram. $\beta_N + \beta_V \le 1,2$ with $\beta_N = N_{Ed} / N_{Rd} \le 1,0$ and $\beta_V = V_{Ed} / V_{Rd} \le 1,0$

N_{Rd} and 0,2 ·V_{Rd} |

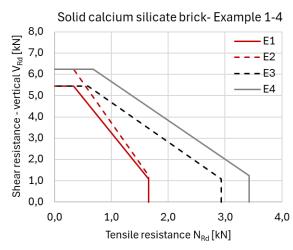
Upper limit max tensile utilization: Upper limit max shear utilization: $0,2\!\cdot\!N_{Rd}$ and $V_{Rd}\parallel$

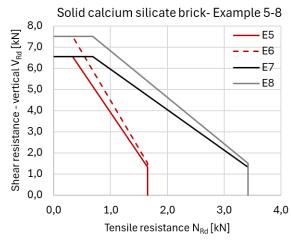
Table 2: Solid calcium silicate brick, maximum values pure tension and pure shear

Solid calciur silicate brick (EN 771-2)		Brick size [n l x b x h ≥ 240 x 115 x	: (Bulk density p ≥ 1,7	Wall thick h _{min} ≥ 115		Mortar min M Vertical joints or not filled	filled
	Load direction	• V,	f _b [N/mm²]	σ [N/mm²]	HUS4 H(F), C	HUS4 H(F), C, 10	A(F)
Single	Tension	N _{Rd} [kN]	≥ 20	0,0	1,66 ²⁾	E1	1,66 ²⁾	E2
anchor	Shear vertical	V _{Rd ∥}	≥ 20	0,0	5,44		6,24	E2
	Tension	$\frac{N_{Rd}}{V_{Rd \parallel}}$ [kN]	N] ≥ 20	0,2	2,931)	E3	3,42 ²)	E4
	Shear vertical			0,2	5,44	ES	6,24	E4
	Load		f _b	σ	HUS4 H(F), C		HUS4 H(F), C,	A(F)
	direction		[N/mm ²]	[N/mm ²]	8		10	
Single	Tension	N _{Rd} [kN]	≥ 30	0,0	1,66 ²⁾	E5	1,66 ²⁾	E6
anchor	Shear vertical	V _{Rd}	≥ 30	0,0	6,56	⊏ວ	7,52	0
	Tension	N _{Rd}	≥ 30	0,2	3,422)	E7	3,422)	E8
	Shear vertical	V _{Rd ∥} [kN]	≥ 30	0,2	6,56	⊏/	7,52	⊏0

¹⁾ Governing failure mode: Pull-out of the anchor or Brick breakout

For tension load: If pull-out of one brick is the governing failure mode, the resistance is increased if larger brick size or compression on wall is present. Upper limit of resistance is the resistance associated with the failure modes pullout of the anchor or brick breakout.





b) $f_b = 30 \text{ N/mm}^2$ a) $f_b = 20 \text{ N/mm}^2$ Figure 2: Tension and shear interaction diagram solid calcium silicate bricks

²⁾ Governing failure mode: Pull-out of one brick



HUS4 in masonry in accordance with ETA 23/0936 (13.05.2025) and TR 054 (July 2022) – Example calculations of resistances to static and quasi-static loading, status 10-2025

Design resistance

Please click on applicable resistance data for report



For interaction of shear and tension, see interaction diagram.

 $\beta_N + \beta_V \le 1,2$ with $\beta_N = N_{Ed} / N_{Rd} \le 1,0$ and $\beta_V = V_{Ed} \parallel / V_{Rd} \parallel \le 1,0$

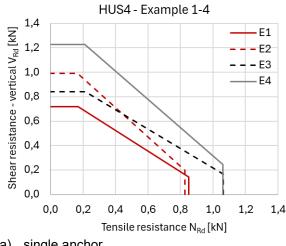
Upper limit max tensile utilization: N_{Rd} and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot N_{Rd}$

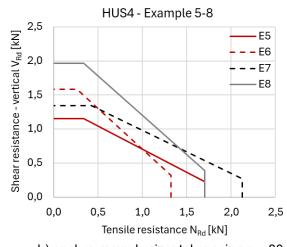
Table 3: Solid lightweight concrete brick, maximum values pure tension and pure shear

Solid lightwe concrete brid (EN 771-3)		Brick size [m l x b x h ≥ 498 x 150 x	: (Bulk density ρ ≥ 0,9	Wall thick h _{min} ≥ 150		Mortar min M Vertical joints or not filled	filled
	Load direction	• V,	f _b [N/mm²]	σ [N/mm²]	HUS4 H(1 8	F), C	HUS4 H(F), C, 10	A(F)
Single	Tension	N _{Rd} [kN]	≥ 5	0,0	0,851)	E1	0,831)	E2
anchor	Shear vertical	V _{Rd ∥}	2 0	0,0	0,72		0,99	LZ
	Tension	N _{Rd}	≥ 7,5	0,0	1,06 ¹⁾	E3	1,06 ¹⁾	E4
	Shear vertical	V _{Rd ∥} [kN]	27,5	0,0	0,84		1,23	□ ⊏4
	Load		f _b	σ	HUS4 H(F), C	HUS4 H(F), C,	A(F)
	direction	V ₁₁ V ₁₁	[N/mm ²]	[N/mm ²]	8		10	
Anchor	Tension	N _{Rd}	\ _ F	0,0	1,70 ¹⁾	ГЕ	1,32 ¹⁾	E6
group 1x2 ³⁾ s _∥ = 80 mm	Shear vertical	V _{Rd ∥} [kN]	≥ 5	0,0	1,15	E5	1,59	E6
	Tension	N _{Rd}	> 7.5	0,0	2,13 ¹⁾	E7	1,70 ¹⁾	E8
	Shear vertical	V _{Rd ∥} [kN]	≥ 7,5	0,0	1,34		1,96	

¹⁾ Governing failure mode: Pull-out of the anchor or Brick breakout

For tension load: If pull-out of one brick is the governing failure mode, the resistance is increased if larger brick size or compression on wall is present. Upper limit of resistance is the resistance associated with the failure modes pull-out of the anchor or brick breakout.





a) single anchor b) anchor group horizontal spacing s = 80mm Figure 3: Tension and shear interaction diagram solid lightweight concrete bricks $f_b = 5 \text{ N/mm}^2$ (E1, E2, E5, E6) and $f_b = 7,5 \text{ N/mm}^2$ (E3, E4, E7, E8)

Results must be checked for conformity with the existing conditions and for plausibility!

²⁾ Governing failure mode: Pull-out of one brick

³⁾ Anchor forces evenly distributed on two anchors



HUS4 in masonry in accordance with ETA 23/0936 (13.05.2025) and TR 054 (July 2022) – Example calculations of resistances to static and quasi-static loading, status 10-2025

Design resistance

Please click on applicable resistance data for report



For interaction of shear and tension, see interaction diagram.

 $\beta_N + \beta_V \le 1,2$ with $\beta_N = N_{Ed} / N_{Rd} \le 1,0$ and $\beta_V = V_{Ed} \parallel / V_{Rd} \parallel \le 1,0$

Upper limit max tensile utilization: N_{Rd} and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot V_{Rd} \parallel Upper limit max shear utilization: <math>0.2 \cdot N_{Rd}$ and $0.2 \cdot N_{Rd}$

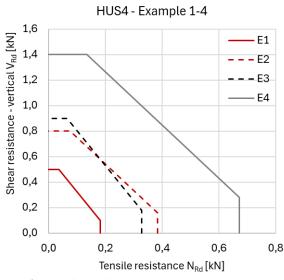
Table 4: Autoclaved aerated concrete brick, maximum values pure tension and pure shear

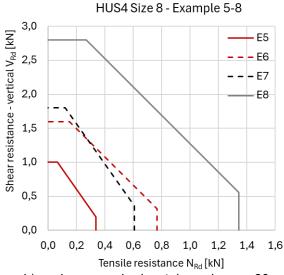
Autoclaved a concrete brid (EN 771-4)		j.	Brick size I x b x 499 x 240	h≥	Bulk density ρ ≥ 0,55	Wall thick h _{min} ≥ 240		Mortar min M Vertical joints or not filled	filled
	Load direction		V _{ii}	f _b [N/mm²]	σ [N/mm²]	HUS4 H(8	F), C	HUS4 H(F), C, 10	A(F)
Single	Tension	N_{Rd}	— [kN]	≥ 4	0,0	0,181)	E1	0,381)	E2
anchor	Shear vertical	$V_{Rd \parallel}$	[KIA]	<u> </u>	0,0	0,50		0,80	LZ
	Tension	N_{Rd}	— [kN]	≥ 6	0,0	0,331)	E3	0,671)	E4
	Shear vertical	$V_{Rd \parallel}$		≥ 0	0,0	0,90	23	1,40	□4
	Load		V, •	f _b	σ	HUS4 H(F), C	HUS4 H(F), C,	A(F)
	direction		V ₁₁	[N/mm ²]	[N/mm ²]	8		10	
Anchor	Tension	N_{Rd}	[LAN]	_ 1	0,0	0,341)	E5	0,771)	E6
group 1x2 ³⁾ s = 80 mm	Shear vertical	$V_{Rd} \parallel$	— [kN]	≥ 4	0,0	1,00	<u> </u>	1,60	⊏0
	Tension	N_{Rd}	FL-N 17	> 6	0,0	0,61 ¹⁾	E7	1,34 ¹⁾	E8
	Shear vertical	V _{Rd} ∥	— [kN]	≥ 6	0,0	1,80		2,80	

¹⁾ Governing failure mode: Pull-out of the anchor or Brick breakout



For tension load: If pull-out of one brick is the governing failure mode, the resistance is increased if larger brick size or compression on wall is present. Upper limit of resistance is the resistance associated with the failure modes pull-out of the anchor or brick breakout.





a) single anchor b) anchor group horizontal spacing s = 80mm

Figure 4: Tension and shear interaction diagram solid lightweight concrete bricks $f_b = 4 \text{ N/mm}^2$ (E1, E2, E5, E6) and $f_b = 6 \text{ N/mm}^2$ (E3, E4, E7, E8)

²⁾ Governing failure mode: Pull-out of one brick

³⁾ Anchor forces evenly distributed on two anchors



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized				
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h_{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936				
Embedment depth:	h _{nom} = 60 mm				
Material:	Carbon steel				
Assessment:	ETA 23/0936 European Technical Assessment				
Issued:	13.05.2025				
Proof:	Design Method EOTA TR054 July 2022				
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$				
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 18 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²				
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading				
Geometry					
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$				
Minimum anchor distance to joints:	$c \perp \geq c_{j} \perp = 20$ mm and $c_{\parallel} \geq c_{j} \parallel = 20$ mm No setting near (c < 20 mm) or in joints!				
No setting in cut bricks with reduced horizontal bearing area	1 DF Header Setting area Settin				



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength $f_{b,mean} \geq$ 18 N/mm² No compression on wall $\sigma = 0$ N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 2

2 Tension load (EOTA TR054, Section 4.2)

Brick strength f_{b,mean} ≥ 18 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	1,936
Brick breakout**	1,936
Pull-out of one brick**	2,208

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² No compression on wall $\sigma = 0$ N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]		
5,500	0,88	2,5	1,936		

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 20	-	20	1,0	0,88
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γмm [-]	N _{Rd,b} [kN]
5,500	4,840	≥ 90	90	2,5	1,936

2.4 Pullout of one brick

 A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
 55 200	0	0,20	0,00
 $N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
5,520	2,5	2,208	



Base material: clay brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 52 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq$ 18 N/mm²ETA 23/0936 (13.05.2025)No compression on wall σ = 0 N/mm²Example E1 Page:

3 Shear load (EOTA TR054, Section 4.3)

Brick strength f_{b,mean} ≥ 18 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	3,160
Brick edge failure**	3,160
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength $f_{b,mean} \geq$ 18 N/mm² No compression on wall $\sigma = 0$ N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∦ [mm]	αg,∨∥ [-]	α _{j,} ∨∥ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∦ [-]	e _{c,V⊥} [mm]	$\psi_{g,V\perp}$ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	$V_{Rk,b}$ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	7,900	7,900	3,160	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,\vee} \ \ [extbf{-}]$	α _{j,} ∨∥ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	Ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γMm [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	7,900	7,900	3,160	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength $f_{b,mean} \geq$ 18 N/mm² No compression on wall $\sigma = 0$ N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page: 6

4 Combined tension and shear loads (EOTA TR054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 18$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βn [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
1,936	0,632		

4.2 Maximum shear load

β _N [-]	βv [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,387	3,160		

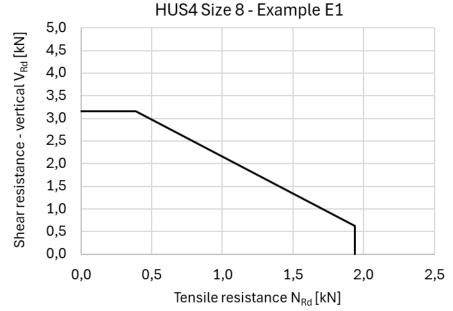


Figure 1: Solid clay brick, single anchor, example E1



Base material: clay brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 52 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq$ 18 N/mm²ETA 23/0936 (13.05.2025)No compression on wall σ = 0 N/mm²Example E1 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge ($c_{min} = c_{cr}$) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11.0 \text{ mm}$ to 12.0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength $f_{b,mean} \geq$ 18 N/mm² No compression on wall $\sigma = 0$ N/mm² Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 1

1 Input data



1 input data				
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized			
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936			
Embedment depth:	h _{nom} = 75 mm			
Material:	Carbon steel			
Assessment:	ETA 23/0936 European Technical Assessment			
Issued:	13.05.2025			
Proof:	Design Method EOTA TR 054 July 2022			
Stand off installation:	e _b = 0 mm (no stand off)			
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 18 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$			
Minimum anchor distance to joints:	$c \perp \geq c_{j \perp} = 20$ mm and $c_{\parallel} \geq c_{j \parallel} = 20$ mm No setting near (c < 20 mm) or in joints!			
No setting in cut bricks with reduced horizontal bearing area	1 DF Header Allowable setting area pp pp pp pp pp pp pp pp pp			



Base material: clay brick, solid Anchor type: HUS4 Size 10 I x b x h \geq 240 mm x 115 mm x 52 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 18 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0 N/mm² Example E2 Page: 2

2 Tension load (EOTA TR054, Section 4.2)

Brick strength f_{b,mean} ≥ 18 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	2,324
Brick breakout**	2,324
Pull-out of one brick**	2,208



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 3

Tension load, f_{b,mean} ≥ 18 N/mm²

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
7,000	0,83	2,5	2,324

2.3 Brick breakout

s∥ [mm]	c _j ∥ [mm]	SETA,∥ [mm]	CETA,j∦ [mm]	$\alpha_{g,N} \ \ [extbf{-}]$	α _{j,N} [-]
-	≥ 20	-	20	1,0	0,83
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{\sf g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kľ	N] N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
INKK,D,ETA [KI	1 IAKK,D [KI4]	C [IIIII]	Chilli,ETA [TTTT]	ywm [-]	TARO,D [KTA]
7,000	5,810	≥ 112,5	112,5	2,5	2,324

