www.hilti.pl

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Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	C30/37 - 800x600mm - M30 2x5 - 700kN	Date:	04.02.2022
Fastening Point:			

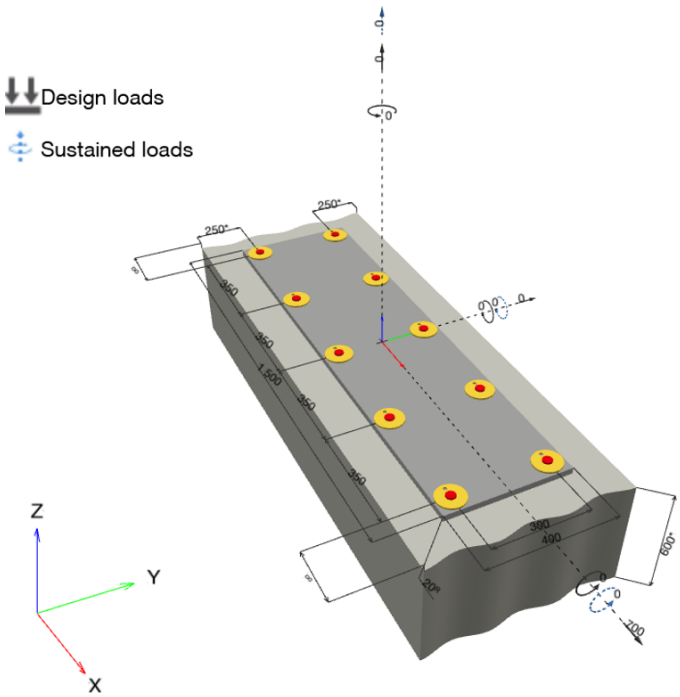
Specifier's comments:

1 Input data

Anchor type and size:	**HIT-HY 200-A + HIT-V (5.8) M30**
Return period (service life in years):	50
Item number:	not available
Hilti Filling Set or any suitable annular gap filling solution	
Effective embedment depth:	$h_{ef,act}$ = 160.0 mm ($h_{ef,limit}$ = - mm)
Material:	5.8
Approval No.:	ETA 11/0493
Issued I Valid:	14.12.2020 | -
Proof:	Engineering judgement SOFA BOND - based on ETAG BOND testing
Stand-off installation:	e_b = 0.0 mm (no stand-off); t = 20.0 mm
Baseplate[R] :	l_x x l_y x t = 1,500.0 mm x 400.0 mm x 20.0 mm; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	cracked concrete, C30/37, $f_{c,cube}$ = 37.00 N/mm^2; h = 600.0 mm, Temp. short/long: 0/0 °C
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	No reinforcement or Reinforcement spacing >= 150 mm (any Ø) or >= 100 mm (Ø <= 10 mm) no longitudinal edge reinforcement

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

Geometry [mm] & Loading [kN, kNm]



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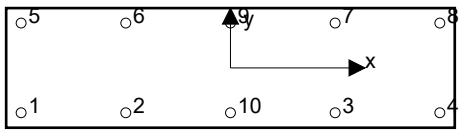
1.1 Load combination

Case	Description	Forces [kN] / Moments [kNm]	Seismic	Fire	Max. Util. Anchor [%]
1	Kombinacja 1	N = 0.000; V_x = 700.000; V_y = 0.000; M_x = 0.000; M_y = 0.000; M_z = 0.000;	no	no	98

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	0.000	70.000	70.000	0.000
2	0.000	70.000	70.000	0.000
3	0.000	70.000	70.000	0.000
4	0.000	70.000	70.000	0.000
5	0.000	70.000	70.000	0.000
6	0.000	70.000	70.000	0.000
7	0.000	70.000	70.000	0.000
8	0.000	70.000	70.000	0.000
9	0.000	70.000	70.000	0.000
10	0.000	70.000	70.000	0.000



max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [N/mm^2]
resulting tension force in (x/y)=(0.0/0.0): 0.000 [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 TR 029, Section 5.2.2)

	Load [kN]	Capacity [kN]	Utilization β_N [%]	Status
Steel failure*	N/A	N/A	N/A	N/A
Concrete Breakout failure**	N/A	N/A	N/A	N/A
Splitting failure**	N/A	N/A	N/A	N/A

