

## PATTERSON - KELLEY

DES. **J. ROBERSON**

SHEET

**1**

JOB NO. **11-1924**

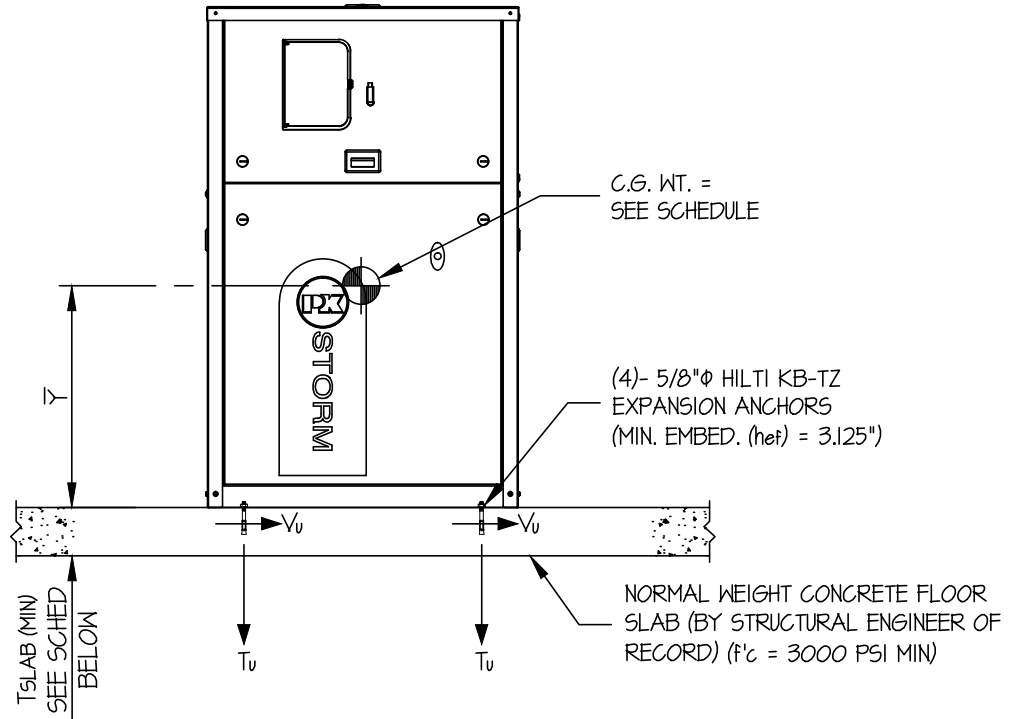
## STORM 1250, 1500 & 1750/2000 BOILERS

DATE **10/22/19**

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. ( $S_{Ds} = 2.20$ ,  $a_p = 1.0$ ,  $l_p = 1.5$ ,  $R_p = 2.5$ ,  $\Omega_o = 2.0$ ,  $z/h = 0$ )

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



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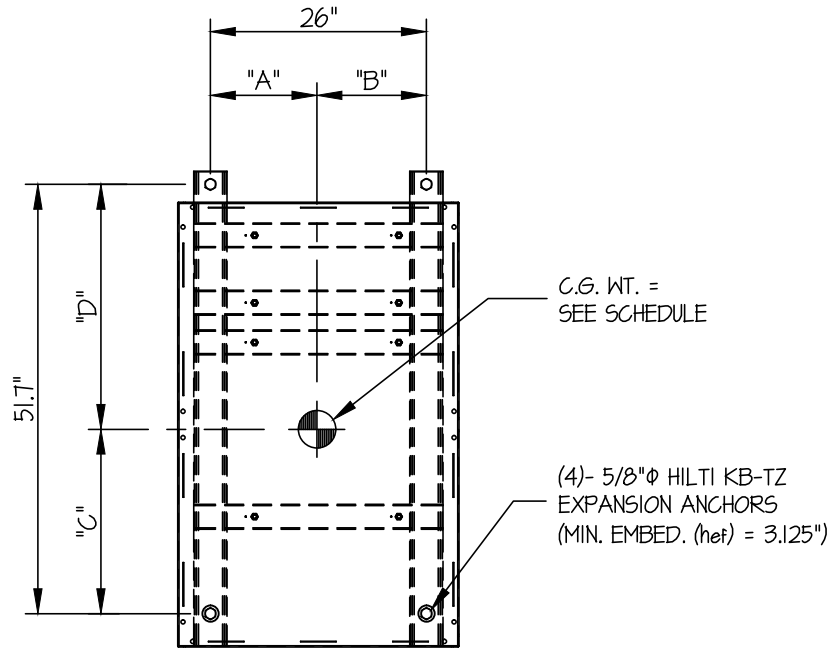
### STORM 1250, 1500 & 1750/2000 BOILERS