2.4 Pullout of one brick

A ^H act [mm ²]	A^{V}_{act} [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
55 200	0	0,20	0,00
N _{Rk,pb} [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
5,520	2,5	2,208	_



Base material: clay brick, solidAnchor type: HUS4 Size 10 $l x b x h \ge 240 \text{ mm } x 115 \text{ mm } x 52 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 18 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0 \text{ N/mm}^2$ Example E2 Page: 4

3 Shear load (EOTA TR054, Section 4.3)

Brick strength f_{b,mean} ≥ 18 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	4,560
Brick edge failure**	4,560
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	$\alpha_{g,V}$ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	ψ _{g,} ∨∦ [-]	e _{c,V⊥} [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
o l [mm]	o [mm]	\/ [[cN]]	V	V # [kN]]	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	11,400	11,400	4,560	

3.3 Brick edge failure

_					
s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∥ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	c _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	$V_{Rk,c}$ [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	11,400	11,400	4,560	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 6

4 Combined tension and shear loads (EOTA TR054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 18$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βn [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
2,208	0,912		

4.2 Maximum shear load

β _N [-]	β _V [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,442	4,560		

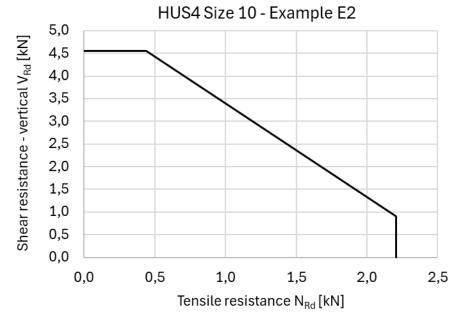


Figure 1: Solid clay brick, single anchor, example E2



Base material: clay brick, solid Anchor type: HUS4 Size 10 I x b x h \geq 240 mm x 115 mm x 52 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 18 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0 N/mm² Example E2 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge ($c_{min} = c_{cr}$) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13.0 \text{ mm}$ to 14.0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength $f_{b,mean} \geq$ 18 N/mm² Compression on wall σ = 0,1 N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 1

1 Input data



•				
Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized			
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936			
Embedment depth:	h _{nom} = 60 mm			
Material:	Carbon steel			
Assessment:	ETA 23/0936 European Technical Assessment			
Issued:	13.05.2025			
Proof:	Design Method EOTA TR 054 July 2022			
Stand off installation:	e _b = 0 mm (no stand off)			
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 18 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm Vertical compression on wall, $\sigma =$ 0,1 N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$			
Minimum anchor distance to joints:	$c\perp \geq c_{j\perp}=20$ mm and $c_{\parallel}\geq c_{j\parallel}=20$ mm No setting near (c < 20 mm) or in joints!			
No setting in cut bricks with reduced horizontal bearing area	1 DF Header			



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 18 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	1,936
Brick breakout**	1,936
Pull-out of one brick**	3,091



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
5,500	0,88	2,5	1,936

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,N}$ [-]	αj,N [-]
-	≥ 20	-	20	1,0	0,88
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
5,500	4,840	≥ 90	90	2,5	1,936

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
55 200	0	0,20	0,10
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
7,728	2,5	3,091	



Base material: clay brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 52 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 18 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,1 N/mm² Example E3 Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 18 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	3,160
Brick edge failure**	3,160
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j} ∥ [mm]	α _{g,} ∨∥ [-]	$\alpha_{j,\vee\parallel}$ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA} ,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V} \ \ [mm]$	ψ _{g,} ∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	7,900	7,900	3,160	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ∨∥ [-]	αj,∨∥ [-]
-	≥ 20	-	20	1,0	1,0
- []	- F1	- f1	- fu.u.1		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨ ∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γMm [-]	
0,0	1,000	0,0	1,000	2,5	
au [mana]		\/ [LNI]	\/ [[.N]]	\/ [[ch.]]	
c∥ [mm]	c _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	7,900	7,900	3,160	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 6

4 Combined tension and shear loads (EOTA TR054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 18$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
1,936	0,632		

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,387	3,160	•	

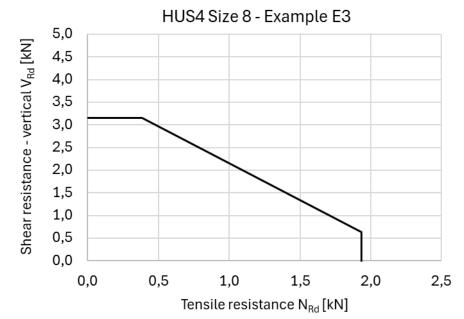


Figure 1: Solid clay brick, single anchor, example E3



Base material: clay brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 52 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 18 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,1 N/mm² Example E3 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11,0 \text{ mm}$ to 12,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized				
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936				
Embedment depth:	h _{nom} = 75 mm				
Material:	Carbon steel				
Assessment:	ETA 23/0936 European Technical Assessment				
Issued:	13.05.2025				
Proof:	Design Method EOTA TR 054 July 2022				
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$				
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 18 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.) Anchor in header or stretcher position Minimum wall thickness: 115 mm Unplastered wall Vertical compression on wall, $\sigma = 0,1$ N/mm²				
Installation/Use	Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Cleaning: Manual cleaning Drilling: Hammer drilling or rotary drilling Anchorage subject to static or quasi-static loading				
Geometry					
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$				
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c \perp \geq c_{j} \perp = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near (c < 20 mm) or in joints! 1 DF stretcher 1 DF Header $1 DF Heade$				

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E4 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 18 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	2,324
Brick breakout**	2,324
Pull-out of one brick**	3,091



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 3

Tension load, f_{b,mean} ≥ 18 N/mm²

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
7,000	0,83	2,5	2,324

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 20	-	20	1,0	0,83
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
7,000	5,810	≥ 112,5	112,5	2,5	2,324

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
55 200	0	0,20	0,10
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
7,728	2,5	3,091	



Base material: clay brick, solidAnchor type: HUS4 Size 10 $l x b x h \ge 240 \text{ mm } x 115 \text{ mm } x 52 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 18 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)Compression on wall $\sigma = 0.1 \text{ N/mm}^2$ Example E4Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 18 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,004
Steel Strength (with lever arm)*	N/A
Local brick failure**	4,560
Brick edge failure**	4,560
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _j ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∦ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
au [mm]	o Imml	\/	V	V II [IzN]]	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	11,400	11,400	4,560	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	αj,∨∥ [-]
-	≥ 20	-	20	1,0	1,0
- [1	- F1	- f1	- fu.u.1		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
a [mayea]		\/ [LNI]	\/ [[.N]]	\/ [[.N]]	
c∥ [mm]	c _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	11,400	11,400	4,560	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 18 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 18$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	βv [-]	α[-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
 2,324	0,912		

4.2 Maximum shear load

β _N [-]	β _V [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,465	4,560		

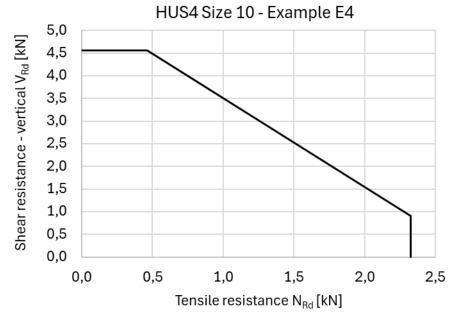


Figure 1: Solid clay brick, single anchor, example E4



Base material: clay brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 52 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 18 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,1 N/mm² Example E4 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13,0 \text{ mm}$ to 14,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: clay brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 52 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq$ 27 N/mm²ETA 23/0936 (13.05.2025)No compression on wall σ = 0 N/mm²Example E5Page:

1 Input data



Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized			
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936			
Embedment depth:	h _{nom} = 60 mm			
Material:	Carbon steel			
Assessment:	ETA 23/0936 European Technical Assessment			
Issued:	13.05.2025			
Proof:	Design Method EOTA TR 054 July 2022			
Stand off installation:	e _b = 0 mm (no stand off)			
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 27 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$			
Minimum anchor distance to joints:	$c \perp \geq c_{j} \perp = 20$ mm and $c_{\parallel} \geq c_{j} \parallel = 20$ mm No setting near (c < 20 mm) or in joints!			
No setting in cut bricks with reduced horizontal bearing area	1 DF Header			



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength $f_{b,mean} \geq$ 27 N/mm² No compression on wall $\sigma = 0$ N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E5 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 27 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	2,358
Brick breakout**	2,358
Pull-out of one brick**	2,208

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² No compression on wall σ = 0 N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E5 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	$N_{Rd,s}$ [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
6,700	0,88	2,5	2,358

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 20	-	20	1,0	0,88
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	сета,ј⊥ [mm]	α _{g,N⊥} [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
6,700	5,896	≥ 90	90	2,5	2,358

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm ²]
55 200	0	0,20	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
5,520	2,5	2,208	



Base material: clay brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 52 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq$ 27 N/mm²ETA 23/0936 (13.05.2025)No compression on wall σ = 0 N/mm²Example E5Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 27 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	3,880
Brick edge failure**	3,880
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength $f_{b,mean} \geq$ 27 N/mm² No compression on wall $\sigma = 0$ N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E5 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∦ [mm]	αg,∨∥ [-]	α _{j,} ∨∦ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∦ [-]	e _{c,V⊥} [mm]	$\psi_{g,V\perp}$ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	9,700	9,700	3,880	

3.3 Brick edge failure

s∥ [mm]	c _{j∥} [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,V} \ [-]$	αj,∨∥ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{ extsf{g}, extsf{N}ot}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
ec,∨∥ [mm]	Ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γмm [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	9,700	9,700	3,880	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 18$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βn [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
2,208	0,776		

4.2 Maximum shear load

β _N [-]	βv [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,442	3,880		

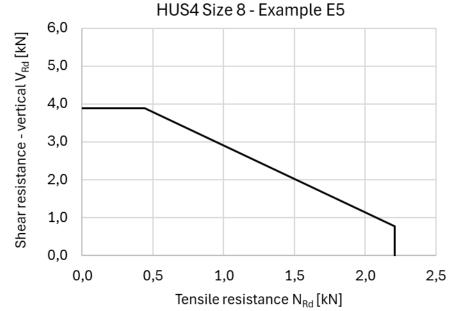


Figure 1: Solid clay brick, single anchor, example E5



Base material: clay brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 52 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq$ 27 N/mm²ETA 23/0936 (13.05.2025)No compression on wall σ = 0 N/mm²Example E5Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge ($c_{min} = c_{cr}$) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11.0 \text{ mm}$ to 12.0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: clay brick, solidAnchor type: HUS4 Size 10 $l x b x h \ge 240 \text{ mm } x 115 \text{ mm } x 52 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 27 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0 \text{ N/mm}^2$ Example E6Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating Countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	e _b = 0 mm (no stand off)		
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 27 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c \perp \geq c_{j} \perp = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near (c < 20 mm) or in joints! $1 \text{DF stretcher} \qquad \qquad 1 \text{DF Header}$ $a_{\text{II}} = 20 \text{ mm}$ Allowable setting area $a_{\text{II}} = 20 \text{ mm}$ a_{II		



Base material: clay brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 52 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 27 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0 N/mm² Example E6 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 18 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	2,822
Brick breakout**	2,822
Pull-out of one brick**	2,208

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 3

Tension load, f_{b,mean} ≥ 27 N/mm²

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
8,500	0,83	2,5	2,822

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	с _{ЕТА,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 20	-	20	1,0	0,83
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Μm} [-]	N _{Rd,b} [kN]
8,500	7,055	≥ 112,5	112,5	2,5	2,822

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
55 200	0	0,20	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
5,520	2,5	2,208	



Base material: clay brick, solidAnchor type: HUS4 Size 10 $l x b x h \ge 240 \text{ mm } x 115 \text{ mm } x 52 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 27 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0 \text{ N/mm}^2$ Example E6Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 27 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	5,600
Brick edge failure**	5,600
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	$\alpha_{g,\vee\parallel}$ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} [mm]	V _{Rk,b,ETA} [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	14,000	14,000	5,600	

3.3 Brick edge failure

s∥ [mm]	c _{j∥} [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,V} \ [-]$	αj,∨∥ [-]
-	≥ 20	-	20	1,0	1,0
a [mm]	o [mm]	o [mm]	o [mm]	. [1	. [1
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	$c_{min,ETA}$ [mm]	$V_{Rk,c,ETA}$ [kN]	$V_{Rk,c\parallel}$ [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	14,000	14,000	5,600	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² No compression on wall σ = 0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 27$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βn [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
2,208	1,120		

4.2 Maximum shear load

 βn [-]	βv [-]	α[-]	Status
 0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,442	5,600		

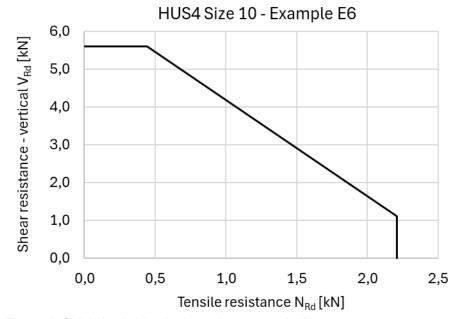


Figure 1: Solid clay brick, single anchor, example E6



Base material: clay brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 52 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 27 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0 N/mm² Example E6 Page: 7

5 Warnings

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- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge ($c_{min} = c_{cr}$) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13.0 \text{ mm}$ to 14.0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 8		
Anonor type and diameter.	HUS4-H hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 60 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	e _b = 0 mm (no stand off)		
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 27 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm Vertical compression on wall, $\sigma = 0,1$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 90 \text{ mm}$		
Minimum anchor distance to joints:	$c\perp \geq c_{j\perp}=20$ mm and $c_{\parallel}\geq c_{j\parallel}=20$ mm No setting near (c < 20 mm) or in joints!		
No setting in cut bricks with reduced horizontal bearing area	1 DF Header 1 DF Header Setting area G _g = 20 mm Allowable setting area G _g = 20 mm C _{um} = 90 mm Allowable setting area G _g = 20 mm C _{um} = 90 mm Allowable setting area G _g = 20 mm		



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm² Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 27 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	2,358
Brick breakout**	2,358
Pull-out of one brick**	3,091



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
8,500	0,88	2,5	2,358

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∦ [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 20	-	20	1,0	0,88
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
8,500	5,896	≥ 90	90	2,5	2,358

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
55 200	0	0,20	0,10
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
7,728	2,5	3,091	



Base material: clay brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 52 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq$ 27 N/mm²ETA 23/0936 (13.05.2025)Compression on wall σ = 0,1 N/mm²Example E7Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 27 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	3,880
Brick edge failure**	3,880
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,\vee}$ [-]	α _{j,} ∨∦ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	c _{eta,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	9,700	9,700	3,880	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∥ [-]	αj,∨∥ [-]
-	≥ 20	-	20	1,0	1,0
. F 1					
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨ ∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
au [mana]		\/ [LNI]	\/ [[ch.]]	\/ [Ich]]	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	9,700	9,700	3,880	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 27$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

