

### PATTERSON-KELLEY, LLC

DES. J. ROBERSON

SHEET

1

JOB NO. 11-2007

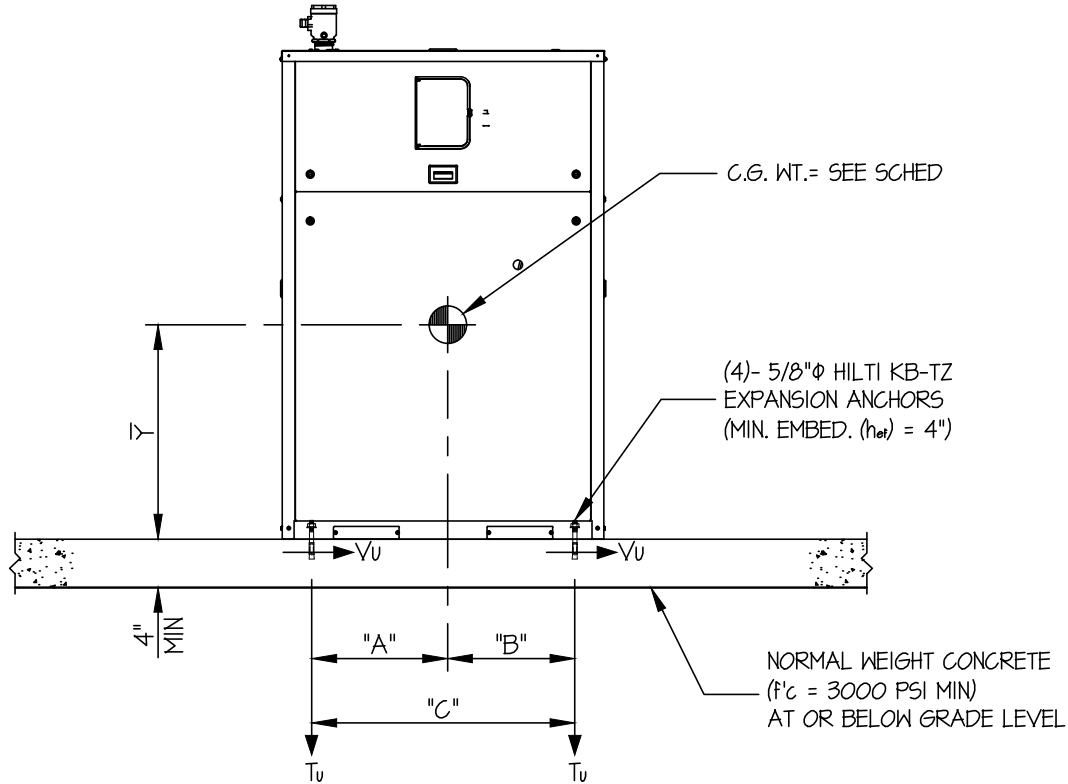
### 2500/3000 & 3500/4000 MODEL BOILER

DATE 4/8/20

OF 2 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE



FRONT ELEVATION

NOTES:

- FORCES ARE DETERMINED PER 2019 CALIFORNIA BUILDING CODE AND ASCE 7-16.

STRENGTH DESIGN IS USED. ( $S_{bs} = 2.20$ ,  $a_p = 1.0$ ,  $l_p = 1.5$ ,  $R_p = 2.5$ ,  $\Omega_o = 2.0$ ,  $z/h = 0$ )

HORIZONTAL FORCE ( $E_h$ ) =  $0.99 W_p$

HORIZONTAL FORCE ( $E_{mh}$ ) =  $1.98 W_p$  (FOR CONCRETE ANCHORAGE)

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 VERIFY ALL CONDITIONS AND PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.



