

PRONTUARIO



TenarisTamsa, es el proveedor líder de tubos de acero sin costura y de servicios para la industria energética mexicana y otras aplicaciones industriales locales, así como principal exportador de productos de valor agregado. Es la sede operativa de Tenaris en México, con su planta productiva ubicada en el puerto de Veracruz.

Además de ofrecer tubos, conexiones y roscas especiales, ofrece los servicios de: inspección y rehabilitación de tubos recuperados, enrosque y apriete, además de la entrega en la modalidad Justo a Tiempo donde TenarisTamsa se responsabiliza de los inventarios de tubo de revestimiento y producción, ofreciendo una garantía de entrega en pozo en 72 horas.

Cuenta además con centros de atención en Ciudad del Carmen, Distrito Federal, Guadalajara, Monterrey, Poza Rica, Reynosa y Villahermosa que están a la disposición de sus clientes para resolver dudas e inquietudes.

Con el fin de apoyar las actividades de la industria petrolera, TenarisTamsa ha diseñado este prontuario con información básica sobre las dimensiones, propiedades mecánicas y desempeño de sus tubos.





## SISTEMA DE CALIDAD

Para competir con éxito en los mercados internacionales, TenarisTamsa entrega productos que cumplen con las especificaciones de calidad y los requerimientos establecidos por el cliente.

Dentro de estas especificaciones se ubican las normas API (5CT para tubos de revestimiento y producción, 5L para tubos de conducción y 5D para tubos de perforación), las normas internacionales ISO 9001:2008 y API-Q1/ ISO TS 29001 (Octava edición, diciembre 2007); así como la ISO/TS16949:2009 para la fabricación de productos tubulares para la industria automotriz.



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A pesar del cuidado y la atención que Tubos de Acero de México, S.A. (TAMSA) ha puesto en la preparación de este prontuario, el cual proporciona información de la mayor parte de los productos fabricados por TenarisTamsa; este prontuario debe ser usado únicamente como referencia. Por lo anterior, para saber si el producto que le interesa está dentro de nuestras posibilidades técnicas para fabricarlo, deberá consultar directamente a nuestro departamento de ventas.

Este prontuario no deberá ser utilizado como manual de diseño y TAMSA no asumirá ninguna responsabilidad por el uso diferente al de exclusivamente como referencia y por lo tanto, cualquier resultado obtenido de diseños conforme a cálculos en base a la información contenida en el prontuario, no será reconocido ni aceptado por TAMSA.

# FORMULARIO

## FORMULAS DE CAMPO UTILIZADAS EN LA PERFORACION DE POZOS PETROLEROS

### PRESION HIDROSTATICA

$$Ph = \frac{(\rho)(h)}{10}$$

Ph = Presión hidrostática (Kg/cm<sup>2</sup>)

$\rho$  = Densidad del fluido (g/cm<sup>3</sup>)

h = Altura de la columna (m)

$$Ph = 0.052 (\rho)(h)$$

Ph = Presión hidrostática (psi)

$\rho$  = Densidad del fluido (lb/gal)

h = Altura de la columna (pie)

### FACTOR DE FLOTACION

$$F_b = 1 - \frac{\rho_L}{\rho_a}$$

F<sub>b</sub> = Factor de flotación (adimensional)

$\rho_L$  = Densidad del fluido de perforación (g/cm<sup>3</sup>) o (lb/gal)

$\rho_a$  = Densidad del material (g/cm<sup>3</sup>) o (lb/gal). Acero = 7.85 g/cm<sup>3</sup>

### CAPACIDADES ANULARES

$$C_i = 0.5067(d^2)$$

$$C_a = 0.5067 (d_1^2 - D_2^2)$$

C<sub>i</sub> = Capacidad volumétrica por el interior de la tubería (lt/m)

C<sub>a</sub> = Capacidad volumétrica por el espacio anular entre tubería (lt/m)

d = Diámetro interior de la tubería (pg)

d<sub>1</sub> = Diámetro interior de la tubería más grande (pg)

D<sub>2</sub> = Diámetro exterior de la tubería más pequeña (pg)

### DESPLAZAMIENTO DE BOMBAS DUPLEX Y TRIPLEX

$$F_{pd} = 0.0068(2dt^2 - dr^2)(Ls)Ev \quad F_{pt} = 0.0102101(dt^2)(Ls)Ev$$

F<sub>pd</sub> = Desplazamiento volumétrico de la bomba duplex (gal/emb)

F<sub>pt</sub> = Desplazamiento volumétrico de la bomba triplex (gal/emb)

dt = Diámetro del pistón (pg)

dr = Diámetro del vástago (pg)

L<sub>s</sub> = Longitud de la camisa (pg)

Ev = Eficiencia volumétrica (adimensional)

## LONGITUD DE LASTRABARRENAS REQUERIDOS EN EL APAREJO DE FONDO

$$L_{DC} = \frac{PSB}{W_{DC} (F_s)(F_b)\cos\alpha}$$

$L_{DC}$  = Longitud de los lastrabarrenas (m)

PSB = Peso sobre la barrena a aplicarse (Kg)

$W_{DC}$  = Peso unitario de los lastrabarrenas (Kg/m)

$F_s$  = Factor de seguridad (85%)

$F_b$  = Factor de flotación (adimensional)

$\alpha$  = Angulo de inclinación del pozo (grados)

## TUBO DE PERFORACION

Para el grado de tubería que va inmediatamente arriba de los lastrabarrenas:

$$L_{TP} = \frac{R_T(0.9) - MOP}{W_{TP} [F_b]} - \frac{L_{DC}(W_{DC})}{W_{TP}}$$

Para los subsecuentes grados de tubería de perforación:

$$L_{TP_n} = \frac{R_{T_n}(0.9) - MOP}{W_{TP_n} [F_b]} - \frac{L_{DC}(W_{DC}) + L_{TP_1}(W_{TP_1}) + \dots + L_{TP_{n-1}}(W_{TP_{n-1}})}{W_{TP_n}}$$

$L_{TP}$  = Longitud de la tubería de perforación del grado en cálculo (m)

$L_{DC}$  = Longitud de los lastrabarrenas (m)

$R_T$  = Resistencia a la tensión de la tubería del grado en cálculo (Kg)

$W_{TP}$  = Peso ajustado de la tubería de perforación del grado en cálculo (Kg/m)

$W_{DC}$  = Peso unitario de los lastrabarrenas (Kg/m)

MOP = Margen adicional para tensión (jalón) (Kg)

$F_b$  = Factor de flotación (adimensional)

## TUBERIAS

Volúmen de acero (cuando la sarta es extraída del pozo y hay que sustituirla por fluido de perforación):

$$V_a = \frac{W_{sarta}}{7.85}$$

$V_a$  = Volúmen de acero ( $m^3$ )

$W_{sarta}$  = Peso de la sarta en el aire (toneladas)

### Determinación del peso unitario de una tubería:

$$W_u = 10.69(D-t)(t)$$

$W_u$  = Peso unitario nominal (lb/pie)

$D$  = Diámetro exterior de la tubería (pg)

$t$  = Espesor de la pared del cuerpo del tubo (pg)

### Determinación de la resistencia a la fuerza de tensión de una tubería:

$$F_t = \frac{\pi}{4} \sigma_y (D^2 - d^2) = \pi \sigma_y (Dt - t^2)$$

$F_t$  = Resistencia a la fuerza de tensión de la tubería (lb-pie)

$\sigma_y$  = Esfuerzo a la cedencia de la tubería (psi)

$D$  = Diámetro exterior de la tubería (pg)

$d$  = Diámetro interior de la tubería (pg)

$t$  = Espesor de la pared del cuerpo del tubo (pg)

### Determinación de la resistencia a la presión interna de una tubería:

$$P_i = 0.875 \frac{(2t\sigma_y)}{D} = 0.875\sigma_y \left(1 - \frac{d}{D}\right)$$

$P_i$  = Resistencia a la presión interna de la tubería (psi)

$\sigma_y$  = Esfuerzo a la cedencia de la tubería (psi)

$D$  = Diámetro exterior de la tubería (pg)

$d$  = Diámetro interior de la tubería (pg)

$t$  = Espesor de la pared del cuerpo del tubo (pg)

### Determinación de la resistencia al colapso para diferentes modos de deformación:

Colapso elástico

$$P_c = \frac{2E}{1-\nu^2} \left\{ \frac{1}{\left(\frac{D}{t}\right) \left[ \left(\frac{D}{t}\right) - 1 \right]^2} \right\}$$

Colapso de Transición

$$P_c = \sigma_y \left[ \frac{F_c}{\left(\frac{D}{t}\right)} - G_c \right]$$

## Colapso Plástico

$$P_c = \sigma_y \left[ \frac{A_c}{\left( \frac{D}{t} \right)} - B_c \right] - C_c$$

## Colapso de Cedencia

$$P_c = 2\sigma_y \left[ \frac{\left( \frac{D}{t} \right) - 1}{\left( \frac{D}{t} \right)^2} \right]$$

$P_c$  = Resistencia al colapso (psi).

$\sigma_y$  = Esfuerzo a la cedencia de la tubería (psi).

$E$  = Módulo de Young para el acero (psi). Para el acero =  $30 \times 10^6$  psi.

$\nu$  = Relación de poisson (adimensional).

$D$  = Diámetro exterior de la tubería (pg).

$t$  = Espesor de la pared del cuerpo del tubo (pg).

$A_c, B_c, C_c, F_c$  y  $G_c$  = Coeficientes empíricos, dados por las siguientes ecuaciones (adimensionales).

$$A_c = 2.8762 + 0.10679 \times 10^{-5} (\sigma_y) + 0.21301 \times 10^{-10} (\sigma_y^2) - 0.53132 \times 10^{-16} (\sigma_y^3)$$

$$B_c = 0.026233 + 0.50609 \times 10^{-6} (\sigma_y)$$

$$C_c = -465.93 + 0.030867 (\sigma_y) - 0.10483 \times 10^{-7} (\sigma_y^2) + 0.36989 \times 10^{-13} (\sigma_y^3)$$

$$F_c = \frac{46.95 \times 10^6 \left[ \frac{3B_c}{A_c} \right]^3}{\sigma_y \left[ \frac{3B_c}{2 + \left[ \frac{B_c}{A_c} \right]} \right] \left[ 1 - \frac{3B_c}{2 + \left[ \frac{B_c}{A_c} \right]} \right]^2} \quad G_c = \frac{F_c B_c}{A_c}$$

## Determinación de la resistencia al torque puro:

$$Q = \frac{0.096167(J)(\sigma_y)}{D}$$

$Q$  = Resistencia a la torsión de la tubería (lb-pie)

$J$  = Momento de inercia polar (pg<sup>4</sup>);  $J = \frac{\pi}{32} (D^4 - d^4)$

$\sigma_y$  = Esfuerzo a la cedencia del material (psi)

$D$  = Diámetro exterior del tubo (pg)

**Determinación de la resistencia de una tubería cuando es sometida a esfuerzos combinados (esfuerzos biaxiales):**

$$P_b = \left\{ \left[ \sqrt{1 - 0.75 \left( \frac{\sigma_t}{\sigma_y} \right)^2} \right] \pm \left[ 0.5 \left( \frac{\sigma_t}{\sigma_y} \right) \right] \right\} P_n$$

$P_b$  = Resistencia de la tubería al esfuerzo biaxial (psi).

$P_n$  = Resistencia nominal de la tubería (psi).

$\sigma_y$  = Esfuerzo a la cedencia de la tubería (psi).

$\sigma_t$  = Esfuerzo al que se encuentra trabajando la tubería dentro del pozo (psi).

**Determinación de la tensión requerida en la tubería de revestimiento después de cementarla en función de la altura de cemento por el espacio anular, cambios de presión, cambios en la densidad del fluido y cambios de temperatura:**

$$X = \frac{W_u L - (A_e \delta c g - A_i \delta i g)L + (1 - 2\upsilon)(A_e \Delta P_{es} - A_i \Delta P_{is}) - E \lambda A_s \Delta t + F_s}{W_u - (A_e \delta e g - A_i \delta i g) - (1 - \upsilon)(A_e \Delta \delta e - A_i \Delta \delta i) - A_e(\delta c - \delta e)}$$

$$e = \frac{12(F_s)(L-X)}{E(A_s)}$$

$X$  = Altura del cemento (pie).

$L$  = Profundidad del pozo (pie).

$W_u$  = Peso Unitario de la tubería (lb/pie).

$A_e$  = Área exterior de la tubería ( $pg^2$ ).

$A_i$  = Área interior de la tubería ( $pg^2$ ).

$A_s$  = Área de acero de la tubería ( $pg^2$ ) =  $A_e - A_i$ .

$\delta c$  = Gradiente del cemento (psi/pie).

(cemento de alta densidad + cemento de baja densidad).

$\delta i$  = Gradiente del fluido por el interior de la tubería (psi/pie).

$\delta e$  = Gradiente del fluido por el exterior de la tubería (psi/pie).

$\upsilon$  = Relación de Poisson = 0.3 (adimensional).

$E$  = Módulo de elasticidad (psi). Para el acero =  $30 \times 10^6$  psi.

$e$  = Elongación de la tubería (pg).

$\lambda$  = Coeficiente de expansión térmica del acero =  $6.67 \times 10^{-6}$  ( $pg/pg \cdot {}^\circ F$ )

$\Delta t$  = Variación de la temperatura desde la cima del cemento a la superficie ( ${}^\circ F$ ).

$\Delta P_{es}$  = Cambio de la presión superficial en el exterior (psi).

$\Delta P_{is}$  = Cambio de la presión superficial en el interior (psi).

$F_s$  = Fuerza de tensión durante el anclaje de la tubería para evitar el pandeo (lb- $\sqrt{in}$ ).

$\Delta\delta_e$  = Cambio del gradiente de la densidad en la próxima etapa por fuera de la tubería (psi/pie).

$\Delta\delta_i$  = Cambio del gradiente de la densidad en la próxima etapa por dentro de la tubería (psi/pie).

Nota: Se recomienda que la tensión de la tubería de revestimiento se realice cuando la compresibilidad del cemento sea entre 100 a 300 psi.

### Determinación de la elongación de una sarta

$$e = \frac{12(W)(L)}{E(A_s)}$$

e = Elongación de la tubería (pg)

W = Peso de la tubería flotado (lb)

L = Longitud de la tubería (pie)

E = Módulo de elasticidad (psi). Para el acero =  $30 \times 10^6$  psi

$A_s$  = Área de sección transversal de la tubería ( $pg^2$ )

### Determinación de la profundidad de atrapamiento de la sarta:

$$Lt = \frac{(E)(e)(W_u)}{40.8 (P)}$$

Lt = Profundidad a donde se encuentra atrapada la tubería (pie)

E = Módulo de elasticidad (psi). Para el acero =  $30 \times 10^6$  psi

e = Elongación de la tubería causada por la fuerza de tensión (pg)

$W_u$  = Peso unitario de la tubería (lb/pie)

P = Fuerza de tensión aplicada en la superficie (lb- $\sqrt{in}$ )

### Esfuerzos combinados de la tubería con la tensión y torsión:

$$N = \frac{0.203(Q_T)(Lq)}{10,000(D^4 - d^4)}$$

N = Número de vueltas aplicadas en la superficie para generar torque (adimensional)

$Q_T$  = Torque aplicado con el número de vueltas aplicadas en la superficie (lb/pie)

L<sub>Q</sub> = Longitud de la tubería a donde se aplica el torque (pie)

D = Diámetro exterior de la tubería (pg)

d = Diámetro interior de la tubería (pg)

$$Q_t = \frac{0.096167(J)}{D} \sqrt{\sigma_y^2 - \frac{P^2}{A^2}}$$

QT = Torque combinado con la tensión aplicada en superficie (lb-pie)

J = Momento de inercia polar (pg<sup>4</sup>)

D = Diámetro exterior de la tubería (pg)

P = Tensión aplicada en la superficie (lb<sub>f</sub>)

A = Área de la sección transversal (pg<sup>2</sup>)

$\sigma_y$  = Esfuerzo a la cedencia del material (psi)

$$A = \frac{\pi}{4} (D^2 - d^2) \quad J = \frac{\pi}{32} (D^4 - d^4)$$

A = Área de la sección transversal de la tubería (pg<sup>2</sup>)

J = Momento de inercia polar del elemento cilíndrico hueco (pg<sup>4</sup>)

D = Diámetro exterior de la tubería (pg)

d = Diámetro interior de la tubería (pg)

### Severidad de la pata de perro:

$$SPP_{acp} = \frac{108000 (F)}{\pi LT} = \frac{381971.86}{T}$$

SPP<sub>acp</sub> = Severidad de la pata de perro aceptable (grados/30 m)

T = Tensión aplicada a la sarta (lb)

Nota: Esta ecuación es válida para tubería de rango 2 y se considera una máxima carga lateral de 2,000 lb, de acuerdo con Arthur Lubinski.

### MECANISMOS DE CARGA EN TUBERIA

$$\Delta F_{temp} = -\alpha EA_s \Delta T = -207 A_s \Delta T$$

$\Delta F_{temp}$  = Variación de fuerza axial por temperatura (lb)

$\alpha$  = Coeficiente de expansión térmica (1/°F). Para el acero es  $6.67 \times 10^{-6} \text{ } ^\circ\text{F}^{-1}$

E = Módulo de Young (psi). Para el acero es  $30 \times 10^6$  psi

A<sub>s</sub> = Área de la sección transversal de la tubería (pg<sup>2</sup>)

$\Delta T$  = Variación de la temperatura sobre la longitud libre (°F)

$$\Delta F_a = +0.471 d^2 \Delta P_i$$

$\Delta F_a$  = Variación de fuerza axial por variación en la presión interna (lb).

El signo + significa un incremento de la fuerza de tensión generada por la presión interna.

d = Diámetro interior de la tubería (pg)

$\Delta P_i$  = Variación de la presión interna (psi)

$$\Delta F_a = -0.471 D^2 \Delta P_e$$

$\Delta F_a$  = Variación de fuerza axial por variación en la presión externa (lb).

El signo – significa un decremento de la fuerza de tensión generada por la presión externa.

D = Diámetro exterior de la tubería (pg)

$\Delta P_e$  = Variación de la presión externa (psi)

### PRUEBA INTEGRAL DE PRESIÓN (PRUEBA DE GOTEO O LEAK OFF)

Cálculos previos:

$$P_h = \frac{(\rho)(h)}{10} \quad P_g = \frac{(\gamma)(h)}{1300.86(d_h-d_p)} \quad P_s = P_{TR} - P_h + P_g$$

Después de la prueba:

$$\rho_{eq} = \rho + \frac{10(P_f)}{h}$$

P<sub>h</sub> = Presión hidrostática (Kg/cm<sup>2</sup>)

P<sub>g</sub> = Presión requerida para romper la gelatinosidad del fluido (Kg/cm<sup>2</sup>)

P<sub>TR</sub> = Resistencia a la presión interna de la TR (Kg/cm<sup>2</sup>)

P<sub>s</sub> = Presión máxima superficial (no rebasar la presión interna de TR) (Kg/cm<sup>2</sup>)

P<sub>f</sub> = Presión de inicio de fractura de la formación (presión registrada y estabilizada en superficie) (Kg/cm<sup>2</sup>)

$\rho$  = Densidad del fluido (g/cm<sup>3</sup>)

$\rho_{eq}$  = Densidad equivalente (g/cm<sup>3</sup>)

g = Gelatinosidad del fluido medido a 10 minutos (lb/100 pie<sup>2</sup>)

h = Altura de la columna o profundidad donde se realizó la prueba (m)

d<sub>h</sub> = Diámetro del agujero ó diámetro interior de la tubería de revestimiento (pg)

d<sub>p</sub> = Diámetro exterior de la tubería de perforación o de los lastrabarrenas (pg)

## CONTROL DE BROTES

$$\rho_c = \rho_i + \frac{10(PCR)}{h} + M \quad PIC = Pr + PCR$$

$$PFC = Pr \left( \frac{\rho_c}{\rho_i} \right) = (PIC - PCR) \left( \frac{\rho_c}{\rho_i} \right) \quad W_{barita} = \frac{85(\rho_c - \rho_i)}{4.25 - \rho_c}$$

$$\rho_{fi} = \rho_i - \frac{10(PCR - PIC)}{Lb} \quad D_{est} = 3.18 \left[ \frac{\rho_i(Q)^2}{PCR} \right]^{0.25}$$

$\rho_i$  = Densidad inicial del fluido de perforación ( $\text{g/cm}^3$ )

$\rho_c$  = Densidad de control ( $\text{g/cm}^3$ )

$\rho_{fi}$  = Densidad del fluido invasor ( $\text{g/cm}^3$ )

PIC = Presión inicial de circulación ( $\text{Kg/cm}^2$ )

PFC = Presión final de circulación ( $\text{Kg/cm}^2$ )

Pr = Presión reducida de circulación ( $\text{Kg/cm}^2$ )

PCR = Presión de cierre estabilizada en la tubería de perforación ( $\text{Kg/cm}^2$ )

PCTR = Presión de cierre estabilizada en la tubería

de revestimiento ( $\text{Kg/cm}^2$ )

h = Profundidad vertical del pozo o donde se encuentre la barrena (m)

Q = Gasto de la bomba o de la unidad de alta presión (lt/min)

Lb = Longitud de la burbuja (m). Evaluada por el volumen  
de entrada en presas y capacidades anulares

M = Margen del viaje, comúnmente de 0.03 a 0.04 ( $\text{g/cm}^3$ )

$W_{barita}$  = Número de sacos de barita para incrementar la densidad  
del fluido (sacos/ $\text{m}^3$ )

$D_{est}$  = Diámetro del estrangulador (pg)

## BARRENAS

$$C_m = \frac{C_b + C_{eq}(Tr + Tv)}{m} \quad Tv = 0.004(\text{Prof})$$

$$TMP = \frac{60(C_m)}{C_{eq}}$$

$C_m$  = Costo por metro perforado ( $\$/\text{m}$ )

$C_b$  = Costo de la barrena (\$)

$C_{eq}$  = Costo del equipo de perforación ( $\$/\text{hora}$ )

Tr = Tiempo de rotación efectiva de la barrena (horas)

Tv = Tiempo de viaje (horas)

m = Metros perforados (m)

Prof = Profundidad (m)

TMP = Tiempo máximo permisible (min/m)

## HIDRAULICA DE PERFORACION

$$V_a = \frac{24.5(Q)}{(d_h^2 - d_p^2)}$$

$$V_c = \frac{7.7791(\mu) + 7.7791 \sqrt{\mu^2 + 77.469(D_h - D_p)^2(\rho)(Y_p)}}{\rho(D_h - D_p)}$$

$$\Delta P_i = \frac{\mu^{0.18} \rho^{0.82} Q^{1.82} L}{700.71(d^{4.82})}$$

$$\Delta P_a = \frac{\mu^{0.18} \rho^{0.82} Q^{1.82} L}{700.71(D_h - D_p)^3(D_h + D_p)^{1.82}}$$

$$\Delta P_b = \frac{\rho(Q^2)}{1444(C_d^2)(A_T^2)}$$

$$\Delta T = \frac{\pi}{4} \left[ j_1^2 + j_2^2 + j_3^2 + \dots + j_n^2 \right]$$

$$V_T = \frac{Q}{3.117 A_T}$$

$$I = 0.004298(\rho)(Q)(V_T) = 0.05(Q) \sqrt{(\rho)\Delta P_B}$$

$$HHP = \frac{\Delta P_B(Q)}{1714}$$

$$\rho_{eq} = \rho + \frac{\Sigma \Delta P_a}{1.42L}$$

$$HP = \frac{PQ}{1714}$$

Q = Gasto (gal/min)

P = Presión de bombeo (gal/min)

L = Longitud de la tubería (m)

$\rho$  = Densidad del fluido de perforación (g/cm<sup>3</sup>)

$\rho_{eq}$  = Densidad equivalente de circulación (g/cm<sup>3</sup>)

- $\mu$  = Viscosidad plástica (cp)  
 $Y_p$  = Punto de cedencia del fluido de perforación (lb/100 pie<sup>2</sup>)  
 $d$  = Diámetro interior de la tubería de perforación  
 o de los lastrabarrenas (pg)  
 $d_h$  = Diámetro del agujero ó diámetro interior de la tubería de revestimiento (pg)  
 $d_p$  = Diámetro exterior de la tubería de perforación  
 o de los lastrabarrenas (pg)  
 $C_d$  = Coeficiente de descarga en toberas, depende del tamaño y tipo ( $C_d = 0.95$ )  
 $A_t$  = Área total de las toberas (pg<sup>2</sup>)  
 $j$  = Diámetro de las toberas en 32<sup>avos</sup> (pg)  
 $V_a$  = Velocidad anular del fluido de perforación (pie/min)  
 $V_c$  = Velocidad crítica por el espacio anular por el fluido de perforación (pie/min)  
 $V_t$  = Velocidad en las toberas (pie/seg)  
 $\Delta P_i$  = Caída de presión por el interior de la tubería (psi)  
 $\Delta P_a$  = Caída de presión por el espacio anular (psi)  
 $\Delta P_b$  = Caída de presión en la barrena (psi)  
 $I$  = Fuerza de impacto (lb)  
 $HHP$  = Índice de limpieza en la barrena (HP/pg<sup>2</sup>)  
 $HP$  = Caballaje hidráulico en la bomba (HP)

### CONSTRUCCION POZO DIRECCIONAL (SEVERIDAD DE 1.5°/30)

$$L_{dz} = \sqrt{(X_2 - X_1)^2 + (Y_2 - Y_1)^2}$$

$$R = \tan^{-1} \frac{\Delta X}{\Delta Y}$$

Cálculos para la construcción del ángulo máximo con severidad de 1.5°/30 m:

$$\theta_{máx} = \tan^{-1} \left[ \frac{L_{dz} - 1145.92}{CO-ID} \right] + \sin^{-1} \left\{ \frac{1145.92 \cos \left[ \tan^{-1} \left( \frac{L_{dz} - 1145.92}{CO-ID} \right) \right]}{CO-ID} \right\}$$

$$PV = 1145.92(\operatorname{Sen} \theta_{máx})$$

$$DH = 1145.92(1 - \operatorname{Cos} \theta_{máx})$$

$$LC = \frac{1145.92(\theta_{\max})}{57.2958}$$

Cálculo de la severidad de la pata de perro:

$$PP = \cos^{-1} \left\{ [(\sin \alpha_1 \sin \alpha_2) \cos(R_1 - R_2)] + (\cos \alpha_1 \cos \alpha_2) \right\}$$

$$SPP = \frac{30(PP)}{LC}$$

$L_{dz}$  = Desplazamiento horizontal (m)

$X_1, Y_1$  = Coordenadas conductor (m)

$X_2, Y_2$  = Coordenadas objetivo (m)

$R$  = Rumbo (en la dirección del objetivo a partir del norte o sur)

ID = Inicio de la desviación (m)

CO = Profundidad a la cima del objetivo (m)

PV = Profundidad vertical (m)

DH = Desplazamiento horizontal (m)

LC = Longitud de curso (m)

PP = Pata de perro (grados)

SPP = Severidad de la pata de perro (grados/30 m)

## DENSIDAD DE LA LECHADA DE CEMENTO

$$\rho_{lechada} = \frac{m_c + m_w}{V_c + V_w} = \frac{\text{masa total}}{\text{Volumen de la lechada}}$$

Rendimiento de agua por saco de cemento = 23.03 lt

$$V_c = \frac{m_c}{\rho_c} \quad V_b = \frac{m_b}{\rho_b}$$

Rendimiento de agua para la bentonita = 2.86 lt/1% de bentonita.

$V_c$  = Volumen de cemento (lt/saco)

$V_w$  = Volumen de agua (lt/saco)

$V_b$  = Volumen de bentonita (lt/saco de cemento)

$m_c$  = Masa de cemento (kg) = saco de cemento 50 Kg

$m_w$  = Masa de agua (kg)

$m_b$  = Masa de la bentonita, dependiendo del porcentaje con relación al cemento (kg)

$\rho_{lechada}$  = Densidad de la lechada ( $\text{g}/\text{cm}^3$ )

$\rho_c$  = Densidad del cemento ( $\text{g}/\text{cm}^3$ ) =  $3.15 \text{ g}/\text{cm}^3$

$\rho_b$  = Densidad de la bentonita ( $\text{g}/\text{cm}^3$ ) =  $2.65 \text{ g}/\text{cm}^3$

**GRADIENTE GEOTERMICO (COSTA DEL GOLFO DE MEXICO)**

$$T = 21.1 + \frac{\text{Prof.}}{35}$$

T = Temperatura (°C)

**Prof.** = Profundidad (m)

**GRADOS API**

$$^{\circ}\text{API} = \frac{141.5}{\gamma} - 131.5$$

°API = Grados API (adimensional)

γ = Gravedad específica con relación al agua a 60°F  
y 760 mm Hg (adim.)



# RANGOS DE TUBO

## RANGOS DE TUBO

Rangos para tubos de revestimiento de acuerdo con la norma API 5CT/ISO 11960

| RANGO | LONGITUD |               |
|-------|----------|---------------|
|       | pies     | metros        |
| 1     | 16 - 25  | 4.88 - 7.62   |
| 2     | 25 - 34  | 7.62 - 10.36  |
| 3     | 34 - 48  | 10.36 - 14.63 |

Rangos para tubos de producción de acuerdo con la norma API 5CT/ISO 11960

| RANGO | LONGITUD |               |
|-------|----------|---------------|
|       | pies     | metros        |
| 1     | 20 - 24  | 6.10 - 7.32   |
| 2     | 28 - 32  | 8.53 - 9.75   |
| 3     | 38 - 42  | 11.58 - 12.80 |

Rangos para tubos de perforación de acuerdo con la norma API 5D

| RANGO | LONGITUD |               |
|-------|----------|---------------|
|       | pies     | metros        |
| 1     | 18 - 22  | 5.49 - 6.71   |
| 2     | 27 - 30  | 8.23 - 9.14   |
| 3     | 38 - 45  | 11.58 - 13.72 |



DRIFT

## DIÁMETRO DEL CALIBRADOR O DRIFT

Diámetro de calibrador para tuberías de revestimiento y producción de acuerdo con la norma del API 5CT/ISO 11960.

| DIÁMETRO DE LA TUBERÍA DE REVESTIMIENTO | DIÁMETRO DEL DRIFT (pg) |
|---|-------------------------|
| Mayor a 13 3/8"                         | d – 3/16"               |
| 13 3/8" - 9 5/8"                        | d – 5/32"               |
| Menor de 9 5/8"                         | d – 1/8"                |

| DIÁMETRO DE LA TUBERÍA DE PRODUCCIÓN | DIÁMETRO DEL DRIFT (pg) |
|--------------------------------------|-------------------------|
| Mayor de 2 7/8"                      | d – 1/8"                |
| Menor de 2 7/8"                      | d – 3/32"               |



INTERCAMBIABILIDAD

## INTERCAMBIABILIDAD DE CONEXIONES TUBING

| Tubo              |               | Tecnología |                   |     |     |     |     |     |              |      | Tecnologías Tradicionales |
|-------------------|---------------|------------|-------------------|-----|-----|-----|-----|-----|--------------|------|---------------------------|
| Diámetro Exterior | Peso Unitario | API        | Wedge Series 500™ |     |     |     |     |     | Blue™ Series |      |                           |
| (pulgadas)        | (lb/pie)      | 8HRR       | 511               | 521 | 513 | 503 | 533 | 553 | 563          | Blue |                           |
| <b>4 1/2</b>      | 12.60         | ●          | ●                 | ●   | ●   |     |     |     | ●            | ●    | PJD                       |
|                   | 12.75 EU      | ●          |                   |     |     | ●   | ●   | ●   |              |      | ●                         |
|                   | 15.10         |            | ●                 |     | ●   |     |     |     |              |      |                           |
|                   | 15.20         | ●          |                   |     |     |     |     |     | ●            | ●    |                           |
|                   | 15.50         |            |                   |     |     | ●   | ●   |     |              |      | ●                         |
|                   | 17.00         | ●          |                   |     | ●   |     | ●   | ●   | ●            | ●    |                           |
|                   | 18.80         |            |                   |     | ●   |     |     |     |              |      |                           |
|                   | 18.90         | ●          |                   |     |     |     |     |     |              |      |                           |
|                   | 21.50         | ●          |                   |     | ●   |     |     | ●   | ●            |      |                           |
|                   | 21.60         |            |                   |     |     | ●   | ●   |     |              |      |                           |
|                   | 23.70         | ●          |                   |     |     |     |     | ●   |              |      |                           |
|                   | 24.00         |            |                   |     |     | ●   | ●   |     |              |      |                           |
|                   | 26.00         |            |                   |     |     |     |     |     |              |      |                           |
|                   | 26.10         | ●          |                   |     |     |     |     | ●   |              |      |                           |
| <b>4</b>          | 9.50          | ●          | ●                 | ●   |     |     |     |     |              | ●    |                           |
|                   | 10.70         | ●          |                   |     |     |     |     |     |              |      |                           |
|                   | 10.90         |            |                   |     |     |     |     |     |              | ●    |                           |
|                   | 11.00 EU      | ●          | ●                 | ●   | ●   | ●   | ●   | ●   | ●            |      | ●                         |
|                   | 13.20         | ●          |                   |     |     |     |     | ●   | ●            | ●    |                           |
|                   | 13.40         |            |                   |     |     | ●   | ●   |     |              |      | ●                         |
|                   | 16.10         | ●          |                   |     |     | ●   | ●   | ●   | ●            | ●    |                           |
|                   | 18.90         | ●          |                   |     |     |     |     | ●   | ●            | ●    |                           |
|                   | 19.00         |            |                   |     |     | ●   | ●   |     |              |      |                           |
|                   | 22.20         | ●          |                   |     |     |     |     | ●   |              |      |                           |
|                   | 22.50         |            |                   |     |     | ●   | ●   |     |              |      |                           |
| <b>3 1/2</b>      | 7.70          | ●          | ●                 |     |     |     |     |     |              | ●    |                           |
|                   | 9.20          | ●          | ●                 |     |     |     |     |     |              | ●    |                           |
|                   | 9.30 EU       | ●          |                   |     |     | ●   | ●   | ●   |              |      | ●                         |
|                   | 10.20         | ●          | ●                 |     |     |     |     |     | ●            | ●    |                           |
|                   | 10.30         |            |                   |     |     | ●   | ●   | ●   |              |      | ●                         |
|                   | 12.70         | ●          |                   |     |     |     |     |     | ●            | ●    |                           |
|                   | 12.95 EU      | ●          |                   |     |     | ●   | ●   |     |              |      | ●                         |
|                   | 14.30         | ●          |                   |     |     | ●   | ●   | ●   | ●            | ●    |                           |
|                   | 15.50         | ●          |                   |     |     |     |     | ●   | ●            | ●    |                           |
|                   | 15.80         |            |                   |     |     | ●   | ●   |     |              |      |                           |
|                   | 17.00         | ●          |                   |     |     |     |     | ●   |              |      |                           |
|                   | 17.05         |            |                   |     |     | ●   | ●   |     |              |      |                           |

| Tubo                            |                           | Tecnología |                   |     |     |     |     |     |              |                           |     |
|---------------------------------|---------------------------|------------|-------------------|-----|-----|-----|-----|-----|--------------|---------------------------|-----|
| Diámetro Exterior<br>(pulgadas) | Peso Unitario<br>(lb/pie) | API        | Wedge Series 500™ |     |     |     |     |     | Blue™ Series | Tecnologías Tradicionales |     |
|                                 |                           | 8HRR       | 511               | 521 | 513 | 503 | 533 | 553 | 563          | Blue                      | PJD |
| <b>2 7/8</b>                    | 6.40                      | •          | •                 |     |     |     |     | •   | •            |                           |     |
|                                 | 6.50 EU                   | •          |                   |     |     | •   | •   | •   |              |                           | •   |
|                                 | 7.80                      | •          |                   |     |     |     |     | •   | •            |                           |     |
|                                 | 7.90 EU                   | •          |                   |     |     | •   | •   |     |              |                           | •   |
|                                 | 8.60                      | •          |                   |     |     |     |     | •   | •            |                           |     |
|                                 | 8.70 EU                   | •          |                   |     |     | •   | •   |     |              |                           | •   |
|                                 | 9.35                      | •          |                   |     |     |     |     | •   | •            |                           |     |
|                                 | 9.45 EU                   | •          |                   |     |     |     |     |     |              |                           |     |
|                                 | 9.50                      |            |                   |     | •   | •   |     |     |              |                           |     |
|                                 | 10.50                     | •          |                   |     |     |     |     | •   | •            |                           |     |
|                                 | 10.70                     |            |                   |     | •   | •   |     |     | •            |                           |     |
|                                 | 11.50                     | •          |                   |     |     |     |     | •   |              |                           |     |
|                                 | 11.65                     |            |                   |     | •   | •   |     |     |              |                           |     |
| <b>2 3/8</b>                    | 4.00                      | •          |                   |     |     |     |     |     |              |                           |     |
|                                 | 4.60                      | •          | •                 |     |     |     |     | •   | •            |                           |     |
|                                 | 4.70 EU                   | •          |                   |     | •   | •   | •   |     |              |                           | •   |
|                                 | 5.80                      | •          |                   |     |     |     |     | •   | •            |                           |     |
|                                 | 5.95 EU                   | •          |                   |     |     | •   | •   |     |              |                           | •   |
|                                 | 6.60                      | •          |                   |     | •   | •   | •   | •   | •            |                           |     |
|                                 | 7.35                      | •          |                   |     |     |     |     | •   | •            |                           |     |
|                                 | 7.45 EU                   | •          |                   |     | •   | •   |     |     |              |                           |     |

• Disponibilidad de fabricación.

Productos no indicados mediante • consultar factibilidad técnica.

La intercambiabilidad es válida para el mismo diámetro y color.

Las conexiones 503, 533, 553 y 563 pueden ser intercambiables entre sí y en ciertos pesos unitarios.

Las conexiones 513 y 523 pueden ser intercambiables entre sí y en ciertos pesos unitarios.

## INTERCAMBIABILIDAD DE CONEXIONES CASING



| Tubo              |               | Tecnología |                   |     |     |     |     |     |     |     |              |                           |     |     |
|-------------------|---------------|------------|-------------------|-----|-----|-----|-----|-----|-----|-----|--------------|---------------------------|-----|-----|
| Diámetro Exterior | Peso Unitario | API        | Wedge Series 500™ |     |     |     |     |     |     |     | Blue™ Series | Tecnologías Tradicionales |     |     |
| (pulgadas)        | (lb/pie)      | BCN        | 511               | 521 | 513 | 523 | 503 | 533 | 553 | 563 | Blue         | ER                        | SLX | PJD |
| <b>6 5/8</b>      | 20.00         | •          |                   |     | •   |     |     |     |     | •   | •            |                           |     |     |
|                   | 24.00         | •          | •                 | •   |     |     |     |     | •   | •   | •            |                           | •   |     |
|                   | 28.00         | •          | •                 | •   |     |     |     |     | •   | •   | •            |                           | •   |     |
|                   | 32.00         | •          |                   |     |     |     |     |     | •   | •   | •            |                           | •   |     |
| <b>5 1/2</b>      | 14.00         | •          |                   | •   |     |     |     |     |     | •   |              |                           |     |     |
|                   | 15.50         | •          | •                 | •   |     |     |     |     | •   | •   | •            |                           |     |     |
|                   | 17.00         | •          | •                 | •   | •   | •   |     |     | •   | •   | •            |                           |     | •   |
|                   | 20.00         | •          | •                 | •   | •   | •   |     |     | •   | •   | •            |                           | •   |     |
|                   | 23.00         | •          |                   |     |     |     | •   |     | •   | •   | •            |                           | •   |     |
|                   | 26.80         | •          |                   |     |     |     |     | •   | •   | •   | •            |                           | •   |     |
|                   | 29.70         | •          |                   |     |     |     |     |     |     | •   | •            |                           |     |     |
|                   | 32.60         | •          |                   |     |     |     |     |     | •   | •   | •            |                           |     |     |
|                   | 35.30         | •          |                   |     |     |     |     |     |     |     |              |                           |     |     |
|                   | 38.00         | •          |                   |     |     |     |     |     |     |     |              |                           |     |     |
| <b>5</b>          | 40.50         | •          |                   |     |     |     |     |     |     |     |              |                           |     |     |
|                   | 43.10         | •          |                   |     |     |     |     |     |     |     |              |                           |     |     |
|                   | 11.50         | •          |                   |     |     |     |     |     |     |     |              |                           |     |     |
|                   | 13.00         | •          |                   | •   |     |     |     |     |     |     |              |                           |     |     |
|                   | 15.00         | •          | •                 | •   | •   | •   |     |     | •   | •   | •            |                           | •   | •   |
|                   | 18.00         | •          | •                 | •   | •   | •   |     |     | •   | •   | •            |                           | •   | •   |
|                   | 21.40         | •          |                   |     |     |     | •   |     | •   | •   | •            |                           | •   |     |
| <b>4 1/2</b>      | 23.20         | •          |                   |     | •   | •   |     |     | •   | •   | •            |                           | •   |     |
|                   | 24.10         | •          |                   |     | •   | •   |     |     | •   | •   | •            |                           | •   |     |
|                   | 9.50          | •          |                   |     |     |     |     |     |     |     |              |                           |     |     |
|                   | 10.50         | •          | •                 | •   | •   |     |     |     |     |     | •            |                           |     |     |
|                   | 11.60         | •          | •                 | •   | •   | •   | •   | •   | •   | •   | •            |                           | •   | •   |
|                   | 13.50         | •          | •                 | •   | •   | •   | •   | •   | •   | •   | •            |                           | •   | •   |
|                   | 15.10         | •          | •                 | •   | •   | •   | •   | •   | •   | •   | •            |                           | •   |     |
|                   | 15.20         |            |                   |     |     |     |     |     |     | •   | •            |                           |     |     |

• Disponibilidad de fabricación.

Productos no indicados mediante • consultar factibilidad técnica.

La intercambiabilidad es válida para el mismo diámetro y color.

Las conexiones 503, 533, 553 y 563 pueden ser intercambiables entre sí y en ciertos pesos unitarios.

Las conexiones 513 y 523 pueden ser intercambiables entre sí y en ciertos pesos unitarios.



