

PATTERSON-KELLEY CO.

P-K COMPACT WATER HEATER (PK08DH)

DES. J. ROBERSON

JOB NO. 11-1520

DATE 7/6/15

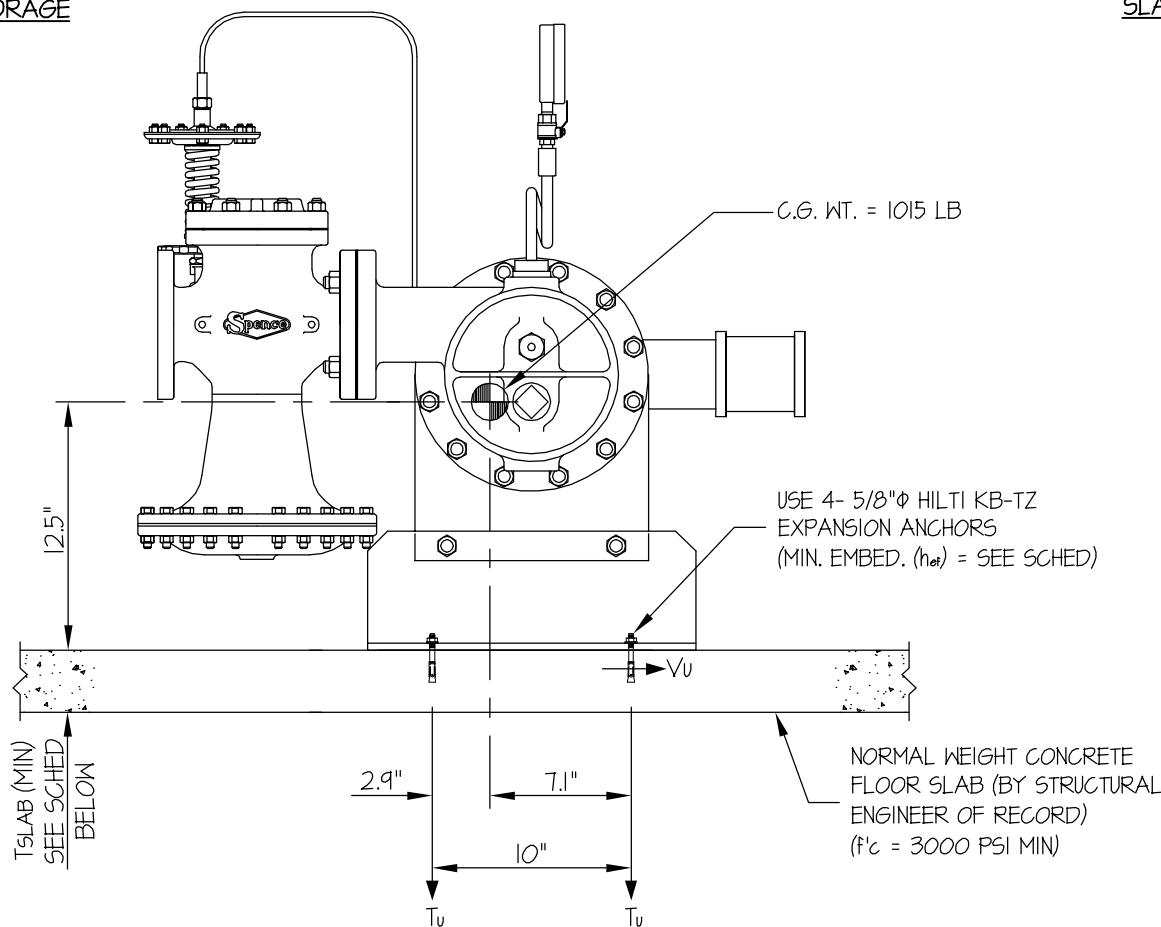
SHEET

1

OF 3 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE

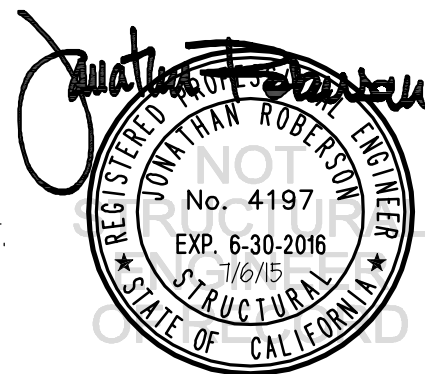


FRONT ELEVATION

ANCHORS				QTY	T _{SLAB}	T _u (lb)	V _u (lb)
MAX Sps	TYPE	DIAM	EFF EMBED				
200	HILTI KB-TZ	5/8"	3.125"	4	5"	2253	925
220	HILTI KB-TZ	5/8"	4"	4	6"	2505	1019

NOTES:

- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10. STRENGTH DESIGN IS USED. ($a_p = 1.0$, $l_p = 1.5$, $R_p = 2.5$, $\Omega_o = 2.5$, $z/h = 0$)
- CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THIS PREAPPROVAL ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.



