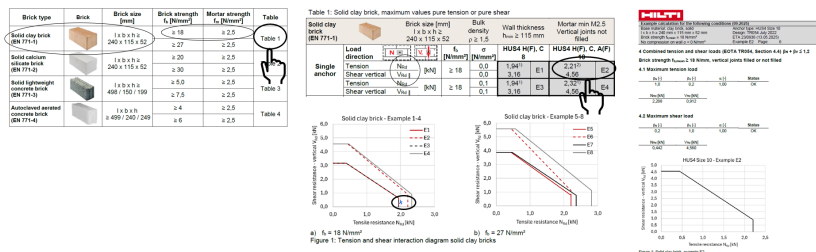
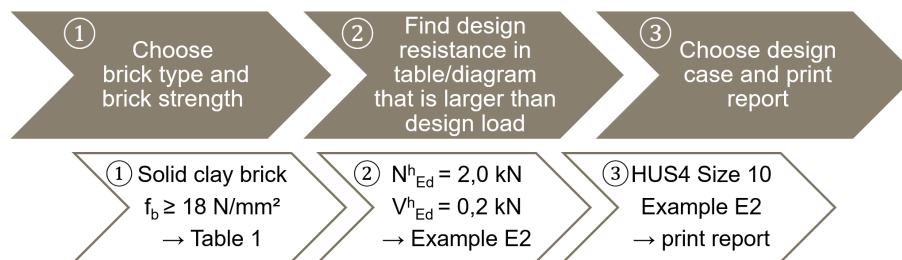


This document provides pre-calculated design resistance data to static or quasi-static loading in accordance with TR 054 of July 2022 for Hilti screw anchor HUS4 Size 8 and Size 10 based on ETA 23/0936 (13.05.2025). It is the responsibility of the user to derive the loads on each screw and compare with 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/mm ²]	Mortar strength f_m [N/mm ²]	Table
Solid clay brick (EN 771-1)		$l \times b \times h \geq 240 \times 115 \times 52$	≥ 18	$\geq 2,5$	Table 1
			≥ 27	$\geq 2,5$	
Solid calcium silicate brick (EN 771-2)		$l \times b \times h \geq 240 \times 115 \times 52$	≥ 20	$\geq 2,5$	Table 2
			≥ 30	$\geq 2,5$	
Solid lightweight concrete brick (EN 771-3)		$l \times b \times h \geq 498 / 150 / 199$	$\geq 5,0$	$\geq 2,5$	Table 3
			$\geq 7,5$	$\geq 2,5$	
Autoclaved aerated concrete brick (EN 771-4)		$l \times b \times h \geq 499 / 240 / 249$	≥ 4	$\geq 2,5$	Table 4
			≥ 6	$\geq 2,5$	



Design resistance

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



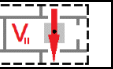
For interaction of shear and tension, see interaction diagram.

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

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

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

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

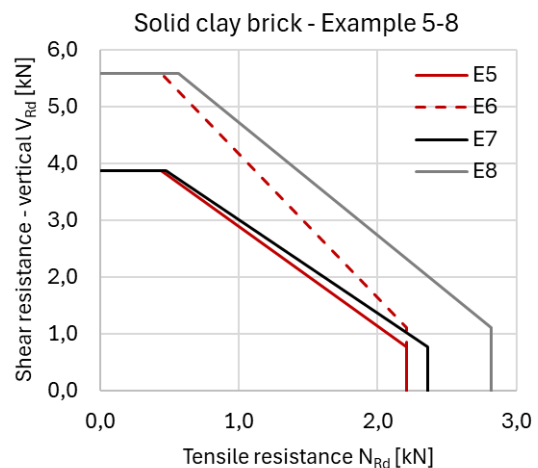
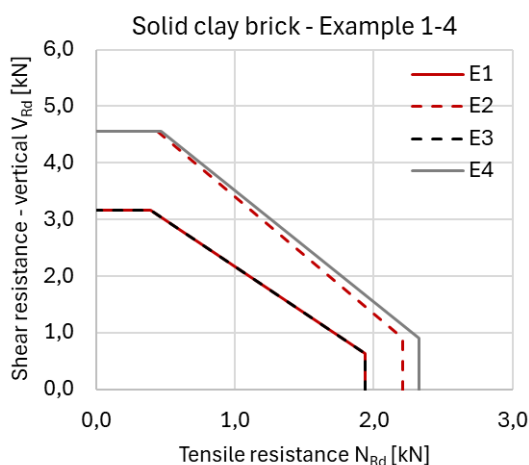
Solid clay brick (EN 771-1)		Brick size [mm] $l \times b \times h \geq 240 \times 115 \times 52$		Bulk density $\rho \geq 1,5$	Wall thickness $h_{min} \geq 115$ mm	Mortar min M2.5 Vertical joints filled or not filled	
Single anchor	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}		≥ 18	0,0	1,94 ¹⁾	2,21 ²⁾
	Shear vertical	V_{Rd}			0,0	3,16	4,56
	Tension	N_{Rd}		≥ 18	0,1	1,94 ¹⁾	2,32 ¹⁾
	Shear vertical	V_{Rd}			0,1	3,16	4,56
Single anchor	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}		≥ 27	0,0	2,21 ²⁾	2,21 ²⁾
	Shear vertical	V_{Rd}			0,0	3,88	5,60
	Tension	N_{Rd}		≥ 27	0,1	2,36 ¹⁾	2,82 ¹⁾
	Shear vertical	V_{Rd}			0,1	3,88	5,60

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

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



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) $f_b = 18$ N/mm²

b) $f_b = 27$ N/mm²

Figure 1: Tension and shear interaction diagram solid clay bricks

Design resistance

Please click on applicable resistance data for report



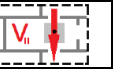
For interaction of shear and tension, see interaction diagram.

$$\beta_N + \beta_V \leq 1,2 \quad \text{with } \beta_N = N_{Ed} / N_{Rd} \leq 1,0 \text{ and } \beta_V = V_{Ed} / V_{Rd} \leq 1,0$$

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

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

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

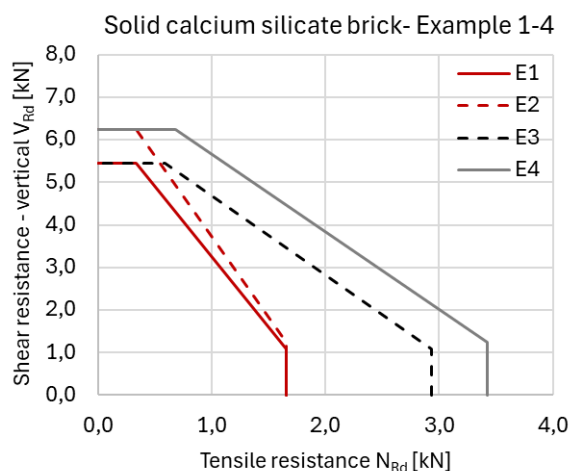
Solid calcium silicate brick (EN 771-2)		Brick size [mm] $l \times b \times h \geq 240 \times 115 \times 113$		Bulk density $\rho \geq 1,7$	Wall thickness $h_{min} \geq 115 \text{ mm}$	Mortar min M2.5 Vertical joints filled or not filled	
Single anchor	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}		≥ 20	0,0	1,66 ²⁾	1,66 ²⁾
	Shear vertical	V_{Rd}			0,0	5,44	6,24
	Tension	N_{Rd}		≥ 20	0,2	2,93 ¹⁾	3,42 ²⁾
	Shear vertical	V_{Rd}			0,2	5,44	6,24
Single anchor	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}		≥ 30	0,0	1,66 ²⁾	1,66 ²⁾
	Shear vertical	V_{Rd}			0,0	6,56	7,52
	Tension	N_{Rd}		≥ 30	0,2	3,42 ²⁾	3,42 ²⁾
	Shear vertical	V_{Rd}			0,2	6,56	7,52

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

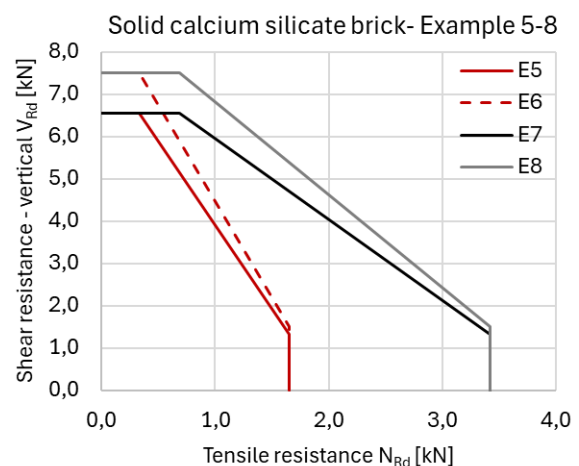
²⁾ Governing failure mode: Pull-out of one brick



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) $f_b = 20 \text{ N/mm}^2$



b) $f_b = 30 \text{ N/mm}^2$

Figure 2: Tension and shear interaction diagram solid calcium silicate bricks

Design resistance

Please click on applicable resistance data for report



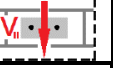
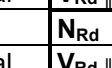
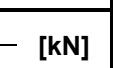
For interaction of shear and tension, see interaction diagram.

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

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

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

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

Solid lightweight concrete brick (EN 771-3)		Brick size [mm] $l \times b \times h \geq 498 \times 150 \times 199$		Bulk density $\rho \geq 0,9$	Wall thickness $h_{min} \geq 150$ mm	Mortar min M2.5 Vertical joints filled or not filled	
Single anchor	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}		≥ 5	0,0	0,85 ¹⁾	0,83 ¹⁾
	Shear vertical	V_{Rd}			0,0	0,72	0,99
						E1	E2
Anchor group 1x2 ³⁾ $s_{ } = 80$ mm	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}		≥ 5	0,0	1,70 ¹⁾	1,32 ¹⁾
	Shear vertical	V_{Rd}			0,0	1,15	1,59
						E5	E6
	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}		$\geq 7,5$	0,0	2,13 ¹⁾	1,70 ¹⁾
	Shear vertical	V_{Rd}			0,0	1,34	1,96
						E7	E8

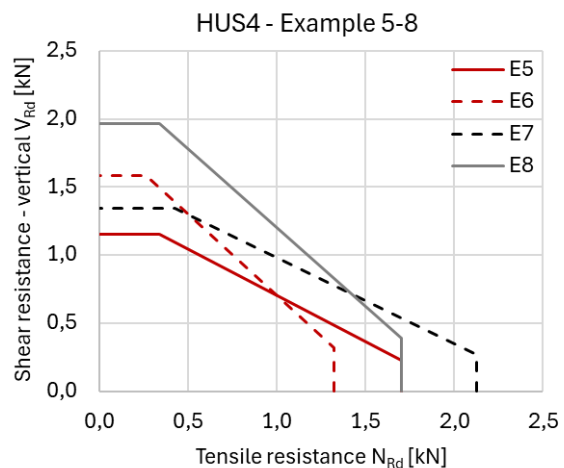
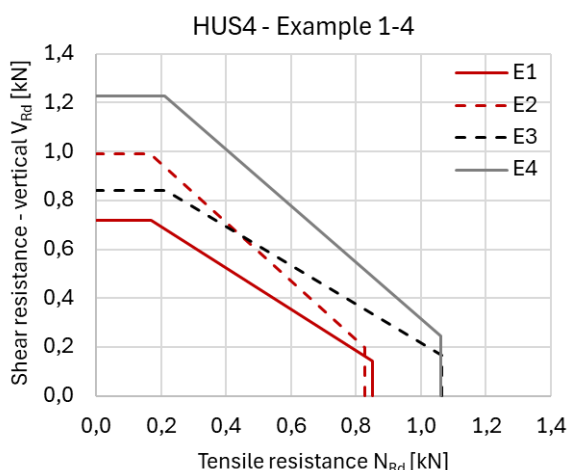
¹⁾ Governing failure mode: Pull-out of the anchor or Brick breakout

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

³⁾ Anchor forces evenly distributed on two anchors



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 $s = 80$ mm

Figure 3: Tension and shear interaction diagram solid lightweight concrete bricks

$f_b = 5$ N/mm² (E1, E2, E5, E6) and $f_b = 7,5$ N/mm² (E3, E4, E7, E8)

Design resistance

Please click on applicable resistance data for report



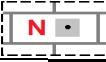
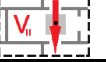
For interaction of shear and tension, see interaction diagram.

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

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

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

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

Autoclaved aerated concrete brick (EN 771-4)		Brick size [mm] l x b x h ≥ 499 x 240 x 249		Bulk density $\rho \geq 0,55$	Wall thickness $h_{min} \geq 240$ mm	Mortar min M2.5 Vertical joints filled or not filled	
Single anchor	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}	[kN]	≥ 4	0,0	0,18 ¹⁾	0,38 ¹⁾
	Shear vertical	V_{Rd}	[kN]	≥ 4	0,0	0,50	0,80
	Tension	N_{Rd}	[kN]	≥ 6	0,0	0,33 ¹⁾	0,67 ¹⁾
Anchor group 1x2 ³⁾ $s_{ } = 80$ mm	Load direction			f_b [N/mm ²]	σ [N/mm ²]	HUS4 H(F), C 8	HUS4 H(F), C, A(F) 10
	Tension	N_{Rd}	[kN]	≥ 4	0,0	0,34 ¹⁾	0,77 ¹⁾
	Shear vertical	V_{Rd}	[kN]	≥ 4	0,0	1,00	1,60
	Tension	N_{Rd}	[kN]	≥ 6	0,0	0,61 ¹⁾	1,34 ¹⁾
	Shear vertical	V_{Rd}	[kN]	≥ 6	0,0	1,80	2,80

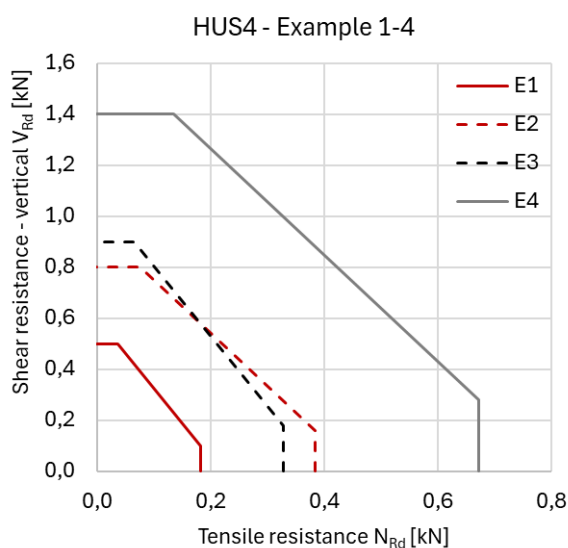
¹⁾ Governing failure mode: Pull-out of the anchor or Brick breakout

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

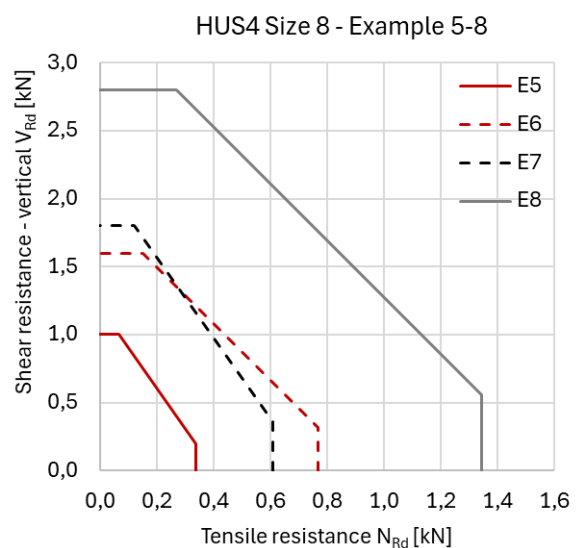
³⁾ Anchor forces evenly distributed on two anchors



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 $s = 80$ mm

Figure 4: Tension and shear interaction diagram solid lightweight concrete bricks

$f_b = 4$ N/mm² (E1, E2, E5, E6) and $f_b = 6$ N/mm² (E3, E4, E7, E8)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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 hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$ Mortar: M2.5, maximum joint width 10 mm
Wall layout:	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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher $l_b \geq 240 \text{ mm}$ 1 DF Header