	β _N [-]	βv [-]	α[-]	Status
	1,0	0,2	1,00	OK
N	Rd [kN]	V _{Rd} [kN]		
	2,358	0,776	•	

4.2 Maximum shear load

	β _N [-]	β√ [-]	α[-]	Status
	0,2	1,0	1,00	OK
I	N _{Rd} [kN]	V _{Rd} [kN]		
	0,472	3,880		

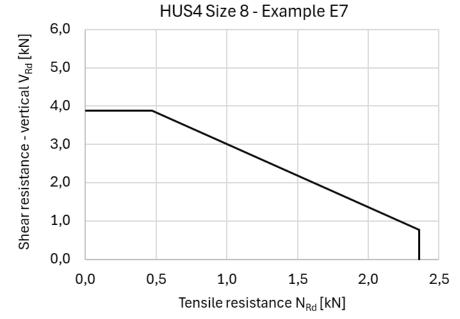


Figure 1: Solid clay brick, single anchor, example E7



 $\begin{array}{lll} \text{Base material: clay brick, solid} & \text{Anchor type: HUS4 Size 8} \\ \text{I x b x h} \geq 240 \text{ mm x 115 mm x 52 mm} & \text{Design: TR 054 July 2022} \\ \text{Brick strength f}_{b,mean} \geq 27 \text{ N/mm}^2 & \text{ETA 23/0936 (13.05.2025)} \\ \text{Compression on wall } \sigma = 0,1 \text{ N/mm}^2 & \text{Example E7} & \text{Page:} \end{array}$

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11,0$ mm to 12,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h_{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$		
Base material: Wall layout:	Solid clay brick (Mz), L x W x H: \geq 240 mm x 115 mm x 52 mm Compressive strength: $f_{b,mean} \geq$ 27 N/mm², bulk density $\rho \geq$ 1,5 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.) Anchor in header or stretcher position Minimum wall thickness: 115 mm Unplastered wall Vertical compression on wall, σ = 0,1 N/mm²		
Installation/Use	Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Cleaning: Manual cleaning Drilling: Hammer drilling or rotary drilling Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 112,5 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c \perp \geq c_{j} \perp = 20 \text{ mm and } c_{\parallel} \geq c_{j} \parallel = 20 \text{ mm}$ $No \text{ setting near } (c < 20 \text{ mm}) \text{ or in joints!}$ $1DF \text{ stretcher}$ $Allowable \text{ setting area}$ $c_{j} = 20 \text{ mm}$ $1DF \text{ Header}$ $c_{j} = 20 \text{ mm}$		

Results must be checked for conformity with the existing conditions and for plausibility!



Anchor type: HUS4 Size 10 Base material: clay brick, solid $1 \times b \times h \ge 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Design: TR 054 July 2022 Brick strength f_{b,mean} ≥ 27 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,1 N/mm² Example E8 Page:

2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 27 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	2,822
Brick breakout**	2,822
Pull-out of one brick**	3,091



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 3

Tension load, f_{b,mean} ≥ 27 N/mm²

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	N _{Rd,p} [kN]
8,500	0,83	2,5	2,822

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{\text{g,N}}$ [-]	α _{j,N} [-]
-	≥ 20	-	20	1,0	0,83
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
8,500	7,055	≥ 112,5	112,5	2,5	2,822

2.4 Pullout of one brick

 A ^H act [mm²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm ²]	
55 200	0	0,20	0,10	
 $N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]		
7,728	2,5	3,091	_	



Base material: clay brick, solidAnchor type: HUS4 Size 10 $l x b x h \ge 240 \text{ mm } x 115 \text{ mm } x 52 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 27 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)Compression on wall $\sigma = 0.1 \text{ N/mm}^2$ Example E8Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 27 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,004
Steel Strength (with lever arm)*	N/A
Local brick failure**	5,600
Brick edge failure**	5,600
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∦ [mm]	α _{g,} ν∥ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 20	-	20	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA} ,j⊥ [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψ _{g,} γ∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	14,000	14,000	5,600	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∦ [mm]	$\alpha_{g,\vee}$ [-]	α _{j,} ∨∥ [-]
 -	≥ 20	-	20	1,0	1,0
 s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	$\alpha_{j,V\perp}$ [-]
 -	≥ 20	-	20	1,0	1,0
$e_{c,V}$ [mm]	ψg,∨∥ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γMm [-]	
 0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	$c_{min,ETA}$ [mm]	$V_{Rk,c,ETA}$ [kN]	$V_{Rk,c}$ [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	14,000	14,000	5,600	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: clay brick, solid I x b x h \geq 240 mm x 115 mm x 52 mm Brick strength f_{b,mean} \geq 27 N/mm² Compression on wall σ = 0,1 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 18$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

<u></u>	3 _N [-]	β _V [-]	α[-]	Status
	1,0	0,2	1,00	OK
NF	Rd [kN]	V _{Rd} [kN]		
2	2,822	1,120		

4.2 Maximum shear load

 β _N [-]	β _V [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,564	5,600		

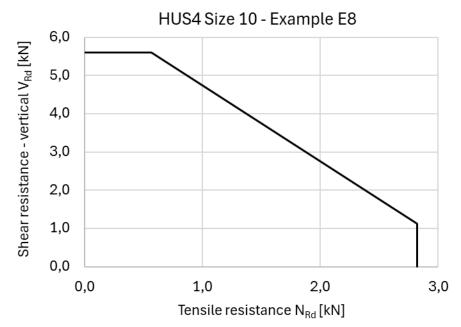


Figure 1: Solid clay brick, single anchor, example E8



 $\begin{array}{lll} \text{Base material: clay brick, solid} & \text{Anchor type: HUS4 Size 10} \\ \text{I x b x h} \geq 240 \text{ mm x 115 mm x 52 mm} & \text{Design: TR 054 July 2022} \\ \text{Brick strength f}_{b,mean} \geq 27 \text{ N/mm}^2 & \text{ETA 23/0936 (13.05.2025)} \\ \text{Compression on wall } \sigma = 0.1 \text{ N/mm}^2 & \text{Example E8} & \text{Page:} & 7 \end{array}$

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13,0 \text{ mm}$ to 14,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: calcium silicate brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 113 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq 20 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Example E1Page:

1 Input data



-			
Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 60 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$		
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 20 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 90 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j\bot} = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c\bot < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher 2 DF Header $Cut \text{ edge brick}$ $Allowable \text{ setting area}$ $area$ $c_{j\bot} = 20 \text{ mm}$ $Allowable \text{ setting area}$ $c_{j\bot} = 20 \text{ mm}$ $Allowable \text{ setting area}$ $c_{j\bot} = 40 \text{ mm}$ $c_{j\bot} = 20 mm$		



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 20 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	2,933
Brick breakout**	2,933
Pull-out of one brick**	1,656

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: calcium silicate brick, solid l x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,E}$	_{TA} [kN]	$\alpha_{j,N}$ [-]	γ _{Mm} [-]	N _{Rd,p} [kN]
9,4	100	0,78	2,5	2,933

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,N}$ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,78
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$\alpha_{\text{g,N}\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
9,400	7,332	≥ 90	90	2,5	2,933

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
55 200	0	0,15	0,00
NI FLAIT		N	
N _{Rk,pb} [kN]	γ _{Mm} [-]	N _{Rd,pb} [kN]	
4,140	2,5	1,656	



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 20 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0,0 N/mm² Example E1 Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 20 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	5,440
Brick edge failure**	5,440
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _{i∥} [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{g,V}$ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψ _{g,} ∨∥ [-]	$e_{c,V\perp}$ [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
o l [mm]	o [mm]	\/ [[cN]]	V	V # [kN]]	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	13,600	13,600	5,440	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∦ [mm]	CETA,j∦ [mm]	αg,∨∦ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	ψg,∀∥ [-]	e _{c,∨⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	Cmin,ETA [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	13,600	13,600	5,440	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 20$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
1,656	1,088		

4.2 Maximum shear load

 βn [-]	βv [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,331	5,440		

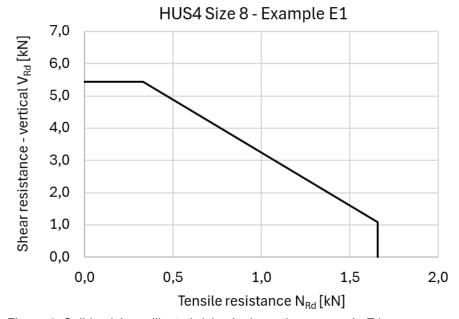


Figure 1: Solid calcium silicate brick, single anchor, example E1



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 20 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0,0 N/mm² Example E1 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
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- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11,0 \text{ mm}$ to 12,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70.0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: calcium silicate brick, solidAnchor type: HUS4 Size 10I x b x h \geq 240 mm x 115 mm x 113 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq$ 20 N/mm²ETA 23/0936 (13.05.2025)No compression on wall σ = 0,0 N/mm²Example E2Page: 1

1 Input data



_			
Anchor type and diameter:	HUS4 Size 10 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	e _b = 0 mm (no stand off)		
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 20 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c \perp \geq c_{j} \perp = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ $No \text{ setting near } (c \perp < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}) \text{ or in joints!}$ 2 DF stretcher 2 DF Header $Cut \text{ edge brick area}$ $Allowable \text{ setting area}$ $area$ $Allowable \text{ setting area}$ $area$ $area$ $I_{b} \geq 240 \text{ mm}$ $I_{b} \geq 240 \text{ mm}$		



Base material: calcium silicate brick, solid $l x b x h \ge 240 \text{ mm } x 115 \text{ mm } x 113 \text{ mm}$ Brick strength $f_{b,mean} \ge 20 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 20 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	3,445
Brick breakout**	3,445
Pull-out of one brick**	1,656



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
9,900	0,87	2,5	3,445

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{g,N}$ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,87
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γмm [-]	N _{Rd,b} [kN]
9,900	8,613	≥ 90	90	2,5	3,445

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ_d [N/mm ²]
55 200	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
4,140	2,5	1,656	



Base material: calcium silicate brick, solidAnchor type: HUS4 Size 10 $1 \times b \times h \ge 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 20 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Example E2Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 20 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	6,240
Brick edge failure**	6,240
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	$\alpha_{j,\vee\parallel}$ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA} ,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψ _{g,} γ∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	15,600	15,600	6,240	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∥ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨ ∦ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
au [mana]	a "[mama]	\/ [LNI]	\/ " [[4]]	\/ [[c]]	
c∥ [mm]	c _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	15,600	15,600	6,240	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 20$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
1,656	1,248	•	

4.2 Maximum shear load

	β _N [-]	βv [-]	α [-]	Status
	0,2	1,0	1,00	OK
	N _{Rd} [kN]	V _{Rd} [kN]		
_	0,331	6,240		

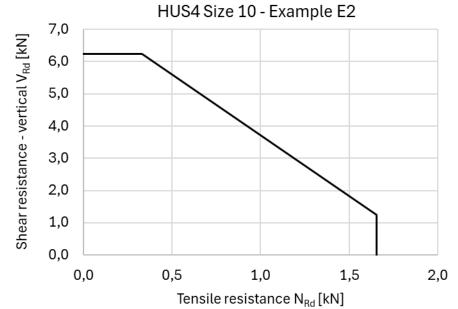


Figure 1: Solid calcium silicate brick, single anchor, example E2



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 20 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0,0 N/mm² Example E2 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13.0 \text{ mm}$ to 14,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength f_{b,mean} \geq 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 60 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$		
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 20 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm Vertical compression on wall, $\sigma = 0.20$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ $No \text{ setting near } (c_{\perp} < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}) \text{ or in joints!}$ 2 DF stretcher 2 DF Header $Cut \text{ edge brick}$ $Allowable \text{ setting area}$ $Allowable \text{ setting area}$ $C_{i,i} = 20 \text{ mm}$ $Allowable \text{ setting area}$ $Allowable \text{ setting area}$ $C_{i,i} = 40 \text{ mm}$ $C_{i,i} = 40 \text{ mm}$		



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 20 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	2,933
Brick breakout**	2,933
Pull-out of one brick**	3,422



Base material: calcium silicate brick, solid l x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
9,400	0,78	2,5	2,933

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,Ν∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,78
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
9,400	7,332	≥ 90	90	2,5	2,933

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
55 200	0	0,15	0,20
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
8,556	2,5	3,422	



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 20 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,20 N/mm² Example E3 Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 20 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	5,440
Brick edge failure**	5,440
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	CETA,j∦ [mm]	α _{g,} ν∦ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	C _{ETA,j⊥} [mm]	$\alpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	13,600	13,600	5,440	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	αj,∨∥ [-]
-	≥ 40	-	40	1,0	1,0
- f1	- F1	- f1	- [m.m.]		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
a., []		\/	\ / FL-N II	\/ FL-N II	
c∥ [mm]	c _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	13,600	13,600	5,440	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 20$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α[-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
2,933	1,088	-	

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0.587	5 440		

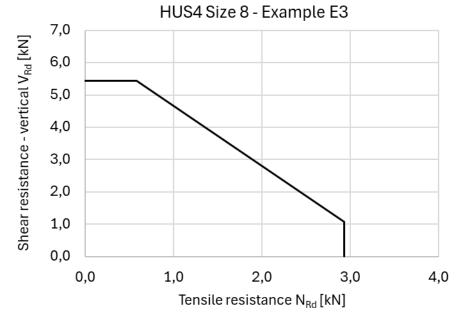


Figure 1: Solid calcium silicate brick, single anchor, example E3



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 20 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,20 N/mm² Example E3 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11,0$ mm to 12,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall $\sigma = 0,20$ N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 1

1 Input data



•				
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized			
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936			
Embedment depth:	h _{nom} = 75 mm			
Material:	Carbon steel			
Assessment:	ETA 23/0936 European Technical Assessment			
Issued:	13.05.2025			
Proof:	Design Method EOTA TR 054 July 2022			
Stand off installation:	e _b = 0 mm (no stand off)			
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 20 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm Vertical compression on wall, $\sigma =$ 0,20 N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$			
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c \perp \geq c_{j} \perp = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ $No \text{ setting near } (c \perp < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}) \text{ or in joints!}$ 2 DF stretcher 2 DF Header $c_{ut} \text{ edge brick}$ $area$ $c_{j_{\perp}} = 20 \text{ mm}$ $Allowable \text{ setting area}$ $area$ $c_{j_{\perp}} = 20 \text{ mm}$ $Allowable \text{ setting area}$ $area$ $c_{j_{\perp}} = 40 \text{ mm}$ $l_{b} \geq 240 \text{ mm}$			



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E4 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 20 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	3,445
Brick breakout**	3,445
Pull-out of one brick**	3,422



Base material: calcium silicate brick, solid l x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
9,900	0,87	2,5	3,445

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	CETA,j∦ [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,87
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	Cmin,ETA [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
9,900	8,613	≥ 90	90	2,5	3,445

2.4 Pullout of one brick

 A ^H act [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]	
 55 200	0	0,15	0,20	
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]		
 8,556	2,5	3,422		