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SEISMIC ANCHORAGE

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PLAN AT BASE

| MODEL       | WEIGHT (lb.) | $\bar{Y}$ (in.) | "A" (in.) | "B" (in.) | "C" (in.) | "D" (in.) | T <sub>u</sub> (lb.) | V <sub>u</sub> (lb.) |
|-------------|--------------|-----------------|-----------|-----------|-----------|-----------|----------------------|----------------------|
| 1250        | 1112         | 25.1            | 13.2      | 12.8      | 19.1      | 32.6      | 1339                 | 862                  |
| 1500        | 1208         | 24.9            | 13.3      | 12.7      | 20.3      | 31.4      | 1395                 | 910                  |
| * 1750/2000 | 1305         | 24.6            | 12.8      | 13.2      | 22.2      | 29.5      | 1408                 | 934                  |

\* THIS UNIT USED IN THE CALCULATION BELOW.

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

STRENGTH DESIGN IS USED (S<sub>ds</sub> = 2.20, a<sub>p</sub> = 1.0, l<sub>p</sub> = 1.5, R<sub>p</sub> = 2.5, Ω<sub>o</sub> = 2.0, z/h = 0)

WEIGHT = 1305 LB

HORIZONTAL FORCE (E<sub>mh</sub>) = 198 W<sub>p</sub> = 2584 LB

VERTICAL FORCE (E<sub>v</sub>) = 0.44 W<sub>p</sub> = 574 LB

BOLT SPECS: 5/8"φ HILTI KB-TZ:

φT = 0.75φN<sub>t</sub> = 2508 LB/BOLT (TENSION)

φV = φV<sub>n</sub> = 4940 LB/BOLT (SHEAR)

BOLT FORCES:

TENSION (T)

$$T_{u\text{ MAXIMUM}} = \left[ \frac{2584\#(24.6\")(13.2\"){(0.3)}}{1\text{BOLT}(51.7\")(26\")} \right] + \frac{2584\#(24.6\")(29.5\"){(0.3)}}{1\text{BOLT}(26\")(51.7\")} - \frac{(1305\#(0.9) - 574\#)(13.2\")(29.5\"){(0.3)}}{1\text{BOLT}(26\")(51.7\")} = 1408 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_{u\text{ MAXIMUM}} = \left[ \frac{2584\#(13.2\"){(0.3)}}{2\text{BOLTS}(26\")} \right] + \frac{2584\#(29.5\"){(0.3)}}{2\text{BOLTS}(51.7\")} = 934 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left( \frac{T_u}{\phi T} \right) + \left( \frac{V_u}{\phi V} \right) \leq 1.2 \quad \left( \frac{1408}{2508} \right) + \left( \frac{934}{4940} \right) = 0.75 \leq 1.2 \quad \therefore \text{O.K.}$$

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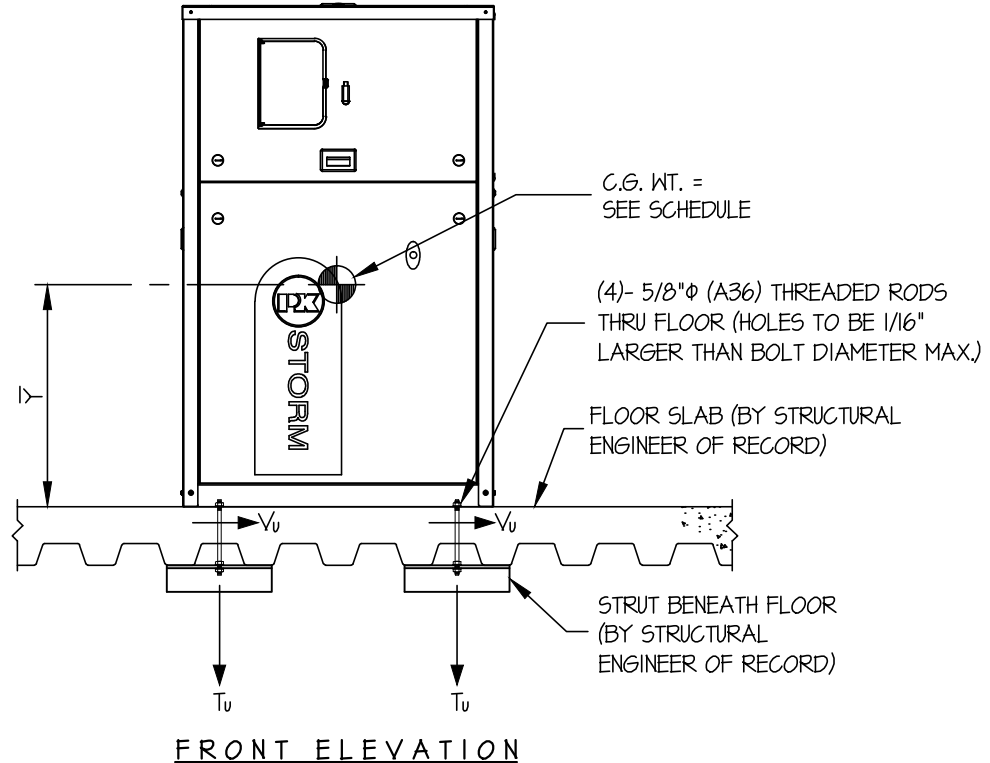
### STORM 1250, 1500 & 1750/2000 BOILERS

