



# Diversified Technology Services

2045 Preisker Ln. Suite-A - Santa Maria, CA 93454 - (805) 928-6392

Circuit ID Number: 426-454      Date: 25-Oct-03  
 Client: DTS Client      Location: Somewhere USA

## Process Piping Specification Form Information

**Circuit**  
**Description:** Production Well Head 426-454 Flow Lines

**Service:** Production Oil      **Default to Pressure t-min values for Monitoring** Yes      **Yes / No**

**Year Built:** 1/1/1987      **Coefficient Y from table 304.1.1 of B-31.3 (Y):** 0.4      **(Y)**

**MAWP:** 1000      **psi at max temp.** 250      **°F**

**Max Insp. Interval (Years)** 5      **Default Corrosion Rate (Mills per Yr):** 0.002

**Technician Initials:** RDS

**Prior Technician Initials:** \_\_\_\_\_      **Prior Date of Inspection** \_\_\_\_\_

(Only Enter a date if you have previos inspections readings)

**Piping Sizes and Specifics:**

ID	Size	OD	ID	Corr. Allowance	Nominal Thickness	Material	Matl Stress @ temp.	Eff (%)	Est. Mill Tolerance
A	6	6.625	6.011	0.1250	0.432	A-106B	20000	1.00	12.5%
B	4	4.5	4.076	0.1250	0.337	A234 WPB	20000	1.00	12.5%
C	16	16	14.938	0.1250	0.656	A-106B	20000	1.00	12.5%
D									
E									
F									
G									

Max Inspection Interval of 5 years due to CLASS 1 Piping over waterways.

API-570 Inspector: API Certified Inspector      Certification Number: 15



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## Pressure Calculation Form for B31.3 Piping (Spec. - A)

<p><b>Formula:</b></p> $t = \frac{PD}{2(SE+PY)}$	<p style="text-align: right;">Nominal Thickness of Material (T) : <u>0.432</u></p> <p><b>Statistics:</b></p> <table style="width: 100%;"> <tr> <td>Pressure (MAWP) : <u>1000</u></td> <td>Material Allowable Stress (S) : <u>20000</u></td> </tr> <tr> <td>Joint Efficiency (E) : <u>1.00</u></td> <td>Inside Diameter (d) : <u>6.011</u></td> </tr> </table>	Pressure (MAWP) : <u>1000</u>	Material Allowable Stress (S) : <u>20000</u>	Joint Efficiency (E) : <u>1.00</u>	Inside Diameter (d) : <u>6.011</u>
Pressure (MAWP) : <u>1000</u>	Material Allowable Stress (S) : <u>20000</u>				
Joint Efficiency (E) : <u>1.00</u>	Inside Diameter (d) : <u>6.011</u>				

**Variables:**

Outside Diameter (D) : <u>6.63</u>	Coefficient Y from table 304.1.1 of B-31.3 (Y) : <u>0.40</u>	Corrosion Allow. (c) : <u>0.125</u>
Design Temperature : <u>250</u>	Coefficient Y used in Calculation (Y) : <u>0.40</u>	Mill Tolerance Percentage (MT) : <u>12.5%</u>

**Calculations for Variables:**

<u>Coefficient Y Verification</u>	<u>Verification for ( T )</u>	<u>Formula for Y Coefficient</u>
<p>If ( T &lt; D/6 ) Then Y = Coefficient from Table.</p> <p>But if ( T ≥ D/6 ) Then Y = Formula at right.</p>	<p>T = <u>0.432</u></p> <p>D/6 = <u>1.104</u></p>	$Y = \frac{d + 2c}{D + d + 2c}$ <p>Y = <u>0.49</u> from calculation</p> <p>Y = <u>0.40</u> from table 304.1.1 of B-31.3</p>

**Calculation for Pressure t-min.**

$$t = \frac{PD}{2(SE+PY)}$$

$$t = \frac{1000.0 \times 6.625}{2 * 20000 \times 1 + 1000 \times 0.40}$$

$$t = \frac{6625.000}{2 * 20000 + 400}$$

$$t = \frac{6625.000}{40800.000}$$

$$t = 0.162$$

**Calculation for Structural t-min.**

$t_s$	=	Nom	-	MT	-	CA
$t_s$	=	(	<u>0.432</u>	-	<u>12.5%</u>	) - <u>0.125</u>
$t_s$	=	<u>0.378</u>	-	<u>0.125</u>		
$t_s$	=	<u>0.253</u>				

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**Structural t-min Requirements:**

$t_s = \underline{0.253}$  Inches

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**Pressure t-min Requirements:**

$t = \underline{0.162}$  Inches

API-570 Inspector: API Certified Inspector

Certification Number: 15



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## Pressure Calculation Form for B31.3 Piping (Spec. - B)

<p><b>Formula:</b></p> $t = \frac{PD}{2(SE+PY)}$	<p style="text-align: right;">Nominal Thickness of Material (T) : <u>0.337</u></p> <p><b>Statistics:</b></p> <table style="width: 100%;"> <tr> <td>Pressure (MAWP) : <u>1000</u></td> <td>Material Allowable Stress (S) : <u>20000</u></td> </tr> <tr> <td>Joint Efficiency (E) : <u>1.00</u></td> <td>Inside Diameter (d) : <u>4.076</u></td> </tr> </table>	Pressure (MAWP) : <u>1000</u>	Material Allowable Stress (S) : <u>20000</u>	Joint Efficiency (E) : <u>1.00</u>	Inside Diameter (d) : <u>4.076</u>
Pressure (MAWP) : <u>1000</u>	Material Allowable Stress (S) : <u>20000</u>				
Joint Efficiency (E) : <u>1.00</u>	Inside Diameter (d) : <u>4.076</u>				