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

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4 Shear load (EOTA TR 029, Section 5.2.3)

	Load [kN]	Capacity [kN]	Utilization β_V [%]	Status
Steel failure (without lever arm)*	70.000	112.240	63	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout failure**	700.000	752.180	94	OK
Concrete edge failure in direction y-**	350.000	357.347	98	OK

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

4.1 Steel failure (without lever arm)

$V_{Rk,s}$ [kN]	$\gamma_{M,s}$	$V_{Rd,s}$ [kN]	V_{Sd} [kN]
140.300	1.250	112.240	70.000

4.2 Pryout failure (concrete cone relevant)

$A_{c,N}$ [mm²]	$A^0_{c,N}$ [mm²]	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]	k-factor
1,466,400	230,400	240.0	480.0	2.000

$e_{c1,V}$ [mm]	$\Psi_{ec1,N}$	$e_{c2,V}$ [mm]	$\Psi_{ec2,N}$	$\Psi_{s,N}$	$\Psi_{re,N}$
0.0	1.000	0.0	1.000	1.000	1.000

$N^0_{Rk,c}$ [kN]	$\gamma_{M,c,p}$	$V_{Rd,cp}$ [kN]	V_{Sd} [kN]
88.637	1.500	752.180	700.000

Group anchor ID
1-10

4.3 Concrete edge failure in direction y-

l_f [mm]	d_{nom} [mm]	k_1	α	β
160.0	30.00	1.700	0.080	0.065

c_1 [mm]	$A_{c,V}$ [mm²]	$A^0_{c,V}$ [mm²]
250.0	806,250	281,250

$\Psi_{s,V}$	$\Psi_{h,V}$	$\Psi_{\alpha,V}$	$e_{c,V}$ [mm]	$\Psi_{ec,V}$	$\Psi_{re,V}$
1.000	1.000	2.500	0.0	1.000	1.000

$V^0_{Rk,c}$ [kN]	$\gamma_{M,c}$	$V_{Rd,c}$ [kN]	V_{Sd} [kN]
74.794	1.500	357.347	350.000

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5 Displacements (highest loaded anchor)

Short term loading:

N_{Sk}	=	0.000 [kN]	δ_N	=	0.0000 [mm]
V_{Sk}	=	51.852 [kN]	δ_V	=	1.5556 [mm]
			δ_{NV}	=	1.5556 [mm]

Long term loading:

N_{Sk}	=	0.000 [kN]	δ_N	=	0.0000 [mm]
V_{Sk}	=	51.852 [kN]	δ_V	=	2.5926 [mm]
			δ_{NV}	=	2.5926 [mm]

Comments: Tension displacements are valid with half of the required installation torque moment for uncracked concrete! Shear displacements are valid without friction between the concrete and the baseplate! The gap due to the drilled hole and clearance hole tolerances are not included in this calculation!

The acceptable anchor displacements depend on the fastened construction and must be defined by the designer!

6 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!
- Checking the transfer of loads into the base material is required in accordance with EOTA TR 029, Section 7!
- The design is only valid if the clearance hole in the fixture is not larger than the value given in Table 4.1 of EOTA TR029! For larger diameters of the clearance hole see Chapter 1.1. of EOTA TR029!
- Your design has selected filled holes. Please ensure that there is a proper method to fill the annular gap between the fixture and HIT-HY 200-A + HIT-V (5.8) M30and contact Hilti in case of any questions.
- The accessory list in this report is 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.
- Drilled hole cleaning must be performed according to instructions for use (blow twice with oil-free compressed air (min. 6 bar), brush twice, blow twice with oil-free compressed air (min. 6 bar)).
- Characteristic bond resistances depend on short- and long-term temperatures.
- Please contact Hilti to check feasibility of HIT-V rod supply.
- The design method SOFA assumes that no hole clearance between the anchors and the fixture is present. This can be achieved by filling the gap with mortar of sufficient compressive strength (e.g. by using the HILTI Filling set) or by other suitable means
- The compliance with current standards (e.g. EN 1993, AS 4100:1998, etc.) is the responsibility of the user
- An SLS-check is not performed for SOFA and has to be provided by the user!
- The characteristic bond resistances depend on the return period (service life in years): 50

Fastening meets the design criteria!

