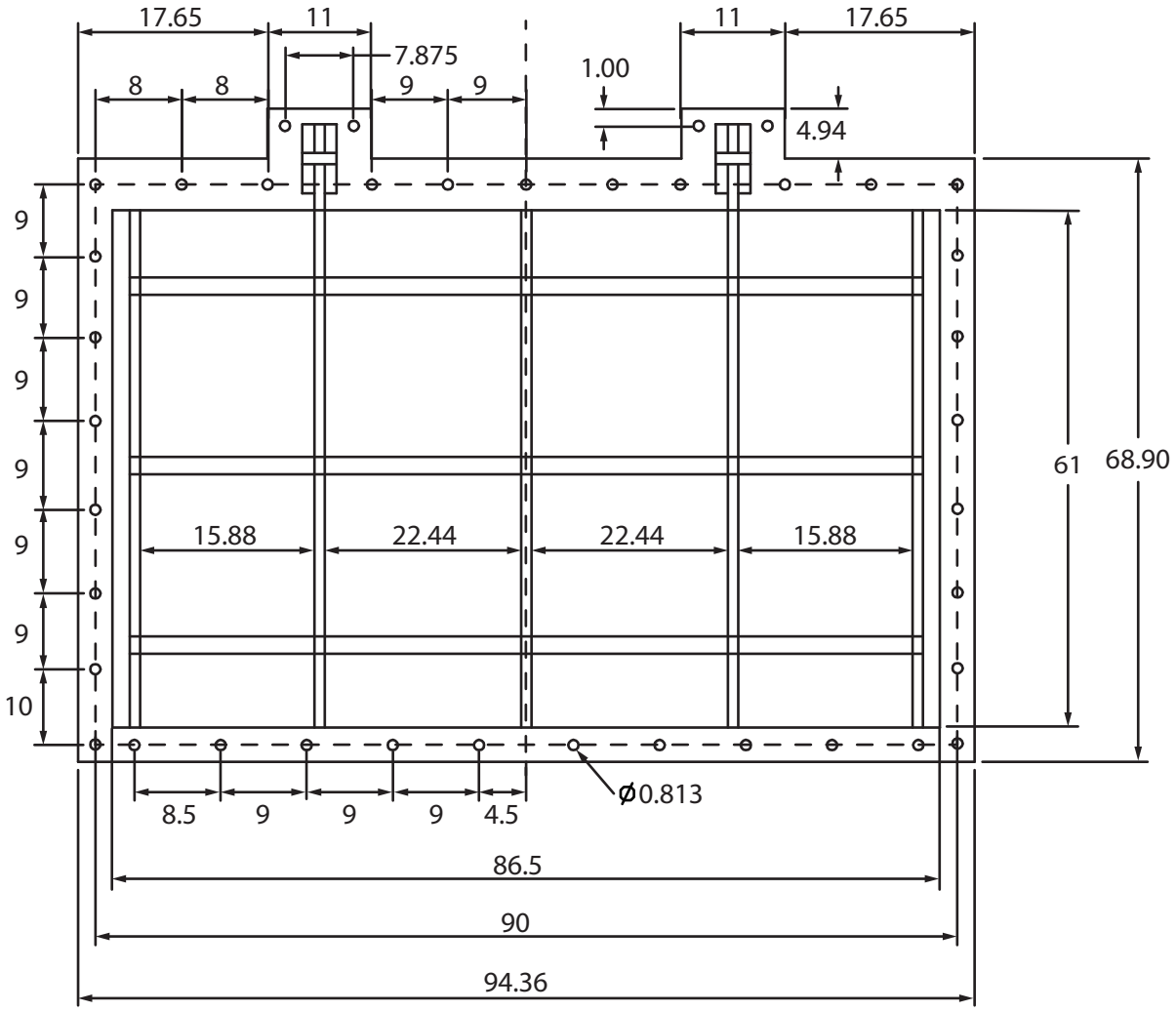
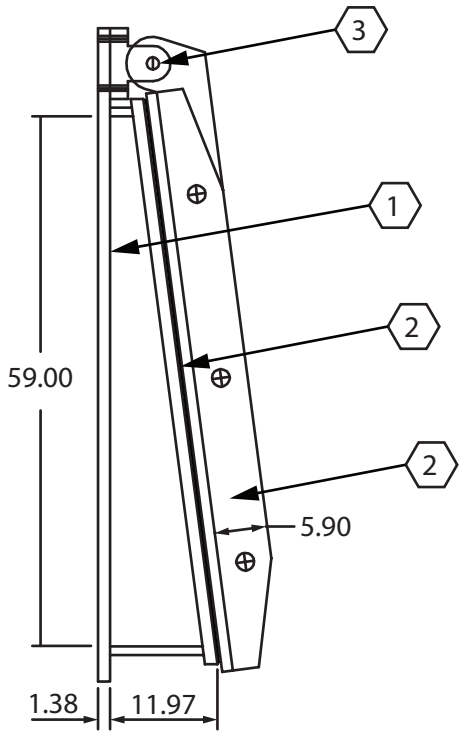