DATE 10/22/19

OF 2 SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



NOTES:

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

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

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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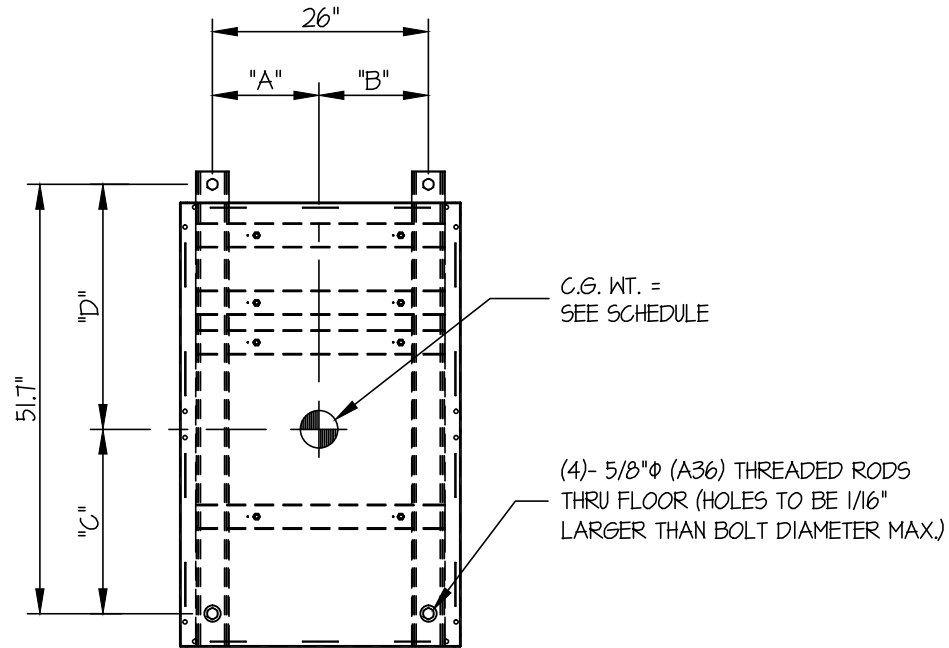
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UPPER FLOOR



PLAN AT BASE

| MODEL       | WEIGHT (lb.) | $\bar{Y}$ (in.) | "A" (in.) | "B" (in.) | "C" (in.) | "D" (in.) | T <sub>u</sub> (lb.) | V <sub>u</sub> (lb.) |
|-------------|--------------|-----------------|-----------|-----------|-----------|-----------|----------------------|----------------------|
| 1250        | 1112         | 25.1            | 13.2      | 12.8      | 19.1      | 32.6      | 1037                 | 688                  |
| 1500        | 1208         | 24.9            | 13.3      | 12.7      | 20.3      | 31.4      | 1080                 | 726                  |
| * 1750/2000 | 1305         | 24.6            | 12.8      | 13.2      | 22.2      | 29.5      | 1089                 | 745                  |

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

STRENGTH DESIGN IS USED ( $S_{ds} = 2.20, a_p = 1.0, I_p = 1.5, R_p = 2.5, z/h \leq 1$ )

WEIGHT = 1305 LB

HORIZONTAL FORCE ( $E_h$ ) = 158  $W_p = 2062$  LB

VERTICAL FORCE ( $E_v$ ) = 0.44  $W_p = 574$  LB

BOLT SPECS: 5/8"φ (A36) THREADED ROD

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

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

BOLT FORCES:

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[ \frac{2062\#(24.6'')(12.8'')}{1_{\text{BOLT}}(51.7'')(26'')} \times (0.3) \right] + \frac{2062\#(24.6'')(29.5'')}{1_{\text{BOLT}}(26'')(51.7'')} - \frac{(1305\#(0.9) - 574\#)(12.8'')(29.5'')}{1_{\text{BOLT}}(26'')(51.7'')} = 1089 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \left[ \frac{2062\#(13.2'')}{2_{\text{BOLTS}}(26'')} \times (0.3) \right] + \frac{2062\#(29.5'')}{2_{\text{BOLTS}}(51.7'')} = 745 \text{ LB/BOLT (MAX)}$$