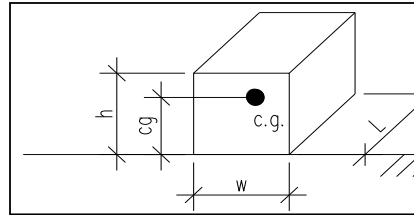


**HYDROTHERM KN-20 BOILER SEISMIC ANCHORAGE (ASCE 7-05)**  
**Slab on Grade Applications Only**

Equipment Parameters:

weight,  $W_p = 2613.00$  LBS.  
 $w = 26.06$  in.  
 $L = 54.25$  in.  
 $h = 63.40$  in.  
 $cg = 35.94$  in.



Seismic Parameters:

$S_s = 1.798$  (ASCE 7-05 Figure 22-1)      Site Class =   
 $a_p = 1.000$  (ASCE 7-05 Table 13.6-1)  
 $I_p = 1.000$  (ASCE Table 11.5-1)      Seismic Use Group =

$R_p = 2.500$  (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 =

Seismic Force:

$F_p = (0.4 * a_p * S_{DS} * W_p) / (R_p / I_p) = 501.1$  LBS. (ASCE 7-05 Eqn. 13.3-1)  
 Upper Limit:  $F_{pMAX} = 1.6 * S_{DS} * I_p * W_p = 5011.4$  LBS. (ASCE 7-05 Eqn. 13.3-2)  
 Lower Bound:  $F_{pMIN} = 0.3 * S_{DS} * I_p * W_p = 939.6$  LBS. (ASCE 7-05 Eqn. 13.3-3)  
 $F_{p, DESIGN} = 939.6$  LBS.

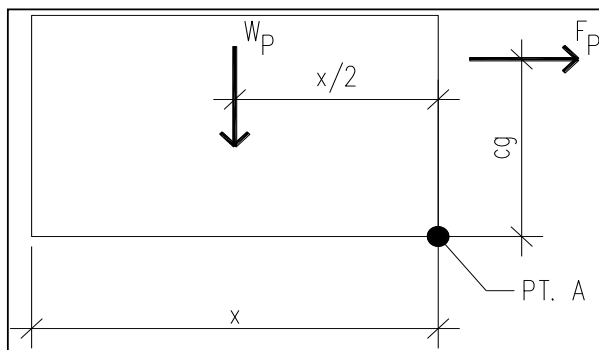
**HYDROTHERM KN-20 BOILER SEISMIC ANCHORAGE (ASCE 7-05)**

Design Anchorage Force:

Horizontal Shear Force Per Anchor:

$$R_H = F_p/4 = \boxed{234.9} \text{ LBS.}$$

Overtuning Resistance About Point A:



$$x = \boxed{26.06} \text{ in.}$$

$x = \text{lesser of } L \text{ or } W$

$$M_{OT} = F_p * cg = \boxed{2814.0} \text{ LBS.-FT.}$$

$$M_{RES} = W_p * x/2 = \boxed{2837.3} \text{ LBS.-FT. OK, No Uplift}$$

Vertical Acceleration: assume  $\rho = 1.0$

$$E_v = \rho * F_p + 0.2 * S_{DS} * W = \boxed{861.3} \text{ LBS. (ASCE Section 13.3.1)}$$

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

Force Summary Per Corner:

Component Anchorage:

$$R_{HNET} = \boxed{234.9} \text{ LBS.}$$

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

Anchors Embedded in Concrete or CMU:

$$1.3 * R_p * R_{HNET} = \boxed{763.5} \text{ LBS.}$$

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