NOTES:
1. Drawing not to scale
2. Flange bolt hole pattern dimensions refelcted about valve centerline

ITEM	DESCRIPTION	MATERIAL
1	BODY	HDPE
2	FLAP	HDPE
3	PIN	STAINLESS 316
4	SEAT	EPDM

Drawing Name:
61" x 86.5" RECTANGULAR
HDPE FLAP VALVE
MATERIAL LIST & DIMENSIONS

Drawing Number:
61X86.5FLAP-00

Date: 1/23/2019

Revision Number: 0

USA WWG

Company:		Page:	1
Specifier:		Project:	Marginal Wharf- NJ
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	1/24/2019
E-Mail:			

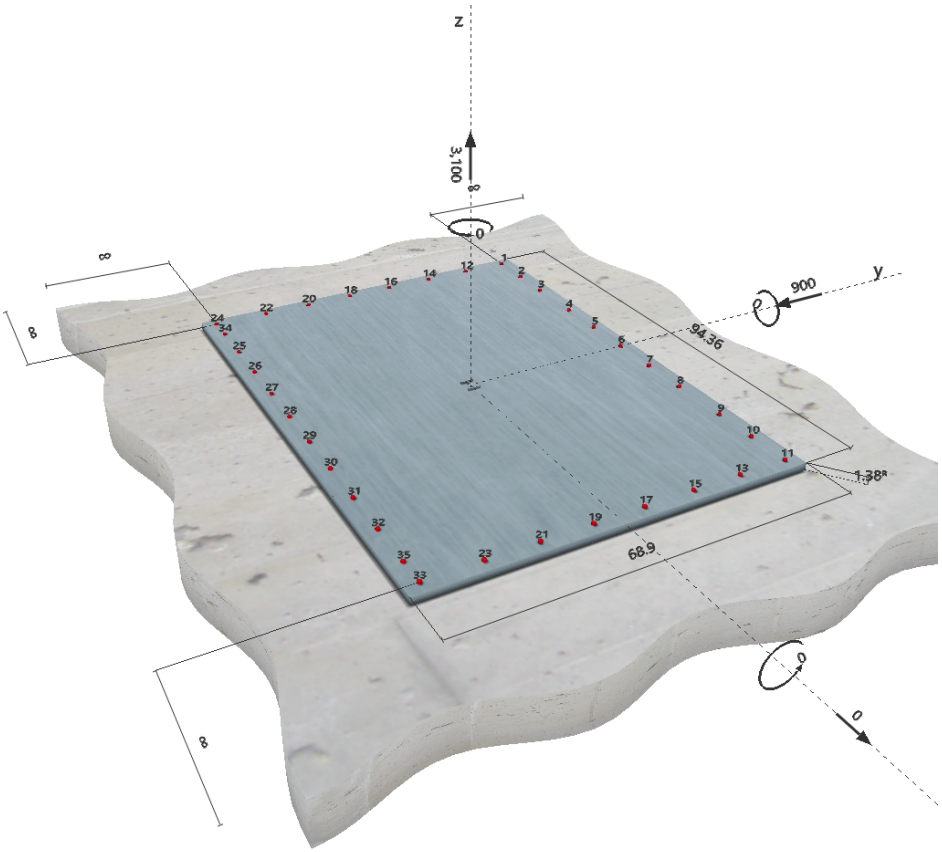
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ - SS 304 3/4 (3 3/4)**
Effective embedment depth:	h_{ef} = 3.750 in., h_{nom} = 4.313 in.
Material:	AISI 304
Evaluation Service Report:	ESR-1917
Issued I Valid:	5/1/2017 | 5/1/2019
Proof:	Design method ACI 318 / AC193
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.380 in.
Anchor plate:	l_x x l_y x t = 94.360 in. x 68.900 in. x 1.380 in.; (Recommended plate thickness: not calculated
Profile:	S shape (AISC); (L x W x T x FT) = 3.000 in. x 2.330 in. x 0.170 in. x 0.260 in.
Base material:	uncracked concrete, 4000, f_c' = 4,000 psi; h = 420.000 in.
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	no

R - user is responsible to ensure a rigid base plate for the entered thickness with appropriate solutions (stiffeners,...)

