HYDROTHERM KN-2 BOILER SEISMIC ANCHORAGE (ASCE 7-05)
Slab on Grade Applications Only

Equipment Parameters:

weight, W_p =	550.00	LBS.
w =	14.66	in.
L =	25.50	in.
h =	51.88	in.
cg =	27.38	in.
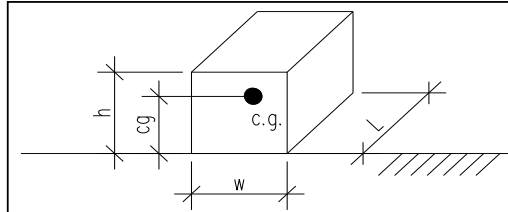
Seismic Parameters:

S_S =	1.798	ASCE 7-05 Figure 22-1)	Site Class =	C
a_p =	1.000	(ASCE 7-05 Table 13.6-1)		
Ip =	1.250	(ASCE Table 11.5-1)	Seismic Use Group =	II

R_p =	2.500	(Default value for Anchorage per ASCE 7-05 Table 13.6-1)
F_a =	1.000	(ASCE 7-05 Table 11.4-1)
$S_{MS} = F_a*S_s$ =	1.798	(ASCE 7-05 Eqn. 11.4-1)
$S_{DS} = 2/3*S_{MS}$ =	1.199	(ASCE 7-05 Eqn. 11.4-3)

Seismic Design Category = **D**

Seismic Force:

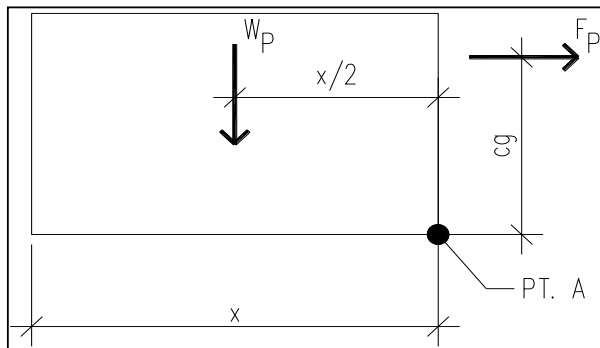|		
$F_p = (0.4*a_p*S_{DS}*W_p)/(R_p/I_p)$ =	131.9	LBS. (ASCE 7-05 Eqn. 13.3-1)
Upper Limit: $F_{pMAX} = 1.6*S_{DS}*I_p*W_p$ =	1318.5	LBS. (ASCE 7-05 Eqn. 13.3-2)
Lower Bound: $F_{pMIN} = 0.3*S_{DS}*I_p*W_p$ =	247.2	LBS. (ASCE 7-05 Eqn. 13.3-3)
$F_{p, DESIGN}$ =	247.2	LBS.

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Design Anchorage Force:

Horizontal Shear Force Per Anchor:

$$R_H = F_p/4 = \boxed{61.8} \text{ LBS.}$$

Overturning Resistance About Point A:

$$x = \boxed{14.66} \text{ in.}$$
$$x = \text{lesser of L or W}$$

$$M_{OT} = F_p * cg = \boxed{564.1} \text{ LBS.-FT.}$$

$$M_{RES} = W_p * x/2 = \boxed{336.0} \text{ LBS.-FT.} \quad \textbf{Uplift}$$

Vertical Acceleration: assume $\rho = 1.0$
$$Ev = \rho * Fp + 0.2 * S_{DS} * W = \boxed{193.7} \text{ LBS. (ASCE Section 13.3.1)}$$

$$R_{VNETUP} = (M_{OT}/(2*x)) - (W_p/4) + (Ev/4) = \boxed{0.0} \text{ LBS.} \quad \textbf{No Uplfit}$$

Force Summary Per Corner:
        Component Anchorage:

$$R_{HNET} = \boxed{61.8} \text{ LBS.}$$
$$R_{VNETUP} = \boxed{0.0} \text{ LBS.}$$

        Anchors Embedded in Concrete or CMU:

$$1.3 * R_p * R_{HNET} = \boxed{200.9} \text{ LBS.}$$
$$1.3 * R_p * R_{VNETUP} = \boxed{0.0} \text{ LBS.}$$