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7 Installation data

Baseplate, steel: S 355; E = 210,000.00 N/mm^2; f_{yk} = 355.00 N/mm^2

Profile: no profile

Hole diameter in the fixture: d_f = 33.0 mm

Plate thickness (input): 20.0 mm

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

Anchor type and size: HIT-HY 200-A + HIT-V (5.8) M30

Item number: not available

Maximum installation torque: 300 Nm

Hole diameter in the base material: 35.0 mm

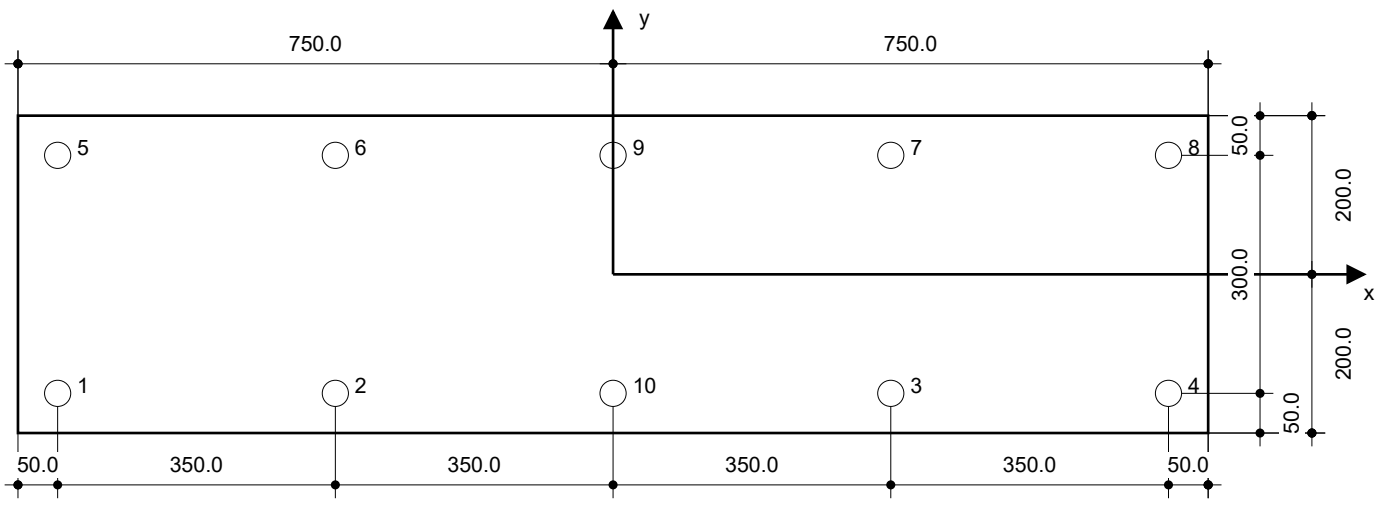
Hole depth in the base material: 160.0 mm

Minimum thickness of the base material: 230.0 mm

Hilti HIT-V threaded rod with HIT-HY 200 injection mortar with 160 mm embedment h_ef, M30, Steel galvanized, Hammer drilling installation per ETA 11/0493, with annular gaps filled with Hilti Filling Set or any suitable gap solutions

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Compressed air with required accessories to blow from the bottom of the hole • Proper diameter wire brush	• Dispenser including cassette and mixer • Hilti Filling Set • Torque wrench



Coordinates Anchor [mm]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-700.0	-150.0	-	-	250.0	550.0
2	-350.0	-150.0	-	-	250.0	550.0
3	350.0	-150.0	-	-	250.0	550.0
4	700.0	-150.0	-	-	250.0	550.0
5	-700.0	150.0	-	-	550.0	250.0

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
6	-350.0	150.0	-	-	550.0	250.0
7	350.0	150.0	-	-	550.0	250.0
8	700.0	150.0	-	-	550.0	250.0
9	0.0	150.0	-	-	550.0	250.0
10	0.0	-150.0	-	-	250.0	550.0

8 Remarks; Your Cooperation Duties

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