

PATTERSON-KELLEY CO.

P-K COMPACT WATER HEATER (PK12DH)

DES. **J. ROBERSON**

JOB NO. **11-1520**

DATE **7/7/15**

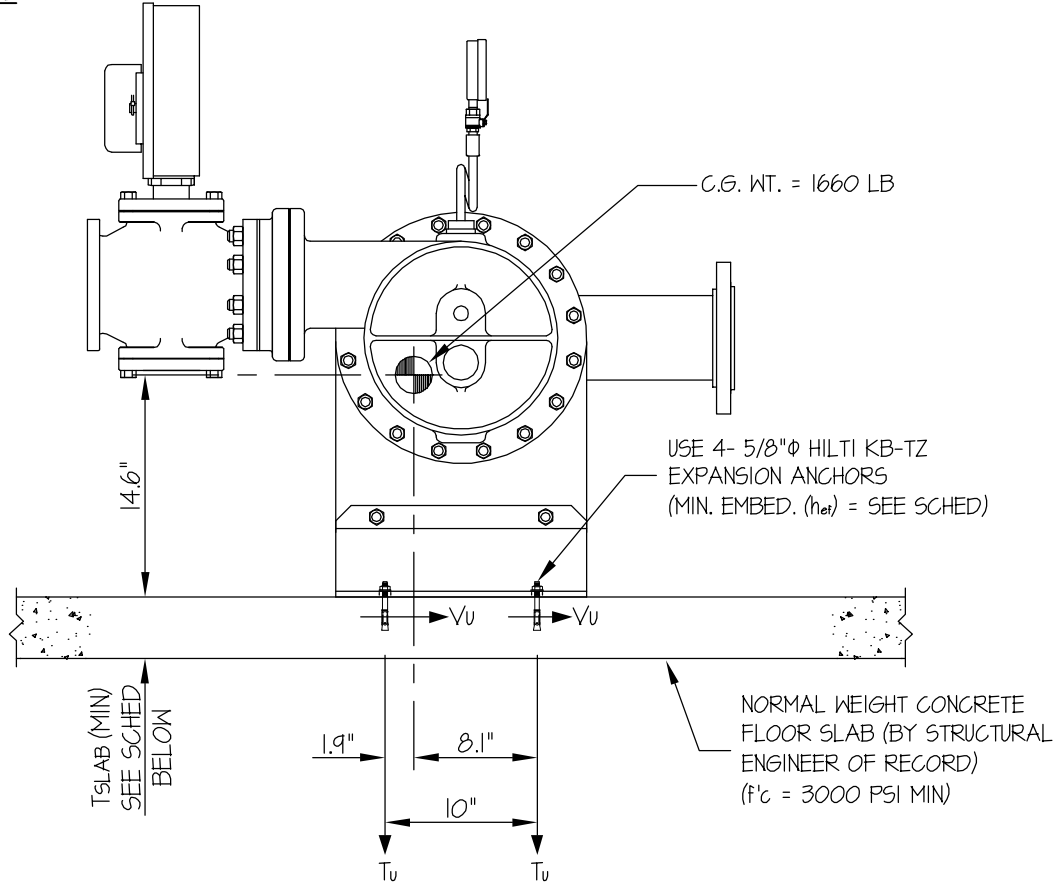
SHEET

1

OF **3** SHEETS

SEISMIC ANCHORAGE

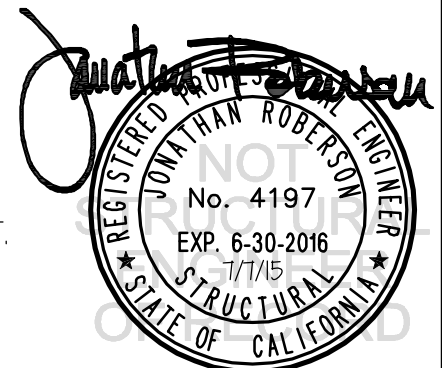
SLAB ON GRADE



ANCHORS							
MAX Sds	TYPE	DIAM	EFF EMBED	QTY	T _{SLAB}	T _u (lb)	V _u (lb)
110	HILTI KB-TZ	5/8"	3.125"	4	5"	2336	846
140	HILTI KB-TZ	5/8"	4"	4	6"	3040	1078

