EASE

EQUIPMENT **ANCHORAGE** & SEISMIC ENGINEERING
www.EquipmentAnchorage.com

PATTERSON-KELLEY

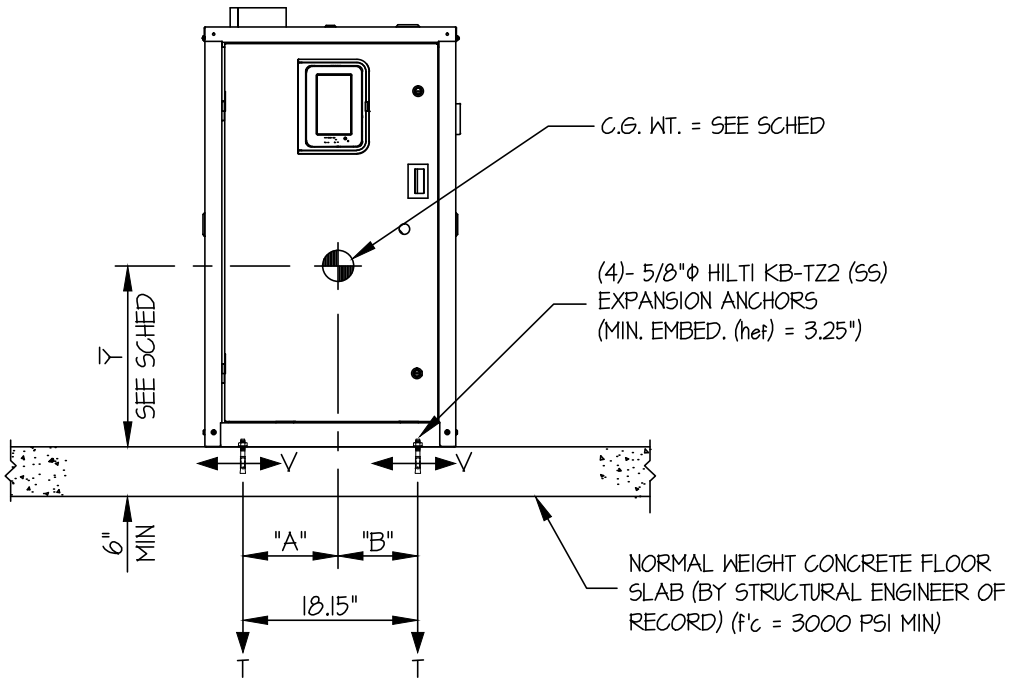
STORM 650/800/1000 COMMERCIAL BOILERS

DES.	J. ROBERSON
JOB NO.	11-2506
DATE	5/23/25

SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE



FRONT ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2022 CALIFORNIA BUILDING CODE AND ASCE 7-16. STRENGTH DESIGN IS USED. (EXAMPLE: S_{DS} = 2.30, a_p = 1.0, I_p = 1.5, R_p = 2.5, Ω_0 = 2.0, z/h = 0)

   HORIZONTAL FORCE (E_h) = 1.035 W_p
   HORIZONTAL FORCE (E_{mh}) = 2.07 W_p (FOR CONCRETE ANCHORAGE)
   VERTICAL FORCE (E_v) = 0.46 W_p

2. THIS CALCULATION ENCOMPASSES WEIGHTS AND VERTICAL C.G. POSITIONS NOT EXCEEDING VALUES SHOWN.

3. THIS CALCULATION WAS PREPARED WITHOUT KNOWLEDGE OF ANY SITE CONDITION. COMPATIBILITY FOR USE WITH A SITE SHALL BE EVALUATED BY THE STRUCTURAL ENGINEER OF RECORD OF THE INSTALLATION (SEOR). USE REQUIRES APPROVAL BY THE SEOR.

