

Voorhaar Stress Engineering

CASE STUDY ABOUT THE BOURDON EFFECT REROUNDING IN A BEND

Date: Do 11-Feb-2021

Time: 09:31:23

Project: VARIOUS CALCULATIONS

Jobnr: PV2021



Door P.W.H. Voorhaar

$\phi = 4.5 \cdot \text{in}$ Outside Diameter

$\delta = 0.12 \cdot \text{in}$ Wallthickness

$D = \phi - \delta$ Mean Diameter

$M = 12.5$ Mill tolerance %

$\alpha = 90 \cdot \text{deg}$ Bend angle

$\text{corr} = 0 \cdot \text{mm}$ Corrosion allowance

$R = 4 \cdot 1.5 \cdot \text{in}$ Radius

$P = x \cdot \text{bar}$ Pressure

$E = 181300 \cdot \frac{\text{N}}{\text{mm}^2}$ Modulus of elasticity

$\mu = 0.28$ Poison ratio

$t = \delta \cdot \left[\frac{100 - M}{100} \right] - \text{corr}$ Netto wall

$r = \frac{\phi - t}{2}$ $r = 55.817 \cdot \text{mm}$ $t = 2.667 \cdot \text{mm}$

$h = \frac{\delta \cdot R}{2r}$ $h = 0.149$

$k_{x,1} = \frac{1.65}{h}$ $k_{rer} = \frac{k_{\text{default}}}{\square}$

$k_{rer} = 11.021$

$$1 + 6 \cdot \frac{P}{E} \cdot \frac{r \cdot R}{t}$$

Voorhaar Stress Engineering

CASE STUDY ABOUT THE BOURDON EFFECT

REROUNDING IN A BEND

Date: Do 11-Feb-2021

Time: 09:31:23

Project: VARIOUS CALCULATIONS

Jobnr: PV2021

$$\theta = \frac{\mu}{E} \cdot k \cdot \alpha \cdot \frac{P \cdot \phi}{4 \cdot \delta} \cdot \left[\frac{R}{R - \frac{1}{2} \cdot D} \right]^2$$

Degrees displacement due to Bourdon effect

