

工程指示 / 要求簡箋(E.I.)

工程指示編號：EI / 5154 / 22 修改版次：-
 工程編號：J - 858 工程名稱：將軍澳日出康城 LP-11
 工程項目：幕牆 單元件 地盆用鐵件 (修補方案 M16)
 收件人：Maggie 發件人：Ant Yeung 日期：29/09/2022

要求提供 / 確認 事項：

- | | | |
|------------------------------------|-------------------------------------|-------------------------------|
| <input type="checkbox"/> 初步鋁料 B.M. | <input type="checkbox"/> 加工拆圖，然後生產 | <input type="checkbox"/> 尺寸表 |
| <input type="checkbox"/> 正式鋁料 B.M. | <input type="checkbox"/> 技術上資料 / 指示 | <input type="checkbox"/> 報價 |
| <input type="checkbox"/> 配件 B.M. | <input type="checkbox"/> 樣辦或貨品說明書 | <input type="checkbox"/> 分判合約 |

內容：

請按加工圖生產鐵件送地盆使用。

1. 修補方案 M16 用 (現在位置為 T1 A-E)
2. 有兩款方案，請留意
3. 驗焊: Fillet Weld (100% Visual, 10% MPI) / Name: (For Curtain Wall)
4. 出貨前，請給 Mill cert 和熱浸 Cert
5. 有油瀝青油
6. 附計數供記錄

請在 2022. 10. 10 前完成上列要求。

附：

以上項目為：

- 原合約工程包 原合約工程加 / 減賬 新工程報價

原因：-

分發東莞各部門：

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 生產技術總監 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 技術部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 生產部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 機械設計部 <input type="checkbox"/> 連附件 |
| <input type="checkbox"/> 採購部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 生產統籌部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 小羅 & 清 <input type="checkbox"/> 連附件 | |
| <input type="checkbox"/> 質檢部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 會計部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 報關組 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 其他 _____ <input type="checkbox"/> 連附件 |

分發其他分判：

連附件

分發香港各部門：

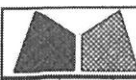
- | | | | |
|--|--|---|---|
| <input type="checkbox"/> 行政部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 會計部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 統籌部 <input type="checkbox"/> 連附件 | <input checked="" type="checkbox"/> 工程部地盤科文 <input type="checkbox"/> 連附件 積哥 |
| <input checked="" type="checkbox"/> 採購部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> QS 部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 維修部 <input type="checkbox"/> 連附件 | <input type="checkbox"/> 其他 _____ <input type="checkbox"/> 連附件 |

傳遞編號：

HK / 22

發件人簽署：

項目經理簽署：

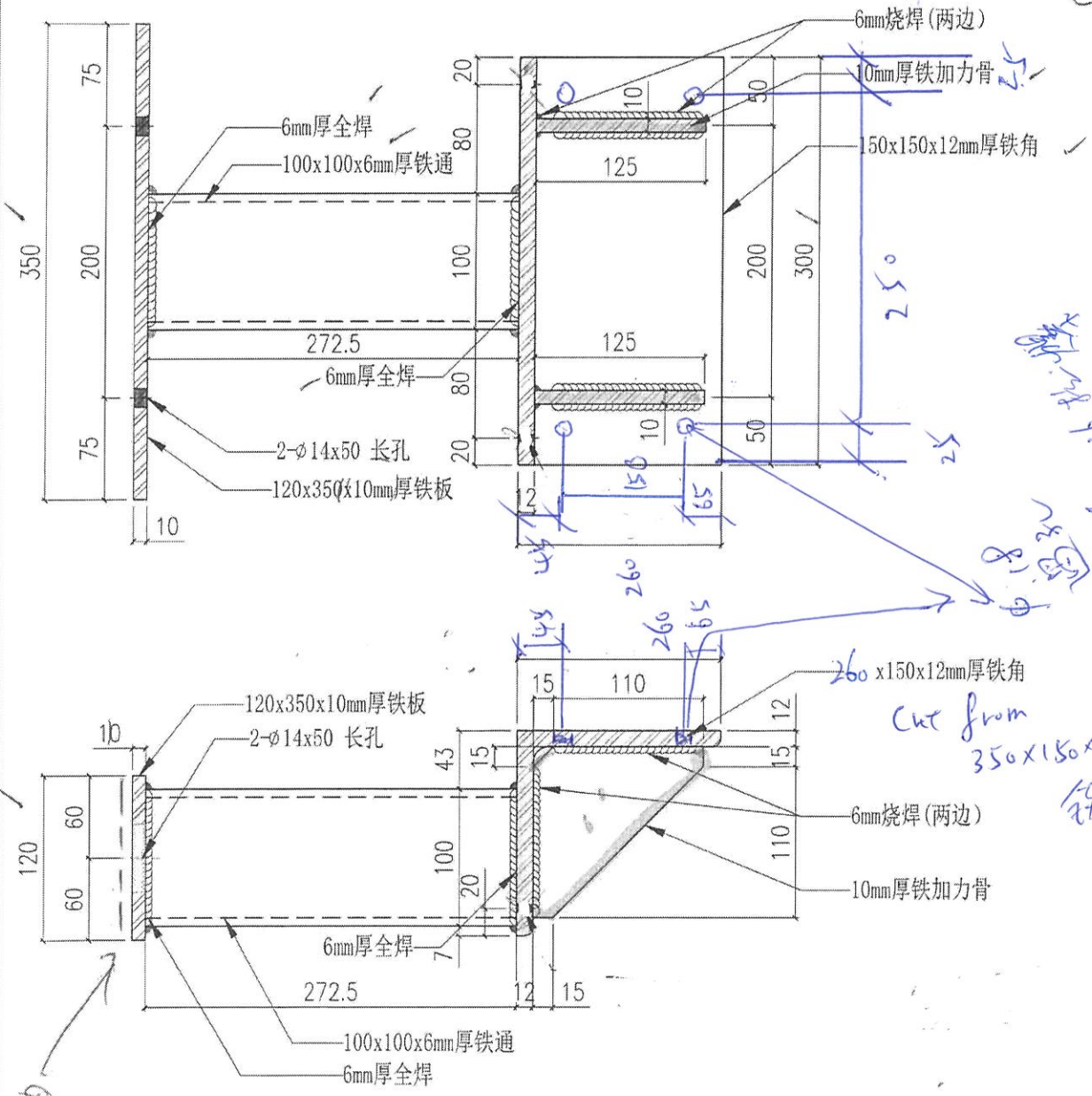
 美特铝质有限公司 MIDI Aluminium Fabricator Ltd.		工程號 J858 地盘 康城11期	類別 制圖 WCM	物料號 2022-06-09	- RE-A-16 圖號 MS-01
修改 - - - 日期 - - -	採用工廠 材料颜色 热浸锌	地盘 ✓ 图纸名称 铁料加工图	復核 - - 批准 - -	數量 - 單件重量 - (KG)	