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 20 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,20 N/mm² Example E4 Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 20 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	6,240
Brick edge failure**	6,240
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _j ∥ [mm]	s _{ETA} ,∥ [mm]	CETA,j∦ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∥ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA} ,j⊥ [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∦ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	15,600	15,600	6,240	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∥ [-]	αj,∨∥ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{\sf g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	Ψg,∨∦ [-]	e _{c,V⊥} [mm]	Ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	$V_{Rk,c}$ [kN]	$V_{Rd,c\parallel}$ [kN]	
≥ 90	90	15,600	15,600	6,240	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 20 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 20$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
3,422	1,248		

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,684	6,240		

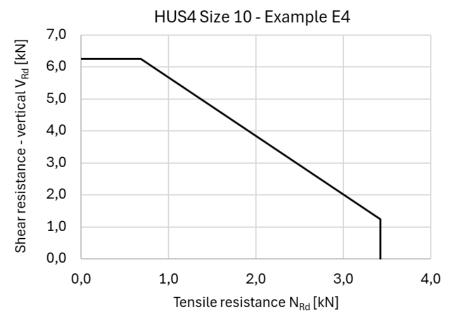


Figure 1: Solid calcium silicate brick, single anchor, example E4



Base material: calcium silicate brick, solid
I x b x h \geq 240 mm x 115 mm x 113 mm
Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 20 N/mm²
ETA 23/0936 (13.05.2025)
Compression on wall σ = 0,20 N/mm²
Example E4 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13,0$ mm to 14,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: calcium silicate brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 113 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq 30 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Example E5Page:

1 Input data



i input data			
Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 60 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$		
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 30 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 90 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j\bot} = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c\bot < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher 2 DF Header $Cut \text{ edge brick } \text{ Allowable setting area } \text{ Allowable } Allowab$		



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² No compression on wall $\sigma = 0.0$ N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E5 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 30 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	3,526
Brick breakout**	3,526
Pull-out of one brick**	1,656



Base material: calcium silicate brick, solid l x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	N _{Rd,p} [kN]
11,300	0,78	2,5	3,526

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∦ [mm]	αg,Ν∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,78
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Μm} [-]	N _{Rd,b} [kN]
11,300	8,814	≥ 90	90	2,5	3,526

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]	
 55 200	0	0,15	0,00	
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]		
4,140	2,5	1,656		



Base material: calcium silicate brick, solidAnchor type: HUS4 Size 8I x b x h \geq 240 mm x 115 mm x 113 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq 30 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Example E5Page: 40.000

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 30 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	6,560
Brick edge failure**	6,560
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E5 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	$\alpha_{j,\vee\parallel}$ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA} ,j⊥ [mm]	$lpha_{ extsf{g}, extsf{N}ot}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	16,400	16,400	6,560	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ∨∥ [-]	α _{j,} ∨∥ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	ψg,∨ ∦ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
ou [mm]	C [mm]	V [kN]	\/[k\l]	\/ [LN]	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA∥} [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	16,400	16,400	6,560	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page:

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 30$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

 β _N [-]	βν [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
 1,656	1,312		

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN] V _{Rd} [kN]		
0,331	6,560		

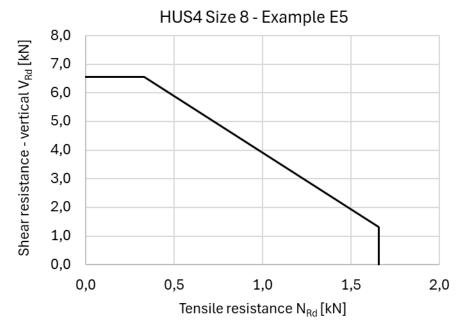


Figure 1: Solid calcium silicate brick, single anchor, example E5



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 30 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0,0 N/mm² Example E5 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11,0 \text{ mm}$ to 12,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 30 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0,0 N/mm² Example E6 Page: 1

1 Input data



i input data				
Anchor type and diameter:	HUS4 Size 10 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized			
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936			
Embedment depth:	h _{nom} = 75 mm			
Material:	Carbon steel			
Assessment:	ETA 23/0936 European Technical Assessment			
Issued:	13.05.2025			
Proof:	Design Method EOTA TR 054 July 2022			
Stand off installation:	e _b = 0 mm (no stand off)			
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 30 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$			
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_j\bot = 20 \text{ mm and } c\ \geq c_j\ = 40 \text{ mm}$ No setting near $(c\bot < 20 \text{ mm and } c\ < 40 \text{ mm})$ or in joints! 2 DF stretcher 2 DF Header $Cut \text{ edge brick}$ $Allowable \text{ setting area}$ $Allowable \text{ setting area}$ $C_{ini} = 112,5 \text{ mm}$ $C_{in} = 20 \text{ mm}$ $C_{in} = 20 \text{ mm}$ $C_{in} = 112,5 \text{ mm}$ $C_{in} = 112,5 \text{ mm}$ $C_{in} = 40 \text{ mm}$ $C_{in} = 112,5 \text{ mm}$ $C_{in} = 112,5 \text{ mm}$ $C_{in} = 112,5 \text{ mm}$			



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 30 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	4,176
Brick breakout**	4,176
Pull-out of one brick**	1,656



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γ _{Mm} [-]	$N_{Rd,p}$ [kN]
12.000	0,87	2.5	4.176

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,87
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
12,000	10,440	≥ 90	90	2,5	4,176

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ_d [N/mm ²]
55 200	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
4,140	2,5	1,656	



Base material: calcium silicate brick, solidAnchor type: HUS4 Size 10 $l x b x h \ge 240 \text{ mm } x 115 \text{ mm } x 113 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 30 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Example E6Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 30 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	7,520
Brick edge failure**	7,520
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _j ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψ _{g,} ∨∥ [-]	e _{c,V⊥} [mm]	ψ _{g,} ∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	18,800	18,800	7,520	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ∨∦ [-]	αj,∨∥ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{\sf g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	Ψg,∨∦ [-]	e _{c,V⊥} [mm]	Ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
•	·	·	ŕ	ŕ	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	$V_{Rk,c}$ [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	18,800	18,800	7,520	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 30$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

 β _N [-]	βv [-]	α[-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
 1,656	1,504	•	

4.2 Maximum shear load

 β _N [-]	βv [-]	α [-]	Status
 0,2	1,0	1,00	OK
 N _{Rd} [kN]	V _{Rd} [kN]		
 0.331	7 520		

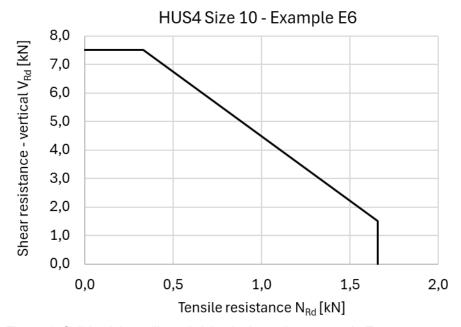


Figure 1: Solid calcium silicate brick, single anchor, example E6



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 30 N/mm² ETA 23/0936 (13.05.2025) No compression on wall σ = 0,0 N/mm² Example E6 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13,0$ mm to 14,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: calcium silicate brick, solid l x b x h \geq 240 mm x 115 mm x 113 mm Brick strength f_{b,mean} \geq 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 1

1 Input data



i input data				
Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized			
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936			
Embedment depth:	h _{nom} = 60 mm			
Material:	Carbon steel			
Assessment:	ETA 23/0936 European Technical Assessment			
Issued:	13.05.2025			
Proof:	Design Method EOTA TR 054 July 2022			
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$			
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 30 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm Vertical compression on wall, $\sigma = 0.20$ N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 90 \text{ mm}$			
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j}\bot = 20 \text{ mm and } c\ \geq c_{j}\ = 40 \text{ mm}$ No setting near $(c\bot < 20 \text{ mm and } c\ < 40 \text{ mm})$ or in joints! 2 DF stretcher 2 DF Header $Cut \text{ edge brick}$ $area$ $Cut \text{ edge brick}$ $area$ $area$ $c_{ji} = 40 \text{ mm}$ $Allowable \text{ setting area}$ $area$ $c_{ji} = 40 \text{ mm}$ $Allowable \text{ setting area}$ $area$ $c_{ji} = 40 \text{ mm}$ $c_{ji} = 20 \text{ mm}$ $c_{ji} = 40 \text{ mm}$			



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 30 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	3,932
Brick breakout**	3,932
Pull-out of one brick**	3,422



Base material: calcium silicate brick, solid l x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall $\sigma = 0,20$ N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
11,300	0,78	2,5	3,932

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,78
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
11,300	9,831	≥ 90	90	2,5	3,932

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
55 200	0	0,15	0,20
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
8,556	2,5	3,422	



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 30 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,20 N/mm² Example E7 Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 30 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	6,560
Brick edge failure**	6,560
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	$\alpha_{j,\vee\parallel}$ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA} ,j⊥ [mm]	$lpha_{ extsf{g}, extsf{N}ot}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	16,400	16,400	6,560	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∥ [-]	αj,∨∥ [-]
-	≥ 40	-	40	1,0	1,0
- f1	- F1	- []	- [m.m.]		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
a., []		\ /	\ / FL-N II	V FI-NII	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA∥} [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	16,400	16,400	6,560	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E7 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 30$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

$$β_N$$
 [-] $β_V$ [-] $α$ [-] **Status**
1,0 0,2 1,00 OK

$$N_{Rd}$$
 [kN] V_{Rd} [kN]
3,422 1,312

4.2 Maximum shear load

_	β _N [-]	βv [-]	α[-]	Status
	0,2	1,0	1,00	OK
_	N _{Rd} [kN]	V _{Rd} [kN]		
	0.684	6.560		

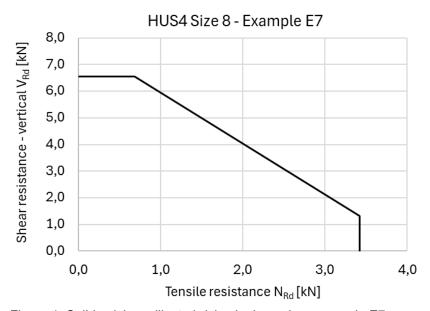


Figure 1: Solid calcium silicate brick, single anchor, example E7



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 30 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,20 N/mm² Example E7 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11,0$ mm to 12,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	eь = 0 mm (no stand off)		
Base material: Wall layout:	Solid calcium silicate brick, L x W x H: \geq 240 mm x 115 mm x 113 mm Compressive strength: $f_{b,mean} \geq$ 30 N/mm², bulk density $\rho \geq$ 1,7 kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Any wall configuration (stretcher bond, English bond etc.), unplastered wall Anchor in header or stretcher position Minimum wall thickness: 115 mm Vertical compression on wall, $\sigma = 0.20$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j}\bot = 20 \text{ mm and } c\ \geq c_{j}\ = 40 \text{ mm}$ No setting near ($c\bot < 20 \text{ mm and } c\ < 40 \text{ mm}$) or in joints! 2 DF stretcher 2 DF Header $Cut \text{ edge brick}$ Allowable setting area $C_{min} = 112.5 \text{ mm}$ $C_{min} = 112.5 \text{ mm}$ $C_{min} = 112.5 \text{ mm}$ $C_{j_{\perp}} = 20 \text{ mm}$ $C_{j_{\perp}} = 20 \text{ mm}$ $C_{j_{\perp}} = 40 \text{ mm}$ $C_{j_{\perp}} = 40 \text{ mm}$		



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 30 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	4,176
Brick breakout**	4,176
Pull-out of one brick**	3,422



Base material: calcium silicate brick, solid l x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
12,000	0,87	2,5	4,176

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	CETA,j∥ [mm]	αg,Ν∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,87
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	Cmin,ETA [mm]	γмm [-]	N _{Rd,b} [kN]
12,000	10,440	≥ 90	90	2,5	4,176

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
55 200	0	0,15	0,20
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
8,556	2,5	3,422	



Base material: calcium silicate brick, solid Anchor type: HUS4 Size 10 l x b x h \geq 240 mm x 115 mm x 113 mm Design: TR 054 July 2022 Brick strength f_{b,mean} \geq 30 N/mm² ETA 23/0936 (13.05.2025) Compression on wall σ = 0,20 N/mm² Example E8 Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 30 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	7,520
Brick edge failure**	7,520
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

] SETA,∥ [mm] CETA,j∥ [mm]	s_{\parallel} [mm] $c_{j\parallel}$ [mm]	αg,∨∥ [-]	$\alpha_{j,\vee}$ [-]
- 40	- ≥ 40	1,0	1,0
$S_{ETA,\perp}$ [mm] $C_{ETA,j\perp}$ [mm]	s_{\perp} [mm] $c_{j\perp}$ [mm]	$lpha_{g,N\perp}$ [-]	αj,∨⊥ [-]
- 20	- ≥ 20	1,0	1,0
] $\mathbf{e}_{c,V\perp}$ [mm] $\psi_{g,V\perp}$ [-]	$e_{c,V\parallel}$ [mm] $\psi_{g,V\parallel}$ [-]	γ _{Mm} [-]	
0,0 1,000	0,0 1,000	2,5	
nm] $V_{Rk,b,ETA}$ [kN] $V_{Rk,b}$ [kN]	c_{\parallel} [mm] $c_{min,ETA\parallel}$ [mm]	$V_{Rd,b}$ [kN]	
18,800 18,800	≥ 90 90	7,520	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	- ≥ 20 $e_{c,V\parallel} \text{ [mm]} \qquad \qquad \psi_{g,V\parallel} \text{ [-]}$ 0,0 1,000 $c\parallel \text{ [mm]} \qquad \qquad c_{min,ETA\parallel} \text{ [mm]}$	1,0 γ _{Mm} [-] 2,5 V _{Rd,b∥} [kN]	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	_{CETA,j} ∥ [mm]	αg,∨∥ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨ ∦ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
ou [mm]	o "[mm]	\/ " [[K]]	\/ " [[4N]]	\/ " [[4N]]	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	18,800	18,800	7,520	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: calcium silicate brick, solid I x b x h \geq 240 mm x 115 mm x 113 mm Brick strength $f_{b,mean} \geq$ 30 N/mm² Compression on wall σ = 0,20 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 30$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
3,422	1,504		

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
 0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,684	7,520		

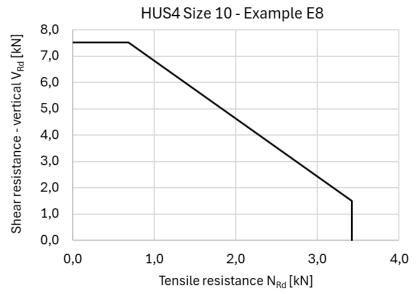


Figure 1: Solid calcium silicate brick, single anchor, example E8



Base material: calcium silicate brick, solid
I x b x h \geq 240 mm x 115 mm x 113 mm
Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq$ 30 N/mm²
ETA 23/0936 (13.05.2025)
Compression on wall σ = 0,20 N/mm²
Example E8 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13,0 \text{ mm}$ to 14,0 mm (through setting)