NOTES:

- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10. STRENGTH DESIGN IS USED. ($\alpha_p = 1.0$, $\rho_p = 1.5$, $R_p = 2.5$, $\Omega_o = 2.5$, $z/h = 0$)
- 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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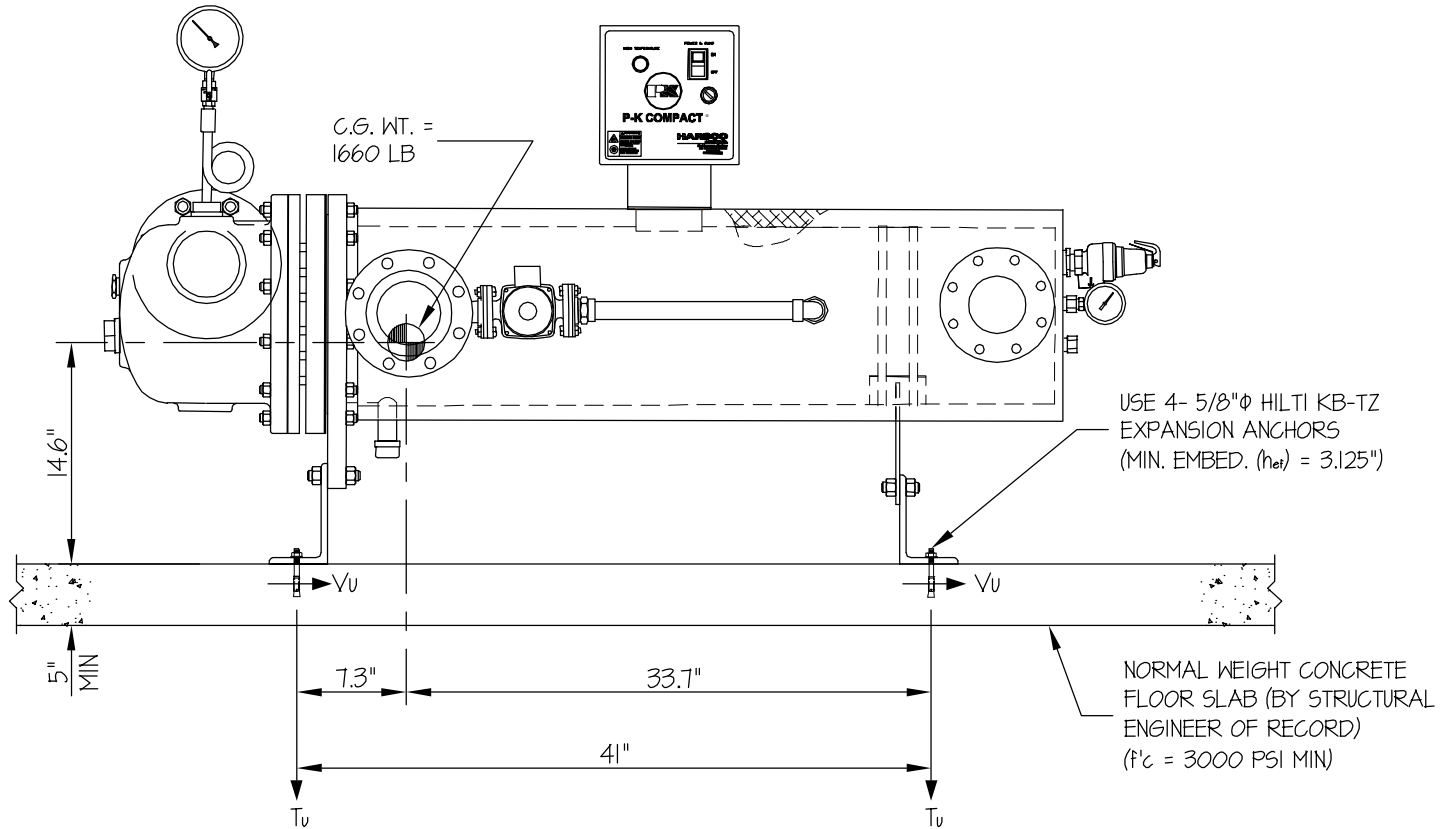
DATE **7/7/15**