Geometry [in.] & Loading [lb, in.lb]



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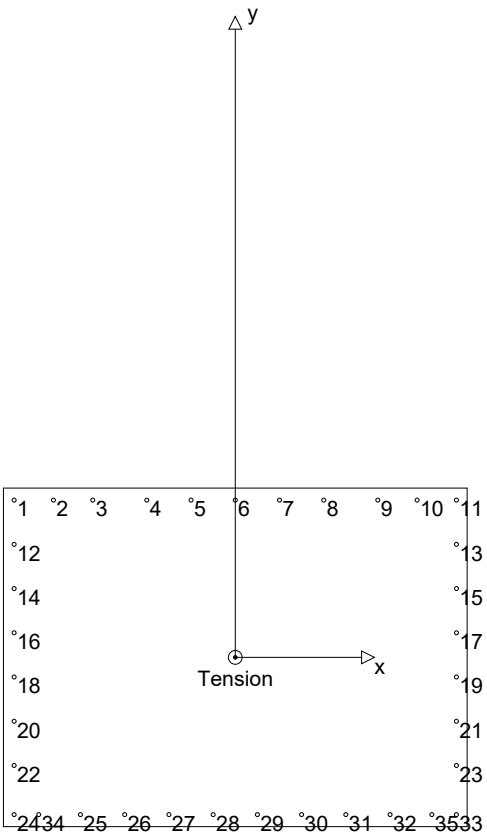
2 Load case/Resulting anchor forces

Load case: Design loads

Anchor reactions [lb]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	91	26	0	-26
2	91	26	0	-26
3	91	26	0	-26
4	91	26	0	-26
5	91	26	0	-26
6	91	26	0	-26
7	91	26	0	-26
8	91	26	0	-26
9	91	26	0	-26
10	91	26	0	-26
11	91	26	0	-26
12	91	26	0	-26
13	91	26	0	-26
14	90	26	0	-26
15	90	26	0	-26
16	89	26	0	-26
17	89	26	0	-26
18	88	26	0	-26
19	88	26	0	-26
20	88	26	0	-26
21	88	26	0	-26
22	87	26	0	-26
23	87	26	0	-26
24	86	26	0	-26
25	86	26	0	-26
26	86	26	0	-26
27	86	26	0	-26
28	86	26	0	-26
29	86	26	0	-26
30	86	26	0	-26
31	86	26	0	-26
32	86	26	0	-26
33	86	26	0	-26
34	86	26	0	-26
35	86	26	0	-26



max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 3,100 [lb]
resulting compression force in (x/y)=(0.000/0.000): 0 [lb]

Anchor forces based on a rigid base plate assumption!

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

3 Tension load

	Load N_{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	91	18,041	1	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Strength**	3,100	173,272	2	OK

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

3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ESR-1917
$\phi\ N_{sa} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.24	101,500

Calculations

N_{sa} [lb]
24,055

Results

N_{sa} [lb]	ϕ steel	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
24,055	0.750	18,041	91

3.2 Concrete Breakout Strength

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\, \psi_{ed,N}\, \psi_{c,N}\, \psi_{cp,N}\, N_b$ ACI 318-08 Eq. (D-5)

$\phi\ N_{cbg} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

A_{Nc} see ACI 318-08, Part D.5.2.1, Fig. RD.5.2.1(b)

$A_{Nc0} = 9\, h_{ef}^2$ ACI 318-08 Eq. (D-6)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\, e'_N}{3\, h_{ef}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-9)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}}\right) \leq 1.0$ ACI 318-08 Eq. (D-11)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-08 Eq. (D-13)

$N_b = k_c\, \lambda\, \sqrt{f'_c}\, h_{ef}^{1.5}$ ACI 318-08 Eq. (D-7)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
3.750	0.000	0.743	∞	1.000

c_{ac} [in.]	k_c	λ	f'_c [psi]
7.000	24	1	4,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
3,465.00	126.56	1.000	0.883	1.000	1.000	11,023

Results

N_{cbg} [lb]	ϕ concrete	$\phi\ N_{cbg}$ [lb]	N_{ua} [lb]
266,573	0.650	173,272	3,100

Company:
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4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	26	10,212	1	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	900	422,488	1	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

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

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-1917
$\phi\ V_{steel} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.24	101,500

Calculations

V_{sa} [lb]
15,711

Results

V_{sa} [lb]	ϕ steel	$\phi\ V_{sa}$ [lb]	V_{ua} [lb]
15,711	0.650	10,212	26

4.2 Pryout Strength

$V_{cpg} = k_{cp}\left[\left(\frac{A_{Nc}}{A_{Nc0}}\right)\psi_{ec,N}\,\psi_{ed,N}\,\psi_{c,N}\,\psi_{cp,N}\,N_b\right]$ ACI 318-08 Eq. (D-31)

$\phi\ V_{cpg} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

A_{Nc} see ACI 318-08, Part D.5.2.1, Fig. RD.5.2.1(b)

$A_{Nc0} = 9\,h_{ef}^2$ ACI 318-08 Eq. (D-6)

