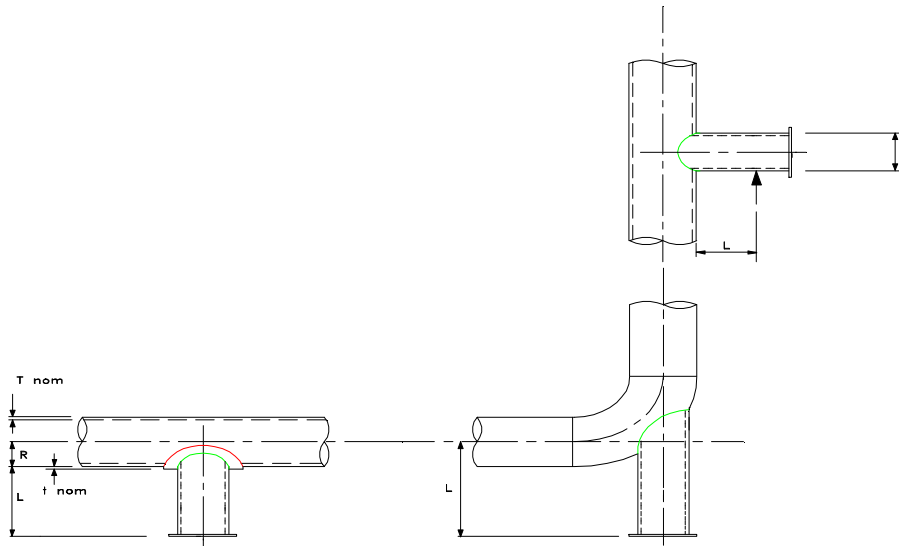


Trunnion Calculation Sheet

PIPE SUPPORT No.

LINE NUMBER.



PIPE INPUT DATA:

Pipe Dia. mm =	600	Pipe radius (R) mm =	300
Pipe nom. thk (Tnom) mm =	12.7	Pipe tolerance (%) =	12.5
		or Pipe tolerance (mm) =	
		Pipe min. thk (T) mm =	7.93
Trunnion Dia (d) mm =	355.6	Trunnion radius (r) mm =	177.8
Pad nom. thk (tpnom) mm =	0	Pad tolerance (%) =	12.5
		or Pad tolerance (mm) =	
		Pad min. thk. (tp) mm =	0.00
Moment arm (L) mm =	613	Pipe corr. allw. (mm) =	3.18
		Effective wall thickness for calculation (tmin) mm = T + tp =	7.93

LOADING INPUT DATA:

Design press. (P), barg =	15.17
Direct axial load (Fa), N =	38500
Force producing longitudinal moment (FI), N =	17000
Force producing circumferential moment (Fc), N =	7000

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Trunnion Calculation Sheet

PIPE SUPPORT No.

0

CALCULATION:

(USING KELLOGGS METHOD)

$$\text{Longitudinal linear load (f}_l\text{), N/mm} \quad f_l = \frac{F_l L}{\pi r^2} = 104.92$$

$$\text{Circumferential linear load (f}_c\text{), N/mm} \quad f_c = \frac{F_c L}{\pi r^2} = 43.20$$

$$\text{Direct axial lineal load (f}_a\text{), N/mm} \quad f_a = \frac{F_a}{2 \pi r} = 34.46$$

$$\text{Combined circ. load with out-plane factor (f}_1\text{), N/mm} \quad f_1 = 1.5(f_a + f_c) = 116.49$$

$$\text{Combined long. load with out-plane factor (f}_2\text{), N/mm} \quad f_2 = (1.5 f_a) + f_l = 156.60$$

$$\text{Circumferential bending stress (S}_{bc}\text{), N/mm}^2 = \quad S_{bc} = \frac{1.17 f_1 \sqrt{R}}{t_{min}^{3/2}} = 105.66$$

$$\text{Longitudinal bending stress (S}_{bl}\text{), N/mm}^2 = \quad S_{bl} = \frac{1.17 f_2 \sqrt{R}}{t_{min}^{3/2}} = 142.05$$

$$\text{Hoop primary stress (S}_{ph}\text{), N/mm}^2 = \quad S_{ph} = P \cdot R / (10 \cdot t_{min}) = 57.37$$

$$\text{Longt. primary stress (S}_{pl}\text{), N/mm}^2 = \quad S_{pl} = P \cdot R / (20 \cdot t_{min}) = 28.69$$

$$\text{Combined circ. stress (S}_c\text{), N/mm}^2 = \quad S_{bc} + S_{ph} = 163.03 \quad 109\%$$

$$\text{Combined long. stress (S}_l\text{), N/mm}^2 = \quad S_{bl} + S_{pl} = 170.73 \quad 115\%$$

$$\text{Allow. stress (S}_h\text{), N/mm}^2 = 99.29 \quad 1.5 \cdot S_h \text{ (S}_{ha}\text{), N/mm}^2 = 148.94$$

Sc to be less than 1.5 · Sh

Sl to be less than 1.5 · Sh

RESULTS:

This calculation shows the trunnion to be: **INADEQUATE**

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