位置	QTY
T1-9F	58 \times 2
T2-9F	54 \times 2
T3-9F	53 \times 2
合計:	165 \times 6

Option A

12隻

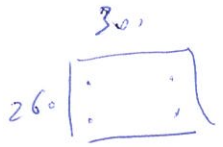
102



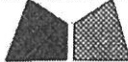
2个有油

cut from 350x150x12.5 铁通

(粘孔x4)



RE-B-16

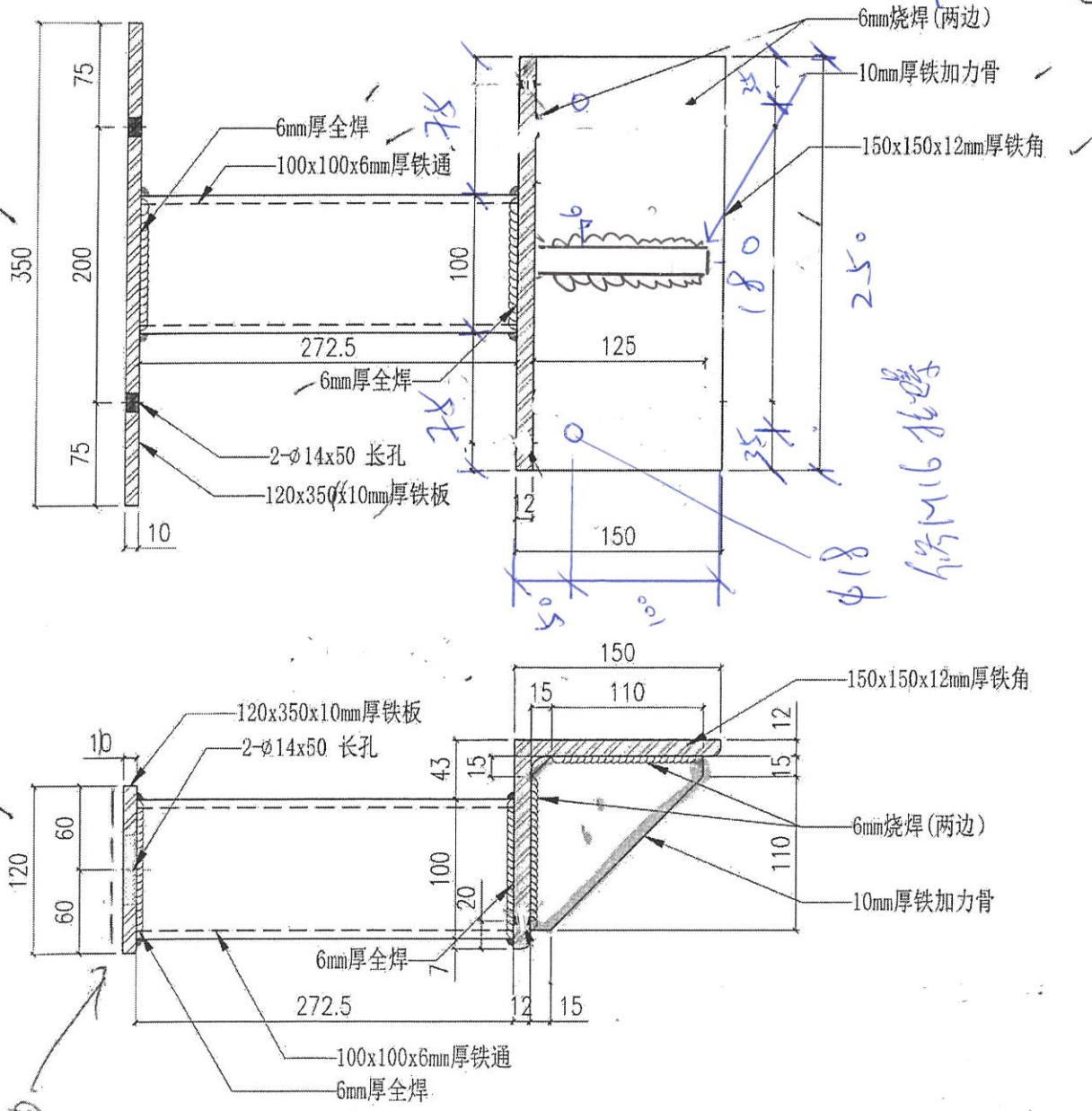
 美特鋁質有限公司 MIDI Aluminium Fabricator Ltd.			工程號 J858 地盤 康城11期	類別 制圖 WCM	物料號 2022-06-09 圖號 MS-01
修改 - 日期 -	採用工廠 材料顏色 熟浸漆	地盤 <input checked="" type="checkbox"/>	图纸名称 铁料加工图	復核 - 批准 -	數量 - 單件重量 - (KG)

option B

☆A 復光

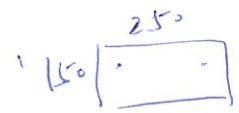
12層

位置	QTY
T1-9F	58
T2-9F	54
T3-9F	53
合计:	165



25°

(拾得孔 x 2)



