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)
- \( a_p = 1.000 \) (ASCE 7-05 Table 13.6-1)
- \( I_p = 1.250 \) (ASCE Table 11.5-1)

Seismic Use Group = R

Seismic Force:

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

Seismic Design Category = D

Upper Limit: \( F_{p,\text{MAX}} = 1.6 \times S_{DS} \times I_p \times W_p = 1318.5 \) LBS. (ASCE 7-05 Eqn. 13.3-2)

Lower Bound: \( F_{p,\text{MIN}} = 0.3 \times S_{DS} \times I_p \times W_p = 247.2 \) LBS. (ASCE 7-05 Eqn. 13.3-3)

Seismic Force: \( F_p = (0.4 \times a_p \times S_{DS} \times W_p )/(R_p/I_p) = 131.9 \) LBS. (ASCE 7-05 Eqn. 13.3-1)

Seismic Force: \( F_{p,\text{DESIGN}} = 247.2 \) LBS.
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Design Anchorage Force:

Horizontal Shear Force Per Anchor:

\[ R_H = \frac{F_p}{4} = 61.8 \text{ LBS.} \]

Overturning Resistance About Point A:

Vertical Acceleration: \[ \text{assume } \rho = 1.0 \]

\[ E_v = \rho F_p + 0.2 S_{DS} W = 193.7 \text{ LBS. (ASCE Section 13.3.1)} \]

\[ M_{\text{RES}} = W_p \frac{x}{2} = 336.0 \text{ LBS.-FT. Uplift} \]

\[ M_{\text{OT}} = F_p \cdot c_g = 564.1 \text{ LBS.-FT.} \]

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

Force Summary Per Corner:

Component Anchorage:

\[ R_{\text{HNET}} = 61.8 \text{ LBS.} \]

\[ R_{\text{VNETUP}} = 0.0 \text{ LBS.} \]

Anchors Embedded in Concrete or CMU:

\[ 1.3 R_p R_{\text{HNET}} = 200.9 \text{ LBS.} \]

\[ 1.3 R_p R_{\text{VNETUP}} = 0.0 \text{ LBS.} \]