4. STRUCTURAL ENGINEER OF RECORD FOR THE INSTALLATION SHALL VERIFY ALL CONDITIONS, EVALUATE INTERACTION WITH ADJACENT EQUIPMENT AND ANCHORS, AND PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2026
STRUCTURAL
STATE OF CALIFORNIA
5/23/25

NOT STRUCTURALLY ENGINEERED

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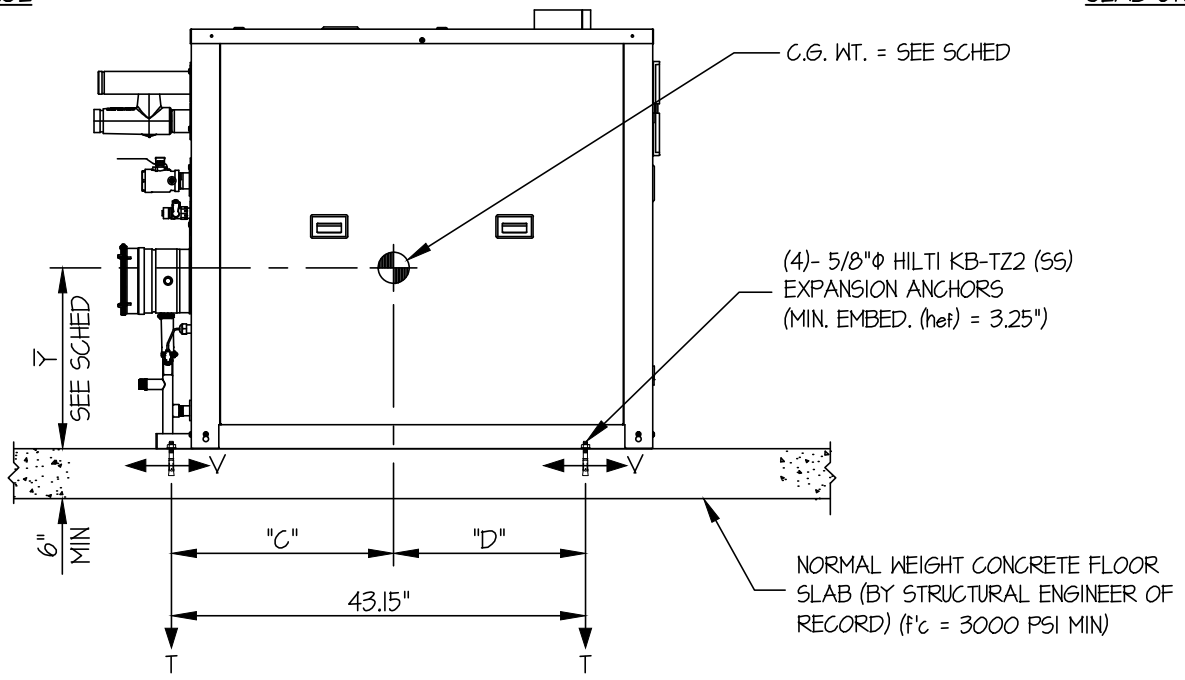
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE



SIDE ELEVATION

MODEL NUMBER	TOTAL WEIGHT (lb.)	$\bar{Y}$ (in.)	"A" (in.)	"B" (in.)	"C" (in.)	"D" (in.)	Tu (lb.)	Vu (lb.)
ST650	625	19.01	9.76	8.39	25.06	18.09	793	480
ST800	660	18.93	9.81	8.34	24.41	18.74	814	497
* ST1000	705	18.84	9.88	8.27	23.19	19.96	827	515

LOADS:

WEIGHT (W_p) = 705 LB
HORIZONTAL FORCE (E_{mh}) = 2.07 W_p = 1459 LB
VERTICAL FORCE (E_v) = 0.46 W_p = 324 LB

ANCHOR SPEC: 5/8"Φ HILTI KB-TZ2 (SS): (h_{ef} = 3.25")
SPACING = 12" MIN
EDGE DISTANCE = 32" MIN:
$\phi T = 0.75\phi N_n$ = 3285 LB/ANCHOR (TENSION)
$\phi V = \phi V_n$ = 6668 LB/ANCHOR (SHEAR)

ANCHOR FORCES:

TENSION (T)

$$T_{U\ MAXIMUM} = \left[\frac{1459\#(18.84'')(9.88'')}{1\ BOLT\ (43.15'')(18.15'')} \times (0.3) \right] + \frac{1459\#(18.84'')(23.19)}{1\ BOLT\ (18.15'')(43.15'')} - \frac{(705\#(0.9) - 324\#)(9.88'')(23.19'')}{1\ BOLT\ (18.15'')(43.15'')} = 827\ LB/BOLT\ (MAX)$$

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

SHEAR (V)

$$V_{U\ MAXIMUM} = \left[\frac{1459\#(23.19)}{2\ BOLTS\ (43.15'')} \times (0.3) \right] + \frac{1459\#(9.88'')}{2\ BOLTS\ (18.15'')} = 515\ LB/BOLT\ (MAX)$$