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

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid

 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$ No compression on wall $\sigma = 0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8

Design: TR 054 July 2022

ETA 23/0936 (13.05.2025)

Example E1 Page: 2

2 Tension load (EOTA TR054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$, 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)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
5,500	0,88	2,5	1,936

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 20	-	20	1,0	0,88
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
5,500	4,840	≥ 90	90	2,5	1,936

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	$f_{V,k0}$ [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E1 Page: 4

3 Shear load (EOTA TR054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E1 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	7,900	7,900	3,160	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E1 Page: 6

4 Combined tension and shear loads (EOTA TR054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,387	3,160

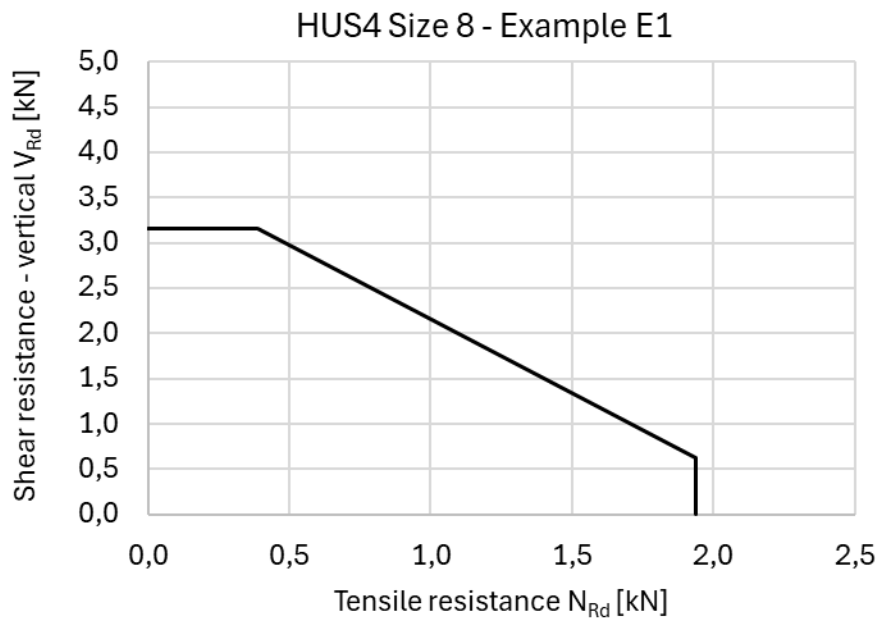


Figure 1: Solid clay brick, single anchor, example E1

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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 Size 10 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
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Wall layout:	Compressive strength: $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher $l_b \geq 240 \text{ mm}$ 1 DF Header $l_b \geq 115 \text{ mm}$

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

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid

 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$ No compression on wall $\sigma = 0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10

Design: TR 054 July 2022

ETA 23/0936 (13.05.2025)

Example E2 Page: 2

2 Tension load (EOTA TR054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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

Tension load, $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
2.1 Steel Strength

$N_{Rk, s, \text{ETA}} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd, s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk, p, \text{ETA}} [\text{kN}]$	$\alpha_{j, N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd, p} [\text{kN}]$
7,000	0,83	2,5	2,324

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{\text{ETA}, \parallel} [\text{mm}]$	$c_{\text{ETA}, j\parallel} [\text{mm}]$	$\alpha_{g, N\parallel} [-]$	$\alpha_{j, N} [-]$
-	≥ 20	-	20	1,0	0,83
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{\text{ETA}, \perp} [\text{mm}]$	$c_{\text{ETA}, j\perp} [\text{mm}]$	$\alpha_{g, N\perp} [-]$	$e_{c, N\parallel, \perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk, b, \text{ETA}} [\text{kN}]$	$N_{Rk, b} [\text{kN}]$	$c [\text{mm}]$	$c_{\text{min}, \text{ETA}} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd, b} [\text{kN}]$
7,000	5,810	$\geq 112,5$	112,5	2,5	2,324

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	$f_{V,k0}$ [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	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 $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	11,400	11,400	4,560	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E2 Page: 6

4 Combined tension and shear loads (EOTA TR054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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]
2,208	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

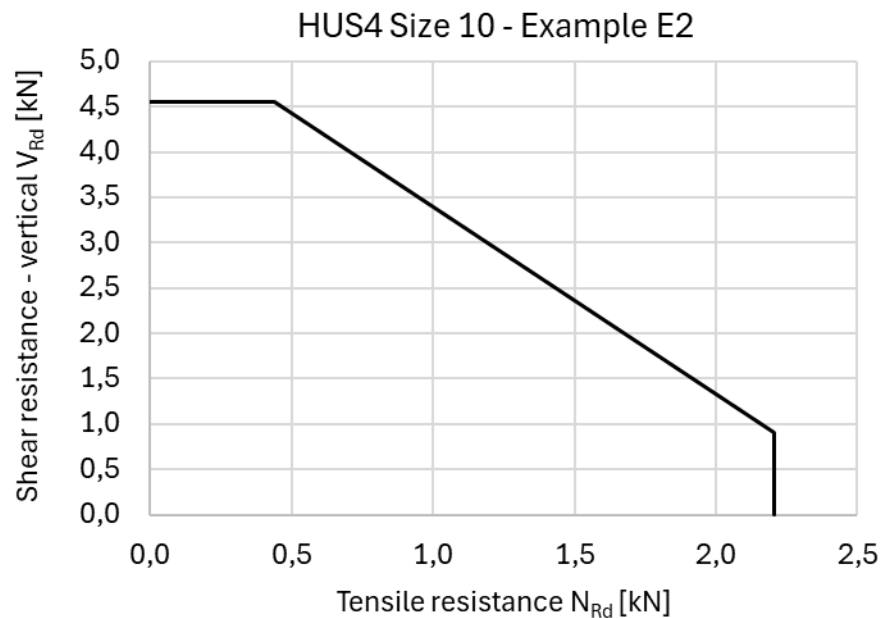


Figure 1: Solid clay brick, single anchor, example E2

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b,mean} \geq 18 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{nom} = 60 \text{ mm}$ 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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Compressive strength: $f_{b,mean} \geq 18 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$ Mortar: M2.5, maximum joint width 10 mm
Wall layout:	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, $\sigma = 0,1 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ 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:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher 1 DF Header

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

**Example calculation for the following conditions (10-2025)**

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
5,500	0,88	2,5	1,936

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{ } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 20	-	20	1,0	0,88
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,j\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
5,500	4,840	≥ 90	90	2,5	1,936

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$	Example E3 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	7,900	7,900	3,160	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$	Example E3 Page: 6

4 Combined tension and shear loads (EOTA TR054, Section 4.4) $\beta_N + \beta_V \leq 1,2$
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,387	3,160

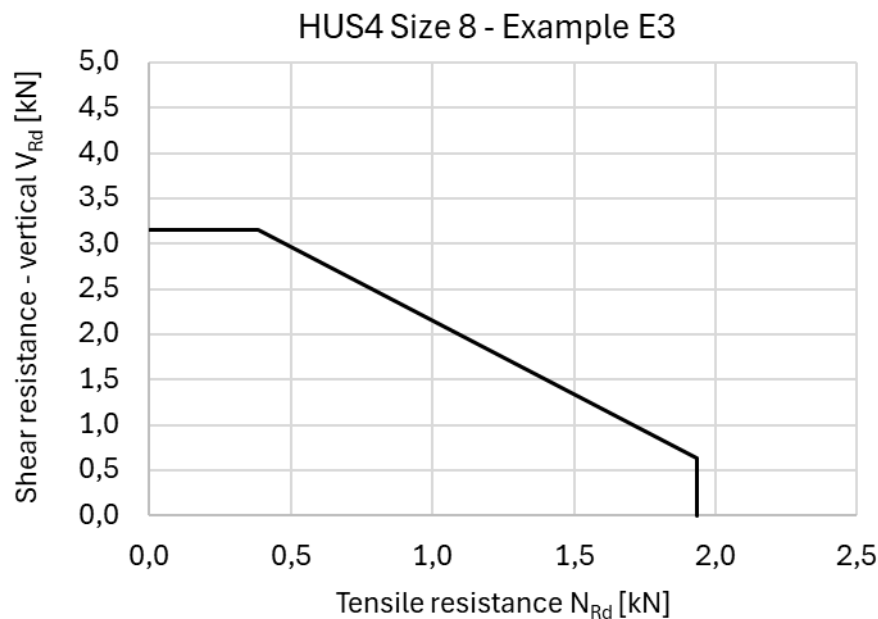


Figure 1: Solid clay brick, single anchor, example E3

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b,mean} \geq 18 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{nom} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{nom} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Compressive strength: $f_{b,mean} \geq 18 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$ Mortar: M2.5, maximum joint width 10 mm
Wall layout:	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, $\sigma = 0,1 \text{ N/mm}^2$
Installation/Use	Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to $+80^\circ\text{C}$ 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:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher 1 DF Header

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

**Example calculation for the following conditions (10-2025)**

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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

Tension load, $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
2.1 Steel Strength

$N_{Rk, s, \text{ETA}} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd, s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk, p, \text{ETA}} [\text{kN}]$	$\alpha_{j, N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd, p} [\text{kN}]$
7,000	0,83	2,5	2,324

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{\text{ETA}, \parallel} [\text{mm}]$	$c_{\text{ETA}, j\parallel} [\text{mm}]$	$\alpha_{g, N\parallel} [-]$	$\alpha_{j, N} [-]$
-	≥ 20	-	20	1,0	0,83
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{\text{ETA}, \perp} [\text{mm}]$	$c_{\text{ETA}, j\perp} [\text{mm}]$	$\alpha_{g, N\perp} [-]$	$e_{c, N\parallel, \perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk, b, \text{ETA}} [\text{kN}]$	$N_{Rk, b} [\text{kN}]$	$c [\text{mm}]$	$c_{\text{min}, \text{ETA}} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd, b} [\text{kN}]$
7,000	5,810	$\geq 112,5$	112,5	2,5	2,324

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$	Example E4 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	11,400	11,400	4,560	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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]
2,324	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

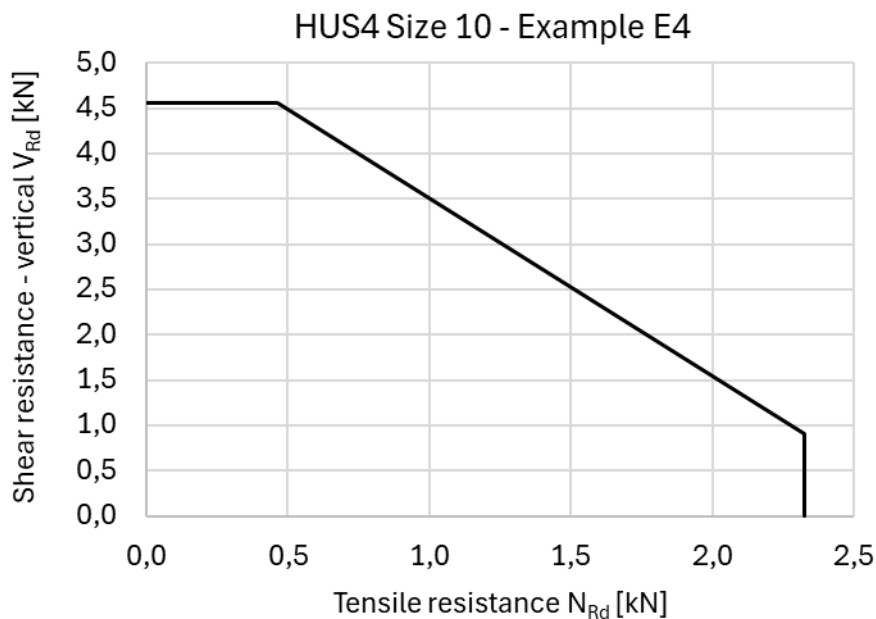


Figure 1: Solid clay brick, single anchor, example E4

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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

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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$ Mortar: M2.5, maximum joint width 10 mm
Wall layout:	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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher 1 DF Header

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

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid

 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$ No compression on wall $\sigma = 0 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$, 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)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
6,700	0,88	2,5	2,358

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 20	-	20	1,0	0,88
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
6,700	5,896	≥ 90	90	2,5	2,358

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	$f_{V,k0}$ [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E5 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	9,700	9,700	3,880	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E5 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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]
2,208	0,776

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	3,880

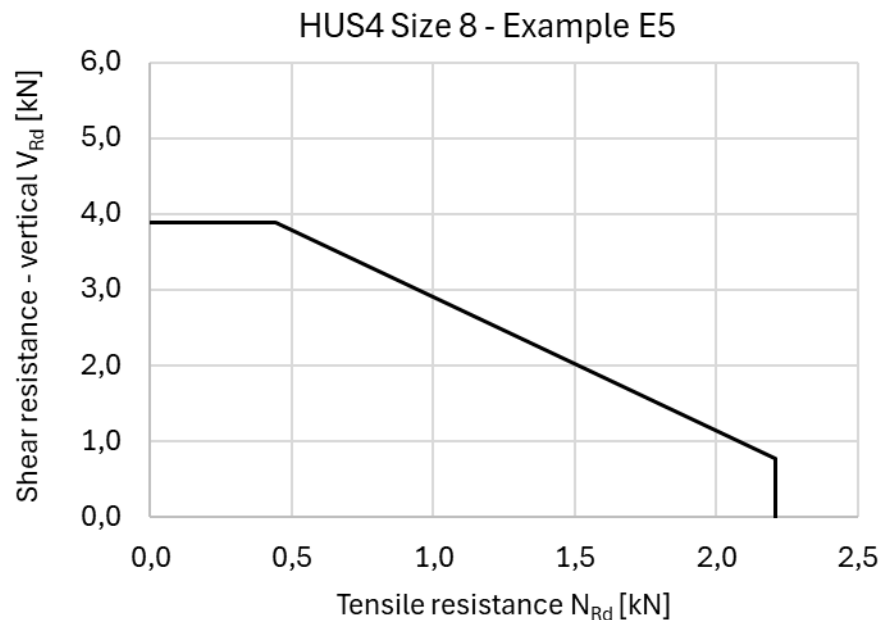


Figure 1: Solid clay brick, single anchor, example E5

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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 hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$
Wall layout:	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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher 1 DF Header

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

Example calculation for the following conditions (10-2025)

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

2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}^2$, 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)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E6 Page: 3

Tension load, $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
8,500	0,83	2,5	2,822

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 20	-	20	1,0	0,83
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
8,500	7,055	$\geq 112,5$	112,5	2,5	2,822

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	$f_{V,k0}$ [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E6 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)**Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 No compression on wall $\sigma = 0 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	14,000	14,000	5,600	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	Example E6 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}$, 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]
2,208	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]
0,442	5,600

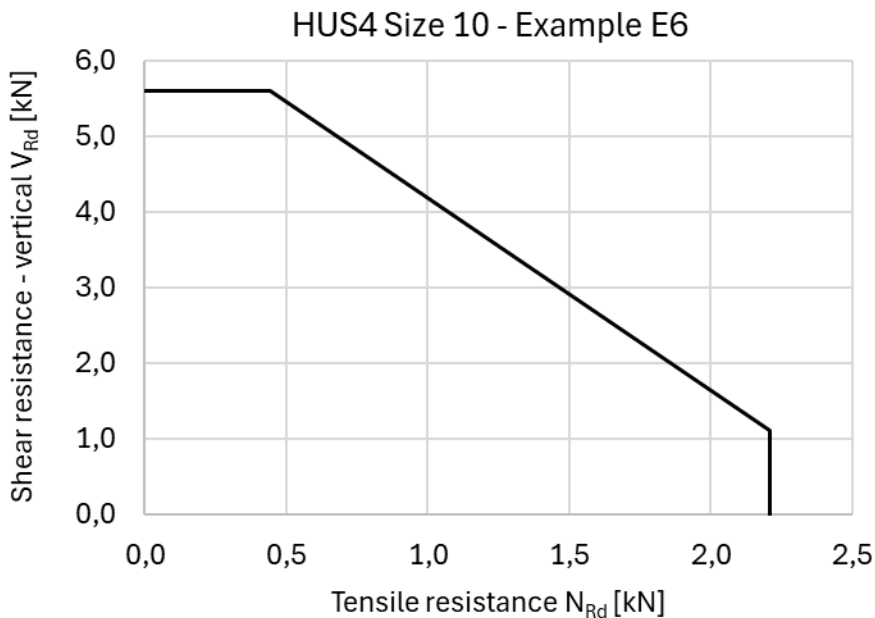


Figure 1: Solid clay brick, single anchor, example E6

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0 \text{ N/mm}^2$	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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b,mean} \geq 27 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{nom} = 60 \text{ mm}$ 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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Compressive strength: $f_{b,mean} \geq 27 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$ Mortar: M2.5, maximum joint width 10 mm
Wall layout:	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, $\sigma = 0,1 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ 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:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher 1 DF Header