**Variables:**

Outside Diameter (D) : <u>4.50</u>	Coefficient Y from table 304.1.1 of B-31.3 (Y) : <u>0.40</u>	Corrosion Allow. (c) : <u>0.125</u>
Design Temperature : <u>250</u>	Coefficient Y used in Calculation (Y) : <u>0.40</u>	Mill Tolerance Percentage (MT) : <u>12.5%</u>

**Calculations for Variables:**

<u>Coefficient Y Verification</u>	<u>Verification for ( T )</u>	<u>Formula for Y Coefficient</u>
<p>If ( T &lt; D/6 ) Then Y = Coefficient from Table.</p> <p>But if ( T ≥ D/6 ) Then Y = Formula at right.</p>	<p>T = <u>0.337</u></p> <p>D/6 = <u>0.75</u></p>	$Y = \frac{d + 2c}{D + d + 2c}$ <p>Y = <u>0.49</u> from calculation</p> <p>Y = <u>0.40</u> from table 304.1.1 of B-31.3</p>

**Calculation for Pressure t-min.**

$$t = \frac{PD}{2(SE+PY)}$$

$$t = \frac{1000.0 \times 4.50}{2 * 20000 \times 1 + 1000 \times 0.40}$$

$$t = \frac{4500.000}{40800.000}$$

$$t = 0.110$$

**Calculation for Structural t-min.**

$t_s$	=	Nom	-	MT	-	CA
$t_s$	=	(	<u>0.337</u>	-	<u>12.5%</u>	) - <u>0.125</u>
$t_s$	=	<u>0.295</u>	-	<u>0.125</u>		
$t_s$	=	<u>0.17</u>				

  

**Structural t-min Requirements:**

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$t_s = 0.170$  Inches

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**Pressure t-min Requirements:**

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$t = 0.110$  Inches

API-570 Inspector: API Certified Inspector

Certification Number: 15



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## Pressure Calculation Form for B31.3 Piping (Spec. - C)

<p><b>Formula:</b></p> $t = \frac{PD}{2(SE+PY)}$	<p style="text-align: right;">Nominal Thickness of Material (T) : <u>0.656</u></p> <p><b>Statistics:</b></p> <table style="width: 100%;"> <tr> <td>Pressure (MAWP) : <u>1000</u></td> <td>Material Allowable Stress (S) : <u>20000</u></td> </tr> <tr> <td>Joint Efficiency (E) : <u>1.00</u></td> <td>Inside Diameter (d) : <u>14.938</u></td> </tr> </table>	Pressure (MAWP) : <u>1000</u>	Material Allowable Stress (S) : <u>20000</u>	Joint Efficiency (E) : <u>1.00</u>	Inside Diameter (d) : <u>14.938</u>
Pressure (MAWP) : <u>1000</u>	Material Allowable Stress (S) : <u>20000</u>				
Joint Efficiency (E) : <u>1.00</u>	Inside Diameter (d) : <u>14.938</u>				

**Variables:**

Outside Diameter (D) : <u>16.00</u>	Coefficient Y from table 304.1.1 of B-31.3 (Y) : <u>0.40</u>	Corrosion Allow. (c) : <u>0.125</u>
Design Temperature : <u>250</u>	Coefficient Y used in Calculation (Y) : <u>0.40</u>	Mill Tolerance Percentage (MT) : <u>12.5%</u>

**Calculations for Variables:**

<u>Coefficient Y Verification</u>	<u>Verification for ( T )</u>	<u>Formula for Y Coefficient</u>
<p>If ( T &lt; D/6 ) Then Y = Coefficient from Table.</p> <p>But if ( T ≥ D/6 ) Then Y = Formula at right.</p>	<p>T = 0.656</p> <p>D/6 = 2.667</p>	$Y = \frac{d + 2c}{D + d + 2c}$ <p>Y = 0.49 from calculation</p> <p>Y = 0.40 from table 304.1.1 of B-31.3</p>

**Calculation for Pressure t-min.**

$$t = \frac{PD}{2(SE+PY)}$$

$$t = \frac{1000.0 \times 16.000}{2 * 20000 \times 1 + 1000 \times 0.40}$$

$$t = \frac{16000.000}{2 * 20000 + 400}$$

$$t = \frac{16000.000}{40800.000}$$

$$t = 0.392$$

**Calculation for Structural t-min.**

$$t_s = \text{Nom} - \text{MT} - \text{CA}$$

$$t_s = ( 0.656 - 12.5\% ) - 0.125$$

$$t_s = 0.574 - 0.125$$

$$t_s = 0.449$$

**Structural t-min Requirements:**

$$t_s = 0.449 \text{ Inches}$$

**Pressure t-min Requirements:**

$$t = 0.392 \text{ Inches}$$

API-570 Inspector: API Certified Inspector

Certification Number: 15