起脚修補方案

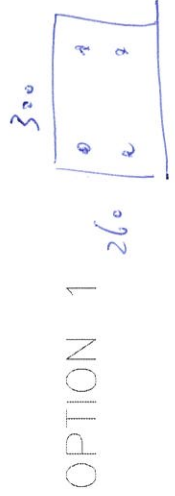
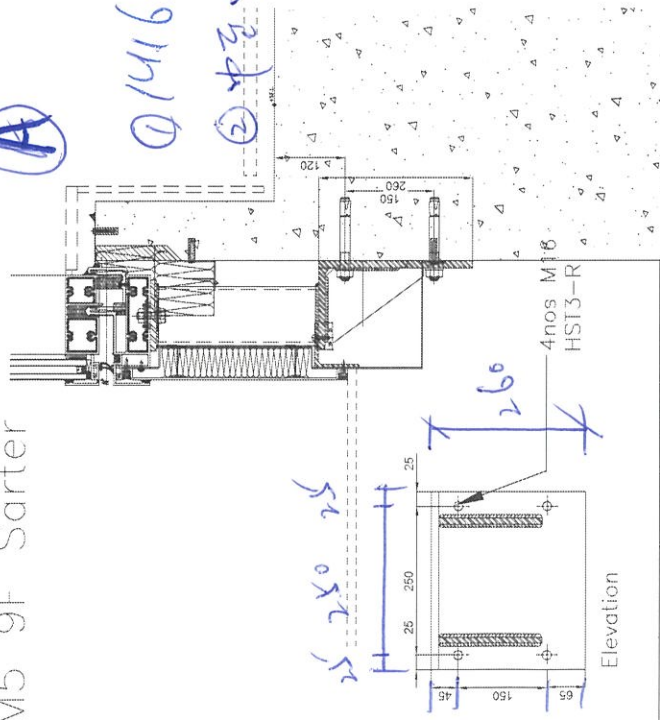
2022.9.28

RM5 9F Sarter

(A)

① M16x4

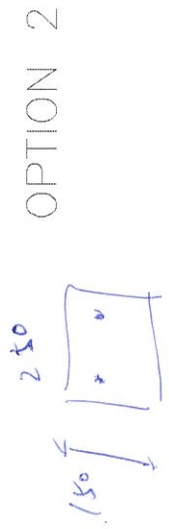
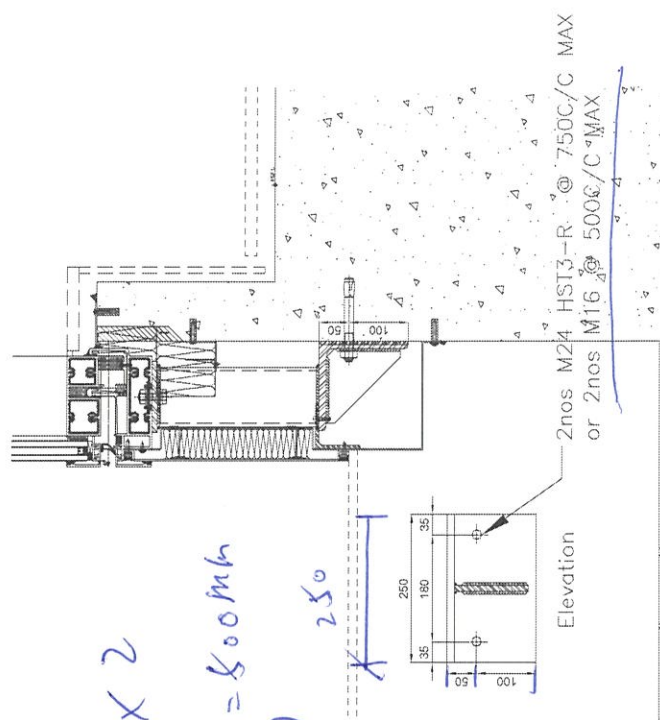
② 中區中樑厚度的位置



(B)

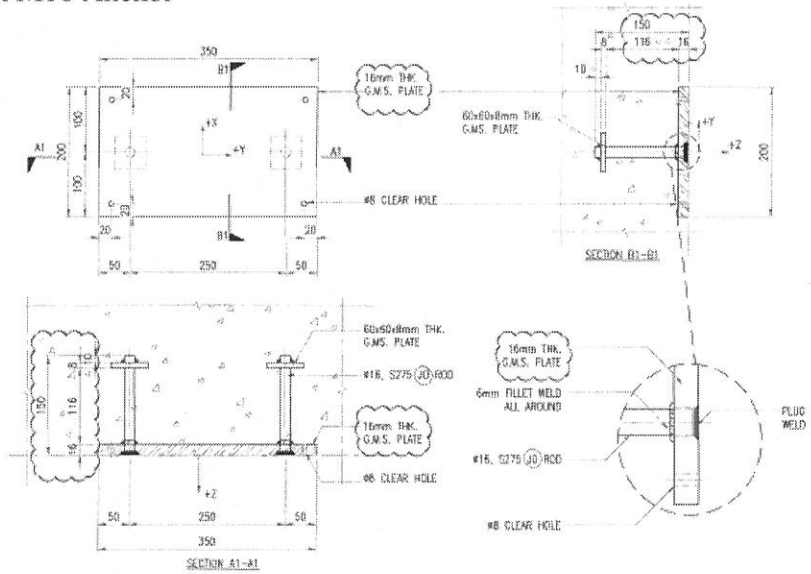
① M16x2

② 中區中樑 = 800mm (中樑)



