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Company: RVint Engineering Ltd.
 Address: 23 Nunnery Lane, YO23 1AB, York
 Phone | Fax: 01904636494 |
 Design: Fulford Bronte Pull Out
 Fastening Point:

Page: 1
 Specifier: Andrew Milner
 E-Mail: andrew@rvengineering.co.uk
 Date: 03/08/2022

Specifier's comments:

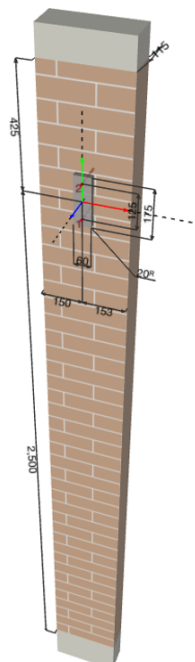
1 Input data



Anchor type and size:	HIT-HY 270 + HAS-U 8.8 HDG M8
Item number:	2223947 HAS-U 8.8 HDG M8x150 (insert) / 2092828 HIT-HY 270 (mortar)
Effective embedment depth:	$h_{ef,opti} = 80.0 \text{ mm}$ ($h_{ef,limit} = 85.0 \text{ mm}$)
Material:	8.8
Approval No.:	ETA-19/0160
Issued Valid:	30/08/2019 -
Proof:	Design Method EOTA TR054
Stand-off installation:	$e_b = 0.0 \text{ mm}$ (no stand-off); $t = 20.0 \text{ mm}$
Baseplate ^R :	$l_x \times l_y \times t = 60.0 \text{ mm} \times 175.0 \text{ mm} \times 20.0 \text{ mm}$; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	Brick layout: Stretcher; Brick: Mz, NF, $f=20$ (solid brick), Clay, L x W x H: 240.0 mm x 115.0 mm x 72.0 mm; $f_{b,v} = 20.00 \text{ N/mm}^2$; $E_{wall} = 4,478.00 \text{ N/mm}^2$ Mortar: M2,5 - M9; Vertical joints filled: YES; vertical: 5.0 mm; horizontal: 5.0 mm
Installation/Use:	Installation condition: wet; Use condition: wet; Cleaning: compressed air Temp. short/long: 40/24 °C

^R - The anchor calculation is based on a rigid baseplate assumption.

Geometry [mm]

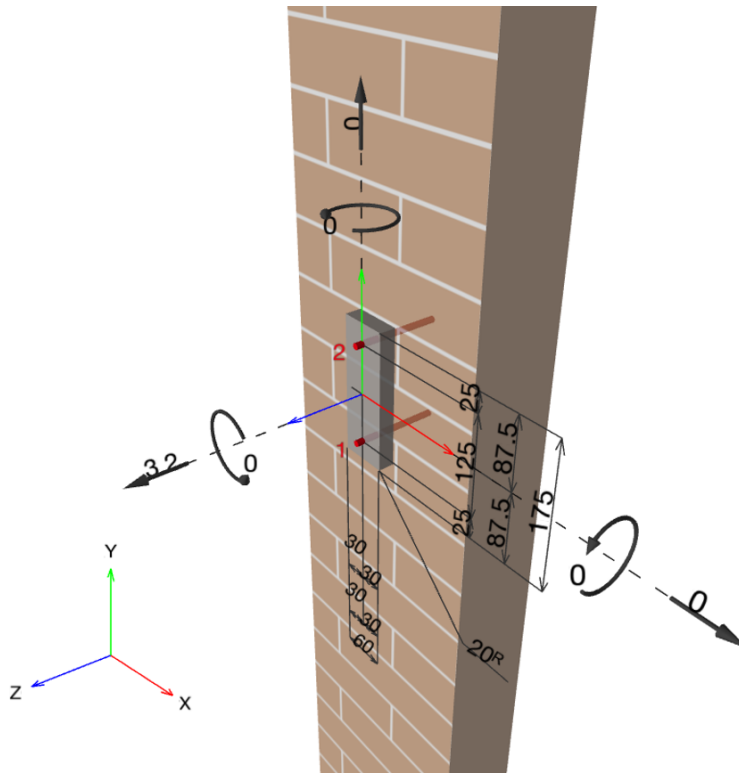


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Geometry [mm] & Loading [kN, kNm]