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

**Example calculation for the following conditions (10-2025)**

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
8,500	0,88	2,5	2,358

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 20	-	20	1,0	0,88
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
8,500	5,896	≥ 90	90	2,5	2,358

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$	Example E7 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	9,700	9,700	3,880	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}$, 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]
2,358	0,776

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,472	3,880

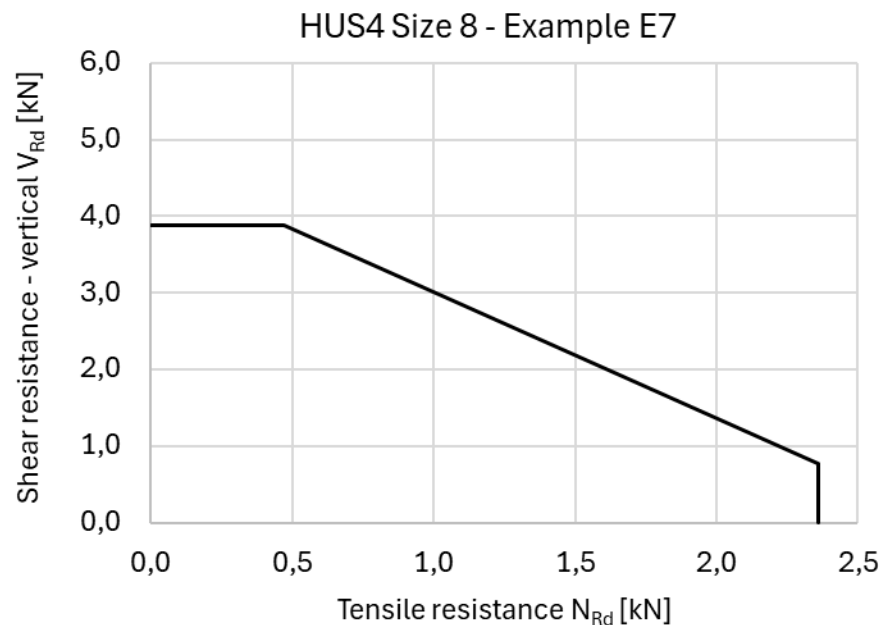


Figure 1: Solid clay brick, single anchor, example E7

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid clay brick (Mz), $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$, bulk density $\rho \geq 1,5 \text{ kg/dm}^3$ Mortar: M2.5, maximum joint width 10 mm
Wall layout:	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, $\sigma = 0,1 \text{ N/mm}^2$
Installation/Use	Installation condition: dry or wet masonry Use condition: dry internal conditions Use condition: Temperature -40°C to $+80^\circ\text{C}$ Cleaning: Manual cleaning Drilling: Hammer drilling or rotary drilling Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 20 \text{ mm}$ No setting near ($c < 20 \text{ mm}$) or in joints!
No setting in cut bricks with reduced horizontal bearing area	1DF stretcher 1 DF Header

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

**Example calculation for the following conditions (10-2025)**

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$	Example E8 Page: 3

Tension load, $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
2.1 Steel Strength

$N_{Rk, s, \text{ETA}} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd, s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk, p, \text{ETA}} [\text{kN}]$	$\alpha_{j, N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd, p} [\text{kN}]$
8,500	0,83	2,5	2,822

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$s_{\text{ETA}, \parallel} [\text{mm}]$	$c_{\text{ETA}, \parallel} [\text{mm}]$	$\alpha_{g, N \parallel} [-]$	$\alpha_{j, N} [-]$
-	≥ 20	-	20	1,0	0,83
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$s_{\text{ETA}, \perp} [\text{mm}]$	$c_{\text{ETA}, \perp} [\text{mm}]$	$\alpha_{g, N \perp} [-]$	$e_{c, N \parallel, \perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk, b, \text{ETA}} [\text{kN}]$	$N_{Rk, b} [\text{kN}]$	$c [\text{mm}]$	$c_{\text{min}, \text{ETA}} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd, b} [\text{kN}]$
8,500	7,055	$\geq 112,5$	112,5	2,5	2,822

2.4 Pullout of one brick

A ^H _{act} [mm ²]	A ^V _{act} [mm ²]	f _{v,k0} [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	

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$	Example E8 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	14,000	14,000	5,600	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 20	-	20	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,1 \text{ N/mm}^2$

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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 18 \text{ N/mm}$, 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]
2,822	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

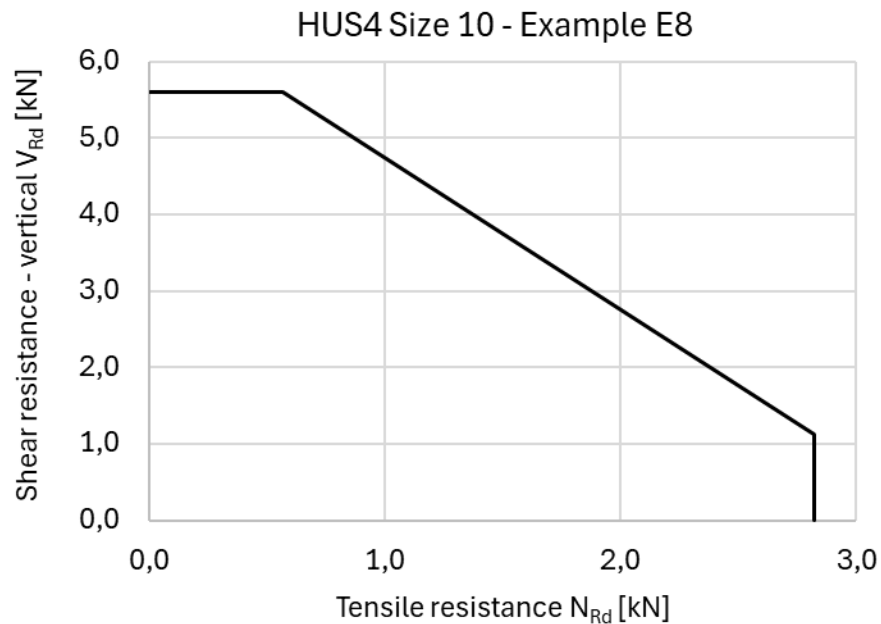


Figure 1: Solid clay brick, single anchor, example E8

Example calculation for the following conditions (10-2025)

Base material: clay brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 52 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 27 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,1 \text{ N/mm}^2$	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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

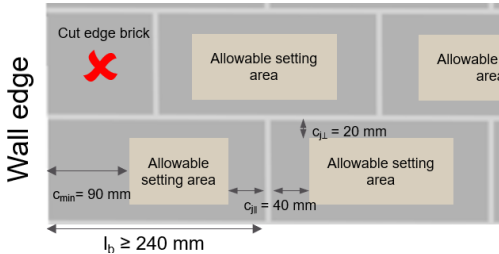
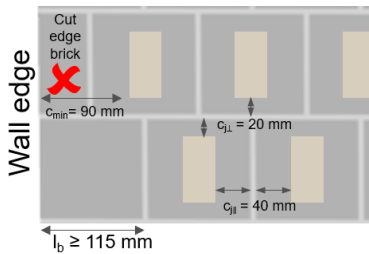
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

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

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, 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)

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 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: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
9,400	0,78	2,5	2,933

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,78
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
9,400	7,332	≥ 90	90	2,5	2,933

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	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	

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
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: 4

3 Shear load (EOTA TR 054, Section 4.3)**Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

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

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$SETA_{j\parallel} [\text{mm}]$	$CETA_{j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{\parallel} [\text{mm}]$	$c_{\text{min},ETA\parallel} [\text{mm}]$	$V_{Rk,b,ETA\parallel} [\text{kN}]$	$V_{Rk,b\parallel} [\text{kN}]$	$V_{Rd,b\parallel} [\text{kN}]$	
≥ 90	90	13,600	13,600	5,440	

3.3 Brick edge failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$SETA_{j\parallel} [\text{mm}]$	$CETA_{j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{\parallel} [\text{mm}]$	$c_{\text{min},ETA\parallel} [\text{mm}]$	$V_{Rk,c,ETA\parallel} [\text{kN}]$	$V_{Rk,c\parallel} [\text{kN}]$	$V_{Rd,c\parallel} [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, 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]
1,656	1,088

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,331	5,440

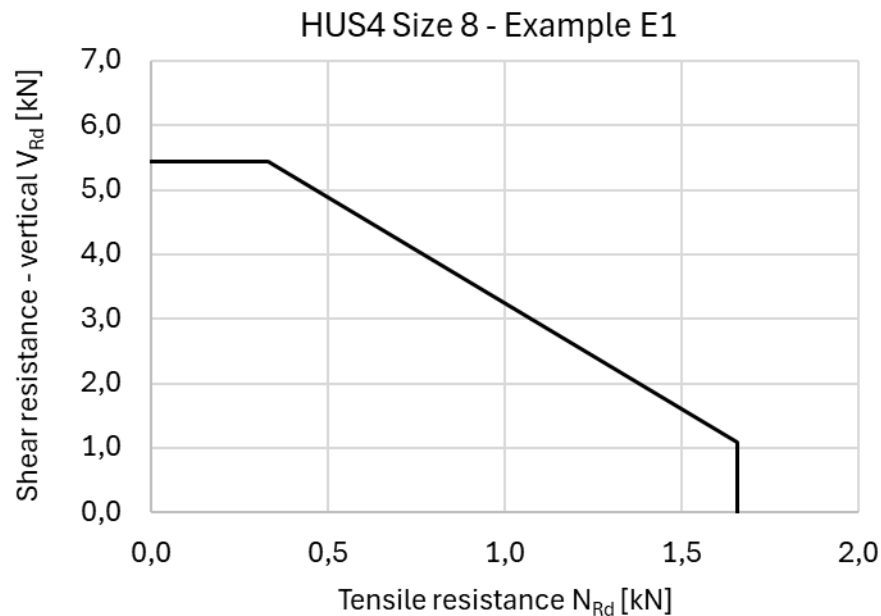


Figure 1: Solid calcium silicate brick, single anchor, example E1

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
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: 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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

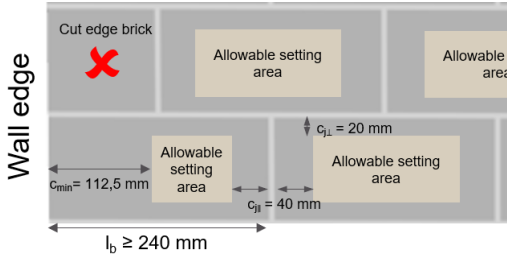
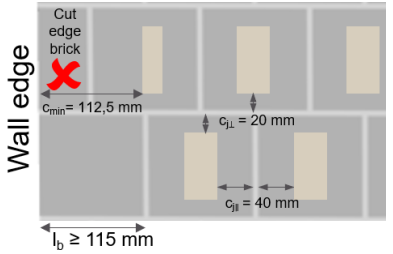
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 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 Size 10 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
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10
Design: TR 054 July 2022
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Example E2 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
9,900	0,87	2,5	3,445

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$C_{ETA,j,\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,87
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j,\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
9,900	8,613	≥ 90	90	2,5	3,445

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	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	

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

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

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	15,600	15,600	6,240	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}$, 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]
1,656	1,248

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,331	6,240

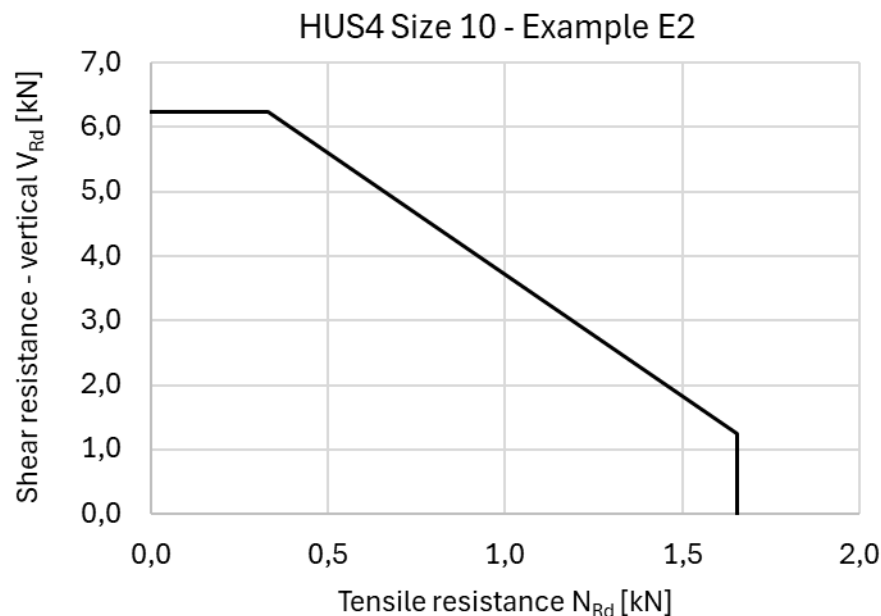


Figure 1: Solid calcium silicate brick, single anchor, example E2

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
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: 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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

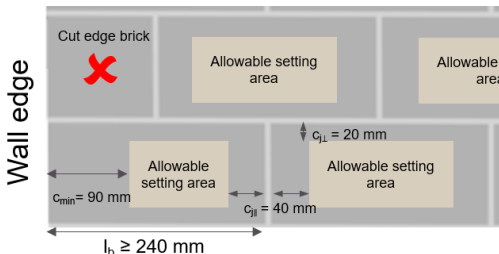
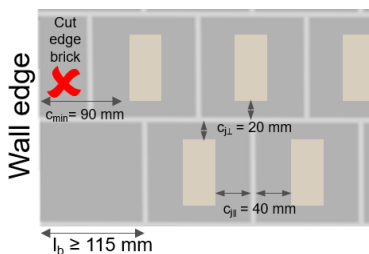
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
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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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,20 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
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Example E3 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
 Design: TR 054 July 2022
 ETA 23/0936 (13.05.2025)
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Tension load
2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
9,400	0,78	2,5	2,933

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$C_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,78
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
9,400	7,332	≥ 90	90	2,5	2,933

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
55 200	0	0,15	0,20
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
8,556	2,5	3,422	

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$	Example E3 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
 Design: TR 054 July 2022
 ETA 23/0936 (13.05.2025)
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Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{, } [\text{mm}]$	$CETA_{,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{,\perp} [\text{mm}]$	$CETA_{,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	13,600	13,600	5,440	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{, } [\text{mm}]$	$CETA_{,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{,\perp} [\text{mm}]$	$CETA_{,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,587	5,440