Option A

RM5 Check Remedial case of strater (missing CA06)
 4nos HST3-R M16 Anchor

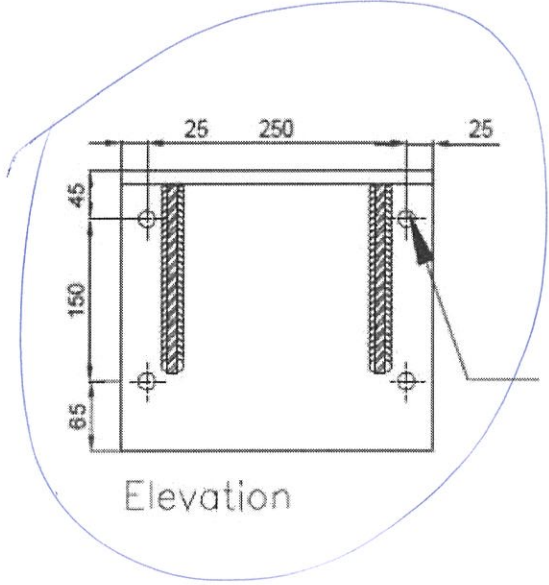
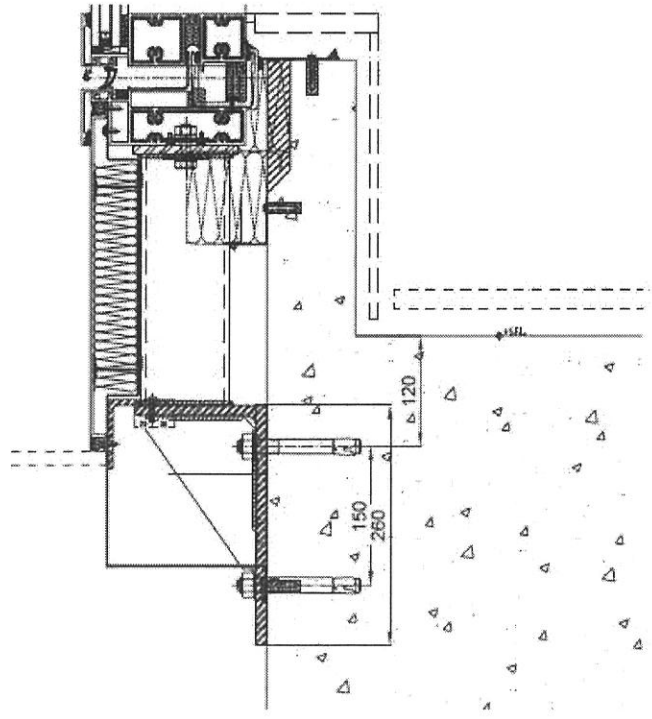


2 CAST-IN EMBED CODE (TOL 9/F, 11/F & A/F) (FOR STRATER)

	UNFACTORED LOAD ALONG AXIS (kN)	UNFACTORED MOMENT ABOUT AXIS (kNm)
F _x	-	M _x +/- 5.81
F _y	-	M _y +/- 0.14
F _z	1/-0.4	M _z -

Factored reaction load on anchor $F_t = 2 * F_z = 18.8 \text{ KN}$

Factored Moment $M_e = 2 * M_x = 7.62 \text{ KNm}$



1.1 Load combination

Case	Description	Forces [kN] / Moments [kNm]	Seismic	Fire	Max. Util. Anchor [%]
1	Combination 1	N = 18.800; V _x = 0.000; V _y = 0.000; M _x = 0.000; M _y = 7.620; M _z = 0.000;	no	no	99

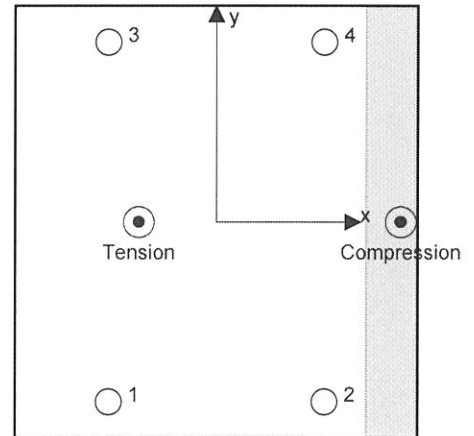
2 Load case/Resulting anchor forces

Anchor reactions [kN]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	23.672	0.000	0.000	0.000
2	3.877	0.000	0.000	0.000
3	23.672	0.000	0.000	0.000
4	3.877	0.000	0.000	0.000

max. concrete compressive strain: 0.23 [‰]
 max. concrete compressive stress: 6.79 [N/mm²]
 resulting tension force in (x/y)=(-53.9/0.0): 55.098 [kN]
 resulting compression force in (x/y)=(128.1/0.0): 36.298 [kN]



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

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Company:	Page:	4
Address:	Specifier:	
Phone Fax:	E-Mail:	
Design: Concrete - Sep 27, 2022	Date:	28/9/2022
Fastening point:		

3 Tension load (ETAG, Annex C, Section 5.2.2)

	Load [kN]	Capacity [kN]	Utilization β_N [%]	Status
Steel Strength*	23.672	49.571	48	OK
Pullout Strength*	23.672	24.150	99	OK
Concrete Breakout Failure**	55.098	55.788	99	OK
Splitting failure**	N/A	N/A	N/A	N/A

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

3.1 Steel Strength

$$N_{Sd} \leq N_{Rd,s} = \frac{N_{Rk,s}}{\gamma_{M,s}} \quad \text{ETAG 001 Annex C, Table 5.2.2.1}$$

$N_{Rk,s}$ [kN]	$\gamma_{M,s}$	$N_{Rd,s}$ [kN]	N_{Sd} [kN]
69.400	1.400	49.571	23.672

3.2 Pullout Strength

$$N_{Sd} \leq N_{Rd,p} = \frac{\psi_c \cdot N_{Rk,p}}{\gamma_{M,p}} \quad \text{ETAG 001 Annex C, Table 5.2.2.1}$$

$N_{Rk,p}$ [kN]	ψ_c	$\gamma_{M,p}$	$N_{Rd,p}$ [kN]	N_{Sd} [kN]
27.000	1.342	1.500	24.150	23.672

3.3 Concrete Breakout Failure

$$N_{Sd} \leq N_{Rd,c} = \frac{N_{Rk,c}}{\gamma_{M,c}} \quad \text{ETAG 001 Annex C, Table 5.2.2.1}$$

$$N_{Rk,c} = N_{Rk,c}^0 \cdot \frac{A_{c,N}}{A_{c,N}^0} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{ec1,N} \cdot \psi_{ec2,N} \quad \text{ETAG 001 Annex C, Eq. (5.2)}$$

$$N_{Rk,c}^0 = k_1 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1,5} \quad \text{ETAG 001 Annex C, Eq. (5.2a)}$$

$$A_{c,N}^0 = s_{cr,N} \cdot s_{cr,N} \quad \text{ETAG 001 Annex C, Eq. (5.2b)}$$

$$\psi_{s,N} = 0.7 + 0.3 \cdot \frac{c}{c_{cr,N}} \leq 1.00 \quad \text{ETAG 001 Annex C, Eq. (5.2c)}$$

$$\psi_{re,N} = 0.5 + \frac{h_{ef}}{200} \leq 1.00 \quad \text{ETAG 001 Annex C, Eq. (5.2d)}$$

$$\psi_{ec1,N} = \frac{1}{1 + \frac{2 \cdot e_{c1,N}}{s_{cr,N}}} \leq 1.00 \quad \text{ETAG 001 Annex C, Eq. (5.2e)}$$

$$\psi_{ec2,N} = \frac{1}{1 + \frac{2 \cdot e_{c2,N}}{s_{cr,N}}} \leq 1.00 \quad \text{ETAG 001 Annex C, Eq. (5.2e)}$$