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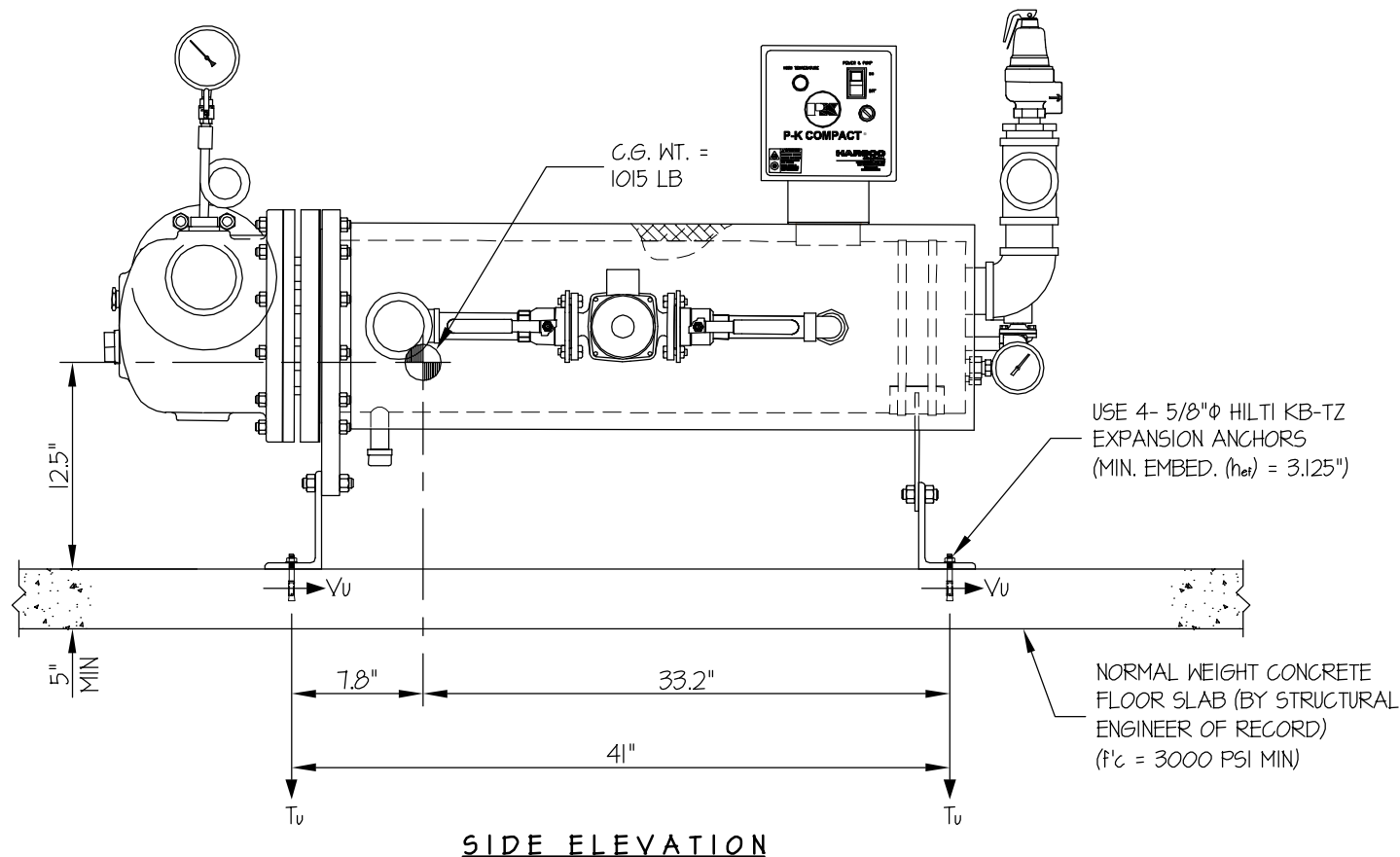
2