OF **3** SHEETS

SEISMIC ANCHORAGE

MAX $S_{Ds} \leq 1.10$

SLAB ON GRADE



SIDE ELEVATION

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

STRENGTH DESIGN IS USED ($S_{Ds} = 1.10$, $\alpha_p = 1.0$, $l_p = 15$, $R_p = 2.5$, $\Omega_o = 2.5$, $z/h = 0$)

WEIGHT = 1660 LB

HORIZONTAL FORCE (E_{mh}) = 124 $W_p = 2058$ LB

VERTICAL FORCE (E_v) = 0.22 $W_p = 365$ LB

BOLT FORCES:

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

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

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

TENSION (T)

$$T_u \text{ MAXIMUM} = \left[\frac{2058 \# (14.6") (1.9")}{1 \text{ BOLT } (41") (10")} \times (0.3) \right] + \frac{2058 \# (14.6") (33.7")}{1 \text{ BOLT } (10") (41")} - \frac{(1660 \# (0.9) - 365 \#) (1.9") (33.7")}{1 \text{ BOLT } (10") (41")} = 2336 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_u \text{ MAXIMUM} = \frac{2058 \# (33.7")}{2 \text{ BOLTS } (41")} = 846 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left(\frac{T_u}{\phi T} \right) + \left(\frac{V_u}{\phi V} \right) \leq 1.2 \quad \left(\frac{2336}{2508} \right) + \left(\frac{846}{4940} \right) = 1.10 \leq 1.2 \quad \therefore \text{O.K.}$$

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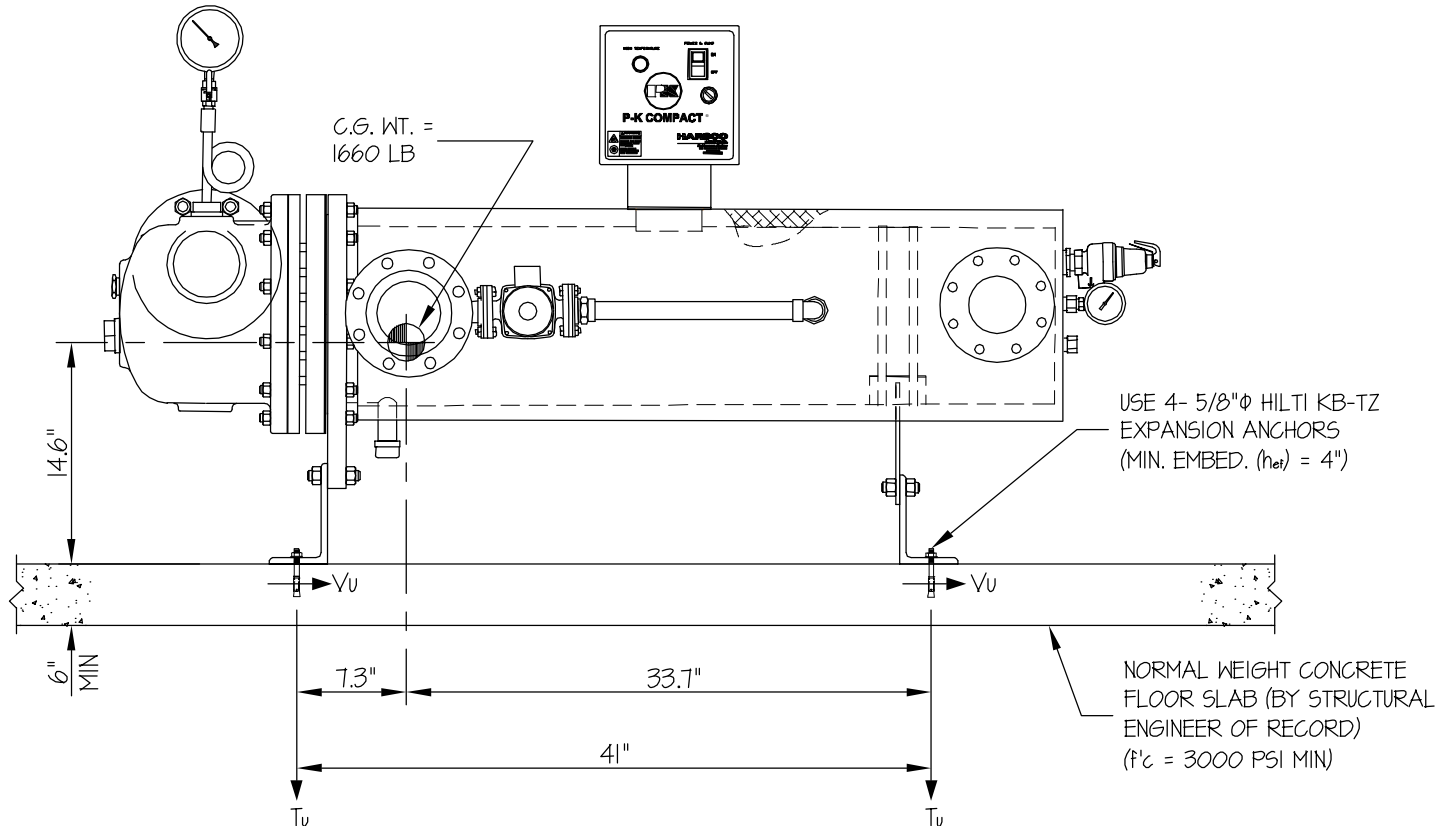
DATE **7/7/15**