Setting tool: Impact screw wrench SIW 4AT-22 Gear 1

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 115,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page: 1

Anchor type: HUS4 Size 8

1 Input data



HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating		
HUS4-C countersunk head configuration, carbon steel galvanized		
Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
h _{nom} = 60 mm		
Carbon steel		
ETA 23/0936 European Technical Assessment		
13.05.2025		
Design Method EOTA TR 054 July 2022		
$e_b = 0$ mm (no stand off)		
Solid lightweight concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm Compressive strength: $f_{b,mean} \geq 5$ N/mm², bulk density $\rho \geq 0.9$ kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall Anchor in stretcher position Minimum wall thickness: 150 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²		
Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$		
$c \bot \geq c_{j}\bot = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c \bot < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher $c_{\perp} = 20 \text{ mm} \text{ and } c_{\parallel} < 40 \text{ mm} \text{ or in joints!}$ Allowable setting area Allowable setting area Allowable setting area		



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 5 N/mm²

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	0,851
Brick breakout**	0,851
Pull-out of one brick**	5,976



Base material: lightweight concrete brick, solid $| x b x h \ge 498 \text{ mm } x 150 \text{ mm } x 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
2,800	0,76	2,5	0,851

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	с _{ЕТА,j∦} [mm]	$\alpha_{\text{g,N}}$ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,76
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
2,800	2,128	≥ 90	90	2,5	0,851

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	



Base material: lightweight concrete brick, solidAnchor type: HUS4 Size 8I x b x h \geq 498 mm x 150 mm x 199 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq 5$ N/mm²ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0.0$ N/mm²Example E1Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	0,720
Brick edge failure**	0,720
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,\vee}$ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	C _{ETA} ,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	1,800	1,800	0,720	

3.3 Brick edge failure

s∥ [m	nm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∦ [mm]	$\alpha_{\text{g,V}}$ [-]	$\alpha_{j,\vee}$ [-]
-		≥ 40	-	40	1,0	1,0
s⊥ [m	nm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-		≥ 20	-	20	1,0	1,0
e _{c,V} [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0)	1,000	0,0	1,000	2,5	
c∥ [m	nm] c _{min,}	_{ETA∥} [mm] \	′ _{Rk,c,ETA} ∥ [kN]	$V_{Rk,c\parallel}$ [kN]	$V_{Rd,c\parallel}$ [kN]	
≥ 9	0	90	1,800	1,800	0,720	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	βv [-]	α[-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,851	0,144		

4.2 Maximum shear load

	β _N [-]	βv [-]	α [-]	Status
	0,2	1,0	1,00	OK
	N _{Rd} [kN]	V _{Rd} [kN]		
_	0,170	0,720		

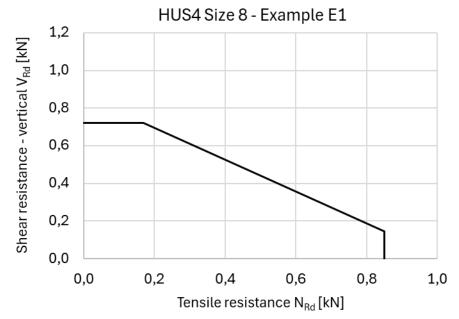


Figure 1: Solid lightweight concrete brick, single anchor, example E1



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength f_{b,mean} \geq 5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: d_f = 11,0 mm to 12,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: lightweight concrete brick, solid $l x b x h \ge 498 \text{ mm } x 150 \text{ mm } x 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 1

1 Input data



•			
Anchor type and diameter:	HUS4-H HUS4-HF	hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized	
Specification text:		10, nominal embedment depth h _{nom} = 75 mm I, hammer drilled, installation per ETA 23/0936	
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 Eu	ropean Technical Assessment	
Issued:	13.05.2025		
Proof:	Design Method E	EOTA TR 054 July 2022	
Stand off installation:	e₀ = 0 mm (no st	tand off)	
Base material: Wall layout:	Solid lightweight concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm Compressive strength: $f_{b,mean} \geq 5$ N/mm², bulk density $\rho \geq 0.9$ kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall Anchor in stretcher position Minimum wall thickness: 150 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} =$	= 112,5 mm	
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	No setting near (Stretcher	n and $c_{\parallel} \ge c_{j\parallel} = 40$ mm ($c_{\perp} < 20$ mm and $c_{\parallel} < 40$ mm) or in joints!	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	0,826
Brick breakout**	0,826
Pull-out of one brick**	4,482



Base material: lightweight concrete brick, solid $| x b x h \ge 498 \text{ mm } x | 150 \text{ mm } x | 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
3,500	0,59	2,5	0,826

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,59
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
3,500	2,065	≥ 90	90	2,5	0,826

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	



Base material: lightweight concrete brick, solidAnchor type: HUS4 Size 10 $l x b x h \ge 498 \text{ mm } x 150 \text{ mm } x 199 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Example E2Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	0,991
Brick edge failure**	0,991
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	CETA,j∦ [mm]	$\alpha_{g,V}$ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 40	-	40	1,0	0,59
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∥ [-]	$e_{c,V\perp}$ [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	4,200	2,478	0,991	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∦ [-]	αj,∨∥ [-]
-	≥ 40	-	40	1,0	0,59
. F 1					
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γмт [-]	
0,0	1,000	0,0	1,000	2,5	
	F) / FLA17) / FL. N. IZ) / FLAD	
c∥ [mm]	c _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	4,200	2,478	0,991	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	βv [-]	α[-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,826	0,198		

4.2 Maximum shear load

β _N [-]	βv [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
 0,165	0,991		

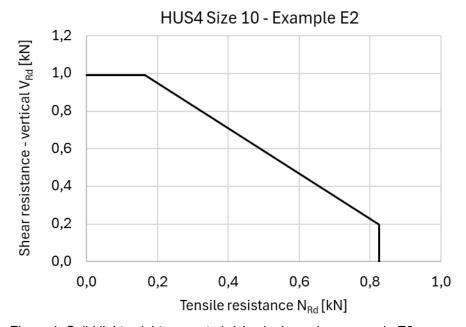


Figure 1: Solid lightweight concrete brick, single anchor, example E2



Base material: lightweight concrete brick, solid $l \times b \times h \ge 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$

Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025) No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Example E2 Page:

5 Warnings

 Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!

Anchor type: HUS4 Size 10

Design: TR 054 July 2022

- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: d_f = 13,0 mm to 14,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength f_{b,mean} \geq 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h_{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 60 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	eь = 0 mm (no stand off)		
Base material: Wall layout:	Solid lightweight concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm Compressive strength: $f_{b,mean} \geq 7,5$ N/mm², bulk density $\rho \geq 0,9$ kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall Anchor in stretcher position Minimum wall thickness: 150 mm No vertical compression on wall, σ = 0,0 N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	C_L \geq C_j_L = 20 mm and C_ \geq C_j = 40 mm No setting near (C_L < 20 mm and C < 40 mm) or in joints! Stretcher Cut edge brick Allowable setting area Allowable setting area Allowable setting area Allowable setting area		



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 2

Anchor type: HUS4 Size 8

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 7,5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	1,064
Brick breakout**	1,064
Pull-out of one brick**	4,482



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
3,500	0,76	2,5	1,064

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∦ [mm]	$\alpha_{g,N}$ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,76
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Mm} [-]	$N_{Rd,b}$ [kN]
3,500	2,660	≥ 90	90	2,5	1,064

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	



Base material: lightweight concrete brick, solidAnchor type: HUS4 Size 8I x b x h \geq 498 mm x 150 mm x 199 mmDesign: TR 054 July 2022Brick strength $f_{b,mean} \geq 7,5$ N/mm²ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0,0$ N/mm²Example E3Page:

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 7,5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	0,840
Brick edge failure**	0,840
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∥ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	αj,∨⊥ [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	Ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψ _{g,} ∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	$c_{\text{min,ETA}}$ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	2,100	2,100	0,840	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∥ [-]	αj,∨∥ [-]
-	≥ 40	-	40	1,0	1,0
- f1	- F1	- []	- fu.u.1		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
a., []		\ /	\	V FI-NII	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	2,100	2,100	0,840	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 7,5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βN	[-] β·	/ [-]	α [-]	Status
1,	0 (),2	1,00	OK
N_{Rd}	[kN] V _{Ro}	[kN]		
1,0	64 0,	168		

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
 0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,213	0,840		

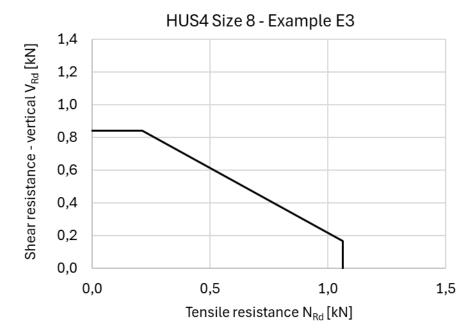


Figure 1: Solid lightweight concrete brick, single anchor, example E3



Base material: lightweight concrete brick, solid Anchor type: HUS4 Size 8 l x b x h \geq 498 mm x 150 mm x 199 mm Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq 7,5$ N/mm² ETA 23/0936 (13.05.2025) No compression on wall $\sigma = 0,0$ N/mm² Example E3 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge ($c_{min} = c_{cr}$) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: d_f = 11,0 mm to 12,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength f_{b,mean} \geq 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 1

1 Input data



Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	e _b = 0 mm (no stand off)		
Base material: Wall layout:	Solid lightweight concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm Compressive strength: $f_{b,mean} \geq 7,5$ N/mm², bulk density $\rho \geq 0,9$ kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall Anchor in stretcher position Minimum wall thickness: 150 mm No vertical compression on wall, $\sigma = 0,0$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j}\bot = 20 \text{ mm and } c\ \geq c_{j}\ = 40 \text{ mm}$ No setting near ($c\bot < 20 \text{ mm and } c\ < 40 \text{ mm}$) or in joints! Stretcher		



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 7,5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	1,062
Brick breakout**	1,062
Pull-out of one brick**	4,482



Base material: lightweight concrete brick, solid $l \times b \times h \ge 498 \text{ mm } \times 150 \text{ mm } \times 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
4,500	0,59	2,5	1,062

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,59
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	Cmin,ETA [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
4,500	2,665	≥ 90	90	2,5	1,062

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	



Base material: lightweight concrete brick, solidAnchor type: HUS4 Size 10 $1 \times b \times h \ge 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Design: TR 054 July 2022Brick strength $f_{b,mean} \ge 7,5 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025)No compression on wall $\sigma = 0,0 \text{ N/mm}^2$ Example E4Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 7,5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,227
Brick edge failure**	1,227
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _j ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	0,59
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψ _{g,} ∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	5,200	3,068	1,227	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∦ [mm]	αg,∨∥ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 40	-	40	1,0	0,59
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	$c_{min,ETA}$ [mm]	$V_{Rk,c,ETA}$ [kN]	$V_{Rk,c\parallel}$ [kN]	$V_{Rd,c\parallel}$ [kN]	
≥ 90	90	5,200	3,068	1,227	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 7,5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
1,062	0,245		

4.2 Maximum shear load

 βn [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,212	1,227		

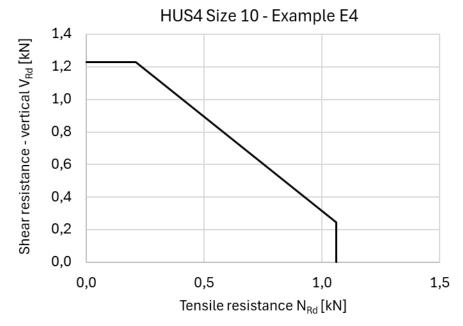


Figure 1: Solid lightweight concrete brick, single anchor, example E4



Base material: lightweight concrete brick, solid $l \times b \times h \geq 498 \text{ mm } \times 150 \text{ mm } \times 199 \text{ mm}$ Design: TR 054 July 2022 Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ ETA 23/0936 (13.05.2025) No compression on wall $\sigma = 0,0 \text{ N/mm}^2$ Example E4 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: d_f = 13,0 mm to 14,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 1



1 Input data

i input data				
Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized			
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936			
Embedment depth:	h _{nom} = 60 mm			
Material:	Carbon steel			
Assessment:	ETA 23/0936 European Technical Assessment			
Issued:	13.05.2025			
Proof:	Design Method EOTA TR 054 July 2022			
Stand off installation:	e _b = 0 mm (no stand off)			
Base material: Wall layout:	Solid lightweight concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm Compressive strength: $f_{b,mean} \geq 5$ N/mm², bulk density $\rho \geq 0.9$ kg/dm³ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall Anchor in stretcher position Minimum wall thickness: 150 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Spacing	s _∥ = 80 mm, horizontal spacing			
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$			
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_j\bot = 20 \text{ mm and } c_{\parallel} \geq c_j\parallel = 40 \text{ mm}$ No setting near ($c\bot < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher $c_{\perp} = 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}$ Allowable setting area $c_{\perp} = 20 \text{ mm}$ Allowable setting area $c_{\perp} = 20 \text{ mm}$ Allowable setting area $c_{\parallel} = 40 \text{ mm}$ Allowable setting area			



Base material: lightweight concrete brick, solid $1 \times b \times h \ge 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$

Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	0,851
Brick breakout**	1,702
Pull-out of one brick**	5,976



Base material: lightweight concrete brick, solid $| x b x h \ge 498 \text{ mm } x 150 \text{ mm } x 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	$N_{Rd,s}$ [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γ _{Mm} [-]	$N_{Rd,p}$ [kN]
2,800	0,76	2,5	0,851

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	$\alpha_{g,N}$ [-]	αj,N [-]
80	≥ 40	80	40	2,0	0,76
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
2,800	4,256	≥ 90	90	2,5	1,702

2.4 Pullout of one brick

	A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
	149 400	0	0,15	0,00
	N [IZN]	[1	N[kN]	
_	N _{Rk,pb} [kN]	γMm [-]	N _{Rd,pb} [kN]	
	11,205	2,5	4,482	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 5 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page:



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,152
Brick edge failure**	1,152
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid $l x b x h \ge 498 \text{ mm } x 150 \text{ mm } x 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
18,800	1,25	15,040

3.2 Local brick failure

s [mm]	c _{j∥} [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{g,V}$ [-]	$\alpha_{j,\vee\parallel}$ [-]
80	≥ 40	-	40	1,6	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψ _{g,} ∨∦ [-]	e _{c,V⊥} [mm]	$\psi_{g,V\perp}$ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	1,800	2,880	1,152	

3.3 Brick edge failure

s _∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	αg,∨∥ [-]	α _{j,} ∨∥ [-]
80	≥ 40	80	40	1,6	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
ec,∨∥ [mm]	ψg,∨∦ [-]	e _{c,∨⊥} [mm]	ψg,∨⊥ [-]	γMm [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c} ∥ [kN]	V _{Rd,c} ∥ [kN]	
≥ 90	90	1,800	2,880	1,152	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength f_{b,mean} \geq 5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 6



4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βn [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
1,702	0,230		