OF 3 SHEETS

SEISMIC ANCHORAGE

MAX $S_{ds} \leq 2.00$

SLAB ON GRADE



LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED ($S_{ds} = 2.00$, $a_p = 10$, $I_p = 15$, $R_p = 2.5$, $\Omega_o = 2.5$, $z/h = 0$)

WEIGHT = 1015 LB

HORIZONTAL FORCE (E_{mh}) = $2.25 W_p = 2284$ LB

VERTICAL FORCE (E_v) = $0.40 W_p = 406$ LB

BOLT FORCES:

BOLT SPECS: 5/8" HILTI KB-TZ ($h_{ef} = 3.125"$)

$\phi T = 0.75 \phi N_n = 2508$ LB/BOLT (TENSION)

$\phi V = \phi V_n = 4940$ LB/BOLT (SHEAR)

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[\frac{2284 \# (12.5") (2.9")}{1 \text{ BOLT } (41") (10")} \times (0.3) \right] + \frac{2284 \# (12.5") (33.2")}{1 \text{ BOLT } (10") (41")} - \frac{(1015 \# (0.9) - 406 \#) (2.9") (33.2")}{1 \text{ BOLT } (10") (41")}$$

(HORIZ - FRONT TO BACK) (HORIZ - SIDE TO SIDE) (WEIGHT(0.9) - E_v)

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \frac{2284 \# (33.2")}{2 \text{ BOLTS } (41")} = 925 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left(\frac{T_u}{\phi T} \right) + \left(\frac{V_u}{\phi V} \right) \leq 1.2 \quad \left(\frac{2253}{2508} \right) + \left(\frac{925}{4940} \right) = 1.09 \leq 1.2 \quad \therefore \text{OK}$$

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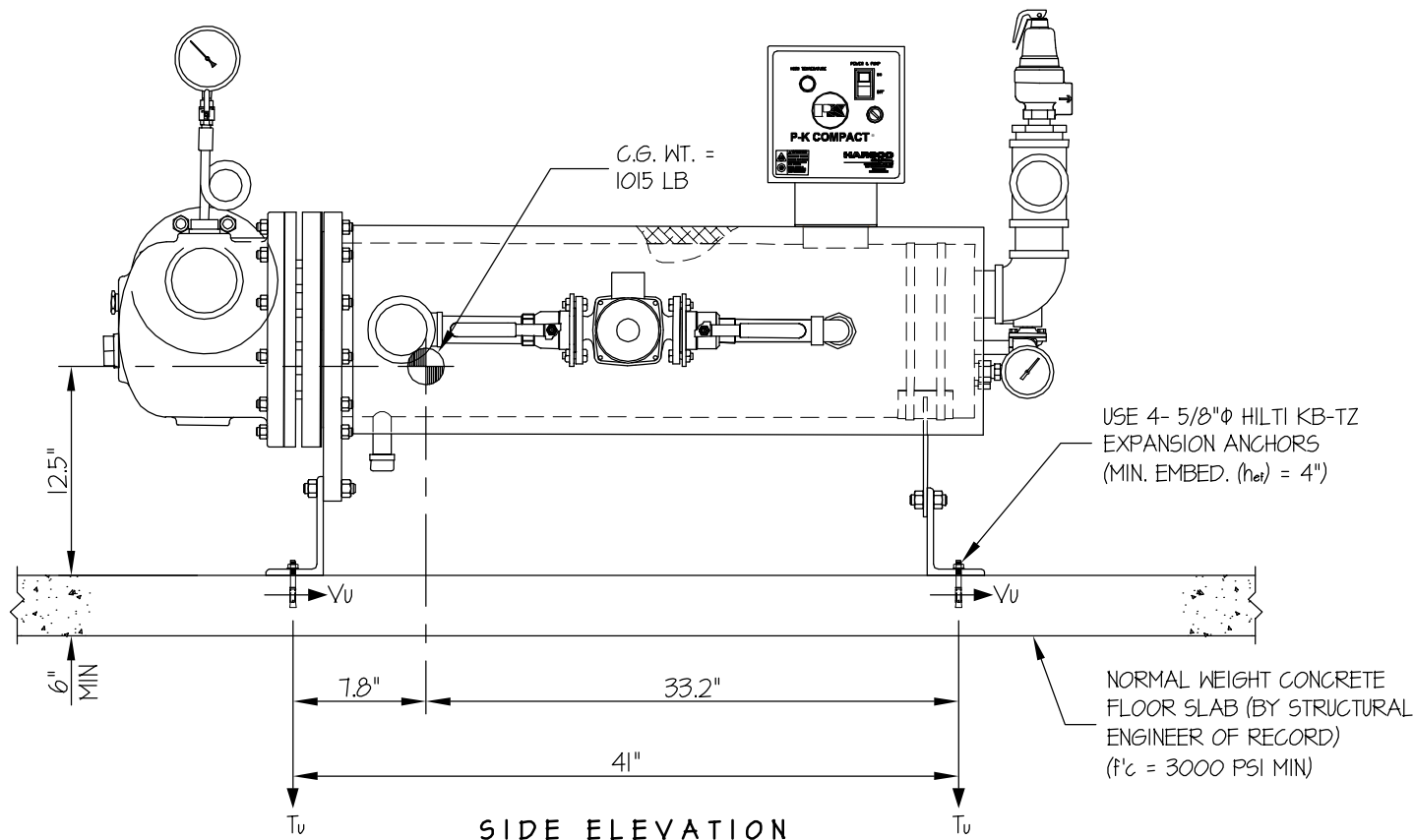
3