OF **3** SHEETS

SEISMIC ANCHORAGE

1.10 < MAX S_{DS} ≤ 1.40

SLAB ON GRADE



SIDE ELEVATION

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

STRENGTH DESIGN IS USED (S_{DS} = 1.40, a_p = 1.0, I_p = 1.5, R_p = 2.5, Ω_o = 2.5, z/h = 0)

WEIGHT = 1660 LB

HORIZONTAL FORCE (E_{mh}) = 158 W_p = 2623 LB

VERTICAL FORCE (E_v) = 0.28 W_p = 465 LB

BOLT FORCES:

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

φT = 0.75φ_n = 3329 LB/BOLT (TENSION)

φV = φ_n = 4940 LB/BOLT (SHEAR)

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[\frac{2623\#(14.6'')(1.9'')}{1 \text{ BOLT}(41'')(10'')} \times (0.3) \right] + \frac{2623\#(14.6'')(33.7'')}{1 \text{ BOLT}(10'')(41'')} - \frac{(1660\#(0.9) - 465\#)(1.9'')(33.7'')}{1 \text{ BOLT}(10'')(41'')} = 3040 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \frac{2623\#(33.7'')}{2 \text{ BOLTS}(41'')} = 1078 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left(\frac{T_u}{\phi T} \right) + \left(\frac{V_u}{\phi V} \right) \leq 1.2 \quad \left(\frac{3040}{3329} \right) + \left(\frac{1078}{4940} \right) = 1.13 \leq 1.2 \quad \therefore \text{O.K.}$$

