

## MINIMUM WALL THICKNESS

### OPERATING PRESSURE

WHAT IS THE MINIMUM REQUIRED WALL THICKNESS TO BE ABLE TO SAFELY CONTAIN 3,600 PSI AT A WATER DEPTH OF 2,000 FEET

**(Pt = 3,600 PSI AT 2,000 FEET OF WATER DEPTH?).**

#### BASIC DATA

- AT 2,000 FEET WATER DEPTH, THE EXTERNAL WATER PRESSURE  $P_o$  IS  
 $P_o = (2,000 \text{ FEET}) (64 \text{ PCF} / 144 \text{ IN}^2/\text{FT}) = 889 \text{ PSI}$
- SMYS OF X-60 PIPE = 60,000 PSI
- O. D. = 18 INCHES
- FACTOR OF SAFETY = 0.72
- $SH = 0.72 (60,000 \text{ PSI}) = 43,200$

CALCULATE THE MINIMAL REQUIRED WALL FROM EQUATION 4 B31.8

$$SH = (Pt - Pe) * ((18 - t)/2t)$$

$$43,200 = (3,600 - 899) * ((18 - t)/2t)$$

$$43,200 = 2,711 * ((18 - t)/2t)$$

$$43200 / 2711 = ((18 - t)/2t)$$

$$15.935 = ((18 - t)/2t)$$

$$15.935 * 2t = ((18 - t)/2t) * 2t$$

$$31.935t = 18 - t$$

$$31.87 * t + t = 18$$

$$32.87 * t = 18$$

$$t = 18 / 32.87$$

$$t = 0.548 \text{ INCHES}$$

**THIS ANSWER IS THE ABSOLUTE MINIMUM WALL THICKNESS THAT IS REQUIRED TO SAFELY OPERATE A PIPELINE AT A MAOP OF 3,600 PSI AND IN 2,000 FEET OF WATER**