$\psi_{ec,N} = \left(\frac{1}{1+\frac{2\,e'_N}{3\,h_{ef}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-9)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-08 Eq. (D-11)

$\psi_{cp,N} = \mathrm{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-08 Eq. (D-13)

$N_b = k_c\,\lambda\,\sqrt{f'_c}\,h_{ef}^{1.5}$ ACI 318-08 Eq. (D-7)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
2	3.750	0.000	0.000	∞

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ	f'_c [psi]
1.000	7.000	24	1	4,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
3,465.00	126.56	1.000	1.000	1.000	1.000	11,023

Results

V_{cpg} [lb]	ϕ concrete	$\phi\ V_{cpg}$ [lb]	V_{ua} [lb]
603,554	0.700	422,488	900

Company:
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5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.018	0.003	5/3	1	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

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!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!

Fastening meets the design criteria!

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7 Installation data

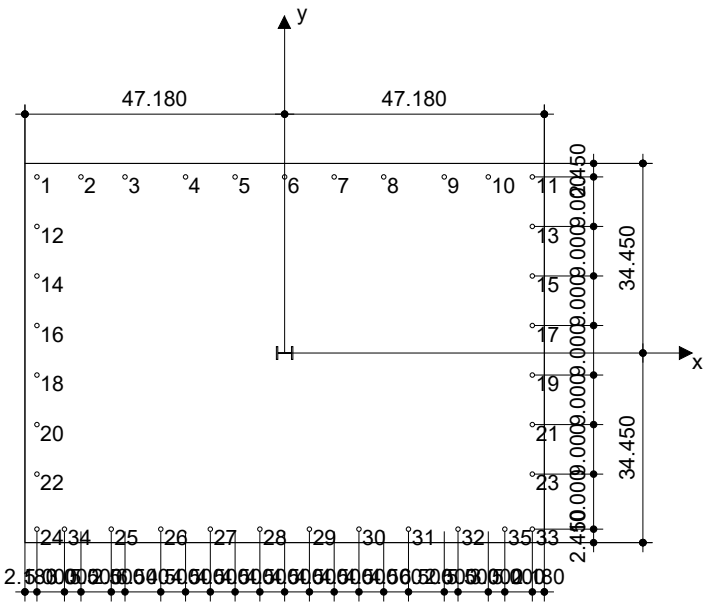
Anchor plate, steel: -
Profile: S shape (AISC); 3.000 x 2.330 x 0.170 x 0.260 in.
Hole diameter in the fixture: d_f = 0.813 in.
Plate thickness (input): 1.380 in.
Recommended plate thickness: not calculated
Drilling method: Hammer drilled
Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: Kwik Bolt TZ - SS 304 3/4 (3 3/4)
Installation torque: 1,320.002 in.lb
Hole diameter in the base material: 0.750 in.
Hole depth in the base material: 4.500 in.
Minimum thickness of the base material: 8.000 in.

R - user is responsible to ensure a rigid base plate for the entered thickness with appropriate solutions (stiffeners,...)

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer	• Manual blow-out pump	• Torque wrench
• Properly sized drill bit		• Hammer



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-45.000	32.000	-	-	-	-
2	-37.000	32.000	-	-	-	-
3	-29.000	32.000	-	-	-	-
4	-18.000	32.000	-	-	-	-
5	-9.000	32.000	-	-	-	-
6	0.000	32.000	-	-	-	-
7	9.000	32.000	-	-	-	-
8	18.000	32.000	-	-	-	-
9	29.000	32.000	-	-	-	-
10	37.000	32.000	-	-	-	-
11	45.000	32.000	-	-	-	-
12	-45.000	23.000	-	-	-	-
13	45.000	23.000	-	-	-	-
14	-45.000	14.000	-	-	-	-
15	45.000	14.000	-	-	-	-
16	-45.000	5.000	-	-	-	-
17	45.000	5.000	-	-	-	-
18	-45.000	-4.000	-	-	-	-
19	45.000	-4.000	-	-	-	-
20	-45.000	-13.000	-	-	-	-
21	45.000	-13.000	-	-	-	-
22	-45.000	-22.000	-	-	-	-
23	45.000	-22.000	-	-	-	-
24	-45.000	-32.000	-	-	-	-
25	-31.500	-32.000	-	-	-	-
26	-22.500	-32.000	-	-	-	-
27	-13.500	-32.000	-	-	-	-
28	-4.500	-32.000	-	-	-	-
29	4.500	-32.000	-	-	-	-
30	13.500	-32.000	-	-	-	-
31	22.500	-32.000	-	-	-	-
32	31.500	-32.000	-	-	-	-
33	45.000	-32.000	-	-	-	-
34	-40.000	-32.000	-	-	-	-
35	40.000	-32.000	-	-	-	-

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8 Remarks; Your Cooperation Duties

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