# NOMENCLATURA SERIE 500

## NOMENCLATURA WEDGE SERIES 500™

### Código de Identificación de Roscas Acuñadas

| Primer Dígito     | Segundo Dígito   | Tercer Dígito  |
|-------------------|--|--|
| Serie 500         | Extremo del Tubo   | Sistema de Sellado                                     |
| 5 - Rosca Acuñada | 0 - Rosca integral en extremo recalcado API                | 1 - Sistema de acuñamiento + grasa                     |
|                   | 1 - Rosca integral en extremo liso (Flush)                 |  |
|                   | 2 - Rosca integral formada (suajeada) (Semi Flush)         |  |
|                   | 3 - Rosca integral recalcada                               | 3 - Sistema de acuñamiento + grasa + sello metal-metal |
|                   | 5 - Rosca integral con recalcado solo en caja y piñón liso |  |
|                   | 6 - Rosca acoplada   |  |



# CÓDIGO DE COLORES

## GRADOS DE ACERO API 5CT/ISO11960

De acuerdo con la norma API 5CT/ISO 11960. Para tubo con cople normal del mismo grado de acero, con longitud de 6 pies o mayor; si la orden de compra no especificara otra cosa, el código de color a aplicar sería cualquiera de los siguientes o ambos:

- 1 Pintar sobre el cuerpo del tubo las bandas correspondientes al grado de acero, a una distancia no mayor de dos pies del extremo (cople, caja, piñón o liso).
- 2 Pintar el cople del color correspondiente al grado de acero, incluyendo sus bandas.

| GRADO DE ACERO | COPE  |       | TUBO<br>BANDA | CODIGO DE COLORES |
|----------------|-------|-------|---------------|-------------------|
|                | COLOR | BANDA |               |                   |
| H40            | —     | —     | —             |                   |
| J55 tubing     |       | —     | —             |                   |
| J55 casing     |       | —     | —             |                   |
| K55            |       | —     |               |                   |
| M65 (*)        |       | —     | —             |                   |
| N80            |       | —     | —             |                   |
| N80 Q          |       | —     | —             |                   |
| L80 tipo 1     |       | —     | —             |                   |
| L80 9Cr        |       | —     | —             |                   |
| L80 13Cr       |       | —     | —             |                   |

(\*) El grado de acero M65 se suministra con cople grado L80 tipo 1  
Q: Con tratamiento Térmico

| GRADO DE ACERO | COPE  |       | TUBO  | CODIGO DE COLORES |
|----------------|-------|-------|-------|-------------------|
|                | COLOR | BANDA | BANDA |                   |
| C90 tipo 1     |       | —     |       |                   |
| C90 tipo 2     |       |       |       |                   |
| T95 tipo 1     |       | —     |       |                   |
| T95 tipo 2     |       |       |       |                   |
| C95            |       | —     |       |                   |
| P110           |       | —     |       |                   |
| Q125 tipo 1    |       | —     |       |                   |
| Q125 tipo 2    |       |       |       |                   |
| Q125 tipo 3    |       |       |       |                   |
| Q125 tipo 4    |       |       |       |                   |

## GRADOS DE ACERO PROPIETARIOS

| GRADO DE ACERO | COPE  |       | TUBO | CÓDIGO DE COLORES |
|----------------|-------|-------|------|-------------------|
|                | COLOR | BANDA |      |                   |
| TRC80          |       |       |      |                   |
| TRC85          |       |       |      |                   |
| TRC90          |       |       |      |                   |
| TRC95          |       |       |      |                   |
| TRC95HC        |       |       |      |                   |
| TRC100         |       |       |      |                   |
| TRC110         |       |       |      |                   |
| TAC80          |       |       |      |                   |
| TAC95          |       |       |      |                   |
| TAC110         |       |       |      |                   |
| TAC140         |       |       |      |                   |

## GRADOS DE ACERO PARA TUBO DE LINEA

Este código de colores únicamente se aplica a partir de grados de acero L320 ó X46 y de diámetros de 4 1/2" y mayores. Esto de acuerdo a la norma API 5L ó ISO 3183:2007.

| GRADO DE ACERO | TUBO  | CODIGO DE COLORES |
|----------------|-------|-------------------|
|                | BANDA |                   |
| L320 ó X46     |       |                   |
| L360 ó X52     |       |                   |
| L390 ó X56     |       |                   |
| L415 ó X60     |       |                   |
| L450 ó X65     |       |                   |
| L485 ó X70     |       |                   |
| L555 ó X80     |       |                   |

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

Requerimiento Pemex

| DIAMETRO                           | PESO   | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |         |         |         |          |          |          |         |        |         |                             |         |          | GRADO DE ACERO PROPIETARIOS |         |         |         |          |          |
|------------------------------------|--------|---|---------|---------|---------|----------|----------|----------|---------|--------|---------|-----------------------------|---------|----------|-----------------------------|---------|---------|---------|----------|----------|
|                                    |        | GRADO DE ACERO API 5CT - ISO 11960      |         |         |         |          |          |          |         |        |         | GRADO DE ACERO PROPIETARIOS |         |          |                             |         |         |         |          |          |
| pulg                               | lb/pie | H40                                     | J55     | K55     | M65     | L80      | N80 Q    | C90      | C95     | T95    | P110    | Q125                        | TAC80   | TAC95    | TAC110                      | TAC140  | TRC80   | TRC95   | TRC95HC  | TRC110   |
| Color de las franjas según el peso |        | [Black]                                 | [Green] | [Green] | [Green] | [Orange] | [Orange] | [Purple] | [Brown] | [Grey] | [White] | [Yellow]                    | [White] | [White]  | [White]                     | [White] | [Brown] | [Brown] | [Brown]  |          |
| Más una franja de color            |        |   | [Pink]  | [Blue]  | [Brown] | [Green]  |          |          |         |        |         |                             | [Blue]  | [Yellow] | [Green]                     | [Brown] | [Blue]  | [Pink]  | [Yellow] | [Orange] |
| 20                                 | 94.00  | 1                                       | 1       | 1       |         |          |          |          |         |        |         |                             |         |          |                             |         |         |         |          |          |
|                                    | 106.50 | 2                                       | 2       | 2       |         |          |          |          |         |        |         |                             |         |          |                             |         |         |         |          |          |
|                                    | 133.00 | 3                                       | 3       | 3       |         |          |          |          |         |        |         |                             |         |          |                             |         |         |         |          |          |
| 18 5/8                             | 87.50  | 1                                       | 1       | 1       |         |          |          |          |         |        |         |                             |         |          |                             |         |         |         |          |          |
|                                    | 121.00 | 2                                       | 2       | 2       |         |          |          |          |         |        |         |                             |         |          |                             |         |         |         |          |          |
| 16                                 | 65.00  | 1                                       | 1       | 1       | 1       | 1        | 1        |          |         |        |         |                             | 1       |          |                             |         |         |         |          |          |
|                                    | 75.00  | 2                                       | 2       | 2       | 2       | 2        | 2        |          |         |        |         |                             | 2       |          |                             |         |         |         |          |          |
|                                    | 84.00  | 3                                       | 3       | 3       | 3       | 3        | 3        |          |         |        |         |                             | 3       |          |                             |         |         |         |          |          |
|                                    | 95.00  | 6                                       | 6       | 6       | 6       | 6        | 6        |          |         |        |         |                             | 6       |          |                             |         |         |         |          |          |
|                                    | 109.00 | 4                                       | 4       | 4       | 4       | 4        | 4        |          |         |        |         |                             | 4       |          |                             |         |         |         |          |          |
|                                    | 137.90 | 5                                       | 5       | 5       | 5       | 5        | 5        |          |         |        |         |                             | 5       |          |                             |         |         |         |          |          |
| 13 5/8                             | 88.20  | 1                                       | 1       | 1       | 1       | 1        | 1        | 1        | 1       | 1      | 1       | 1                           | 1       | 1        | 1                           | 1       | 1       | 1       | 1        |          |
| 13 3/8                             | 48.00  | 1                                       | 1       | 1       | 1       | 1        | 1        | 1        | 1       | 1      | 1       | 1                           | 1       | 1        | 1                           | 1       | 1       | 1       | 1        |          |
|                                    | 54.50  | 2                                       | 2       | 2       | 2       | 2        | 2        | 2        | 2       | 2      | 2       | 2                           | 2       | 2        | 2                           | 2       | 2       | 2       | 2        |          |
|                                    | 61.00  | 3                                       | 3       | 3       | 3       | 3        | 3        | 3        | 3       | 3      | 3       | 3                           | 3       | 3        | 3                           | 3       | 3       | 3       | 3        |          |

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

Requerimiento Pemex

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

Requerimiento Pemex

| DIAMETRO                           | PESO   | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |     |     |     |     |       |     |     |     |      |                             |       |       |        |        |       |       |         |        |
|------------------------------------|--------|---|-----|-----|-----|-----|-------|-----|-----|-----|------|-----------------------------|-------|-------|--------|--------|-------|-------|---------|--------|
|                                    |        | GRADO DE ACERO API 5CT - ISO 11960      |     |     |     |     |       |     |     |     |      | GRADO DE ACERO PROPIETARIOS |       |       |        |        |       |       |         |        |
| pulg                               | lb/pie | H40                                     | J55 | K55 | M65 | L80 | N80 Q | C90 | C95 | T95 | P110 | Q125                        | TAC80 | TAC95 | TAC110 | TAC140 | TRC80 | TRC95 | TRC95HC | TRC110 |
| Color de las franjas según el peso |        | ■                                       | ■   | ■   | ■   | ■   | ■     | ■   | ■   | ■   | ■    | ■                           | ■     | ■     | ■      | ■      | ■     | ■     | ■       |        |
| Más una franja de color            |        |   | ■   | ■   | ■   | ■   | ■     |     |     |     |      |                             | ■     | ■     | ■      | ■      | ■     | ■     | ■       |        |
| 10 3/4                             | 45.50  | 3                                       | 3   | 3   | 3   | 3   | 3     | 3   | 3   | 3   | 3    | 3                           | 3     | 3     | 3      | 3      | 3     | 3     | 3       |        |
|                                    | 51.00  | 4                                       | 4   | 4   | 4   | 4   | 4     | 4   | 4   | 4   | 4    | 4                           | 4     | 4     | 4      | 4      | 4     | 4     | 4       |        |
|                                    | 55.50  | 5                                       | 5   | 5   | 5   | 5   | 5     | 5   | 5   | 5   | 5    | 5                           | 5     | 5     | 5      | 5      | 5     | 5     | 5       |        |
|                                    | 60.70  | 6                                       | 6   | 6   | 6   | 6   | 6     | 6   | 6   | 6   | 6    | 6                           | 6     | 6     | 6      | 6      | 6     | 6     | 6       |        |
|                                    | 65.70  | 7                                       | 7   | 7   | 7   | 7   | 7     | 7   | 7   | 7   | 7    | 7                           | 7     | 7     | 7      | 7      | 7     | 7     | 7       |        |
|                                    | 73.20  | 8                                       | 8   | 8   | 8   | 8   | 8     | 8   | 8   | 8   | 8    | 8                           | 8     | 8     | 8      | 8      | 8     | 8     | 8       |        |
|                                    | 79.20  | 9                                       | 9   | 9   | 9   | 9   | 9     | 9   | 9   | 9   | 9    | 9                           | 9     | 9     | 9      | 9      | 9     | 9     | 9       |        |
|                                    | 85.30  | 10                                      | 10  | 10  | 10  | 10  | 10    | 10  | 10  | 10  | 10   | 10                          | 10    | 10    | 10     | 10     | 10    | 10    | 10      |        |
| 9 7/8                              | 62.80  | 2                                       | 2   | 2   | 2   | 2   | 2     | 2   | 2   | 2   | 2    | 2                           | 2     | 2     | 2      | 2      | 2     | 2     | 2       |        |
| 9 5/8                              | 32.30  | 1                                       | 1   | 1   | 1   | 1   | 1     | 1   | 1   | 1   | 1    | 1                           | 1     | 1     | 1      | 1      | 1     | 1     | 1       |        |
|                                    | 36.00  | 2                                       | 2   | 2   | 2   | 2   | 2     | 2   | 2   | 2   | 2    | 2                           | 2     | 2     | 2      | 2      | 2     | 2     | 2       |        |
|                                    | 40.00  | 3                                       | 3   | 3   | 3   | 3   | 3     | 3   | 3   | 3   | 3    | 3                           | 3     | 3     | 3      | 3      | 3     | 3     | 3       |        |
|                                    | 43.50  | 4                                       | 4   | 4   | 4   | 4   | 4     | 4   | 4   | 4   | 4    | 4                           | 4     | 4     | 4      | 4      | 4     | 4     | 4       |        |
|                                    | 47.00  | 5                                       | 5   | 5   | 5   | 5   | 5     | 5   | 5   | 5   | 5    | 5                           | 5     | 5     | 5      | 5      | 5     | 5     | 5       |        |
|                                    | 53.50  | 6                                       | 6   | 6   | 6   | 6   | 6     | 6   | 6   | 6   | 6    | 6                           | 6     | 6     | 6      | 6      | 6     | 6     | 6       |        |

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

## Requerimiento Pemex

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

Requerimiento Pemex

| DIAMETRO                           | PESO   | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |         |         |         |          |          |          |         |        |         |                             |         |          |         |         |         |         |          |          |
|------------------------------------|--------|---|---------|---------|---------|----------|----------|----------|---------|--------|---------|-----------------------------|---------|----------|---------|---------|---------|---------|----------|----------|
|                                    |        | GRADO DE ACERO API 5CT - ISO 11960      |         |         |         |          |          |          |         |        |         | GRADO DE ACERO PROPIETARIOS |         |          |         |         |         |         |          |          |
| pulg                               | lb/pie | H40                                     | J55     | K55     | M65     | L80      | N80 Q    | C90      | C95     | T95    | P110    | Q125                        | TAC80   | TAC95    | TAC110  | TAC140  | TRC80   | TRC95   | TRC95HC  | TRC110   |
| Color de las franjas según el peso |        | [Black]                                 | [Green] | [Green] | [Green] | [Orange] | [Orange] | [Purple] | [Brown] | [Grey] | [White] | [Yellow]                    | [White] | [White]  | [White] | [White] | [Brown] | [Brown] | [Brown]  |          |
| Más una franja de color            |        |   | [Pink]  | [Blue]  | [Brown] | [Green]  |          |          |         |        |         |                             | [Blue]  | [Yellow] | [Green] | [Brown] | [Blue]  | [Pink]  | [Yellow] | [Orange] |
| 7 5/8                              | 26.40  | 2                                       | 2       | 2       | 2       | 2        | 2        | 2        | 2       | 2      | 2       | 2                           | 2       | 2        | 2       | 2       | 2       | 2       | 2        |          |
|                                    | 29.70  | 3                                       | 3       | 3       | 3       | 3        | 3        | 3        | 3       | 3      | 3       | 3                           | 3       | 3        | 3       | 3       | 3       | 3       | 3        |          |
|                                    | 33.70  | 4                                       | 4       | 4       | 4       | 4        | 4        | 4        | 4       | 4      | 4       | 4                           | 4       | 4        | 4       | 4       | 4       | 4       | 4        |          |
|                                    | 39.00  | 5                                       | 5       | 5       | 5       | 5        | 5        | 5        | 5       | 5      | 5       | 5                           | 5       | 5        | 5       | 5       | 5       | 5       | 5        |          |
|                                    | 42.80  | 6                                       | 6       | 6       | 6       | 6        | 6        | 6        | 6       | 6      | 6       | 6                           | 6       | 6        | 6       | 6       | 6       | 6       | 6        |          |
|                                    | 45.30  | 7                                       | 7       | 7       | 7       | 7        | 7        | 7        | 7       | 7      | 7       | 7                           | 7       | 7        | 7       | 7       | 7       | 7       | 7        |          |
|                                    | 47.10  | 8                                       | 8       | 8       | 8       | 8        | 8        | 8        | 8       | 8      | 8       | 8                           | 8       | 8        | 8       | 8       | 8       | 8       | 8        |          |
|                                    | 51.20  | 9                                       | 9       | 9       | 9       | 9        | 9        | 9        | 9       | 9      | 9       | 9                           | 9       | 9        | 9       | 9       | 9       | 9       | 9        |          |
|                                    | 55.30  | 10                                      | 10      | 10      | 10      | 10       | 10       | 10       | 10      | 10     | 10      | 10                          | 10      | 10       | 10      | 10      | 10      | 10      | 10       |          |
|                                    | 59.20  |   |         |         |         | 11       | 11       |          |         |        |         |                             |         |          |         |         |         |         |          |          |
| 7                                  | 17.00  | 1                                       | 1       | 1       | 1       | 1        | 1        | 1        | 1       | 1      | 1       | 1                           | 1       | 1        | 1       | 1       | 1       | 1       | 1        |          |
|                                    | 20.00  | 2                                       | 2       | 2       | 2       | 2        | 2        | 2        | 2       | 2      | 2       | 2                           | 2       | 2        | 2       | 2       | 2       | 2       | 2        |          |
|                                    | 23.00  | 3                                       | 3       | 3       | 3       | 3        | 3        | 3        | 3       | 3      | 3       | 3                           | 3       | 3        | 3       | 3       | 3       | 3       | 3        |          |
|                                    | 26.00  | 4                                       | 4       | 4       | 4       | 4        | 4        | 4        | 4       | 4      | 4       | 4                           | 4       | 4        | 4       | 4       | 4       | 4       | 4        |          |
|                                    | 29.00  | 5                                       | 5       | 5       | 5       | 5        | 5        | 5        | 5       | 5      | 5       | 5                           | 5       | 5        | 5       | 5       | 5       | 5       | 5        |          |

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

## Requerimiento Pemex

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

Requerimiento Pemex

| DIAMETRO                           | PESO   | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |         |         |         |          |          |          |         |        |         |                             |         |          |         |         |         |         |          |          |
|------------------------------------|--------|---|---------|---------|---------|----------|----------|----------|---------|--------|---------|-----------------------------|---------|----------|---------|---------|---------|---------|----------|----------|
|                                    |        | GRADO DE ACERO API 5CT - ISO 11960      |         |         |         |          |          |          |         |        |         | GRADO DE ACERO PROPIETARIOS |         |          |         |         |         |         |          |          |
| pulg                               | lb/pie | H40                                     | J55     | K55     | M65     | L80      | N80 Q    | C90      | C95     | T95    | P110    | Q125                        | TAC80   | TAC95    | TAC110  | TAC140  | TRC80   | TRC95   | TRC95HC  | TRC110   |
| Color de las franjas según el peso |        | [Black]                                 | [Green] | [Green] | [Green] | [Orange] | [Orange] | [Purple] | [Brown] | [Grey] | [White] | [Yellow]                    | [White] | [White]  | [White] | [White] | [Brown] | [Brown] | [Brown]  |          |
| Más una franja de color            |        |   | [Pink]  | [Blue]  | [Brown] | [Green]  |          |          |         |        |         |                             | [Blue]  | [Yellow] | [Green] | [Brown] | [Blue]  | [Pink]  | [Yellow] | [Orange] |
| 5 1/2                              | 17.00  | 3                                       | 3       | 3       | 3       | 3        | 3        | 3        | 3       | 3      | 3       | 3                           | 3       | 3        | 3       | 3       | 3       | 3       | 3        |          |
|                                    | 20.00  | 4                                       | 4       | 4       | 4       | 4        | 4        | 4        | 4       | 4      | 4       | 4                           | 4       | 4        | 4       | 4       | 4       | 4       | 4        |          |
|                                    | 23.00  | 5                                       | 5       | 5       | 5       | 5        | 5        | 5        | 5       | 5      | 5       | 5                           | 5       | 5        | 5       | 5       | 5       | 5       | 5        |          |
|                                    | 26.80  | 6                                       | 6       | 6       | 6       | 6        | 6        | 6        | 6       | 6      | 6       | 6                           | 6       | 6        | 6       | 6       | 6       | 6       | 6        |          |
|                                    | 29.70  | 7                                       | 7       | 7       | 7       | 7        | 7        | 7        | 7       | 7      | 7       | 7                           | 7       | 7        | 7       | 7       | 7       | 7       | 7        |          |
|                                    | 32.60  | 8                                       | 8       | 8       | 8       | 8        | 8        | 8        | 8       | 8      | 8       | 8                           | 8       | 8        | 8       | 8       | 8       | 8       | 8        |          |
|                                    | 35.30  | 9                                       | 9       | 9       | 9       | 9        | 9        | 9        | 9       | 9      | 9       | 9                           | 9       | 9        | 9       | 9       | 9       | 9       | 9        |          |
|                                    | 38.00  | 10                                      | 10      | 10      | 10      | 10       | 10       | 10       | 10      | 10     | 10      | 10                          | 10      | 10       | 10      | 10      | 10      | 10      | 10       |          |
|                                    | 40.50  | 11                                      | 11      | 11      | 11      | 11       | 11       | 11       | 11      | 11     | 11      | 11                          | 11      | 11       | 11      | 11      | 11      | 11      | 11       |          |
|                                    | 43.10  | 12                                      | 12      | 12      | 12      | 12       | 12       | 12       | 12      | 12     | 12      | 12                          | 12      | 12       | 12      | 12      | 12      | 12      | 12       |          |
| 5                                  | 11.50  | 1                                       | 1       | 1       | 1       | 1        | 1        | 1        | 1       | 1      | 1       | 1                           | 1       | 1        | 1       | 1       | 1       | 1       | 1        |          |
|                                    | 13.00  | 2                                       | 2       | 2       | 2       | 2        | 2        | 2        | 2       | 2      | 2       | 2                           | 2       | 2        | 2       | 2       | 2       | 2       | 2        |          |
|                                    | 15.00  | 3                                       | 3       | 3       | 3       | 3        | 3        | 3        | 3       | 3      | 3       | 3                           | 3       | 3        | 3       | 3       | 3       | 3       | 3        |          |
|                                    | 18.00  | 4                                       | 4       | 4       | 4       | 4        | 4        | 4        | 4       | 4      | 4       | 4                           | 4       | 4        | 4       | 4       | 4       | 4       | 4        |          |
|                                    | 21.40  | 5                                       | 5       | 5       | 5       | 5        | 5        | 5        | 5       | 5      | 5       | 5                           | 5       | 5        | 5       | 5       | 5       | 5       | 5        |          |

## FRANJAS DE IDENTIFICACION PARA TUBO DE REVESTIMIENTO

Requerimiento Pemex

| DIAMETRO                           | PESO   | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |         |         |         |          |          |          |         |        |         |                             |         |          |         |         |         |         |          |          |
|------------------------------------|--------|---|---------|---------|---------|----------|----------|----------|---------|--------|---------|-----------------------------|---------|----------|---------|---------|---------|---------|----------|----------|
|                                    |        | GRADO DE ACERO API 5CT - ISO 11960      |         |         |         |          |          |          |         |        |         | GRADO DE ACERO PROPIETARIOS |         |          |         |         |         |         |          |          |
| pulg                               | lb/pie | H40                                     | J55     | K55     | M65     | L80      | N80 Q    | C90      | C95     | T95    | P110    | Q125                        | TAC80   | TAC95    | TAC110  | TAC140  | TRC80   | TRC95   | TRC95HC  | TRC110   |
| Color de las franjas según el peso |        | [Black]                                 | [Green] | [Green] | [Green] | [Orange] | [Orange] | [Purple] | [Brown] | [Grey] | [White] | [Yellow]                    | [White] | [White]  | [White] | [White] | [Brown] | [Brown] | [Brown]  |          |
| Más una franja de color            |        |   | [Pink]  | [Blue]  | [Brown] | [Green]  |          |          |         |        |         |                             | [Blue]  | [Yellow] | [Green] | [Brown] | [Blue]  | [Pink]  | [Yellow] | [Orange] |
| 5                                  | 23.20  | 6                                       | 6       | 6       | 6       | 6        | 6        | 6        | 6       | 6      | 6       | 6                           | 6       | 6        | 6       | 6       | 6       | 6       | 6        |          |
|                                    | 24.10  | 7                                       | 7       | 7       | 7       | 7        | 7        | 7        | 7       | 7      | 7       | 7                           | 7       | 7        | 7       | 7       | 7       | 7       | 7        |          |
| 4 1/2                              | 9.50   | 1                                       | 1       | 1       | 1       | 1        | 1        | 1        | 1       | 1      | 1       | 1                           | 1       | 1        | 1       | 1       | 1       | 1       | 1        |          |
|                                    | 10.50  | 2                                       | 2       | 2       | 2       | 2        | 2        | 2        | 2       | 2      | 2       | 2                           | 2       | 2        | 2       | 2       | 2       | 2       | 2        |          |
|                                    | 11.60  | 3                                       | 3       | 3       | 3       | 3        | 3        | 3        | 3       | 3      | 3       | 3                           | 3       | 3        | 3       | 3       | 3       | 3       | 3        |          |
|                                    | 13.50  | 4                                       | 4       | 4       | 4       | 4        | 4        | 4        | 4       | 4      | 4       | 4                           | 4       | 4        | 4       | 4       | 4       | 4       | 4        |          |
|                                    | 15.10  | 5                                       | 5       | 5       | 5       | 5        | 5        | 5        | 5       | 5      | 5       | 5                           | 5       | 5        | 5       | 5       | 5       | 5       | 5        |          |

Q - Con tratamiento Térmico

## FRANJAS DE IDENTIFICACION PARA TUBO DE PRODUCCION

Requerimiento Pemex

| DIAMETRO                           | PESO          | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |     |     |       |     |      |                             |       |       |       |        |
|------------------------------------|---------------|---|-----|-----|-------|-----|------|-----------------------------|-------|-------|-------|--------|
|                                    |               | NORMA API 5CT - ISO 11960               |     |     |       |     |      | GRADO DE ACERO PROPIETARIOS |       |       |       |        |
| pulg                               | lb/pie        | H40                                     | J55 | L80 | N80 Q | C90 | P110 | TRC80                       | TRC85 | TRC90 | TRC95 | TRC110 |
| Color de las franjas según el peso |               |   |     |     |       |     |      |                             |       |       |       |        |
| Más una franja de color            |               |   |     |     |       |     |      |                             |       |       |       |        |
| 4 1/2                              | 12.60 / 12.75 | 1                                       | 1   | 1   | 1     | 1   | 1    | 1                           | 1     | 1     | 1     | 1      |
|                                    | 15.20         | 2                                       | 2   | 2   | 2     | 2   | 2    | 2                           | 2     | 2     | 2     | 2      |
|                                    | 17.00         | 3                                       | 3   | 3   | 3     | 3   | 3    | 3                           | 3     | 3     | 3     | 3      |
|                                    | 18.90         | 4                                       | 4   | 4   | 4     | 4   | 4    | 4                           | 4     | 4     | 4     | 4      |
|                                    | 21.50         | 5                                       | 5   | 5   | 5     | 5   | 5    | 5                           | 5     | 5     | 5     | 5      |
|                                    | 23.70         | 6                                       | 6   | 6   | 6     | 6   | 6    | 6                           | 6     | 6     | 6     | 6      |
|                                    | 26.10         | 7                                       | 7   | 7   | 7     | 7   | 7    | 7                           | 7     | 7     | 7     | 7      |
| 4                                  | 9.50          | 1                                       | 1   | 1   | 1     | 1   | 1    | 1                           | 1     | 1     | 1     | 1      |
|                                    | 10.70 / 11.00 | 2                                       | 2   | 2   | 2     | 2   | 2    | 2                           | 2     | 2     | 2     | 2      |
|                                    | 13.20         | 3                                       | 3   | 3   | 3     | 3   | 3    | 3                           | 3     | 3     | 3     | 3      |
|                                    | 16.10         | 4                                       | 4   | 4   | 4     | 4   | 4    | 4                           | 4     | 4     | 4     | 4      |
|                                    | 18.90         | 5                                       | 5   | 5   | 5     | 5   | 5    | 5                           | 5     | 5     | 5     | 5      |
|                                    | 22.20         | 6                                       | 6   | 6   | 6     | 6   | 6    | 6                           | 6     | 6     | 6     | 6      |

## FRANJAS DE IDENTIFICACION PARA TUBO DE PRODUCCION

## Requerimiento Pemex

## FRANJAS DE IDENTIFICACION PARA TUBO DE PRODUCCION

Requerimiento Pemex

| DIAMETRO                           | PESO        | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |     |     |       |     |      |                             |       |       |       |        |
|------------------------------------|-------------|---|-----|-----|-------|-----|------|-----------------------------|-------|-------|-------|--------|
|                                    |             | NORMA API 5CT - ISO 11960               |     |     |       |     |      | GRADO DE ACERO PROPIETARIOS |       |       |       |        |
| pulg                               | lb/pie      | H40                                     | J55 | L80 | N80 Q | C90 | P110 | TRC80                       | TRC85 | TRC90 | TRC95 | TRC110 |
| Color de las franjas según el peso |             |   |     |     |       |     |      |                             |       |       |       |        |
| Más una franja de color            |             |   |     |     |       |     |      |                             |       |       |       |        |
| 2 3/8                              | 4.00        | 1                                       | 1   | 1   | 1     | 1   | 1    | 1                           | 1     | 1     | 1     | 1      |
|                                    | 4.60 / 4.70 | 2                                       | 2   | 2   | 2     | 2   | 2    | 2                           | 2     | 2     | 2     | 2      |
|                                    | 5.80 / 5.95 | 3                                       | 3   | 3   | 3     | 3   | 3    | 3                           | 3     | 3     | 3     | 3      |
|                                    | 6.60        | 4                                       | 4   | 4   | 4     | 4   | 4    | 4                           | 4     | 4     | 4     | 4      |
|                                    | 7.35 / 7.45 | 5                                       | 5   | 5   | 5     | 5   | 5    | 5                           | 5     | 5     | 5     | 5      |

Q: Con tratamiento Térmico

## FRANJAS DE IDENTIFICACION PARA TUBO DE PERFORACION

Requerimiento Pemex

| DIAMETRO                           | PESO   | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |     |      |      |
|------------------------------------|--------|---|-----|------|------|
|                                    |        | NORMA API RP 7G                         |     |      |      |
| pulg                               | lb/pie | E75                                     | X95 | G105 | S135 |
| Color de las franjas según el peso |        |   |     |      |      |
| Más una franja de color            |        |   |     |      |      |
| 6 5/8                              | 25.20  | 1                                       | 1   | 1    | 1    |
|                                    | 27.72  | 2                                       | 2   | 2    | 2    |
| 5 1/2                              | 21.90  | 1                                       | 1   | 1    | 1    |
|                                    | 24.70  | 2                                       | 2   | 2    | 2    |
| 5                                  | 16.25  | 1                                       | 1   | 1    | 1    |
|                                    | 19.50  | 2                                       | 2   | 2    | 2    |
|                                    | 25.60  | 3                                       | 3   | 3    | 3    |
| 4 1/2                              | 13.75  | 1                                       | 1   | 1    | 1    |
|                                    | 16.60  | 2                                       | 2   | 2    | 2    |
|                                    | 20.00  | 3                                       | 3   | 3    | 3    |
| 4                                  | 11.85  | 1                                       | 1   | 1    | 1    |
|                                    | 14.00  | 2                                       | 2   | 2    | 2    |
| 3 1/2                              | 9.50   | 1                                       | 1   | 1    | 1    |
|                                    | 13.30  | 2                                       | 2   | 2    | 2    |
|                                    | 15.50  | 3                                       | 3   | 3    | 3    |

## FRANJAS DE IDENTIFICACION PARA TUBO DE PERFORACION

Requerimiento Pemex

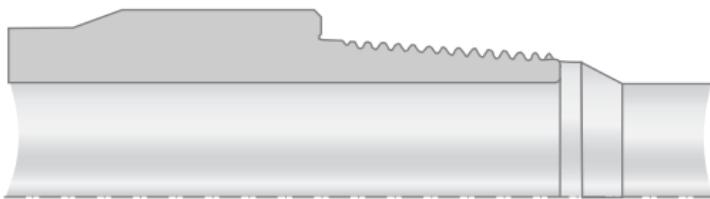
| DIAMETRO | PESO                               | NUMERO DE FRANJAS, DEPENDIENDO DEL PESO |     |      |      |
|----------|------------------------------------|---|-----|------|------|
|          |                                    | NORMA API RP 7G                         |     |      |      |
| pulg     | lb/pie                             | E75                                     | X95 | G105 | S135 |
|          | Color de las franjas según el peso |   |     |      |      |
|          | Más una franja de color            |   |     |      |      |
| 2 7/8    | 6.85                               | 1                                       | 1   | 1    | 1    |
|          | 10.40                              | 2                                       | 2   | 2    | 2    |
| 2 3/8    | 6.65                               | 1                                       | 1   | 1    | 1    |



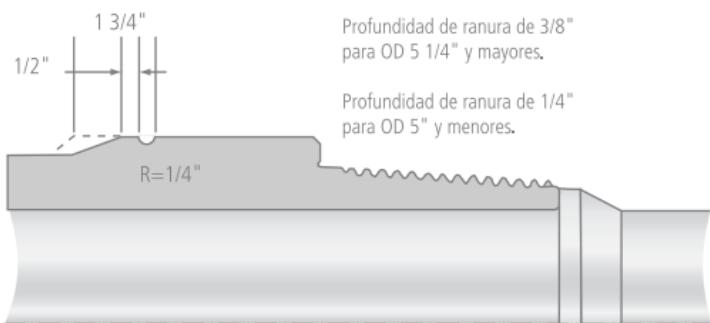
# IDENTIFICACIÓN DEL TUBO DE PERFORACIÓN

## IDENTIFICACION DEL TUBO DE PERFORACION

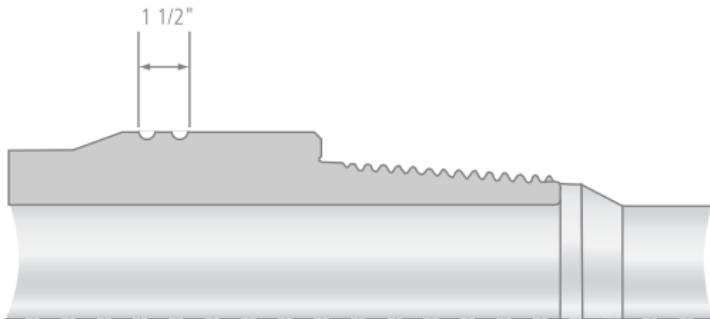
Tubo de perforación estándar



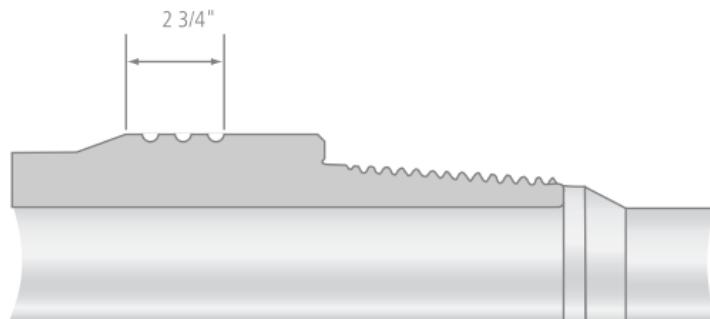
GRADO E75



GRADO X95

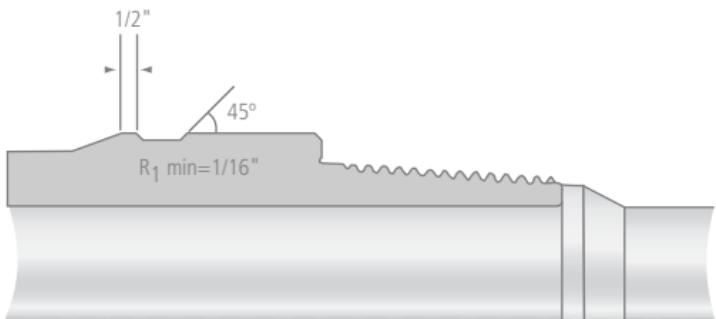


GRADO G105

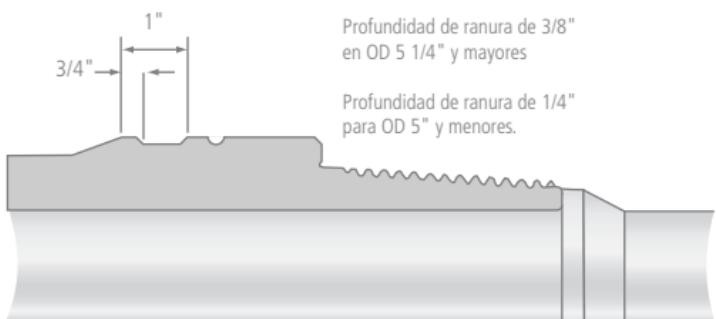


GRADO S135

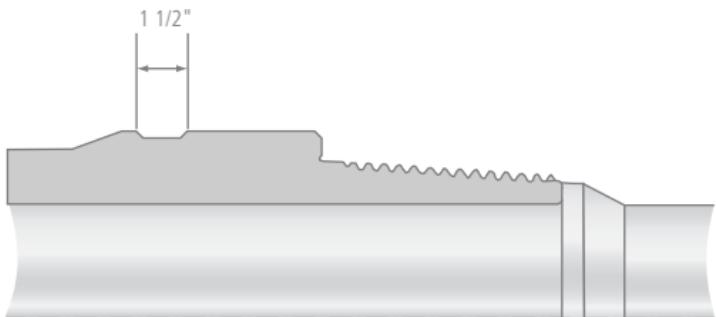
## Tubo de perforación pesado



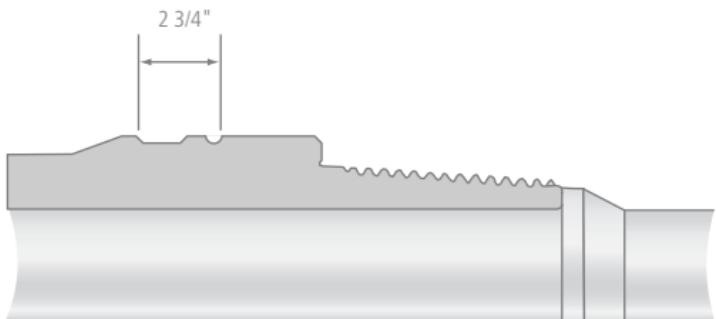
GRADO E75



GRADO X95



GRADO G105



GRADO S135

# MARCAJE DE TUBO

## REPRESENTACION DEL MARCAJE PARA TUBO

Requerimiento Pemex

Ejemplo: Tubo de revestimiento de 13 3/8" N80 72.00 lb/pie conexión BCN





TUBO DE REVESTIMIENTO

| TUBO DE REVESTIMIENTO<br>CASING |        |             | FLUENCIA | Kpsi   | 40    | 55                | 55                       | 65             | 80    | 80    | 90    | 95    | 95  | 110 | 125 | 80           | 95   | 110  | 140   | 80                           | 95     | 95     | 110   |       |         |
|---------------------------------|--------|-------------|----------|--------|-------|-------------------|--------------------------|----------------|-------|-------|-------|-------|-----|-----|-----|--------------|------|------|-------|------------------------------|--------|--------|-------|-------|---------|
| D.E.                            | PESO   | DIMENSIONES |          |        |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |       |       |       |       |     |     |     |              |      |      |       | RESISTENTE<br>A LA CORROSION |        |        |       |       |         |
|                                 |        | ESP.        | D.I.     | DRIFT  | DRIFT | AREA              |                          | API            |       |       |       |       |     |     |     | ALTO COLAPSO |      |      |       |                              |        |        |       |       |         |
| pulg                            | lb/pie | pulg        | pulg     | pulg   | pulg  | pulg <sup>2</sup> |                          | H40            | J55   | K55   | M65   | L80   | N80 | C90 | C95 | T95          | P110 | Q125 | TAC80 | TAC95                        | TAC110 | TAC140 | TRC80 | TRC95 | TRC95HC |
| 20                              | 94.00  | 0.438       | 19.124   | 18.937 |       | 26.918            | Colapso                  | psi            | 520   | 520   | 520   | 520   |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | Tensión                  | lbx1000        | 1,077 | 1,480 | 1,480 | 1,750 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Interna               | psi            | 1,530 | 2,110 | 2,110 | 2,490 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Prueba                | psi            | 1,100 | 1,400 | 1,400 | 2,250 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 | 106.50 | 0.500       | 19.000   | 18.813 |       | 30.631            | Colapso                  | psi            | 770   | 770   | 770   |       |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | Tensión                  | lbx1000        | 1,685 | 1,685 | 1,685 | 1,990 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Interna               | psi            | 2,410 | 2,410 | 2,410 | 2,840 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Prueba                | psi            | 1,600 | 1,600 | 1,600 | 2,600 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 | 133.00 | 0.635       | 18.730   | 18.543 |       | 38.631            | Colapso                  | psi            | 1,500 | 1,500 |       |       |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | Tensión                  | lbx1000        | 2,125 | 2,125 |       |       |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Interna               | psi            | 3,060 | 3,060 |       |       |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Prueba                | psi            | 2,100 | 2,100 |       |       |     |     |     |              |      |      |       |                              |        |        |       |       |         |
| 18 5/8                          | 87.50  | 0.435       | 17.755   | 17.568 |       | 24.858            | Colapso                  | psi            | 630   | 630   | 630   | 630   |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | Tensión                  | lbx1000        | 994   | 1,367 | 1,367 | 1,616 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Interna               | psi            | 1,630 | 2,250 | 2,250 | 2,660 |     |     |     |              |      |      |       |                              |        |        |       |       |         |
|                                 |        |             |          |        |       |                   | P. Prueba                | psi            | 1,100 | 1,500 | 1,500 | 2,400 |     |     |     |              |      |      |       |                              |        |        |       |       |         |



| TUBO DE REVESTIMIENTO<br>CASING |        |             | FLUENCIA | Kpsi   | 40     | 55                | 55                       | 65             | 80    | 80    | 90    | 95    | 95    | 110   | 125   | 80           | 95    | 110   | 140                          | 80    | 95     | 95     | 110   |       |         |
|---------------------------------|--------|-------------|----------|--------|--------|-------------------|--------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|--------------|-------|-------|------------------------------|-------|--------|--------|-------|-------|---------|
| D.E.                            | PESO   | DIMENSIONES |          |        |        |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |       |       |       |       |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 |        | ESP.        | D.I.     | DRIFT  | DRIFT  | AREA              |                          | API            |       |       |       |       |       |       |       | ALTO COLAPSO |       |       | RESISTENTE<br>A LA CORROSION |       |        |        |       |       |         |
| pulg                            | lb/pie | pulg        | pulg     | pulg   | pulg   | pulg <sup>2</sup> |                          | H40            | J55   | K55   | M65   | L80   | N80   | C90   | C95   | T95          | P110  | Q125  | TAC80                        | TAC95 | TAC110 | TAC140 | TRC80 | TRC95 | TRC95HC |
| 16                              | 95.00  | 0.566       | 14.868   | 14.681 |        | 27.444            | Colapso                  | psi            | 1,890 | 1,890 |       |       |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | Tensión                  | lbx1000        | 1,509 | 1,509 |       |       |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | P. Interna               | psi            | 3,400 | 3,400 |       |       |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | P. Prueba                | psi            | 2,300 | 2,300 |       |       |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 | 109.00 | 0.656       | 14.688   | 14.501 |        | 31.622            | Colapso                  | psi            | 2,560 | 2,560 | 3,080 | 3,080 | 3,320 | 3,470 | 3,520 |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | Tensión                  | lbx1000        | 1,739 | 1,739 | 2,530 | 2,530 | 3,004 | 3,478 | 3,950 |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | P. Interna               | psi            | 3,950 | 3,950 | 5,740 | 5,740 | 6,820 | 7,890 | 8,970 |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | P. Prueba                | psi            | 2,700 | 2,700 | 5,200 | 5,200 | 6,200 | 5,400 | 8,200 |              |       |       |                              |       |        |        |       |       |         |
|                                 | 137.90 | 0.843       | 14.314   | 14.127 |        | 40.141            | Colapso                  | psi            | 4,490 | 4,490 | 5,650 | 5,650 |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | Tensión                  | lbx1000        | 2,208 | 2,208 | 3,211 | 3,211 |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | P. Interna               | psi            | 5,070 | 5,070 | 7,380 | 7,380 |       |       |       |              |       |       |                              |       |        |        |       |       |         |
|                                 |        |             |          |        |        |                   | P. Prueba                | psi            | 4,600 | 4,600 | 5,400 | 5,400 |       |       |       |              |       |       |                              |       |        |        |       |       |         |
| 13 5/8                          | 88.20  | 0.625       | 12.375   | 12.188 | 12.250 | 25.525            | Colapso                  | psi            | 2,800 | 3,360 | 3,360 | 3,660 | 3,980 | 3,980 | 4,130 | 4,260        | 4,260 | 4,570 | 4,800                        |       | 6,500  | 3,980  | 4,260 | 4,570 |         |
|                                 |        |             |          |        |        |                   | Tensión                  | lbx1000        | 1,021 | 1,404 | 1,404 | 1,659 | 2,042 | 2,042 | 2,297 | 2,425        | 2,425 | 2,808 | 3,191                        |       | 3,574  | 2,042  | 2,425 | 2,808 |         |
|                                 |        |             |          |        |        |                   | P. Interna               | psi            | 3,210 | 4,420 | 4,420 | 5,220 | 6,420 | 6,420 | 7,220 | 7,630        | 7,630 | 8,830 | 10,030                       |       | 11,240 | 6,420  | 7,630 | 8,830 |         |
|                                 |        |             |          |        |        |                   | P. Prueba                | psi            | 2,200 | 3,000 | 3,000 | 4,800 | 5,700 | 5,700 | 6,000 | 6,000        | 6,000 | 6,000 | 6,000                        |       | 10,000 | 5,700  | 6,000 | 6,000 |         |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.   | PESO   | DIMENSIONES |        |        |        |                   | PROPIEDADES MECANICAS | GRADO DE ACERO |       |       |       |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|--------|--------|-------------|--------|--------|--------|-------------------|-----------------------|----------------|-------|-------|-------|-------|-------|-------|-------|--------------|-------|------|---------------------------|-------|--------|--------|-------|-------|---------|--------|-------|-------|
|        |        | ESP.        | D.I.   | DRIFT  | DRIFT  | AREA              |                       | API            |       |       |       |       |       |       |       | ALTO COLAPSO |       |      | RESISTENTE A LA CORROSION |       |        |        |       |       |         |        |       |       |
| pulg   | lb/pie | pulg        | pulg   | pulg   | pulg   | pulg <sup>2</sup> |                       | H40            | J55   | K55   | M65   | L80   | N80   | C90   | C95   | T95          | P110  | Q125 | TAC80                     | TAC95 | TAC110 | TAC140 | TRC80 | TRC95 | TRC95HC | TRC110 |       |       |
| 13 3/8 | 48.00  | 0.330       | 12.715 | 12.559 | 13.523 |                   | Colapso               | psi            | 740   |       |       |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 541   |       |       |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 1,730 |       |       |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 1,200 |       |       |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
| 54.50  | 0.380  | 12.615      | 12.495 | 15.514 |        |                   | Colapso               | psi            | 1,130 | 1,130 | 1,140 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 853   | 853   | 1,008 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 2,730 | 2,730 | 3,230 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 1,900 | 1,900 | 3,000 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
| 61.00  | 0.430  | 12.515      | 12.359 | 17.487 |        |                   | Colapso               | psi            | 1,540 | 1,540 | 1,620 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 962   | 962   | 1,137 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 3,090 | 3,090 | 3,660 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 2,100 | 2,100 | 3,300 |       |       |       |       |              |       |      |                           |       |        |        |       |       |         |        |       |       |
| 68.00  | 0.480  | 12.415      | 12.259 | 19.445 |        |                   | Colapso               | psi            | 1,950 | 1,950 | 2,100 | 2,260 | 2,260 | 2,320 | 2,330 | 2,330        | 2,330 |      |                           |       | 2,930  | 2,990  | 3,280 | 3,530 | 2,260   | 2,330  | 2,990 | 2,330 |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 1,069 | 1,069 | 1,264 | 1,556 | 1,556 | 1,750 | 1,847 | 1,847        | 2,139 |      |                           |       | 1,556  | 1,847  | 2,139 | 2,722 | 1,556   | 1,847  | 1,847 | 2,139 |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 3,450 | 3,450 | 4,080 | 5,020 | 5,020 | 5,650 | 5,970 | 5,970        | 6,910 |      |                           |       | 5,020  | 5,970  | 6,910 | 8,790 | 5,020   | 5,970  | 5,970 | 6,910 |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 2,400 | 2,400 | 3,700 | 4,600 | 4,600 | 5,200 | 5,500 | 5,500        | 6,300 |      |                           |       | 4,600  | 5,500  | 6,300 | 8,040 | 4,600   | 5,500  | 5,500 | 6,300 |