$A_{c,N}$ [mm ²]	$A_{c,N}^0$ [mm ²]	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]		
204,525	65,025	127.5	255.0		
$e_{c1,N}$ [mm]	$\psi_{ec1,N}$	$e_{c2,N}$ [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$
53.9	0.703	0.0	1.000	1.000	1.000
k_1	$N_{Rk,c}^0$ [kN]	$\gamma_{M,c}$	$N_{Rd,c}$ [kN]	N_{Sd} [kN]	
7.200	37.850	1.500	55.788	55.098	

 Group anchor ID
 1-4

4 Shear load (ETAG, Annex C, Section 5.2.3)

	Load [kN]	Capacity [kN]	Utilization β_V [%]	Status
Steel Strength (without lever arm)*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

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

5 Displacements (highest loaded anchor)

Short term loading:

N_{Sk} = 17.535 [kN]	δ_N = 2.3554 [mm]
V_{Sk} = 0.000 [kN]	δ_V = 0.0000 [mm]
	δ_{NV} = 2.3554 [mm]

Long term loading:

N_{Sk} = 17.535 [kN]	δ_N = 2.2246 [mm]
V_{Sk} = 0.000 [kN]	δ_V = 0.0000 [mm]
	δ_{NV} = 2.2246 [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 anchor plate! 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 anchor plates 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 anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate 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 ETAG 001, Annex C(2010)Section 7! The software considers that the grout is installed under the anchor plate without creating air voids and before application of the loads.
- The design is only valid if the clearance hole in the fixture is not larger than the value given in Table 4.1 of ETAG 001, Annex C! For larger diameters of the clearance hole see Chapter 1.1. of ETAG 001, Annex C!
- 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.
- The characteristic bond resistances depend on the return period (service life in years): 50

Fastening meets the design criteria!

7 Installation data

Anchor plate, steel: GB Q390; $E = 205,000.00 \text{ N/mm}^2$; $f_{yk} = 350.00 \text{ N/mm}^2$
 Profile: no profile
 Hole diameter in the fixture: $d_f = 18.0 \text{ mm}$
 Plate thickness (input): 12.0 mm
 Recommended plate thickness: not calculated
 Drilling method: Hammer drilled
 Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: HST3-R M16 hef2
 Item number: 2105876 HST3-R M16x135 35/15
 Maximum installation torque: 110 Nm
 Hole diameter in the base material: 16.0 mm
 Hole depth in the base material: 106.0 mm
 Minimum thickness of the base material: 160.0 mm

Hilti HST3 stud anchor with 98 mm embedment, M16 hef2, Stainless steel, installation per ETA-98/0001

7.1 Recommended accessories

Drilling

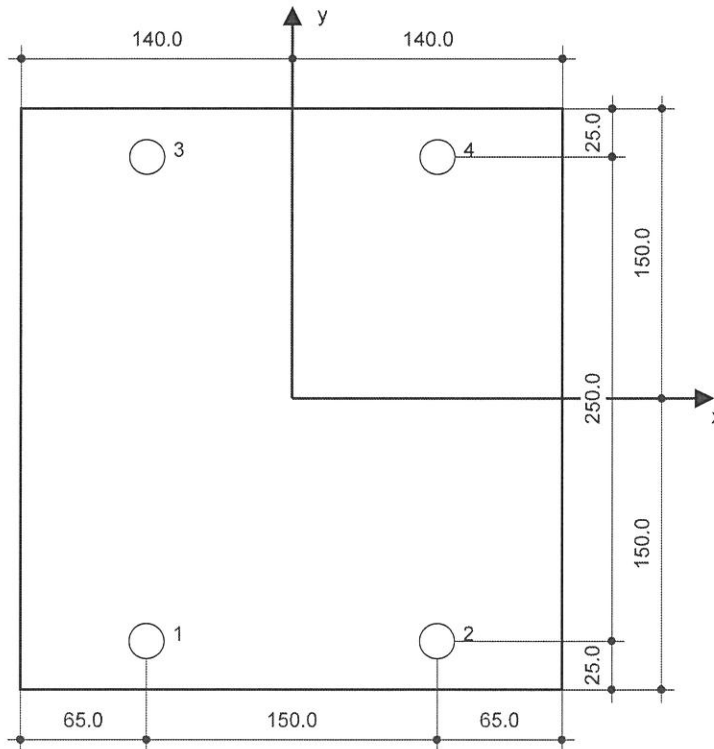
- Suitable Rotary Hammer
- Properly sized drill bit

Cleaning

- Manual blow-out pump

Setting

- Torque wrench
- Hammer



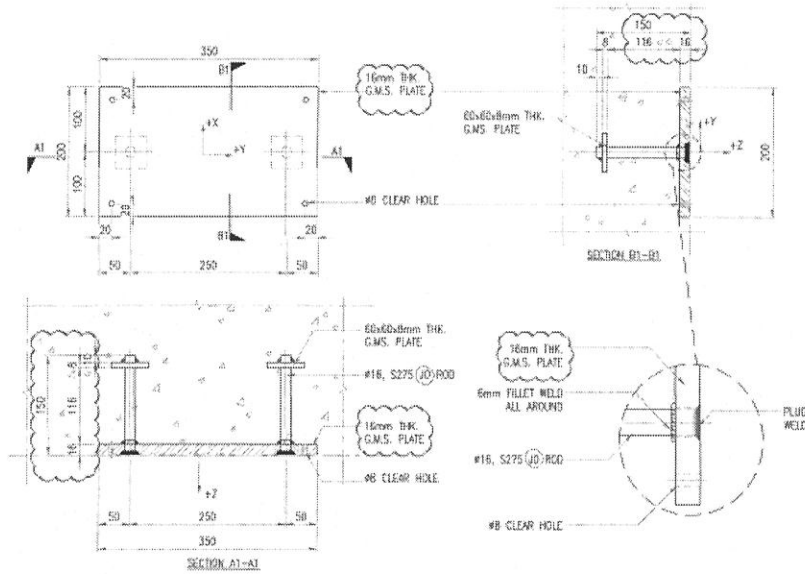
Coordinates Anchor [mm]