INTERACTION:

$$\left(\frac{T_u}{\phi T}\right) + \left(\frac{V_u}{\phi V}\right) \leq 1.2 \quad \left(\frac{827}{3285}\right) + \left(\frac{515}{6668}\right) = 0.33 \leq 1.2 \quad \therefore \text{O.K.}$$

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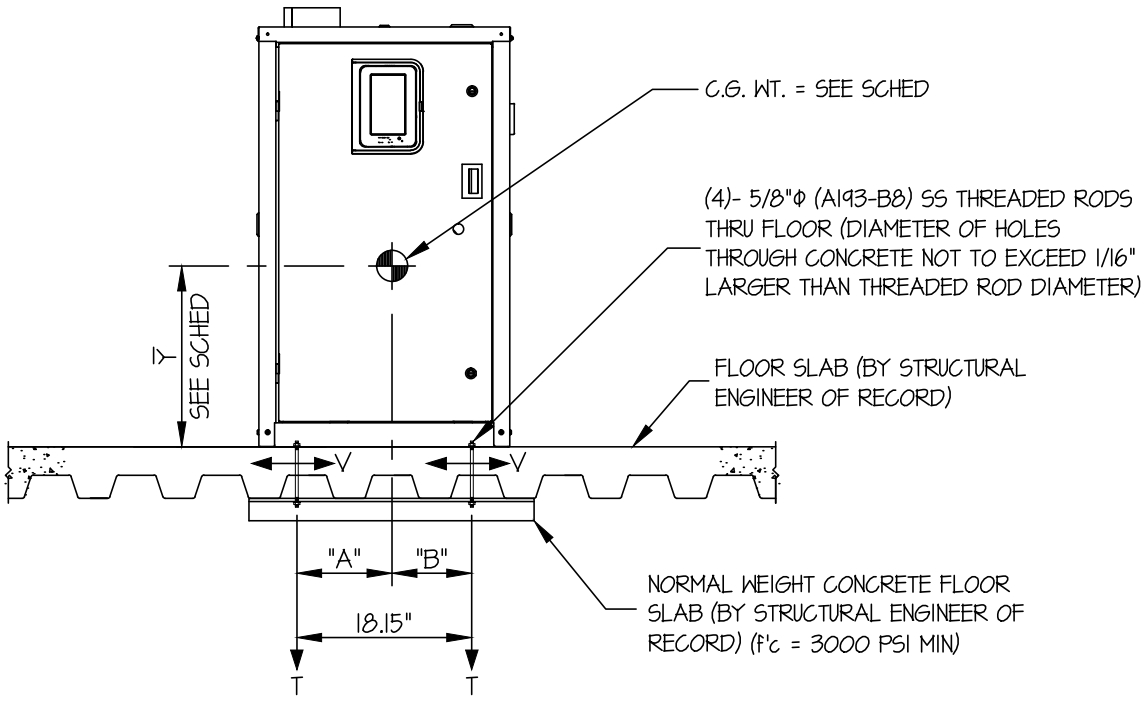
UPPER FLOOR



FRONT ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2022 CALIFORNIA BUILDING CODE AND ASCE 7-16. STRENGTH DESIGN IS USED. (EXAMPLE: S_{DS} = 2.30, a_p = 1.0, I_p = 1.5, R_p = 2.5, $z/h \leq 1$)

   HORIZONTAL FORCE (E_h) = 1.66 W_p
   VERTICAL FORCE (E_v) = 0.46 W_p

2. THIS CALCULATION ENCOMPASSES WEIGHTS AND VERTICAL C.G. POSITIONS NOT EXCEEDING VALUES SHOWN.

3. THIS CALCULATION WAS PREPARED WITHOUT KNOWLEDGE OF ANY SITE CONDITION. COMPATIBILITY FOR USE WITH A SITE SHALL BE EVALUATED BY THE STRUCTURAL ENGINEER OF RECORD OF THE INSTALLATION (SEOR). USE REQUIRES APPROVAL BY THE SEOR.

