

PIPE THICKNESS CALCULATIONS

As per ASME B 31.3 - 1996 Edition, 1998 Addenda.

Design Data :

Design Pressure	P	:	46 barg	Design Temp.	T	:	93 °C
Nominal Pipe Size		:	200 NPS	Outside Diameter	D	:	219.075 mm
Nominal wall thickness	t _n	:	8.179 mm	Minimum wall thickness	t _{min}	:	7.156 mm *)
Material Spec.		:	A 106 Gr.B	Stress Value @ 93 °C	S _d	:	1,379 bar
Corrosion Allowance	c	:	3.00 mm	Stress Value @ 38 °C	S _t	:	1,379 bar
Coefficient (Table 304.1.1)	y	:	0.4 (t < D/6)	Quality Factor	E	:	1

Note : *) Minimum thickness of pipe is equal to Nominal thickness x 0.875

Required thickness :

Para. 304.1.2

$$t = \frac{P * D}{2 * (S_d * E + y * P)} + c = 6.60 \text{ mm} < \text{thk. selected, thus OK}$$

Pipe selected schedule 40

Maximum Allowable Pressure (New & Cold)

$$P_{(N+C)} = \frac{S_t * E * t_{min}}{(D/2) - y * t_{min}} = 92.51 \text{ barg}$$

Maximum Allowable Working Pressure (Hot & Corroded)

$$P_{(H+C)} = \frac{S_d * E * (t_{min} - c)}{(D/2) - y * (t_{min} - c)} = 53 \text{ barg}$$

Maximum Allowable Non Shock W.P. of Flange Material Grade A 105 (Group 1.1)

At 93 °C Design Temperature for 300 lb, ANSI Rating = 47 barg

Maximum Allowable Working Pressure P_{max} = 47 barg, Limited by : Flange

$$\text{Hydrotest Pressure} = 1.5 \times P_{max} \times S_t / S_d = 69.81 \text{ barg}$$

Para. 345.4.2