Anchor	x	y	c _{-x}	c _{+x}	c _{-y}	c _{+y}
1	-75.0	-125.0	300.0	450.0	300.0	550.0
2	75.0	-125.0	450.0	300.0	300.0	550.0
3	-75.0	125.0	300.0	450.0	550.0	300.0
4	75.0	125.0	450.0	300.0	550.0	300.0

option B

RM5 Check Remedial case of strater (missing CA06) Option 2

2nos HST3-R M24 Anchor@750cc/2 nos M16@500C/C



2 CAST-IN EMBED CARR (TOL 4/F, 11/F & A/F) (FOR STRATER)

UNFACTORED LOAD ALONG AXIS (kN)		UNFACTORED MOMENT ABOUT AXIS (kNm)	
Fx	-	Mx	+/- 5.81
Fy	-	My	+/- 0.14
Ft	+/- 0.4	Mz	-

Factored reaction load on anchor $F = 2 * Fz = 18.8 \text{ KN}$

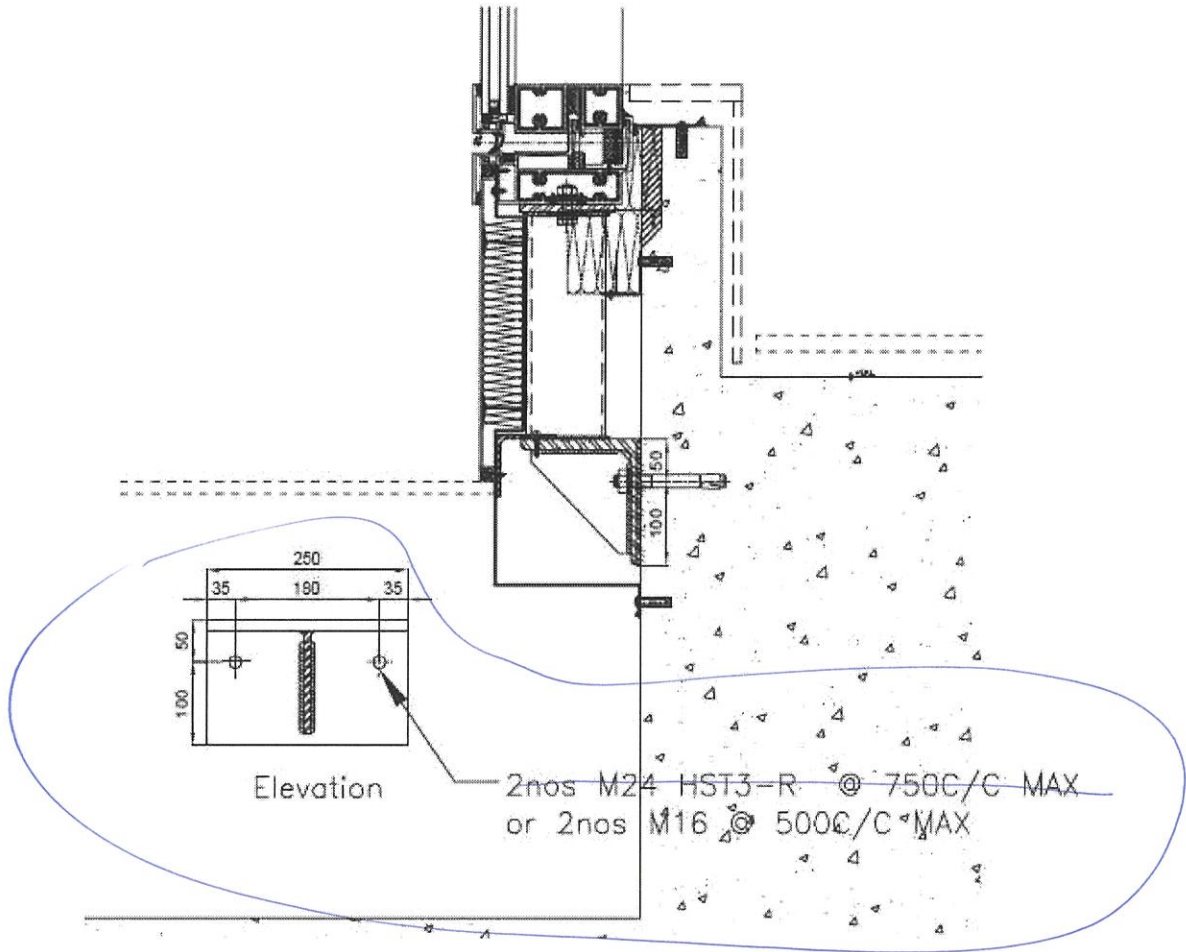
Factored Moment $M = 2 * Mx = 7.62 \text{ KNm}$