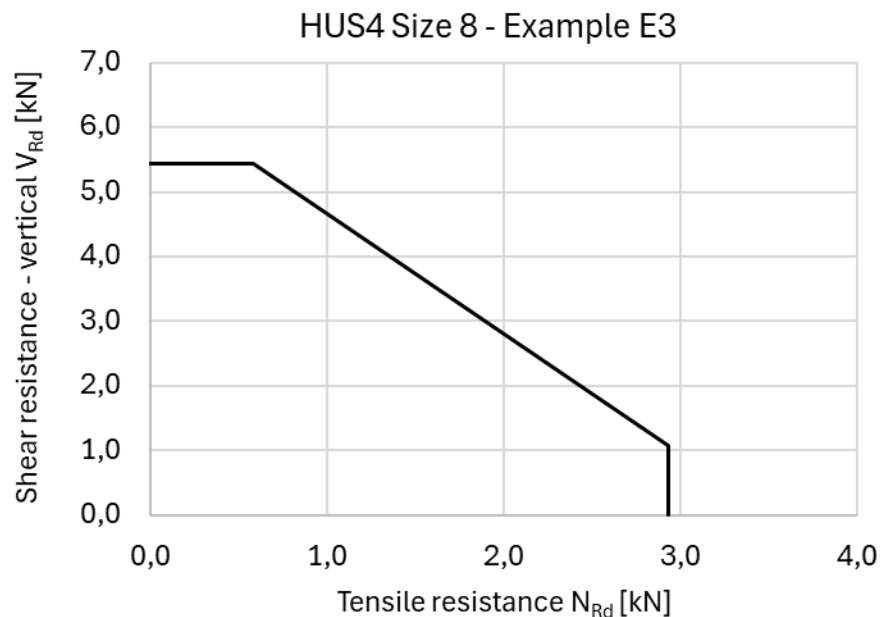


Figure 1: Solid calcium silicate brick, single anchor, example E3

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
Design: TR 054 July 2022
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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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

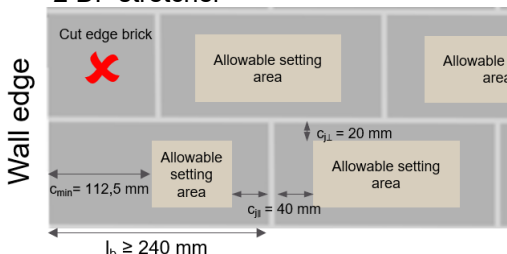
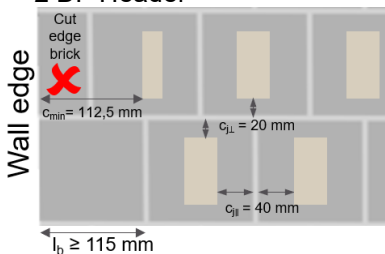
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,20 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
9,900	0,87	2,5	3,445

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{ } [\text{mm}]$	$SETA_{ } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,87
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
9,900	8,613	≥ 90	90	2,5	3,445

2.4 Pullout of one brick

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

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

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$	Example E4 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b,mean} \geq 20 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	15,600	15,600	6,240	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,684	6,240

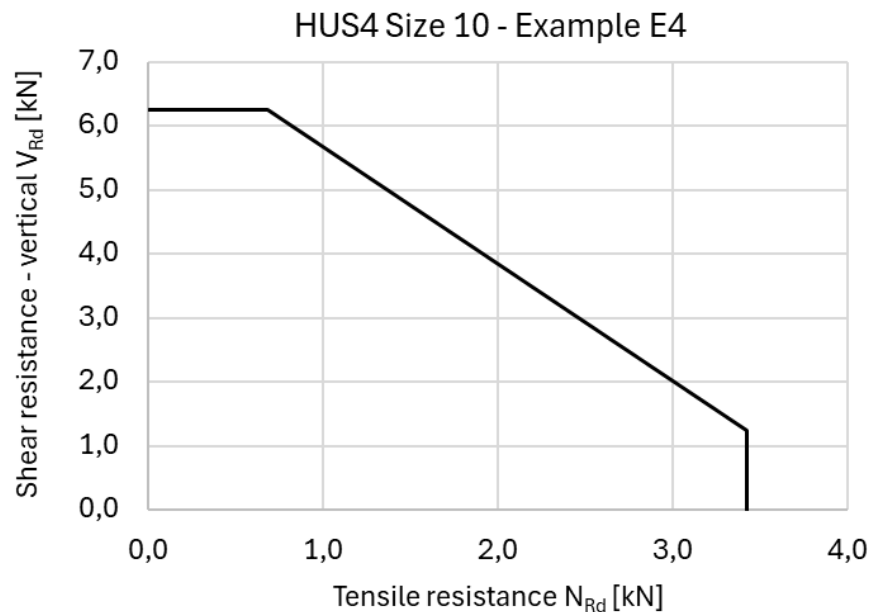


Figure 1: Solid calcium silicate brick, single anchor, example E4

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 20 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

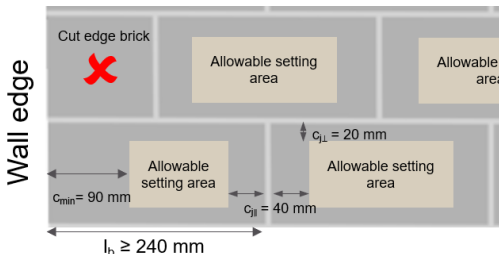
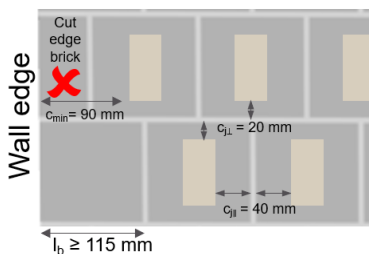
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
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 $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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

Tension load
2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
11,300	0,78	2,5	3,526

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$C_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,78
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
11,300	8,814	≥ 90	90	2,5	3,526

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	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	

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
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: 4

3 Shear load (EOTA TR 054, Section 4.3)**Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	16,400	16,400	6,560	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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]
1,656	1,312

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,331	6,560

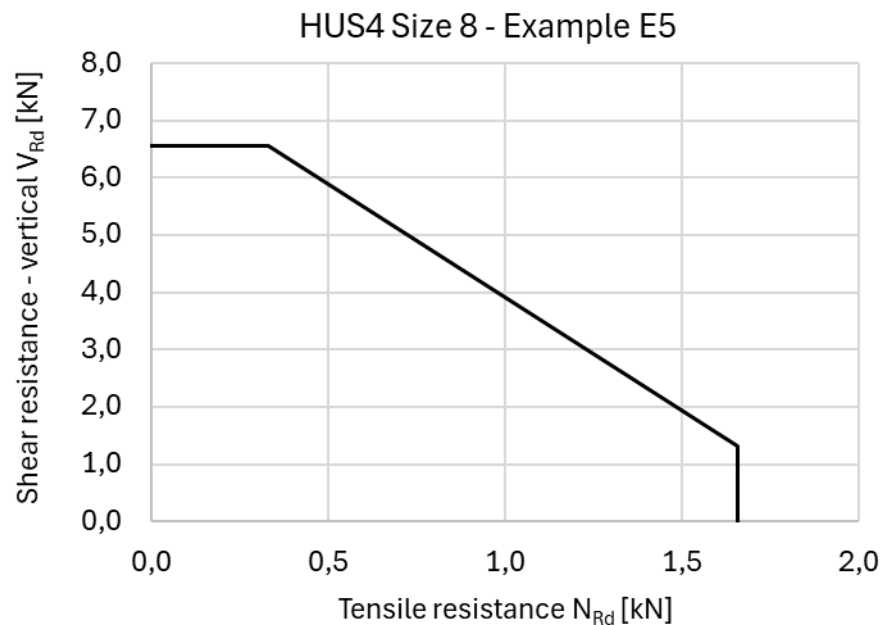


Figure 1: Solid calcium silicate brick, single anchor, example E5

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
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: 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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

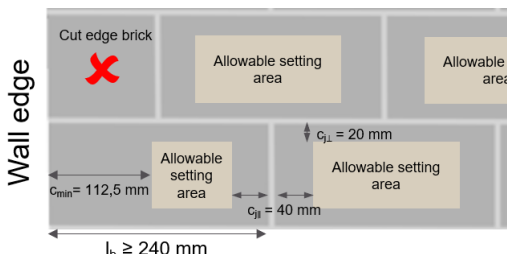
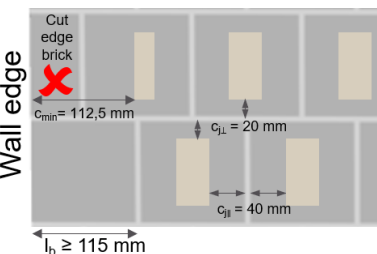
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
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 $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
12,000	0,87	2,5	4,176

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$C_{ETA,j,\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,87
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j,\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
12,000	10,440	≥ 90	90	2,5	4,176

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	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	

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E6 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)**Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	18,800	18,800	7,520	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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]
1,656	1,504

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,331	7,520

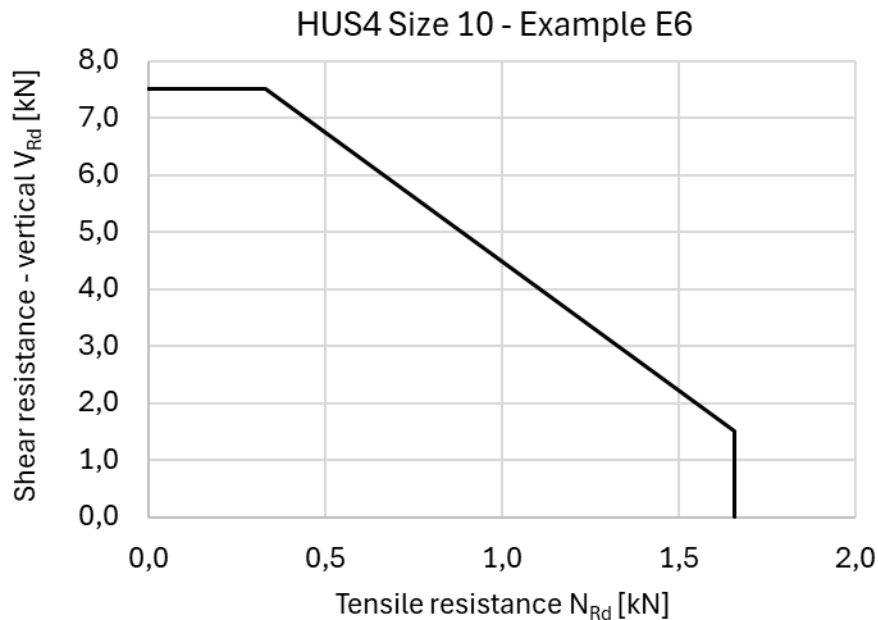


Figure 1: Solid calcium silicate brick, single anchor, example E6

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
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: 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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

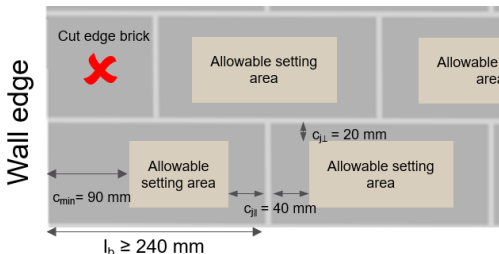
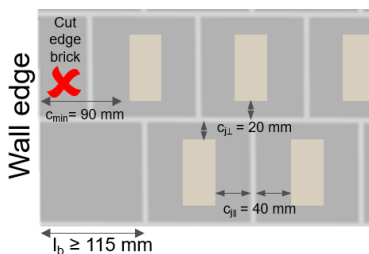
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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 hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,20 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
11,300	0,78	2,5	3,932

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$C_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,78
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
11,300	9,831	≥ 90	90	2,5	3,932

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
55 200	0	0,15	0,20
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
8,556	2,5	3,422	

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$	Example E7 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b,mean} \geq 30 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} \text{ [kN]}$	$\gamma_{Ms} \text{ [-]}$	$V_{Rd,s} \text{ [kN]}$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{j } \text{ [mm]}$	$CETA_{j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{j\perp} \text{ [mm]}$	$CETA_{j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{min,ETA } \text{ [mm]}$	$V_{Rk,b,ETA } \text{ [kN]}$	$V_{Rk,b } \text{ [kN]}$	$V_{Rd,b } \text{ [kN]}$	
≥ 90	90	16,400	16,400	6,560	

3.3 Brick edge failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{j } \text{ [mm]}$	$CETA_{j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{j\perp} \text{ [mm]}$	$CETA_{j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{min,ETA } \text{ [mm]}$	$V_{Rk,c,ETA } \text{ [kN]}$	$V_{Rk,c } \text{ [kN]}$	$V_{Rd,c } \text{ [kN]}$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,684	6,560

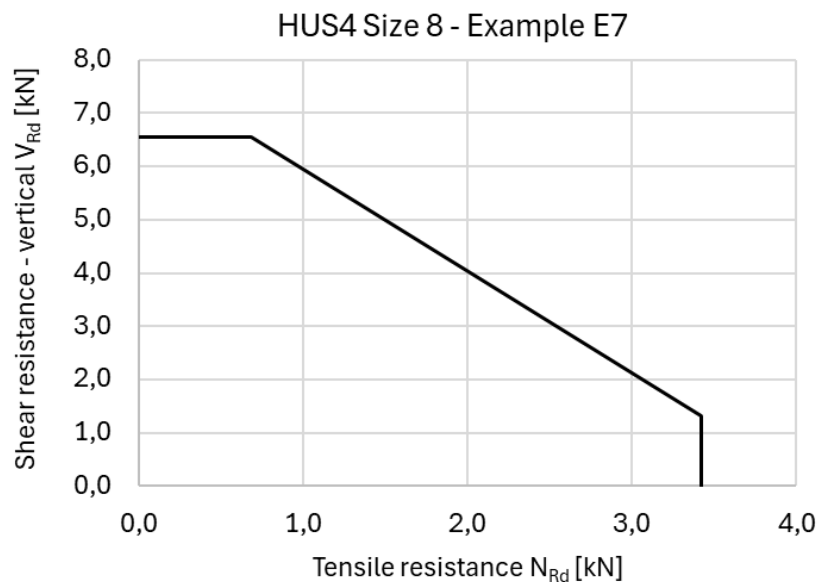


Figure 1: Solid calcium silicate brick, single anchor, example E7

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

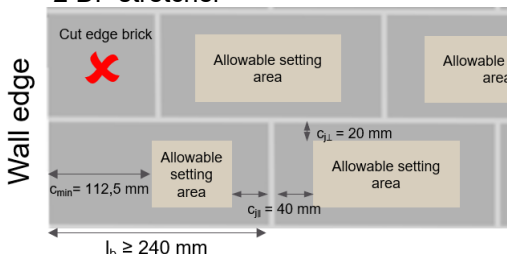
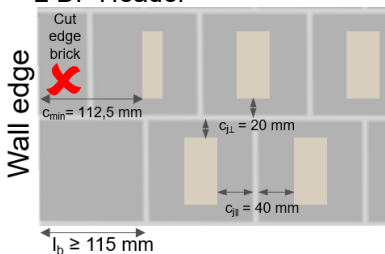
Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid calcium silicate brick, $L \times W \times H: \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, bulk density $\rho \geq 1,7 \text{ kg/dm}^3$ 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, $\sigma = 0,20 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! 2 DF stretcher  2 DF Header 

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

**Example calculation for the following conditions (10-2025)**

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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 $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b,mean} \geq 30 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
12,000	0,87	2,5	4,176

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{ } [\text{mm}]$	$SETA_{ } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,87
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
12,000	10,440	≥ 90	90	2,5	4,176

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
55 200	0	0,15	0,20
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
8,556	2,5	3,422	

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$	Example E8 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b,mean} \geq 30 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	18,800	18,800	7,520	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
 Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}$, 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	1,504

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,684	7,520

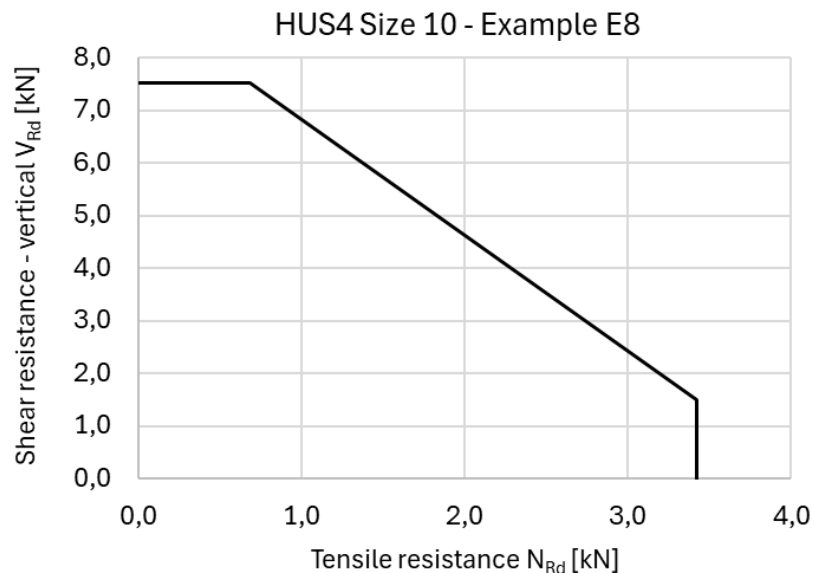


Figure 1: Solid calcium silicate brick, single anchor, example E8

Example calculation for the following conditions (10-2025)

Base material: calcium silicate brick, solid
 $l \times b \times h \geq 240 \text{ mm} \times 115 \text{ mm} \times 113 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 30 \text{ N/mm}^2$
Compression on wall $\sigma = 0,20 \text{ N/mm}^2$

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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Impact screw wrench SIW 4AT-22 Gear 1
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $115,0 \text{ mm}$
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.