4.2 Maximum shear load

β _N [-]	βv [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
 0,340	1,152		

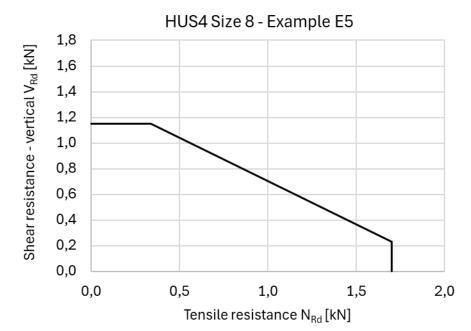


Figure 1: Solid lightweight concrete brick, 2 anchors, s_{||} = 80 mm, example E5



Base material: lightweight concrete brick, solid $l x b x h \ge 498 \text{ mm } x 150 \text{ mm } x 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 7



5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: d_f = 11,0 mm to 12,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70.0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 1



1 Input data

Anchor type and diameter:	HUS4 Size 10 HUS4-H HUS4-HF HUS4-C	hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized	
Specification text:		e 10, nominal embedment depth h _{nom} = 75 mm el, hammer drilled, installation per ETA 23/0936	
Embedment depth:	$h_{nom} = 75 \text{ mm}$		
Material:	Carbon steel		
Assessment:	ETA 23/0936 E	uropean Technical Assessment	
Issued:	13.05.2025		
Proof:	Design Method	EOTA TR 054 July 2022	
Stand off installation:	e _b = 0 mm (no s	stand off)	
Base material: Wall layout:	Compressive si Mortar: M2.5, m Horizontal joints Stretcher bond, Anchor in stretch Minimum wall the	at concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm trength: $f_{b,mean} \geq 5$ N/mm², bulk density $\rho \geq 0.9$ kg/dm³ maximum joint width 10 mm s filled, vertical joints filled or not filled, unplastered wall ther position hickness: 150 mm apression on wall, $\sigma = 0.0$ N/mm²	
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Spacing	s = 80 mm, ho	rizontal spacing	
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom}$	= 112,5 mm	
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	No setting near Stretcher	c (c⊥ < 20 mm and c∥ < 40 mm) or in joints!	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	0,826
Brick breakout**	1,322
Pull-out of one brick**	4,482

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	$N_{Rd,s}$ [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	N _{Rd,p} [kN]	
3,500	0,59	2,5	0,826	

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	с _{ЕТА,j∦} [mm]	$\alpha_{\text{g,N}}$ [-]	α _{j,N} [-]
80	≥ 40	80	40	1,6	0,59
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	C _{ETA,j⊥} [mm]	α _{g,Ν⊥} [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γ _{Mm} [-]	N _{Rd,b} [kN]
3,500	3,304	≥ 90	90	2.5	1,322

2.4 Pullout of one brick

 A^{H}_{act} [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
 149 400	0	0,15	0,00
N _{Rk,pb} [kN]	γ _{Μm} [-]	N _{Rd,pb} [kN]	
 TARK, pb [KT4]	γivim [-]	MRa,pb [KM]	
11,205	2,5	4,482	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,586
Brick edge failure**	1,586
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid $l \times b \times h \ge 498 \text{ mm } \times 150 \text{ mm } \times 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	$\alpha_{g,V}$ [-]	$\alpha_{j,\vee}$ [-]
80	≥ 40	-	40	1,6	0,59
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	αj,∨⊥ [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∥ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	4,200	3,965	1,586	

3.3 Brick edge failure

s∥ [mm]	c _{j∥} [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,V} \ [-]$	αj,∨∥ [-]
80	≥ 40	80	40	1,6	0,59
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{\sf g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	ec,∨⊥ [mm]	ψg,∨⊥ [-]	γMm [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	4,200	3,965	1,586	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: lightweight concrete brick, solid $l \times b \times h \ge 498 \text{ mm } \times 150 \text{ mm } \times 199 \text{ mm}$ Brick strength $f_{b,mean} \ge 5 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 6



4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βn [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
1,322	0,317		

4.2 Maximum shear load

_	β _N [-]	βv [-]	α [-]	Status
	0,2	1,0	1,00	OK
	N _{Rd} [kN]	V _{Rd} [kN]		
	0,264	1,586		

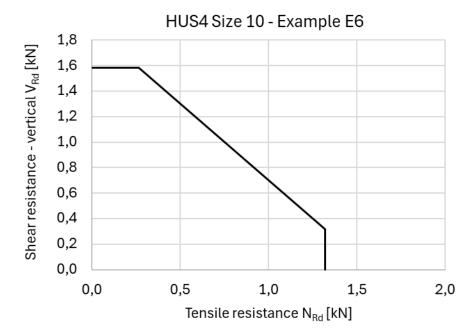


Figure 1: Solid lightweight concrete brick, 2 anchors, s_∥ = 80 mm, example E6



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 7



5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: d_f = 13,0 mm to 14,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 1



1 Input data

Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C	hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized	
Specification text:		e 8, nominal embedment depth h _{nom} = 60 mm el, hammer drilled, installation per ETA 23/0936	
Embedment depth:	$h_{nom} = 60 \text{ mm}$		
Material:	Carbon steel		
Assessment:	ETA 23/0936 E	uropean Technical Assessment	
Issued:	13.05.2025		
Proof:	Design Method	EOTA TR 054 July 2022	
Stand off installation:	e _b = 0 mm (no	stand off)	
Base material: Wall layout:	Compressive s Mortar: M2.5, n Horizontal joint Stretcher bond Anchor in stretc Minimum wall t	nt concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm trength: $f_{b,mean} \geq 7,5$ N/mm², bulk density $\rho \geq 0,9$ kg/dm³ naximum joint width 10 mm s filled, vertical joints filled or not filled, unplastered wall cher position hickness: 150 mm appression on wall, $\sigma = 0,0$ N/mm²	
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Spacing	s _∥ = 80 mm, ho	rizontal spacing	
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom}$	= 90 mm	
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area		Allowable setting area Allowable setting area Allowable setting area Allowable setting area	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 7,5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	1,064
Brick breakout**	2,128
Pull-out of one brick**	4,482

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	$N_{Rd,s}$ [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	N _{Rd,p} [kN]	
3,500	0,76	2,5	1,064	

2.3 Brick breakout

_	s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
	80	≥ 40	80	40	2,0	0,76
	s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA,j⊥} [mm]	α _{g,Ν⊥} [-]	e _{c,N∥,⊥} [mm]
	-	≥ 20	-	20	1,0	0,0
	N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
	3,500	5.320	≥ 90	90	2.5	2,128

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
149 400	0	0,15	0,00
N	. 1	NI (1.NI)	
N _{Rk,pb} [kN]	γ _{Mm} [-]	N _{Rd,pb} [kN]	
11,205	2,5	4,482	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page:



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 7,5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,344
Brick edge failure**	1,344
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	$\alpha_{j,\vee}$ [-]
80	≥ 40	-	40	1,6	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	αj,∨⊥ [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∦ [-]	e _{c,V⊥} [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	2,100	3,360	1,344	

3.3 Brick edge failure

s∥ [mm]	c _{j∥} [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	α _{g,} ν∦ [-]	α _{j,} ∨∥ [-]
80	≥ 40	80	40	1,6	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,} ∨∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γмm [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	2,100	3,360	1,344	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 6



4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 7,5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

βn [-]	βv [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
2,128	0,269		

4.2 Maximum shear load

βn [-]	βv [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,426	1,344		

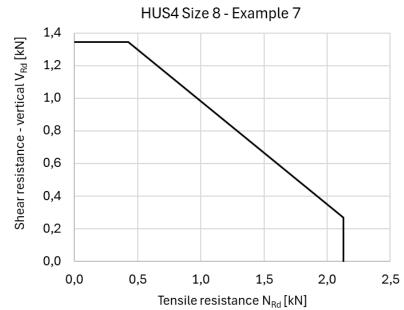


Figure 1: Solid lightweight concrete brick, 2 anchors, s_∥ = 80 mm, example E7



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 7



5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: d_f = 11,0 mm to 12,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 1



1 Input data

Anchor type and diameter:	HUS4 Size 10 HUS4-H HUS4-HF HUS4-C	hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized	
Specification text:		e 10, nominal embedment depth h _{nom} = 75 mm el, hammer drilled, installation per ETA 23/0936	
Embedment depth:	$h_{nom} = 75 \text{ mm}$		
Material:	Carbon steel		
Assessment:	ETA 23/0936 E	uropean Technical Assessment	
Issued:	13.05.2025		
Proof:	Design Method	EOTA TR 054 July 2022	
Stand off installation:	e _b = 0 mm (no s	stand off)	
Base material: Wall layout:	Compressive something Mortar: M2.5, in Horizontal joints Stretcher bond, Anchor in stretch Minimum wall to	at concrete brick, L x W x H: \geq 498 mm x 150 mm x 199 mm trength: $f_{b,mean} \geq 7,5$ N/mm², bulk density $\rho \geq 0,9$ kg/dm³ maximum joint width 10 mm s filled, vertical joints filled or not filled, unplastered wall ther position hickness: 150 mm apression on wall, $\sigma = 0,0$ N/mm²	
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Spacing	s _∥ = 80 mm, ho	rizontal spacing	
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom}$	= 112,5 mm	
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	No setting near Stretcher	m and $c_{\parallel} \ge c_{j\parallel} = 40$ mm $c_{\parallel} < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}) \text{ or in joints!}$ owable setting area Allowable setting area Allowable setting area	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 7,5 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	1,062
Brick breakout**	1,699
Pull-out of one brick**	4,482

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	$N_{Rd,s}$ [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	N _{Rd,p} [kN]	
4,500	0,59	2,5	1,062	

2.3 Brick breakout

_	s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	c _{ETA,j∦} [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
	80	≥ 40	80	40	1,6	0,59
	s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	C _{ETA,j⊥} [mm]	α _{g,N⊥} [-]	$e_{c,N\parallel,\perp}$ [mm]
_	-	≥ 20	-	20	1,0	0,0
	N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
_	4,500	4,248	≥ 90	90	2.5	1,699

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
149 400	0	0,15	0,00
N	. 1	NI (1.NI)	
N _{Rk,pb} [kN]	γ _{Mm} [-]	N _{Rd,pb} [kN]	
11,205	2,5	4,482	



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 7,5 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,964
Brick edge failure**	1,964
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq 7,5 \text{ N/mm}^2$ No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∦ [-]
80	≥ 40	-	40	1,6	0,59
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	Ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	5,200	4,909	1,964	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	αg,∨∥ [-]	α _{j,} ∨∥ [-]
80	≥ 40	80	40	1,6	0,59
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	Ψg,∨∥ [-]	e _{c,V⊥} [mm]	Ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,5	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
<u> </u>	90	5,200	4,909	1,964	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength f_{b,mean} \geq 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 6



4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 7,5$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

$$β_N$$
 [-] $β_V$ [-] $α$ [-] **Status**
1,0 0,2 1,00 OK

$$N_{Rd}$$
 [kN] V_{Rd} [kN]
1,699 0,393

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,340	1,964		

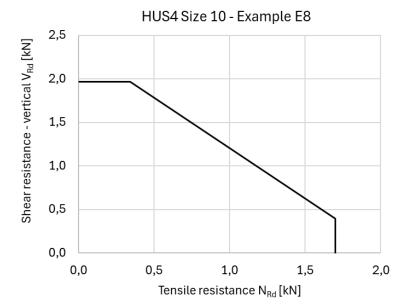


Figure 1: Solid lightweight concrete brick, 2 anchors, s_∥ = 80 mm, example E8



Base material: lightweight concrete brick, solid I x b x h \geq 498 mm x 150 mm x 199 mm Brick strength $f_{b,mean} \geq$ 7,5 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 7



5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: d_f = 13,0 mm to 14,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 150,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm}$, solid brick

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page:

1 Input data



Anchor type and diameter:	HUS4 Size 8 HUS4-H HUS4-HF HUS4-C hexagon head configuration, carbon steel galvanized hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 60 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	$e_b = 0 \text{ mm (no stand off)}$		
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), L x W x H: \geq 499 mm x 240 mm x 249 mm Compressive strength: $f_{b,mean} \geq$ 4 N/mm², bulk density $\rho \geq$ 0,55 kg/dm³ Mortar: M2.5, maximum joint width 3 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall, Anchor in stretcher position Minimum wall thickness: 240 mm No vertical compression on wall, σ = 0,0 N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 90 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j}\bot = 20 \text{ mm and } c\ \geq c_{j}\ = 40 \text{ mm}$ No setting near ($c\bot < 20 \text{ mm and } c\ < 40 \text{ mm}$) or in joints! Stretcher $c_{j}\bot = 20 \text{ mm}$ Allowable setting area $c_{j}\bot = 20 \text{ mm}$ Allowable setting area $c_{j}\bot = 20 \text{ mm}$ $c_{j}\bot = 20 \text{ mm}$ $c_{j}\bot = 20 \text{ mm}$ $c_{j}\bot = 40 \text{ mm}$		



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 4 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	0,183
Brick breakout**	0,183
Pull-out of one brick**	8,982



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	N _{Rd,p} [kN]
0,500	0,73	2,0	0,183

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∦ [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,73
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
0,500	0,365	≥ 90	90	2,0	0,183

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 4 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	0,500
Brick edge failure**	0,500
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength f_{b,mean} ≥ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	αg,∨∥ [-]	αj,∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	C _{ETA} ,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	αj,∨⊥ [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	1,000	1,000	0,500	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	$\alpha_{j,\vee}$ [-]
-	≥ 40	-	40	1,0	1,0
- []	- formal	- f1	- [m.m.]		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γMm [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	c _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	$V_{Rk,c\parallel}$ [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	1,000	1,000	0,500	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E1 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 4$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,183	0,100		

4.2 Maximum shear load

 βn [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
 0,037	0,500		

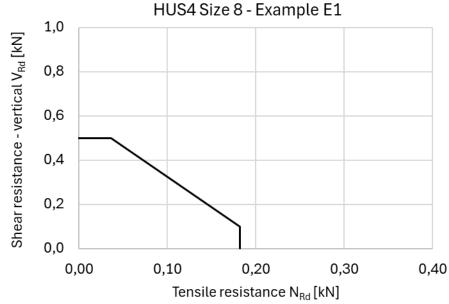


Figure 1: Autoclaved aerated concrete brick, single anchor, example E1



Base material: autoclaved aerated concrete brick $1 \times b \times h \ge 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E1 Page:

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: d_f = 11,0 mm to 12,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm}$, solid brick

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 1

1 Input data



Anchor type and diameter:	HUS4-H HUS4-HF	nexagon head configuration, carbon steel galvanized nexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:		0, nominal embedment depth h _{nom} = 75 mm , hammer drilled, installation per ETA 23/0936		
Embedment depth:	$h_{nom} = 75 \text{ mm}$			
Material:	Carbon steel			
Assessment:	ETA 23/0936 Eu	ropean Technical Assessment		
Issued:	13.05.2025			
Proof:	Design Method E	OTA TR 054 July 2022		
Stand off installation:	$e_b = 0 \text{ mm (no state)}$	and off)		
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), L x W x H: \geq 499 mm x 240 mm x 249 mm Compressive strength: $f_{b,mean} \geq$ 4 N/mm², bulk density $\rho \geq$ 0,55 kg/dm³ Mortar: M2.5, maximum joint width 3 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall, Anchor in stretcher position Minimum wall thickness: 240 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²			
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading			
Geometry				
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} =$: 112,5 mm		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	No setting near (Stretcher Cut edge brick	c _{ij} = 40 mm ↔		



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 4 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	0,384
Brick breakout**	0,384
Pull-out of one brick**	8,982



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm, solid brick}$

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	$N_{Rd,s}$ [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	α _{j,N} [-]	γMm [-]	$N_{Rd,p}$ [kN]
0,800	0,96	2,0	0,384

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{\text{g,N}}$ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,96
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γмm [-]	N _{Rd,b} [kN]
0,800	0,768	≥ 90	90	2,0	0,384

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 4 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	0,800
Brick edge failure**	0,800
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm, solid brick}$

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 10
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E2 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,\vee}$ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	c _{eta,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	1,600	1,600	0,800	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∥ [-]	αj,∨∥ [-]
-	≥ 40	-	40	1,0	1,0
- []	- F1	- f1	- [m.m.]		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨ ∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,0	
[\ /	\ / FL-N II	V FI-NII	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA∥} [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	1,600	1,600	0,800	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb}\|,$ vertical restraint assumed.