| TUBO DE REVESTIMIENTO<br>CASING |       | FLUENCIA    | Kpsi   | 40     | 55     | 55     | 65                       | 80              | 80              | 90  | 95  | 95  | 110          | 125   | 80    | 95    | 110                          | 140   | 80    | 95    | 95     | 110    |       |        |         |        |       |        |       |       |       |       |
|---------------------------------|-------|-------------|--------|--------|--------|--------|--------------------------|-----------------|-----------------|-----|-----|-----|--------------|-------|-------|-------|------------------------------|-------|-------|-------|--------|--------|-------|--------|---------|--------|-------|--------|-------|-------|-------|-------|
|                                 |       | RESISTENCIA | Kpsi   | 60     | 75     | 95     | 85                       | 95              | 100             | 100 | 105 | 105 | 125          | 135   | 100   | 110   | 125                          | 150   | 95    | 105   | 105    | 115    |       |        |         |        |       |        |       |       |       |       |
| D.E.                            | PESO  | DIMENSIONES |        |        |        |        | PROPIEDADES<br>MECANICAS | GRADO DE ACERO  |                 |     |     |     |              |       |       |       |                              |       |       |       |        |        |       |        |         |        |       |        |       |       |       |       |
|                                 |       | ESP.        | D.I.   | DRIFT  | DRIFT  | AREA   |                          | API             |                 |     |     |     | ALTO COLAPSO |       |       |       | RESISTENTE<br>A LA CORROSION |       |       |       |        |        |       |        |         |        |       |        |       |       |       |       |
|                                 |       | pulg        | lb/pie | pulg   | pulg   | pulg   | pulg                     | H40             | J55             | K55 | M65 | L80 | N80          | C90   | C95   | T95   | P110                         | Q125  | TAC80 | TAC95 | TAC110 | TAC140 | TRC80 | TRC95  | TRC95HC | TRC110 |       |        |       |       |       |       |
| 13 3/8                          | 72.00 | 0.514       | 12.347 | 12.191 | 12.250 | 20.768 | Colapso psi              | Colapso psi     |                 |     |     |     | 2,670        | 2,670 | 2,780 | 2,820 | 2,820                        | 2,880 | 3,660 | 3,720 | 4,110  | 4,350  | 2,670 | 2,820  | 3,720   | 2,880  |       |        |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | Tensión lbx1000 | Tensión lbx1000 |     |     |     |              | 1,661 | 1,661 | 1,869 | 1,973                        | 1,973 | 2,284 | 2,596 | 1,661  | 1,973  | 2,284 | 2,907  | 1,661   | 1,973  | 1,973 | 2,284  |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | P. Interna psi  | P. Interna psi  |     |     |     |              | 5,380 | 5,380 | 6,050 | 6,390                        | 6,390 | 7,400 | 8,410 | 5,380  | 6,390  | 7,400 | 9,420  | 5,380   | 6,390  | 6,390 | 7,400  |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | P. Prueba psi   | P. Prueba psi   |     |     |     |              | 4,900 | 4,900 | 5,500 | 5,800                        | 5,800 | 6,800 | 7,700 | 4,900  | 5,800  | 6,800 | 7,700  | 4,900   | 5,800  | 5,800 | 6,800  |       |       |       |       |
| 77.00                           | 77.00 | 0.550       | 12.275 | 12.119 | 22.160 |        | Colapso psi              | Colapso psi     |                 |     |     |     | 3,100        | 3,100 | 3,270 | 3,340 | 3,340                        | 3,490 | 3,550 | 4,360 | 4,580  | 4,980  | 5,320 | 3,100  | 3,340   | 4,580  | 3,490 |        |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | Tensión lbx1000 | Tensión lbx1000 |     |     |     |              | 1,773 | 1,773 | 1,994 | 2,105                        | 2,105 | 2,438 | 2,770 | 1,773  | 2,105  | 2,438 | 3,102  | 1,773   | 2,105  | 2,105 | 2,438  |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | P. Interna psi  | P. Interna psi  |     |     |     |              | 5,760 | 5,760 | 6,480 | 6,840                        | 6,840 | 7,920 | 9,000 | 5,750  | 6,840  | 7,920 | 10,070 | 5,760   | 6,840  | 6,840 | 7,920  |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | P. Prueba psi   | P. Prueba psi   |     |     |     |              | 5,300 | 5,300 | 5,900 | 6,300                        | 6,300 | 7,200 | 8,200 | 5,300  | 6,300  | 7,200 | 9,200  | 5,300   | 6,300  | 6,300 | 7,200  |       |       |       |       |
| 85.00                           | 85.00 | 0.608       | 12.159 | 12.003 | 24.386 |        | Colapso psi              | Colapso psi     |                 |     |     |     | 3,870        | 3,870 | 4,060 | 4,180 | 4,180                        | 4,480 | 4,690 | 5,670 | 5,970  | 6,460  | 7,020 | 3,870  | 4,180   | 5,970  | 4,480 |        |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | Tensión lbx1000 | Tensión lbx1000 |     |     |     |              | 1,951 | 1,951 | 2,195 | 2,317                        | 2,317 | 2,682 | 3,084 | 1,951  | 2,317  | 2,682 | 3,414  | 1,951   | 2,317  | 2,317 | 2,682  |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | P. Interna psi  | P. Interna psi  |     |     |     |              | 6,360 | 6,360 | 7,160 | 7,560                        | 7,560 | 8,750 | 9,940 | 6,360  | 7,560  | 8,750 | 11,140 | 6,360   | 7,560  | 7,560 | 8,750  |       |       |       |       |
|                                 |       |             |        |        |        |        |                          | P. Prueba psi   | P. Prueba psi   |     |     |     |              | 5,800 | 5,800 | 6,500 | 6,900                        | 6,900 | 8,000 | 9,100 | 5,800  | 6,900  | 8,000 | 10,000 | 5,800   | 6,900  | 6,900 | 8,000  |       |       |       |       |
| 11 7/8                          | 71.80 | 0.582       | 10.711 | 10.555 | 10.625 | 20.648 | Colapso psi              | Colapso psi     |                 |     |     |     | 3,170        | 3,880 | 3,880 | 4,270 | 4,750                        | 4,750 | 4,990 | 5,080 | 5,290  | 5,630  | 6,590 | 7,260  | 7,740   | 8,480  | 4,750 | 5,080  | 7,260 | 5,290 |       |       |
|                                 |       |             |        |        |        |        |                          | Tensión lbx1000 | Tensión lbx1000 |     |     |     |              | 826   | 1,136 | 1,136 | 1,342                        | 1,652 | 1,652 | 1,858 | 1,962  | 1,962  | 2,271 | 2,581  | 1,652   | 1,962  | 2,271 | 2,891  | 1,652 | 1,962 | 1,962 | 2,271 |
|                                 |       |             |        |        |        |        |                          | P. Interna psi  | P. Interna psi  |     |     |     |              | 3,430 | 4,720 | 4,720 | 5,570                        | 6,860 | 6,860 | 7,720 | 8,150  | 8,150  | 9,430 | 10,720 | 6,860   | 8,150  | 9,430 | 12,010 | 6,860 | 8,150 | 8,150 | 9,430 |
|                                 |       |             |        |        |        |        |                          | P. Prueba psi   | P. Prueba psi   |     |     |     |              | 3,100 | 4,300 | 4,300 | 5,100                        | 6,300 | 6,300 | 7,100 | 7,500  | 7,500  | 8,600 | 9,800  | 6,300   | 7,500  | 8,600 | 11,000 | 6,300 | 7,500 | 7,500 | 8,600 |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.   | PESO   | DIMENSIONES |        |        |        |                   | PROPIEDADES MECANICAS | GRADO DE ACERO |       |       |       |       |       |       |       |              |       |       |                           | ALTO COLAPSO |        |        | RESISTENTE A LA CORROSION |       |         |        |  |
|--------|--------|-------------|--------|--------|--------|-------------------|-----------------------|----------------|-------|-------|-------|-------|-------|-------|-------|--------------|-------|-------|---------------------------|--------------|--------|--------|---------------------------|-------|---------|--------|--|
|        |        | ESP.        | D.I.   | DRIFT  | DRIFT  | AREA              |                       | API            |       |       |       |       |       |       |       | ALTO COLAPSO |       |       | RESISTENTE A LA CORROSION |              |        |        |                           |       |         |        |  |
| pulg   | lb/pie | pulg        | pulg   | pulg   | pulg   | pulg <sup>2</sup> |                       | H40            | J55   | K55   | M65   | L80   | N80   | C90   | C95   | T95          | P110  | Q125  | TAC80                     | TAC95        | TAC110 | TAC140 | TRC80                     | TRC95 | TRC95HC | TRC110 |  |
| 11 3/4 | 42.00  | 0.333       | 11.084 | 10.928 | 11.000 | 11.944            | Colapso               | psi            | 1,040 |       |       |       |       |       |       |              |       |       |                           |              |        |        |                           |       |         |        |  |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 478   |       |       |       |       |       |       |              |       |       |                           |              |        |        |                           |       |         |        |  |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 1,980 |       |       |       |       |       |       |              |       |       |                           |              |        |        |                           |       |         |        |  |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 1,400 |       |       |       |       |       |       |              |       |       |                           |              |        |        |                           |       |         |        |  |
|        |        |             |        |        |        |                   |                       |                |       |       |       |       |       |       |       |              |       |       |                           |              |        |        |                           |       |         |        |  |
|        |        |             |        |        |        |                   | Colapso               | psi            | 1,510 | 1,510 | 1,590 |       |       |       |       |              |       |       |                           |              |        |        |                           | 1,630 | 1,630   | 1,630  |  |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 737   | 737   | 871   |       |       |       |       |              |       |       |                           |              |        |        |                           | 1,072 | 1,273   | 1,474  |  |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 3,070 | 3,070 | 3,630 |       |       |       |       |              |       |       |                           |              |        |        |                           | 4,470 | 5,310   | 6,140  |  |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 2,100 | 2,100 | 3,300 |       |       |       |       |              |       |       |                           |              |        |        |                           | 4,100 | 4,900   | 5,600  |  |
|        |        |             |        |        |        |                   | Colapso               | psi            | 2,070 | 2,070 | 2,250 |       |       |       |       |              |       |       |                           |              |        |        |                           | 2,440 | 2,550   | 2,570  |  |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 850   | 850   | 1,005 |       |       |       |       |              |       |       |                           |              |        |        |                           | 1,237 | 1,469   | 1,701  |  |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 3,560 | 3,560 | 4,210 |       |       |       |       |              |       |       |                           |              |        |        |                           | 5,180 | 6,150   | 7,130  |  |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 2,400 | 2,400 | 3,900 |       |       |       |       |              |       |       |                           |              |        |        |                           | 4,700 | 5,600   | 6,500  |  |
|        |        |             |        |        |        |                   | Colapso               | psi            | 2,670 | 2,670 | 2,840 | 3,180 | 3,180 | 3,360 | 3,440 | 3,440        | 3,610 | 3,680 | 4,530                     | 4,740        | 5,140  | 5,500  | 3,180                     | 3,440 | 4,740   | 3,610  |  |
|        |        |             |        |        |        |                   | Tensión               | lbx1000        | 951   | 951   | 1,124 | 1,384 | 1,384 | 1,557 | 1,643 | 1,643        | 1,903 | 2,162 | 1,384                     | 1,643        | 1,903  | 2,422  | 1,384                     | 1,643 | 1,643   | 1,903  |  |
|        |        |             |        |        |        |                   | P. Interna            | psi            | 4,010 | 4,010 | 4,730 | 5,830 | 5,830 | 6,550 | 6,920 | 6,920        | 8,010 | 9,100 | 5,830                     | 6,920        | 8,010  | 10,200 | 5,830                     | 6,920 | 6,920   | 8,010  |  |
|        |        |             |        |        |        |                   | P. Prueba             | psi            | 2,700 | 2,700 | 4,300 | 5,300 | 5,300 | 6,000 | 6,300 | 6,300        | 7,300 | 8,300 | 5,300                     | 6,300        | 7,300  | 9,300  | 5,300                     | 6,300 | 6,300   | 7,300  |  |

| TUBO DE REVESTIMIENTO<br>CASING |        |             |        |        |        | FLUENCIA          | Kpsi                     | 40             | 55    | 55    | 65    | 80    | 80  | 90  | 95  | 95  | 110  | 125          | 80    | 95    | 110    | 140                          | 80    | 95     | 95      | 110    |       |        |       |       |       |       |       |
|---------------------------------|--------|-------------|--------|--------|--------|-------------------|--------------------------|----------------|-------|-------|-------|-------|-----|-----|-----|-----|------|--------------|-------|-------|--------|------------------------------|-------|--------|---------|--------|-------|--------|-------|-------|-------|-------|-------|
| D.E.                            | PESO   | DIMENSIONES |        |        |        |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |       |       |       |       |     |     |     |     |      |              |       |       |        |                              |       |        |         |        |       |        |       |       |       |       |       |
|                                 |        | ESP.        | D.I.   | DRIFT  | DRIFT  | AREA              |                          | API            |       |       |       |       |     |     |     |     |      | ALTO COLAPSO |       |       |        | RESISTENTE<br>A LA CORROSION |       |        |         |        |       |        |       |       |       |       |       |
| pulg                            | lb/pie | pulg        | pulg   | pulg   | pulg   | pulg <sup>2</sup> |                          | H40            | J55   | K55   | M65   | L80   | N80 | C90 | C95 | T95 | P110 | Q125         | TAC80 | TAC95 | TAC110 | TAC140                       | TRC80 | TRC95  | TRC95HC | TRC110 |       |        |       |       |       |       |       |
| 11 3/4                          | 65.00  | 0.534       | 10.682 | 10.526 | 10.625 | 18.816            | Colapso                  | psi            |       |       |       |       |     |     |     |     |      |              | 5,660 | 5,960 | 6,450  | 7,010                        | 3,870 | 4,170  | 5,960   | 4,480  |       |        |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | Tensión                  | lbx1000        |       |       |       |       |     |     |     |     |      |              | 1,505 | 1,788 | 2,070  | 2,634                        | 1,505 | 1,788  | 1,788   | 2,070  |       |        |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | P. Interna               | psi            |       |       |       |       |     |     |     |     |      |              | 6,360 | 7,560 | 8,750  | 11,130                       | 6,360 | 7,560  | 7,560   | 8,750  |       |        |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | P. Prueba                | psi            |       |       |       |       |     |     |     |     |      |              | 5,800 | 6,900 | 8,000  | 10,000                       | 5,800 | 6,900  | 6,900   | 8,000  |       |        |       |       |       |       |       |
|                                 | 71.00  | 0.582       | 10.586 | 10.430 |        | 20.420            | Colapso                  | psi            |       |       |       |       |     |     |     |     |      |              | 4,880 | 4,880 | 5,130  | 5,240                        | 5,240 | 5,470  | 5,760   | 6,720  | 7,430 | 7,920  | 8,700 | 4,880 | 5,240 | 7,430 | 5,470 |
|                                 |        |             |        |        |        |                   | Tensión                  | lbx1000        |       |       |       |       |     |     |     |     |      | 1,634        | 1,634 | 1,838 | 1,940  | 1,940                        | 2,246 | 2,552  | 1,634   | 1,940  | 2,246 | 2,859  | 1,634 | 1,940 | 1,940 | 2,246 |       |
|                                 |        |             |        |        |        |                   | P. Interna               | psi            |       |       |       |       |     |     |     |     |      | 6,930        | 6,930 | 7,800 | 8,230  | 8,230                        | 9,530 | 10,840 | 6,930   | 8,230  | 9,530 | 12,140 | 6,930 | 8,230 | 8,230 | 9,530 |       |
|                                 |        |             |        |        |        |                   | P. Prueba                | psi            |       |       |       |       |     |     |     |     |      | 6,300        | 6,300 | 7,100 | 7,500  | 7,500                        | 8,700 | 9,900  | 6,300   | 7,500  | 8,700 | 10,000 | 6,300 | 7,500 | 7,500 | 8,700 |       |
| 10 3/4                          | 32.75  | 0.279       | 10.192 | 10.036 |        | 9.178             | Colapso                  | psi            | 840   | 865   |       |       |     |     |     |     |      |              |       |       |        |                              |       |        |         |        |       |        |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | Tensión                  | lbx1000        | 367   | 505   |       |       |     |     |     |     |      |              |       |       |        |                              |       |        |         |        |       |        |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | P. Interna               | psi            | 1,820 | 2,500 |       |       |     |     |     |     |      |              |       |       |        |                              |       |        |         |        |       |        |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | P. Prueba                | psi            | 1,200 | 1,700 |       |       |     |     |     |     |      |              |       |       |        |                              |       |        |         |        |       |        |       |       |       |       |       |
|                                 | 40.50  | 0.350       | 10.050 | 9.894  |        | 11.435            | Colapso                  | psi            | 1,390 | 1,580 | 1,580 | 1,670 |     |     |     |     |      |              |       |       |        |                              |       |        |         |        |       | 1,730  |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | Tensión                  | lbx1000        | 457   | 629   | 629   | 743   |     |     |     |     |      |              |       |       |        |                              |       |        |         |        |       | 915    |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | P. Interna               | psi            | 2,280 | 3,130 | 3,130 | 3,700 |     |     |     |     |      |              |       |       |        |                              |       |        |         |        | 4,560 |        |       |       |       |       |       |
|                                 |        |             |        |        |        |                   | P. Prueba                | psi            | 1,600 | 2,100 | 2,100 | 3,400 |     |     |     |     |      |              |       |       |        |                              |       |        |         |        | 4,200 |        |       |       |       |       |       |

|                       |  |             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-----------------------|--|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| TUBO DE REVESTIMIENTO |  | FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| CASING                |  | RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.   | PESO  | DIMENSIONES                    |        |       |       |      | PROPIEDADES MECANICAS | GRADO DE ACERO |       |       |       |       |       |       |       |              |       |       |       | RESISTENTE A LA CORROSION |        |        |       |        |         |        |       |       |
|--------|-------|--------------------------------|--------|-------|-------|------|-----------------------|----------------|-------|-------|-------|-------|-------|-------|-------|--------------|-------|-------|-------|---------------------------|--------|--------|-------|--------|---------|--------|-------|-------|
|        |       | ESP.                           | D.I.   | DRIFT | DRIFT | AREA |                       | API            |       |       |       |       |       |       |       | ALTO COLAPSO |       |       |       | RESISTENTE A LA CORROSION |        |        |       |        |         |        |       |       |
|        |       | pulg                           | lb/pie | pulg  | pulg  | pulg |                       | H40            | J55   | K55   | M65   | L80   | N80   | C90   | C95   | T95          | P110  | Q125  | TAC80 | TAC95                     | TAC110 | TAC140 | TRC80 | TRC95  | TRC95HC | TRC110 |       |       |
| 10 3/4 | 45.50 | 0.400 9.950 9.794 9.875 13.006 |        |       |       |      | Colapso               | psi            | 2,090 | 2,090 | 2,270 |       |       |       |       |              |       |       |       |                           |        |        | 2,470 | 2,590  | 2,610   |        |       |       |
|        |       |                                |        |       |       |      | Tensión               | lbx1000        | 715   | 715   | 845   |       |       |       |       |              |       |       |       |                           |        |        | 1,040 | 1,236  | 1,431   |        |       |       |
|        |       |                                |        |       |       |      | P. Interna            | psi            | 3,580 | 3,580 | 4,230 |       |       |       |       |              |       |       |       |                           |        |        | 5,210 | 6,190  | 7,160   |        |       |       |
|        |       |                                |        |       |       |      | P. Prueba             | psi            | 2,500 | 2,500 | 3,900 |       |       |       |       |              |       |       |       |                           |        |        | 4,800 | 5,700  | 6500    |        |       |       |
| 10 1/2 | 51.00 | 0.450 9.850 9.694 14.561       |        |       |       |      | Colapso               | psi            | 2,710 | 2,710 | 2,870 | 3,220 | 3,220 | 3,400 | 3,480 | 3,480        | 3,660 | 3,660 | 4,610 | 4,830                     | 5,220  | 5,600  | 3,220 | 3,480  | 4,830   | 3,660  |       |       |
|        |       |                                |        |       |       |      | Tensión               | lbx1000        | 801   | 801   | 946   | 1,165 | 1,165 | 1,311 | 1,383 | 1,383        | 1,602 | 1,602 | 1,165 | 1,383                     | 1,602  | 2,039  | 1,165 | 1,383  | 1,383   | 1,602  |       |       |
|        |       |                                |        |       |       |      | P. Interna            | psi            | 4,030 | 4,030 | 4,760 | 5,860 | 5,860 | 6,590 | 6,960 | 6,960        | 8,060 | 8,060 | 5,860 | 6,960                     | 8,060  | 10,260 | 5,860 | 6,960  | 6,960   | 8,060  |       |       |
|        |       |                                |        |       |       |      | P. Prueba             | psi            | 2,800 | 2,800 | 4,400 | 5,400 | 5,400 | 6,000 | 6,400 | 6,400        | 7,400 | 7,400 | 5,400 | 6,400                     | 7,400  | 8,900  | 5,400 | 6,400  | 6,400   | 8900   |       |       |
| 11 1/2 | 55.50 | 0.495 9.760 9.604 9.625 15.947 |        |       |       |      | Colapso               | psi            | 3,390 | 3,690 | 4,020 | 4,020 | 4,160 | 4,290 | 4,290 | 4,610        | 4,610 | 5,830 | 6,190 | 6,670                     | 7,250  | 4,020  | 4,290 | 6,190  | 4,610   |        |       |       |
|        |       |                                |        |       |       |      | Tensión               | lbx1000        | 877   | 1,037 | 1,276 | 1,276 | 1,435 | 1,515 | 1,515 | 1,754        | 1,754 | 1,276 | 1,515 | 1,754                     | 2,233  | 1,276  | 1,515 | 1,515  | 1,754   |        |       |       |
|        |       |                                |        |       |       |      | P. Interna            | psi            | 4,430 | 5,240 | 6,450 | 6,450 | 7,250 | 7,660 | 7,660 | 8,860        | 8,860 | 6,450 | 7,660 | 8,860                     | 11,280 | 6,450  | 7,660 | 7,660  | 8,860   |        |       |       |
|        |       |                                |        |       |       |      | P. Prueba             | psi            | 3,000 | 4,800 | 5,900 | 5,900 | 6,600 | 7,000 | 7,000 | 8,100        | 8,100 | 5,900 | 7,000 | 8,100                     | 9,700  | 5,900  | 7,000 | 7,000  | 8100    |        |       |       |
| 12 1/2 | 60.70 | 0.545 9.660 9.504 17.473       |        |       |       |      | Colapso               | psi            |       |       |       |       |       |       |       |              | 5,460 | 5,580 | 5,880 | 6,070                     | 7,010  | 7,800  | 8,340 | 9,180  | 5,160   | 5,580  | 7,800 | 5,880 |
|        |       |                                |        |       |       |      | Tensión               | lbx1000        |       |       |       |       |       |       |       |              | 1,573 | 1,660 | 1,922 | 2,184                     | 1,398  | 1,660  | 1,922 | 2,446  | 1,398   | 1,660  | 1,660 | 1,922 |
|        |       |                                |        |       |       |      | P. Interna            | psi            |       |       |       |       |       |       |       |              | 7,980 | 8,430 | 9,760 | 11,090                    | 7,100  | 8,430  | 9,760 | 12,420 | 7,100   | 8,430  | 8,430 | 9,760 |
|        |       |                                |        |       |       |      | P. Prueba             | psi            |       |       |       |       |       |       |       |              | 7,300 | 7,700 | 8,900 | 10,000                    | 6,500  | 7,700  | 8,900 | 9,700  | 6,500   | 7,700  | 7,700 | 8900  |

**TUBO DE REVESTIMIENTO  
CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.   | PESO  | DIMENSIONES |        |       |       |        | PROPIEDADES<br>MECANICAS | GRADO DE ACERO  |     |     |     |     |     |              |        |        |        |                              |       | RESISTENTE<br>A LA CORROSION |        |        |        |        |         |        |        |        |  |
|--------|-------|-------------|--------|-------|-------|--------|--------------------------|-----------------|-----|-----|-----|-----|-----|--------------|--------|--------|--------|------------------------------|-------|------------------------------|--------|--------|--------|--------|---------|--------|--------|--------|--|
|        |       | ESP.        | D.I.   | DRIFT | DRIFT | AREA   |                          | API             |     |     |     |     |     | ALTO COLAPSO |        |        |        | RESISTENTE<br>A LA CORROSION |       |                              |        |        |        |        |         |        |        |        |  |
|        |       | pulg        | lb/pie | pulg  | pulg  | pulg   |                          | H40             | J55 | K55 | M65 | L80 | N80 | C90          | C95    | T95    | P110   | Q125                         | TAC80 | TAC95                        | TAC110 | TAC140 | TRC80  | TRC95  | TRC95HC | TRC110 |        |        |  |
| 10 3/4 | 65.70 | 0.595       | 9.560  | 9.404 |       | 18.982 | Colapso psi              |                 |     |     |     |     |     | 6,760        | 6,970  | 7,500  | 7,920  | 8,090                        | 9,010 | 10,050                       | 11,170 | 6,300  | 6,970  | 9,010  | 7,500   |        |        |        |  |
|        |       |             |        |       |       |        |                          | Tensión lbx1000 |     |     |     |     |     |              | 1,708  | 1,803  | 2,088  | 2,373                        | 1,519 | 1,803                        | 2,088  | 2,658  | 1,519  | 1,803  | 1,803   | 2,088  |        |        |  |
|        |       |             |        |       |       |        |                          | P. Interna psi  |     |     |     |     |     |              | 8,720  | 9,200  | 10,650 | 12,110                       | 7,750 | 9,200                        | 10,650 | 13,560 | 7,750  | 9,200  | 9,200   | 10,650 |        |        |  |
|        |       |             |        |       |       |        |                          | P. Prueba psi   |     |     |     |     |     |              | 8,000  | 8,400  | 9,700  | 10,000                       | 7,100 | 8,400                        | 9,700  | 9,700  | 7,100  | 8,400  | 8,400   | 9,700  |        |        |  |
| 7 3/4  | 73.20 | 0.672       | 9.406  | 9.250 |       | 21.276 | Colapso psi              |                 |     |     |     |     |     | 8,760        | 9,090  |        |        |                              |       | 9,510                        | 10,870 | 12,690 | 14,070 | 8,060  | 9,090   | 10,870 | 10,010 |        |  |
|        |       |             |        |       |       |        |                          | Tensión lbx1000 |     |     |     |     |     |              | 1,915  | 2,021  |        |                              |       |                              | 1,702  | 2,021  | 2,340  | 2,979  | 1,702   | 2,021  | 2,021  | 2,340  |  |
|        |       |             |        |       |       |        |                          | P. Interna psi  |     |     |     |     |     |              | 9,850  | 10,390 |        |                              |       |                              | 8,750  | 10,390 | 12,030 | 15,320 | 8,750   | 10,390 | 10,390 | 12,030 |  |
|        |       |             |        |       |       |        |                          | P. Prueba psi   |     |     |     |     |     |              | 9,000  | 9,500  |        |                              |       |                              | 8,000  | 9,500  | 10,000 | 10,000 | 8,000   | 9,500  | 9,500  | 10,000 |  |
| 7 1/2  | 79.20 | 0.734       | 9.282  | 9.126 |       | 23.096 | Colapso psi              |                 |     |     |     |     |     | 10,370       | 10,800 |        |        |                              |       | 10,620                       | 12,390 | 14,490 | 16,290 | 9,480  | 10,800  | 12,390 | 12,030 |        |  |
|        |       |             |        |       |       |        |                          | Tensión lbx1000 |     |     |     |     |     |              | 2,079  | 2,194  |        |                              |       |                              | 1,848  | 2,194  | 2,541  | 3,233  | 1,848   | 2,194  | 2,194  | 2,541  |  |
|        |       |             |        |       |       |        |                          | P. Interna psi  |     |     |     |     |     |              | 10,750 | 11,350 |        |                              |       |                              | 9,560  | 11,350 | 13,140 | 16,730 | 9,560   | 11,350 | 11,350 | 13,140 |  |
|        |       |             |        |       |       |        |                          | P. Prueba psi   |     |     |     |     |     |              | 9,800  | 10,000 |        |                              |       |                              | 8,700  | 10,000 | 10,000 | 10,000 | 8,700   | 10,000 | 10,000 | 10,000 |  |
| 8 1/2  | 85.30 | 0.797       | 9.156  | 9.000 |       | 24.921 | Colapso psi              |                 |     |     |     |     |     | 12,010       | 12,540 |        |        |                              |       |                              |        |        |        | 10,920 | 12,540  | 14,080 |        |        |  |
|        |       |             |        |       |       |        |                          | Tensión lbx1000 |     |     |     |     |     |              | 2,243  | 2,367  |        |                              |       |                              |        |        |        |        | 1,994   | 2,367  | 2,741  |        |  |
|        |       |             |        |       |       |        |                          | P. Interna psi  |     |     |     |     |     |              | 11,680 | 12,330 |        |                              |       |                              |        |        |        |        | 10,380  | 12,330 | 14,270 |        |  |
|        |       |             |        |       |       |        |                          | P. Prueba psi   |     |     |     |     |     |              | 10,000 | 10,000 |        |                              |       |                              |        |        |        |        | 9,500   | 10,000 | 10000  |        |  |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |       |                   | PROPIEDADES MECANICAS | GRADO DE ACERO |       |       |       |       |       |     |     |              |      |      |       | ALTO COLAPSO              |        |        |        | RESISTENTE A LA CORROSION |         |        |        |        |        |        |        |
|--------------|--------|-------------|-------|-------|-------|-------------------|-----------------------|----------------|-------|-------|-------|-------|-------|-----|-----|--------------|------|------|-------|---------------------------|--------|--------|--------|---------------------------|---------|--------|--------|--------|--------|--------|--------|
|              |        | ESP.        | D.I.  | DRIFT | DRIFT | AREA              |                       | API            |       |       |       |       |       |     |     | ALTO COLAPSO |      |      |       | RESISTENTE A LA CORROSION |        |        |        |                           |         |        |        |        |        |        |        |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       | H40            | J55   | K55   | M65   | L80   | N80   | C90 | C95 | T95          | P110 | Q125 | TAC80 | TAC95                     | TAC110 | TAC140 | TRC80  | TRC95                     | TRC95HC | TRC110 |        |        |        |        |        |
| <b>9 7/8</b> | 62.80  | 0.625       | 8.625 | 8.469 | 8.500 | 18.162            | Colapso               | psi            |       |       |       |       |       |     |     |              |      |      |       |                           | 9,670  | 11,080 | 12,990 | 14,390                    | 8,260   | 9,320  | 11,080 | 10,280 |        |        |        |
|              |        |             |       |       |       |                   | Tensión               | lbx1000        |       |       |       |       |       |     |     |              |      |      |       |                           | 1,453  | 1,453  | 1,635  | 1,725                     | 1,998   | 2,543  | 1,453  | 1,725  | 1,725  | 1,998  |        |
|              |        |             |       |       |       |                   | P. Interna            | psi            |       |       |       |       |       |     |     |              |      |      |       |                           | 8,860  | 10,520 | 12,180 | 15,510                    | 8,860   | 10,520 | 10,520 | 12,180 |        |        |        |
|              |        |             |       |       |       |                   | P. Prueba             | psi            |       |       |       |       |       |     |     |              |      |      |       |                           | 8,100  | 9,600  | 10,000 | 10,000                    | 8,100   | 9,600  | 9,600  | 10,000 |        |        |        |
| <b>9 3/4</b> | 59.20  | 0.595       | 8.560 | 8.404 |       | 17.113            | Colapso               | psi            |       |       |       |       |       |     |     |              |      |      |       |                           | 7,700  | 7,700  | 8,350  | 8,650                     | 8,650   | 9,490  | 10,220 | 7,700  | 8,650  | 10,490 | 9,490  |
|              |        |             |       |       |       |                   | Tensión               | lbx1000        |       |       |       |       |       |     |     |              |      |      |       |                           | 1,369  | 1,369  | 1,540  | 1,626                     | 1,626   | 1,882  | 2,139  | 1,369  | 1,626  | 1,626  | 1,882  |
|              |        |             |       |       |       |                   | P. Interna            | psi            |       |       |       |       |       |     |     |              |      |      |       |                           | 8,540  | 8,540  | 9,610  | 10,150                    | 10,150  | 11,750 | 13,350 | 8,540  | 10,150 | 10,150 | 11,750 |
|              |        |             |       |       |       |                   | P. Prueba             | psi            |       |       |       |       |       |     |     |              |      |      |       |                           | 7,800  | 7,800  | 8,800  | 9,300                     | 9,300   | 10,000 | 10,000 | 7,800  | 9,300  | 9,300  | 10,000 |
| <b>9 5/8</b> | 32.30  | 0.312       | 9.001 | 8.845 |       | 9.128             | Colapso               | psi            | 1,370 | 1,570 |       |       |       |     |     |              |      |      |       |                           |        |        |        |                           |         |        |        |        |        |        |        |
|              |        |             |       |       |       |                   | Tensión               | lbx1000        | 365   | 502   |       |       |       |     |     |              |      |      |       |                           |        |        |        |                           |         |        |        |        |        |        |        |
|              |        |             |       |       |       |                   | P. Interna            | psi            | 2,270 | 3,120 |       |       |       |     |     |              |      |      |       |                           |        |        |        |                           |         |        |        |        |        |        |        |
|              |        |             |       |       |       |                   | P. Prueba             | psi            | 2,100 | 2,100 |       |       |       |     |     |              |      |      |       |                           |        |        |        |                           |         |        |        |        |        |        |        |
|              | 36.00  | 0.352       | 8.921 | 8.921 |       | 8.765 10.254      | Colapso               | psi            | 1,720 | 2,020 | 2,020 | 2,190 | 2,370 |     |     |              |      |      |       |                           |        |        |        |                           | 2,370   | 2,460  | 2,470  |        |        |        |        |
|              |        |             |       |       |       |                   | Tensión               | lbx1000        | 410   | 564   | 564   | 667   | 820   |     |     |              |      |      |       |                           |        |        |        |                           | 820     | 974    | 1,128  |        |        |        |        |
|              |        |             |       |       |       |                   | P. Interna            | psi            | 2,560 | 3,520 | 3,520 | 4,160 | 5,120 |     |     |              |      |      |       |                           |        |        |        |                           | 5,120   | 6,080  | 7,040  |        |        |        |        |
|              |        |             |       |       |       |                   | P. Prueba             | psi            | 2,300 | 3,200 | 3,200 | 3,800 | 4,600 |     |     |              |      |      |       |                           |        |        |        |                           | 4,700   | 5,600  | 6,400  |        |        |        |        |

| TUBO DE REVESTIMIENTO<br>CASING |        | FLUENCIA    | Kpsi  | 40                       | 55    | 55                | 65         | 80      | 80    | 90    | 95    | 95    | 110   | 125    | 80           | 95     | 110    | 140    | 80     | 95     | 95     | 110    |        |         |        |       |        |        |       |
|---------------------------------|--------|-------------|-------|--------------------------|-------|-------------------|------------|---------|-------|-------|-------|-------|-------|--------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|-------|--------|--------|-------|
| D.E.                            | PESO   | DIMENSIONES |       | PROPIEDADES<br>MECANICAS |       | GRADO DE ACERO    |            |         |       |       |       |       |       |        |              |        |        |        |        |        |        |        |        |         |        |       |        |        |       |
|                                 |        | ESP.        | D.I.  | DRIFT                    | DRIFT | AREA              | API        |         |       |       |       |       |       |        | ALTO COLAPSO |        |        |        |        |        |        |        |        |         |        |       |        |        |       |
| pulg                            | lb/pie | pulg        | pulg  | pulg                     | pulg  | pulg <sup>2</sup> | H40        | J55     | K55   | M65   | L80   | N80   | C90   | C95    | T95          | P110   | Q125   | TAC80  | TAC95  | TAC110 | TAC140 | TRC80  | TRC95  | TRC95HC | TRC110 |       |        |        |       |
| 9 5/8                           | 40.00  | 0.395       | 8.835 | 8.679                    | 8.750 | 11.454            | Colapso    | psi     | 2,570 | 2,570 | 2,770 | 3,090 | 3,090 | 3,260  | 3,330        | 3,330  | 3,330  | 3,330  | 3,330  | 3,330  | 3,330  | 4,320  | 4,450  | 4,940   | 5,280  | 3,090 | 3,330  | 4,560  | 3,470 |
|                                 |        |             |       |                          |       |                   | Tensión    | lbx1000 | 630   | 630   | 744   | 916   | 916   | 1,031  | 1,088        | 1,088  | 1,088  | 1,088  | 1,088  | 1,088  | 916    | 1,088  | 1,260  | 1,604   | 916    | 1,088 | 1,088  | 1,260  |       |
|                                 |        |             |       |                          |       |                   | P. Interna | psi     | 3,950 | 3,950 | 4,670 | 5,750 | 5,750 | 6,460  | 6,820        | 6,820  | 6,820  | 6,820  | 6,820  | 6,820  | 5,750  | 6,820  | 7,900  | 10,050  | 5,750  | 6,820 | 6,820  | 7,900  |       |
|                                 |        |             |       |                          |       |                   | P. Prueba  | psi     | 3,600 | 3,600 | 4,300 | 5,300 | 5,300 | 5,900  | 6,200        | 6,200  | 6,200  | 6,200  | 6,200  | 6,200  | 5,300  | 6,200  | 7,200  | 9,200   | 5,300  | 6,200 | 6,200  | 7,200  |       |
|                                 | 43.50  | 0.435       | 8.755 | 8.599                    |       | 12.559            | Colapso    | psi     | 3,530 | 3,810 | 3,810 | 4,010 | 4,130 | 4,130  | 4,420        | 4,420  | 4,420  | 4,420  | 4,420  | 4,420  | 4,420  | 5,600  | 5,870  | 6,370   | 6,910  | 3,810 | 4,130  | 5,870  | 4,420 |
|                                 |        |             |       |                          |       |                   | Tensión    | lbx1000 | 816   | 1,005 | 1,005 | 1,130 | 1,193 | 1,193  | 1,381        | 1,381  | 1,381  | 1,381  | 1,381  | 1,381  | 1,005  | 1,193  | 1,381  | 1,758   | 1,005  | 1,193 | 1,193  | 1,381  |       |
|                                 |        |             |       |                          |       |                   | P. Interna | psi     | 5,140 | 6,330 | 6,330 | 7,120 | 7,510 | 7,510  | 8,700        | 8,700  | 8,700  | 8,700  | 8,700  | 8,700  | 6,330  | 7,510  | 8,700  | 11,070  | 6,330  | 7,510 | 7,510  | 8,700  |       |
|                                 |        |             |       |                          |       |                   | P. Prueba  | psi     | 4,700 | 5,800 | 5,800 | 6,500 | 6,900 | 6,900  | 8,000        | 8,000  | 8,000  | 8,000  | 8,000  | 8,000  | 5,800  | 6,900  | 8,000  | 10,000  | 5,800  | 6,900 | 6,900  | 8,000  |       |
|                                 | 47.00  | 0.472       | 8.681 | 8.525                    |       | 13.572            | Colapso    | psi     | 4,280 | 4,750 | 4,750 | 4,990 | 5,090 | 5,090  | 5,300        | 5,630  | 5,630  | 5,630  | 5,630  | 5,630  | 5,630  | 6,590  | 7,270  | 7,740   | 8,490  | 4,750 | 5,090  | 7,270  | 5,300 |
|                                 |        |             |       |                          |       |                   | Tensión    | lbx1000 | 882   | 1,086 | 1,086 | 1,222 | 1,289 | 1,289  | 1,493        | 1,493  | 1,493  | 1,493  | 1,493  | 1,493  | 1,086  | 1,289  | 1,493  | 1,900   | 1,086  | 1,289 | 1,289  | 1,493  |       |
|                                 |        |             |       |                          |       |                   | P. Interna | psi     | 5,580 | 6,870 | 6,870 | 7,720 | 8,150 | 8,150  | 9,440        | 10,730 | 10,730 | 10,730 | 10,730 | 10,730 | 6,870  | 8,150  | 9,440  | 12,010  | 6,870  | 8,150 | 8,150  | 9,440  |       |
|                                 |        |             |       |                          |       |                   | P. Prueba  | psi     | 5,100 | 6,300 | 6,300 | 7,100 | 7,500 | 7,500  | 8,600        | 9,800  | 9,800  | 9,800  | 9,800  | 9,800  | 6,300  | 7,500  | 8,600  | 10,000  | 6,300  | 7,500 | 7,500  | 8,600  |       |
|                                 | 53.50  | 0.545       | 8.535 | 8.379                    | 8.500 | 15.546            | Colapso    | psi     | 6,620 | 6,620 | 7,110 | 7,340 | 7,340 | 7,950  | 8,440        | 8,440  | 8,440  | 8,440  | 8,440  | 8,440  | 8,350  | 9,340  | 10,520 | 11,700  | 6,620  | 7,340 | 9,340  | 7,950  |       |
|                                 |        |             |       |                          |       |                   | Tensión    | lbx1000 | 1,244 | 1,244 | 1,399 | 1,477 | 1,477 | 1,710  | 1,943        | 1,943  | 1,943  | 1,943  | 1,943  | 1,943  | 1,244  | 1,477  | 1,710  | 2,177   | 1,244  | 1,477 | 1,477  | 1,710  |       |
|                                 |        |             |       |                          |       |                   | P. Interna | psi     | 7,930 | 7,930 | 8,920 | 9,410 | 9,410 | 10,900 | 12,390       | 12,390 | 12,390 | 12,390 | 12,390 | 12,390 | 7,930  | 9,410  | 10,900 | 13,870  | 7,930  | 9,410 | 9,410  | 10,900 |       |
|                                 |        |             |       |                          |       |                   | P. Prueba  | psi     | 7,200 | 7,200 | 8,200 | 8,600 | 8,600 | 10,000 | 10,000       | 10,000 | 10,000 | 10,000 | 10,000 | 7,200  | 8,600  | 10,000 | 10,000 | 7,200   | 8,600  | 8,600 | 10,000 |        |       |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |        |                   | PROPIEDADES MECANICAS | GRADO DE ACERO |     |     |     |     |     |     |     |              |      |      |       | ALTO COLAPSO              |        |        |        | RESISTENTE A LA CORROSION |         |        |        |        |        |        |        |        |        |        |        |
|--------------|--------|-------------|-------|-------|--------|-------------------|-----------------------|----------------|-----|-----|-----|-----|-----|-----|-----|--------------|------|------|-------|---------------------------|--------|--------|--------|---------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|              |        | ESP.        | D.I.  | DRIFT | DRIFT  | AREA              |                       | API            |     |     |     |     |     |     |     | ALTO COLAPSO |      |      |       | RESISTENTE A LA CORROSION |        |        |        |                           |         |        |        |        |        |        |        |        |        |        |        |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg   | pulg <sup>2</sup> |                       | H40            | J55 | K55 | M65 | L80 | N80 | C90 | C95 | T95          | P110 | Q125 | TAC80 | TAC95                     | TAC110 | TAC140 | TRC80  | TRC95                     | TRC95HC | TRC110 |        |        |        |        |        |        |        |        |        |
| <b>9 5/8</b> | 58.40  | 0.595       | 8.435 | 8.279 | 8.375  | 16.879            | Colapso               | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 7,890  | 7,890  | 8,570  | 8,890                     | 8,890   | 9,770  | 10,540 | 9,370  | 10,690 | 12,440 | 13,790 | 7,890  | 8,890  | 10,690 | 9,770  |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        |     |     |     |     |     |     |     |              |      |      |       |                           | 1,350  | 1,350  | 1,519  | 1,604                     | 1,604   | 1,857  | 2,110  | 1,350  | 1,604  | 1,857  | 2,363  | 1,350  | 1,604  | 1,604  | 1,857  |
|              |        |             |       |       |        |                   | P. Interna            | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 8,650  | 8,650  | 9,740  | 10,280                    | 10,280  | 11,900 | 13,520 | 8,650  | 10,280 | 11,900 | 15,150 | 8,650  | 10,280 | 10,280 | 11,900 |
|              |        |             |       |       |        |                   | P. Prueba             | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 7,900  | 7,900  | 8,900  | 9,400                     | 9,400   | 10,000 | 10,000 | 7,900  | 9,400  | 10,000 | 10,000 | 7,900  | 9,400  | 10,000 | 10,000 |
| 59.40        | 59.40  | 0.609       | 8.407 | 8.251 | 17.250 |                   | Colapso               | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 8,970  | 8,970  | 9,320  | 9,320                     | 9,320   | 9,660  | 11,070 | 12,980 | 14,370 | 8,250  | 9,320  | 11,070 | 10,280 |        |        |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        |     |     |     |     |     |     |     |              |      |      |       |                           | 1,552  | 1,552  | 1,639  | 1,639                     | 1,639   | 1,380  | 1,639  | 1,897  | 2,415  | 1,380  | 1,639  | 1,639  | 1,897  |        |        |
|              |        |             |       |       |        |                   | P. Interna            | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 9,970  | 9,970  | 10,520 | 10,520                    | 10,520  | 8,860  | 10,520 | 12,180 | 15,500 | 8,860  | 10,520 | 10,520 | 12,180 |        |        |
|              |        |             |       |       |        |                   | P. Prueba             | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 9,100  | 9,100  | 9,600  | 9,600                     | 9,600   | 8,100  | 9,600  | 10,000 | 10,000 | 8,100  | 9,600  | 10,000 | 10,000 |        |        |
| 64.90        | 64.90  | 0.672       | 8.281 | 8.125 | 18.901 |                   | Colapso               | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 10,800 | 10,800 | 11,260 | 11,260                    | 11,260  | 10,900 | 12,810 | 14,880 | 16,880 | 9,860  | 11,260 | 12,820 | 12,570 |        |        |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        |     |     |     |     |     |     |     |              |      |      |       |                           | 1,701  | 1,701  | 1,796  | 1,796                     | 1,796   | 1,512  | 1,796  | 2,079  | 2,646  | 1,512  | 1,796  | 1,796  | 2,079  |        |        |
|              |        |             |       |       |        |                   | P. Interna            | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 11,000 | 11,000 | 10,000 | 10,000                    | 10,000  | 9,770  | 11,610 | 13,440 | 17,110 | 9,770  | 11,610 | 11,610 | 13,440 |        |        |
|              |        |             |       |       |        |                   | P. Prueba             | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 10,000 | 10,000 | 10,000 | 10,000                    | 10,000  | 8,900  | 10,000 | 10,000 | 10,000 | 8,900  | 10,000 | 10,000 | 10,000 |        |        |
| 70.30        | 70.30  | 0.734       | 8.157 | 8.000 | 20.498 |                   | Colapso               | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 12,600 | 12,600 | 13,170 | 13,170                    | 13,170  | 12,060 | 14,450 | 16,530 | 19,290 | 12,060 | 14,450 | 16,530 | 19,290 |        |        |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        |     |     |     |     |     |     |     |              |      |      |       |                           | 1,845  | 1,845  | 1,948  | 1,948                     | 1,948   | 1,640  | 1,948  | 2,255  | 2,870  | 1,640  | 1,948  | 2,255  | 2,870  |        |        |
|              |        |             |       |       |        |                   | P. Interna            | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 12,010 | 12,010 | 12,680 | 12,680                    | 12,680  | 10,680 | 12,680 | 14,680 | 18,680 | 10,680 | 12,680 | 14,680 | 18,680 |        |        |
|              |        |             |       |       |        |                   | P. Prueba             | psi            |     |     |     |     |     |     |     |              |      |      |       |                           | 10,000 | 10,000 | 10,000 | 10,000                    | 10,000  | 9,800  | 10,000 | 10,000 | 10,000 | 9,800  | 10,000 | 10,000 | 10,000 |        |        |