1.1 Load combination

Case	Description	Forces [kN] / Moments [kNm]	Seismic	Fire	Max. Util. Anchor [%]
1	Load case: Design loads	N = 3.200; V _x = 0.000; V _y = 0.000; M _x = 0.000; M _y = 0.000; M _z = 0.000;	no	no	100

2 Load case/Resulting anchor forces

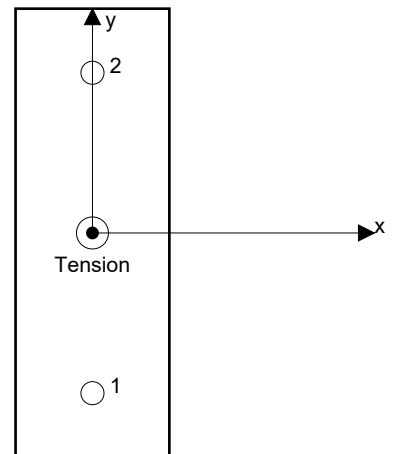
Anchor reactions [kN]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	1.600	0.000	0.000	0.000
2	1.600	0.000	0.000	0.000

max. compressive strain: - [%]
 max. compressive stress: - [N/mm²]
 resulting tension force in (x/y)=(0.0/0.0): 3.200 [kN]
 resulting compression force in (x/y)=(0.0/0.0): 0.000 [kN]

Anchor forces are calculated based on the assumption of a rigid baseplate.



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3 Tension load (EOTA TR054, Section 4.2.1)

	Load [kN]	Capacity [kN]	Utilization β_N [%]	Status
Steel failure*	1.600	19.533	9	OK
Pull-out failure*	1.600	1.600	100	OK
Brick breakout**	3.200	3.200	100	OK
Pullout of one brick**	1.600	34.873	5	OK

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

3.1 Steel failure

$N_{Rk,s}$ [kN]	$\gamma_{M,s}$	$N_{Rd,s}$ [kN]	N_{Sd} [kN]	A-ID
29.300	1.500	19.533	1.600	2

3.2 Pull-out failure

$N_{Rk,p}$ [kN]	α_j	$\gamma_{M,m}$	$N_{Rd,p}$ [kN]	N_{Sd} [kN]	A-ID
4.000	1.000	2.500	1.600	1.600	1

3.3 Brick breakout

$s_{ }$ [mm]	$c_{ }$ [mm]	$s_{ETA, }$ [mm]	$c_{ETA, }$ [mm]	$\alpha_{g,N, }$	$e_{c,N, }$ [mm]	$\psi_{g,N, }$
0.0	0.0	0.0	0.0	1.000	0.0	1.000
s_{\perp} [mm]	c_{\perp} [mm]	$s_{ETA,\perp}$ [mm]	$c_{ETA,\perp}$ [mm]	$\alpha_{g,N,\perp}$	$e_{c,N,\perp}$ [mm]	$\psi_{g,N,\perp}$
125.0	150.0	115.0	115.0	2.000	0.0	1.000
$N_{Rk,b,ETA}$ [kN]	$N_{Rk,b}$ [kN]	c_j [mm]	$c_{j,min,ETA}$ [mm]	α_j		
4.000	8.000	30.5	50.0	1.000		
$\gamma_{M,m}$	$N_{Rd,b}$ [kN]	N_{Sd} [kN]				
2.500	3.200	3.200				

3.4 Pullout of one brick

A_{act}^H [mm ²]	A_{act}^V [mm ²]	f_{vko} [N/mm ²]	σ_d [N/mm ²]
41,515	0	0.20	5.00
$N_{Rk,pb}$ [kN]	$\gamma_{M,m}$	$N_{Rd,pb}$ [kN]	N_{Sd} [kN]
87.181	2.500	34.873	1.600

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4 Shear load (EOTA TR054, Section 4.2.2)

	Load [kN]	Capacity [kN]	Utilization β_v [%]	Status
Steel failure (without lever arm)*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Local brick failure*	N/A	N/A	N/A	N/A
Brick edge failure in direction **	N/A	N/A	N/A	N/A
Pushing out of one brick in direction **	N/A	N/A	N/A	N/A