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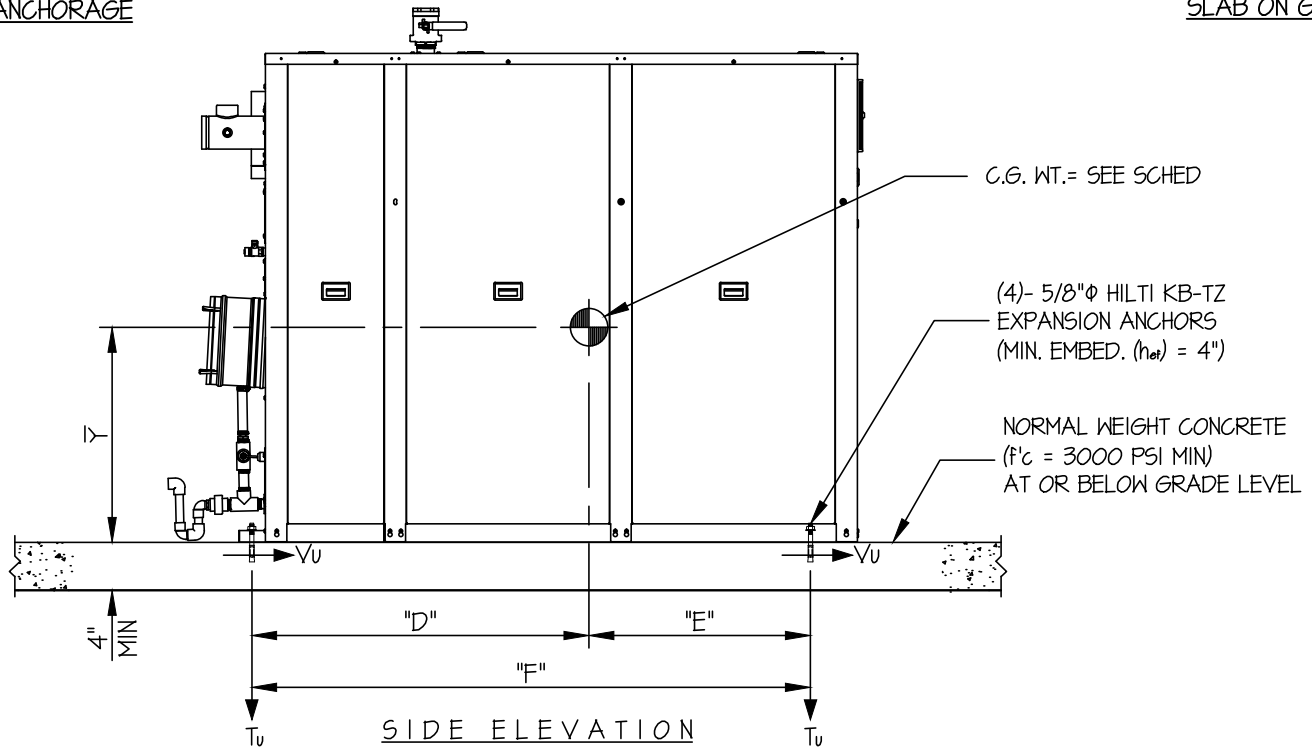
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MODEL	TOTAL WEIGHT (lb.)	$\bar{Y}$ (in.)	"A" (in.)	"B" (in.)	"C" (in.)	"D" (in.)	"E" (in.)	"F" (in.)	T <sub>u</sub> (lb.)	V <sub>u</sub> (lb.)
2500/3000	2329	29.64	18.31	17.69	36	33.20	27.55	60.75	2120	1612
* 3500/4000	2772	29.32	18.61	17.39	36	46.29	30.70	76.99	2620	2076

\* THIS UNIT IS USED IN CALCULATIONS

LOADS: PER 2019 CALIFORNIA BUILDING CODE AND ASCE 7-16.

STRENGTH DESIGN IS USED ( $S_{ds} = 2.20$ ,  $a_p = 1.0$ ,  $I_p = 1.5$ ,  $R_p = 2.5$ ,  $\Omega_0 = 2.0$ ,  $z/h = 0$ )

WEIGHT = 2772 LB

HORIZONTAL FORCE ( $E_{mh}$ ) =  $1.98 W_p = 5489$  LB

VERTICAL FORCE ( $E_v$ ) =  $0.44 W_p = 1220$  LB

BOLT FORCES:

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

EDGE DISTANCE = 2" MIN.

$\phi T = 0.75 \phi N_n = 3632$  LB/BOLT (TENSION)

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

TENSION (T)

$$T_u \text{ MAXIMUM} = \left[ \frac{5489\#(29.32'')(17.39'')}{1 \text{ BOLT}(76.99'')(36'')} \times (0.3) \right] + \frac{5489\#(29.32'')(46.29'')}{1 \text{ BOLT}(36'')(76.99'')} - \frac{(2772\#(0.9) - 1220\#(17.39'')(46.29''))}{1 \text{ BOLT}(36'')(76.99'')} = 2620 \text{ LB/BOLT (MAX)}$$

( HORIZ - FRONT TO BACK )                      ( HORIZ - SIDE TO SIDE )                      ( 0.9WEIGHT) - E<sub>v</sub>