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm, solid brick}$

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 4$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

 β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
 0,384	0,160	•	

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,077	0,800		

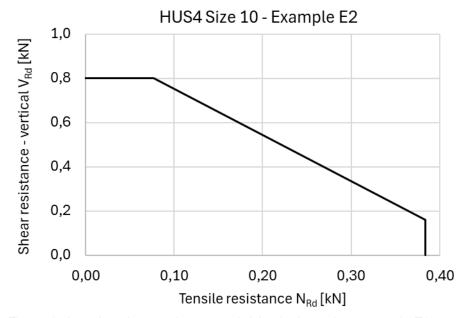


Figure 1: Autoclaved aerated concrete brick, single anchor, example E2



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E2 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: d_f = 13,0 mm to 14,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm}$, solid brick

Brick strength $f_{b,mean} \ge 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page:

1 Input data



Anchor type and diameter:	HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized hus4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 8, nominal embedment depth h _{nom} = 60 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	$h_{nom} = 60 \text{ mm}$		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	e _b = 0 mm (no stand off)		
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), L x W x H: \geq 499 mm x 240 mm x 249 mm Compressive strength: $f_{b,mean} \geq$ 6 N/mm², bulk density $\rho \geq$ 0,65 kg/dm³ Mortar: M2.5, maximum joint width 3 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall, Anchor in stretcher position Minimum wall thickness: 240 mm No vertical compression on wall, σ = 0,0 N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 90 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j\bot} = 20 \text{ mm and } c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c\bot < 20 \text{ mm and } c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher $cut \text{ edge brick}$ Allowable setting area Allowable setting area $c_{min} = 90 \text{ mm}$ $c_{ji} = 40 \text{ mm}$ $l_b \geq 499 \text{ mm}$		



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 6 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 6 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	0,329
Brick breakout**	0,329
Pull-out of one brick**	8,982



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
0,900	0,73	2,0	0,329

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,N}$ [-]	αj,N [-]
-	≥ 40	-	40	1,0	0,73
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
0,900	0,657	≥ 90	90	2,0	0,329

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm ²]	f_{Vk0} [N/mm ²]	σ_d [N/mm²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 6,0 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	0,900
Brick edge failure**	0,900
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm, solid brick}$

Brick strength f_{b,mean} ≥ 6 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
ETA 23/0936 (13.05.2025)
Example E3 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,\vee}$ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	C _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	αj,∨⊥ [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	1,800	1,800	0,900	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,∨∥ [-]	α _{j,} ∨∥ [-]
-	≥ 40	-	40	1,0	1,0
- []	a farmal	- f1	- fu.u.1		
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
) / FI N IZ) / EL N.17) / FI N I	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	1,800	1,800	0,900	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 6 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 6$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,329	0,180		

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,066	0,900		

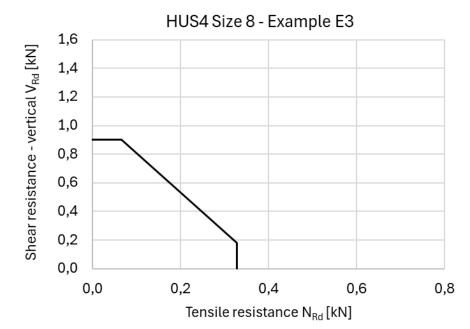


Figure 1: Autoclaved aerated concrete brick, single anchor, example E3



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 6 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E3 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that
 particular brick (solid) or for bricks of the same base material with larger size and larger compressive
 strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: d_f = 11,0 mm to 12,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm}$, solid brick

Brick strength $f_{b,mean} \ge 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 1

1 Input data



-			
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	e _b = 0 mm (no stand off)		
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), L x W x H: \geq 499 mm x 240 mm x 249 mm Compressive strength: $f_{b,mean} \geq$ 6 N/mm², bulk density $\rho \geq$ 0,65 kg/dm³ Mortar: M2.5, maximum joint width 3 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall, Anchor in stretcher position Minimum wall thickness: 240 mm No vertical compression on wall, $\sigma = 0.0$ N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Minimum anchor distance to wall edge:	$c_{min} = 1.5 \cdot h_{nom} = 112.5 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with reduced horizontal bearing area	$c\bot \geq c_{j}\bot = 20 \text{ mm and } c\ \geq c_{j}\ = 40 \text{ mm}$ No setting near $(c\bot < 20 \text{ mm and } c\ < 40 \text{ mm})$ or in joints! Stretcher $c_{j}\bot = 20 \text{ mm}$ Allowable setting area $c_{j}\bot = 20 \text{ mm}$ Allowable setting area $c_{j}\bot = 20 \text{ mm}$ $c_{j}\bot = 20 \text{ mm}$ $c_{j}\bot = 40 \text{ mm}$		



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 6 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	0,672
Brick breakout**	0,672
Pull-out of one brick**	8,982



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 3

Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
1,400	0,96	2,0	0,672

2.3 Brick breakout

s∥ [mm]	c _{j∥} [mm]	SETA,∥ [mm]	CETA,j∦ [mm]	α _{g,N} ∥ [-]	α _{j,N} [-]
-	≥ 40	-	40	1,0	0,96
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
1,400	1,344	≥ 90	90	2,0	0,672

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 6 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,400
Brick edge failure**	1,400
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick $l \times b \times h \ge 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick

Brick strength f_{b,mean} ≥ 6 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _j ∥ [mm]	SETA,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∦ [-]
-	≥ 40	-	40	1,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψ _{g,} ∨∥ [-]	e _{c,V⊥} [mm]	ψ _{g,} ∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	2,800	2,800	1,400	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ∨∥ [-]	α _{j,} ∨∥ [-]
-	≥ 40	-	40	1,0	1,0
. F	. F1				
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Μm} [-]	
0,0	1,000	0,0	1,000	2,0	
		.,			
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	2,800	2,800	1,400	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 6$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

$$β_N$$
 [-] $β_V$ [-] $α$ [-] **Status**
1,0 0,2 1,00 OK

$$N_{Rd}$$
 [kN] V_{Rd} [kN]
0,672 0,280

4.2 Maximum shear load

β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,134	1,400		

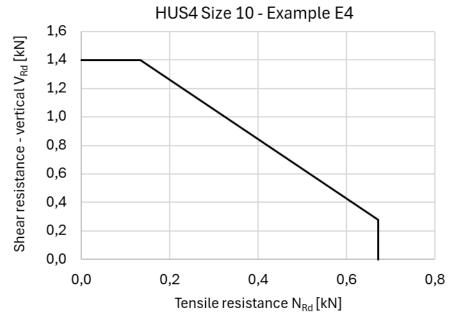


Figure 1: Autoclaved aerated concrete brick, single anchor, example E4



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E4 Page: 7

5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: d_f = 13,0 mm to 14,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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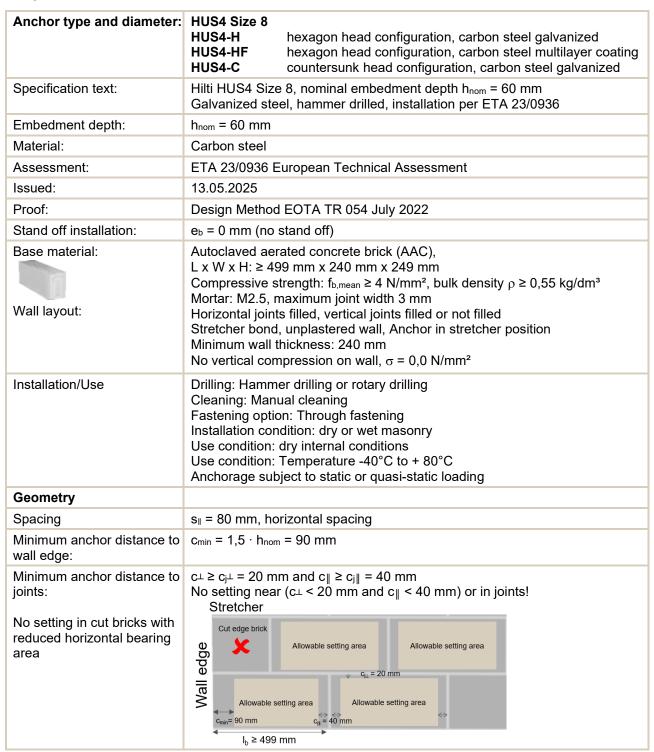
Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page:



1 Input data





Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 4 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	0,183
Brick breakout**	0,338
Pull-out of one brick**	8,982



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm}$, solid brick Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	$N_{Rd,s}$ [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	$\alpha_{j,N}$ [-]	γ _{Mm} [-]	$N_{Rd,p}$ [kN]
0,500	0,73	2,0	0,183

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,N}$ [-]	αj,N [-]
80	≥ 40	-	40	1,85	0,73
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$\alpha_{\text{g,N}\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	N _{Rd,b} [kN]
0,500	0,675	≥ 90	90	2,0	0,338

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm²]	σ _d [N/mm²]
239 520	0	0,15	0,00
NI FLAIT	r 1	NI FLAIT	
 N _{Rk,pb} [kN]	γ _{Mm} [-]	N _{Rd,pb} [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick

Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$ No compression on wall $\sigma = 0.0 \text{ N/mm}^2$ Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page:



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 4 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,000
Brick edge failure**	1,000
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{g,V\parallel}$ [-]	$\alpha_{j,\vee\parallel}$ [-]
80	≥ 40	-	40	2,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	SETA,⊥ [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∥ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	1,000	2,000	1,000	

3.3 Brick edge failure

s∥ [m	ım] c _j ∥ [n	nm] s _{ETA} ,∥ [mn	n] CETA,j [mm]	$lpha_{g,V\parallel}$ [-]	$\alpha_{j,\vee}$ [-]
80	≥ 4	- 0	40	2,0	1,0
s⊥ [m	ım] c _{j⊥} [n	nm] s _{ETA,⊥} [mn	n] c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	$\alpha_{j,V\perp}$ [-]
-	≥ 2	- 0	20	1,0	1,0
e _{c,V} [1	mm] ψg,ν∥	[-] e _{c,V⊥} [mm	ψ _{g,∨⊥} [-]	γMm [-]	
0,0	1,00	0,0	1,000	2,0	
c∥ [m	m] Cmin,ETA [mm] V _{Rk,c,ETA} [k	$V_{Rk,c}$ [kN]	$V_{\text{Rd,c}}$ [kN]	
≥ 9	0 90	1,000	2,000	1,000	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.

Results must be checked for conformity with the existing conditions and for plausibility!



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page: 6



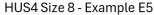
4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 4$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,338	0,200		

4.2 Maximum shear load

 β _N [-]	βv [-]	α [-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,068	1,000		



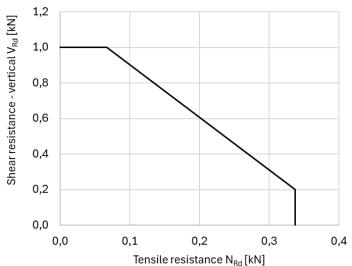


Figure 1: Autoclaved aerated concrete brick, 2 anchors, s_∥ = 80 mm, example E5



Base material: autoclaved aerated concrete brick $1 \times b \times h \ge 499 \text{ mm } \times 240 \text{ mm } \times 249 \text{ mm}, \text{ solid brick}$

Brick strength f_{b,mean} ≥ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E5 Page:



5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: $d_f = 11.0 \text{ mm}$ to 12.0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70.0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



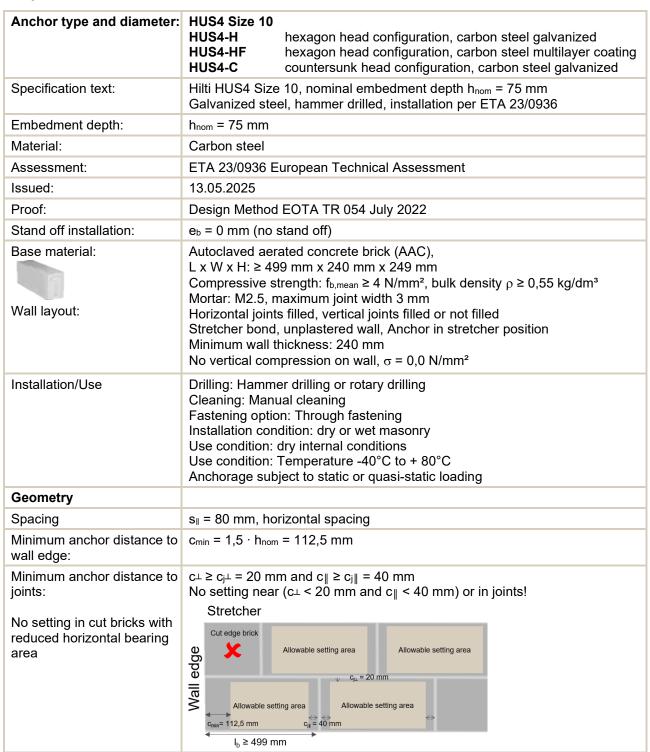
Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 1



1 Input data





Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 4 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	0,384
Brick breakout**	0,768
Pull-out of one brick**	8,982

^{*} highest loaded anchor ** anchor group (anchors in tension)



Base material: autoclaved aerated concrete brick $l x b x h \ge 499 \text{ mm } x 240 \text{ mm } x 249 \text{ mm}$, solid brick Brick strength $f_{b,mean} \ge 4 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	$\alpha_{j,N}$ [-]	γ _{Mm} [-]	$N_{Rd,p}$ [kN]
0,800	0,96	2,0	0,384

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,N}$ [-]	αj,N [-]
80	≥ 40	-	40	2,0	0,96
s⊥ [mm]	$c_{j\perp}$ [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$\alpha_{\text{g,N}\perp}$ [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
0,800	1,536	≥ 90	90	2,0	0,768