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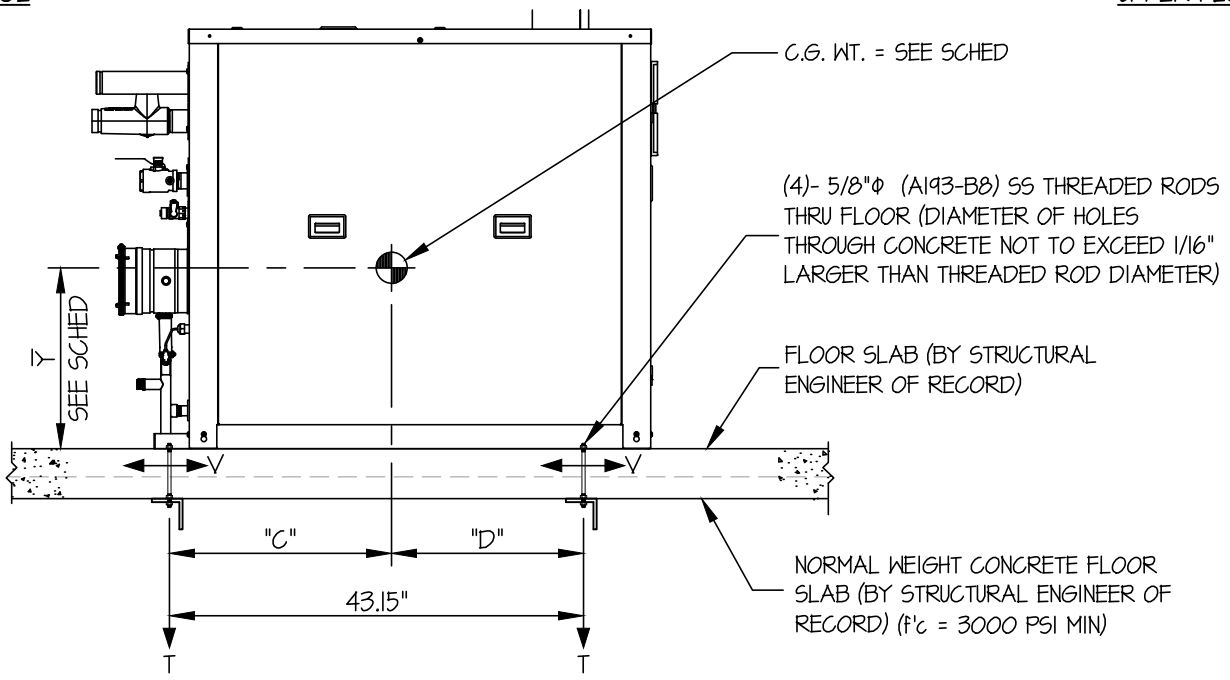

SIDE ELEVATION

MODEL NUMBER	TOTAL WEIGHT (lb.)	$\bar{Y}$ (in.)	"A" (in.)	"B" (in.)	"C" (in.)	"D" (in.)	Tu (lb.)	Vu (lb.)
ST650	625	19.01	9.76	8.39	25.06	18.09	621	385
ST800	660	18.93	9.81	8.34	24.41	18.74	637	399
* ST1000	705	18.84	9.88	8.27	23.19	19.96	646	413

LOADS:

WEIGHT (W_p) = 705 LB
HORIZONTAL FORCE (E_h) = 1.66 W_p = 1170 LB
VERTICAL FORCE (E_v) = 0.46 W_p = 324 LB

ANCHOR SPECS: 5/8"ϕ (A193-B8) SS THREADED ROD

ϕT= 12,940 LB/BOLT (TENSION)
ϕV= 4780 LB/BOLT (SHEAR)

ANCHOR FORCES:

TENSION (T)

$$T_U \text{ MAXIMUM} = \left[\frac{1170\#(18.84'')(8.39'')}{1 \text{ BOLT } (43.15'')(18.15'')} \times (0.3) \right] + \frac{1170\#(18.84'')(23.19)}{1 \text{ BOLT } (18.15'')(43.15'')} - \frac{(705\#(0.9) - 324\#)(8.39'')(23.19'')}{1 \text{ BOLT } (18.15'')(43.15'')} = 646 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_U \text{ MAXIMUM} = \left[\frac{1170\#(9.88'')}{2 \text{ BOLTS } (18.15'')} \times (0.3) \right] + \frac{1170\#(23.19)}{2 \text{ BOLTS } (43.15'')} = 413 \text{ LB/BOLT (MAX)}$$