SHEAR (V)

$$V_u \text{ MAXIMUM} = \left[ \frac{5489\#(18.61'')}{2 \text{ BOLTS}(36'')} \times (0.3) \right] + \frac{5489\#(46.29'')}{2 \text{ BOLTS}(76.99'')} = 2076 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left( \frac{T_u}{\phi T} \right) + \left( \frac{V_u}{\phi V} \right) \leq 1.2 \quad \left( \frac{2620}{3632} \right) + \left( \frac{2076}{4940} \right) = 1.14 \leq 1.2 \quad \therefore \text{O.K.}$$

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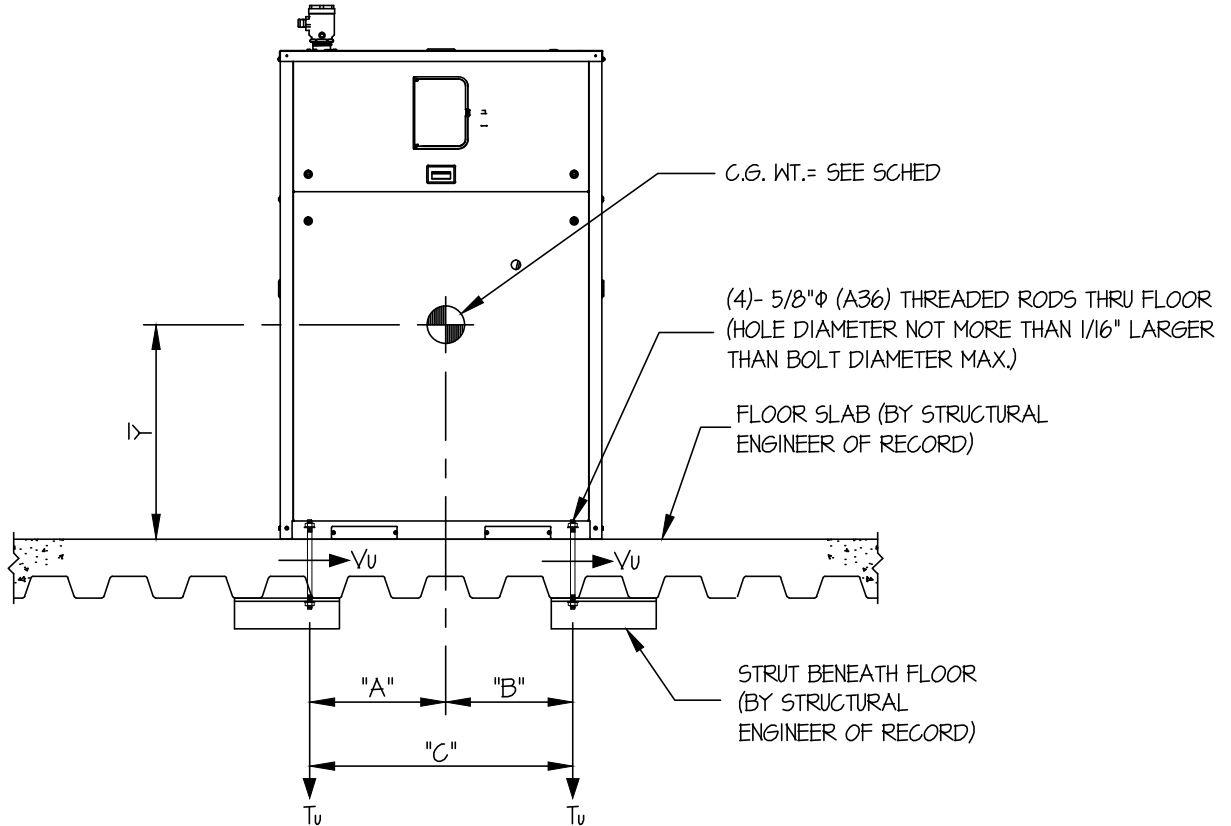
### 2500/3000 & 3500/4000 MODEL BOILER

DATE 4/8/20

OF 2 SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



FRONT ELEVATION

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HORIZONTAL FORCE ( $E_h$ ) =  $1.66 W_p$

