

Fatigue Calculations on 304 Seamless Tubing

Variables Sheet

Input	Name	Output	Unit	Comment
	m	0.132647		Constant
473.8	Sut		MPa	Ultimate Tensile Strength of Material
	Se1	170.568	MPa	Endurance Limit
	b	0.129708		Constant
	S1f	0.124222		Fatigue Strength
5000000	N			Number of Cycles
	Ws	113.712	MPa	Working Stress allowed for material [Ws=Endurance Limit / Safety Factor]
1.5	SF			Safety Factor
134.6	APS		MPa	Resulting Stress from a .375 dia with .072 wall at 6100 psi
	CN	10.147156		
	FSR	-2.742877		Fatigue Strength Ratio

Rules Sheet

Rules

$$m = \left[\frac{1}{3} \right] \cdot \left[\text{LOG} \left[\frac{0.9 \cdot \text{Sut}}{\text{Se1}} \right] \right]$$

$$\text{Se1} = 0.4 \cdot (0.9 \cdot \text{Sut})$$

$$b = \frac{\text{LOG}(0.9 \cdot \text{Sut})^2}{\text{Se1}}$$

$$\text{LOG}(\text{S1f}) = -m \cdot (\text{LOG}(\text{N}) + b)$$

$$\text{Ws} = \frac{\text{Se1}}{\text{SF}}$$

$$\text{CN} = \frac{10^{\left[\frac{b}{m} \right]}}{\frac{\text{S1f}^1}{m}}$$

$$\text{FSR} = \text{LOG} \left[\frac{\text{S1f}}{\text{Sut}} \right]$$

Plots Sheet

Name	Plot Type	Title
P1	Line Chart	Fatigue Strength

Plot: P1

