

Company:
 Specifier:
 Address:
 Phone | Fax: - | -
 E-Mail:

Page: 1
 Project: PRILOGA D
 Sub-Project | Pos. No.: Momentni priključek
 Date: 10.9.2013

Specifier's comments:

1. Input data

Anchor type and diameter:

Effective embedment depth:

Material:

Evaluation Service Report:

Issued | Valid:

Proof:

Stand-off installation:

Anchor plate:

Profile

Base material:

Installation:

Reinforcement:

HIT-HY 200 + HIT-Z, M12

$h_{ef, opti} = 142 \text{ mm}$ ($h_{ef, limit} = 144 \text{ mm}$)

DIN EN ISO 4042

ETA 12/0006

15.3.2013 | 10.2.2017

design method SOFA design method + fib (07/2011) - after ETAG BOND testing

$e_o = 0 \text{ mm}$ (no stand-off); $t = 10 \text{ mm}$

$l_x \times l_y \times t = 250 \times 250 \times 10 \text{ mm}$ (Recommended plate thickness: not calculated)

Square hollow; ($L \times W \times T$) = $60 \text{ mm} \times 60 \text{ mm} \times 5 \text{ mm}$

cracked concrete, C20/25, $f_c = 20.00 \text{ N/mm}^2$; $h = 800 \text{ mm}$, Temp. short/long: 40/24°C

hammer drilled hole, installation condition: dry

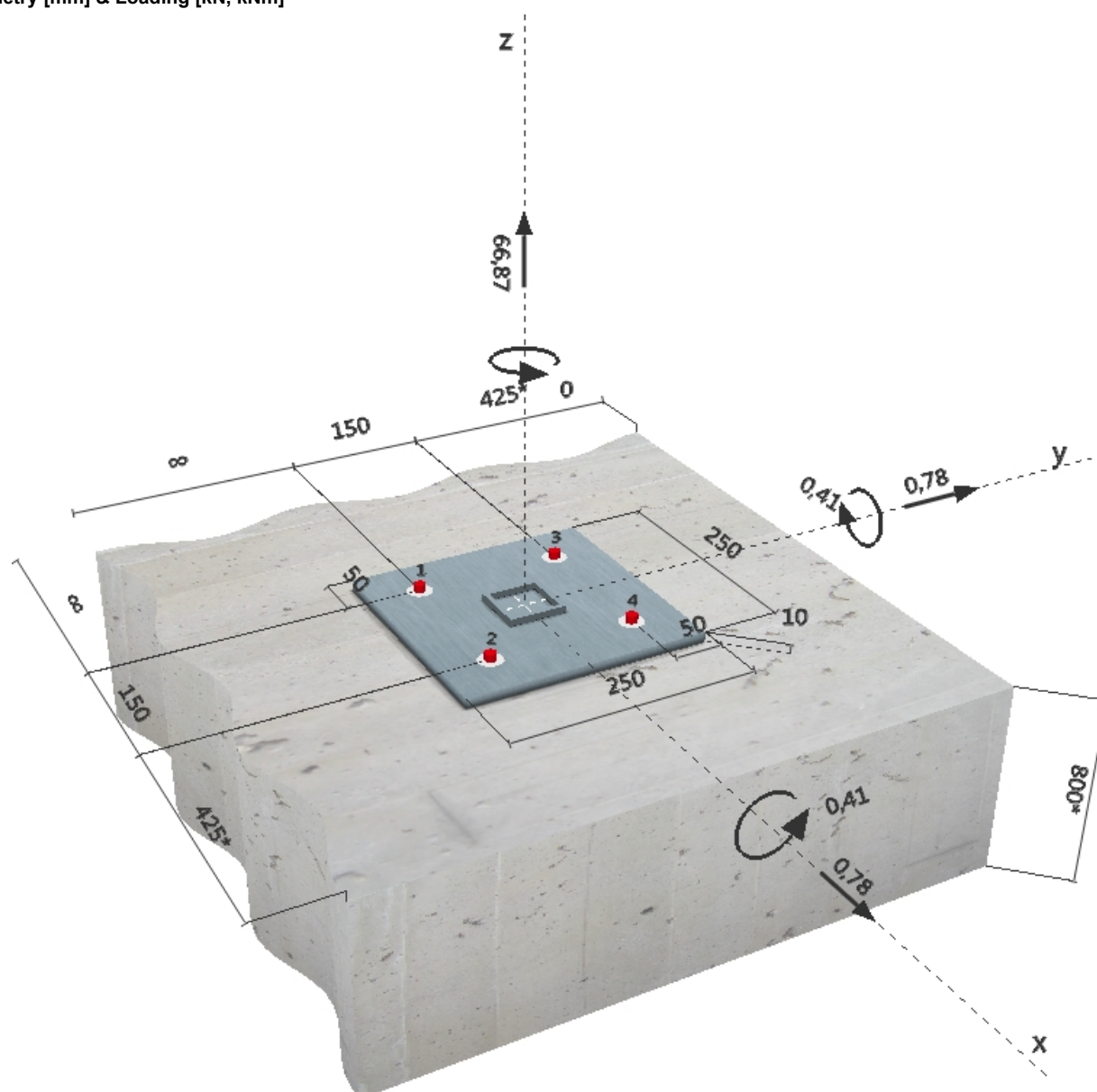
no reinforcement or reinforcement spacing $\geq 150 \text{ mm}$ (any \emptyset) or $\geq 100 \text{ mm}$ ($\emptyset \leq 10 \text{ mm}$)