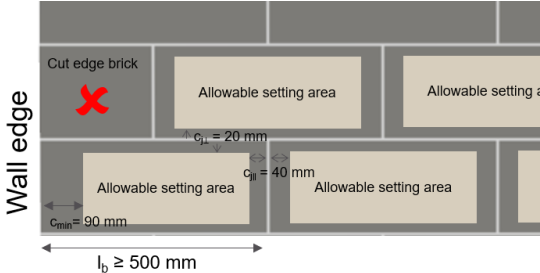
Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher 

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

**Example calculation for the following conditions (10-2025)**

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

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
2,800	0,76	2,5	0,851

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$C_{ETA,j,\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,76
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j,\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
2,800	2,128	≥ 90	90	2,5	0,851

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E1 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

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

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{\parallel} [\text{mm}]$	$c_{\text{min},ETA\parallel} [\text{mm}]$	$V_{Rk,b,ETA\parallel} [\text{kN}]$	$V_{Rk,b\parallel} [\text{kN}]$	$V_{Rd,b\parallel} [\text{kN}]$	
≥ 90	90	1,800	1,800	0,720	

3.3 Brick edge failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{\parallel} [\text{mm}]$	$c_{\text{min},ETA\parallel} [\text{mm}]$	$V_{Rk,c,ETA\parallel} [\text{kN}]$	$V_{Rk,c\parallel} [\text{kN}]$	$V_{Rd,c\parallel} [\text{kN}]$	
≥ 90	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!

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}$, 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]
0,851	0,144

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,170	0,720

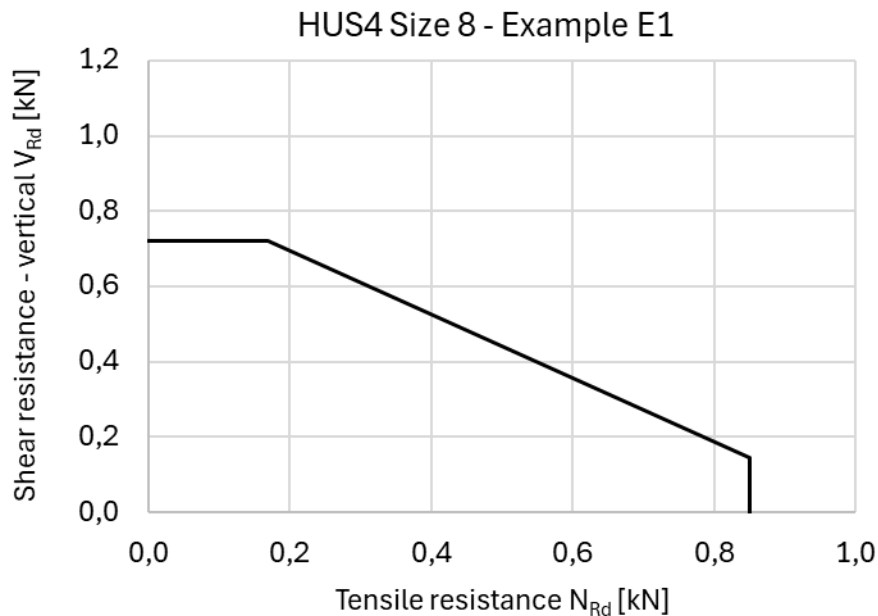


Figure 1: Solid lightweight concrete brick, single anchor, example E1

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
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: 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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $150,0 \text{ mm}$
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.

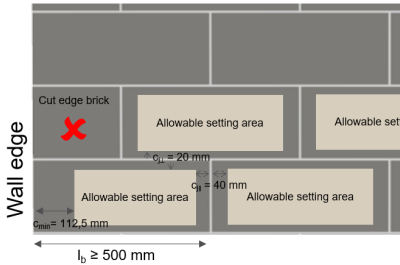
Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher 

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

**Example calculation for the following conditions (10-2025)**

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

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 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: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
3,500	0,59	2,5	0,826

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
3,500	2,065	≥ 90	90	2,5	0,826

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b,mean} \geq 5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	4,200	2,478	0,991	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, 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]
0,826	0,198

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,165	0,991

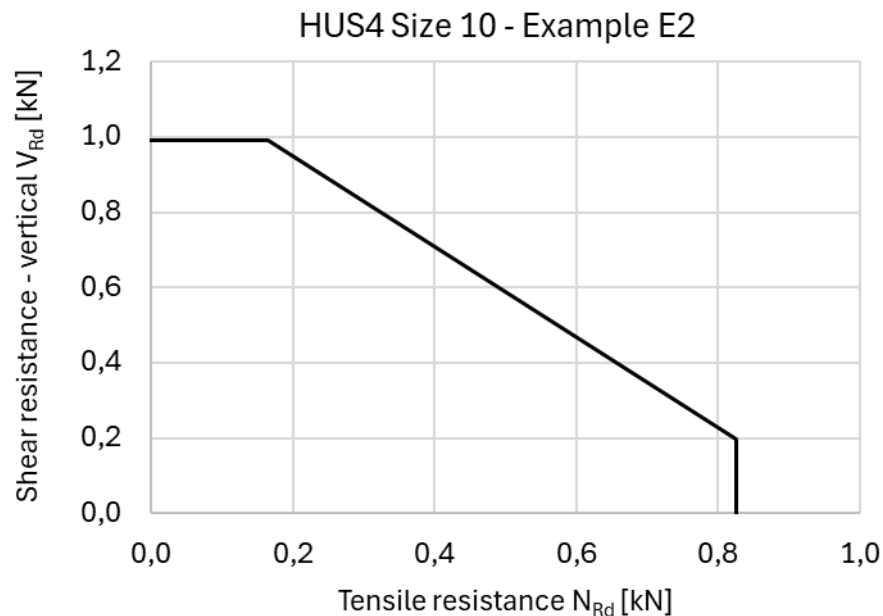


Figure 1: Solid lightweight concrete brick, single anchor, example E2

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $150,0 \text{ mm}$
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.

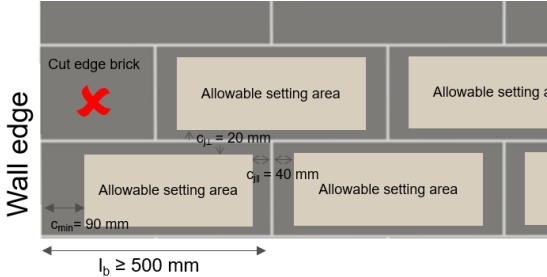
Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher 

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

**Example calculation for the following conditions (10-2025)**

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

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
3,500	0,76	2,5	1,064

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$SETA_{j\parallel} [\text{mm}]$	$C_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,76
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
3,500	2,660	≥ 90	90	2,5	1,064

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 8
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E3 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

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

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	2,100	2,100	0,840	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
 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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}$, 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]
1,064	0,168

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,213	0,840

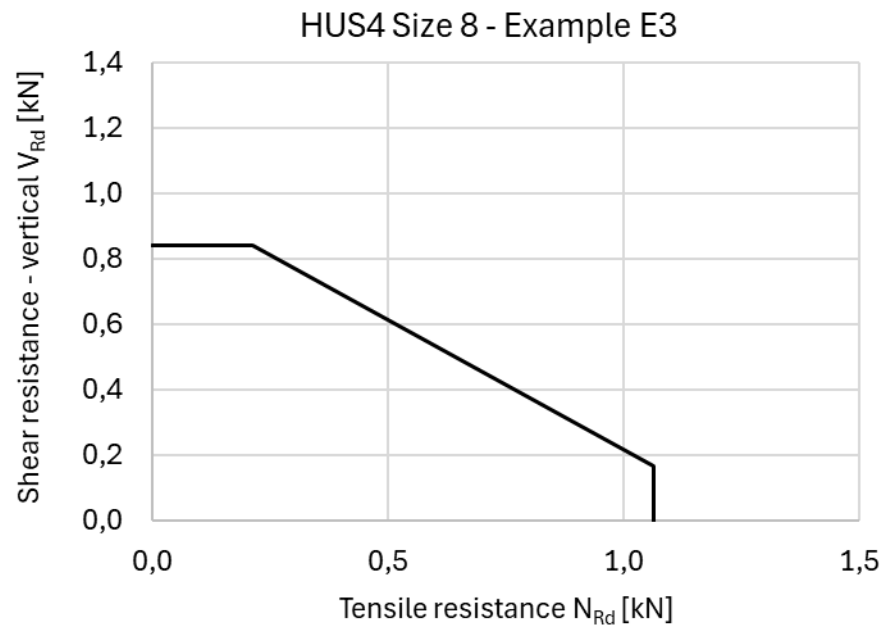


Figure 1: Solid lightweight concrete brick, single anchor, example E3

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
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: 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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $150,0 \text{ mm}$
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.

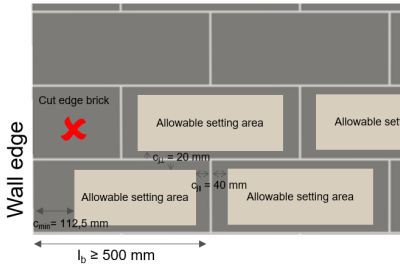
Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
 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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher 

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

Example calculation for the following conditions (10-2025)

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

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 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: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
4,500	0,59	2,5	1,062

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
4,500	2,665	≥ 90	90	2,5	1,062

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E4 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E4 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	5,200	3,068	1,227	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
 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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}$, 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

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

N_{Rd} [kN]	V_{Rd} [kN]
0,212	1,227

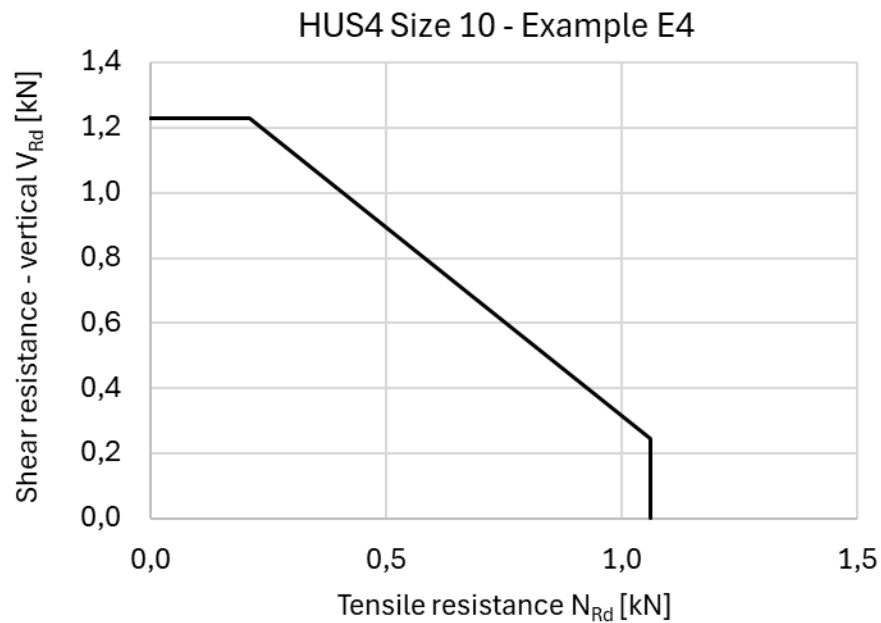


Figure 1: Solid lightweight concrete brick, single anchor, example E4

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid	Anchor type: HUS4 Size 10
$l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$	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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $150,0 \text{ mm}$
Cleaning: manual
Fastening option: Through fastening
Installation per ETA-23/0936

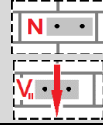
7 Remarks; Your Cooperation Duties

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Example calculation for the following conditions (10-2025)

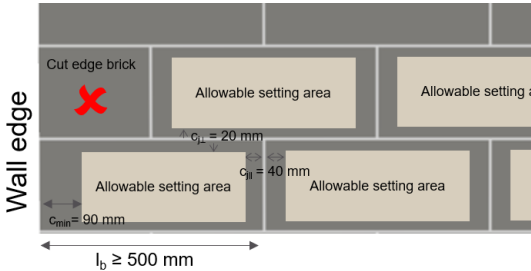
Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

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



1 Input data



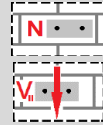
Anchor type and diameter:	HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ Mortar: M2.5, maximum joint width 10 mm Horizontal joints filled, vertical joints filled or not filled
Wall layout:	 Stretcher bond, unplastered wall Anchor in stretcher position Minimum wall thickness: 150 mm No vertical compression on wall, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher
No setting in cut bricks with reduced horizontal bearing area	

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

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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 E5 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, vertical joints filled or not filled

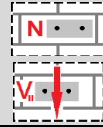
	Capacity [kN]
Steel Strength*	24,000
Pullout Strength*	0,851
Brick breakout**	1,702
Pull-out of one brick**	5,976

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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 E5 Page: 3



Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
2,800	0,76	2,5	0,851

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
80	≥ 40	80	40	2,0	0,76
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
2,800	4,256	≥ 90	90	2,5	1,702

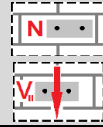
2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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 E5 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}$, 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

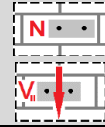
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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 E5 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
80	≥ 40	-	40	1,6	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	1,800	2,880	1,152	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$CETA_{j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
80	≥ 40	80	40	1,6	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 90	90	1,800	2,880	1,152	

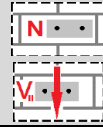
3.4 Pushing out of one brick

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

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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 E5 Page: 6


4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}$, 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]
1,702	0,230

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,340	1,152

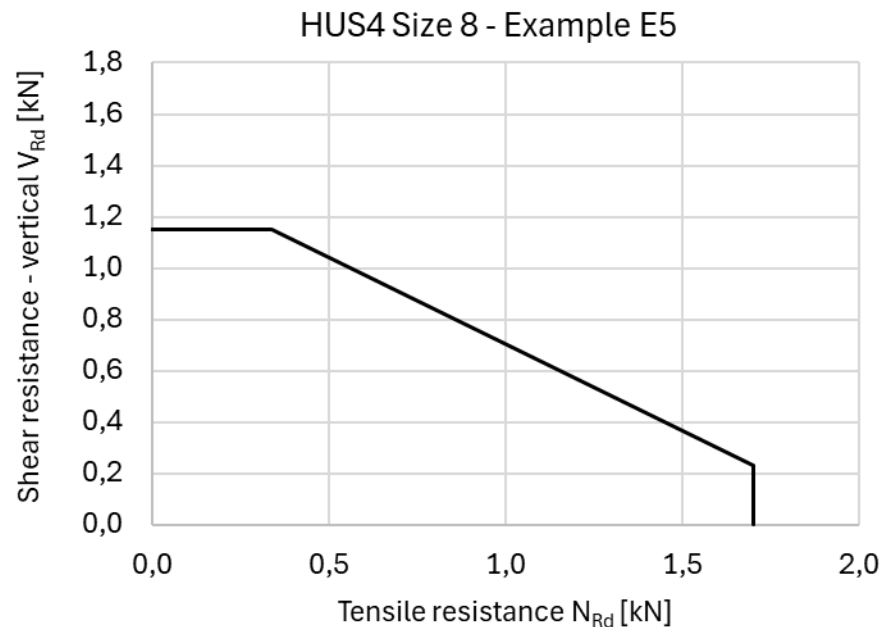
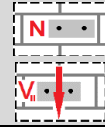


Figure 1: Solid lightweight concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E5

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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 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_j) 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 $12,0 \text{ mm}$ (through setting)
 Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
 Hole diameter in the base material: $8,0 \text{ mm}$
 Recommended plate thickness: not calculated
 Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
 Drilling method: Drilled in hammer mode
 Minimum thickness of the base material: $150,0 \text{ mm}$
 Cleaning: manual
 Fastening option: Through fastening
 Installation per ETA-23/0936

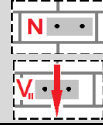
7 Remarks; Your Cooperation Duties

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.