2.4 Pullout of one brick

A ^H act [mm²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
239 520	0	0,15	0,00
NI FLAIT	r 1	NI FLAIT	
 N _{Rk,pb} [kN]	γ _{Mm} [-]	N _{Rd,pb} [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 4 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,600
Brick edge failure**	1,600
Pushing out of one brick in direction x	N/A

^{*} highest loaded anchor ** anchor group (relevant anchors)

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
28,800	1,25	23,040

3.2 Local brick failure

s [mm]	c _{j∥} [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{g,V}$ [-]	$\alpha_{j,\vee\parallel}$ [-]
80	≥ 40	-	40	2,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	α _{g,N⊥} [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	$\psi_{g,\vee}$ [-]	e _{c,V⊥} [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,b,ETA} ∥ [kN]	V _{Rk,b} ∥ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	1,600	3,200	1,600	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ν∥ [-]	α _{j,} ∨∦ [-]
80	≥ 40	-	40	2,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V} ∥ [mm]	Ψg,∨ ∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	1,600	3,200	1,600	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq$ 4 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page: 6



4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 4$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

β _N [-]	β _V [-]	α [-]	Status
1,0	0,2	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0,768	0,320		

4.2 Maximum shear load

0,154

 β _N [-]	βv [-]	α [-]	Status	_
 0,2	1,0	1,00	OK	
N _{Rd} [kN]	V _{Rd} [kN]			

HUS4 Size 10 - Example E6

1,600

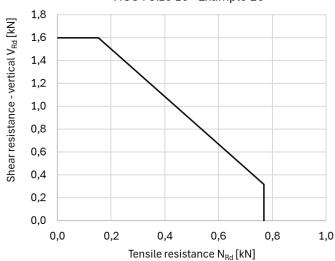


Figure 1: Autoclaved aerated concrete brick, 2 anchors, s_∥ = 80 mm, example E6



Base material: autoclaved aerated concrete brick $1 \times b \times h \ge 499 \text{ mm } \times 240 \text{ mm } \times 249 \text{ mm}, \text{ solid brick}$

Brick strength f_{b,mean} ≥ 4 N/mm² No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E6 Page:



5 Warnings

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- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: $d_f = 13.0 \text{ mm}$ to 14.0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85.0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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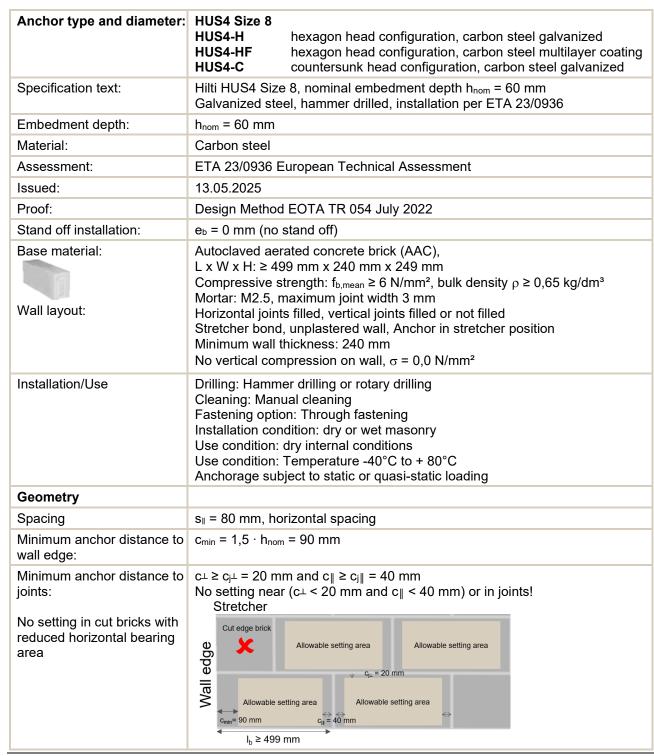
Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 1



1 Input data





Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 6 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	24,000
Pullout Strength*	0,329
Brick breakout**	0,608
Pull-out of one brick**	8,982



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
36,000	1,5	24,000

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
0,900	0,73	2,0	0,329

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	c _{ETA,j∦} [mm]	$\alpha_{g,N}$ [-]	α _{j,N} [-]
80	≥ 40	-	40	1,85	0,73
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	с _{ЕТА,ј⊥} [mm]	$lpha_{g,N\perp}$ [-]	e _{c,N∥,⊥} [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	N _{Rk,b} [kN]	c [mm]	C _{min,ETA} [mm]	γмm [-]	N _{Rd,b} [kN]
0,900	1,215	≥ 90	90	2,0	0,608

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page:



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 6,0 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	15,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	1,800
Brick edge failure**	1,800
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	$V_{Rd,s}$ [kN]
18,800	1,25	15,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,\vee}$ [-]	α _{j,} ∨∦ [-]
80	≥ 40	-	40	2,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	C _{ETA,j⊥} [mm]	$lpha_{g,N\perp}$ [-]	αj,∨⊥ [-]
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel}$ [mm]	ψg,∨∦ [-]	$e_{c,V\perp}$ [mm]	ψg,∨⊥ [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	$V_{Rd,b}$ [kN]	
≥ 90	90	1,800	3,600	1,800	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	α _{g,} ∨∥ [-]	αj,∨∥ [-]
80	≥ 40	-	40	2,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{\sf g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	ψg,∨∥ [-]	e _{c,V⊥} [mm]	ψg,∨⊥ [-]	γMm [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	c _{min,ETA} ∥ [mm]	V _{Rk,c,ETA} ∥ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	1,800	3,600	1,800	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 6



4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 6$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

4.2 Maximum shear load

0,122

β _N [-]	β _V [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		

1,800

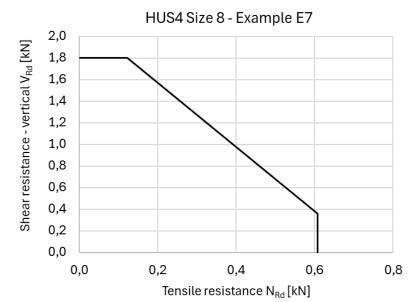


Figure 1: Autoclaved aerated concrete brick, 2 anchors, s_∥ = 80 mm, example E7



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E7 Page: 7



5 Warnings

- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered!
- The installation remarks listed in this report are for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- Compliance with current standards (e.g., EOTA TR 054) is the responsibility of the user.
- Drilling method (hammer, rotary) to be in accordance with the ETA-23/0936!
- Masonry should be built according to industry standards.
- Please note that, for ETA assessed masonry units, the resistance and parameters are only valid for that particular brick (solid) or for bricks of the same base material with larger size and larger compressive strength (solid) or larger dry density, according to EOTA TR 054.
- All boundary conditions must comply with section 1.
- Screws can only be set in the allowed setting area as shown above (see allowed setting area). The
 minimum allowable distances to wall edge (c_{min} = c_{cr}) and joints (c_i) have to be respected.
- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 8

Hole diameter in the fixture: d_f = 11,0 mm to 12,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10

Hole diameter in the base material: 8,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 70,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

Any and all information and data contained in the report concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. You bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The report serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall $\sigma = 0.0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 1



1 Input data

•			
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating countersunk head configuration, carbon steel galvanized		
Specification text:	Hilti HUS4 Size 10, nominal embedment depth h _{nom} = 75 mm Galvanized steel, hammer drilled, installation per ETA 23/0936		
Embedment depth:	h _{nom} = 75 mm		
Material:	Carbon steel		
Assessment:	ETA 23/0936 European Technical Assessment		
Issued:	13.05.2025		
Proof:	Design Method EOTA TR 054 July 2022		
Stand off installation:	eь = 0 mm (no stand off)		
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), L x W x H: \geq 499 mm x 240 mm x 249 mm Compressive strength: $f_{b,mean} \geq$ 6 N/mm², bulk density $\rho \geq$ 0,65 kg/dm³ Mortar: M2.5, maximum joint width 3 mm Horizontal joints filled, vertical joints filled or not filled Stretcher bond, unplastered wall, Anchor in stretcher position Minimum wall thickness: 240 mm No vertical compression on wall, σ = 0,0 N/mm²		
Installation/Use	Drilling: Hammer drilling or rotary drilling Cleaning: Manual cleaning Fastening option: Through fastening Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to + 80°C Anchorage subject to static or quasi-static loading		
Geometry			
Spacing	s _∥ = 80 mm, horizontal spacing		
Minimum anchor distance to wall edge:	$c_{min} = 1,5 \cdot h_{nom} = 112,5 \text{ mm}$		
Minimum anchor distance to joints: No setting in cut bricks with	\bot ≥ $c_j\bot$ = 20 mm and $c_\ $ ≥ $c_j\ $ = 40 mm No setting near ($c\bot$ < 20 mm and $c\ $ < 40 mm) or in joints! Stretcher		
reduced horizontal bearing area	Cut edge brick Allowable setting area Allowable setting area $c_{j\perp} = 20 \text{ mm}$ Allowable setting area Allowable setting area $c_{min} = 112,5 \text{ mm}$ $c_{ji} = 40 \text{ mm}$		



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength f_{b,mean} ≥ 6 N/mm², vertical joints filled or not filled

Capacity [kN]

Steel Strength*	36,667
Pullout Strength*	0,672
Brick breakout**	1,344
Pull-out of one brick**	8,982



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 3



Tension load

2.1 Steel Strength

N _{Rk,s,ETA} [kN]	γMs [-]	N _{Rd,s} [kN]
55,000	1,5	36,667

2.2 Pullout Strength

N _{Rk,p,ETA} [kN]	αj,N [-]	γMm [-]	$N_{Rd,p}$ [kN]
1,400	0,96	2,0	0,672

2.3 Brick breakout

s∥ [mm]	c _i ∥ [mm]	SETA,∥ [mm]	CETA,j∥ [mm]	$\alpha_{g,N}$ [-]	α _{j,N} [-]
80	≥ 40	-	40	2,0	0,96
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	α _{g,N⊥} [-]	$e_{c,N\parallel,\perp}$ [mm]
-	≥ 20	-	20	1,0	0,0
N _{Rk,b,ETA} [kN]	$N_{Rk,b}$ [kN]	c [mm]	C _{min,ETA} [mm]	γMm [-]	$N_{Rd,b}$ [kN]
1,400	2,688	≥ 90	90	2,0	1,344

2.4 Pullout of one brick

A ^H act [mm ²]	A ^V act [mm²]	f_{Vk0} [N/mm ²]	σ _d [N/mm²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ _{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength f_{b,mean} ≥ 6 N/mm, vertical joints filled or not filled

	Capacity [kN]
Steel Strength (without lever arm)*	23,040
Steel Strength (with lever arm)*	N/A
Local brick failure**	2,800
Brick edge failure**	2,800
Pushing out of one brick in direction x	N/A

Top concrete beam or other means of vertical fixation assumed. Brick edge and push-out failure modes towards the top edge and the stability of the full wall body are not checked.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

V _{Rk,s,ETA} [kN]	γMs [-]	V _{Rd,s} [kN]
28,800	1,25	23,040

3.2 Local brick failure

s∥ [mm]	c _i ∥ [mm]	s _{ETA} ,∥ [mm]	CETA,j∦ [mm]	α _{g,} ∨∦ [-]	$\alpha_{j,\vee}$ [-]
80	≥ 40	-	40	2,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	S _{ETA,⊥} [mm]	CETA,j⊥ [mm]	$lpha_{g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,V∥} [mm]	ψg,∨∥ [-]	$e_{c,V\perp}$ [mm]	ψ _{g,∨⊥} [-]	γ _{Mm} [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,b,ETA}$ [kN]	$V_{Rk,b}$ [kN]	V _{Rd,b} ∥ [kN]	
≥ 90	90	2,800	5,600	2,800	

3.3 Brick edge failure

s∥ [mm]	c _i ∥ [mm]	S _{ETA} ,∥ [mm]	C _{ETA,j} ∥ [mm]	αg,ν∥ [-]	αj,∨∥ [-]
80	≥ 40	-	40	2,0	1,0
s⊥ [mm]	c _{j⊥} [mm]	s _{ETA,⊥} [mm]	c _{ETA,j⊥} [mm]	$lpha_{\sf g,N\perp}$ [-]	α _{j,∨⊥} [-]
-	≥ 20	-	20	1,0	1,0
e _{c,∨∥} [mm]	ψg,∨∥ [-]	e _{c,∨⊥} [mm]	ψg,∨⊥ [-]	γMm [-]	
0,0	1,000	0,0	1,000	2,0	
c∥ [mm]	C _{min,ETA} ∥ [mm]	$V_{Rk,c,ETA}$ [kN]	V _{Rk,c∥} [kN]	V _{Rd,c∥} [kN]	
≥ 90	90	2,800	5,600	2,800	

3.4 Pushing out of one brick

N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb\parallel}$, vertical restraint assumed.



Base material: autoclaved aerated concrete brick I x b x h \geq 499 mm x 240 mm x 249 mm, solid brick Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 6



4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \le 1,2$ Brick strength $f_{b,mean} \ge 6$ N/mm, vertical joints filled or not filled

4.1 Maximum tension load

$$β_N$$
 [-] $β_V$ [-] $α$ [-] **Status**
1,0 0,2 1,00 OK

$$N_{Rd}$$
 [kN] V_{Rd} [kN]
1,344 0,560

4.2 Maximum shear load

β _N [-]	βv [-]	α[-]	Status
0,2	1,0	1,00	OK
N _{Rd} [kN]	V _{Rd} [kN]		
0.269	2,800		

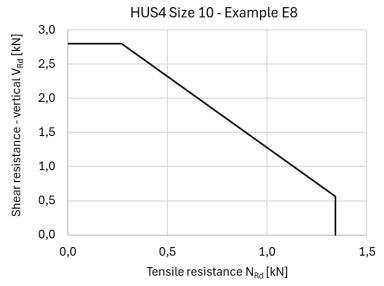


Figure 1: Autoclaved aerated concrete brick, 2 anchors, s_{II} = 80 mm, example E8



Base material: autoclaved aerated concrete brick I x b x h ≥ 499 mm x 240 mm x 249 mm, solid brick

Brick strength f_{b,mean} ≥ 6 N/mm²

No compression on wall σ = 0,0 N/mm²

Anchor type: HUS4 Size 10 Design: TR 054 July 2022 ETA 23/0936 (13.05.2025) Example E8 Page: 7



5 Warnings

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- Application in unplastered walls only, to account for setting position limitations with respect to joint distance.

6 Installation data

Anchor type and diameter: HUS4 Size 10

Hole diameter in the fixture: d_f = 13,0 mm to 14,0 mm (through setting) Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15

Hole diameter in the base material: 10,0 mm Recommended plate thickness: not calculated

Hole depth in the base material: 85,0 mm (cleaned hole)

Drilling method: Drilled in hammer mode

Minimum thickness of the base material: 240,0 mm

Cleaning: manual

Fastening option: Through fastening Installation per ETA-23/0936

7 Remarks; Your Cooperation Duties

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