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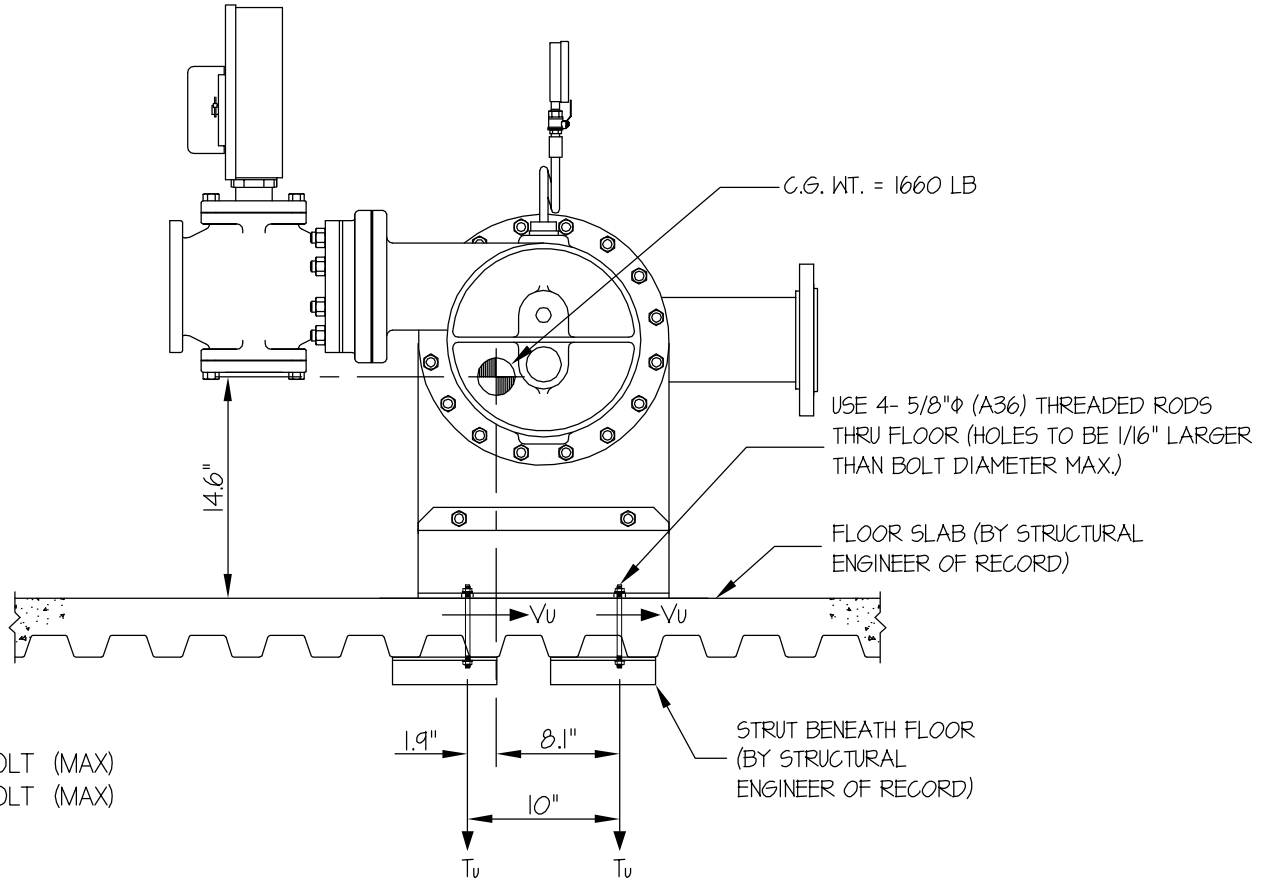
P-K COMPACT WATER HEATER (PK12DH)

DATE **7/7/15**

OF **2** SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



$T_u = 3081 \text{ LB/BOLT (MAX)}$
 $V_u = 1078 \text{ LB/BOLT (MAX)}$

FRONT ELEVATION

NOTES:

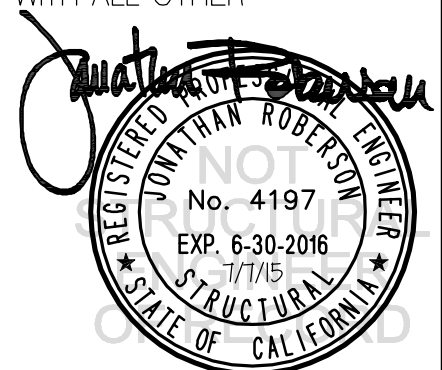
- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.**