Example calculation for the following conditions (10-2025)

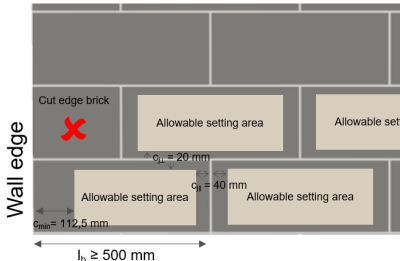
Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 10
 Design: TR 054 July 2022
 ETA 23/0936 (13.05.2025)
 Example E6 Page: 1



1 Input data



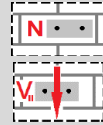
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher 

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

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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 $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$, vertical joints filled or not filled

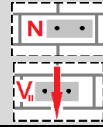
	Capacity [kN]
Steel Strength*	36,667
Pullout Strength*	0,826
Brick breakout**	1,322
Pull-out of one brick**	4,482

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
3,500	0,59	2,5	0,826

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$CETA_{j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
80	≥ 40	80	40	1,6	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
3,500	3,304	≥ 90	90	2,5	1,322

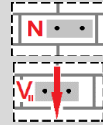
2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

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

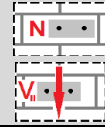
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

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



Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} \text{ [kN]}$	$\gamma_{Ms} \text{ [-]}$	$V_{Rd,s} \text{ [kN]}$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$s_{ETA, } \text{ [mm]}$	$c_{ETA,j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	-	40	1,6	0,59
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$s_{ETA,\perp} \text{ [mm]}$	$c_{ETA,j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{\text{min},ETA } \text{ [mm]}$	$V_{Rk,b,ETA } \text{ [kN]}$	$V_{Rk,b } \text{ [kN]}$	$V_{Rd,b } \text{ [kN]}$	
≥ 90	90	4,200	3,965	1,586	

3.3 Brick edge failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$s_{ETA, } \text{ [mm]}$	$c_{ETA,j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	80	40	1,6	0,59
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$s_{ETA,\perp} \text{ [mm]}$	$c_{ETA,j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{\text{min},ETA } \text{ [mm]}$	$V_{Rk,c,ETA } \text{ [kN]}$	$V_{Rk,c } \text{ [kN]}$	$V_{Rd,c } \text{ [kN]}$	
≥ 90	90	4,200	3,965	1,586	

3.4 Pushing out of one brick

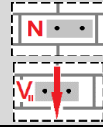
N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
 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: 6


4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}$, 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]
1,322	0,317

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,264	1,586

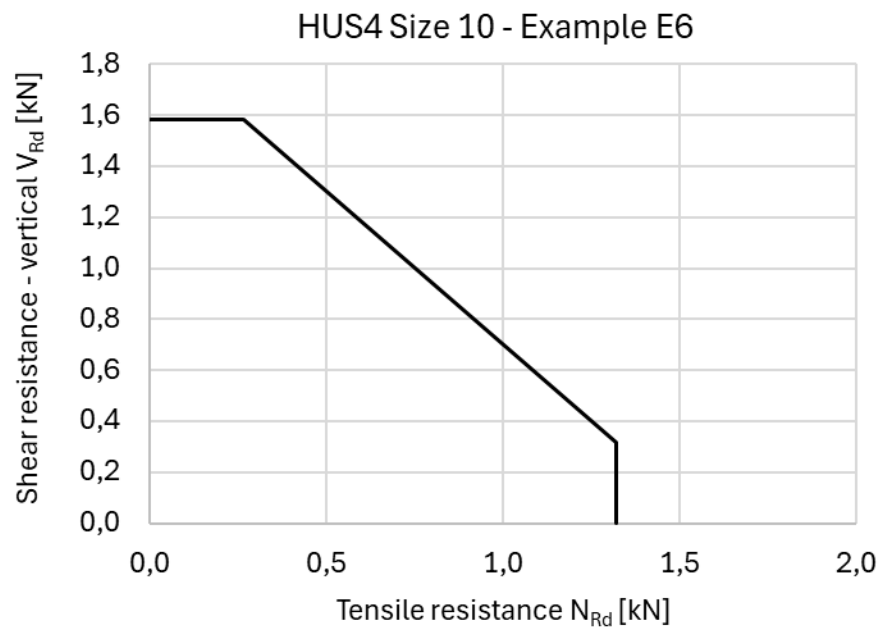
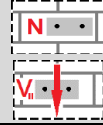


Figure 1: Solid lightweight concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E6

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
Brick strength $f_{b, \text{mean}} \geq 5 \text{ N/mm}^2$
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: 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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $150,0 \text{ mm}$
Cleaning: manual
Fastening option: Through fastening
Installation per ETA-23/0936

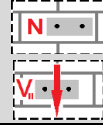
7 Remarks; Your Cooperation Duties

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.

Example calculation for the following conditions (10-2025)

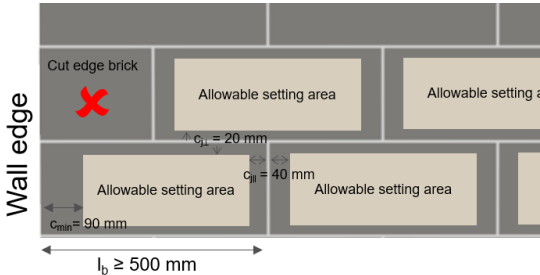
Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
 No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

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



1 Input data



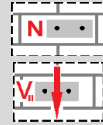
Anchor type and diameter:	HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher 

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

Example calculation for the following conditions (10-2025)

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



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, vertical joints filled or not filled

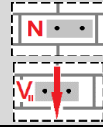
	Capacity [kN]
Steel Strength*	24,000
Pullout Strength*	1,064
Brick breakout**	2,128
Pull-out of one brick**	4,482

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
3,500	0,76	2,5	1,064

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$CETA_{j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
80	≥ 40	80	40	2,0	0,76
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
3,500	5,320	≥ 90	90	2,5	2,128

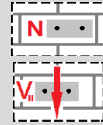
2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

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

Anchor type: HUS4 Size 8
 Design: TR 054 July 2022
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 Example E7 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}$, 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

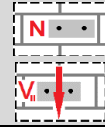
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

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

$V_{Rk,s,ETA} \text{ [kN]}$	$\gamma_{Ms} \text{ [-]}$	$V_{Rd,s} \text{ [kN]}$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{j } \text{ [mm]}$	$CETA_{j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	-	40	1,6	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{j\perp} \text{ [mm]}$	$CETA_{j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{\text{min},ETA } \text{ [mm]}$	$V_{Rk,b,ETA } \text{ [kN]}$	$V_{Rk,b } \text{ [kN]}$	$V_{Rd,b } \text{ [kN]}$	
≥ 90	90	2,100	3,360	1,344	

3.3 Brick edge failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{j } \text{ [mm]}$	$CETA_{j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	80	40	1,6	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{j\perp} \text{ [mm]}$	$CETA_{j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{\text{min},ETA } \text{ [mm]}$	$V_{Rk,c,ETA } \text{ [kN]}$	$V_{Rk,c } \text{ [kN]}$	$V_{Rd,c } \text{ [kN]}$	
≥ 90	90	2,100	3,360	1,344	

3.4 Pushing out of one brick

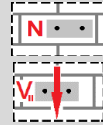
N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

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

Anchor type: HUS4 Size 8
 Design: TR 054 July 2022
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4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}$, 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]
2,128	0,269

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,426	1,344

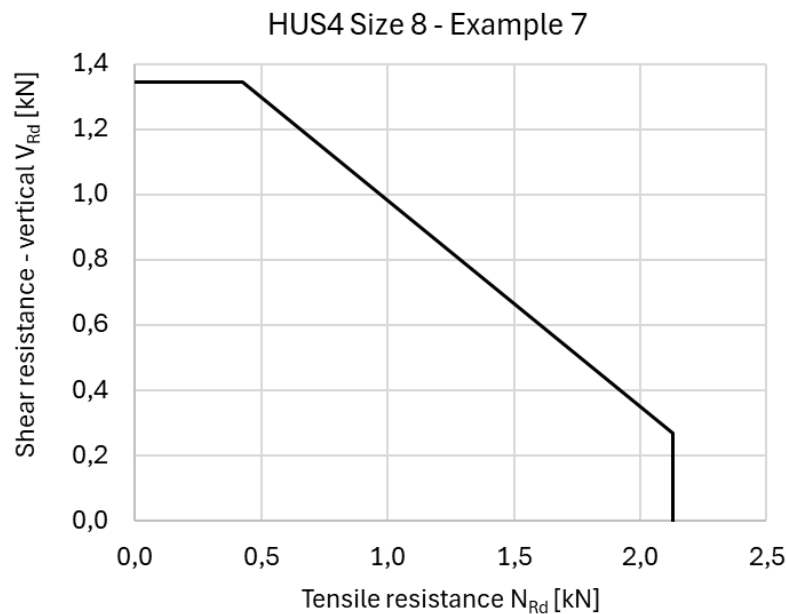
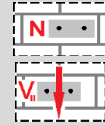


Figure 1: Solid lightweight concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E7

Example calculation for the following conditions (10-2025)

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

Anchor type: HUS4 Size 8
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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_j) 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 $12,0 \text{ mm}$ (through setting)
 Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
 Hole diameter in the base material: $8,0 \text{ mm}$
 Recommended plate thickness: not calculated
 Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
 Drilling method: Drilled in hammer mode
 Minimum thickness of the base material: $150,0 \text{ mm}$
 Cleaning: manual
 Fastening option: Through fastening
 Installation per ETA-23/0936

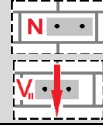
7 Remarks; Your Cooperation Duties

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.

Example calculation for the following conditions (10-2025)

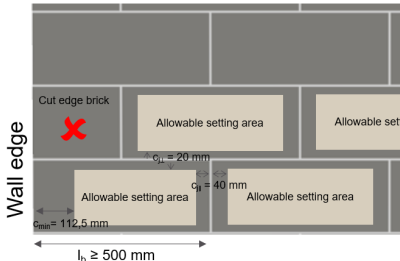
Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
 No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

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



1 Input data



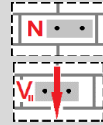
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:  Wall layout:	Solid lightweight concrete brick, $L \times W \times H: \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, bulk density $\rho \geq 0,9 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher 

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

Example calculation for the following conditions (10-2025)

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



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$, vertical joints filled or not filled

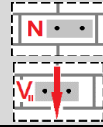
	Capacity [kN]
Steel Strength*	36,667
Pullout Strength*	1,062
Brick breakout**	1,699
Pull-out of one brick**	4,482

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

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

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
4,500	0,59	2,5	1,062

2.3 Brick breakout

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$CETA_{j\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
80	≥ 40	80	40	1,6	0,59
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$CETA_{j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
4,500	4,248	≥ 90	90	2,5	1,699

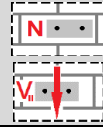
2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
149 400	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
11,205	2,5	4,482	

Example calculation for the following conditions (10-2025)

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

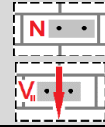
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

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

$V_{Rk,s,ETA} \text{ [kN]}$	$\gamma_{Ms} \text{ [-]}$	$V_{Rd,s} \text{ [kN]}$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$s_{ETA, } \text{ [mm]}$	$c_{ETA,j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	-	40	1,6	0,59
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$s_{ETA,\perp} \text{ [mm]}$	$c_{ETA,j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{\text{min},ETA } \text{ [mm]}$	$V_{Rk,b,ETA } \text{ [kN]}$	$V_{Rk,b } \text{ [kN]}$	$V_{Rd,b } \text{ [kN]}$	
≥ 90	90	5,200	4,909	1,964	

3.3 Brick edge failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$s_{ETA, } \text{ [mm]}$	$c_{ETA,j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	80	40	1,6	0,59
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$s_{ETA,\perp} \text{ [mm]}$	$c_{ETA,j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,5	
$c_{ } \text{ [mm]}$	$c_{\text{min},ETA } \text{ [mm]}$	$V_{Rk,c,ETA } \text{ [kN]}$	$V_{Rk,c } \text{ [kN]}$	$V_{Rd,c } \text{ [kN]}$	
≥ 90	90	5,200	4,909	1,964	

3.4 Pushing out of one brick

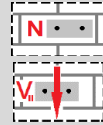
N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
 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: 6


4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,340	1,964

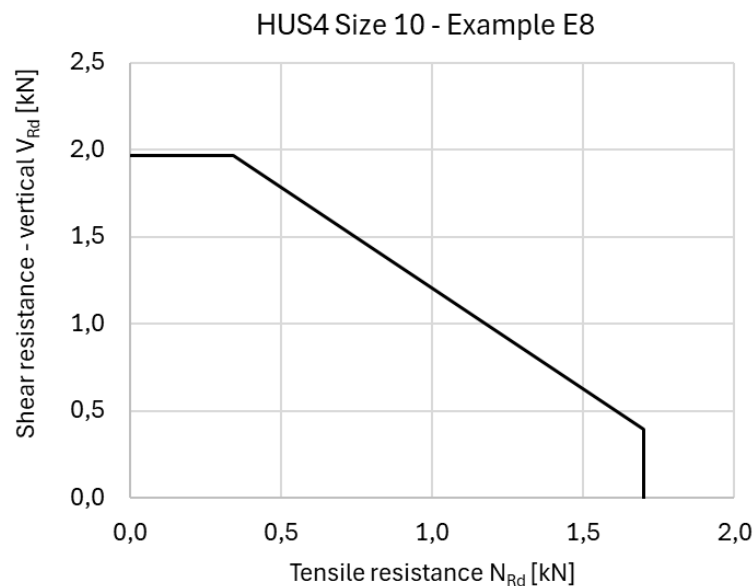
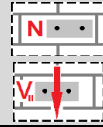


Figure 1: Solid lightweight concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E8

Example calculation for the following conditions (10-2025)

Base material: lightweight concrete brick, solid
 $l \times b \times h \geq 498 \text{ mm} \times 150 \text{ mm} \times 199 \text{ mm}$
 Brick strength $f_{b, \text{mean}} \geq 7,5 \text{ N/mm}^2$
 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: 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_j) 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 $14,0 \text{ mm}$ (through setting)
 Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
 Hole diameter in the base material: $10,0 \text{ mm}$
 Recommended plate thickness: not calculated
 Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
 Drilling method: Drilled in hammer mode
 Minimum thickness of the base material: $150,0 \text{ mm}$
 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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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 E1 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), $L \times W \times H: \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, bulk density $\rho \geq 0,55 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher

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

**Example calculation for the following conditions (10-2025)**

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E1 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b,mean} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E1 Page: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
0,500	0,73	2,0	0,183

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,73
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
0,500	0,365	≥ 90	90	2,0	0,183

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E1 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E1 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{, } [\text{mm}]$	$CETA_{,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{,\perp} [\text{mm}]$	$CETA_{,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	1,000	1,000	0,500	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{, } [\text{mm}]$	$CETA_{,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{,\perp} [\text{mm}]$	$CETA_{,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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 $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E1 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}$, 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

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

N_{Rd} [kN]	V_{Rd} [kN]
0,037	0,500

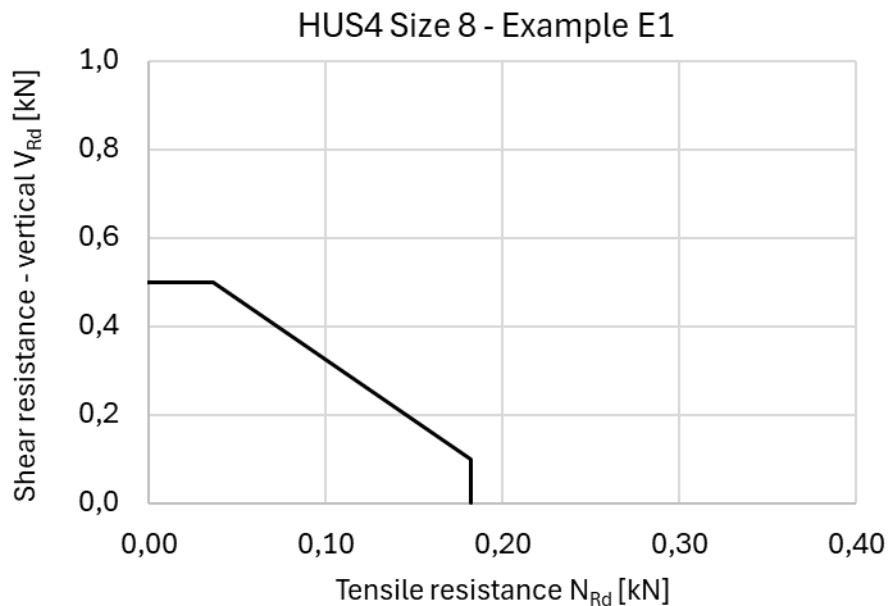


Figure 1: Autoclaved aerated concrete brick, single anchor, example E1

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $240,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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: 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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), $L \times W \times H: \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, bulk density $\rho \geq 0,55 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher

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

**Example calculation for the following conditions (10-2025)**

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b,mean} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
0,800	0,96	2,0	0,384

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,96
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
0,800	0,768	≥ 90	90	2,0	0,384

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{, } [\text{mm}]$	$CETA_{,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{,\perp} [\text{mm}]$	$CETA_{,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	1,600	1,600	0,800	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{, } [\text{mm}]$	$CETA_{,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{,\perp} [\text{mm}]$	$CETA_{,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{\text{min},ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 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.