| TUBO DE REVESTIMIENTO<br>CASING |        |             |       |       |       | FLUENCIA          | Kpsi                     | 40             | 55    | 55    | 65    | 80    | 80  | 90     | 95    | 95     | 110   | 125          | 80    | 95    | 110                          | 140    | 80    | 95    | 95      | 110    |
|---------------------------------|--------|-------------|-------|-------|-------|-------------------|--------------------------|----------------|-------|-------|-------|-------|-----|--------|-------|--------|-------|--------------|-------|-------|------------------------------|--------|-------|-------|---------|--------|
| D.E.                            | PESO   | DIMENSIONES |       |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |       |       |       |       |     |        |       |        |       |              |       |       |                              |        |       |       |         |        |
|                                 |        | ESP.        | D.I.  | DRIFT | DRIFT | AREA              |                          | API            |       |       |       |       |     |        |       |        |       | ALTO COLAPSO |       |       | RESISTENTE<br>A LA CORROSION |        |       |       |         |        |
| pulg                            | lb/pie | pulg        | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                          | H40            | J55   | K55   | M65   | L80   | N80 | C90    | C95   | T95    | P110  | Q125         | TAC80 | TAC95 | TAC110                       | TAC140 | TRC80 | TRC95 | TRC95HC | TRC110 |
| 9 5/8                           | 75.60  | 0.797       | 8.031 | 7.875 |       | 22.100            | Colapso                  | psi            |       |       |       |       |     | 13,670 |       | 14,430 |       |              |       |       |                              |        |       |       |         |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        |       |       |       |       |     |        | 1,989 |        | 2,100 |              |       |       |                              |        |       |       |         |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            |       |       |       |       |     | 13,040 |       | 13,770 |       |              |       |       |                              |        |       |       |         |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            |       |       |       |       |     | 10,000 |       | 10,000 |       |              |       |       |                              |        |       |       |         |        |
| 8 5/8                           | 24.00  | 0.264       | 8.097 | 7.972 |       | 6.934             | Colapso                  | psi            | 1,370 | 1,370 | 1,420 |       |     |        |       |        |       |              |       |       |                              |        | 1,430 | 1,430 |         |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 381   | 381   | 451   |       |     |        |       |        |       |              |       |       |                              |        | 555   | 659   |         |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 2,950 | 2,950 | 3,480 |       |     |        |       |        |       |              |       |       |                              |        | 4,290 | 5,090 |         |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 2,700 | 2,700 | 3,200 |       |     |        |       |        |       |              |       |       |                              |        | 3,900 | 4,700 |         |        |
|                                 | 28.00  | 0.304       | 8.017 | 7.892 |       | 7.947             | Colapso                  | psi            | 1,610 |       | 2,020 |       |     |        |       |        |       |              |       |       |                              |        | 2,160 | 2,210 | 2,210   |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 318   |       | 517   |       |     |        |       |        |       |              |       |       |                              |        | 636   | 755   | 874     |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 2,470 |       | 4,010 |       |     |        |       |        |       |              |       |       |                              |        | 4,930 | 5,860 | 6,780   |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 2,300 |       | 3,700 |       |     |        |       |        |       |              |       |       |                              |        | 4,500 | 5,400 | 6,200   |        |
|                                 | 32.00  | 0.352       | 7.921 | 7.796 | 7.875 | 9.149             | Colapso                  | psi            | 2,200 | 2,530 | 2,530 | 2,740 |     |        |       |        |       |              |       |       |                              |        | 3,050 | 3,280 | 3,420   |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 366   | 503   | 503   | 595   |     |        |       |        |       |              |       |       |                              |        | 732   | 869   | 1,006   |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 2,860 | 3,930 | 3,930 | 4,640 |     |        |       |        |       |              |       |       |                              |        | 5,710 | 6,780 | 7,860   |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 2,600 | 3,600 | 3,600 | 4,200 |     |        |       |        |       |              |       |       |                              |        | 5,200 | 6,200 | 7,200   |        |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.  | PESO  | DIMENSIONES |        |       |        |             | PROPIEDADES<br>MECANICAS | GRADO DE ACERO  |       |       |       |        |        |        |        |              |       |       |        | RESISTENTE<br>A LA CORROSION |        |        |       |        |         |        |
|-------|-------|-------------|--------|-------|--------|-------------|--------------------------|-----------------|-------|-------|-------|--------|--------|--------|--------|--------------|-------|-------|--------|------------------------------|--------|--------|-------|--------|---------|--------|
|       |       | ESP.        | D.I.   | DRIFT | DRIFT  | AREA        |                          | API             |       |       |       |        |        |        |        | ALTO COLAPSO |       |       |        | RESISTENTE<br>A LA CORROSION |        |        |       |        |         |        |
|       |       | pulg        | lb/pie | pulg  | pulg   | pulg        |                          | H40             | J55   | K55   | M65   | L80    | N80    | C90    | C95    | T95          | P110  | Q125  | TAC80  | TAC95                        | TAC110 | TAC140 | TRC80 | TRC95  | TRC95HC | TRC110 |
| 8 5/8 | 36.00 | 0.400       | 7.825  | 7.700 | 10.336 | Colapso psi |                          | 3,450           | 3,450 | 3,760 | 4,100 | 4,100  | 4,250  | 4,350  | 4,350  |              |       | 5,910 | 6,310  | 6,780                        | 7,390  | 4,100  | 4,350 | 6,310  | 4,690   |        |
|       |       |             |        |       |        |             |                          | Tensión lbx1000 | 568   | 568   | 672   | 827    | 827    | 930    | 982    | 982          |       |       | 827    | 982                          | 1,137  | 1,447  | 827   | 982    | 982     | 1,133  |
|       |       |             |        |       |        |             |                          | P. Interna psi  | 4,460 | 4,460 | 5,280 | 6,490  | 6,490  | 7,300  | 7,710  | 7,710        |       |       | 6,490  | 7,710                        | 8,930  | 11,360 | 6,490 | 7,710  | 7,710   | 8,930  |
|       |       |             |        |       |        |             |                          | P. Prueba psi   | 4,100 | 4,100 | 4,800 | 5,900  | 5,900  | 6,700  | 7,000  | 7,000        |       |       | 5,900  | 7,000                        | 8,200  | 10,000 | 5,900 | 7,000  | 7,000   | 8,200  |
| 40.00 | 0.450 | 7.725       | 7.600  | 7.625 | 11.557 | Colapso psi |                          |                 | 4,900 | 5,520 | 5,520 | 5,870  | 6,020  | 6,020  | 6,390  |              |       | 7,370 | 8,230  | 8,890                        | 9,750  | 5,520  | 6,020 | 8,240  | 6,390   |        |
|       |       |             |        |       |        |             |                          | Tensión lbx1000 |       | 751   | 925   | 925    | 1,040  | 1,098  | 1,098  | 1,271        |       |       | 925    | 1,098                        | 1,271  | 1,618  | 925   | 1,098  | 1,098   | 1,271  |
|       |       |             |        |       |        |             |                          | P. Interna psi  |       | 5,930 | 7,300 | 7,300  | 8,220  | 8,670  | 8,670  | 10,040       |       |       | 7,300  | 8,670                        | 10,040 | 12,780 | 7,300 | 8,670  | 8,670   | 10,040 |
|       |       |             |        |       |        |             |                          | P. Prueba psi   |       | 5,400 | 6,700 | 6,700  | 7,500  | 7,900  | 7,900  | 9,200        |       |       | 6,700  | 7,900                        | 9,200  | 10,000 | 6,700 | 7,900  | 7,900   | 9,200  |
| 44.00 | 0.500 | 7.625       | 7.500  | 7.500 | 12.763 | Colapso psi |                          |                 | 6,950 | 6,950 | 7,490 | 7,740  | 7,740  | 8,420  |        |              | 8,630 | 9,700 | 11,020 | 12,260                       | 6,950  | 7,740  | 9,700 | 8,420  |         |        |
|       |       |             |        |       |        |             |                          | Tensión lbx1000 |       | 1,021 | 1,021 | 1,149  | 1,212  | 1,212  | 1,404  |              |       | 1,021 | 1,212  | 1,404                        | 1,787  | 1,021  | 1,212 | 1,212  | 1,404   |        |
|       |       |             |        |       |        |             |                          | P. Interna psi  |       | 8,120 | 8,120 | 9,130  | 9,640  | 9,640  | 11,160 |              |       | 8,120 | 9,640  | 11,160                       | 14,200 | 8,120  | 9,640 | 9,640  | 11,160  |        |
|       |       |             |        |       |        |             |                          | P. Prueba psi   |       | 7,400 | 7,400 | 8,300  | 8,800  | 8,800  | 10,000 |              |       | 7,400 | 8,800  | 10,000                       | 10,000 | 7,400  | 8,800 | 8,800  | 10,000  |        |
| 49.00 | 0.557 | 7.511       | 7.386  | 7.386 | 14.118 | Colapso psi |                          |                 | 8,570 | 8,570 | 9,340 | 9,700  | 9,700  | 10,730 | 11,660 |              |       | 9,910 | 11,410 | 13,450                       | 14,880 | 8,570  | 9,700 | 11,420 | 10,730  |        |
|       |       |             |        |       |        |             |                          | Tensión lbx1000 |       | 1,129 | 1,129 | 1,271  | 1,341  | 1,341  | 1,553  | 1,765        |       |       | 1,129  | 1,341                        | 1,553  | 1,977  | 1,129 | 1,341  | 1,341   | 1,553  |
|       |       |             |        |       |        |             |                          | P. Interna psi  |       | 9,040 | 9,040 | 10,170 | 10,740 | 10,740 | 12,430 | 14,130       |       |       | 9,040  | 10,740                       | 12,430 | 15,820 | 9,040 | 10,740 | 10,740  | 12,430 |
|       |       |             |        |       |        |             |                          | P. Prueba psi   |       | 8,300 | 8,300 | 9,300  | 9,800  | 9,800  | 10,000 | 10,000       |       |       | 8,300  | 9,800                        | 10,000 | 10,000 | 8,300 | 9,800  | 9,800   | 10,000 |

| TUBO DE REVESTIMIENTO<br>CASING |        | FLUENCIA    | Kpsi  | 40    | 55    | 55                | 65                       | 80             | 80   | 90  | 95  | 95  | 110          | 125 | 80  | 95  | 110                          | 140  | 80     | 95     | 95     | 110    |        |        |         |        |
|---------------------------------|--------|-------------|-------|-------|-------|-------------------|--------------------------|----------------|--|-----|-----|-----|--------------|-----|-----|-----|------------------------------|------|--------|--------|--------|--------|--------|--------|---------|--------|
|                                 |        | RESISTENCIA | Kpsi  | 60    | 75    | 95                | 85                       | 95             | 100  | 100 | 105 | 105 | 125          | 135 | 100 | 110 | 125                          | 150  | 95     | 105    | 105    | 115    |        |        |         |        |
| D.E.                            | PESO   | DIMENSIONES |       |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |  |     |     |     |              |     |     |     |                              |      |        |        |        |        |        |        |         |        |
|                                 |        | ESP.        | D.I.  | DRIFT | DRIFT | AREA              |                          | API            |  |     |     |     | ALTO COLAPSO |     |     |     | RESISTENTE<br>A LA CORROSION |      |        |        |        |        |        |        |         |        |
|                                 |        |             |       |       |       | ALT.              | TRANS.                   | H40            | J55  | K55 | M65 | L80 | N80          | C90 | C95 | T95 | P110                         | Q125 | TAC80  | TAC95  | TAC110 | TAC140 | TRC80  | TRC95  | TRC95HC | TRC110 |
| pulg                            | lb/pie | pulg        | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                          |                |  |     |     |     |              |     |     |     |                              |      |        |        |        |        |        |        |         |        |
| 7 3/4                           | 46.10  | 0.595       | 6.560 | 6.435 | 6.500 | 13.374            | Colapso                  | psi            | 11,340 11,340 12,750 13,320 13,320 15,000 16,590 |     |     |     |              |     |     |     |                              |      | 12,150 | 14,580 | 16,660 | 19,480 | 11,340 | 13,320 | 14,580  | 15,000 |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 1,070 1,070 1,204 1,271 1,271 1,471 1,672        |     |     |     |              |     |     |     |                              |      | 1,070  | 1,271  | 1,471  | 1,872  | 1,070  | 1,271  | 1,271   | 1,471  |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 10,750 10,750 12,090 12,760 12,760 14,780 16,790 |     |     |     |              |     |     |     |                              |      | 10,750 | 12,760 | 14,780 | 18,810 | 10,750 | 12,760 | 12,760  | 14,780 |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 9,800 9,800 10,000 10,000 10,000 10,000 10,000   |     |     |     |              |     |     |     |                              |      | 9,800  | 10,000 | 10,000 | 10,000 | 9,800  | 10,000 | 10,000  | 10,000 |
| 7 5/8                           | 24.00  | 0.300       | 7.025 | 6.900 | 6.904 | 2,330             | Colapso                  | psi            | 2,030 2,330                                      |     |     |     |              |     |     |     |                              |      |        |        |        |        |        |        |         |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 276 380  |     |     |     |              |     |     |     |                              |      |        |        |        |        |        |        |         |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 2,750 3,790                                      |     |     |     |              |     |     |     |                              |      |        |        |        |        |        |        |         |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 2,500 2,600                                      |     |     |     |              |     |     |     |                              |      |        |        |        |        |        |        |         |        |
| 26.40                           | 0.328  | 6.969       | 6.844 | 7.519 | 2,900 | 3,100             | Colapso                  | psi            | 2,900 2,900 3,100 3,400 3,400 3,610 3,710 3,710  |     |     |     |              |     |     |     |                              |      | 4,980  | 5,220  | 5,610  | 6,040  | 3,400  | 3,710  | 5,230   | 3,920  |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 414 414 489 602 602 677 714 714                  |     |     |     |              |     |     |     |                              |      | 602    | 714    | 827    | 1,053  | 602    | 714    | 714     | 827    |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 4,140 4,140 4,890 6,020 6,020 6,780 7,150 7,150  |     |     |     |              |     |     |     |                              |      | 6,020  | 7,150  | 8,280  | 10,540 | 6,020  | 7,150  | 7,150   | 8,280  |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 3,800 3,800 4,500 5,500 5,500 6,200 6,500 6,500  |     |     |     |              |     |     |     |                              |      | 5,500  | 6,500  | 7,600  | 9,600  | 5,500  | 6,500  | 6,500   | 7,600  |
| 29.70                           | 0.375  | 6.875       | 6.750 | 8.541 | 4,310 | 4,790             | Colapso                  | psi            | 4,310 4,790 4,790 5,030 5,130 5,130 5,350        |     |     |     |              |     |     |     |                              |      | 6,620  | 7,300  | 7,780  | 8,540  | 4,790  | 5,130  | 7,320   | 5,350  |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 555 683 683 769 811 811 940                      |     |     |     |              |     |     |     |                              |      | 683    | 811    | 940    | 1,196  | 683    | 811    | 811     | 940    |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 5,590 6,890 6,890 7,750 8,180 8,180 9,470        |     |     |     |              |     |     |     |                              |      | 6,890  | 8,180  | 9,470  | 12,050 | 6,890  | 8,180  | 8,180   | 9,470  |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 5,100 6,300 6,300 7,100 7,500 7,500 8,700        |     |     |     |              |     |     |     |                              |      | 6,300  | 7,500  | 8,700  | 10,000 | 6,300  | 7,500  | 7,500   | 8,700  |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.         | PESO  | DIMENSIONES       |        |       |       |        | PROPIEDADES MECANICAS   | GRADO DE ACERO                                   |        |        |        |        |        |        |     |                             |      |      |       | RESISTENTE A LA CORROSION   |        |        |       |
|--------------|-------|-------------------|--------|-------|-------|--------|---|--|--------|--------|--------|--------|--------|--------|-----|-----------------------------|------|------|-------|-----------------------------|--------|--------|-------|
|              |       | ESP.              | D.I.   | DRIFT | DRIFT | AREA   |   | API  |        |        |        |        |        |        |     | ALTO COLAPSO                |      |      |       | RESISTENTE A LA CORROSION   |        |        |       |
|              |       | pulg              | lb/pie | pulg  | pulg  | pulg   |   | H40  | J55    | K55    | M65    | L80    | N80    | C90    | C95 | T95                         | P110 | Q125 | TAC80 | TAC95                       | TAC110 | TAC140 | TRC80 |
| <b>7 5/8</b> | 33.70 | 0.430 6.765 6.640 |        |       |       | 9.720  | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi | 5,720 6,560 6,560 7,050 7,280 7,280 7,870        |        |        |        |        |        |        |     | 8,310 9,280 10,440 11,610   |      |      |       | 6,560 7,280 9,290 7,870     |        |        |       |
|              |       |                   |        |       |       |        |   | 632  | 778    | 778    | 875    | 923    | 923    | 1,069  |     | 778 923 1,069 1,361         |      |      |       | 778 923 923 1,069           |        |        |       |
|              |       |                   |        |       |       |        |   | 6,410  | 7,900  | 7,900  | 8,880  | 9,380  | 9,380  | 10,860 |     | 7,900 9,380 10,860 13,820   |      |      |       | 7,900 9,380 9,380 10,860    |        |        |       |
|              |       |                   |        |       |       |        |   | 5,900  | 7,200  | 7,200  | 8,100  | 8,600  | 8,600  | 9,900  |     | 7,200 8,600 9,900 10,000    |      |      |       | 7,200 8,600 8,600 9,900     |        |        |       |
|              | 39.00 | 0.500 6.625 6.500 |        |       |       | 11.192 | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi | 8,820 8,820 9,620 10,000 10,000 11,080 12,060    |        |        |        |        |        |        |     | 10,110 11,670 13,810 15,250 |      |      |       | 8,820 10,000 11,680 11,080  |        |        |       |
|              |       |                   |        |       |       |        |   | 895  | 895    | 1,007  | 1,063  | 1,063  | 1,231  | 1,399  |     | 895 1,063 1,231 1,567       |      |      |       | 895 1,063 1,063 1,231       |        |        |       |
|              |       |                   |        |       |       |        |   | 9,180  | 9,180  | 10,330 | 10,900 | 10,900 | 12,620 | 14,340 |     | 9,180 10,900 12,620 16,070  |      |      |       | 9,180 10,900 10,900 12,620  |        |        |       |
|              |       |                   |        |       |       |        |   | 8,400  | 8,400  | 9,400  | 10,000 | 10,000 | 10,000 | 10,000 |     | 8,400 10,000 10,000 10,000  |      |      |       | 8,400 10,000 10,000 10,000  |        |        |       |
|              | 42.80 | 0.562 6.501 6.376 |        |       |       | 12.470 | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi | 10,810 10,810 11,890 12,410 12,410 13,930 15,350 |        |        |        |        |        |        |     | 11,600 13,790 15,870 18,330 |      |      |       | 10,810 12,410 13,800 13,930 |        |        |       |
|              |       |                   |        |       |       |        |   | 998  | 998    | 1,122  | 1,185  | 1,185  | 1,372  | 1,559  |     | 998 1,185 1,372 1,746       |      |      |       | 998 1,185 1,185 1,372       |        |        |       |
|              |       |                   |        |       |       |        |   | 10,320   | 10,320 | 11,610 | 12,250 | 12,250 | 14,190 | 16,120 |     | 10,320 12,250 14,190 18,060 |      |      |       | 10,320 12,250 12,250 14,190 |        |        |       |
|              |       |                   |        |       |       |        |   | 9,400  | 9,400  | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |     | 9,400 10,000 10,000 10,000  |      |      |       | 9,400 10,000 10,000 10,000  |        |        |       |
|              | 45.30 | 0.595 6.435 6.310 |        |       |       | 13.141 | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi | 11,510 11,510 12,950 13,670 13,670 15,440 17,100 |        |        |        |        |        |        |     | 12,380 14,910 16,980 19,950 |      |      |       | 11,510 13,670 14,990 15,440 |        |        |       |
|              |       |                   |        |       |       |        |   | 1,051  | 1,051  | 1,183  | 1,248  | 1,248  | 1,445  | 1,643  |     | 1,051 1,248 1,445 1,840     |      |      |       | 1,051 1,248 1,248 1,445     |        |        |       |
|              |       |                   |        |       |       |        |   | 10,920   | 10,920 | 12,290 | 12,970 | 12,970 | 15,020 | 17,070 |     | 10,920 12,970 15,020 19,120 |      |      |       | 10,920 12,970 12,970 15,020 |        |        |       |
|              |       |                   |        |       |       |        |   | 10,000   | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |     | 10,000 10,000 10,000 10,000 |      |      |       | 10,000 10,000 10,000 10,000 |        |        |       |

| TUBO DE REVESTIMIENTO<br>CASING |        | FLUENCIA    | Kpsi  | 40                       | 55             | 55                | 65         | 80      | 80  | 90  | 95     | 95     | 110    | 125    | 80           | 95     | 110    | 140    | 80                           | 95     | 95     | 110    |        |         |        |
|---------------------------------|--------|-------------|-------|--------------------------|----------------|-------------------|------------|---------|-----|-----|--------|--------|--------|--------|--------------|--------|--------|--------|------------------------------|--------|--------|--------|--------|---------|--------|
| D.E.                            | PESO   | DIMENSIONES |       | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |                   |            |         |     |     |        |        |        |        |              |        |        |        |                              |        |        |        |        |         |        |
|                                 |        | ESP.        | D.I.  | DRIFT                    | DRIFT          | AREA              | API        |         |     |     |        |        |        |        | ALTO COLAPSO |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |        |        |         |        |
| pulg                            | lb/pie | pulg        | pulg  | pulg                     | pulg           | pulg <sup>2</sup> | H40        | J55     | K55 | M65 | L80    | N80    | C90    | C95    | T95          | P110   | Q125   | TAC80  | TAC95                        | TAC110 | TAC140 | TRC80  | TRC95  | TRC95HC | TRC110 |
| 7 5/8                           | 47.10  | 0.625       | 6.375 | 6.250                    |                | 13.744            | Colapso    | psi     |     |     | 12,040 | 12,040 | 13,540 | 14,300 | 14,300       | 16,550 | 18,700 | 13,070 | 15,910                       | 17,980 | 20,950 | 12,040 | 14,300 | 15,930  | 16,550 |
|                                 |        |             |       |                          |                |                   | Tensión    | lbx1000 |     |     | 1,100  | 1,100  | 1,237  | 1,306  | 1,306        | 1,512  | 1,718  | 1,100  | 1,306                        | 1,512  | 1,924  | 1,100  | 1,306  | 1,306   | 1,512  |
|                                 |        |             |       |                          |                |                   | P. Interna | psi     |     |     | 11,480 | 11,480 | 12,910 | 13,630 | 13,630       | 15,780 | 17,930 | 11,480 | 13,630                       | 15,780 | 20,080 | 11,480 | 13,630 | 13,630  | 15,780 |
|                                 |        |             |       |                          |                |                   | P. Prueba  | psi     |     |     | 10,000 | 10,000 | 10,000 | 10,000 | 10,000       | 10,000 | 10,000 | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 | 10,000 | 10,000  | 10,000 |
|                                 | 51.20  | 0.687       | 6.251 | 6.126                    |                | 14.974            | Colapso    | psi     |     |     | 14,760 |        | 15,580 |        |              |        |        | 14,530 | 18,040                       | 20,090 | 22,900 | 13,120 | 15,580 | 18,040  | 18,040 |
|                                 |        |             |       |                          |                |                   | Tensión    | lbx1000 |     |     | 1,348  |        | 1,423  |        |              |        |        | 1,198  | 1,423                        | 1,647  | 2,096  | 1,198  | 1,423  | 1,423   | 1,647  |
|                                 |        |             |       |                          |                |                   | P. Interna | psi     |     |     | 14,190 |        | 14,980 |        |              |        |        | 12,610 | 14,980                       | 17,340 | 22,070 | 12,610 | 14,980 | 14,980  | 17,340 |
|                                 |        |             |       |                          |                |                   | P. Prueba  | psi     |     |     | 10,000 |        | 10,000 |        |              |        |        | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 | 10,000 | 10,000  | 10,000 |
|                                 | 55.30  | 0.750       | 6.125 | 6.000                    |                | 16.199            | Colapso    | psi     |     |     | 15,960 |        | 16,850 |        |              |        |        | 15,980 | 20,190                       | 22,210 | 24,770 | 14,190 | 16,850 | 20,190  | 19,510 |
|                                 |        |             |       |                          |                |                   | Tensión    | lbx1000 |     |     | 1,458  |        | 1,539  |        |              |        |        | 1,296  | 1,539                        | 1,782  | 2,268  | 1,296  | 1,539  | 1,539   | 1,782  |
|                                 |        |             |       |                          |                |                   | P. Interna | psi     |     |     | 15,490 |        | 16,350 |        |              |        |        | 13,770 | 16,350                       | 18,930 | 24,100 | 13,770 | 16,350 | 16,350  | 18,930 |
|                                 |        |             |       |                          |                |                   | P. Prueba  | psi     |     |     | 10,000 |        | 10,000 |        |              |        |        | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 | 10,000 | 10,000  | 10,000 |
|                                 | 59.20  | 0.812       | 6.001 | 5.876                    |                | 17.380            | Colapso    | psi     |     |     | 15,220 | 15,220 |        |        |              |        |        |        |                              |        |        |        |        |         |        |
|                                 |        |             |       |                          |                |                   | Tensión    | lbx1000 |     |     | 1,390  | 1,390  |        |        |              |        |        |        |                              |        |        |        |        |         |        |
|                                 |        |             |       |                          |                |                   | P. Interna | psi     |     |     | 14,919 | 14,910 |        |        |              |        |        |        |                              |        |        |        |        |         |        |
|                                 |        |             |       |                          |                |                   | P. Prueba  | psi     |     |     | 10,000 | 10,000 |        |        |              |        |        |        |                              |        |        |        |        |         |        |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.  | PESO  | DIMENSIONES |        |       |       |             | PROPIEDADES MECANICAS | GRADO DE ACERO |       |       |       |       |       |       |       |              |      |      |                           | ALTO COLAPSO |        |        | RESISTENTE A LA CORROSION |       |         |        |
|-------|-------|-------------|--------|-------|-------|-------------|-----------------------|----------------|-------|-------|-------|-------|-------|-------|-------|--------------|------|------|---------------------------|--------------|--------|--------|---------------------------|-------|---------|--------|
|       |       | ESP.        | D.I.   | DRIFT | DRIFT | AREA        |                       | API            |       |       |       |       |       |       |       | ALTO COLAPSO |      |      | RESISTENTE A LA CORROSION |              |        |        |                           |       |         |        |
|       |       | pulg        | lb/pie | pulg  | pulg  | pulg        |                       | H40            | J55   | K55   | M65   | L80   | N80   | C90   | C95   | T95          | P110 | Q125 | TAC80                     | TAC95        | TAC110 | TAC140 | TRC80                     | TRC95 | TRC95HC | TRC110 |
| 7     | 17.00 | 0.231       | 6.538  | 6.413 | 4.912 | Colapso psi | 1,420                 | 1,630          |       |       |       |       |       |       |       |              |      |      |                           |              |        |        |                           |       |         |        |
|       |       |             |        |       |       |             | Tensión lbx1000       | 196            | 270   |       |       |       |       |       |       |              |      |      |                           |              |        |        |                           |       |         |        |
|       |       |             |        |       |       |             | P. Interna psi        | 2,310          | 3,170 |       |       |       |       |       |       |              |      |      |                           |              |        |        |                           |       |         |        |
|       |       |             |        |       |       |             | P. Prueba psi         | 2,100          | 2,900 |       |       |       |       |       |       |              |      |      |                           |              |        |        |                           |       |         |        |
| 20.00 | 20.00 | 0.272       | 6.456  | 6.331 | 5.749 | Colapso psi | 1,970                 | 2,270          | 2,270 | 2,480 |       |       | 2,740 |       |       |              |      |      |                           |              |        |        |                           |       |         |        |
|       |       |             |        |       |       |             | Tensión lbx1000       | 230            | 316   | 316   | 374   |       |       | 460   |       |              |      |      |                           |              |        |        |                           |       |         |        |
|       |       |             |        |       |       |             | P. Interna psi        | 2,720          | 3,740 | 3,740 | 4,420 |       |       | 5,440 |       |              |      |      |                           |              |        |        |                           |       |         |        |
|       |       |             |        |       |       |             | P. Prueba psi         | 2,500          | 3,400 | 3,400 | 4,000 |       |       | 3,400 |       |              |      |      |                           |              |        |        |                           |       |         |        |
| 23.00 | 23.00 | 0.317       | 6.366  | 6.241 | 6.656 | Colapso psi | 3,270                 | 3,270          | 3,540 | 3,830 | 3,830 | 4,030 | 4,140 | 4,140 |       |              |      |      |                           |              |        |        | 3,830                     | 4,140 | 5,910   | 4,440  |
|       |       |             |        |       |       |             | Tensión lbx1000       | 366            | 366   | 433   | 532   | 532   | 599   | 632   | 632   |              |      |      |                           |              |        |        | 532                       | 632   | 632     | 732    |
|       |       |             |        |       |       |             | P. Interna psi        | 4,360          | 4,360 | 5,150 | 6,340 | 6,340 | 7,130 | 7,530 | 7,530 |              |      |      |                           |              |        |        | 6,340                     | 7,530 | 7,530   | 8,720  |
|       |       |             |        |       |       |             | P. Prueba psi         | 4,000          | 4,000 | 4,700 | 5,800 | 5,800 | 6,500 | 6,900 | 6,900 |              |      |      |                           |              |        |        | 5,800                     | 6,900 | 6,900   | 8,000  |
| 26.00 | 26.00 | 0.362       | 6.276  | 6.151 | 7.549 | Colapso psi | 4,330                 | 4,330          | 4,810 | 5,410 | 5,410 | 5,740 | 5,890 | 5,890 | 6,230 |              |      |      |                           |              |        |        | 7,260                     | 8,090 | 8,710   | 9,590  |
|       |       |             |        |       |       |             | Tensión lbx1000       | 415            | 415   | 491   | 604   | 604   | 679   | 717   | 717   | 830          |      |      |                           |              |        |        | 604                       | 717   | 830     | 1,057  |
|       |       |             |        |       |       |             | P. Interna psi        | 4,980          | 4,980 | 5,880 | 7,240 | 7,240 | 8,150 | 8,600 | 8,600 | 9,960        |      |      |                           |              |        |        | 7,240                     | 8,600 | 9,960   | 12,670 |
|       |       |             |        |       |       |             | P. Prueba psi         | 4,600          | 4,600 | 5,400 | 6,600 | 6,600 | 7,400 | 7,900 | 7,900 | 9,100        |      |      |                           |              |        |        | 6,600                     | 7,900 | 9,100   | 10,000 |

**TUBO DE REVESTIMIENTO  
CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.  | PESO   | DIMENSIONES                   |      |       |        |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |  |  |     |     |     |     |     |              |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |        |        |         |        |
|-------|--------|-------------------------------|------|-------|--------|-------------------|--------------------------|----------------|--|--|-----|-----|-----|-----|-----|--------------|--------|--------|--------|------------------------------|--------|--------|--------|--------|---------|--------|
|       |        | ESP.                          | D.I. | DRIFT | DRIFT  | AREA              |                          | API            |  |  |     |     |     |     |     | ALTO COLAPSO |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |        |        |         |        |
|       |        |                               |      | ALT.  | TRANS. |                   |                          | H40            | J55  | K55  | M65 | L80 | N80 | C90 | C95 | T95          | P110   | Q125   | TAC80  | TAC95                        | TAC110 | TAC140 | TRC80  | TRC95  | TRC95HC | TRC110 |
| pulg  | lb/pie | pulg                          | pulg | pulg  | pulg   | pulg <sup>2</sup> |                          |                |  |  |     |     |     |     |     |              |        |        |        |                              |        |        |        |        |         |        |
| 7     | 29.00  | 0.408 6.184 6.059 6.125 8.449 |      |       |        |                   | Colapso                  | psi            | 6,100 7,030 7,030 7,580 7,840 7,840 8,530        |  |     |     |     |     |     |              | 8,690  | 9,780  | 11,140 | 12,390                       | 7,030  | 7,840  | 9,780  | 8,530  |         |        |
|       |        |                               |      |       |        |                   | Tensión                  | lbx1000        | 549 676 676 760 803 803 929                      |  |     |     |     |     |     |              | 676    | 803    | 929    | 1,183                        | 676    | 803    | 803    | 929    |         |        |
|       |        |                               |      |       |        |                   | P. Interna               | psi            | 6,630 8,160 8,160 9,180 9,690 9,690 11,220       |  |     |     |     |     |     |              | 8,160  | 9,690  | 11,220 | 14,280                       | 8,160  | 9,690  | 9,690  | 11,220 |         |        |
|       |        |                               |      |       |        |                   | P. Prueba                | psi            | 6,100 7,500 7,500 8,400 8,900 8,900 10,000       |  |     |     |     |     |     |              | 7,500  | 8,900  | 10,000 | 10,000                       | 7,500  | 8,900  | 8,900  | 10,000 |         |        |
| 32.00 | 32.00  | 0.453 6.094 5.969 6.000 9.317 |      |       |        |                   | Colapso                  | psi            | 7,360 8,600 8,600 9,380 9,740 9,740 10,780       |  |     |     |     |     |     |              | 9,950  | 11,450 | 13,510 | 14,930                       | 8,600  | 9,740  | 11,450 | 10,780 |         |        |
|       |        |                               |      |       |        |                   | Tensión                  | lbx1000        | 606 745 745 839 885 885 1,025                    |  |     |     |     |     |     |              | 745    | 885    | 1,025  | 1,304                        | 745    | 885    | 885    | 1,025  |         |        |
|       |        |                               |      |       |        |                   | P. Interna               | psi            | 7,360 9,060 9,060 10,190 10,760 10,760 12,460    |  |     |     |     |     |     |              | 9,060  | 10,760 | 12,460 | 15,860                       | 9,060  | 10,760 | 10,760 | 12,460 |         |        |
|       |        |                               |      |       |        |                   | P. Prueba                | psi            | 6,700 8,300 8,300 9,300 9,800 9,800 10,000       |  |     |     |     |     |     |              | 8,300  | 9,800  | 10,000 | 10,000                       | 8,300  | 9,800  | 9,800  | 10,000 |         |        |
| 35.00 | 35.00  | 0.498 6.004 5.879             |      |       |        |                   | 10.172                   | Colapso        | psi  | 10,180 10,180 11,170 11,650 11,650 13,030 14,310 |     |     |     |     |     |              |        | 11,150 | 13,120 | 15,230                       | 17,380 | 10,180 | 11,650 | 13,120 | 13,030  |        |
|       |        |                               |      |       |        |                   | Tensión                  | lbx1000        | 814 814 916 966 966 1,119 1,272                  |  |     |     |     |     |     |              | 814    | 966    | 1,119  | 1,424                        | 814    | 966    | 966    | 1,119  |         |        |
|       |        |                               |      |       |        |                   | P. Interna               | psi            | 9,960 9,960 11,210 11,830 11,830 13,700 15,560   |  |     |     |     |     |     |              | 9,960  | 11,830 | 13,700 | 17,430                       | 9,960  | 11,830 | 11,830 | 13,700 |         |        |
|       |        |                               |      |       |        |                   | P. Prueba                | psi            | 9,100 9,100 10,000 10,000 10,000 10,000 10,000   |  |     |     |     |     |     |              | 9,100  | 10,000 | 10,000 | 10,000                       | 9,100  | 10,000 | 10,000 | 10,000 |         |        |
| 38.00 | 38.00  | 0.540 5.920 5.795             |      |       |        |                   | 10.959                   | Colapso        | psi  | 11,390 11,390 12,810 13,430 13,430 15,130 16,740 |     |     |     |     |     |              |        | 12,230 | 14,690 | 16,770                       | 19,640 | 11,390 | 13,430 | 14,690 | 15,130  |        |
|       |        |                               |      |       |        |                   | Tensión                  | lbx1000        | 877 877 986 1,041 1,041 1,206 1,370              |  |     |     |     |     |     |              | 877    | 1,041  | 1,206  | 1,534                        | 877    | 1,041  | 1,041  | 1,206  |         |        |
|       |        |                               |      |       |        |                   | P. Interna               | psi            | 10,800 10,800 12,150 12,830 12,830 14,850 16,880 |  |     |     |     |     |     |              | 10,800 | 12,830 | 14,850 | 18,900                       | 10,800 | 12,830 | 12,830 | 14,850 |         |        |
|       |        |                               |      |       |        |                   | P. Prueba                | psi            | 9,900 9,900 10,000 10,000 10,000 10,000 10,000   |  |     |     |     |     |     |              | 9,900  | 10,000 | 10,000 | 10,000                       | 9,900  | 10,000 | 10,000 | 10,000 |         |        |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.  | PESO   | DIMENSIONES |       |       |        |                   | PROPIEDADES MECANICAS | GRADO DE ACERO  |     |     |     |     |     |     |     |              |        |      |                           | ALTO COLAPSO |        |        | RESISTENTE A LA CORROSION |       |         |        |        |        |
|-------|--------|-------------|-------|-------|--------|-------------------|-----------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|--------------|--------|------|---------------------------|--------------|--------|--------|---------------------------|-------|---------|--------|--------|--------|
|       |        | ESP.        | D.I.  | DRIFT | DRIFT  | AREA              |                       | API             |     |     |     |     |     |     |     | ALTO COLAPSO |        |      | RESISTENTE A LA CORROSION |              |        |        |                           |       |         |        |        |        |
| pulg  | lb/pie | pulg        | pulg  | pulg  | pulg   | pulg <sup>2</sup> |                       | H40             | J55 | K55 | M65 | L80 | N80 | C90 | C95 | T95          | P110   | Q125 | TAC80                     | TAC95        | TAC110 | TAC140 | TRC80                     | TRC95 | TRC95HC | TRC110 |        |        |
| 7     | 42.70  | 0.625       | 5.750 | 5.625 | 12.517 | Colapso psi       |                       |                 |     |     |     |     |     |     |     | 14,640       |        |      | 15,450                    |              |        |        |                           |       | 13,010  | 15,450 | 17,840 |        |
|       |        |             |       |       |        |                   |                       | Tensión lbx1000 |     |     |     |     |     |     |     |              | 1,127  |      |                           | 1,189        |        |        |                           |       |         | 1,001  | 1,189  | 1,189  |
|       |        |             |       |       |        |                   |                       | P. Interna psi  |     |     |     |     |     |     |     |              | 14,060 |      |                           | 14,840       |        |        |                           |       |         | 12,500 | 14,840 | 14,840 |
|       |        |             |       |       |        |                   |                       | P. Prueba psi   |     |     |     |     |     |     |     |              | 10,000 |      |                           | 10,000       |        |        |                           |       |         | 10,000 | 10,000 | 10,000 |
| 46.40 | 46.40  | 0.687       | 5.626 | 5.501 | 13.625 | Colapso psi       |                       |                 |     |     |     |     |     |     |     | 15,930       |        |      | 16,820                    |              |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | Tensión lbx1000 |     |     |     |     |     |     |     |              | 1,226  |      |                           | 1,294        |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | P. Interna psi  |     |     |     |     |     |     |     |              | 15,460 |      |                           | 16,320       |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | P. Prueba psi   |     |     |     |     |     |     |     |              | 10,000 |      |                           | 10,000       |        |        |                           |       |         |        |        |        |
| 50.10 | 50.10  | 0.750       | 5.500 | 5.375 | 14.726 | Colapso psi       |                       |                 |     |     |     |     |     |     |     | 17,220       |        |      | 18,180                    |              |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | Tensión lbx1000 |     |     |     |     |     |     |     |              | 1,325  |      |                           | 1,390        |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | P. Interna psi  |     |     |     |     |     |     |     |              | 16,870 |      |                           | 17,810       |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | P. Prueba psi   |     |     |     |     |     |     |     |              | 10,000 |      |                           | 10,000       |        |        |                           |       |         |        |        |        |
| 53.60 | 53.60  | 0.812       | 5.376 | 5.251 | 15.785 | Colapso psi       |                       |                 |     |     |     |     |     |     |     | 18,460       |        |      | 19,480                    |              |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | Tensión lbx1000 |     |     |     |     |     |     |     |              | 1,421  |      |                           | 1,500        |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | P. Interna psi  |     |     |     |     |     |     |     |              | 18,270 |      |                           | 19,290       |        |        |                           |       |         |        |        |        |
|       |        |             |       |       |        |                   |                       | P. Prueba psi   |     |     |     |     |     |     |     |              | 10,000 |      |                           | 10,000       |        |        |                           |       |         |        |        |        |