OF 3 SHEETS

SEISMIC ANCHORAGE

2.00 < MAX S_{DS} ≤ 2.20

SLAB ON GRADE



LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED (S_{DS} = 2.20, a_p = 10, I_p = 15, R_p = 2.5, Ω₀ = 2.5, z/h = 0)

WEIGHT = 1015 LB

HORIZONTAL FORCE (E_{mh}) = 3.95 W_p = 2517 LB

VERTICAL FORCE (E_v) = 0.44 W_p = 447 LB

BOLT FORCES:

BOLT SPECS: 5/8"φ HILTI KB-TZ (h_{ef} = 4")

φT = 0.75φN_n = 3329 LB/BOLT (TENSION)

φV = φV_n = 4940 LB/BOLT (SHEAR)

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[\frac{2517\#(12.5'')(2.9'')}{1 \text{ BOLT}(41'')(10'')} \times (0.3) \right] + \frac{2517\#(12.5'')(33.2'')}{1 \text{ BOLT}(10'')(41'')} - \frac{(1015\#(0.9) - 447\#)(2.9'')(33.2'')}{1 \text{ BOLT}(10'')(41'')} = 2505 \text{ LB/BOLT (MAX)}$$

(HORIZ - FRONT TO BACK) (HORIZ - SIDE TO SIDE) (WEIGHT(0.9) - E_v)

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \frac{2517\#(33.2'')}{2 \text{ BOLTS}(41'')} = 1019 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left(\frac{T_u}{\phi T} \right) + \left(\frac{V_u}{\phi V} \right) \leq 1.2 \quad \left(\frac{2505}{3329} \right) + \left(\frac{1019}{4940} \right) = 0.96 \leq 1.2 \quad \therefore \text{O.K.}$$