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

5 Warnings

- The anchor design methods in PROFIS Engineering require rigid baseplates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the baseplate are not considered - the baseplate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required baseplate thickness with CBFEM to limit the stress of the baseplate based on the assumptions explained above. The proof if the rigid baseplate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Only the local load transfer from the anchor(s) to the wall is considered, a further load transfer in the wall is not covered by PROFIS!
- Wall is assumed as being perfectly aligned vertically – checking required(!): Noncompliance can lead to significantly different distribution of forces and higher tension loads than those calculated by PROFIS. Masonry wall must not have any damages (neither visible nor not visible)! While installation, the positioning of the anchors needs to be maintained as in the design phase i.e. either relative to the brick or relative to the mortar joints.
- The effect of the joints on the compressive stress distribution on the plate / bricks was not taken into consideration.
- If no significant resistance is felt over the entire depth of the hole when drilling (e.g. in unfilled butt joints), the anchor should not be set at this position or the area should be assessed and reinforced. Hilti recommends the anchoring in masonry always with sieve sleeve. Anchors can only be installed without sieve sleeves in solid bricks when it is guaranteed that it has not any hole or void.
- The accessories and installation remarks listed on 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.
- The compliance with current standards (e.g. EOTA TR054, EOTA TR053) is the responsibility of the user.
- The Young's modulus of the wall E_{wall} (not plastered!) is determined in accordance to EN 1996-1-1:2012
- Drilling method (hammer, rotary) to be in accordance with the approval!
- Masonry needs to be built in a regular way in accordance with state-of-the-art guidelines!
- Please note that, for ETA approved masonry units, the resistance and parameters are only valid for that particular brick (hollow/solid) or for bricks of the same base material with larger size and larger compressive strength (solid), according to EOTA TR054.

Fastening meets the design criteria!

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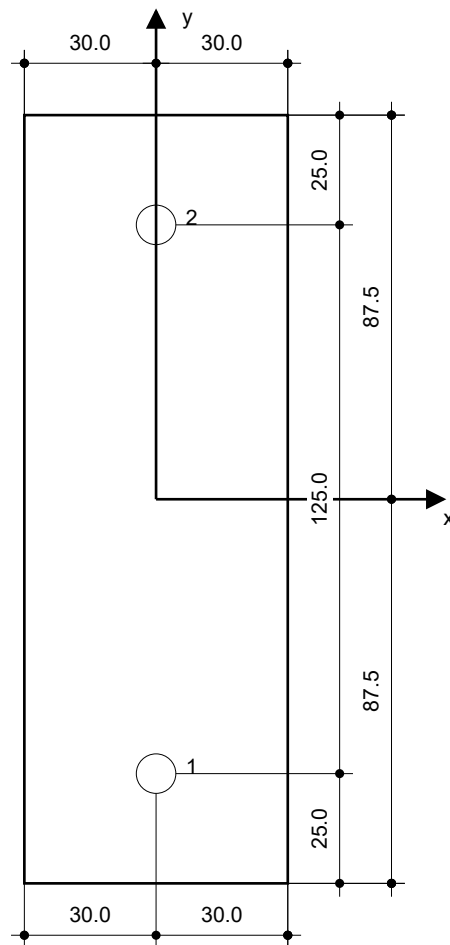
6 Installation data

Baseplate, steel: S 235; $E = 210,000.00 \text{ N/mm}^2$; $f_{yk} = 235.00 \text{ N/mm}^2$
 Profile: no profile

Hole diameter in the fixture: $d_f = 9.0 \text{ mm}$
 Plate thickness (input): 20.0 mm
 Recommended plate thickness: not calculated
 Drilling method: Drilled in hammer mode
 Cleaning: compressed air
 Fastening option: Pre-fastening

Anchor type and size: HIT-HY 270 + HAS-U 8.8 HDG M8
 Item number: 2223947 HAS-U 8.8 HDG M8x150 (insert) / 2092828 HIT-HY 270 (mortar)
 Maximum installation torque: 5 Nm
 Hole diameter in the base material: 10.0 mm
 Hole depth in the base material: 80.0 mm
 Minimum thickness of the base material: 110.0 mm

Hilti HAS-U threaded rod with HIT-HY 270 injection mortar with 80 mm embedment h_{ef} , M8, Hot dip galvanized, Hammer drilling installation per ETA-19/0160



Coordinates Anchor [mm]

Anchor	x	y	c_x	c_{+x}	c_y	c_{+y}
1	0.0	-62.5	150.0	153.0	2,437.5	487.5
2	0.0	62.5	150.0	153.0	2,562.5	362.5



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7 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software 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. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, 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 Software 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.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.