| TUBO DE REVESTIMIENTO<br>CASING |        |             |       |       |       | FLUENCIA          | Kpsi                     | 40             | 55    | 55    | 65    | 80    | 80    | 90     | 95    | 95     | 110    | 125          | 80     | 95     | 110    | 140                          | 80     | 95     | 95      | 110    |        |        |        |
|---------------------------------|--------|-------------|-------|-------|-------|-------------------|--------------------------|----------------|-------|-------|-------|-------|-------|--------|-------|--------|--------|--------------|--------|--------|--------|------------------------------|--------|--------|---------|--------|--------|--------|--------|
| D.E.                            | PESO   | DIMENSIONES |       |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |       |       |       |       |       |        |       |        |        |              |        |        |        |                              |        |        |         |        |        |        |        |
|                                 |        | ESP.        | D.I.  | DRIFT | DRIFT | AREA              |                          | API            |       |       |       |       |       |        |       |        |        | ALTO COLAPSO |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |         |        |        |        |        |
| pulg                            | lb/pie | pulg        | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                          | H40            | J55   | K55   | M65   | L80   | N80   | C90    | C95   | T95    | P110   | Q125         | TAC80  | TAC95  | TAC110 | TAC140                       | TRC80  | TRC95  | TRC95HC | TRC110 |        |        |        |
| 7                               | 57.10  | 0.875       | 5.250 | 5.125 |       | 16.837            | Colapso                  | psi            |       |       |       |       |       | 19,690 |       | 20,780 |        |              |        |        |        |                              |        |        |         |        |        |        |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        |       |       |       |       |       | 1,515  |       | 1,600  |        |              |        |        |        |                              |        |        |         |        |        |        |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            |       |       |       |       |       | 19,690 |       | 20,780 |        |              |        |        |        |                              |        |        |         |        |        |        |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            |       |       |       |       |       | 10,000 |       | 10,000 |        |              |        |        |        |                              |        |        |         |        |        |        |        |
| 6 5/8                           | 20.00  | 0.288       | 6.049 | 5.924 |       | 5.734             | Colapso                  | psi            | 2,520 | 2,970 | 2,970 | 3,190 |       |        |       |        |        |              |        |        |        |                              | 3,470  | 3,790  |         | 4,030  |        |        |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 229   | 315   | 315   | 373   |       |        |       |        |        |              |        |        |        |                              |        | 459    | 545     |        | 631    |        |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 3,040 | 4,180 | 4,180 | 4,940 |       |        |       |        |        |              |        |        |        |                              |        | 6,090  | 7,230   |        | 8,370  |        |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 2,800 | 3,800 | 3,800 | 4,500 |       |        |       |        |        |              |        |        |        |                              |        | 5,600  | 6,600   |        |        |        |        |
|                                 | 24.00  | 0.352       | 5.921 | 5.796 |       | 6.937             | Colapso                  | psi            | 4,560 | 4,560 | 5,080 | 5,760 | 5,760 | 6,140  | 6,310 | 6,310  | 6,730  |              | 7,600  | 8,480  | 9,240  | 10,190                       | 5,760  | 6,310  | 8,490   | 6,730  |        |        |        |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        | 382   | 382   | 451   | 555   | 555   | 624    | 659   | 659    | 763    |              | 555    | 659    | 763    | 971                          | 555    | 659    | 659     | 763    |        |        |        |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            | 5,110 | 5,110 | 6,040 | 7,440 | 7,440 | 8,370  | 8,830 | 8,830  | 10,230 |              | 7,440  | 8,830  | 10,230 | 13,017                       | 7,440  | 8,830  | 8,830   | 10,230 |        |        |        |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            | 4,700 | 4,700 | 5,500 | 6,800 | 6,800 | 7,700  | 8,100 | 8,100  | 9,400  |              | 6,800  | 8,100  | 9,400  | 10,000                       | 6,800  | 8,100  | 8,100   | 9,600  |        |        |        |
|                                 | 28.00  | 0.417       | 5.791 | 5.666 |       | 8.133             | Colapso                  | psi            |       |       |       |       |       | 7,010  | 8,170 | 8,170  | 8,880  | 9,220        | 9,220  | 10,160 |        | 9,590                        | 10,980 | 12,850 | 14,230  | 8,170  | 9,220  | 10,990 | 10,160 |
|                                 |        |             |       |       |       |                   | Tensión                  | lbx1000        |       |       |       |       |       | 529    | 651   | 651    | 732    | 773          | 773    | 895    |        | 651                          | 773    | 895    | 1,139   | 651    | 773    | 773    | 895    |
|                                 |        |             |       |       |       |                   | P. Interna               | psi            |       |       |       |       |       | 7,160  | 8,810 | 8,810  | 9,910  | 10,460       | 10,460 | 12,120 |        | 8,810                        | 10,460 | 12,120 | 15,421  | 8,810  | 10,460 | 10,460 | 12,120 |
|                                 |        |             |       |       |       |                   | P. Prueba                | psi            |       |       |       |       |       | 6,500  | 8,100 | 8,100  | 9,100  | 10,000       | 10,000 | 10,000 |        | 8,100                        | 10,000 | 11,080 | 10,000  | 8,100  | 10,000 | 10,000 | 10,000 |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |             |                   | PROPIEDADES MECANICAS | GRADO DE ACERO |        |        |        |        |        |        |        |              |        |        |        |                           |        |        |        |        |         |        |
|--------------|--------|-------------|-------|-------|-------------|-------------------|-----------------------|----------------|--------|--------|--------|--------|--------|--------|--------|--------------|--------|--------|--------|---------------------------|--------|--------|--------|--------|---------|--------|
|              |        | ESP.        | D.I.  | DRIFT | DRIFT       | AREA              |                       | API            |        |        |        |        |        |        |        | ALTO COLAPSO |        |        |        | RESISTENTE A LA CORROSION |        |        |        |        |         |        |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg        | pulg <sup>2</sup> |                       | H40            | J55    | K55    | M65    | L80    | N80    | C90    | C95    | T95          | P110   | Q125   | TAC80  | TAC95                     | TAC110 | TAC140 | TRC80  | TRC95  | TRC95HC | TRC110 |
| <b>6 5/8</b> | 32.00  | 0.475       | 5.675 | 5.550 | 9.177       | Colapso psi       |                       | 10,320         | 10,320 | 11,330 | 11,820 | 11,820 | 13,220 | 14,540 | 11,240 | 13,250       | 15,360 | 17,570 | 10,320 | 11,820                    | 13,270 | 13,220 | 734    | 872    | 872     | 1,010  |
|              |        |             |       |       |             |                   |                       | 734            | 734    | 826    | 872    | 872    | 1,010  | 1,147  | 734    | 872          | 1,010  | 1,285  | 734    | 872                       | 872    | 1,010  |        |        |         |        |
|              |        |             |       |       |             |                   |                       | 10,040         | 10,040 | 11,290 | 11,920 | 11,920 | 13,800 | 15,680 | 10,040 | 11,920       | 13,800 | 17,570 | 10,040 | 11,920                    | 11,920 | 13,800 |        |        |         |        |
|              |        |             |       |       |             |                   |                       | 9,200          | 9,200  | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000       | 10,000 | 10,000 | 10,000 | 10,000                    | 10,000 | 9,200  | 10,000 | 10,000 | 10,000  |        |
| <b>5 1/2</b> | 14.00  | 0.244       | 5.012 | 4.887 | 4.029       | Colapso psi       |                       | 2,620          | 3,120  | 3,120  | 3,360  |        |        |        |        |              |        |        |        |                           |        |        | 3,620  | 3,970  |         |        |
|              |        |             |       |       |             |                   |                       | 161            | 222    | 222    | 262    |        |        |        |        |              |        |        |        |                           |        |        | 322    | 383    |         |        |
|              |        |             |       |       |             |                   |                       | 3,110          | 4,270  | 4,270  | 5,050  |        |        |        |        |              |        |        |        |                           |        |        | 6,210  | 7,380  |         |        |
|              |        |             |       |       |             |                   |                       | 2,800          | 3,900  | 3,900  | 4,600  |        |        |        |        |              |        |        |        |                           |        |        | 5,700  | 6,700  |         |        |
| <b>15.50</b> | 0.275  | 4.950       | 4.825 | 4.514 | Colapso psi |                   |                       | 4,040          | 4,040  | 4,470  |        |        |        |        |        |              |        |        |        |                           |        |        | 4,990  | 5,380  |         |        |
|              |        |             |       |       |             |                   |                       | 248            | 248    | 293    |        |        |        |        |        |              |        |        |        |                           |        |        | 361    | 429    |         |        |
|              |        |             |       |       |             |                   |                       | 4,810          | 4,810  | 5,690  |        |        |        |        |        |              |        |        |        |                           |        |        | 7,000  | 8,310  |         |        |
|              |        |             |       |       |             |                   |                       | 4,400          | 4,400  | 5,200  |        |        |        |        |        |              |        |        |        |                           |        |        | 6,400  | 7,600  |         |        |
| <b>17.00</b> | 0.304  | 4.892       | 4.767 | 4.962 | Colapso psi |                   |                       | 4,910          | 4,910  | 5,500  | 6,290  | 6,290  | 6,740  | 6,940  | 6,940  | 7,480        |        |        |        |                           |        |        | 6,290  | 6,940  | 8,990   | 7,480  |
|              |        |             |       |       |             |                   |                       | 273            | 273    | 323    | 397    | 397    | 447    | 471    | 471    | 546          |        |        |        |                           |        |        | 397    | 471    | 546     | 695    |
|              |        |             |       |       |             |                   |                       | 5,320          | 5,320  | 6,290  | 7,740  | 7,740  | 8,710  | 9,190  | 9,190  | 10,640       |        |        |        |                           |        |        | 7,740  | 9,190  | 10,640  | 13,540 |
|              |        |             |       |       |             |                   |                       | 4,900          | 4,900  | 5,700  | 7,100  | 7,100  | 8,000  | 8,400  | 8,400  | 9,700        |        |        |        |                           |        |        | 7,100  | 8,400  | 9,700   | 10,000 |

| TUBO DE REVESTIMIENTO<br>CASING |        |             |       | FLUENCIA | Kpsi  | 40                       | 55             | 55      | 65  | 80  | 80    | 90     | 95     | 95     | 110    | 125    | 80           | 95     | 110    | 140    | 80                           | 95     | 95     | 110     |        |        |
|---------------------------------|--------|-------------|-------|----------|-------|--------------------------|----------------|---------|-----|-----|-------|--------|--------|--------|--------|--------|--------------|--------|--------|--------|------------------------------|--------|--------|---------|--------|--------|
| D.E.                            | PESO   | DIMENSIONES |       |          |       | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |         |     |     |       |        |        |        |        |        |              |        |        |        |                              |        |        |         |        |        |
|                                 |        | ESP.        | D.I.  | DRIFT    | DRIFT | AREA                     | API            |         |     |     |       |        |        |        |        |        | ALTO COLAPSO |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |         |        |        |
| pulg                            | lb/pie | pulg        | pulg  | pulg     | pulg  | pulg <sup>2</sup>        | H40            | J55     | K55 | M65 | L80   | N80    | C90    | C95    | T95    | P110   | Q125         | TAC80  | TAC95  | TAC110 | TAC140                       | TRC80  | TRC95  | TRC95HC | TRC110 |        |
| 5 1/2                           | 20.00  | 0.361       | 4.778 | 4.653    |       | 5.828                    | Colapso        | psi     |     |     | 7,540 | 8,830  | 8,830  | 9,630  | 10,020 | 10,020 | 11,100       |        | 10,130 | 11,690 | 13,840                       | 15,280 | 8,830  | 10,020  | 11,700 | 11,100 |
|                                 |        |             |       |          |       |                          | Tensión        | lbx1000 |     |     | 379   | 466    | 466    | 525    | 554    | 554    | 641          |        | 466    | 554    | 641                          | 816    | 466    | 554     | 554    | 641    |
|                                 |        |             |       |          |       |                          | P. Interna     | psi     |     |     | 7,470 | 9,190  | 9,190  | 10,340 | 10,910 | 10,910 | 12,640       |        | 9,190  | 10,910 | 12,640                       | 16,080 | 9,190  | 10,910  | 10,910 | 12,640 |
|                                 |        |             |       |          |       |                          | P. Prueba      | psi     |     |     | 6,800 | 8,400  | 8,400  | 9,500  | 10,000 | 10,000 | 10,000       |        | 8,400  | 10,000 | 10,000                       | 10,000 | 8,400  | 10,000  | 10,000 | 10,000 |
|                                 | 23.00  | 0.415       | 4.670 | 4.545    |       | 6.630                    | Colapso        | psi     |     |     | 9,070 | 11,160 | 11,160 | 12,380 | 12,930 | 12,930 | 14,540       | 16,060 | 11,920 | 14,250 | 16,330                       | 19,000 | 11,160 | 12,930  | 14,250 | 14,540 |
|                                 |        |             |       |          |       |                          | Tensión        | lbx1000 |     |     | 431   | 530    | 530    | 597    | 630    | 630    | 729          | 829    | 530    | 630    | 729                          | 928    | 530    | 630     | 630    | 729    |
|                                 |        |             |       |          |       |                          | P. Interna     | psi     |     |     | 8,580 | 10,560 | 10,560 | 11,880 | 12,540 | 12,540 | 14,530       | 16,510 | 10,560 | 12,540 | 14,530                       | 18,490 | 10,560 | 12,540  | 12,540 | 14,530 |
|                                 |        |             |       |          |       |                          | P. Prueba      | psi     |     |     | 7,800 | 9,700  | 9,700  | 10,000 | 10,000 | 10,000 | 10,000       | 10,000 | 9,700  | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000  | 10,000 | 10,000 |
|                                 | 26.80  | 0.500       | 4.500 | 4.375    |       | 7.854                    | Colapso        | psi     |     |     |       |        | 14,880 |        |        | 15,700 |              |        |        |        |                              |        |        |         |        |        |
|                                 |        |             |       |          |       |                          | Tensión        | lbx1000 |     |     |       |        | 707    |        |        | 746    |              |        |        |        |                              |        |        |         |        |        |
|                                 |        |             |       |          |       |                          | P. Interna     | psi     |     |     |       |        | 14,320 |        |        | 15,700 |              |        |        |        |                              |        |        |         |        |        |
|                                 |        |             |       |          |       |                          | P. Prueba      | psi     |     |     |       |        | 10,000 |        |        | 10,000 |              |        |        |        |                              |        |        |         |        |        |
|                                 | 29.70  | 0.562       | 4.375 | 4.251    |       | 8.718                    | Colapso        | psi     |     |     |       |        | 16,510 |        |        | 17,430 |              |        |        |        |                              |        |        |         |        |        |
|                                 |        |             |       |          |       |                          | Tensión        | lbx1000 |     |     |       |        | 785    |        |        | 828    |              |        |        |        |                              |        |        |         |        |        |
|                                 |        |             |       |          |       |                          | P. Interna     | psi     |     |     |       |        | 16,090 |        |        | 16,990 |              |        |        |        |                              |        |        |         |        |        |
|                                 |        |             |       |          |       |                          | P. Prueba      | psi     |     |     |       |        | 10,000 |        |        | 10,000 |              |        |        |        |                              |        |        |         |        |        |

**TUBO DE REVESTIMIENTO**  
**CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |        |                   | PROPIEDADES MECANICAS | GRADO DE ACERO |        |     |     |     |     |     |     |              |        |      |                           | ALTO COLAPSO |        |        | RESISTENTE A LA CORROSION |       |         |        |  |
|--------------|--------|-------------|-------|-------|--------|-------------------|-----------------------|----------------|--------|-----|-----|-----|-----|-----|-----|--------------|--------|------|---------------------------|--------------|--------|--------|---------------------------|-------|---------|--------|--|
|              |        | ESP.        | D.I.  | DRIFT | DRIFT  | AREA              |                       | API            |        |     |     |     |     |     |     | ALTO COLAPSO |        |      | RESISTENTE A LA CORROSION |              |        |        |                           |       |         |        |  |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg   | pulg <sup>2</sup> |                       | H40            | J55    | K55 | M65 | L80 | N80 | C90 | C95 | T95          | P110   | Q125 | TAC80                     | TAC95        | TAC110 | TAC140 | TRC80                     | TRC95 | TRC95HC | TRC110 |  |
| <b>5 1/2</b> | 32.60  | 0.625       | 4.250 | 4.125 | 9.572  |                   | Colapso               | psi            | 18,130 |     |     |     |     |     |     |              | 19,140 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        | 861    |     |     |     |     |     |     |              | 909    |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Interna            | psi            | 17,900 |     |     |     |     |     |     |              | 18,890 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Prueba             | psi            | 10,000 |     |     |     |     |     |     |              | 10,000 |      |                           |              |        |        |                           |       |         |        |  |
|              | 35.30  | 0.687       | 4.126 | 4.001 | 10.388 |                   | Colapso               | psi            | 19,680 |     |     |     |     |     |     |              | 20,770 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        | 935    |     |     |     |     |     |     |              | 987    |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Interna            | psi            | 19,670 |     |     |     |     |     |     |              | 20,770 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Prueba             | psi            | 10,000 |     |     |     |     |     |     |              | 10,000 |      |                           |              |        |        |                           |       |         |        |  |
|              | 38.00  | 0.750       | 4.000 | 3.875 | 11.192 |                   | Colapso               | psi            | 21,200 |     |     |     |     |     |     |              | 22,380 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        | 1,007  |     |     |     |     |     |     |              | 1,063  |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Interna            | psi            | 21,480 |     |     |     |     |     |     |              | 22,670 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Prueba             | psi            | 10,000 |     |     |     |     |     |     |              | 10,000 |      |                           |              |        |        |                           |       |         |        |  |
|              | 40.50  | 0.812       | 3.876 | 3.751 | 11.959 |                   | Colapso               | psi            | 22,650 |     |     |     |     |     |     |              | 23,910 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | Tensión               | lbx1000        | 1,076  |     |     |     |     |     |     |              | 1,136  |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Interna            | psi            | 23,250 |     |     |     |     |     |     |              | 24,540 |      |                           |              |        |        |                           |       |         |        |  |
|              |        |             |       |       |        |                   | P. Prueba             | psi            | 10,000 |     |     |     |     |     |     |              | 10,000 |      |                           |              |        |        |                           |       |         |        |  |

| TUBO DE REVESTIMIENTO<br>CASING |        |             | FLUENCIA | Kpsi  | 40    | 55                | 55                       | 65             | 80    | 80    | 90    | 95    | 95    | 110    | 125   | 80           | 95     | 110  | 140                          | 80                           | 95     | 95     | 110    |       |         |        |        |
|---------------------------------|--------|-------------|----------|-------|-------|-------------------|--------------------------|----------------|-------|-------|-------|-------|-------|--------|-------|--------------|--------|------|------------------------------|------------------------------|--------|--------|--------|-------|---------|--------|--------|
| D.E.                            | PESO   | DIMENSIONES |          |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |       |       |       |       |       |        |       |              |        |      |                              | RESISTENTE<br>A LA CORROSION |        |        |        |       |         |        |        |
|                                 |        | ESP.        | D.I.     | DRIFT | DRIFT | AREA              |                          | API            |       |       |       |       |       |        |       | ALTO COLAPSO |        |      | RESISTENTE<br>A LA CORROSION |                              |        |        |        |       |         |        |        |
| pulg                            | lb/pie | pulg        | pulg     | pulg  | pulg  | pulg <sup>2</sup> |                          | H40            | J55   | K55   | M65   | L80   | N80   | C90    | C95   | T95          | P110   | Q125 | TAC80                        | TAC95                        | TAC110 | TAC140 | TRC80  | TRC95 | TRC95HC | TRC110 |        |
| 5 1/2                           | 43.10  | 0.875       | 3.750    | 3.625 |       | 12.714            | Colapso                  | psi            |       |       |       |       |       | 24,080 |       | 25,420       |        |      |                              |                              |        |        |        |       |         |        |        |
|                                 |        |             |          |       |       |                   | Tensión                  | lbx1000        |       |       |       |       |       |        | 1,144 |              | 1,208  |      |                              |                              |        |        |        |       |         |        |        |
|                                 |        |             |          |       |       |                   | P. Interna               | psi            |       |       |       |       |       | 25,060 |       | 26,450       |        |      |                              |                              |        |        |        |       |         |        |        |
|                                 |        |             |          |       |       |                   | P. Prueba                | psi            |       |       |       |       |       | 10,000 |       | 10,000       |        |      |                              |                              |        |        |        |       |         |        |        |
| 5                               | 11.50  | 0.220       | 4.560    | 4.435 |       | 3.304             | Colapso                  | psi            | 3,060 | 3,060 | 3,290 |       |       |        |       |              |        |      |                              |                              |        |        | 3,560  | 3,900 |         |        |        |
|                                 |        |             |          |       |       |                   | Tensión                  | lbx1000        | 182   | 182   | 215   |       |       |        |       |              |        |      |                              |                              |        |        |        | 264   | 314     |        |        |
|                                 |        |             |          |       |       |                   | P. Interna               | psi            | 4,240 | 4,240 | 5,010 |       |       |        |       |              |        |      |                              |                              |        |        |        | 6,160 | 7,320   |        |        |
|                                 |        |             |          |       |       |                   | P. Prueba                | psi            | 3,900 | 3,900 | 4,600 |       |       |        |       |              |        |      |                              |                              |        |        |        | 5,600 | 6,700   |        |        |
|                                 | 13.00  | 0.253       | 4.494    | 4.369 |       | 3.773             | Colapso                  | psi            | 4,140 | 4,140 | 4,590 |       |       |        |       |              |        |      |                              |                              |        |        |        | 5,140 | 5,560   |        |        |
|                                 |        |             |          |       |       |                   | Tensión                  | lbx1000        | 208   | 208   | 245   |       |       |        |       |              |        |      |                              |                              |        |        |        | 302   | 358     |        |        |
|                                 |        |             |          |       |       |                   | P. Interna               | psi            | 4,870 | 4,870 | 5,760 |       |       |        |       |              |        |      |                              |                              |        |        |        | 7,080 | 8,410   |        |        |
|                                 |        |             |          |       |       |                   | P. Prueba                | psi            | 4,500 | 4,500 | 5,300 |       |       |        |       |              |        |      |                              |                              |        |        |        | 6,500 | 7,700   |        |        |
|                                 | 15.00  | 0.296       | 4.408    | 4.283 |       | 4.374             | Colapso                  | psi            | 5,560 | 5,560 | 6,280 | 7,250 | 7,250 | 7,830  | 8,110 | 8,110        | 8,850  |      |                              | 8,870                        | 10,020 | 11,490 | 12,770 | 7,250 | 8,110   | 10,020 | 8,850  |
|                                 |        |             |          |       |       |                   | Tensión                  | lbx1000        | 241   | 241   | 284   | 350   | 350   | 394    | 416   | 416          | 481    |      |                              | 350                          | 416    | 481    | 612    | 350   | 416     | 416    | 481    |
|                                 |        |             |          |       |       |                   | P. Interna               | psi            | 5,700 | 5,700 | 6,730 | 8,290 | 8,290 | 9,320  | 9,840 | 9,840        | 11,400 |      |                              | 8,290                        | 9,840  | 11,400 | 14,500 | 8,290 | 9,840   | 9,840  | 11,400 |
|                                 |        |             |          |       |       |                   | P. Prueba                | psi            | 5,200 | 5,200 | 6,200 | 7,600 | 7,600 | 8,500  | 9,000 | 9,000        | 10,000 |      |                              | 7,600                        | 9,000  | 10,000 | 10,000 | 7,900 | 9,000   | 9,000  | 10,000 |

|   |                    |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|---|--------------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| <b>TUBO DE REVESTIMIENTO<br/>CASING</b> | <b>FLUENCIA</b>    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
|   | <b>RESISTENCIA</b> | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| TUBO DE REVESTIMIENTO<br>CASING |        |             |       |       |       | FLUENCIA          | Kpsi                     | 40              | 55    | 55    | 65    | 80    | 80     | 90     | 95     | 95     | 110    | 125          | 80    | 95    | 110    | 140                          | 80    | 95     | 95      | 110    |        |
|---------------------------------|--------|-------------|-------|-------|-------|-------------------|--------------------------|-----------------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------------|-------|-------|--------|------------------------------|-------|--------|---------|--------|--------|
| D.E.                            | PESO   | DIMENSIONES |       |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO  |       |       |       |       |        |        |        |        |        |              |       |       |        |                              |       |        |         |        |        |
|                                 |        | ESP.        | D.I.  | DRIFT | DRIFT | AREA              |                          | API             |       |       |       |       |        |        |        |        |        | ALTO COLAPSO |       |       |        | RESISTENTE<br>A LA CORROSION |       |        |         |        |        |
| pulg                            | lb/pie | pulg        | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                          | H40             | J55   | K55   | M65   | L80   | N80    | C90    | C95    | T95    | P110   | Q125         | TAC80 | TAC95 | TAC110 | TAC140                       | TRC80 | TRC95  | TRC95HC | TRC110 |        |
| 4 1/2                           | 9.50   | 0.205       | 4.090 | 3.965 |       | 2.766             | Colapso psi              | 2,760           | 3,310 | 3,310 | 3,600 |       |        |        |        |        |        |              |       |       |        |                              | 3,900 | 4,200  |         |        |        |
|                                 |        |             |       |       |       |                   |                          | Tensión lbx1000 | 111   | 152   | 152   | 180   |        |        |        |        |        |              |       |       |        |                              |       | 221    | 263     |        |        |
|                                 |        |             |       |       |       |                   |                          | P. Interna psi  | 3,190 | 4,380 | 4,380 | 5,180 |        |        |        |        |        |              |       |       |        |                              |       | 6,380  | 7,570   |        |        |
|                                 |        |             |       |       |       |                   |                          | P. Prueba psi   | 2,900 | 4,000 | 4,000 | 4,700 |        |        |        |        |        |              |       |       |        |                              |       | 5,800  | 6,900   |        |        |
| 5                               | 10.50  | 0.224       | 4.052 | 3.927 |       | 3.009             | Colapso psi              | 4,010           | 4,010 | 4,430 |       |       |        |        |        |        |        |              |       |       |        |                              |       | 4,940  | 5,310   |        |        |
|                                 |        |             |       |       |       |                   |                          | Tensión lbx1000 | 166   | 166   | 196   |       |        |        |        |        |        |              |       |       |        |                              |       | 241    | 286     |        |        |
|                                 |        |             |       |       |       |                   |                          | P. Interna psi  | 4,790 | 4,790 | 5,660 |       |        |        |        |        |        |              |       |       |        |                              |       | 6,970  | 8,280   |        |        |
|                                 |        |             |       |       |       |                   |                          | P. Prueba psi   | 4,400 | 4,400 | 5,200 |       |        |        |        |        |        |              |       |       |        |                              |       | 6,400  | 7,600   |        |        |
| 6                               | 11.60  | 0.250       | 4.000 | 3.875 |       | 3.338             | Colapso psi              | 4,960           | 4,960 | 5,560 | 6,350 | 6,350 | 6,820  | 7,030  | 7,030  | 7,580  |        |              |       |       |        |                              |       | 8,140  | 9,070   | 10,130 | 11,260 |
|                                 |        |             |       |       |       |                   |                          | Tensión lbx1000 | 184   | 184   | 217   | 267   | 267    | 300    | 317    | 317    | 367    |              |       |       |        |                              |       | 267    | 317     | 367    | 467    |
|                                 |        |             |       |       |       |                   |                          | P. Interna psi  | 5,350 | 5,350 | 6,320 | 7,780 | 7,780  | 8,750  | 9,240  | 9,240  | 10,690 |              |       |       |        |                              |       | 7,780  | 9,240   | 10,690 | 13,610 |
|                                 |        |             |       |       |       |                   |                          | P. Prueba psi   | 4,900 | 4,900 | 5,800 | 7,100 | 7,100  | 8,000  | 8,400  | 8,400  | 9,800  |              |       |       |        |                              |       | 7,100  | 8,400   | 9,800  | 10,000 |
| 7                               | 13.50  | 0.290       | 3.920 | 3.795 |       | 3.836             | Colapso psi              |                 |       | 7,310 | 8,540 | 8,540 | 9,300  | 9,660  | 9,660  | 10,690 |        |              |       |       |        |                              |       | 9,890  | 11,390  | 13,410 | 14,840 |
|                                 |        |             |       |       |       |                   |                          | Tensión lbx1000 |       | 249   | 307   | 307   | 345    | 364    | 364    | 422    |        |              |       |       |        |                              | 307   | 364    | 422     | 537    |        |
|                                 |        |             |       |       |       |                   |                          | P. Interna psi  |       | 7,330 | 9,020 | 9,020 | 10,150 | 10,710 | 10,710 | 12,410 |        |              |       |       |        |                              | 9,020 | 10,710 | 12,410  | 15,790 |        |
|                                 |        |             |       |       |       |                   |                          | P. Prueba psi   |       |       | 6,700 | 8,200 | 8,200  | 9,300  | 9,800  | 9,800  | 10,000 |              |       |       |        |                              |       | 8,200  | 9,300   | 9,800  | 10,000 |

**TUBO DE REVESTIMIENTO  
CASING**

|             |      |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |    |     |     |     |
|-------------|------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 55 | 65 | 80 | 80  | 90  | 95  | 95  | 110 | 125 | 80  | 95  | 110 | 140 | 80 | 95  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 85 | 95 | 100 | 100 | 105 | 105 | 125 | 135 | 100 | 110 | 125 | 150 | 95 | 105 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |     |     |     |        |        |     |     |              |        |        |        | ALTO COLAPSO                 |        |        |        | RESISTENTE<br>A LA CORROSION |         |        |  |
|--------------|--------|-------------|-------|-------|-------|-------------------|--------------------------|----------------|-----|-----|-----|--------|--------|-----|-----|--------------|--------|--------|--------|------------------------------|--------|--------|--------|------------------------------|---------|--------|--|
|              |        | ESP.        | D.I.  | DRIFT | DRIFT | AREA              |                          | API            |     |     |     |        |        |     |     | ALTO COLAPSO |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |        | RESISTENTE<br>A LA CORROSION |         |        |  |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                          | H40            | J55 | K55 | M65 | L80    | N80    | C90 | C95 | T95          | P110   | Q125   | TAC80  | TAC95                        | TAC110 | TAC140 | TRC80  | TRC95                        | TRC95HC | TRC110 |  |
| <b>4 1/2</b> | 15.10  | 0.337       | 3.826 | 3.701 |       | 4.407             | Colapso psi              |                |     |     |     | 11,090 | 11,090 |     |     |              | 14,340 | 15,830 | 11,820 | 14,100                       | 16,180 | 18,790 | 11,080 | 12,760                       | 14,100  | 14,340 |  |
|              |        |             |       |       |       |                   | Tensión lbx1000          |                |     |     |     | 353    | 353    |     |     |              | 485    | 551    | 353    | 419                          | 485    | 617    | 353    | 419                          | 419     | 485    |  |
|              |        |             |       |       |       |                   | P. Interna psi           |                |     |     |     | 10,480 | 10,480 |     |     |              | 14,420 | 16,380 | 10,480 | 12,450                       | 14,420 | 18,350 | 10,480 | 12,450                       | 12,450  | 14,420 |  |
|              |        |             |       |       |       |                   | P. Prueba psi            |                |     |     |     | 9,600  | 9,600  |     |     |              | 10,000 | 10,000 | 10,000 | 10,000                       | 10,000 | 10,000 | 9,600  | 10,000                       | 10,000  | 10,000 |  |

TUBO DE PRODUCCIÓN

**TUBO DE PRODUCCION**
**TUBING**

|                    |      |    |    |    |     |     |     |     |    |     |     |     |     |
|--------------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| <b>FLUENCIA</b>    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| <b>RESISTENCIA</b> | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E.         | PESO  | DIMENSIONES |        |       |             | PROPIEDADES MECANICAS | GRADO DE ACERO |       |        |       |        |                           |        |        | RESISTENTE A LA CORROSION |        |        |        |
|--------------|-------|-------------|--------|-------|-------------|-----------------------|----------------|-------|--------|-------|--------|---------------------------|--------|--------|---------------------------|--------|--------|--------|
|              |       | ESP.        | D.I.   | DRIFT | AREA TRANS. |                       | API            |       |        |       |        | RESISTENTE A LA CORROSION |        |        |                           |        |        |        |
|              |       | pulg        | lb/pie | pulg  | pulg        |                       | H40            | J55   | L80    | N80   | C90    | T95                       | P110   | TRC80  | TRC85                     | TRC90  | TRC95  | TRC110 |
| <b>4 1/2</b> | 12.60 | 0.271       | 3.958  | 3.833 | 3.600       | Colapso psi           | 4,490          | 5,730 | 7,500  | 7,500 | 8,120  | 8,410                     | 9,200  | 7,500  | 7,820                     | 8,120  | 8,410  |        |
|              | NU    |             |        |       |             | Tensión lbx1000       | 144            | 198   | 288    | 288   | 324    | 342                       | 396    | 288    | 306                       | 324    | 342    |        |
|              | 12.75 |             |        |       |             | P. Interna psi        | 4,220          | 5,800 | 8,430  | 8,430 | 9,490  | 10,010                    | 11,600 | 8,430  | 8,960                     | 9,490  | 10,010 |        |
|              | EU    |             |        |       |             | P. Prueba psi         | 3,900          | 5,300 | 7,700  | 7,700 | 8,700  | 9,200                     | 10,000 | 7,700  | 8,200                     | 8,700  | 9,200  |        |
|              | 15.20 | 0.337       | 3.826  | 3.701 | 4.407       | Colapso psi           |                |       | 11,080 |       | 12,220 | 12,760                    |        | 11,080 | 11,670                    | 12,220 | 12,760 | 14,340 |
|              |       |             |        |       |             | Tensión lbx1000       |                |       | 353    |       | 397    | 419                       |        | 353    | 375                       | 397    | 419    | 485    |
|              |       |             |        |       |             | P. Interna psi        |                |       | 10,480 |       | 11,800 | 12,450                    |        | 10,480 | 11,140                    | 11,800 | 12,450 | 14,416 |
|              |       |             |        |       |             | P. Prueba psi         |                |       | 9,600  |       | 10,000 | 10,000                    |        | 9,600  | 10,000                    | 10,000 | 10,000 | 10,000 |
|              | 17.00 | 0.380       | 3.740  | 3.615 | 4.918       | Colapso psi           |                |       | 12,370 |       | 13,920 | 14,690                    |        | 12,370 | 13,140                    | 13,920 | 14,690 | 17,010 |
|              |       |             |        |       |             | Tensión lbx1000       |                |       | 393    |       | 443    | 467                       |        | 393    | 418                       | 443    | 467    | 541    |
|              |       |             |        |       |             | P. Interna psi        |                |       | 11,820 |       | 13,300 | 14,040                    |        | 11,820 | 12,560                    | 13,300 | 14,040 | 16,260 |
|              |       |             |        |       |             | P. Prueba psi         |                |       | 10,000 |       | 10,000 | 10,000                    |        | 10,000 | 10,000                    | 10,000 | 10,000 | 10,000 |
|              | 18.90 | 0.430       | 3.640  | 3.515 | 5.498       | Colapso psi           |                |       | 13,830 |       | 15,560 | 16,420                    |        | 13,830 | 14,690                    | 15,560 | 16,420 | 19,010 |
|              |       |             |        |       |             | Tensión lbx1000       |                |       | 440    |       | 495    | 522                       |        | 440    | 467                       | 495    | 522    | 605    |
|              |       |             |        |       |             | P. Interna psi        |                |       | 13,380 |       | 15,050 | 15,890                    |        | 13,380 | 14,210                    | 15,050 | 15,890 | 18,390 |
|              |       |             |        |       |             | P. Prueba psi         |                |       | 10,000 |       | 10,000 | 10,000                    |        | 10,000 | 10,000                    | 10,000 | 10,000 | 10,000 |

**TUBO DE PRODUCCION**  
**TUBING**

|             |      |    |    |    |     |     |     |     |    |     |     |     |     |
|-------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |                   | PROPIEDADES MECANICAS | GRADO DE ACERO |       |       |        |        |                           |       |        |        |        |        |        |
|--------------|--------|-------------|-------|-------|-------------------|-----------------------|----------------|-------|-------|--------|--------|---------------------------|-------|--------|--------|--------|--------|--------|
|              |        | ESP.        | D.I.  | DRIFT | AREA TRANS.       |                       | API            |       |       |        |        | RESISTENTE A LA CORROSION |       |        |        |        |        |        |
|              |        |             |       |       |                   |                       | H40            | J55   | L80   | N80    | C90    | T95                       | P110  | TRC80  | TRC85  | TRC90  | TRC95  | TRC110 |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg <sup>2</sup> |                       |                |       |       |        |        |                           |       |        |        |        |        |        |
| <b>4 1/2</b> | 21.50  | 0.500       | 3.500 | 3.375 | 6.283             | Colapso               | psi            |       |       | 15,800 | 17,780 | 18,770                    |       | 15,800 | 16,790 | 17,780 | 18,770 | 21,730 |
|              |        |             |       |       |                   | Tensión               | lbx1000        |       |       | 503    | 565    | 597                       |       | 503    | 534    | 565    | 597    | 691    |
|              |        |             |       |       |                   | P. Interna            | psi            |       |       | 15,560 | 17,500 | 18,470                    |       | 15,560 | 16,530 | 17,500 | 18,470 | 21,390 |
|              |        |             |       |       |                   | P. Prueba             | psi            |       |       | 10,000 | 10,000 | 10,000                    |       | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
|              | 23.70  | 0.560       | 3.380 | 3.255 | 6.932             | Colapso               | psi            |       |       | 17,430 | 19,610 | 20,700                    |       | 17,430 | 18,520 | 19,610 | 20,700 | 23,970 |
|              |        |             |       |       |                   | Tensión               | lbx1000        |       |       | 555    | 624    | 659                       |       | 555    | 589    | 624    | 659    | 762    |
|              |        |             |       |       |                   | P. Interna            | psi            |       |       | 17,420 | 19,600 | 20,690                    |       | 17,420 | 18,510 | 19,600 | 20,690 | 23,960 |
|              |        |             |       |       |                   | P. Prueba             | psi            |       |       | 10,000 | 10,000 | 10,000                    |       | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
|              | 26.00  | 0.630       | 3.240 | 3.115 | 7.660             | Colapso               | psi            |       |       | 19,260 | 21,670 | 22,880                    |       | 19,260 | 20,470 | 21,670 | 22,880 | 26,490 |
|              |        |             |       |       |                   | Tensión               | lbx1000        |       |       | 613    | 689    | 728                       |       | 613    | 651    | 689    | 728    | 843    |
|              |        |             |       |       |                   | P. Interna            | psi            |       |       | 19,600 | 22,050 | 23,280                    |       | 19,600 | 20,830 | 22,050 | 23,280 | 26,950 |
|              |        |             |       |       |                   | P. Prueba             | psi            |       |       | 10,000 | 10,000 | 10,000                    |       | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| <b>4</b>     | 9.50   | 0.226       | 3.548 | 3.423 | 2.680             | Colapso               | psi            | 4,050 | 5,110 | 6,590  | 6,590  | 7,080                     | 7,310 |        | 6,590  | 6,840  | 7,080  | 7,310  |
|              |        |             |       |       |                   | Tensión               | lbx1000        | 107   | 147   | 214    | 214    | 241                       | 255   |        | 214    | 228    | 241    | 255    |
|              |        |             |       |       |                   | P. Interna            | psi            | 3,960 | 5,440 | 7,910  | 7,910  | 8,900                     | 9,390 |        | 7,910  | 8,400  | 8,900  | 9,390  |
|              |        |             |       |       |                   | P. Prueba             | psi            | 3,600 | 5,000 | 7,200  | 7,200  | 8,100                     | 8,600 |        | 7,200  | 7,700  | 8,100  | 8,600  |

**TUBO DE PRODUCCION**
**TUBING**

|                    |      |    |    |    |     |     |     |     |    |     |     |     |     |
|--------------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| <b>FLUENCIA</b>    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| <b>RESISTENCIA</b> | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E. | PESO  | DIMENSIONES |        |       |             | PROPIEDADES MECANICAS | GRADO DE ACERO |       |        |       |        |                           |      |        | RESISTENTE A LA CORROSION |        |        |        |
|------|-------|-------------|--------|-------|-------------|-----------------------|----------------|-------|--------|-------|--------|---------------------------|------|--------|---------------------------|--------|--------|--------|
|      |       | ESP.        | D.I.   | DRIFT | AREA TRANS. |                       | API            |       |        |       |        | RESISTENTE A LA CORROSION |      |        |                           |        |        |        |
|      |       | pulg        | lb/pie | pulg  | pulg        |                       | H40            | J55   | L80    | N80   | C90    | T95                       | P110 | TRC80  | TRC85                     | TRC90  | TRC95  | TRC110 |
| 4    | 10.70 | 0.262       | 3.476  | 3.351 | 3.077       | Colapso psi           | 4,900          | 6,590 | 8,800  | 8,800 | 9,600  | 9,980                     |      | 8,800  | 9,200                     | 9,600  | 9,980  |        |
|      | NU    |             |        |       |             | Tensión lbx1000       | 123            | 169   | 246    | 246   | 277    | 292                       |      | 246    | 262                       | 277    | 292    |        |
|      | 11.00 |             |        |       |             | P. Interna psi        | 4,590          | 6,300 | 9,170  | 9,170 | 10,320 | 10,890                    |      | 9,170  | 9,740                     | 10,320 | 10,890 |        |
|      | EU    |             |        |       |             | P. Prueba psi         | 4,200          | 5,800 | 8,400  | 8,400 | 9,400  | 10,000                    |      | 8,400  | 8,900                     | 9,400  | 10,000 |        |
|      | 13.20 | 0.330       | 3.340  | 3.215 | 3.805       | Colapso psi           |                |       | 12,110 |       | 13,620 | 14,380                    |      | 12,110 | 12,870                    | 13,620 | 14,380 | 16,650 |
|      |       |             |        |       |             | Tensión lbx1000       |                |       | 304    |       | 342    | 361                       |      | 304    | 323                       | 342    | 361    | 419    |
|      |       |             |        |       |             | P. Interna psi        |                |       | 11,550 |       | 12,990 | 13,720                    |      | 11,550 | 12,270                    | 12,990 | 13,720 | 15,880 |
|      |       |             |        |       |             | P. Prueba psi         |                |       | 10,000 |       | 10,000 | 10,000                    |      | 10,000 | 10,000                    | 10,000 | 10,000 | 10,000 |
|      | 16.10 | 0.415       | 3.170  | 3.045 | 4.674       | Colapso psi           |                |       | 14,880 |       | 16,740 | 17,670                    |      | 14,880 | 15,810                    | 16,740 | 17,670 | 20,460 |
|      |       |             |        |       |             | Tensión lbx1000       |                |       | 374    |       | 421    | 444                       |      | 374    | 397                       | 421    | 444    | 514    |
|      |       |             |        |       |             | P. Interna psi        |                |       | 14,530 |       | 16,340 | 17,250                    |      | 14,530 | 15,430                    | 16,340 | 17,250 | 19,970 |
|      |       |             |        |       |             | P. Prueba psi         |                |       | 10,000 |       | 10,000 | 10,000                    |      | 10,000 | 10,000                    | 10,000 | 10,000 | 10,000 |
|      | 18.90 | 0.500       | 3.000  | 2.875 | 5.498       | Colapso psi           |                |       | 17,500 |       | 19,690 | 20,780                    |      | 17,500 | 18,590                    | 19,690 | 20,780 | 24,060 |
|      |       |             |        |       |             | Tensión lbx1000       |                |       | 440    |       | 495    | 522                       |      | 440    | 467                       | 495    | 522    | 605    |
|      |       |             |        |       |             | P. Interna psi        |                |       | 17,500 |       | 19,690 | 20,780                    |      | 17,500 | 18,590                    | 19,690 | 20,780 | 24,060 |
|      |       |             |        |       |             | P. Prueba psi         |                |       | 10,000 |       | 10,000 | 10,000                    |      | 10,000 | 10,000                    | 10,000 | 10,000 | 10,000 |