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E2 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,077	0,800

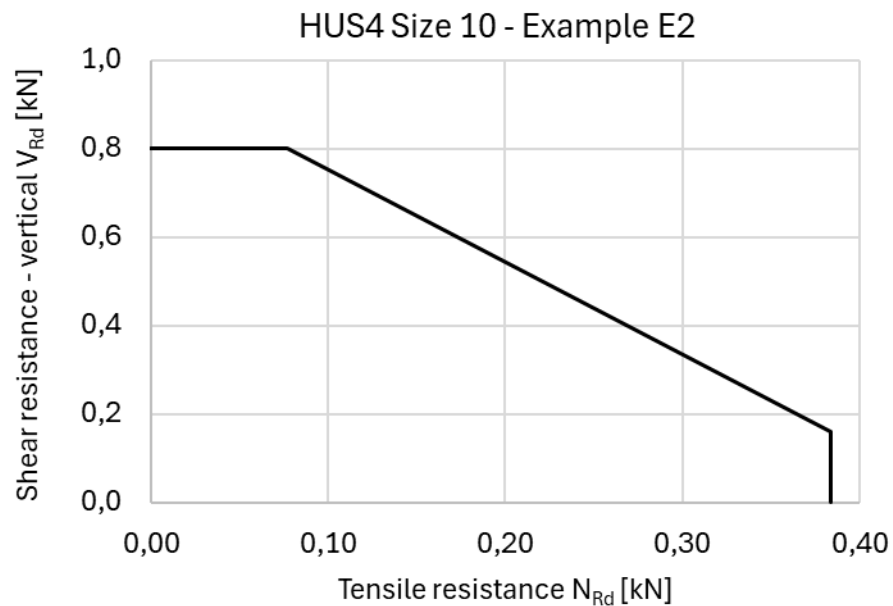


Figure 1: Autoclaved aerated concrete brick, single anchor, example E2

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $240,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, 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: 1
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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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{nom} = 60 \text{ mm}$ 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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), $L \times W \times H: \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b,mean} \geq 6 \text{ N/mm}^2$, bulk density $\rho \geq 0,65 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ 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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher

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

**Example calculation for the following conditions (10-2025)**

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E3 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E3 Page: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
0,900	0,73	2,0	0,329

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,73
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
0,900	0,657	≥ 90	90	2,0	0,329

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E3 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 6,0 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E3 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{\parallel} [\text{mm}]$	$c_{min,ETA\parallel} [\text{mm}]$	$V_{Rk,b,ETA\parallel} [\text{kN}]$	$V_{Rk,b\parallel} [\text{kN}]$	$V_{Rd,b\parallel} [\text{kN}]$	
≥ 90	90	1,800	1,800	0,900	

3.3 Brick edge failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{\parallel} [\text{mm}]$	$c_{min,ETA\parallel} [\text{mm}]$	$V_{Rk,c,ETA\parallel} [\text{kN}]$	$V_{Rk,c\parallel} [\text{kN}]$	$V_{Rd,c\parallel} [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E3 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,066	0,900

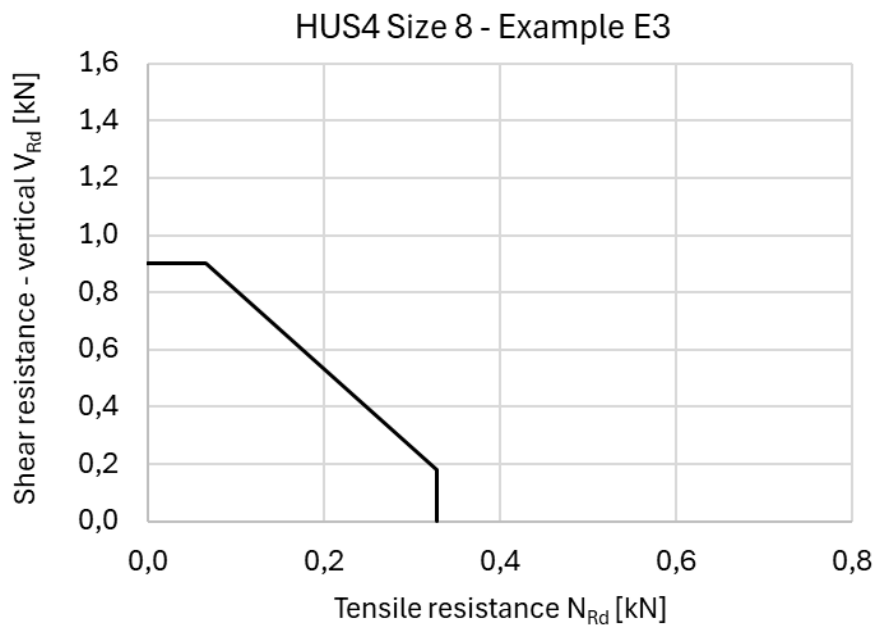


Figure 1: Autoclaved aerated concrete brick, single anchor, example E3

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	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_j) 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 $12,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
Hole diameter in the base material: $8,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $240,0 \text{ mm}$
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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	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 HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{nom} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{nom} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material: Wall layout:	Autoclaved aerated concrete brick (AAC), $L \times W \times H: \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b,mean} \geq 6 \text{ N/mm}^2$, bulk density $\rho \geq 0,65 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
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 $+80^\circ\text{C}$ 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 setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher

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

**Example calculation for the following conditions (10-2025)**

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E4 Page: 2

2 Tension load (EOTA TR 054, Section 4.2)**Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$, 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

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b,mean} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E4 Page: 3

Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
1,400	0,96	2,0	0,672

2.3 Brick breakout

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
-	≥ 40	-	40	1,0	0,96
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
1,400	1,344	≥ 90	90	2,0	0,672

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E4 Page: 4

3 Shear load (EOTA TR 054, Section 4.3)**Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}$, 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

* 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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E4 Page: 5

Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{\parallel} [\text{mm}]$	$c_{\text{min},ETA\parallel} [\text{mm}]$	$V_{Rk,b,ETA\parallel} [\text{kN}]$	$V_{Rk,b\parallel} [\text{kN}]$	$V_{Rd,b\parallel} [\text{kN}]$	
≥ 90	90	2,800	2,800	1,400	

3.3 Brick edge failure

$s_{\parallel} [\text{mm}]$	$c_{j\parallel} [\text{mm}]$	$s_{ETA,\parallel} [\text{mm}]$	$c_{ETA,j\parallel} [\text{mm}]$	$\alpha_{g,V\parallel} [-]$	$\alpha_{j,V\parallel} [-]$
-	≥ 40	-	40	1,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V\parallel} [\text{mm}]$	$\psi_{g,V\parallel} [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{\parallel} [\text{mm}]$	$c_{\text{min},ETA\parallel} [\text{mm}]$	$V_{Rk,c,ETA\parallel} [\text{kN}]$	$V_{Rk,c\parallel} [\text{kN}]$	$V_{Rd,c\parallel} [\text{kN}]$	
≥ 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!

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E4 Page: 6

4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,134	1,400

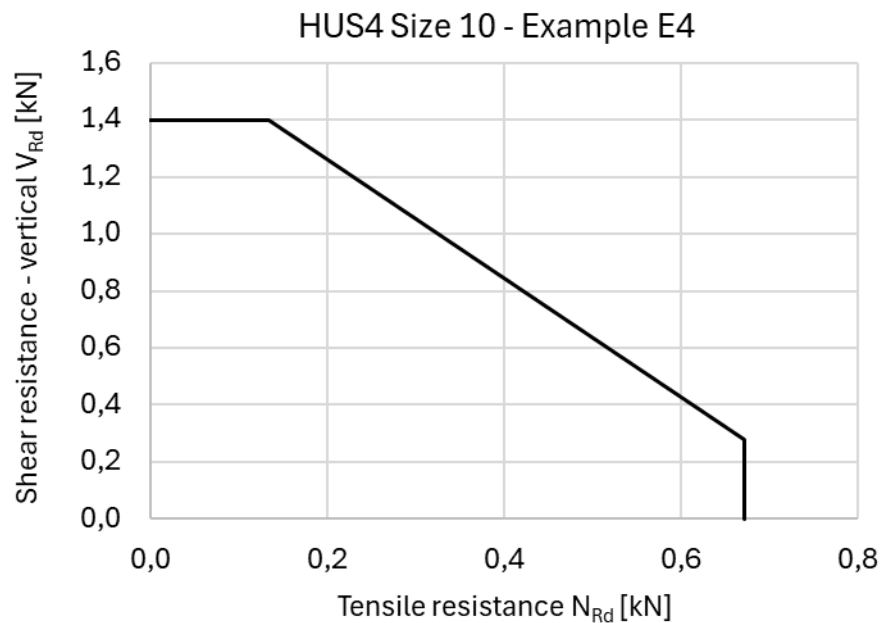


Figure 1: Autoclaved aerated concrete brick, single anchor, example E4

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	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_j) 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 $14,0 \text{ mm}$ (through setting)
Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
Hole diameter in the base material: $10,0 \text{ mm}$
Recommended plate thickness: not calculated
Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
Drilling method: Drilled in hammer mode
Minimum thickness of the base material: $240,0 \text{ mm}$
Cleaning: manual
Fastening option: Through fastening
Installation per ETA-23/0936

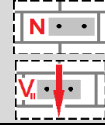
7 Remarks; Your Cooperation Duties

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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
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: 1



1 Input data



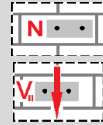
Anchor type and diameter:	HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Autoclaved aerated concrete brick (AAC), $L \times W \times H: \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, bulk density $\rho \geq 0,55 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
Wall layout:	
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher
No setting in cut bricks with reduced horizontal bearing area	

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, vertical joints filled or not filled

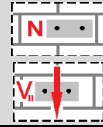
	Capacity [kN]
Steel Strength*	24,000
Pullout Strength*	0,183
Brick breakout**	0,338
Pull-out of one brick**	8,982

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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



Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
0,500	0,73	2,0	0,183

2.3 Brick breakout

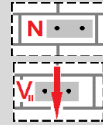
$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
80	≥ 40	-	40	1,85	0,73
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
0,500	0,675	≥ 90	90	2,0	0,338

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E5 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}$, 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

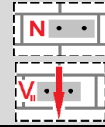
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b,mean} \geq 4 \text{ N/mm}^2$
 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: 5



Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} \text{ [kN]}$	$\gamma_{Ms} \text{ [-]}$	$V_{Rd,s} \text{ [kN]}$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{, } \text{ [mm]}$	$CETA_{,j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{,\perp} \text{ [mm]}$	$CETA_{,j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } \text{ [mm]}$	$c_{min,ETA } \text{ [mm]}$	$V_{Rk,b,ETA } \text{ [kN]}$	$V_{Rk,b } \text{ [kN]}$	$V_{Rd,b } \text{ [kN]}$	
≥ 90	90	1,000	2,000	1,000	

3.3 Brick edge failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{, } \text{ [mm]}$	$CETA_{,j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{,\perp} \text{ [mm]}$	$CETA_{,j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } \text{ [mm]}$	$c_{min,ETA } \text{ [mm]}$	$V_{Rk,c,ETA } \text{ [kN]}$	$V_{Rk,c } \text{ [kN]}$	$V_{Rd,c } \text{ [kN]}$	
≥ 90	90	1,000	2,000	1,000	

3.4 Pushing out of one brick

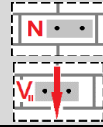
N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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: 6


4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,068	1,000

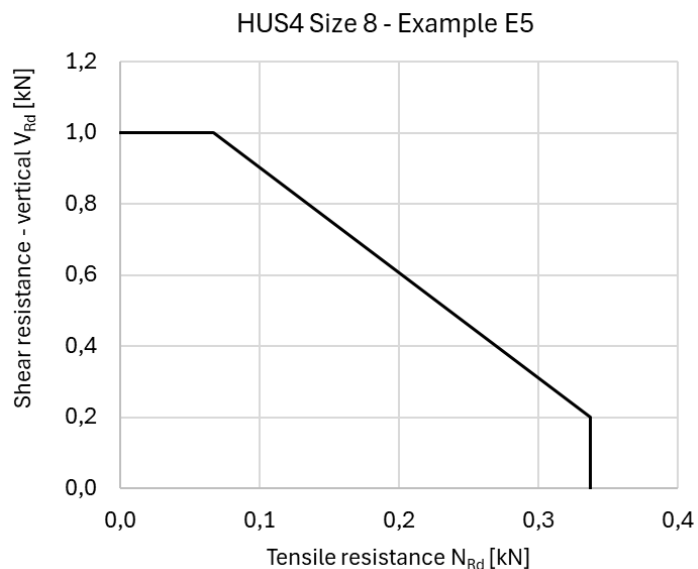
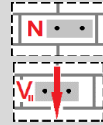


Figure 1: Autoclaved aerated concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E5

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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: 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_j) 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 $12,0 \text{ mm}$ (through setting)
 Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
 Hole diameter in the base material: $8,0 \text{ mm}$
 Recommended plate thickness: not calculated
 Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
 Drilling method: Drilled in hammer mode
 Minimum thickness of the base material: $240,0 \text{ mm}$
 Cleaning: manual
 Fastening option: Through fastening
 Installation per ETA-23/0936

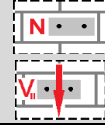
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Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
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 E6 Page: 1



1 Input data



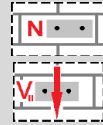
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Autoclaved aerated concrete brick (AAC), $L \times W \times H \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, bulk density $\rho \geq 0,55 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
Wall layout:	
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher
No setting in cut bricks with reduced horizontal bearing area	

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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 E6 Page: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, vertical joints filled or not filled

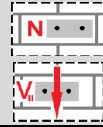
	Capacity [kN]
Steel Strength*	36,667
Pullout Strength*	0,384
Brick breakout**	0,768
Pull-out of one brick**	8,982

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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 E6 Page: 3



Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
0,800	0,96	2,0	0,384

2.3 Brick breakout

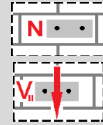
$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
80	≥ 40	-	40	2,0	0,96
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$c_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
0,800	1,536	≥ 90	90	2,0	0,768

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E6 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}$, 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

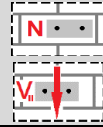
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b,mean} \geq 4 \text{ N/mm}^2$
 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 E6 Page: 5



Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} \text{ [kN]}$	$\gamma_{Ms} \text{ [-]}$	$V_{Rd,s} \text{ [kN]}$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{j } \text{ [mm]}$	$CETA_{j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{j\perp} \text{ [mm]}$	$CETA_{j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } \text{ [mm]}$	$c_{min,ETA } \text{ [mm]}$	$V_{Rk,b,ETA } \text{ [kN]}$	$V_{Rk,b } \text{ [kN]}$	$V_{Rd,b } \text{ [kN]}$	
≥ 90	90	1,600	3,200	1,600	

3.3 Brick edge failure

$s_{ } \text{ [mm]}$	$c_{j } \text{ [mm]}$	$SETA_{j } \text{ [mm]}$	$CETA_{j } \text{ [mm]}$	$\alpha_{g,V } \text{ [-]}$	$\alpha_{j,V } \text{ [-]}$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} \text{ [mm]}$	$c_{j\perp} \text{ [mm]}$	$SETA_{j\perp} \text{ [mm]}$	$CETA_{j\perp} \text{ [mm]}$	$\alpha_{g,N\perp} \text{ [-]}$	$\alpha_{j,V\perp} \text{ [-]}$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } \text{ [mm]}$	$\psi_{g,V } \text{ [-]}$	$e_{c,V\perp} \text{ [mm]}$	$\psi_{g,V\perp} \text{ [-]}$	$\gamma_{Mm} \text{ [-]}$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } \text{ [mm]}$	$c_{min,ETA } \text{ [mm]}$	$V_{Rk,c,ETA } \text{ [kN]}$	$V_{Rk,c } \text{ [kN]}$	$V_{Rd,c } \text{ [kN]}$	
≥ 90	90	1,600	3,200	1,600	

3.4 Pushing out of one brick

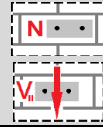
N/A for $V_{Rk,pb\perp}$ Not checked for $V_{Rk,pb||}$, vertical restraint assumed.