Max. load width of above loading $Bo = 1268.8 \text{ mm}$

Spacing of anchor $s = 500 \text{ mm}$

Max. design load $Ft = s/Bo * F = 7.41 \text{ KN}$

$Me = s/Bo * M = 3.0 \text{ KNm}$




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

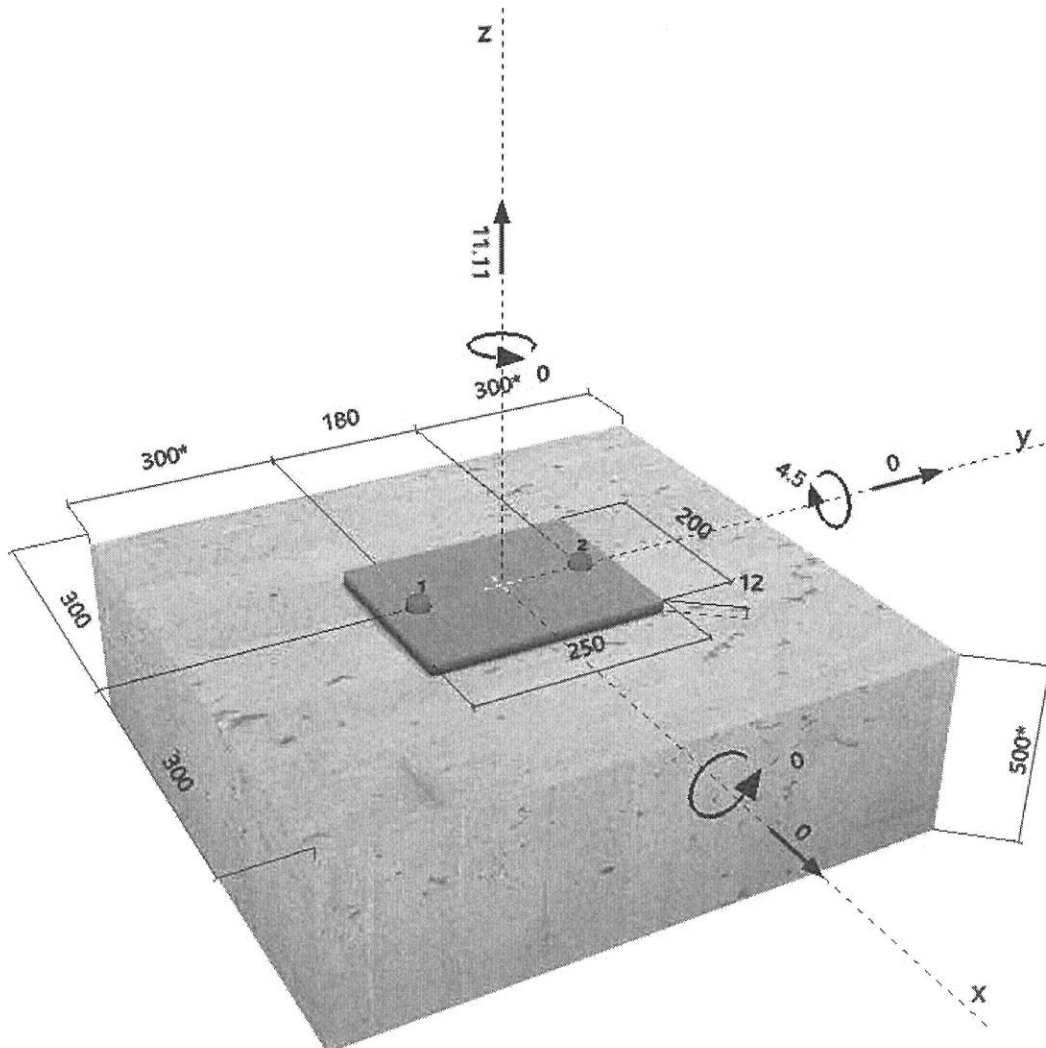
Page: 2
 Project:
 Sub-Project | Pos. No.:
 Date: 28/9/2022

Specifier's comments:

1 Input data

Anchor type and diameter:	HST3-R M24 hef2	
Effective embedment depth:	$h_{ef} = 125 \text{ mm}$, $h_{nom} = 143 \text{ mm}$	
Material:	A4	
Evaluation Service Report:	ETA-98/0001	
Issued Valid:	28/7/2016 -	
Proof:	Design method ETAG (No. 001 Annex C/2010)	
Stand-off installation:	$e_b = 0 \text{ mm}$ (no stand-off); $t = 12 \text{ mm}$	
Anchor plate:	$l_x \times l_y \times t = 200 \text{ mm} \times 250 \text{ mm} \times 12 \text{ mm}$; (Recommended plate thickness: not calculated)	
Profile:	no profile	
Base material:	cracked concrete, C35/45, $f_{c,cube} = 45.00 \text{ N/mm}^2$; $h = 500 \text{ mm}$	
Installation:	hammer drilled hole, Installation condition: Dry	
Reinforcement:	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	

Geometry [mm] & Loading [kN, kNm]



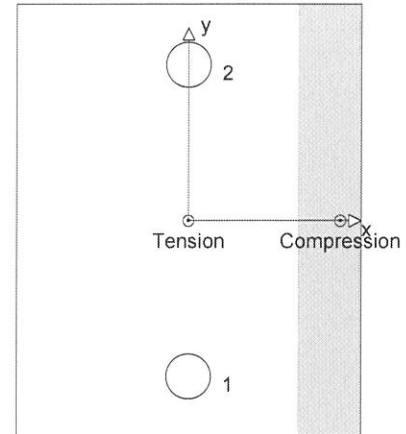
2 Load case/Resulting anchor forces

Load case: Design loads

Anchor reactions [kN]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	31.152	0.000	0.000	0.000
2	31.152	0.000	0.000	0.000

 max. concrete compressive strain: 0.38 [‰]
 max. concrete compressive stress: 11.28 [N/mm²]
 resulting tension force in (x/y)=(0/0): 62.304 [kN]
 resulting compression force in (x/y)=(88/0): 51.194 [kN]


3 Tension load (ETAG, Annex C, Section 5.2.2)

	Load [kN]	Capacity [kN]	Utilization β_N [%]	Status
Steel Strength*	31.152	100.000	32	OK
Pullout Strength*	31.152	35.777	88	OK
Concrete Breakout Strength**	62.304	66.600	94	OK
Splitting failure**	N/A	N/A	N/A	N/A

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

3.1 Steel Strength

$N_{Rk,s}$ [kN]	$\gamma_{M,s}$	$N_{Rd,s}$ [kN]	N_{Sd} [kN]
156.000	1.560	100.000	31.152

3.2 Pullout Strength

$N_{Rk,p}$ [kN]	ψ/c	$\gamma_{M,p}$	$N_{Rd,p}$ [kN]	N_{Sd} [kN]
40.000	1.342	1.500	35.777	31.152

3.3 Concrete Breakout Strength

$A_{c,N}$ [mm ²]	$A_{c,N}^0$ [mm ²]	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]		
208125	140625	188	375		
$e_{c1,N}$ [mm]	$\psi_{ec1,N}$	$e_{c2,N}$ [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$
0	1.000	0	1.000	1.000	1.000
k_1	$N_{Rk,c}^0$ [kN]	$\gamma_{M,c}$	$N_{Rd,c}$ [kN]	N_{Sd} [kN]	
7.200	67.500	1.500	66.600	62.304	