**TUBO DE PRODUCCION**  
**TUBING**

|             |      |    |    |    |     |     |     |     |    |     |     |     |     |
|-------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |       |        |        |        |                              |        |        |        |        |        |        |        |
|--------------|--------|-------------|-------|-------|-------------------|--------------------------|----------------|-------|--------|--------|--------|------------------------------|--------|--------|--------|--------|--------|--------|--------|
|              |        | ESP.        | D.I.  | DRIFT | AREA<br>TRANS.    |                          | API            |       |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |        |        |        |        |        |
|              |        |             |       |       |                   |                          | H40            | J55   | L80    | N80    | C90    | T95                          | P110   | TRC80  |        |        |        |        |        |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg <sup>2</sup> |                          |                |       |        |        |        |                              |        | TRC85  |        |        |        |        |        |
| <b>4</b>     | 22.20  | 0.610       | 2.780 | 2.655 | 6,496             | Colapso                  | psi            |       | 20,680 | 20,680 | 23,260 | 24,560                       |        | 20,680 | 21,970 | 23,260 | 24,560 | 28,430 |        |
|              |        |             |       |       |                   | Tensión                  | lbx1000        |       | 520    | 520    | 585    | 617                          |        | 520    | 552    | 585    | 617    | 715    |        |
|              |        |             |       |       |                   | P. Interna               | psi            |       | 21,350 | 21,350 | 24,020 | 25,350                       |        | 21,350 | 22,680 | 24,020 | 25,350 | 29,360 |        |
|              |        |             |       |       |                   | P. Prueba                | psi            |       | 10,000 | 10,000 | 10,000 | 10,000                       |        | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |        |
| <b>3 1/2</b> | 7.70   | 0.216       | 3.068 | 2.943 | 2.228             | Colapso                  | psi            | 4,630 | 5,970  | 7,870  | 7,870  | 8,540                        | 8,850  |        | 7,870  | 8,210  | 8,540  | 8,850  |        |
|              |        |             |       |       |                   | Tensión                  | lbx1000        | 89    | 123    | 178    | 178    | 201                          | 212    |        | 178    | 189    | 201    | 212    |        |
|              |        |             |       |       |                   | P. Interna               | psi            | 4,320 | 5,940  | 8,640  | 8,640  | 9,720                        | 10,260 |        | 8,640  | 9,180  | 9,720  | 10,260 |        |
|              |        |             |       |       |                   | P. Prueba                | psi            | 3,900 | 5,400  | 7,900  | 7,900  | 8,900                        | 9,400  |        | 7,900  | 8,400  | 8,900  | 9,400  |        |
| <b>9.20</b>  | 0.254  | 2.992       | 2.867 | 2.590 |                   | Colapso                  | psi            | 5,380 | 7,400  | 10,540 | 10,540 | 11,570                       | 12,080 | 13,530 | 10,540 | 11,060 | 11,570 | 12,080 | 13,530 |
|              |        |             |       |       |                   | Tensión                  | lbx1000        | 104   | 142    | 207    | 207    | 233                          | 246    | 285    | 207    | 220    | 233    | 246    | 285    |
| <b>9.30</b>  |        |             |       |       |                   | P. Interna               | psi            | 5,080 | 6,990  | 10,160 | 10,160 | 11,430                       | 12,070 | 13,970 | 10,160 | 10,800 | 11,430 | 12,070 | 13,970 |
|              |        |             |       |       |                   | P. Prueba                | psi            | 4,600 | 6,400  | 9,300  | 9,300  | 10,000                       | 10,000 | 10,000 | 9,300  | 9,900  | 10,000 | 10,000 | 10,000 |
| <b>10.20</b> | 0.289  | 2.922       | 2.797 | 2.915 |                   | Colapso                  | psi            | 6,060 | 8,330  | 12,120 | 12,120 | 13,640                       | 14,390 |        | 12,120 | 12,880 | 13,640 | 14,390 | 16,670 |
|              |        |             |       |       |                   | Tensión                  | lbx1000        | 117   | 160    | 233    | 233    | 262                          | 277    |        | 233    | 248    | 262    | 277    | 320    |
|              |        |             |       |       |                   | P. Interna               | psi            | 5,780 | 7,950  | 11,560 | 11,560 | 13,010                       | 13,730 |        | 11,560 | 12,280 | 13,010 | 13,730 | 15,900 |
|              |        |             |       |       |                   | P. Prueba                | psi            | 5,300 | 7,300  | 10,000 | 10,000 | 10,000                       | 10,000 |        | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |

**TUBO DE PRODUCCION**
**TUBING**

|                    |      |    |    |    |     |     |     |     |    |     |     |     |     |
|--------------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| <b>FLUENCIA</b>    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| <b>RESISTENCIA</b> | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |     |        |        |        |                              |        |        | RESISTENTE<br>A LA CORROSION |        |        |        |
|--------------|--------|-------------|-------|-------|-------------------|--------------------------|----------------|-----|--------|--------|--------|------------------------------|--------|--------|------------------------------|--------|--------|--------|
|              |        | ESP.        | D.I.  | DRIFT | AREA<br>TRANS.    |                          | API            |     |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |                              |        |        |        |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg <sup>2</sup> |                          | H40            | J55 | L80    | N80    | C90    | T95                          | P110   | TRC80  | TRC85                        | TRC90  | TRC95  | TRC110 |
| <b>3 1/2</b> | 12.70  | 0.375       | 2.750 | 2.625 | 3.682             | Colapso psi              |                |     | 15,310 | 15,310 | 17,220 | 18,180                       | 21,050 | 15,310 | 16,260                       | 17,220 | 18,180 | 21,050 |
|              | NU     |             |       |       |                   | Tensión lbx1000          |                |     | 295    | 295    | 331    | 350                          | 405    | 295    | 313                          | 331    | 350    | 405    |
|              | 12.95  |             |       |       |                   | P. Interna psi           |                |     | 15,000 | 15,000 | 16,880 | 17,810                       | 20,630 | 15,000 | 15,940                       | 16,880 | 17,810 | 20,630 |
|              | EU     |             |       |       |                   | P. Prueba psi            |                |     | 10,000 | 10,000 | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 |
|              | 14.30  | 0.430       | 2.640 | 2.515 | 4.147             | Colapso psi              |                |     | 17,240 |        | 19,400 | 20,480                       |        | 17,240 | 18,320                       | 19,400 | 20,480 | 23,710 |
|              |        |             |       |       |                   | Tensión lbx1000          |                |     | 332    |        | 373    | 394                          |        | 332    | 353                          | 373    | 394    | 456    |
|              |        |             |       |       |                   | P. Interna psi           |                |     | 17,200 |        | 19,350 | 20,430                       |        | 17,200 | 18,280                       | 19,350 | 20,430 | 23,650 |
|              |        |             |       |       |                   | P. Prueba psi            |                |     | 10,000 |        | 10,000 | 10,000                       |        | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 |
|              | 15.50  | 0.476       | 2.548 | 2.423 | 4.522             | Colapso psi              |                |     | 18,800 |        | 21,150 | 22,330                       |        | 18,800 | 19,980                       | 21,150 | 22,330 | 25,850 |
|              |        |             |       |       |                   | Tensión lbx1000          |                |     | 362    |        | 407    | 430                          |        | 362    | 384                          | 407    | 430    | 497    |
|              |        |             |       |       |                   | P. Interna psi           |                |     | 19,040 |        | 21,420 | 22,610                       |        | 19,040 | 20,230                       | 21,420 | 22,610 | 26,180 |
|              |        |             |       |       |                   | P. Prueba psi            |                |     | 10,000 |        | 10,000 | 10,000                       |        | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 |
|              | 17.00  | 0.530       | 2.440 | 2.315 | 4.945             | Colapso psi              |                |     | 20,560 |        | 23,130 | 24,410                       |        | 20,560 | 21,840                       | 23,130 | 24,410 | 28,270 |
|              |        |             |       |       |                   | Tensión lbx1000          |                |     | 396    |        | 445    | 470                          |        | 396    | 420                          | 445    | 470    | 544    |
|              |        |             |       |       |                   | P. Interna psi           |                |     | 21,200 |        | 23,850 | 25,180                       |        | 21,200 | 22,530                       | 23,850 | 25,180 | 29,150 |
|              |        |             |       |       |                   | P. Prueba psi            |                |     | 10,000 |        | 10,000 | 10,000                       |        | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 |

**TUBO DE PRODUCCION**  
**TUBING**

|             |      |    |    |    |     |     |     |     |    |     |     |     |     |
|-------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| FLUENCIA    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| RESISTENCIA | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |   | PROPIEDADES<br>MECANICAS  | GRADO DE ACERO |        |        |        |        |                              |        |        |        |        |        |
|--------------|--------|-------------|-------|-------|---|---|----------------|--------|--------|--------|--------|------------------------------|--------|--------|--------|--------|--------|
|              |        | ESP.        | D.I.  | DRIFT | AREA<br>TRANS.  |   | API            |        |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |        |        |        |
|              |        |             |       |       |   |   | H40            | J55    | L80    | N80    | C90    | T95                          | P110   | TRC80  | TRC85  | TRC90  | TRC95  |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg <sup>2</sup>   |   |                |        |        |        |        |                              |        |        |        |        |        |
| <b>2 7/8</b> | 6.40   | 0.217       | 2.441 | 2.347 | 1.812   | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi | 5,580          | 7,680  | 11,170 | 11,170 | 12,390 | 12,940                       | 14,550 | 11,170 | 11,820 | 12,390 | 12,940 |
|              | NU     |             |       |       |   |   | 72             | 100    | 145    | 145    | 163    | 172                          | 199    | 145    | 154    | 163    | 172    |
|              | 6.50   |             |       |       |   |   | 5,280          | 7,260  | 10,570 | 10,570 | 11,890 | 12,550                       | 14,530 | 10,570 | 11,230 | 11,890 | 12,550 |
|              | EU     |             |       |       |   |   | 4,800          | 6,600  | 9,700  | 9,700  | 10,000 | 10,000                       | 10,000 | 9,700  | 10,000 | 10,000 | 10,000 |
| <b>7.80</b>  | 0.276  | 2.323       | 2.229 | 2.254 | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi |   | 13,890         | 13,890 | 15,620 | 16,490 | 19,090 | 13,890                       | 14,750 | 15,620 | 16,490 | 19,090 |        |
|              | NU     |             |       |       |   |   | 180            | 180    | 203    | 214    | 248    | 180                          | 192    | 203    | 214    | 248    |        |
|              | 7.90   |             |       |       |   |   | 13,440         | 13,440 | 15,120 | 15,960 | 18,480 | 13,440                       | 14,280 | 15,120 | 15,960 | 18,480 |        |
|              | EU     |             |       |       |   |   | 10,000         | 10,000 | 10,000 | 10,000 | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 | 10,000 |        |
| <b>8.60</b>  | 0.308  | 2.259       | 2.165 | 2.484 | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi |   | 15,300         | 15,300 | 17,220 | 18,170 | 21,040 | 15,300                       | 16,260 | 17,220 | 18,170 | 21,040 |        |
|              | NU     |             |       |       |   |   | 199            | 199    | 224    | 236    | 273    | 199                          | 211    | 224    | 236    | 273    |        |
|              | 8.70   |             |       |       |   |   | 15,000         | 15,000 | 16,870 | 17,810 | 20,620 | 15,000                       | 15,940 | 16,870 | 17,810 | 20,620 |        |
|              | EU     |             |       |       |   |   | 10,000         | 10,000 | 10,000 | 10,000 | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 | 10,000 |        |
| <b>9.35</b>  | 0.340  | 2.195       | 2.101 | 2.708 | Colapso psi<br>Tensión lbx1000<br>P. Interna psi<br>P. Prueba psi |   | 16,680         |        | 18,770 | 19,810 |        | 16,680                       | 17,730 | 18,770 | 19,810 | 22,940 |        |
|              | NU     |             |       |       |   |   | 217            |        | 244    | 257    |        | 217                          | 230    | 244    | 257    | 298    |        |
|              | 9.45   |             |       |       |   |   | 16,560         |        | 18,630 | 19,660 |        | 16,560                       | 17,590 | 18,630 | 19,660 | 22,770 |        |
|              | EU     |             |       |       |   |   | 10,000         |        | 10,000 | 10,000 |        | 10,000                       | 10,000 | 10,000 | 10,000 | 10,000 |        |

**TUBO DE PRODUCCION**
**TUBING**

|                    |      |    |    |    |     |     |     |     |    |     |     |     |     |
|--------------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| <b>FLUENCIA</b>    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| <b>RESISTENCIA</b> | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E.         | PESO         | DIMENSIONES |        |       |                 | PROPIEDADES MECANICAS | GRADO DE ACERO |        |        |        |        |                           |      |        | RESISTENTE A LA CORROSION |        |        |        |
|--------------|--------------|-------------|--------|-------|-----------------|-----------------------|----------------|--------|--------|--------|--------|---------------------------|------|--------|---------------------------|--------|--------|--------|
|              |              | ESP.        | D.I.   | DRIFT | AREA TRANS.     |                       | API            |        |        |        |        | RESISTENTE A LA CORROSION |      |        |                           |        |        |        |
|              |              | pulg        | lb/pie | pulg  | pulg            |                       | H40            | J55    | L80    | N80    | C90    | T95                       | P110 | TRC80  | TRC85                     | TRC90  | TRC95  | TRC110 |
| <b>2 7/8</b> | <b>10.50</b> | 0.392       | 2.091  | 1.997 | 3.058           | Colapso psi           |                |        | 18,840 |        | 21,200 | 22,370                    |      | 18,840 | 20,020                    | 21,200 | 22,370 | 25,910 |
|              |              |             |        |       |                 | Tensión lbx1000       |                |        | 245    |        | 275    | 290                       |      | 245    | 260                       | 275    | 290    | 336    |
|              |              |             |        |       |                 | P. Interna psi        |                |        | 19,090 |        | 21,470 | 22,670                    |      | 19,090 | 20,280                    | 21,470 | 22,670 | 26,250 |
|              |              |             |        |       |                 | P. Prueba psi         |                |        | 10,000 |        | 10,000 | 10,000                    |      | 10,000 | 10,000                    | 10,000 | 10,000 | 10,000 |
| <b>11.50</b> | <b>0.440</b> | 0.440       | 1.995  | 1.901 | 3.366           | Colapso psi           |                |        | 20,740 |        | 23,330 | 24,630                    |      | 20,740 | 22,040                    | 23,330 | 24,630 | 28,520 |
|              |              |             |        |       |                 | Tensión lbx1000       |                |        | 269    |        | 303    | 320                       |      | 269    | 286                       | 303    | 320    | 370    |
|              |              |             |        |       |                 | P. Interna psi        |                |        | 21,430 |        | 24,100 | 25,440                    |      | 21,430 | 22,770                    | 24,100 | 25,440 | 29,460 |
|              |              |             |        |       |                 | P. Prueba psi         |                |        | 10,000 |        | 10,000 | 10,000                    |      | 10,000 | 10,000                    | 10,000 | 10,000 | 10,000 |
| <b>2 3/8</b> | <b>4.00</b>  | 0.167       | 2.041  | 1.947 | 1.158           | Colapso psi           | 5,230          | 7,190  | 9,980  | 9,980  | 10,940 | 11,410                    |      | 9,980  | 10,470                    | 10,940 | 11,410 |        |
|              |              |             |        |       |                 | Tensión lbx1000       | 46             | 64     | 93     | 93     | 104    | 110                       |      | 93     | 98                        | 104    | 110    |        |
|              |              |             |        |       |                 | P. Interna psi        | 4,920          | 6,770  | 9,840  | 9,840  | 11,070 | 11,690                    |      | 9,840  | 10,460                    | 11,070 | 11,690 |        |
|              |              |             |        |       |                 | P. Prueba psi         | 4,500          | 6,200  | 9,000  | 9,000  | 10,000 | 10,000                    |      | 9,000  | 9,600                     | 10,000 | 10,000 |        |
| <b>4.60</b>  | 0.190        | 1.995       | 1.901  | 1.304 | Colapso psi     | 5,890                 | 8,100          | 11,780 | 11,780 | 13,250 | 13,980 | 16,130                    |      | 11,780 | 12,510                    | 13,250 | 13,980 |        |
| <b>NU</b>    |              |             |        |       | Tensión lbx1000 | 52                    | 72             | 104    | 104    | 117    | 124    | 143                       |      | 104    | 111                       | 117    | 124    |        |
| <b>4.70</b>  |              |             |        |       | P. Interna psi  | 5,600                 | 7,700          | 11,200 | 11,200 | 12,600 | 13,300 | 15,400                    |      | 11,200 | 11,900                    | 12,600 | 13,300 |        |
| <b>EU</b>    |              |             |        |       | P. Prueba psi   | 5,100                 | 7,000          | 10,000 | 10,000 | 10,000 | 10,000 | 10,000                    |      | 10,000 | 10,000                    | 10,000 | 10,000 |        |

**TUBO DE PRODUCCION**
**TUBING**

|                    |      |    |    |    |     |     |     |     |    |     |     |     |     |
|--------------------|------|----|----|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| <b>FLUENCIA</b>    | Kpsi | 40 | 55 | 80 | 80  | 90  | 95  | 110 | 80 | 85  | 90  | 95  | 110 |
| <b>RESISTENCIA</b> | Kpsi | 60 | 75 | 95 | 100 | 100 | 105 | 125 | 95 | 100 | 100 | 105 | 115 |

| D.E.         | PESO   | DIMENSIONES |       |       |                   | PROPIEDADES<br>MECANICAS | GRADO DE ACERO |     |        |        |        |                              |        |        |        |        |        |        |
|--------------|--------|-------------|-------|-------|-------------------|--------------------------|----------------|-----|--------|--------|--------|------------------------------|--------|--------|--------|--------|--------|--------|
|              |        | ESP.        | D.I.  | DRIFT | AREA<br>TRANS.    |                          | API            |     |        |        |        | RESISTENTE<br>A LA CORROSION |        |        |        |        |        |        |
|              |        |             |       |       |                   |                          | H40            | J55 | L80    | N80    | C90    | T95                          | P110   | TRC80  |        |        |        |        |
| pulg         | lb/pie | pulg        | pulg  | pulg  | pulg <sup>2</sup> |                          |                |     |        |        |        |                              |        | TRC85  |        |        |        |        |
| <b>2 3/8</b> | 5.80   | 0.254       | 1.867 | 1.773 | 1.692             | Colapso                  | psi            |     | 15,280 | 15,280 | 17,190 | 18,150                       | 21,010 | 15,280 | 16,240 | 17,190 | 18,150 |        |
|              | NU     |             |       |       |                   | Tensión                  | lbx1000        |     | 135    | 135    | 152    | 161                          | 186    | 135    | 144    | 152    | 161    |        |
|              | 5.95   |             |       |       |                   | P. Interna               | psi            |     | 14,970 | 14,970 | 16,840 | 17,780                       | 20,590 | 14,970 | 15,910 | 16,840 | 17,780 |        |
|              | EU     |             |       |       |                   | P. Prueba                | psi            |     | 10,000 | 10,000 | 10,000 | 10,000                       | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |        |
| <b>6.60</b>  | 0.295  | 1.785       | 1.691 | 1.928 |                   | Colapso                  | psi            |     | 17,410 |        | 19,580 | 20,670                       |        | 17,410 | 18,490 | 19,580 | 20,670 | 23,930 |
|              | NU     |             |       |       |                   | Tensión                  | lbx1000        |     | 154    |        | 173    | 183                          |        | 154    | 164    | 173    | 183    | 212    |
|              |        |             |       |       |                   | P. Interna               | psi            |     | 17,390 |        | 19,560 | 20,650                       |        | 17,390 | 18,480 | 19,560 | 20,650 | 23,910 |
|              |        |             |       |       |                   | P. Prueba                | psi            |     | 10,000 |        | 10,000 | 10,000                       |        | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| <b>7.35</b>  | 0.336  | 1.703       | 1.609 | 2.152 |                   | Colapso                  | psi            |     | 19,430 |        | 21,860 | 23,080                       |        | 19,430 | 20,650 | 21,860 | 23,080 | 26,720 |
|              | NU     |             |       |       |                   | Tensión                  | lbx1000        |     | 172    |        | 194    | 204                          |        | 172    | 183    | 194    | 204    | 237    |
|              | 7.45   |             |       |       |                   | P. Interna               | psi            |     | 19,810 |        | 22,280 | 23,520                       |        | 19,810 | 21,040 | 22,280 | 23,520 | 27,230 |
|              | EU     |             |       |       |                   | P. Prueba                | psi            |     | 10,000 |        | 10,000 | 10,000                       |        | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |

NU: No upset

EU: Upset

Nota: Los aceros TRC-95 y L-80 son fabricados con Baja Dureza Controlada (BDC).

TUBO DE CONDUCCIÓN

**TUBO DE CONDUCCION**  
**LINE PIPE**

|            |           | FLUENCIA    |        | psi   | 30,500 35,500 42,100 46,400 52,200 56,600 60,200 65,300 70,300 80,500 |      |  |       |        |        |        |        |        |        | 30,500 35,500 42,100 46,400 52,200 56,600 60,200 65,300 70,300 80,500 |        |                                      |       |       |       |       |       |       |       |       |       |       |
|------------|-----------|-------------|--------|-------|---|------|--|-------|--------|--------|--------|--------|--------|--------|---|--------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |       |   |      | RESISTENCIA A LA PRESION INTERNA (psi) |       |        |        |        |        |        |        |   |        | PRESION DE PRUEBA HIDROSTATICA (psi) |       |       |       |       |       |       |       |       |       |       |
|            |           | ESP.        | PESO   | D.I.  | TIPO  | CED. | GRADO DE ACERO                         |       |        |        |        |        |        |        |   |        | GRADO DE ACERO                       |       |       |       |       |       |       |       |       |       |       |
| pulg       | pulg      | pulg        | lb/pie | pulg  |   |      | A                                      | B     | X42    | X46    | X52    | X56    | X60    | X65    | X70   | X80    | A                                    | B     | X42   | X46   | X52   | X56   | X60   | X65   | X70   | X80   |       |
| 2"         | 2 3/8"    | 0.154       | 3.66   | 2.067 | STD   | 40   | 3,460                                  | 4,030 | 4,780  | 5,270  | 5,920  | 6,420  | 6,830  | 7,410  | 7,980   | 9,130  | 2,370                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.172       | 4.05   | 2.031 |   |      | 3,870                                  | 4,500 | 5,340  | 5,880  | 6,620  | 7,170  | 7,630  | 8,280  | 8,910   | 10,200 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.188       | 4.40   | 1.999 |   |      | 4,230                                  | 4,920 | 5,830  | 6,430  | 7,230  | 7,840  | 8,340  | 9,050  | 9,740   | 11,150 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.218       | 5.03   | 1.939 | XS  | 80   | 4,900                                  | 5,700 | 6,760  | 7,450  | 8,380  | 9,090  | 9,670  | 10,490 | 11,290  | 12,930 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.250       | 5.68   | 1.875 |   |      | 5,620                                  | 6,540 | 7,760  | 8,550  | 9,620  | 10,430 | 11,090 | 12,030 | 12,950  | 14,830 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.281       | 6.29   | 1.813 |   |      | 6,320                                  | 7,350 | 8,720  | 9,610  | 10,810 | 11,720 | 12,460 | 13,520 | 14,560  | 16,670 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.344       | 7.46   | 1.687 |   | 160  | 7,730                                  | 9,000 | 10,670 | 11,760 | 13,230 | 14,350 | 15,260 | 16,550 | 17,820  | 20,400 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
| 2 1/2"     | 2 7/8"    | 0.156       | 4.53   | 2.563 |   |      | 2,900                                  | 3,370 | 4,000  | 4,410  | 4,960  | 5,370  | 5,720  | 6,200  | 6,680   | 7,640  | 1,990                                | 2,310 | 2,740 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |
|            |           | 0.172       | 4.97   | 2.531 |   |      | 3,190                                  | 3,720 | 4,410  | 4,860  | 5,470  | 5,930  | 6,300  | 6,840  | 7,360   | 8,430  | 2,190                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.188       | 5.40   | 2.499 |   | 30   | 3,490                                  | 4,060 | 4,820  | 5,310  | 5,970  | 6,480  | 6,890  | 7,470  | 8,040   | 9,210  | 2,390                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.203       | 5.80   | 2.469 | STD   | 40   | 3,770                                  | 4,390 | 5,200  | 5,730  | 6,450  | 6,990  | 7,440  | 8,070  | 8,690   | 9,950  | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.216       | 6.14   | 2.443 |   |      | 4,010                                  | 4,670 | 5,540  | 6,100  | 6,860  | 7,440  | 7,910  | 8,590  | 9,240   | 10,580 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.250       | 7.02   | 2.375 |   |      | 4,640                                  | 5,400 | 6,410  | 7,060  | 7,940  | 8,610  | 9,160  | 9,940  | 10,700  | 12,250 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |
|            |           | 0.276       | 7.67   | 2.323 | XS  | 80   | 5,120                                  | 5,960 | 7,070  | 7,800  | 8,770  | 9,510  | 10,110 | 10,970 | 11,810  | 13,520 | 2,470                                | 2,470 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 | 2,970 |       |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo (Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
**LINE PIPE**

|            |           | FLUENCIA    | psi    | 30,500 | 35,500 | 42,100 | 46,400                                 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100 | 46,400                               | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |       |
|------------|-----------|-------------|--------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |       |       |       |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |       |       |       |
| pulg       | pulg      | pulg        | lb/pie | pulg   |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65   | X70   | X80   |
| 2 1/2"     | 2 7/8"    | 0.375       | 10.01  | 2.125  |        | 160    | 6,960                                  | 8,100  | 9,610  | 10,590 | 11,920 | 12,920 | 13,740 | 14,910 | 16,050 | 18,380 | 2,470                                | 2,470  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
| 3"         | 3 1/2"    | 0.188       | 6.66   | 3.124  |        | 30     | 2,870                                  | 3,340  | 3,960  | 4,360  | 4,910  | 5,320  | 5,660  | 6,140  | 6,610  | 7,570  | 1,970                                | 2,290  | 2,710  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.216       | 7.58   | 3.068  | STD    | 40     | 3,290                                  | 3,830  | 4,550  | 5,010  | 5,640  | 6,110  | 6,500  | 7,050  | 7,590  | 8,690  | 2,260                                | 2,470  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.250       | 8.69   | 3.000  |        |        | 3,810                                  | 4,440  | 5,260  | 5,800  | 6,530  | 7,080  | 7,530  | 8,160  | 8,790  | 10,060 | 2,470                                | 2,470  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.281       | 9.67   | 2.938  |        |        | 4,290                                  | 4,990  | 5,920  | 6,520  | 7,330  | 7,950  | 8,460  | 9,170  | 9,880  | 11,310 | 2,470                                | 2,470  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.300       | 10.26  | 2.900  | XS     | 80     | 4,580                                  | 5,330  | 6,320  | 6,960  | 7,830  | 8,490  | 9,030  | 9,800  | 10,550 | 12,080 | 2,470                                | 2,470  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.438       | 14.32  | 2.624  |        | 160    | 6,680                                  | 7,770  | 9,220  | 10,160 | 11,430 | 12,400 | 13,180 | 14,300 | 15,400 | 17,630 | 2,470                                | 2,470  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
| 3 1/2"     | 4"        | 0.226       | 9.12   | 3.548  | STD    | 40     | 3,020                                  | 3,510  | 4,160  | 4,590  | 5,160  | 5,600  | 5,950  | 6,460  | 6,950  | 7,960  | 2,070                                | 2,410  | 2,850  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.250       | 10.02  | 3.500  |        |        | 3,340                                  | 3,880  | 4,600  | 5,080  | 5,710  | 6,190  | 6,580  | 7,140  | 7,690  | 8,800  | 2,290                                | 2,660  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.281       | 11.17  | 3.438  |        |        | 3,750                                  | 4,360  | 5,180  | 5,700  | 6,420  | 6,960  | 7,400  | 8,030  | 8,640  | 9,900  | 2,570                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.318       | 12.52  | 3.364  | XS     | 80     | 4,240                                  | 4,940  | 5,860  | 6,460  | 7,260  | 7,870  | 8,380  | 9,080  | 9,780  | 11,200 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
| 4"         | 4 1/2"    | 0.219       | 10.02  | 4.062  |        |        | 2,600                                  | 3,020  | 3,590  | 3,950  | 4,450  | 4,820  | 5,130  | 5,560  | 5,990  | 6,860  | 1,780                                | 2,070  | 2,460  | 2,710  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.237       | 10.80  | 4.026  | STD    | 40     | 2,810                                  | 3,270  | 3,880  | 4,280  | 4,810  | 5,220  | 5,550  | 6,020  | 6,480  | 7,420  | 1,930                                | 2,240  | 2,660  | 2,930  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.250       | 11.36  | 4.000  |        |        | 2,970                                  | 3,450  | 4,090  | 4,510  | 5,080  | 5,500  | 5,850  | 6,350  | 6,830  | 7,830  | 2,030                                | 2,370  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo ( Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
**LINE PIPE**

|            |           | FLUENCIA    | psi    | 30,500 | 35,500 | 42,100 | 46,400                                 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100 | 46,400                               | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |       |
|------------|-----------|-------------|--------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |       |       |       |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |       |       |       |
| pulg       | pulg      | pulg        | lb/pie | pulg   |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65   | X70   | X80   |
| 4"         | 4 1/2"    | 0.281       | 12.67  | 3.938  |        |        | 3,330                                  | 3,880  | 4,600  | 5,070  | 5,700  | 6,190  | 6,580  | 7,140  | 7,680  | 8,800  | 2,290                                | 2,660  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.312       | 13.97  | 3.876  |        |        | 3,700                                  | 4,310  | 5,110  | 5,630  | 6,330  | 6,870  | 7,300  | 7,920  | 8,530  | 9,770  | 2,540                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.337       | 15.00  | 3.826  | XS     | 80     | 4,000                                  | 4,650  | 5,520  | 6,080  | 6,840  | 7,420  | 7,890  | 8,560  | 9,210  | 10,550 | 2,740                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.438       | 19.02  | 3.624  |        | 120    | 5,200                                  | 6,050  | 7,170  | 7,900  | 8,890  | 9,640  | 10,250 | 11,120 | 11,970 | 13,710 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.531       | 22.53  | 3.438  |        | 160    | 6,300                                  | 7,330  | 8,690  | 9,580  | 10,780 | 11,690 | 12,430 | 13,480 | 14,520 | 16,620 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.674       | 27.57  | 3.152  | XXS    |        | 7,990                                  | 9,300  | 11,030 | 12,160 | 13,680 | 14,840 | 15,780 | 17,120 | 18,430 | 21,100 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
| 5"         | 5 9/16"   | 0.219       | 12.51  | 5.125  |        |        | 2,100                                  | 2,450  | 2,900  | 3,200  | 3,600  | 3,900  | 4,150  | 4,500  | 4,840  | 5,550  | 1,440                                | 1,680  | 1,990  | 2,190  | 2,470  | 2,670  | 2,840  | 2,970 | 2,970 | 2,970 |
|            |           | 0.258       | 14.63  | 5.047  | STD    | 40     | 2,480                                  | 2,880  | 3,420  | 3,770  | 4,240  | 4,590  | 4,890  | 5,300  | 5,710  | 6,530  | 1,700                                | 1,980  | 2,340  | 2,580  | 2,910  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.281       | 15.87  | 5.001  |        |        | 2,700                                  | 3,140  | 3,720  | 4,100  | 4,610  | 5,000  | 5,320  | 5,770  | 6,210  | 7,120  | 1,850                                | 2,150  | 2,550  | 2,810  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.312       | 17.51  | 4.939  |        |        | 2,990                                  | 3,480  | 4,130  | 4,550  | 5,120  | 5,560  | 5,910  | 6,410  | 6,900  | 7,900  | 2,050                                | 2,390  | 2,830  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.344       | 19.19  | 4.875  |        |        | 3,300                                  | 3,840  | 4,560  | 5,020  | 5,650  | 6,130  | 6,520  | 7,070  | 7,610  | 8,710  | 2,260                                | 2,630  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.375       | 20.80  | 4.813  | XS     | 80     | 3,600                                  | 4,190  | 4,970  | 5,470  | 6,160  | 6,680  | 7,100  | 7,700  | 8,290  | 9,500  | 2,470                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.500       | 27.06  | 4.563  |        | 120    | 4,800                                  | 5,580  | 6,620  | 7,300  | 8,210  | 8,900  | 9,470  | 10,270 | 11,060 | 12,660 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.625       | 32.99  | 4.313  |        | 160    | 6,000                                  | 6,980  | 8,280  | 9,120  | 10,260 | 11,130 | 11,840 | 12,840 | 13,820 | 15,830 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo (Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

| TUBO DE CONDUCCION<br>LINE PIPE |           |             | FLUENCIA | psi   | 30,500 | 35,500 | 42,100                                 | 46,400 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100                               | 46,400 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |
|---------------------------------|-----------|-------------|----------|-------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| OD<br>ASTM                      | OD<br>API | DIMENSIONES |          |       |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |        |       |       |
|                                 |           | ESP.        | PESO     | D.I.  | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |        |       |       |
| pulg                            | pulg      |             |          |       |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70   | X80   |
| 6"                              | 6 5/8"    | 0.250       | 17.04    | 6.125 |        |        | 2,010                                  | 2,340  | 2,780  | 3,060  | 3,450  | 3,740  | 3,980  | 4,310  | 4,640  | 5,320  | 1,380                                | 1,610  | 2,380  | 2,630  | 2,950  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.280       | 18.99    | 6.065 | STD    | 40     | 2,260                                  | 2,630  | 3,110  | 3,430  | 3,860  | 4,190  | 4,450  | 4,830  | 5,200  | 5,950  | 1,550                                | 1,800  | 2,670  | 2,940  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.312       | 21.06    | 6.001 |        |        | 2,510                                  | 2,930  | 3,470  | 3,820  | 4,300  | 4,660  | 4,960  | 5,380  | 5,790  | 6,630  | 1,720                                | 2,010  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.344       | 23.10    | 5.937 |        |        | 2,770                                  | 3,230  | 3,830  | 4,220  | 4,740  | 5,140  | 5,470  | 5,930  | 6,390  | 7,310  | 1,900                                | 2,210  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.375       | 25.05    | 5.875 |        |        | 3,020                                  | 3,520  | 4,170  | 4,600  | 5,170  | 5,610  | 5,960  | 6,470  | 6,960  | 7,970  | 2,070                                | 2,410  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.432       | 28.60    | 5.761 | XS     | 80     | 3,480                                  | 4,050  | 4,800  | 5,290  | 5,960  | 6,460  | 6,870  | 7,450  | 8,020  | 9,190  | 2,390                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.500       | 32.74    | 5.625 |        |        | 4,030                                  | 4,690  | 5,560  | 6,130  | 6,890  | 7,480  | 7,950  | 8,620  | 9,280  | 10,630 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.562       | 36.43    | 5.501 |        | 120    | 4,530                                  | 5,270  | 6,250  | 6,890  | 7,750  | 8,400  | 8,940  | 9,690  | 10,440 | 11,950 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.625       | 40.09    | 5.375 |        |        | 5,040                                  | 5,860  | 6,950  | 7,660  | 8,620  | 9,340  | 9,940  | 10,780 | 11,610 | 13,290 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.719       | 45.39    | 5.187 |        |        | 5,790                                  | 6,740  | 8,000  | 8,810  | 9,910  | 10,750 | 11,430 | 12,400 | 13,350 | 15,290 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.750       | 47.10    | 5.125 |        |        | 6,040                                  | 7,030  | 8,340  | 9,190  | 10,340 | 11,210 | 11,930 | 12,940 | 13,930 | 15,950 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.864       | 53.21    | 4.897 |        |        | 6,960                                  | 8,100  | 9,610  | 10,590 | 11,910 | 12,920 | 13,740 | 14,900 | 16,040 | 18,370 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.875       | 53.78    | 4.875 |        |        | 7,050                                  | 8,210  | 9,730  | 10,720 | 12,070 | 13,080 | 13,910 | 15,090 | 16,250 | 18,610 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
| 8"                              | 8 5/8"    | 0.250       | 22.38    | 8.125 |        | 20     | 1,550                                  | 1,800  | 2,140  | 2,350  | 2,650  | 2,870  | 3,050  | 3,310  | 3,570  | 4,080  | 1,060                                | 1,230  | 1,830  | 2,020  | 2,270  | 2,460  | 2,620  | 2,840  | 2,970 | 2,970 |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo ( Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
LINE PIPE

|            |           | FLUENCIA    | psi    | 30,500 | 35,500 | 42,100 | 46,400                                 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100 | 46,400                               | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |     |
|------------|-----------|-------------|--------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-----|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |       |       |     |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |       |       |     |
| pulg       | pulg      | pulg        | lb/pie | pulg   |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65   | X70   | X80 |
| 8"         | 8 5/8"    | 0.277       | 24.72  | 8.071  | 30     | 1,710  | 2,000                                  | 2,370  | 2,610  | 2,930  | 3,180  | 3,380  | 3,670  | 3,950  | 4,520  | 1,180  | 1,370                                | 2,030  | 2,240  | 2,510  | 2,730  | 2,900  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.312       | 27.73  | 8.001  |        | 1,930  | 2,250                                  | 2,670  | 2,940  | 3,300  | 3,580  | 3,810  | 4,130  | 4,450  | 5,100  | 1,320  | 1,540                                | 2,280  | 2,520  | 2,830  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.322       | 28.58  | 7.981  |        | 1,990  | 2,320                                  | 2,750  | 3,030  | 3,410  | 3,700  | 3,930  | 4,270  | 4,590  | 5,260  | 1,370  | 1,590                                | 2,360  | 2,600  | 2,920  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.344       | 30.45  | 7.937  |        | 2,130  | 2,480                                  | 2,940  | 3,240  | 3,640  | 3,950  | 4,200  | 4,560  | 4,910  | 5,620  | 1,460  | 1,700                                | 2,520  | 2,780  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.375       | 33.07  | 7.875  |        | 2,320  | 2,700                                  | 3,200  | 3,530  | 3,970  | 4,310  | 4,580  | 4,970  | 5,350  | 6,130  | 1,590  | 1,850                                | 2,750  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.406       | 35.64  | 7.813  | 60     | 2,510  | 2,920                                  | 3,470  | 3,820  | 4,300  | 4,660  | 4,960  | 5,380  | 5,790  | 6,630  | 1,720  | 2,010                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.438       | 38.33  | 7.749  |        | 2,710  | 3,150                                  | 3,740  | 4,120  | 4,640  | 5,030  | 5,350  | 5,800  | 6,250  | 7,150  | 1,860  | 2,160                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.500       | 43.43  | 7.625  | XS     | 3,090  | 3,600                                  | 4,270  | 4,710  | 5,300  | 5,740  | 6,110  | 6,620  | 7,130  | 8,170  | 2,120  | 2,470                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.562       | 48.44  | 7.501  |        | 3,480  | 4,050                                  | 4,800  | 5,290  | 5,950  | 6,450  | 6,860  | 7,450  | 8,020  | 9,180  | 2,380  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.594       | 50.95  | 7.437  | 100    | 3,680  | 4,280                                  | 5,070  | 5,590  | 6,290  | 6,820  | 7,260  | 7,870  | 8,470  | 9,700  | 2,520  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.625       | 53.45  | 7.375  |        | 3,870  | 4,500                                  | 5,340  | 5,880  | 6,620  | 7,180  | 7,630  | 8,280  | 8,910  | 10,210 | 2,650  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.719       | 60.77  | 7.187  | 120    | 4,450  | 5,180                                  | 6,140  | 6,770  | 7,620  | 8,260  | 8,780  | 9,530  | 10,260 | 11,740 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.750       | 63.14  | 7.125  |        | 4,640  | 5,400                                  | 6,410  | 7,060  | 7,940  | 8,610  | 9,160  | 9,940  | 10,700 | 12,250 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |
|            |           | 0.812       | 67.82  | 7.001  | 140    | 5,020  | 5,850                                  | 6,940  | 7,640  | 8,600  | 9,330  | 9,920  | 10,760 | 11,580 | 13,260 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |     |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo (Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

| TUBO DE CONDUCCION<br>LINE PIPE |           |             | FLUENCIA | psi    | 30,500 | 35,500 | 42,100                                 | 46,400 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100                               | 46,400 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |
|---------------------------------|-----------|-------------|----------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| OD<br>ASTM                      | OD<br>API | DIMENSIONES |          |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |        |       |       |
|                                 |           | ESP.        | PESO     | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |        |       |       |
| pulg                            | pulg      |             |          |        |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70   | X80   |
| 8"                              | 8 5/8"    | 0.875       | 72.49    | 6.875  |        |        | 5,410                                  | 6,300  | 7,470  | 8,240  | 9,270  | 10,050 | 10,690 | 11,590 | 12,480 | 14,290 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 1.000       | 81.51    | 6.625  |        |        | 6,190                                  | 7,200  | 8,540  | 9,410  | 10,590 | 11,480 | 12,210 | 13,250 | 14,260 | 16,330 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
| 10"                             | 10 3/4"   | 0.250       | 28.06    | 10.250 | 20     |        | 1,240                                  | 1,440  | 1,710  | 1,890  | 2,120  | 2,300  | 2,450  | 2,660  | 2,860  | 3,280  | 850                                  | 990    | 1,660  | 1,830  | 2,060  | 2,240  | 2,380  | 2,580  | 2,780 | 2,970 |
|                                 |           | 0.279       | 31.23    | 10.192 |        |        | 1,390                                  | 1,610  | 1,910  | 2,110  | 2,370  | 2,570  | 2,730  | 2,970  | 3,190  | 3,660  | 950                                  | 1,110  | 1,860  | 2,050  | 2,300  | 2,500  | 2,660  | 2,880  | 2,970 | 2,970 |
|                                 | 30        | 0.307       | 34.27    | 10.136 | 30     |        | 1,520                                  | 1,770  | 2,100  | 2,320  | 2,610  | 2,830  | 3,010  | 3,260  | 3,510  | 4,020  | 1,050                                | 1,220  | 2,040  | 2,250  | 2,530  | 2,750  | 2,920  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.344       | 38.27    | 10.062 |        |        | 1,710                                  | 1,990  | 2,360  | 2,600  | 2,920  | 3,170  | 3,370  | 3,660  | 3,940  | 4,510  | 1,170                                | 1,360  | 2,290  | 2,520  | 2,840  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 | 40        | 0.365       | 40.52    | 10.020 | STD    | 40     | 1,810                                  | 2,110  | 2,500  | 2,760  | 3,100  | 3,360  | 3,580  | 3,880  | 4,180  | 4,780  | 1,240                                | 1,450  | 2,430  | 2,680  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.438       | 48.28    | 9.874  |        |        | 2,170                                  | 2,530  | 3,000  | 3,310  | 3,720  | 4,040  | 4,290  | 4,660  | 5,010  | 5,740  | 1,490                                | 1,740  | 2,920  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 | 60        | 0.500       | 54.79    | 9.750  | XS     | 60     | 2,480                                  | 2,890  | 3,430  | 3,780  | 4,250  | 4,610  | 4,900  | 5,320  | 5,720  | 6,550  | 1,700                                | 1,980  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.562       | 61.21    | 9.626  |        |        | 2,790                                  | 3,250  | 3,850  | 4,250  | 4,780  | 5,180  | 5,510  | 5,970  | 6,430  | 7,360  | 1,910                                | 2,230  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 | 80        | 0.594       | 64.43    | 9.562  | 80     |        | 2,950                                  | 3,430  | 4,070  | 4,490  | 5,050  | 5,470  | 5,820  | 6,310  | 6,800  | 7,780  | 2,020                                | 2,350  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.625       | 67.65    | 9.500  |        |        | 3,100                                  | 3,610  | 4,280  | 4,720  | 5,310  | 5,760  | 6,130  | 6,640  | 7,150  | 8,190  | 2,130                                | 2,480  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 | 100       | 0.719       | 77.10    | 9.312  | 100    |        | 3,570                                  | 4,160  | 4,930  | 5,430  | 6,110  | 6,620  | 7,050  | 7,640  | 8,230  | 9,420  | 2,450                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |
|                                 |           | 0.812       | 86.26    | 9.126  |        |        | 4,030                                  | 4,690  | 5,570  | 6,130  | 6,900  | 7,480  | 7,960  | 8,630  | 9,290  | 10,640 | 2,760                                | 2,760  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo ( Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
LINE PIPE