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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)
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4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$, 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

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

N_{Rd} [kN]	V_{Rd} [kN]
0,154	1,600

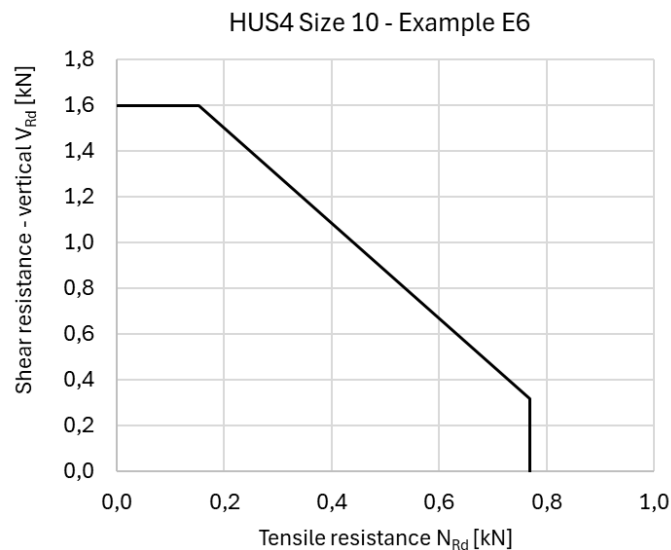
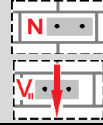


Figure 1: Autoclaved aerated concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E6

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 4 \text{ N/mm}^2$
 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 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_j) 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 $14,0 \text{ mm}$ (through setting)
 Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
 Hole diameter in the base material: $10,0 \text{ mm}$
 Recommended plate thickness: not calculated
 Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
 Drilling method: Drilled in hammer mode
 Minimum thickness of the base material: $240,0 \text{ mm}$
 Cleaning: manual
 Fastening option: Through fastening
 Installation per ETA-23/0936

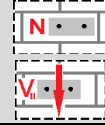
7 Remarks; Your Cooperation Duties

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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
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



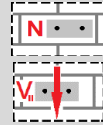
Anchor type and diameter:	HUS4 Size 8 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 8, nominal embedment depth $h_{\text{nom}} = 60 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 60 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Autoclaved aerated concrete brick (AAC), $L \times W \times H: \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$, bulk density $\rho \geq 0,65 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
Wall layout:	
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 90 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher
No setting in cut bricks with reduced horizontal bearing area	

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$, vertical joints filled or not filled

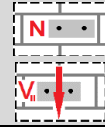
	Capacity [kN]
Steel Strength*	24,000
Pullout Strength*	0,329
Brick breakout**	0,608
Pull-out of one brick**	8,982

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 No compression on wall $\sigma = 0,0 \text{ N/mm}^2$

Anchor type: HUS4 Size 8
 Design: TR 054 July 2022
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 Example E7 Page: 3



Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
36,000	1,5	24,000

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
0,900	0,73	2,0	0,329

2.3 Brick breakout

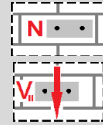
$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$SETA_{j } [\text{mm}]$	$C_{ETA,j } [\text{mm}]$	$\alpha_{g,N } [-]$	$\alpha_{j,N} [-]$
80	≥ 40	-	40	1,85	0,73
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$SETA_{j\perp} [\text{mm}]$	$C_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N ,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
0,900	1,215	≥ 90	90	2,0	0,608

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 8
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E7 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 6,0 \text{ N/mm}$, 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

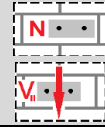
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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: 5



Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
18,800	1,25	15,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	1,800	3,600	1,800	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 90	90	1,800	3,600	1,800	

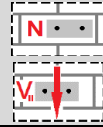
3.4 Pushing out of one brick

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}$, 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]
0,608	0,360

4.2 Maximum shear load

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

N_{Rd} [kN]	V_{Rd} [kN]
0,122	1,800

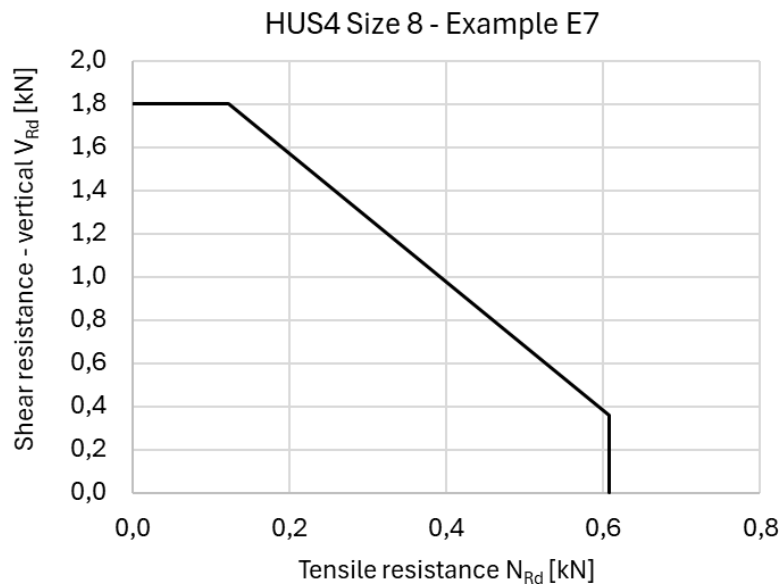
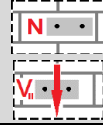


Figure 1: Autoclaved aerated concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E7

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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_j) 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 $12,0 \text{ mm}$ (through setting)
 Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 10
 Hole diameter in the base material: $8,0 \text{ mm}$
 Recommended plate thickness: not calculated
 Hole depth in the base material: $70,0 \text{ mm}$ (cleaned hole)
 Drilling method: Drilled in hammer mode
 Minimum thickness of the base material: $240,0 \text{ mm}$
 Cleaning: manual
 Fastening option: Through fastening
 Installation per ETA-23/0936

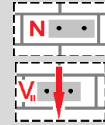
7 Remarks; Your Cooperation Duties

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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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



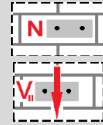
Anchor type and diameter:	HUS4 Size 10 HUS4-H hexagon head configuration, carbon steel galvanized HUS4-HF hexagon head configuration, carbon steel multilayer coating HUS4-C countersunk head configuration, carbon steel galvanized
Specification text:	Hilti HUS4 Size 10, nominal embedment depth $h_{\text{nom}} = 75 \text{ mm}$ Galvanized steel, hammer drilled, installation per ETA 23/0936
Embedment depth:	$h_{\text{nom}} = 75 \text{ mm}$
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:	$e_b = 0 \text{ mm}$ (no stand off)
Base material:	Autoclaved aerated concrete brick (AAC), $L \times W \times H: \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$ Compressive strength: $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$, bulk density $\rho \geq 0,65 \text{ kg/dm}^3$ 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, $\sigma = 0,0 \text{ N/mm}^2$
Wall layout:	
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 $+80^\circ\text{C}$ Anchorage subject to static or quasi-static loading
Geometry	
Spacing	$s_{\parallel} = 80 \text{ mm}$, horizontal spacing
Minimum anchor distance to wall edge:	$c_{\text{min}} = 1,5 \cdot h_{\text{nom}} = 112,5 \text{ mm}$
Minimum anchor distance to joints:	$c_{\perp} \geq c_{j\perp} = 20 \text{ mm}$ and $c_{\parallel} \geq c_{j\parallel} = 40 \text{ mm}$ No setting near ($c_{\perp} < 20 \text{ mm}$ and $c_{\parallel} < 40 \text{ mm}$) or in joints! Stretcher
No setting in cut bricks with reduced horizontal bearing area	

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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: 2



2 Tension load (EOTA TR 054, Section 4.2)

Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$, vertical joints filled or not filled

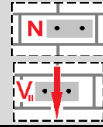
	Capacity [kN]
Steel Strength*	36,667
Pullout Strength*	0,672
Brick breakout**	1,344
Pull-out of one brick**	8,982

* highest loaded anchor ** anchor group (anchors in tension)

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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: 3



Tension load

2.1 Steel Strength

$N_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$N_{Rd,s} [\text{kN}]$
55,000	1,5	36,667

2.2 Pullout Strength

$N_{Rk,p,ETA} [\text{kN}]$	$\alpha_{j,N} [-]$	$\gamma_{Mm} [-]$	$N_{Rd,p} [\text{kN}]$
1,400	0,96	2,0	0,672

2.3 Brick breakout

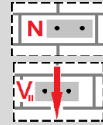
$s_{\parallel} [\text{mm}]$	$c_{\parallel} [\text{mm}]$	$SETA_{\parallel} [\text{mm}]$	$C_{ETA,j,\parallel} [\text{mm}]$	$\alpha_{g,N\parallel} [-]$	$\alpha_{j,N} [-]$
80	≥ 40	-	40	2,0	0,96
$s_{\perp} [\text{mm}]$	$c_{\perp} [\text{mm}]$	$SETA_{\perp} [\text{mm}]$	$C_{ETA,j,\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$e_{c,N\parallel,\perp} [\text{mm}]$
-	≥ 20	-	20	1,0	0,0
$N_{Rk,b,ETA} [\text{kN}]$	$N_{Rk,b} [\text{kN}]$	$c [\text{mm}]$	$C_{min,ETA} [\text{mm}]$	$\gamma_{Mm} [-]$	$N_{Rd,b} [\text{kN}]$
1,400	2,688	≥ 90	90	2,0	1,344

2.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vk0} [N/mm ²]	σ_d [N/mm ²]
239 520	0	0,15	0,00
$N_{Rk,pb}$ [kN]	γ_{Mm} [-]	$N_{Rd,pb}$ [kN]	
17,964	2,0	8,982	

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick	Anchor type: HUS4 Size 10
$l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick	Design: TR 054 July 2022
Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$	ETA 23/0936 (13.05.2025)
No compression on wall $\sigma = 0,0 \text{ N/mm}^2$	Example E8 Page: 4



3 Shear load (EOTA TR 054, Section 4.3)

Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}$, 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

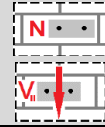
* highest loaded anchor ** anchor group (relevant anchors)

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.

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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: 5



Shear load

3.1 Steel Strength (without lever arm)

$V_{Rk,s,ETA} [\text{kN}]$	$\gamma_{Ms} [-]$	$V_{Rd,s} [\text{kN}]$
28,800	1,25	23,040

3.2 Local brick failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,b,ETA } [\text{kN}]$	$V_{Rk,b } [\text{kN}]$	$V_{Rd,b } [\text{kN}]$	
≥ 90	90	2,800	5,600	2,800	

3.3 Brick edge failure

$s_{ } [\text{mm}]$	$c_{j } [\text{mm}]$	$s_{ETA, } [\text{mm}]$	$c_{ETA,j } [\text{mm}]$	$\alpha_{g,V } [-]$	$\alpha_{j,V } [-]$
80	≥ 40	-	40	2,0	1,0
$s_{\perp} [\text{mm}]$	$c_{j\perp} [\text{mm}]$	$s_{ETA,\perp} [\text{mm}]$	$c_{ETA,j\perp} [\text{mm}]$	$\alpha_{g,N\perp} [-]$	$\alpha_{j,V\perp} [-]$
-	≥ 20	-	20	1,0	1,0
$e_{c,V } [\text{mm}]$	$\psi_{g,V } [-]$	$e_{c,V\perp} [\text{mm}]$	$\psi_{g,V\perp} [-]$	$\gamma_{Mm} [-]$	
0,0	1,000	0,0	1,000	2,0	
$c_{ } [\text{mm}]$	$c_{min,ETA } [\text{mm}]$	$V_{Rk,c,ETA } [\text{kN}]$	$V_{Rk,c } [\text{kN}]$	$V_{Rd,c } [\text{kN}]$	
≥ 90	90	2,800	5,600	2,800	

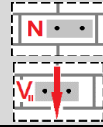
3.4 Pushing out of one brick

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

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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: 6


4 Combined tension and shear loads (EOTA TR 054, Section 4.4) $\beta_N + \beta_V \leq 1,2$

Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}$, 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 [-]	β_V [-]	α [-]	Status
0,2	1,0	1,00	OK

N_{Rd} [kN]	V_{Rd} [kN]
0,269	2,800

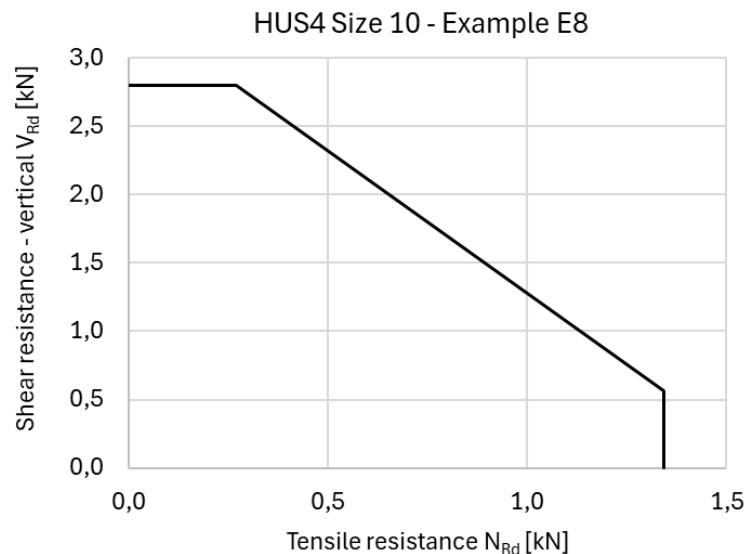
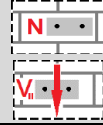


Figure 1: Autoclaved aerated concrete brick, 2 anchors, $s_{||} = 80 \text{ mm}$, example E8

Example calculation for the following conditions (10-2025)

Base material: autoclaved aerated concrete brick
 $l \times b \times h \geq 499 \text{ mm} \times 240 \text{ mm} \times 249 \text{ mm}$, solid brick
 Brick strength $f_{b, \text{mean}} \geq 6 \text{ N/mm}^2$
 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: 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_j) 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 $14,0 \text{ mm}$ (through setting)
 Setting tool: Screwdriver and power limitation SF 6H-A-22 Gear 2 / 15
 Hole diameter in the base material: $10,0 \text{ mm}$
 Recommended plate thickness: not calculated
 Hole depth in the base material: $85,0 \text{ mm}$ (cleaned hole)
 Drilling method: Drilled in hammer mode
 Minimum thickness of the base material: $240,0 \text{ mm}$
 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.