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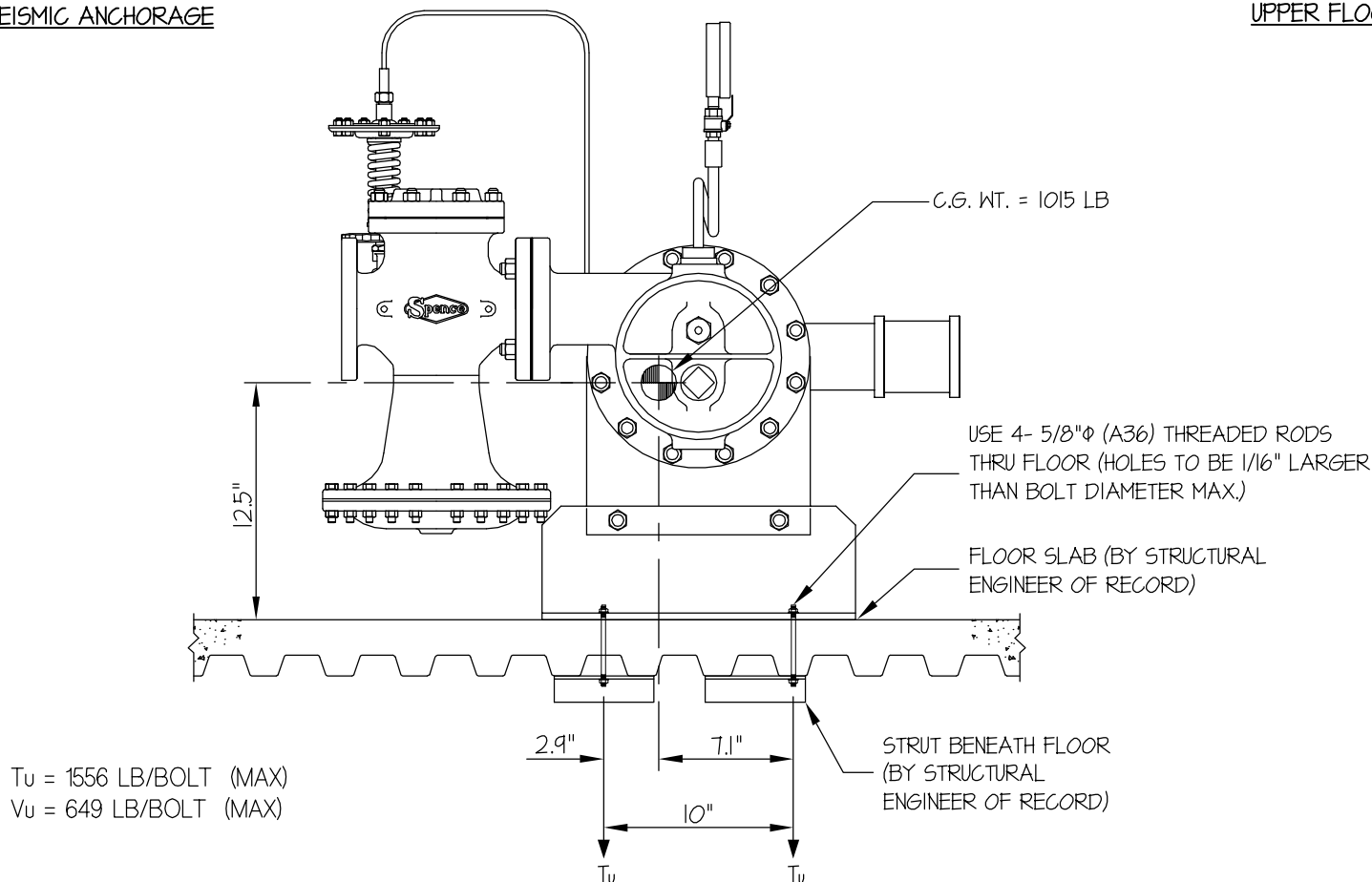
SHEET

1

OF **2** SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



FRONT ELEVATION

NOTES:

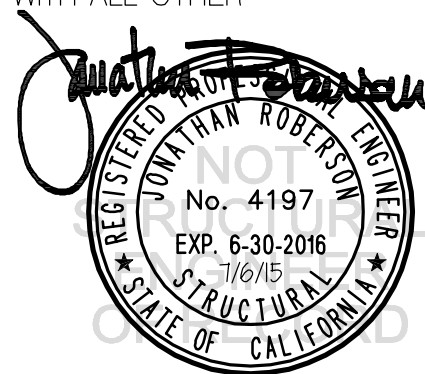
- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED. ($S_Ds = 2.20$, $a_p = 1.0$, $I_p = 1.5$, $R_p = 2.5$, $z/h \leq 1$)