|            |           | FLUENCIA    | psi    | 30,500 | 35,500 | 42,100 | 46,400                                 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100 | 46,400                               | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |       |
|------------|-----------|-------------|--------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |       |       |       |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |       |       |       |
| pulg       | pulg      | pulg        | lb/pie | pulg   |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65   | X70   | X80   |
| 10"        | 10 3/4"   | 0.844       | 89.29  | 9.062  | 120    | 4,190  | 4,880                                  | 5,780  | 6,380  | 7,170  | 7,780  | 8,270  | 8,970  | 9,660  | 11,060 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.875       | 92.37  | 9.000  |        | 4,340  | 5,060                                  | 6,000  | 6,610  | 7,440  | 8,060  | 8,580  | 9,300  | 10,010 | 11,470 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.938       | 98.39  | 8.874  |        | 4,660  | 5,420                                  | 6,430  | 7,090  | 7,970  | 8,640  | 9,190  | 9,970  | 10,730 | 12,290 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 1.000       | 104.23 | 8.750  |        | 4,970  | 5,780                                  | 6,850  | 7,550  | 8,500  | 9,210  | 9,800  | 10,630 | 11,440 | 13,100 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 1.250       | 126.94 | 8.250  |        | 6,210  | 7,220                                  | 8,570  | 9,440  | 10,620 | 11,520 | 12,250 | 13,290 | 14,310 | 16,380 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
| 12"        | 12 3/4"   | 0.375       | 49.61  | 12.000 | STD    | 1,570  | 1,830                                  | 2,170  | 2,390  | 2,690  | 2,910  | 3,100  | 3,360  | 3,620  | 4,140  | 1,080  | 1,250                                | 2,110  | 2,320  | 2,610  | 2,830  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.406       | 53.57  | 11.938 |        | 1,700  | 1,980                                  | 2,350  | 2,590  | 2,910  | 3,150  | 3,350  | 3,640  | 3,920  | 4,490  | 1,170  | 1,360                                | 2,280  | 2,510  | 2,830  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.438       | 57.65  | 11.874 |        | 1,830  | 2,130                                  | 2,530  | 2,790  | 3,140  | 3,400  | 3,620  | 3,930  | 4,230  | 4,840  | 1,260  | 1,460                                | 2,460  | 2,710  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.500       | 65.48  | 11.750 | XS     | 2,090  | 2,440                                  | 2,890  | 3,180  | 3,580  | 3,880  | 4,130  | 4,480  | 4,820  | 5,520  | 1,440  | 1,670                                | 2,810  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.562       | 73.22  | 11.626 |        | 2,350  | 2,740                                  | 3,250  | 3,580  | 4,030  | 4,370  | 4,640  | 5,040  | 5,420  | 6,210  | 1,610  | 1,880                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.625       | 81.01  | 11.500 | 60     | 2,620  | 3,050                                  | 3,610  | 3,980  | 4,480  | 4,860  | 5,160  | 5,600  | 6,030  | 6,910  | 1,790  | 2,090                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.688       | 88.71  | 11.374 |        | 2,880  | 3,350                                  | 3,980  | 4,380  | 4,930  | 5,340  | 5,680  | 6,170  | 6,640  | 7,600  | 1,970  | 2,300                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.750       | 96.21  | 11.250 |        | 3,140  | 3,650                                  | 4,330  | 4,780  | 5,370  | 5,830  | 6,200  | 6,720  | 7,240  | 8,290  | 2,150  | 2,510                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.812       | 103.63 | 11.126 |        | 3,400  | 3,960                                  | 4,690  | 5,170  | 5,820  | 6,310  | 6,710  | 7,280  | 7,840  | 8,970  | 2,330  | 2,710                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo (Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

| TUBO DE CONDUCCION<br>LINE PIPE |           |             | FLUENCIA | psi    | 30,500 | 35,500 | 42,100                                 | 46,400 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100                               | 46,400 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |       |
|---------------------------------|-----------|-------------|----------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| OD<br>ASTM                      | OD<br>API | DIMENSIONES |          |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |        |       |       |       |
|                                 |           | ESP.        | PESO     | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |        |       |       |       |
| pulg                            | pulg      |             |          |        |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70   | X80   |       |
| 12"                             | 12 3/4"   | 0.844       | 107.32   | 11.062 | 100    | 3,530  | 4,110                                  | 4,880  | 5,380  | 6,050  | 6,560  | 6,970  | 7,560  | 8,140  | 9,330  | 2,420  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 0.875       | 111.08   | 11.000 |        | 3,660  | 4,260                                  | 5,060  | 5,570  | 6,270  | 6,800  | 7,230  | 7,840  | 8,440  | 9,670  | 2,510  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 0.938       | 118.44   | 10.874 |        | 3,930  | 4,570                                  | 5,420  | 5,970  | 6,720  | 7,290  | 7,750  | 8,410  | 9,050  | 10,360 | 2,690  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 1.000       | 125.61   | 10.750 |        | 4,190  | 4,870                                  | 5,780  | 6,370  | 7,160  | 7,770  | 8,260  | 8,960  | 9,650  | 11,050 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 1.062       | 132.69   | 10.626 |        | 4,450  | 5,170                                  | 6,140  | 6,760  | 7,610  | 8,250  | 8,780  | 9,520  | 10,250 | 11,730 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 1.125       | 139.81   | 10.500 |        | 4,710  | 5,480                                  | 6,500  | 7,160  | 8,060  | 8,740  | 9,300  | 10,080 | 10,860 | 12,430 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 1.250       | 153.67   | 10.250 |        | 5,230  | 6,090                                  | 7,220  | 7,960  | 8,960  | 9,710  | 10,330 | 11,200 | 12,060 | 13,810 | 2,760  | 2,760                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
| 14"                             | 14"       | 0.375       | 54.62    | 13.250 | STD    | 30     | 1,430                                  | 1,660  | 1,970  | 2,180  | 2,450  | 2,650  | 2,820  | 3,060  | 3,300  | 3,770  | 980                                  | 1,140  | 1,920  | 2,110  | 2,380  | 2,580  | 2,740  | 2,970  | 2,970 | 2,970 | 2,970 |
|                                 |           | 0.406       | 59.00    | 13.188 |        | 1,550  | 1,800                                  | 2,140  | 2,350  | 2,650  | 2,870  | 3,060  | 3,310  | 3,570  | 4,090  | 1,060  | 1,240                                | 2,080  | 2,290  | 2,570  | 2,790  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 0.438       | 63.50    | 13.124 | 40     | 1,670  | 1,940                                  | 2,300  | 2,540  | 2,860  | 3,100  | 3,300  | 3,580  | 3,850  | 4,410  | 1,150  | 1,330                                | 2,240  | 2,470  | 2,780  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 0.469       | 67.84    | 13.062 |        | 1,790  | 2,080                                  | 2,470  | 2,720  | 3,060  | 3,320  | 3,530  | 3,830  | 4,120  | 4,720  | 1,230  | 1,430                                | 2,400  | 2,640  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 0.500       | 72.16    | 13.000 | XS     |        | 1,910                                  | 2,220  | 2,630  | 2,900  | 3,260  | 3,540  | 3,760  | 4,080  | 4,390  | 5,030  | 1,310                                | 1,520  | 2,560  | 2,820  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |
|                                 |           | 0.562       | 80.73    | 12.876 |        | 2,140  | 2,490                                  | 2,960  | 3,260  | 3,670  | 3,980  | 4,230  | 4,590  | 4,940  | 5,660  | 1,470  | 1,710                                | 2,870  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 |       |       |
|                                 |           | 0.594       | 85.05    | 12.812 | 60     | 2,260  | 2,640                                  | 3,130  | 3,450  | 3,880  | 4,200  | 4,470  | 4,850  | 5,220  | 5,980  | 1,550  | 1,810                                | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 |       |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo ( Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
LINE PIPE

|            |           | FLUENCIA    | psi    | 30,500 | 35,500 | 42,100 | 46,400                                 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100 | 46,400                                | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |       |       |       |
|------------|-----------|-------------|--------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICAS (psi) |        |        |        |        |        |        |       |       |       |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                        |        |        |        |        |        |        |       |       |       |
| pulg       | pulg      | pulg        | lb/pie | pulg   |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                     | B      | X42    | X46    | X52    | X56    | X60    | X65   | X70   | X80   |
| 14"        | 14"       | 0.625       | 89.36  | 12.750 | 80     | 2,380  | 2,770                                  | 3,290  | 3,630  | 4,080  | 4,420  | 4,700  | 5,100  | 5,490  | 6,290  | 1,630  | 1,900                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.688       | 97.91  | 12.624 |        | 2,620  | 3,050                                  | 3,620  | 3,990  | 4,490  | 4,870  | 5,180  | 5,620  | 6,050  | 6,920  | 1,800  | 2,090                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.750       | 106.23 | 12.500 |        | 2,860  | 3,330                                  | 3,950  | 4,350  | 4,890  | 5,310  | 5,640  | 6,120  | 6,590  | 7,550  | 1,960  | 2,280                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.812       | 114.48 | 12.376 |        | 3,100  | 3,600                                  | 4,270  | 4,710  | 5,300  | 5,740  | 6,110  | 6,630  | 7,140  | 8,170  | 2,120  | 2,470                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.875       | 122.77 | 12.250 |        | 3,340  | 3,880                                  | 4,600  | 5,080  | 5,710  | 6,190  | 6,580  | 7,140  | 7,690  | 8,800  | 2,290  | 2,660                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 0.938       | 130.98 | 12.124 | 100    | 3,580  | 4,160                                  | 4,940  | 5,440  | 6,120  | 6,640  | 7,060  | 7,660  | 8,240  | 9,440  | 2,450  | 2,760                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 1.000       | 138.97 | 12.000 |        | 3,810  | 4,440                                  | 5,260  | 5,800  | 6,530  | 7,080  | 7,530  | 8,160  | 8,790  | 10,060 | 2,610  | 2,760                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 1.062       | 146.88 | 11.876 |        | 4,050  | 4,710                                  | 5,590  | 6,160  | 6,930  | 7,510  | 7,990  | 8,670  | 9,330  | 10,690 | 2,760  | 2,760                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 1.125       | 154.84 | 11.750 |        | 4,290  | 4,990                                  | 5,920  | 6,530  | 7,340  | 7,960  | 8,470  | 9,180  | 9,890  | 11,320 | 2,760  | 2,760                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
|            |           | 1.250       | 170.37 | 11.500 |        | 4,770  | 5,550                                  | 6,580  | 7,250  | 8,160  | 8,840  | 9,410  | 10,200 | 10,980 | 12,580 | 2,760  | 2,760                                 | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970  | 2,970 | 2,970 | 2,970 |
| 16"        | 16"       | 0.375       | 62.64  | 15.250 | STD    | 30     | 1,250                                  | 1,460  | 1,730  | 1,900  |        |        |        |        |        | 860    | 1,000                                 | 1,680  | 1,850  |        |        |        |        |       |       |       |
|            |           | 0.406       | 67.68  | 15.188 |        |        | 1,350                                  | 1,580  | 1,870  | 2,060  |        |        |        |        |        | 930    | 1,080                                 | 1,820  | 2,000  |        |        |        |        |       |       |       |
|            |           | 0.438       | 72.86  | 15.124 |        |        | 1,460                                  | 1,700  | 2,020  | 2,220  |        |        |        |        |        | 1,000  | 1,170                                 | 1,960  | 2,160  |        |        |        |        |       |       |       |
|            |           | 0.469       | 77.87  | 15.062 |        |        | 1,560                                  | 1,820  | 2,160  | 2,380  |        |        |        |        |        | 1,070  | 1,250                                 | 2,100  | 2,310  |        |        |        |        |       |       |       |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo (Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

STD PARED NORMAL (Standard)

XS PARED DE ALTO ESPESOR (Extra Strong)

XXS PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
**LINE PIPE**

| FLUENCIA   |           | psi         | 30,500 | 35,500 | 42,100 | 46,400 | 52,200                                 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100 | 46,400 | 52,200                               | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |     |     |     |     |
|------------|-----------|-------------|--------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|-----|-----|-----|-----|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |     |     |     |     |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |     |     |     |     |
| pulg       | pulg      | pulg        | lb/pie | pulg   |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60 | X65 | X70 | X80 |
| 16"        | 16"       | 0.500       | 82.85  | 15.000 | XS     | 40     | 1,670                                  | 1,940  | 2,300  | 2,540  |        |        |        |        |        |        | 1,140                                | 1,330  | 2,240  | 2,470  |        |        |     |     |     |     |
|            |           | 0.562       | 92.75  | 14.876 |        |        | 1,870                                  | 2,180  | 2,590  | 2,850  |        |        |        |        |        |        | 1,290                                | 1,500  | 2,510  | 2,770  |        |        |     |     |     |     |
|            |           | 0.625       | 102.72 | 14.750 |        |        | 2,080                                  | 2,430  | 2,880  | 3,170  |        |        |        |        |        |        | 1,430                                | 1,660  | 2,800  | 2,970  |        |        |     |     |     |     |
|            |           | 0.656       | 107.50 | 14.688 |        | 60     | 2,190                                  | 2,550  | 3,020  | 3,330  |        |        |        |        |        |        | 1,500                                | 1,750  | 2,930  | 2,970  |        |        |     |     |     |     |
|            |           | 0.688       | 112.62 | 14.624 |        |        | 2,300                                  | 2,670  | 3,170  | 3,490  |        |        |        |        |        |        | 1,570                                | 1,830  | 2,970  | 2,970  |        |        |     |     |     |     |
|            |           | 0.750       | 122.27 | 14.500 |        |        | 2,500                                  | 2,910  | 3,450  | 3,810  |        |        |        |        |        |        | 1,720                                | 2,000  | 2,970  | 2,970  |        |        |     |     |     |     |
|            |           | 0.812       | 131.84 | 14.376 |        |        | 2,710                                  | 3,150  | 3,740  | 4,120  |        |        |        |        |        |        | 1,860                                | 2,160  | 2,970  | 2,970  |        |        |     |     |     |     |
|            |           | 0.844       | 136.61 | 14.312 |        | 80     | 2,820                                  | 3,280  | 3,890  | 4,280  |        |        |        |        |        |        | 1,930                                | 2,250  | 2,970  | 2,970  |        |        |     |     |     |     |
|            |           | 0.875       | 141.48 | 14.250 |        |        | 2,920                                  | 3,400  | 4,030  | 4,440  |        |        |        |        |        |        | 2,000                                | 2,330  | 2,970  | 2,970  |        |        |     |     |     |     |
|            |           | 1.000       | 160.35 | 14.000 |        |        | 3,340                                  | 3,880  | 4,600  | 5,080  |        |        |        |        |        |        | 2,290                                | 2,660  | 2,970  | 2,970  |        |        |     |     |     |     |
| 18"        | 18"       | 0.406       | 76.36  | 17.188 |        |        | 1,200                                  | 1,400  | 1,660  | 1,830  |        |        |        |        |        |        | 830                                  | 960    | 1,610  | 1,780  |        |        |     |     |     |     |
|            |           | 0.438       | 82.23  | 17.124 |        | 30     | 1,300                                  | 1,510  | 1,790  | 1,980  |        |        |        |        |        |        | 890                                  | 1,040  | 1,740  | 1,920  |        |        |     |     |     |     |
|            |           | 0.469       | 87.89  | 17.062 |        |        | 1,390                                  | 1,620  | 1,920  | 2,120  |        |        |        |        |        |        | 950                                  | 1,110  | 1,860  | 2,060  |        |        |     |     |     |     |
|            |           | 0.500       | 93.54  | 17.000 | XS     |        | 1,480                                  | 1,730  | 2,050  | 2,260  |        |        |        |        |        |        | 1,020                                | 1,180  | 1,990  | 2,190  |        |        |     |     |     |     |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo ( Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

**STD** PARED NORMAL (Standard)

**XS** PARED DE ALTO ESPESOR (Extra Strong)

**XXS** PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
LINE PIPE

|            |           | FLUENCIA    | psi    | 30,500 | 35,500 | 42,100 | 46,400                                 | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100 | 46,400                               | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |     |     |     |
|------------|-----------|-------------|--------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|--------|--------|-----|-----|-----|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |        |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |        |        |        |        |        |        |     |     |     |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.   | GRADO DE ACERO                         |        |        |        |        |        |        |        |        |        | GRADO DE ACERO                       |        |        |        |        |        |        |     |     |     |
| od         | od        | pulg        | lb/pie | pulg   |        |        | A                                      | B      | X42    | X46    | X52    | X56    | X60    | X65    | X70    | X80    | A                                    | B      | X42    | X46    | X52    | X56    | X60    | X65 | X70 | X80 |
| 18"        | 18"       | 0.562       | 104.76 | 16.876 | 40     | 1,670  | 1,940                                  | 2,300  | 2,540  |        |        |        |        |        |        |        | 1,140                                | 1,330  | 2,230  | 2,460  |        |        |        |     |     |     |
|            |           | 0.625       | 116.09 | 16.750 |        | 1,850  | 2,160                                  | 2,560  | 2,820  |        |        |        |        |        |        |        | 1,270                                | 1,480  | 2,490  | 2,740  |        |        |        |     |     |     |
|            |           | 0.688       | 127.32 | 16.624 |        | 2,040  | 2,370                                  | 2,820  | 3,100  |        |        |        |        |        |        |        | 1,400                                | 1,630  | 2,740  | 2,970  |        |        |        |     |     |     |
|            |           | 0.750       | 138.30 | 16.500 | 60     | 2,220  | 2,590                                  | 3,070  | 3,380  |        |        |        |        |        |        |        | 1,530                                | 1,780  | 2,970  | 2,970  |        |        |        |     |     |     |
|            |           | 0.812       | 149.20 | 16.376 |        | 2,410  | 2,800                                  | 3,320  | 3,660  |        |        |        |        |        |        |        | 1,650                                | 1,920  | 2,970  | 2,970  |        |        |        |     |     |     |
|            |           | 0.875       | 160.18 | 16.250 |        | 2,590  | 3,020                                  | 3,580  | 3,950  |        |        |        |        |        |        |        | 1,780                                | 2,070  | 2,970  | 2,970  |        |        |        |     |     |     |
|            |           | 0.938       | 171.08 | 16.124 |        | 2,780  | 3,240                                  | 3,840  | 4,230  |        |        |        |        |        |        |        | 1,910                                | 2,220  | 2,970  | 2,970  |        |        |        |     |     |     |
|            |           | 1.000       | 181.73 | 16.000 |        | 2,970  | 3,450                                  | 4,090  | 4,510  |        |        |        |        |        |        |        | 2,030                                | 2,370  | 2,970  | 2,970  |        |        |        |     |     |     |
| 20"        | 20"       | 0.438       | 91.59  | 19.124 |        | 1,170  | 1,360                                  | 1,610  | 1,780  |        |        |        |        |        |        |        | 800                                  | 930    | 1,660  | 1,830  |        |        |        |     |     |     |
|            |           | 0.469       | 97.92  | 19.062 |        | 1,250  | 1,460                                  | 1,730  | 1,900  |        |        |        |        |        |        |        | 860                                  | 1,000  | 1,780  | 1,960  |        |        |        |     |     |     |
|            |           | 0.500       | 104.23 | 19.000 | XS     | 1,330  | 1,550                                  | 1,840  | 2,030  |        |        |        |        |        |        |        | 920                                  | 1,070  | 1,890  | 2,090  |        |        |        |     |     |     |
|            |           | 0.562       | 116.78 | 18.876 |        | 1,500  | 1,750                                  | 2,070  | 2,280  |        |        |        |        |        |        |        | 1,030                                | 1,200  | 2,130  | 2,350  |        |        |        |     |     |     |
|            |           | 0.594       | 123.11 | 18.812 | 40     | 1,590  | 1,850                                  | 2,190  | 2,410  |        |        |        |        |        |        |        | 1,090                                | 1,270  | 2,250  | 2,480  |        |        |        |     |     |     |
|            |           | 0.625       | 129.45 | 18.750 |        | 1,670  | 1,940                                  | 2,300  | 2,540  |        |        |        |        |        |        |        | 1,140                                | 1,330  | 2,370  | 2,610  |        |        |        |     |     |     |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo (Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

**STD** PARED NORMAL (Standard)

**XS** PARED DE ALTO ESPESOR (Extra Strong)

**XXS** PARED DE GRAN ESPESOR (Doble Extra Strong)

**TUBO DE CONDUCCION**  
**LINE PIPE**

|            |           | FLUENCIA    | psi    | 30,500 | 35,500 | 42,100                                 | 46,400         | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 | 30,500 | 35,500 | 42,100                               | 46,400         | 52,200 | 56,600 | 60,200 | 65,300 | 70,300 | 80,500 |      |      |      |
|------------|-----------|-------------|--------|--------|--------|--|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|----------------|--------|--------|--------|--------|--------|--------|------|------|------|
| OD<br>ASTM | OD<br>API | DIMENSIONES |        |        |        | RESISTENCIA A LA PRESION INTERNA (psi) |                |        |        |        |        |        |        |        |        | PRESION DE PRUEBA HIDROSTATICA (psi) |                |        |        |        |        |        |        |      |      |      |
|            |           | ESP.        | PESO   | D.I.   | TIPO   | CED.                                   | GRADO DE ACERO |        |        |        |        |        |        |        |        |                                      | GRADO DE ACERO |        |        |        |        |        |        |      |      |      |
| pulg       | pulg      | pulg        | lb/pie | pulg   |        |  | L210           | L245   | L290   | L320   | L360   | L390   | L415   | L450   | L485   | L555                                 | L210           | L245   | L290   | L320   | L360   | L390   | L415   | L450 | L485 | L555 |
| 20"        | 20"       | 0.688       | 142.03 | 18.624 |        |  | 1,840          | 2,140  | 2,530  | 2,790  |        |        |        |        |        |                                      | 1,260          | 1,470  | 2,610  | 2,870  |        |        |        |      |      |      |
|            |           | 0.750       | 154.34 | 18.500 |        |  | 2,000          | 2,330  | 2,760  | 3,050  |        |        |        |        |        |                                      | 1,370          | 1,600  | 2,840  | 2,970  |        |        |        |      |      |      |
|            |           | 0.812       | 166.56 | 18.376 |        |  | 2,170          | 2,520  | 2,990  | 3,300  |        |        |        |        |        |                                      | 1,490          | 1,730  | 2,970  | 2,970  |        |        |        |      |      |      |
|            |           | 0.875       | 178.89 | 18.250 |        |  | 2,340          | 2,720  | 3,220  | 3,550  |        |        |        |        |        |                                      | 1,600          | 1,860  | 2,970  | 2,970  |        |        |        |      |      |      |
|            |           | 0.938       | 191.14 | 18.124 |        |  | 2,500          | 2,910  | 3,460  | 3,810  |        |        |        |        |        |                                      | 1,720          | 2,000  | 2,970  | 2,970  |        |        |        |      |      |      |
|            |           | 1.000       | 203.11 | 18.000 |        |  | 2,670          | 3,110  | 3,680  | 4,060  |        |        |        |        |        |                                      | 1,830          | 2,130  | 2,970  | 2,970  |        |        |        |      |      |      |

\*Grados de Acero A 25 y X 80, disponibles con previa solicitud.

\*Grados de Acero hasta X 52, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles en todos los diámetros.

\*Grados de Acero desde X56 hasta X70, niveles PSL1 ó PSL2 certificados conforme a la norma NACE MR0175 (dureza Max. 250 HV10) disponibles para diámetros menores o iguales a 16".

\*Grados de Acero desde B hasta X70 PSL2, certificados y marcados como servicio amargo ( Annex H of API 5L Ed. 44), disponibles para diámetros menores o iguales a 16".

**STD** PARED NORMAL (Standard)

**XS** PARED DE ALTO ESPESOR (Extra Strong)

**XXS** PARED DE GRAN ESPESOR (Doble Extra Strong)

TUBO DE PERFORACIÓN

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |             |                    |        |      |      |
|-------|------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|---|-------------|--------------------|--------|------|------|
|       |      | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-26 (IF) |             | GRADO DE ACERO API |        |      |      |
|       |      |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |               |   |             | E75                | X95    | G105 | S135 |
| 2 3/8 | 4.85 | Nuevo                | 0.190 | 1.995 | 2.375 | 1.3040            | Colapso               | psi    | 11,040             | 13,984                     | 15,456  | 19,035  |               | ID Conexión                                     | pg          | 1 3/4              |        |      |      |
|       |      |                      |       |       |       |                   | Tensión               | lb     | 97,817             | 123,902                    | 136,944 | 176,071 |               | Drift   | pg          | 1.625              |        |      |      |
|       |      |                      |       |       |       |                   | P. Interna            | psi    | 10,500             | 13,300                     | 14,700  | 18,900  |               | Peso ajustado                                   | lb/pie      | 5.26               |        |      |      |
|       |      |                      |       |       |       |                   | Torsión               | lb-pie | 4,763              | 6,033                      | 6,668   | 8,574   |               | Tensión   | lb          | 313,681            |        |      |      |
|       |      | Premium              | 0.152 | 1.995 | 2.299 | 1.0250            | Colapso               | psi    | 8,522              | 10,161                     | 10,912  | 12,891  |               | Torsión   | lb-pie      | 6,875              |        |      |      |
|       |      |                      |       |       |       |                   | Tensión               | lb     | 76,893             | 97,398                     | 107,650 | 138,407 |               | Nuevo   | OD Conexión | pg                 | 3 3/8  |      |      |
|       |      |                      |       |       |       |                   | P. Interna            | psi    | 9,600              | 12,160                     | 13,440  | 17,280  |               | Par de apriete                                  | lb-pie      | 4,125              |        |      |      |
|       |      |                      |       |       |       |                   | Torsión               | lb-pie | 3,725              | 4,719                      | 5,215   | 6,705   |               | Premium   | OD Conexión | pg                 | 3 1/8  |      |      |
|       |      | 2 <sup>a</sup>       | 0.133 | 1.995 | 2.261 | 0.8890            | Colapso               | psi    | 6,852              | 7,996                      | 8,491   | 9,664   |               | Par de apriete                                  | lb-pie      | 1,945              |        |      |      |
|       |      |                      |       |       |       |                   | Tensión               | lb     | 66,686             | 84,469                     | 93,360  | 120,035 |               | 2 <sup>a</sup>                                  | OD Conexión | pg                 | 3 3/32 |      |      |
|       |      |                      |       |       |       |                   | P. Interna            | psi    | 8,400              | 10,640                     | 11,760  | 15,120  |               | Par de apriete                                  | lb-pie      | 1,689              |        |      |      |
|       |      |                      |       |       |       |                   | Torsión               | lb-pie | 3,224              | 4,083                      | 4,513   | 5,802   |               |   |             |                    |        |      |      |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA     | Kpsi        | 75                   | 95    | 105   | 135   |                            |                       |                    |         |               |   |                    |  |                |                |         |         |         |        |
|--------------|-------------|----------------------|-------|-------|-------|----------------------------|-----------------------|--------------------|---------|---------------|---|--------------------|--|----------------|----------------|---------|---------|---------|--------|
| RESISTENCIA  | Kpsi        | 100                  | 105   | 115   | 145   |                            |                       |                    |         |               |   |                    |  |                |                |         |         |         |        |
| D.E.         | PESO        | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                    |         |               |   |                    |  |                |                |         |         |         |        |
|              |             | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-26 (IF) | GRADO DE ACERO API |  |                |                |         |         |         |        |
| pulg         | lb/pie      |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75                | X95     | G105          | S135  |                    |  | E75            | X95            | G105    | S135    |         |        |
| <b>2 3/8</b> | <b>6.65</b> | Nuevo                | 0.280 | 1.815 | 2.375 | 1.8429                     | Colapso               | psi                | 15,599  | 19,759        | 21,839  | 28,079             |  | ID Conexión    | pg             | 1 3/4   | 1 3/4   | 1 3/4   |        |
|              |             |                      |       |       |       |                            | Tensión               | lb                 | 138,214 | 175,072       | 193,500   | 248,786            |  | Drift          | pg             | 1.625   | 1.625   | 1.625   |        |
|              |             |                      |       |       |       |                            | P. Interna            | psi                | 15,474  | 19,600        | 21,663  | 27,853             |  | Peso ajustado  | lb/pie         | 6.99    | 7.11    | 7.11    |        |
|              |             |                      |       |       |       |                            | Torsión               | lb-pie             | 6,250   | 7,917         | 8,751   | 11,251             |  | Tensión        | lb             | 313,681 | 313,681 | 313,681 |        |
|              |             | Premium              | 0.224 | 1.815 | 2.263 | 1.4349                     | Colapso               | psi                | 13,378  | 16,945        | 18,729  | 24,080             |  | Torsión        | lb-pie         | 6,875   | 6,875   | 6,875   |        |
|              |             |                      |       |       |       |                            | Tensión               | lbx1000            | 107,616 | 136,313       | 150,662   | 193,709            |  | Nuevo          | OD Conexión    | pg      | 3 3/8   | 3 3/8   | 3 3/8  |
|              |             |                      |       |       |       |                            | P. Interna            | psi                | 14,147  | 17,920        | 19,806  | 25,465             |  |                | Par de apriete | lb-pie  | 4,125   | 4,125   | 4,125  |
|              |             |                      |       |       |       |                            | Torsión               | lb-pie             | 4,811   | 6,093         | 6,735   | 8,659              |  | Premium        | OD Conexión    | pg      | 3 3/16  | 3 1/4   | 3 9/32 |
|              |             | 2 <sup>a</sup>       | 0.196 | 1.815 | 2.207 | 1.2383                     | Colapso               | psi                | 12,138  | 15,375        | 16,993  | 21,849             |  |                | Par de apriete | lb-pie  | 2,467   | 3,005   | 3,279  |
|              |             |                      |       |       |       |                            | Tensión               | lbx1000            | 92,871  | 117,636       | 130,019   | 167,167            |  | 2 <sup>a</sup> | OD Conexión    | pg      | 3 5/32  | 3 7/32  | 3 1/4  |
|              |             |                      |       |       |       |                            | P. Interna            | psi                | 12,379  | 15,680        | 17,331  | 22,282             |  |                | Par de apriete | lb-pie  | 2,204   | 2,734   | 3,005  |
|              |             |                      |       |       |       |                            | Torsión               | lb-pie             | 4,130   | 5,232         | 5,782   | 7,434              |  |                |                |         |         |         |        |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**

DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.<br>pulg | PESO<br>lb/pie | DIMENSIONES DEL TUBO |       |       |       |                   |                       |         |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |             |                    |         |  |  |
|--------------|----------------|----------------------|-------|-------|-------|-------------------|-----------------------|---------|--------------------|----------------------------|---------|---------|---------------|---|-------------|--------------------|---------|--|--|
|              |                | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |         | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-31 (IF) |             | GRADO DE ACERO API |         |  |  |
|              |                |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> | E75                   | X95     | G105               | S135                       | E75     | X95     | G105          | S135  | ID Conexión | pg                 | 2 1/8   |  |  |
| 2 7/8        | 6.85           | Nuevo                | 0.217 | 2.441 | 2.875 | 1.8120            | Colapso               | psi     | 10,467             | 12,940                     | 14,020  | 17,034  |               | Drift   | pg          | 2.000              |         |  |  |
|              |                |                      |       |       |       |                   | Tensión               | lb      | 135,902            | 172,143                    | 190,263 | 244,624 |               | Peso ajustado                                   | lb/pie      | 7.50               |         |  |  |
|              |                |                      |       |       |       |                   | P. Interna            | psi     | 9,907              | 12,548                     | 13,869  | 17,832  |               | Tensión   | lb          | 447,130            |         |  |  |
|              |                |                      |       |       |       |                   | Torsión               | lb-pie  | 8,083              | 10,238                     | 11,316  | 14,549  |               | Torsión   | lb-pie      | 12,053             |         |  |  |
|              |                | Premium              | 0.174 | 2.441 | 2.788 | 1.4260            | Colapso               | psi     | 7,640              | 9,017                      | 9,633   | 11,180  |               | Nuevo   | OD Conexión | pg                 | 4 1/8   |  |  |
|              |                |                      |       |       |       |                   | Tensión               | lbx1000 | 106,946            | 135,465                    | 149,725 | 192,503 |               | Par de apriete                                  | lb-pie      | 7,122              |         |  |  |
|              |                |                      |       |       |       |                   | P. Interna            | psi     | 9,057              | 11,473                     | 12,680  | 16,303  |               | Premium   | OD Conexión | pg                 | 3 11/16 |  |  |
|              |                |                      |       |       |       |                   | Torsión               | lb-pie  | 6,332              | 8,020                      | 8,865   | 11,397  |               | Par de apriete                                  | lb-pie      | 3,154              |         |  |  |
|              |                | 2 <sup>a</sup>       | 0.152 | 2.441 | 2.745 | 1.2374            | Colapso               | psi     | 6,055              | 6,963                      | 7,335   | 8,123   |               | 2 <sup>a</sup>                                  | OD Conexión | pg                 | 3 21/32 |  |  |
|              |                |                      |       |       |       |                   | Tensión               | lbx1000 | 92,801             | 117,549                    | 129,922 | 167,043 |               | Par de apriete                                  | lb-pie      | 2,804              |         |  |  |
|              |                |                      |       |       |       |                   | P. Interna            | psi     | 7,925              | 10,039                     | 11,095  | 14,265  |               |   |             |                    |         |  |  |
|              |                |                      |       |       |       |                   | Torsión               | lb-pie  | 5,484              | 6,946                      | 7,677   | 9,871   |               |   |             |                    |         |  |  |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |             |                    |         |         |         |        |
|-------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|---|-------------|--------------------|---------|---------|---------|--------|
|       |       | CLASE                | ESP.  | D.I.  | D.E   | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-31 (IF) |             | GRADO DE ACERO API |         |         |         |        |
|       |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> | E75                   | X95    | G105               | S135                       | E75     | X95     | G105          | S135  | ID Conexión | pg                 | 2 1/8   | 2       | 2       | 1 5/8  |
| 2 7/8 | 10.40 | Nuevo                | 0.362 | 2.151 | 2.875 | 2.8579            | Colapso               | psi    | 16,509             | 20,911                     | 23,112  | 29,716  |               | Drift   | pg          | 1.963              | 1.875   | 1.875   | 1.500   |        |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 214,344            | 271,503                    | 300,082 | 385,820 |               | Peso ajustado                                   | lb/pie      | 10.87              | 11.09   | 11.09   | 11.55   |        |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 16,526             | 20,933                     | 23,137  | 29,747  |               | Tensión   | lb          | 447,130            | 495,726 | 495,726 | 623,844 |        |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 11,554             | 14,635                     | 16,176  | 20,798  |               | Torsión   | lb-pie      | 12,053             | 13,389  | 13,389  | 17,170  |        |
|       |       | Premium              | 0.290 | 2.151 | 2.730 | 2.2005            | Colapso               | psi    | 14,223             | 18,016                     | 19,912  | 25,602  |               | Nuevo   | OD Conexión | pg                 | 4 1/8   | 4 1/8   | 4 1/8   | 4 3/8  |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 166,535            | 210,945                    | 233,149 | 299,764 |               | Par de apriete                                  | lb-pie      | 7,122              | 7,918   | 7,918   | 10,167  |        |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 15,110             | 19,139                     | 21,153  | 27,197  |               | Premium   | OD Conexión | pg                 | 3 13/16 | 3 29/32 | 3 15/16 | 4 1/16 |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 8,858              | 11,220                     | 12,401  | 15,945  |               | Par de apriete                                  | lb-pie      | 4,957              | 5,726   | 6,110   | 7,694   |        |
|       |       | 2 <sup>a</sup>       | 0.253 | 2.151 | 2.658 | 1.9141            | Colapso               | psi    | 12,938             | 16,388                     | 18,113  | 23,288  |               | 2 <sup>a</sup>                                  | OD Conexión | pg                 | 3 3/4   | 3 27/32 | 3 7/8   | 4      |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 143,557            | 181,839                    | 200,980 | 258,403 |               | Par de apriete                                  | lb-pie      | 3,867              | 4,969   | 5,345   | 6,893   |        |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 13,221             | 16,746                     | 18,509  | 23,798  |               |   |             |                    |         |         |         |        |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 7,591              | 9,615                      | 10,627  | 13,663  |               |   |             |                    |         |         |         |        |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

|             |      |     |     |     |     |
|-------------|------|-----|-----|-----|-----|
| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

|             |      |     |     |     |     |
|-------------|------|-----|-----|-----|-----|
| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |                |                    |         |      |      |  |
|-------|------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|---|----------------|--------------------|---------|------|------|--|
|       |      | CLASE                | ESP.  | D.I.  | D.E   | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-38 (IF) |                | GRADO DE ACERO API |         |      |      |  |
|       |      |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |               |   |                | E75                | X95     | G105 | S135 |  |
| 3 1/2 | 9.50 | Nuevo                | 0.254 | 2.992 | 3.500 | 2.5902            | Colapso               | psi    | 10,001             | 12,077                     | 13,055  | 15,748  |               | ID Conexión                                     | pg             | 2 11/16            |         |      |      |  |
|       |      |                      |       |       |       |                   | Tensión               | lb     | 194,264            | 246,068                    | 271,970 | 349,676 |               | Drift   | pg             | 2.563              |         |      |      |  |
|       |      |                      |       |       |       |                   | Presión Interna       | psi    | 9,525              | 12,065                     | 13,335  | 17,145  |               | Peso ajustado                                   | lb/pie         | 10.58              |         |      |      |  |
|       |      |                      |       |       |       |                   | Torsión               | lb-pie | 14,146             | 17,918                     | 19,805  | 25,463  |               | Tensión   | lb             | 587,308            |         |      |      |  |
|       |      | Premium              | 0.203 | 2.992 | 3.398 | 2.0397            | Colapso               | psi    | 7,074              | 8,284                      | 8,813   | 10,093  |               | Torsión   | lb-pie         | 18,107             |         |      |      |  |
|       |      |                      |       |       |       |                   | Tensión               | lb     | 152,979            | 193,774                    | 214,171 | 275,363 |               | Nuevo   | OD Conexión    | pg                 | 4 3/4   |      |      |  |
|       |      |                      |       |       |       |                   | Presión Interna       | psi    | 8,709              | 11,031                     | 12,192  | 15,675  |               |   | Par de apriete | lb-pie             | 10,864  |      |      |  |
|       |      |                      |       |       |       |                   | Torsión               | lb-pie | 11,094             | 14,025                     | 15,531  | 19,968  |               | Premium   | OD Conexión    | pg                 | 4 13/32 |      |      |  |
|       |      | 2 <sup>a</sup>       | 0.178 | 2.992 | 3.348 | 1.7706            | Colapso               | psi    | 5,544              | 6,301                      | 6,596   | 7,137   |               |   | Par de apriete | lb-pie             | 5,773   |      |      |  |
|       |      |                      |       |       |       |                   | Tensión               | lb     | 132,793            | 168,204                    | 185,910 | 239,027 |               | 2 <sup>a</sup>                                  | OD Conexión    | pg                 | 4 11/32 |      |      |  |
|       |      |                      |       |       |       |                   | Presión Interna       | psi    | 7,620              | 9,652                      | 10,668  | 13,716  |               |   | Par de apriete | lb-pie             | 4,797   |      |      |  |
|       |      |                      |       |       |       |                   | Torsión               | lb-pie | 9,612              | 12,176                     | 13,457  | 17,302  |               |   |                |                    |         |      |      |  |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

## TUBO DE PERFORACION

DRILL PIPE

| FLUENCIA     | Kpsi         | 75                   | 95    | 105   | 135   |                            |                       |                                 |               |   |                                 |
|--------------|--------------|----------------------|-------|-------|-------|----------------------------|-----------------------|---------------------------------|---------------|---|---------------------------------|
| RESISTENCIA  | Kpsi         | 100                  | 105   | 115   | 145   |                            |                       |                                 |               |   |                                 |
| D.E.         | PESO         | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                                 |               |   |                                 |
| pulg         | lb/pie       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API              | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-38 (IF) | GRADO DE ACERO API              |
|              |              |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75 X95 G105 S135               |               |   | E75 X95 G105 S135               |
| <b>3 1/2</b> | <b>13.30</b> | Nuevo                | 0.368 | 2.764 | 3.500 | 3.6209                     | Colapso psi           | 14,113 17,877 19,758 25,404     |               | ID Conexión pg                                  | 2 11/16 2 9/16 2 7/16 2 1/8     |
|              |              |                      |       |       |       |                            | Tensión lb            | 271,569 343,988 380,197 488,825 |               | Drift pg  | 2.457 2.438 2.313 2.000         |
|              |              |                      |       |       |       |                            | Presión Interna psi   | 13,800 17,480 19,320 24,840     |               | Peso ajustado lb/pie                            | 13.93 14.62 14.71 14.92         |
|              |              |                      |       |       |       |                            | Torsión lb-pie        | 18,551 23,498 25,972 33,392     |               | Tensión lb                                      | 587,308 649,158 708,063 842,440 |
|              |              | Premium              | 0.294 | 2.764 | 3.353 | 2.8287                     | Colapso psi           | 12,015 15,218 16,820 21,626     |               | Torsión lb-pie                                  | 18,107 20,326 22,213 26,515     |
|              |              |                      |       |       |       |                            | Tensión lb            | 212,150 268,723 297,010 381,870 |               | Nuevo OD Conexión pg                            | 4 3/4 5 5 5                     |
|              |              |                      |       |       |       |                            | Presión Interna psi   | 12,617 15,982 17,664 22,711     |               | Par de apriete lb-pie                           | 10,864 12,196 13,328 15,909     |
|              |              |                      |       |       |       |                            | Torsión lb-pie        | 14,361 18,191 20,106 25,850     |               | Premium OD Conexión pg                          | 4 1/2 4 19/32 4 21/32 4 13/16   |
|              |              | 2 <sup>a</sup>       | 0.258 | 2.764 | 3.299 | 2.4453                     | Colapso psi           | 10,858 13,753 15,042 18,396     |               | Par de apriete lb-pie                           | 7,274 8,822 9,879 12,614        |
|              |              |                      |       |       |       |                            | Tensión lb            | 183,398 232,304 256,757 330,116 |               | 2 <sup>a</sup> OD Conexión pg                   | 4 7/16 4 17/32 4 19/32 4 23/32  |
|              |              |                      |       |       |       |                            | Presión Interna psi   | 11,040 13,984 15,456 19,872     |               | Par de apriete lb-pie                           | 6,268 7,785 8,822 10,957        |
|              |              |                      |       |       |       |                            | Torsión lb-pie        | 12,365 15,663 17,312 22,258     |               |   |                                 |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |         |                    | DIMENSIONES DE LA CONEXION |         |         |               |  |             |         |                    |         |         |         |
|-------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|---------|--------------------|----------------------------|---------|---------|---------------|--|-------------|---------|--------------------|---------|---------|---------|
|       |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |         | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROP. MECANICAS DE LA CONEXION NC-38 (IF) Y NC-40 (4FH) PARA S-135 |             |         | GRADO DE ACERO API |         |         |         |
|       |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |         | E75                | X95                        | G105    | S135    |               | E75  | X95         | G105    | S135               |         |         |         |
| 3 1/2 | 15.50 | Nuevo                | 0.449 | 2.602 | 3.500 | 4.3037            | Colapso               | psi     | 16,774             | 21,247                     | 23,484  | 30,194  |               | ID Conexión  | pg          | 2 9/16  | 2 7/16             | 2 1/8   | 2 1/4   |         |
|       |       |                      |       |       |       |                   | Tensión               | lb      | 322,775            | 408,848                    | 451,885 | 580,995 |               | Drift  | pg          | 2.414   | 2.313              | 2.000   | 2.125   |         |
|       |       |                      |       |       |       |                   | P. Interna            | psi     | 16,838             | 21,328                     | 29,520  | 30,308  |               | Peso ajustado  | lb/pie      | 16.54   | 16.82              | 17.03   | 17.57   |         |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie  | 21,086             | 26,708                     | 29,530  | 37,954  |               | Tensión  | lb          | 649,158 | 708,063            | 842,440 | 979,996 |         |
|       |       | Premium              | 0.359 | 2.602 | 3.320 | 3.3416            | Colapso               | psi     | 14,472             | 18,331                     | 20,260  | 26,049  |               | Torsión  | lb-pie      | 20,326  | 22,213             | 26,515  | 32,943  |         |
|       |       |                      |       |       |       |                   | Tensión               | lbx1000 | 250,620            | 317,452                    | 350,868 | 451,115 |               | Nuevo  | OD Conexión | pg      | 5                  | 5       | 5       | 5 1/2   |
|       |       |                      |       |       |       |                   | P. Interna            | psi     | 15,394             | 19,499                     | 21,552  | 27,710  |               | Par de apriete   | lb-pie      | 12,196  | 13,328             | 15,909  | 19,766  |         |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie  | 16,146             | 20,452                     | 22,605  | 29,063  |               | Premium  | OD Conexión | pg      | 4 17/32            | 4 21/32 | 4 23/32 | 5 3/32  |
|       |       | 2 <sup>a</sup>       | 0.314 | 2.602 | 3.231 | 2.8796            | Colapso               | psi     | 13,174             | 16,686                     | 18,443  | 23,712  |               | Par de apriete   | lb-pie      | 7,785   | 9,879              | 10,957  | 14,419  |         |
|       |       |                      |       |       |       |                   | Tensión               | lbx1000 | 215,967            | 273,558                    | 302,354 | 388,741 |               | 2 <sup>a</sup>   | OD Conexión | pg      | 4 15/32            | 4 19/32 | 4 5/8   | 4 31/32 |
|       |       |                      |       |       |       |                   | P. Interna            | psi     | 13,470             | 17,062                     | 18,858  | 24,246  |               | Par de apriete   | lb-pie      | 6,769   | 8,822              | 9,348   | 11,963  |         |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie  | 13,828             | 17,515                     | 19,359  | 24,890  |               |  |             |         |                    |         |         |         |