VERTICAL FORCE ( $E_v$ ) =  $0.46 W_p$

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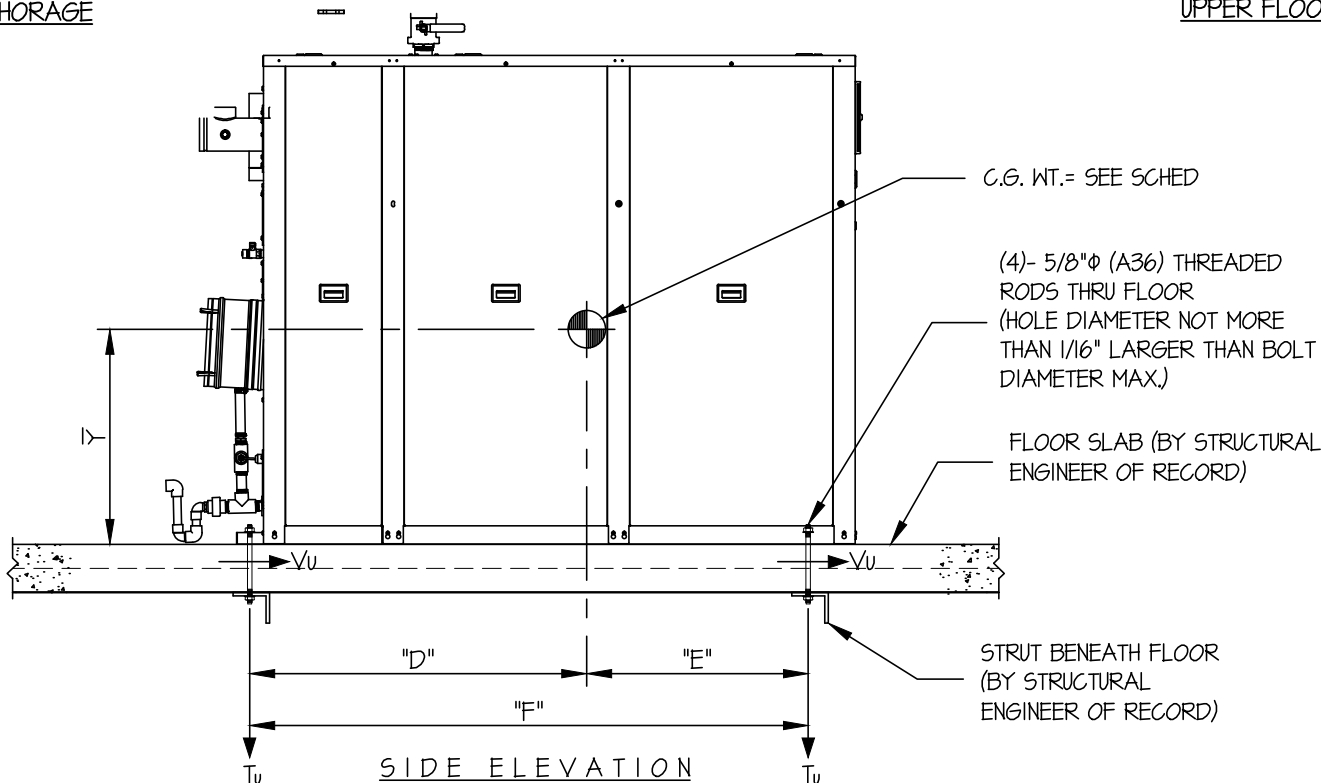
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SEISMIC ANCHORAGE

UPPER FLOOR



MODEL	TOTAL WEIGHT (lb)	Y (in)	"A" (in)	"B" (in)	"C" (in)	"D" (in)	"E" (in)	"F" (in)	Tu (lb)	Vu (lb)
2500/3000	2329	29.64	18.31	17.69	36	33.20	27.55	60.75	1743	1351
* 3500/4000	2772	29.32	18.61	17.39	36	46.29	30.70	76.99	2153	1740

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WEIGHT = 2772 LB

HORIZONTAL FORCE ( $E_h$ ) = 166  $W_p$  = 4602 LB

VERTICAL FORCE ( $E_v$ ) = 0.46  $W_p$  = 1275 LB

BOLT FORCES:

BOLT SPECS: 5/8" (A36) THREADED ROD

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

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

TENSION (T)

$$T_u \text{ MAXIMUM} = \left[ \frac{4602 \# (29.32") (17.39")}{1 \text{ BOLT } (76.99") (36")} \times (0.3) \right] + \frac{4602 \# (29.32") (46.29")}{1 \text{ BOLT } (36") (76.99")} - \frac{(2772 \# (0.9) - 1275 \# (17.39") (46.29"))}{1 \text{ BOLT } (36") (76.99")} = 2153 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_u \text{ MAXIMUM} = \left[ \frac{4602 \# (18.61")}{2 \text{ BOLTS } (36")} \times (0.3) \right] + \frac{4602 \# (46.29")}{2 \text{ BOLTS } (76.99")} = 1740 \text{ LB/BOLT (MAX)}$$