HORIZONTAL FORCE (E_h) = $1.58 W_p$

VERTICAL FORCE (E_v) = $0.44 W_p$

- CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
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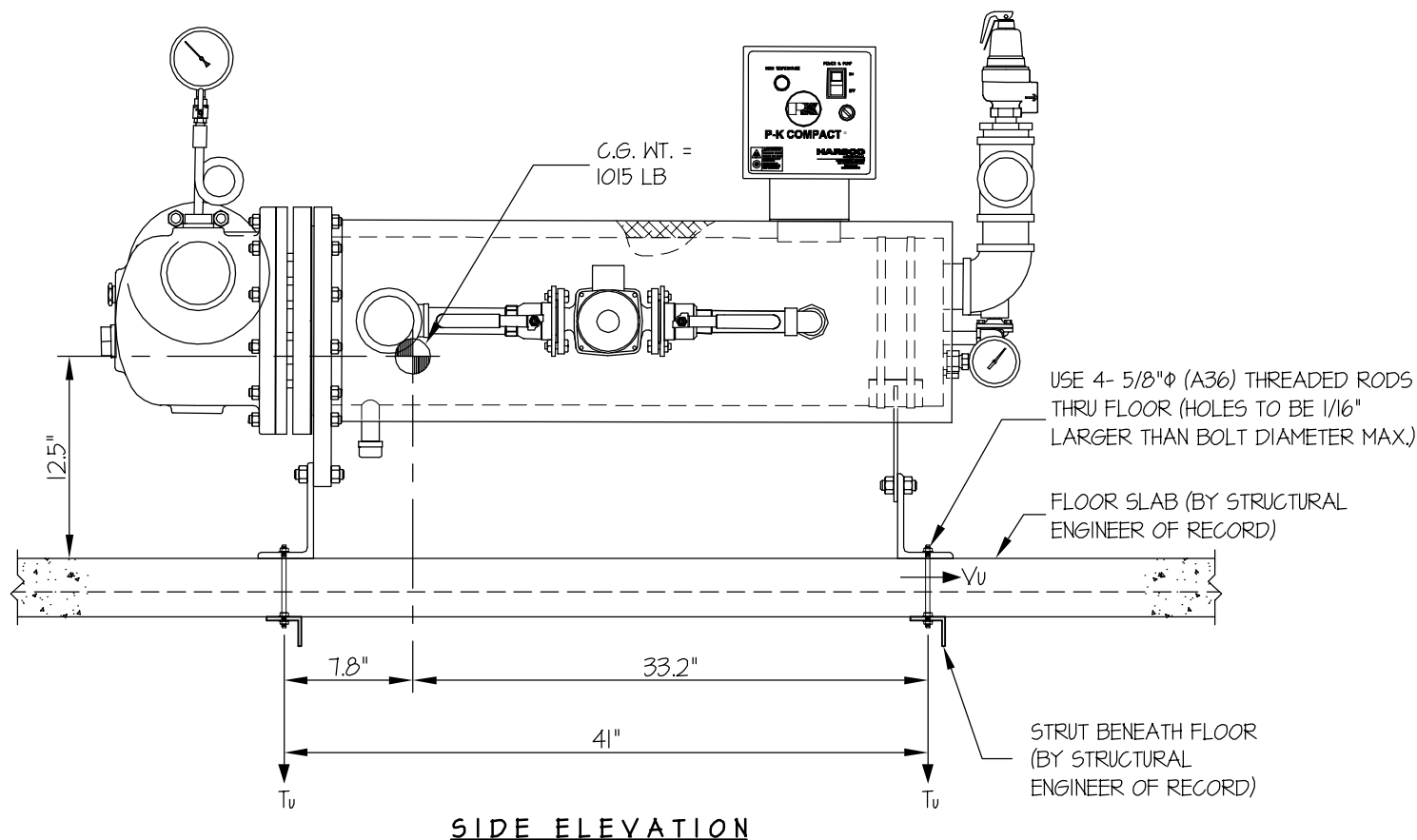
SHEET

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OF 2 SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED ($S_{Ds} = 2.20$, $a_p = 10$, $I_p = 15$, $R_p = 2.5$, $z/h \leq 1$)

WEIGHT = 1015 LB

HORIZONTAL FORCE (E_h) = 158 $W_p = 1604$ LB

VERTICAL FORCE (E_v) = 0.44 $W_p = 447$ LB

BOLT FORCES:

BOLT SPECS: 5/8"Φ (A36) THREADED ROD

$\phi T = 10,016$ LB/BOLT (TENSION)

$\phi V = 5342$ LB/BOLT (SHEAR)

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[\frac{1604\#(12.5'')(2.9'')}{1 \text{ BOLT } (41'')(10'')} \times (0.3) \right] + \frac{1604\#(12.5'')(33.2'')}{1 \text{ BOLT } (10'')(41'')} - \frac{(1015\#(0.9) - 447\#)(2.9'')(33.2'')}{1 \text{ BOLT } (10'')(41'')} = 1556 \text{ LB/BOLT (MAX)}$$

(HORIZ. - FRONT TO BACK) (HORIZ. - SIDE TO SIDE) (WEIGHT(0.9) - E_v)

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \frac{1604\#(33.2'')}{2 \text{ BOLTS } (41'')} = 649 \text{ LB/BOLT (MAX)}$$