4 Shear load (ETAG, Annex C, Section 5.2.3)

	Load [kN]	Capacity [kN]	Utilization β_v [%]	Status
Steel Strength (without lever arm)*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

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

5 Displacements (highest loaded anchor)

Short term loading:

N_{Sk}	=	23.076 [kN]	δ_N	=	0.972 [mm]
V_{Sk}	=	0.000 [kN]	δ_v	=	0.000 [mm]
			δ_{NV}	=	0.972 [mm]

Long term loading:

N_{Sk}	=	23.076 [kN]	δ_N	=	2.065 [mm]
V_{Sk}	=	0.000 [kN]	δ_v	=	0.000 [mm]
			δ_{NV}	=	2.065 [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 anchor plate! 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 Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution 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 design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. 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 ETAG 001, Annex C(2010)Section 7! The software considers that the grout is installed under the anchor plate without creating air voids and before application of the loads.
- The design is only valid if the clearance hole in the fixture is not larger than the value given in Table 4.1 of ETAG 001, Annex C! For larger diameters of the clearance hole see Chapter 1.1. of ETAG 001, Annex C!
- 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:

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7 Installation data

Anchor plate, steel: -
 Profile: no profile
 Hole diameter in the fixture: $d_f = 26$ mm
 Plate thickness (input): 12 mm
 Recommended plate thickness: not calculated
 Drilling method: Hammer drilled
 Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: HST3-R M24 hef2
 Installation torque: 0.240 kNm
 Hole diameter in the base material: 24 mm
 Hole depth in the base material: 153 mm
 Minimum thickness of the base material: 250 mm

7.1 Recommended accessories

Drilling

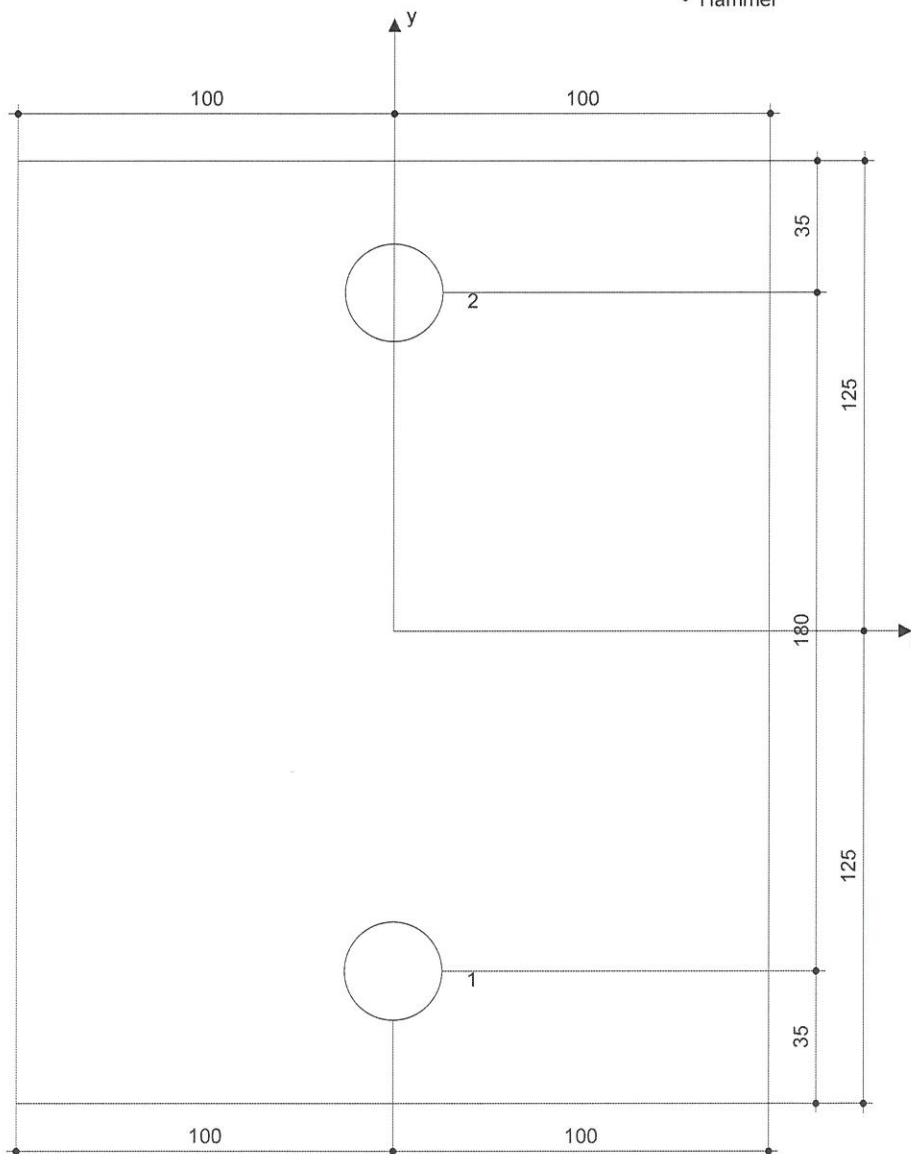
- Suitable Rotary Hammer
- Properly sized drill bit

Cleaning

- Manual blow-out pump

Setting

- Hilti seismic filling set
- Torque wrench
- Hammer



Coordinates Anchor [mm]

Anchor	x	y	C _{-x}	C _{+x}	C _{-y}	C _{+y}
1	0	-90	300	300	300	480
2	0	90	300	300	480	300

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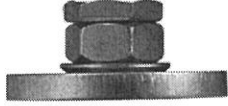
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8 Remarks; Your Cooperation Duties

- 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.

HST3 (-R) subject to:

Anchor size	M8	M10	M12	M16	M20	M24
Hammer drilling* 	TE2(-A) – TE30(-A)				TE40 – TE70	
Diamond core drilling* 	DD-30W, DD-EC1					
Setting tool* 	Setting tool HS-SC				-	
Hollow drill bit drilling* 	-	TE-CD, TE-YD				
Seismic Set/ Filling Set** 	Seismic/Filling Set M8-M20 (Carbon and Stainless Steel A4)					-

***Installation methods provided in ETA-98/0001**

**Seismic set needed to fill the annular gap between anchor and fixture:
 No annular gap, double design resistance (agap=1)