no longitudinal edge reinforcement

Reinforcement to control splitting according to fib (07/2011), 16.1.5 present



Geometry [mm] & Loading [kN, kNm]



Company:
 Specifier:
 Address:
 Phone | Fax: - | -
 E-Mail:

Page: 2
 Project: PRILOGA D
 Sub-Project | Pos. No.: Momentni priključek
 Date: 10.9.2013

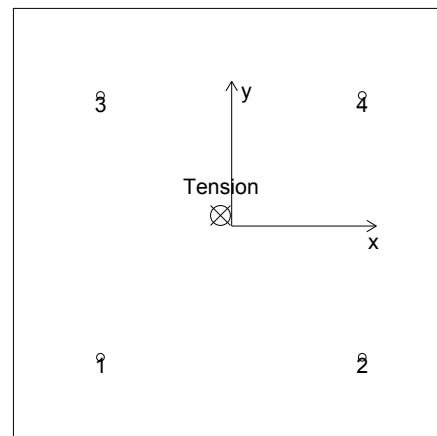
2. Load case/Resulting anchor forces

Load case (Design loads):

Anchor reactions [kN]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	16.718	0.276	0.195	0.195
2	13.984	0.276	0.195	0.195
3	19.451	0.276	0.195	0.195
4	16.718	0.276	0.195	0.195



max. concrete compressive strain [‰]: 0.00
 max. concrete compressive stress [N/mm²]: 0.00
 resulting tension force in (x/y)=(-6/6) [kN]: 66.870
 resulting compression force in (x/y)=(0/0) [kN]: 0.000

3. Tension load SOFA (fib (07/2011), section 16.2.1)

Proof	Load [kN]	Capacity [kN]	Utilization β_N [%]	Status
Steel Strength*	19.451	36.667	53	OK
Combined pullout-concrete cone failure**	66.870	97.735	68	OK
Concrete Breakout Strength**	66.870	67.100	100	OK
Splitting failure**	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (anchors in tension)

Steel Strength

$N_{Rk,s}$ [kN]	$\gamma_{M,s}$	$N_{Rd,s}$ [kN]	N_{Sd} [kN]
55.000	1.500	36.667	19.451

Combined pullout-concrete cone failure

$A_{p,N}$ [mm ²]	$A_{p,N}^0$ [mm ²]	$\Psi_{A,Np}$	$\tau_{Rk,ucr,25}$ [N/mm ²]	$s_{cr,Np}$ [mm]	$c_{cr,Np}$ [mm]	c [mm]	$h_{ef,Helix}$ [mm]
108900	32400	3.361	24.00	180	90	425	60
Ψ_c	$\tau_{Rk,cr}$ [N/mm ²]	$\max \tau_{Rk,cr}$ [N/mm ²]	$\Psi_{g,Np}^0$	$\Psi_{g,Np}$			
1.000	22.00	7.08	1.000	1.000			
$e_{c1,N}$ [mm]	$\Psi_{ec1,Np}$	$e_{c2,N}$ [mm]	$\Psi_{ec2,Np}$	$\Psi_{s,Np}$	$\Psi_{re,Np}$		
6	0.936	6	0.936	1.000	1.000		
$N_{Rk,p}^0$ [kN]	$N_{Rk,p}$ [kN]	$\gamma_{M,p}$	$N_{Rd,p}$ [kN]	N_{Sd} [kN]			
49.763	146.603	1.500	97.735	66.870			

Company:
 Specifier:
 Address:
 Phone | Fax: - | -
 E-Mail:

Page: 3
 Project: PRILOGA D
 Sub-Project | Pos. No.: Momentni priključek
 Date: 10.9.2013

Concrete Breakout Strength

$A_{c,N}$ [mm ²]	$A_{c,N}^0$ [mm ²]	$\psi_{A,N}$	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]		
331776	181476	1.828	213	426		
$e_{c1,N}$ [mm]	$\psi_{ec1,N}$	$e_{c2,N}$ [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$	k_1
6	0.972	6	0.972	1.000	1.000	7.700
$N_{Rk,c}^0$ [kN]	$\gamma_{M,c}$	$N_{Rd,c}$ [kN]	N_{Sd} [kN]			
58.269	1.500	67.100	66.870			

Company:
 Specifier:
 Address:
 Phone | Fax: - | -
 E-Mail:

Page: 4
 Project: PRILOGA D
 Sub-Project | Pos. No.: Momentni priključek
 Date: 10.9.2013

4. Shear load SOFA (fib (07/2011), section 16.2.2)

Proof	Load [kN]	Capacity [kN]	Utilization β_v [%]	Status
Steel Strength (without lever arm)*	0.276	21.600	1	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	1.103	142.037	1	OK
Concrete edge failure in direction y^{+}	0.552	42.765	1	OK

* anchor having the highest loading **anchor group (relevant anchors)

Steel Strength (without lever arm)

$V_{Rk,s}$ [kN]	$\gamma_{M,s}$	$V_{Rd,s}$ [kN]	V_{Sd} [kN]
27.000	1.250	21.600	0.276

Pryout Strength (Concrete Breakout Strength controls)

$A_{c,N}$ [mm ²]	$A_{c,N}^0$ [mm ²]	$\psi_{A,N}$	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]	k_4	
331776	181476	1.828	213	426	2.000	
$e_{c1,V}$ [mm]	$\psi_{ec1,N}$	$e_{c2,V}$ [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$	k_1
0	1.000	0	1.000	1.000	1.000	7.700
$N_{Rk,c}^0$ [kN]	$\gamma_{M,c,p}$	$V_{Rd,c1}$ [kN]	V_{Sd} [kN]			
58.269	1.500	142.037	1.103			

Concrete edge failure in direction y^{+}

l_r [mm]	d [mm]	k_v	α	β		
142	12	1.700	0.050	0.046		
c_1 [mm]	$A_{c,V}$ [mm ²]	$A_{c,V}^0$ [mm ²]	$\psi_{A,V}$			
575	1150000	1487813	0.773			
$\psi_{s,V}$	$\psi_{h,V}$	$\psi_{a,V}$	$e_{c,V}$ [mm]	$\psi_{ec,V}$	$\psi_{re,V}$	$\psi_{90^\circ,V}$
0.848	1.038	1.265	0	1.000	1.000	2.000
$V_{Rk,c}^0$ [kN]	n	$\gamma_{M,c}$	$V_{Rd,c}$ [kN]	V_{Sd} [kN]		
149.060	2	1.500	42.765	0.552		

Note: Resistance limit acc. to fib (07/2011) Eq. (10.2-7) is governing

5. Combined tension and shear loads SOFA (fib (07/2011), section 16.2.3)

	β_N	β_v	α	Utilization $\beta_{N,v}$ [%]	Status
steel	0.530	0.013	2.0	28	OK
concrete	0.997	0.013	1.5	100	OK

$$\beta_N^a + \beta_v^a \leq 1$$

6. Displacements

The displacement of the highest loaded anchor should be calculated according to the relevant approval under the effect of the following characteristic loads.

$$N_{Sk} = 14.410 \text{ [kN]}$$

$$V_{Sk} = 0.200 \text{ [kN]}$$

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

Company:
Specifier:
Address:
Phone | Fax: - | -
E-Mail:

Page: 5
Project: PRILOGA D
Sub-Project | Pos. No.: Momentni priključek
Date: 10.9.2013

7. Warnings

- The design method fib (07/2011) 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 Dynamic Set) or by other suitable means.
- The compliance with current standards (e.g. EC3) is the responsibility of the user
- Characteristic bond resistances depend on short- and long-term temperatures.
- Checking the transfer of loads into the base material is required in accordance with fib (07/2011)!
- To avoid failure of the anchor plate the required thickness can be calculated in PROFIS Anchor. Load re-distributions on the anchors due to elastic deformations of the anchor plate are not considered. The anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the loading!
- 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.

Fastening meets the design criteria!