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.
- 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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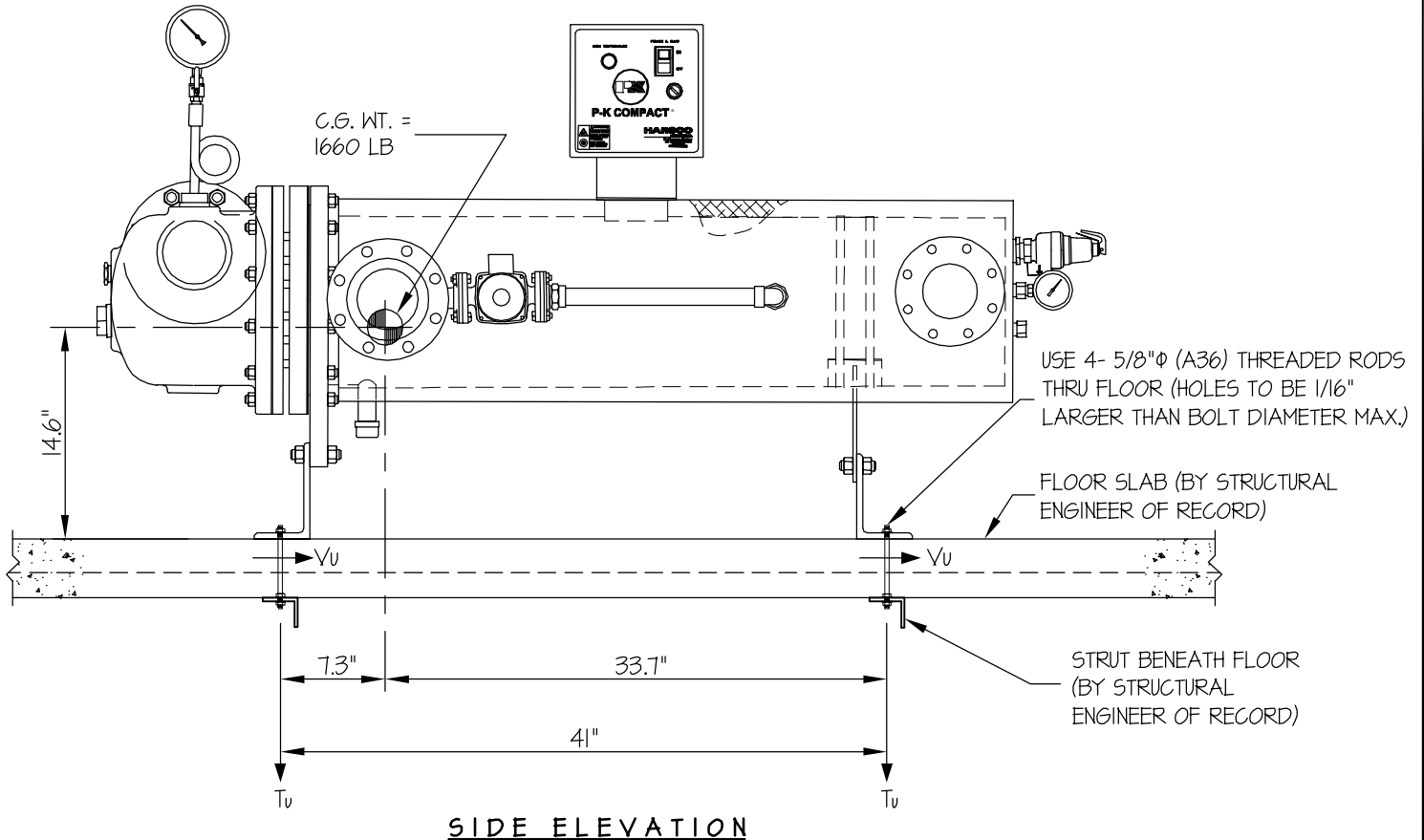
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DATE **7/7/15**

OF **2** SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



SIDE ELEVATION

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 = 1660 LB

HORIZONTAL FORCE (E_h) = 158 $W_p = 2623$ LB

VERTICAL FORCE (E_v) = 0.44 $W_p = 730$ LB

BOLT FORCES:

BOLT SPECS: 5/8"φ (A36) THREADED ROD

φT = 10,016 LB/BOLT (TENSION)

φV = 5342 LB/BOLT (SHEAR)

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[\frac{2623\#(14.6'')(1.9'')}{1 \text{ BOLT } (41'')(10'')} \times (0.3) \right] + \frac{2623\#(14.6'')(33.7'')}{1 \text{ BOLT } (10'')(41'')} - \frac{(1660\#(0.9) - 730\#)(1.9'')(33.7'')}{1 \text{ BOLT } (10'')(41'')} = 3081 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \frac{2623\#(33.7'')}{2 \text{ BOLTS } (41'')} = 1078 \text{ LB/BOLT (MAX)}$$