Company:
 Specifier:
 Address:
 Phone | Fax: - | -
 E-Mail:

Page: 6
 Project: PRILOGA D
 Sub-Project | Pos. No.: Momentni priključek
 Date: 10.9.2013

8. Installation data

Anchor plate, steel: -

Profile: Square hollow, 60 mm x 60 mm x 5 mm

Hole diameter in the fixture: $d_f = 14$ mm

Plate thickness (input): 10 mm

Recommended plate thickness: not calculated

Cleaning: No cleaning of the drilled hole is required

Annular gap must be removed by e.g. filling the holes with mortar of sufficient compressive strength.

Anchor type and diameter: HIT-HY 200 + HIT-Z, M12

Installation torque: 0.040 kNm

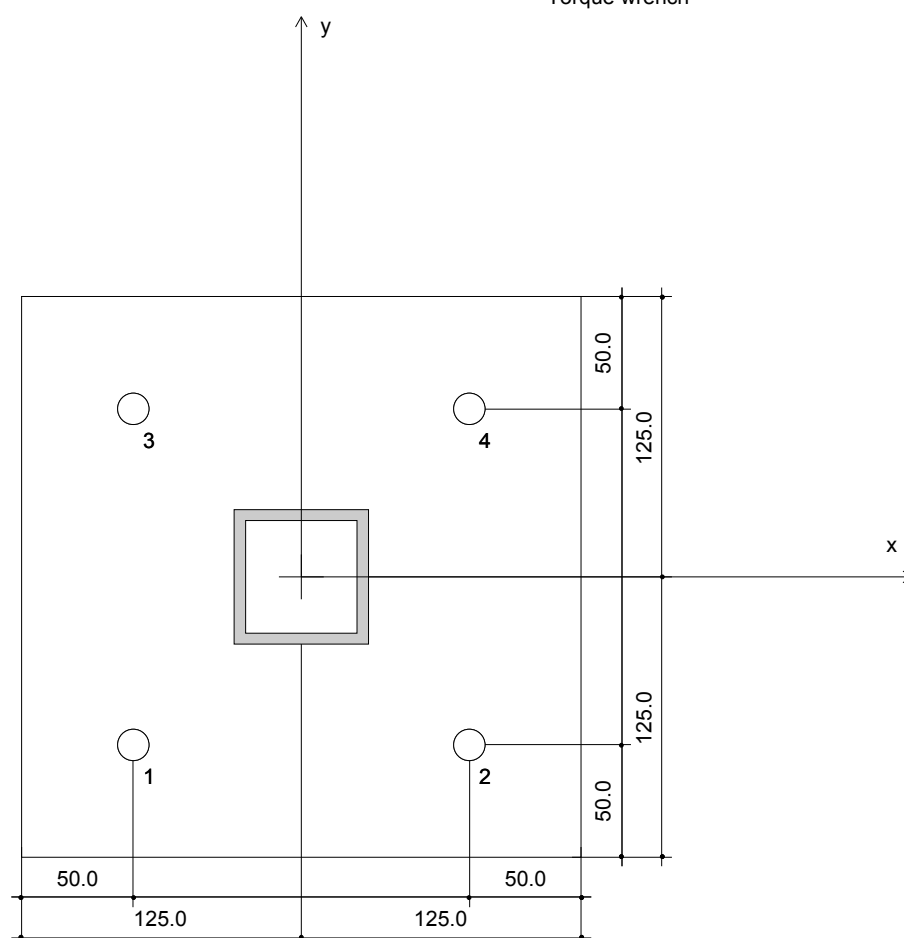
Hole diameter in the base material: 14 mm

Hole depth in the base material: 172 mm

Minimum thickness of the base material: 202 mm

8.1. Required accessories

Drilling	Cleaning	Setting
<ul style="list-style-type: none"> Suitable Rotary Hammer Properly sized drill bit 	<ul style="list-style-type: none"> No accessory required 	<ul style="list-style-type: none"> Dispenser including cassette and mixer Dynamic set Torque wrench



Coordinates Anchor [mm]

Anchor	x	y	c_x	c_{xx}	c_y	c_{yy}
1	-75	-75	-	575	-	575
2	75	-75	-	425	-	575
3	-75	75	-	575	-	425
4	75	75	-	425	-	425

Company:
Specifier:
Address:
Phone | Fax: - | -
E-Mail:

Page: 7
Project: PRILOGA D
Sub-Project | Pos. No.: Momentni priključek
Date: 10.9.2013

9. 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.