IF: Internal Flush

FH: Full Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi   | 75                   | 95    | 105   | 135   |                            |                       |                    |         |               |   |                    |                               |         |     |      |      |  |
|-------------|--------|----------------------|-------|-------|-------|----------------------------|-----------------------|--------------------|---------|---------------|---|--------------------|-------------------------------|---------|-----|------|------|--|
| RESISTENCIA | Kpsi   | 100                  | 105   | 115   | 145   |                            |                       |                    |         |               |   |                    |                               |         |     |      |      |  |
| D.E.        | PESO   | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                    |         |               |   |                    |                               |         |     |      |      |  |
|             |        | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-46 (IF) | GRADO DE ACERO API |                               |         |     |      |      |  |
| pulg        | lb/pie |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75                | X95     | G105          | S135  |                    |                               | E75     | X95 | G105 | S135 |  |
| 4           | 11.85  | Nuevo                | 0.262 | 3.476 | 4.000 | 3.0767                     | Colapso psi           | 8,381              | 9,978   | 10,708        | 12,618  |                    | ID Conexión lpg               | 3 1/4   |     |      |      |  |
|             |        |                      |       |       |       |                            | Tensión lb            | 230,775            | 292,290 | 323,057       | 415,360   |                    | Drift pg                      | 3.125   |     |      |      |  |
|             |        |                      |       |       |       |                            | Presión Interna psi   | 8,597              | 10,889  | 12,036        | 15,474  |                    | Peso ajustado lb/pie          | 13.52   |     |      |      |  |
|             |        |                      |       |       |       |                            | Torsión lb-pie        | 19,474             | 24,668  | 27,264        | 35,054  |                    | Tensión lb                    | 901,164 |     |      |      |  |
|             |        | Premium              | 0.210 | 3.476 | 3.895 | 2.4269                     | Colapso psi           | 5,704              | 6,508   | 6,827         | 7,445   |                    | Torsión lb-pie                | 33,625  |     |      |      |  |
|             |        |                      |       |       |       |                            | Tensión lb            | 182,016            | 230,554 | 254,823       | 327,630   |                    | Nuevo OD Conexión pg          | 6       |     |      |      |  |
|             |        |                      |       |       |       |                            | Presión Interna psi   | 7,860              | 9,956   | 11,004        | 14,148  |                    | Par de apriete lb-pie         | 20,175  |     |      |      |  |
|             |        |                      |       |       |       |                            | Torsión lb-pie        | 15,310             | 19,392  | 21,433        | 27,557  |                    | Premium OD Conexión pg        | 5 7/32  |     |      |      |  |
|             |        | 2 <sup>a</sup>       | 0.183 | 3.476 | 3.843 | 2.1084                     | Colapso psi           | 4,311              | 4,702   | 4,876         | 5,436   |                    | Par de apriete lb-pie         | 7,843   |     |      |      |  |
|             |        |                      |       |       |       |                            | Tensión lb            | 158,132            | 200,301 | 221,385       | 284,638   |                    | 2 <sup>a</sup> OD Conexión pg | 5 5/32  |     |      |      |  |
|             |        |                      |       |       |       |                            | Presión Interna psi   | 6,878              | 8,712   | 9,629         | 12,380  |                    | Par de apriete lb-pie         | 6,476   |     |      |      |  |
|             |        |                      |       |       |       |                            | Torsión lb-pie        | 13,218             | 16,823  | 18,594        | 23,907  |                    |                               |         |     |      |      |  |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E. | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |                |                    |         |         |           |        |
|------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|---|----------------|--------------------|---------|---------|-----------|--------|
|      |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-46 (IF) |                | GRADO DE ACERO API |         |         |           |        |
|      |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |               |   |                | E75                | X95     | G105    | S135      |        |
| 4    | 14.00 | Nuevo                | 0.330 | 3.340 | 4.000 | 3.8048            | Colapso               | psi    | 11,354             | 14,382                     | 15,896  | 20,141  |               | ID Conexión                                     | pg             | 3 1/4              | 3 1/4   | 3 1/4   | 3         |        |
|      |       |                      |       |       |       |                   | Tensión               | lb     | 285,359            | 361,454                    | 399,502 | 513,646 |               | Drift   | pg             | 3.125              | 3.125   | 3.125   | 2.875     |        |
|      |       |                      |       |       |       |                   | Presión Interna       | psi    | 10,828             | 13,716                     | 15,159  | 19,491  |               | Peso ajustado                                   | lb/pie         | 15.85              | 16.19   | 16.19   | 16.42     |        |
|      |       |                      |       |       |       |                   | Torsión               | lb-pie | 23,288             | 29,498                     | 32,603  | 41,918  |               | Tensión   | lb             | 901,164            | 901,164 | 901,164 | 1,048,426 |        |
|      |       | Premium              | 0.264 | 3.340 | 3.868 | 2.9891            | Colapso               | psi    | 9,012              | 10,795                     | 11,622  | 13,836  |               | Torsión   | lb-pie         | 33,625             | 33,625  | 33,625  | 39,229    |        |
|      |       |                      |       |       |       |                   | Tensión               | lb     | 224,182            | 283,963                    | 313,854 | 403,527 |               | Nuevo   | OD Conexión    | pg                 | 6       | 6       | 6         | 6      |
|      |       |                      |       |       |       |                   | Presión Interna       | psi    | 9,900              | 12,540                     | 13,860  | 17,820  |               |   | Par de apriete | lb-pie             | 20,175  | 20,175  | 20,175    | 23,538 |
|      |       |                      |       |       |       |                   | Torsión               | lb-pie | 18,196             | 23,048                     | 25,474  | 32,752  |               | Premium   | OD Conexión    | pg                 | 5 9/32  | 5 3/8   | 5 7/16    | 5 9/16 |
|      |       | 2 <sup>a</sup>       | 0.231 | 3.340 | 3.802 | 2.5915            | Colapso               | psi    | 7,295              | 8,570                      | 9,134   | 10,520  |               |   | Par de apriete | lb-pie             | 9,233   | 11,363  | 12,813    | 15,787 |
|      |       |                      |       |       |       |                   | Tensión               | lb     | 194,363            | 246,193                    | 272,108 | 349,852 |               | 2 <sup>a</sup>                                  | OD Conexión    | pg                 | 5 7/32  | 5 5/16  | 5 11/32   | 5 1/2  |
|      |       |                      |       |       |       |                   | Presión Interna       | psi    | 8,663              | 10,973                     | 12,128  | 15,593  |               |   | Par de apriete | lb-pie             | 7,843   | 9,937   | 10,647    | 14,288 |
|      |       |                      |       |       |       |                   | Torsión               | lb-pie | 15,738             | 19,935                     | 22,034  | 28,329  |               |   |                |                    |         |         |           |        |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi         | 75                   | 95    | 105   | 135   |                            |                       |                    |         |         |         |
|-------------|--------------|----------------------|-------|-------|-------|----------------------------|-----------------------|--------------------|---------|---------|---------|
| RESISTENCIA | Kpsi         | 100                  | 105   | 115   | 145   |                            |                       |                    |         |         |         |
| D.E.        | PESO         | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                    |         |         |         |
| pulg        | lb/pie       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API |         |         |         |
|             |              |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75                | X95     | G105    | S135    |
| <b>4</b>    | <b>15.70</b> | Nuevo                | 0.380 | 3.240 | 4.000 | 4.3216                     | Colapso psi           | 12,896             | 16,335  | 18,055  | 23,213  |
|             |              |                      |       |       |       |                            | Tensión lb            | 324,118            | 410,550 | 453,765 | 583,413 |
|             |              |                      |       |       |       |                            | Presión Interna psi   | 12,469             | 15,794  | 17,456  | 22,444  |
|             |              |                      |       |       |       |                            | Torsión lb-pie        | 25,810             | 32,692  | 36,134  | 46,458  |
|             |              | Premium              | 0.304 | 3.240 | 3.848 | 3.3847                     | Colapso psi           | 10,914             | 13,825  | 15,190  | 18,593  |
|             |              |                      |       |       |       |                            | Tensión lb            | 253,851            | 321,544 | 355,391 | 456,931 |
|             |              |                      |       |       |       |                            | Presión Interna psi   | 11,400             | 14,440  | 15,960  | 20,520  |
|             |              |                      |       |       |       |                            | Torsión lb-pie        | 20,067             | 25,418  | 28,094  | 36,120  |
|             |              | 2 <sup>a</sup>       | 0.266 | 3.240 | 3.772 | 2.9298                     | Colapso psi           | 9,531              | 11,468  | 12,374  | 14,840  |
|             |              |                      |       |       |       |                            | Tensión lb            | 219,738            | 278,335 | 307,633 | 395,528 |
|             |              |                      |       |       |       |                            | Presión Interna psi   | 9,975              | 12,635  | 13,965  | 17,955  |
|             |              |                      |       |       |       |                            | Torsión lb-pie        | 17,315             | 21,932  | 24,241  | 31,166  |

| FLUENCIA    | Kpsi   | 75                   | 95   | 105  | 135  |                            |                               |                    |     |      |      |
|-------------|--------|----------------------|------|------|------|----------------------------|-------------------------------|--------------------|-----|------|------|
| RESISTENCIA | Kpsi   | 100                  | 105  | 115  | 145  |                            |                               |                    |     |      |      |
| D.E.        | PESO   | DIMENSIONES DEL TUBO |      |      |      | DIMENSIONES DE LA CONEXION |                               |                    |     |      |      |
| pulg        | lb/pie | CLASE                | ESP. | D.I. | D.E. | AREA TRANS.                | PROPIEDADES MECANICAS         | GRADO DE ACERO API |     |      |      |
|             |        |                      | pulg | pulg | pulg | pulg <sup>2</sup>          |                               | E75                | X95 | G105 | S135 |
|             |        |                      |      |      |      |                            | ID Conexión pg                | 3 1/4              |     |      |      |
|             |        |                      |      |      |      |                            | Drift pg                      | 3.095              |     |      |      |
|             |        |                      |      |      |      |                            | Peso ajustado lb/pie          | 17.54              |     |      |      |
|             |        |                      |      |      |      |                            | Tensión lb                    | 901,164            |     |      |      |
|             |        |                      |      |      |      |                            | Torsión lb-pie                | 33,625             |     |      |      |
|             |        |                      |      |      |      |                            | Nuevo OD Conexión pg          | 6                  |     |      |      |
|             |        |                      |      |      |      |                            | Par de apriete lb-pie         | 20,175             |     |      |      |
|             |        |                      |      |      |      |                            | Premium OD Conexión pg        | 5 5/16             |     |      |      |
|             |        |                      |      |      |      |                            | Par de apriete lb-pie         | 9,937              |     |      |      |
|             |        |                      |      |      |      |                            | 2 <sup>a</sup> OD Conexión pg | 5 1/4              |     |      |      |
|             |        |                      |      |      |      |                            | Par de apriete lb-pie         | 8,535              |     |      |      |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**

DRILL PIPE

|                    |      |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|
| <b>FLUENCIA</b>    | Kpsi | 75  | 95  | 105 | 135 |
| <b>RESISTENCIA</b> | Kpsi | 100 | 105 | 115 | 145 |

|                    |      |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|
| <b>FLUENCIA</b>    | Kpsi | 75  | 95  | 105 | 135 |
| <b>RESISTENCIA</b> | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |        |                    |     |      |      |
|-------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|---|--------|--------------------|-----|------|------|
|       |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-50 (IF) |        | GRADO DE ACERO API |     |      |      |
|       |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |               |   |        | E75                | X95 | G105 | S135 |
| 4 1/2 | 13.75 | Nuevo                | 0.271 | 3.958 | 4.500 | 3.6005            | Colapso               | psi    | 7,173              | 8,412                      | 8,956   | 10,283  | Nuevo         | ID Conexión                                     | pg     | 3 3/4              |     |      |      |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 270,034            | 342,043                    | 378,047 | 486,061 |               | Drift   | pg     | 3.625              |     |      |      |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 7,904              | 10,012                     | 11,066  | 14,228  |               | Peso ajustado                                   | lb/pie | 15.36              |     |      |      |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 25,907             | 32,816                     | 36,270  | 46,633  |               | Tensión   | lb     | 939,096            |     |      |      |
|       |       | Premium              | 0.217 | 3.958 | 4.392 | 2.8434            | Colapso               | psi    | 4,686              | 5,190                      | 5,352   | 5,908   |               | Torsión   | lb-pie | 37,676             |     |      |      |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 213,258            | 270,127                    | 298,561 | 383,864 |               | OD Conexión                                     | pg     | 6 5/8              |     |      |      |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 7,227              | 9,154                      | 10,117  | 13,008  |               | Par de apriete                                  | lb-pie | 22,836             |     |      |      |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 20,403             | 25,844                     | 28,564  | 36,725  |               |   |        |                    |     |      |      |
|       |       | 2 <sup>a</sup>       | 0.190 | 3.958 | 4.337 | 2.4719            | Colapso               | psi    | 3,397              | 3,845                      | 4,016   | 4,287   |               |   |        |                    |     |      |      |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 185,389            | 234,827                    | 259,545 | 333,701 |               |   |        |                    |     |      |      |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 6,323              | 8,010                      | 8,853   | 11,382  |               |   |        |                    |     |      |      |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 17,715             | 22,439                     | 24,801  | 31,887  |               |   |        |                    |     |      |      |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA     | Kpsi   | 75                   | 95    | 105   | 135   |                            |                       |                    |         |               |   |                    |                               |         |           |           |           |
|--------------|--------|----------------------|-------|-------|-------|----------------------------|-----------------------|--------------------|---------|---------------|---|--------------------|-------------------------------|---------|-----------|-----------|-----------|
| RESISTENCIA  | Kpsi   | 100                  | 105   | 115   | 145   |                            |                       |                    |         |               |   |                    |                               |         |           |           |           |
| D.E.         | PESO   | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                    |         |               |   |                    |                               |         |           |           |           |
|              |        | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-46 (XH) | GRADO DE ACERO API |                               |         |           |           |           |
| pulg         | lb/pie |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75                | X95     | G105          | S135  |                    |                               | E75     | X95       | G105      | S135      |
| <b>4 1/2</b> | 16.60  | Nuevo                | 0.337 | 3.826 | 4.500 | 4.4074                     | Colapso psi           | 10,392             | 12,765  | 13,825        | 16,773  |                    | ID Conexión pg                | 3 1/4   | 3         | 3         | 2 3/4     |
|              |        |                      |       |       |       |                            | Tensión lb            | 330,558            | 418,707 | 462,781       | 595,004   |                    | Drift pg                      | 3.125   | 2.875     | 2.875     | 2.625     |
|              |        |                      |       |       |       |                            | Presión Interna psi   | 9,829              | 12,450  | 13,761        | 17,693  |                    | Peso ajustado lb/pie          | 18.37   | 18.79     | 18.79     | 19.00     |
|              |        |                      |       |       |       |                            | Torsión lb-pie        | 30,807             | 39,022  | 43,130        | 55,453  |                    | Tensión lb                    | 901,164 | 1,048,426 | 1,048,426 | 1,183,908 |
|              |        | Premium              | 0.270 | 3.826 | 4.365 | 3.4689                     | Colapso psi           | 7,525              | 8,868   | 9,467         | 10,964  |                    | Torsión lb-pie                | 33,993  | 39,659    | 39,659    | 44,871    |
|              |        |                      |       |       |       |                            | Tensión lb            | 260,165            | 329,542 | 364,231       | 468,297   |                    | Nuevo OD Conexión pg          | 6 1/4   | 6 1/4     | 6 1/4     | 6 1/4     |
|              |        |                      |       |       |       |                            | Presión Interna psi   | 8,987              | 11,383  | 12,581        | 16,176  |                    | Par de apriete lb-pie         | 20,396  | 20,396    | 23,795    | 26,923    |
|              |        |                      |       |       |       |                            | Torsión lb-pie        | 24,139             | 30,576  | 33,795        | 43,450  |                    | Premium OD Conexión pg        | 5 13/32 | 5 17/32   | 5 19/32   | 5 25/32   |
|              |        | 2 <sup>a</sup>       | 0.236 | 3.826 | 4.298 | 3.0103                     | Colapso psi           | 5,951              | 6,828   | 7,185         | 7,923   |                    | Par de apriete lb-pie         | 12,085  | 15,035    | 16,546    | 21,230    |
|              |        |                      |       |       |       |                            | Tensión lb            | 225,771            | 285,977 | 316,080       | 406,388   |                    | 2 <sup>a</sup> OD Conexión pg | 5 11/32 | 5 7/16    | 5 1/2     | 5 21/32   |
|              |        |                      |       |       |       |                            | Presión Interna psi   | 7,863              | 9,960   | 11,009        | 14,154  |                    | Par de apriete lb-pie         | 10,647  | 12,813    | 14,288    | 18,083    |
|              |        |                      |       |       |       |                            | Torsión lb-pie        | 20,908             | 26,483  | 29,271        | 37,634  |                    |                               |         |           |           |           |

XH: Extra Hole.

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |                |                    |         |         |           |         |
|-------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|---|----------------|--------------------|---------|---------|-----------|---------|
|       |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-50 (IF) |                | GRADO DE ACERO API |         |         |           |         |
|       |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |               |   |                | E75                | X95     | G105    | S135      |         |
| 4 1/2 | 16.60 | Nuevo                | 0.337 | 3.826 | 4.500 | 4.4074            | Colapso               | psi    | 10,392             | 12,765                     | 13,825  | 16,773  |               | ID Conexión                                     | pg             | 3 3/4              | 3 3/4   | 3 3/4   | 3 1/2     |         |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 330,558            | 418,707                    | 462,781 | 595,004 |               | Drift   | pg             | 3.625              | 3.625   | 3.625   | 3.375     |         |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 9,829              | 12,450                     | 13,761  | 17,693  |               | Peso ajustado                                   | lb/pie         | 17.95              | 18.36   | 18.36   | 18.62     |         |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 30,807             | 39,022                     | 43,130  | 55,453  |               | Tensión   | lb             | 939,095            | 939,095 | 939,095 | 1,109,920 |         |
|       |       | Premium              | 0.270 | 3.826 | 4.365 | 3.4689            | Colapso               | psi    | 7,525              | 8,868                      | 9,467   | 10,964  |               | Torsión   | lb-pie         | 37,676             | 37,676  | 37,676  | 44,673    |         |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 260,165            | 329,542                    | 364,231 | 468,297 |               | Nuevo   | OD Conexión    | pg                 | 6 5/8   | 6 5/8   | 6 5/8     | 6 5/8   |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 8,987              | 11,383                     | 12,581  | 16,176  |               |   | Par de apriete | lb-pie             | 22,836  | 22,836  | 22,836    | 27,076  |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 24,139             | 30,576                     | 33,795  | 43,450  |               | Premium   | OD Conexión    | pg                 | 5 23/32 | 5 27/32 | 5 29/32   | 6 1/16  |
|       |       | 2 <sup>a</sup>       | 0.236 | 3.826 | 4.298 | 3.0103            | Colapso               | psi    | 5,951              | 6,828                      | 7,185   | 7,923   |               |   | Par de apriete | lb-pie             | 11,590  | 14,926  | 16,633    | 21,017  |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 225,771            | 285,977                    | 316,080 | 406,388 |               | 2 <sup>a</sup>                                  | OD Conexión    | pg                 | 5 11/16 | 5 25/32 | 5 13/16   | 5 31/32 |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 7,863              | 9,960                      | 11,009  | 14,154  |               |   | Par de apriete | lb-pie             | 10,773  | 13,245  | 14,082    | 18,367  |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 20,908             | 26,483                     | 29,271  | 37,634  |               |   |                |                    |         |         |           |         |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA     | Kpsi   | 75                   | 95    | 105   | 135   |                   |                            |                    |         |               |   |                    |                       |                |           |           |         |  |
|--------------|--------|----------------------|-------|-------|-------|-------------------|----------------------------|--------------------|---------|---------------|---|--------------------|-----------------------|----------------|-----------|-----------|---------|--|
| RESISTENCIA  | Kpsi   | 100                  | 105   | 115   | 145   |                   |                            |                    |         |               |   |                    |                       |                |           |           |         |  |
| D.E.         | PESO   | DIMENSIONES DEL TUBO |       |       |       | CLASIFICACION     | DIMENSIONES DE LA CONEXION |                    |         |               |   |                    |                       |                |           |           |         |  |
| pulg         | lb/pie | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS      | GRADO DE ACERO API |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-46 (XH) | GRADO DE ACERO API |                       |                |           |           |         |  |
|              |        |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                            | E75                | X95     | G105          | S135  |                    |                       | E75            | X95       | G105      | S135    |  |
| <b>4 1/2</b> | 20.00  | Nuevo                | 0.430 | 3.640 | 4.500 | 5.4981            | Colapso psi                | 12,964             | 16,421  | 18,149        | 23,335  |                    | ID Conexión pg        | 3              | 2 3/4     | 2 1/2     |         |  |
|              |        |                      |       |       |       |                   | Tensión lb                 | 412,358            | 522,320 | 577,301       | 742,244   |                    | Drift pg              | 2.875          | 2.625     | 2.375     |         |  |
|              |        |                      |       |       |       |                   | Presión Interna psi        | 12,542             | 15,886  | 17,558        | 22,575  |                    | Peso ajustado lb/pie  | 22.09          | 22.67     | 22.86     |         |  |
|              |        |                      |       |       |       |                   | Torsión lb-pie             | 36,901             | 46,741  | 51,661        | 66,421  |                    | Tensión lb            | 1,048,426      | 1,183,908 | 1,307,608 |         |  |
|              |        | Premium              | 0.344 | 3.640 | 4.328 | 4.3055            | Colapso psi                | 10,975             | 13,901  | 15,350        | 18,806  |                    | Torsión lb-pie        | 39,659         | 44,871    | 49,630    |         |  |
|              |        |                      |       |       |       |                   | Tensión lb                 | 322,916            | 409,026 | 452,082       | 581,248   |                    | Nuevo                 | OD Conexión pg | 6 1/4     | 6 1/4     | 6 1/4   |  |
|              |        |                      |       |       |       |                   | Presión Interna psi        | 11,467             | 14,524  | 16,053        | 20,640  |                    | Par de apriete lb-pie | 23,795         | 26,923    | 29,778    |         |  |
|              |        |                      |       |       |       |                   | Torsión lb-pie             | 28,683             | 36,332  | 40,157        | 51,630  |                    | Premium               | OD Conexión pg | 5 1/2     | 5 21/32   | 5 23/32 |  |
|              |        | 2 <sup>a</sup>       | 0.301 | 3.640 | 4.242 | 3.7267            | Colapso psi                | 9,631              | 11,598  | 12,520        | 15,033  |                    | Par de apriete lb-pie | 14,288         | 18,083    | 19,644    |         |  |
|              |        |                      |       |       |       |                   | Tensión lb                 | 279,502            | 354,035 | 391,302       | 503,103   |                    | 2 <sup>a</sup>        | OD Conexión pg | 5 13/32   | 5 9/16    | 5 5/8   |  |
|              |        |                      |       |       |       |                   | Presión Interna psi        | 10,033             | 12,709  | 14,047        | 18,060  |                    | Par de apriete lb-pie | 12,085         | 15,787    | 17,311    |         |  |
|              |        |                      |       |       |       |                   | Torsión lb-pie             | 24,747             | 31,346  | 34,645        | 44,544  |                    |                       |                |           |           |         |  |

XH: Extra Hole.

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |             |                    |           |           |           |        |
|-------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|---|-------------|--------------------|-----------|-----------|-----------|--------|
|       |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION NC-50 (IF) |             | GRADO DE ACERO API |           |           |           |        |
|       |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |               |   |             | E75                | X95       | G105      | S135      |        |
| 4 1/2 | 20.00 | Nuevo                | 0.430 | 3.640 | 4.500 | 5.4981            | Colapso               | psi    | 12,964             | 16,421                     | 18,149  | 23,335  |               | ID Conexión                                     | pg          | 3 5/8              | 3 1/2     | 3 1/2     | 3         |        |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 412,358            | 522,320                    | 577,301 | 742,244 |               | Drift   | pg          | 3.452              | 3.375     | 3.375     | 2.875     |        |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 12,542             | 15,886                     | 17,558  | 22,575  |               | Peso ajustado                                   | lb/pie      | 21.59              | 22.08     | 22.08     | 23.03     |        |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 36,901             | 46,741                     | 51,661  | 66,421  |               | Tensión   | lb          | 1,025,980          | 1,109,920 | 1,109,920 | 1,416,225 |        |
|       |       | Premium              | 0.344 | 3.640 | 4.328 | 4.3055            | Colapso               | psi    | 10,975             | 13,901                     | 15,350  | 18,806  |               | Torsión   | lb-pie      | 41,235             | 44,673    | 44,673    | 57,800    |        |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 322,916            | 409,026                    | 452,082 | 581,248 |               | Nuevo   | OD Conexión | pg                 | 6 5/8     | 6 5/8     | 6 5/8     | 6 5/8  |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 11,467             | 14,524                     | 16,053  | 20,640  |               | Par de apriete                                  | lb-pie      | 24,993             | 27,076    | 27,076    | 36,398    |        |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 28,683             | 36,332                     | 40,157  | 51,630  |               | Premium   | OD Conexión | pg                 | 5 13/16   | 5 15/16   | 6 1/32    | 6 7/32 |
|       |       | 2 <sup>a</sup>       | 0.301 | 3.640 | 4.242 | 3.7267            | Colapso               | psi    | 9,631              | 11,598                     | 12,520  | 15,033  |               | Par de apriete                                  | lb-pie      | 14,082             | 17,497    | 20,127    | 25,569    |        |
|       |       |                      |       |       |       |                   | Tensión               | lb     | 279,502            | 354,035                    | 391,302 | 503,103 |               | 2 <sup>a</sup>                                  | OD Conexión | pg                 | 5 3/4     | 5 7/8     | 5 29/32   | 6 3/32 |
|       |       |                      |       |       |       |                   | Presión Interna       | psi    | 10,033             | 12,709                     | 14,047  | 18,060  |               | Par de apriete                                  | lb-pie      | 12,415             | 15,776    | 16,633    | 21,914    |        |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie | 24,747             | 31,346                     | 34,645  | 44,544  |               |   |             |                    |           |           |           |        |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

## TUBO DE PERFORACION

DRILL PIPE

| FLUENCIA     | Kpsi  | 75                   | 95    | 105   | 135   |                            |                       |                                 |   |
|--------------|-------|----------------------|-------|-------|-------|----------------------------|-----------------------|---------------------------------|---|
| RESISTENCIA  | Kpsi  | 100                  | 105   | 115   | 145   |                            |                       |                                 |   |
| D.E.         | PESO  | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                                 |   |
|              |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API              |   |
|              |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75 X95 G105 S135               |   |
| <b>4 1/2</b> | 22.82 | Nuevo                | 0.500 | 3.500 | 4.500 | 6.2832                     | Colapso psi           | 14,814 18,765 20,741 26,667     |   |
|              |       |                      |       |       |       |                            | Tensión lb            | 471,239 596,903 659,734 848,230 | ID Conexión pg                          |
|              |       |                      |       |       |       |                            | Presión Interna psi   | 14,583 18,472 20,417 26,250     | Drift pg                                |
|              |       |                      |       |       |       |                            | Torsión lb-pie        | 40,912 51,821 57,276 73,641     | Peso ajustado lb/pie                    |
|              |       | Premium              | 0.400 | 3.500 | 4.300 | 4.9009                     | Colapso psi           | 12,655 16,030 17,718 22,780     | Tensión lb                              |
|              |       |                      |       |       |       |                            | Tensión lb            | 367,566 465,584 514,593 661,620 | 1,025,980 1,109,920 1,268,963 1,551,706 |
|              |       |                      |       |       |       |                            | Presión Interna psi   | 13,333 16,889 18,667 24,000     | Torsión lb-pie                          |
|              |       |                      |       |       |       |                            | Torsión lb-pie        | 31,587 40,010 44,222 56,856     | 41,235 44,673 51,447 63,406             |
|              |       | 2 <sup>a</sup>       | 0.350 | 3.500 | 4.200 | 4.2333                     | Colapso psi           | 11,458 14,514 16,042 20,510     | Nuevo OD Conexión pg                    |
|              |       |                      |       |       |       |                            | Tensión lb            | 317,497 402,163 444,496 571,495 | 6 5/8 6 5/8 6 5/8 6 5/8                 |
|              |       |                      |       |       |       |                            | Presión Interna psi   | 11,667 14,779 16,333 21,000     | Par de apriete lb-pie                   |
|              |       |                      |       |       |       |                            | Torsión lb-pie        | 27,161 34,404 38,026 48,890     | 24,993 27,076 31,025 38,044             |
|              |       |                      |       |       |       |                            |                       |                                 | Premium OD Conexión pg                  |
|              |       |                      |       |       |       |                            |                       |                                 | Par de apriete lb-pie                   |
|              |       |                      |       |       |       |                            |                       |                                 | 2 <sup>a</sup> OD Conexión pg           |
|              |       |                      |       |       |       |                            |                       |                                 | Par de apriete lb-pie                   |

IF: Internal Flush

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**

DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.     | PESO           | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |                |   |        |                    |           |           |           |
|----------|----------------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|----------------|---|--------|--------------------|-----------|-----------|-----------|
|          |                | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION  | PROP. MECANICAS DE LA CONEXION NC-50 (XH) |        | GRADO DE ACERO API |           |           |           |
|          |                |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |                |   |        | E75                | X95       | G105      | S135      |
| <b>5</b> | 19.50          | Nuevo                | 0.362 | 4.276 | 5.000 | 5.2746            | Colapso               | psi    | 9,962              | 12,026                     | 12,999  | 15,672  |                | ID Conexión                               | pg     | 3 3/4              | 3 1/2     | 3 1/4     | 2 3/4     |
|          |                |                      |       |       |       |                   | Tensión               | lb     | 395,595            | 501,087                    | 553,833 | 712,070 |                | Drift                                     | pg     | 3.625              | 3.375     | 3.125     | 2.625     |
|          |                |                      |       |       |       |                   | Presión Interna       | psi    | 9,503              | 12,037                     | 13,304  | 17,105  |                | Peso ajustado                             | lb/pie | 20.85              | 21.45     | 21.93     | 22.61     |
|          |                |                      |       |       |       |                   | Torsión               | lb-pie | 41,167             | 52,144                     | 57,633  | 74,100  |                | Tensión                                   | lb     | 939,095            | 1,109,920 | 1,268,963 | 1,551,706 |
|          | Premium        |                      | 0.290 | 4.276 | 4.855 | 4.1538            | Colapso               | psi    | 7,041              | 8,241                      | 8,765   | 10,029  |                | Torsión                                   | lb-pie | 37,676             | 44,673    | 51,447    | 63,406    |
|          |                |                      |       |       |       |                   | Tensión               | lb     | 311,535            | 394,612                    | 436,150 | 560,764 | Nuevo          | OD Conexión                               | pg     | 6 5/8              | 6 5/8     | 6 5/8     | 6 5/8     |
|          |                |                      |       |       |       |                   | Presión Interna       | psi    | 8,688              | 11,005                     | 12,163  | 15,638  |                | Par de apriete                            | lb-pie | 22,836             | 27,076    | 31,025    | 38,044    |
|          |                |                      |       |       |       |                   | Torsión               | lb-pie | 32,285             | 40,895                     | 45,199  | 58,113  | Premium        | OD Conexión                               | pg     | 5 7/8              | 6 1/32    | 6 3/32    | 6 5/16    |
|          | 2 <sup>a</sup> |                      | 0.253 | 4.276 | 4.783 | 3.6058            | Colapso               | psi    | 5,514              | 6,262                      | 6,552   | 7,079   |                | Par de apriete                            | lb-pie | 15,776             | 20,127    | 21,914    | 28,381    |
|          |                |                      |       |       |       |                   | Tensión               | lb     | 270,432            | 342,548                    | 378,605 | 486,778 | 2 <sup>a</sup> | OD Conexión                               | pg     | 5 13/16            | 5 15/16   | 6         | 6 3/16    |
|          |                |                      |       |       |       |                   | Presión Interna       | psi    | 7,602              | 9,629                      | 10,643  | 13,684  |                | Par de apriete                            | lb-pie | 14,082             | 17,497    | 19,244    | 24,645    |
|          |                |                      |       |       |       |                   | Torsión               | lb-pie | 27,976             | 35,436                     | 39,166  | 50,356  |                |   |        |                    |           |           |           |

XH: Extra Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi         | 75                   | 95    | 105   | 135   |                            |                       |                    |         |         |         |
|-------------|--------------|----------------------|-------|-------|-------|----------------------------|-----------------------|--------------------|---------|---------|---------|
| RESISTENCIA | Kpsi         | 100                  | 105   | 115   | 145   |                            |                       |                    |         |         |         |
| D.E.        | PESO         | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                    |         |         |         |
| pulg        | lb/pie       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API |         |         |         |
|             |              |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75                | X95     | G105    | S135    |
| <b>5</b>    | <b>25.60</b> | Nuevo                | 0.500 | 4.000 | 5.000 | 7.0686                     | Colapso psi           | 13,500             | 17,100  | 18,900  | 24,300  |
|             |              |                      |       |       |       |                            | Tensión lb            | 530,144            | 671,515 | 742,201 | 954,259 |
|             |              |                      |       |       |       |                            | Presión Interna psi   | 13,125             | 16,625  | 18,375  | 23,625  |
|             |              |                      |       |       |       |                            | Torsión lb-pie        | 52,257             | 66,192  | 73,159  | 94,062  |
|             |              | Premium              | 0.400 | 4.000 | 4.800 | 5.5292                     | Colapso psi           | 11,458             | 14,514  | 16,042  | 20,510  |
|             |              |                      |       |       |       |                            | Tensión lb            | 414,690            | 525,274 | 580,566 | 764,443 |
|             |              |                      |       |       |       |                            | Presión Interna psi   | 12,000             | 15,200  | 16,800  | 21,600  |
|             |              |                      |       |       |       |                            | Torsión lb-pie        | 40,544             | 51,356  | 56,762  | 72,979  |
|             |              | 2 <sup>a</sup>       | 0.350 | 4.000 | 4.700 | 4.7831                     | Colapso psi           | 10,338             | 12,640  | 13,685  | 16,587  |
|             |              |                      |       |       |       |                            | Tensión lb            | 358,731            | 454,392 | 502,223 | 645,715 |
|             |              |                      |       |       |       |                            | Presión Interna psi   | 10,500             | 13,300  | 14,700  | 18,900  |
|             |              |                      |       |       |       |                            | Torsión lb-pie        | 34,947             | 44,267  | 48,926  | 62,905  |

| FLUENCIA    | Kpsi   | 75                   | 95   | 105  | 135  |                            |                       |                               |           |           |           |           |
|-------------|--------|----------------------|------|------|------|----------------------------|-----------------------|-------------------------------|-----------|-----------|-----------|-----------|
| RESISTENCIA | Kpsi   | 100                  | 105  | 115  | 145  |                            |                       |                               |           |           |           |           |
| D.E.        | PESO   | DIMENSIONES DEL TUBO |      |      |      | DIMENSIONES DE LA CONEXION |                       |                               |           |           |           |           |
| pulg        | lb/pie | CLASE                | ESP. | D.I. | D.E. | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API            |           |           |           |           |
|             |        |                      | pulg | pulg | pulg | pulg <sup>2</sup>          |                       | E75                           | X95       | G105      | S135      |           |
|             |        |                      |      |      |      |                            |                       | ID Conexión pg                | 3 1/2     | 3         | 2 3/4     | 3 1/4     |
|             |        |                      |      |      |      |                            |                       | Drift pg                      | 3.375     | 2.875     | 2.625     | 3.125     |
|             |        |                      |      |      |      |                            |                       | Peso ajustado lb/pie          | 26.85     | 27.87     | 28.32     | 29.43     |
|             |        |                      |      |      |      |                            |                       | Tensión lb                    | 1,109,920 | 1,416,225 | 1,551,706 | 1,778,274 |
|             |        |                      |      |      |      |                            |                       | Torsión lb-pie                | 44,673    | 56,984    | 63,406    | 76,156    |
|             |        |                      |      |      |      |                            |                       | Nuevo OD Conexión pg          | 6 5/8     | 6 5/8     | 6 5/8     | 7 1/4     |
|             |        |                      |      |      |      |                            |                       | Par de apriete lb-pie         | 27,076    | 34,680    | 38,044    | 47,230    |
|             |        |                      |      |      |      |                            |                       | Premium OD Conexión pg        | 6 1/32    | 6 7/32    | 6 9/32    | 6 15/16   |
|             |        |                      |      |      |      |                            |                       | Par de apriete lb-pie         | 20,127    | 25,569    | 27,437    | 35,446    |
|             |        |                      |      |      |      |                            |                       | 2 <sup>a</sup> OD Conexión pg | 5 15/16   | 6 3/32    | 6 5/32    | 6 13/16   |
|             |        |                      |      |      |      |                            |                       | Par de apriete lb-pie         | 17,497    | 21,914    | 23,728    | 30,943    |

XH: Extra Hole

FH: Full Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**

DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E. | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |        |                    | DIMENSIONES DE LA CONEXION |         |         |               |  |                |           |                    |           |           |         |
|------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|--------|--------------------|----------------------------|---------|---------|---------------|--|----------------|-----------|--------------------|-----------|-----------|---------|
|      |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |        | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROP. MECANICAS DE LA CONEXION 5 1/2" (FH) |                |           | GRADO DE ACERO API |           |           |         |
|      |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |        | E75                | X95                        | G105    | S135    |               | E75  | X95            | G105      | S135               |           |           |         |
| 5    | 25.60 | Nuevo                | 0.500 | 4.000 | 5.000 | 7.0686            | Colapso               | psi    | 13,500             | 17,100                     | 18,900  | 24,300  |               | ID Conexión                                | pg             | 3 1/2     | 3 1/2              | 3 1/2     | 3 1/4     |         |
|      |       |                      |       |       |       |                   | Tensión               | lb     | 530,144            | 671,515                    | 742,201 | 954,259 |               | Drift                                      | pg             | 3.375     | 3.375              | 3.375     | 3.125     |         |
|      |       |                      |       |       |       |                   | Presión Interna       | psi    | 13,125             | 16,625                     | 18,375  | 23,625  |               | Peso ajustado                              | lb/pie         | 28.27     | 28.59              | 29.16     | 29.43     |         |
|      |       |                      |       |       |       |                   | Torsión               | lb-pie | 52,257             | 66,192                     | 73,159  | 94,062  |               | Tensión                                    | lb             | 1,619,231 | 1,619,231          | 1,619,231 | 1,778,274 |         |
|      |       | Premium              | 0.400 | 4.000 | 4.800 | 5.5292            | Colapso               | psi    | 11,458             | 14,514                     | 16,042  | 20,510  |               | Torsión                                    | lb-pie         | 60,338    | 60,338             | 72,627    | 76,156    |         |
|      |       |                      |       |       |       |                   | Tensión               | lb     | 414,690            | 525,274                    | 580,566 | 764,443 |               | Nuevo                                      | OD Conexión    | pg        | 7                  | 7         | 7 1/4     | 7 1/4   |
|      |       |                      |       |       |       |                   | Presión Interna       | psi    | 12,000             | 15,200                     | 16,800  | 21,600  |               |  | Par de apriete | lb-pie    | 37,742             | 37,742    | 43,490    | 47,230  |
|      |       |                      |       |       |       |                   | Torsión               | lb-pie | 40,544             | 51,356                     | 56,762  | 72,979  |               | Premium                                    | OD Conexión    | pg        | 6 1/2              | 6 21/32   | 6 23/32   | 6 15/16 |
|      |       | 2 <sup>a</sup>       | 0.350 | 4.000 | 4.700 | 4.7831            | Colapso               | psi    | 10,338             | 12,640                     | 13,685  | 16,587  |               |  | Par de apriete | lb-pie    | 20,205             | 25,483    | 27,645    | 35,446  |
|      |       |                      |       |       |       |                   | Tensión               | lb     | 358,731            | 454,392                    | 502,223 | 645,715 |               | 2 <sup>a</sup>                             | OD Conexión    | pg        | 6 13/32            | 6 9/16    | 6 5/8     | 6 13/16 |
|      |       |                      |       |       |       |                   | Presión Interna       | psi    | 10,500             | 13,300                     | 14,700  | 18,900  |               |  | Par de apriete | lb-pie    | 17,127             | 22,294    | 24,412    | 30,943  |
|      |       |                      |       |       |       |                   | Torsión               | lb-pie | 34,947             | 44,267                     | 48,926  | 62,905  |               |  |                |           |                    |           |           |         |

FH: Full Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
**DRILL PIPE**

| FLUENCIA     | Kpsi   | 75                   | 95    | 105   | 135   |                            |                       |                    |         |         |         |
|--------------|--------|----------------------|-------|-------|-------|----------------------------|-----------------------|--------------------|---------|---------|---------|
| RESISTENCIA  | Kpsi   | 100                  | 105   | 115   | 145   |                            |                       |                    |         |         |         |
| D.E.         | PESO   | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                    |         |         |         |
|              |        | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API |         |         |         |
| pulg         | lb/pie |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75                | X95     | G105    | S135    |
| <b>5 1/2</b> | 21.90  | Nuevo                | 0.361 | 4.778 | 5.500 | 5.8282                     | Colapso psi           | 8,413              | 10,019  | 10,753  | 12,679  |
|              |        |                      |       |       |       |                            | Tensión lb            | 437,116            | 553,681 | 611,963 | 786,809 |
|              |        |                      |       |       |       |                            | Presión Interna psi   | 8,615              | 10,912  | 12,061  | 15,507  |
|              |        |                      |       |       |       |                            | Torsión lb-pie        | 50,710             | 64,233  | 70,994  | 91,278  |
|              |        | Premium              | 0.289 | 4.778 | 5.356 | 4.5971                     | Colapso psi           | 5,730              | 6,542   | 6,865   | 7,496   |
|              |        |                      |       |       |       |                            | Tensión lb            | 344,780            | 436,721 | 482,692 | 620,604 |
|              |        |                      |       |       |       |                            | Presión Interna psi   | 7,876              | 9,977   | 11,027  | 14,177  |
|              |        |                      |       |       |       |                            | Torsión lb-pie        | 39,863             | 50,494  | 55,809  | 71,754  |
|              |        | 2 <sup>a</sup>       | 0.253 | 4.778 | 5.283 | 3.9938                     | Colapso psi           | 4,334              | 4,733   | 4,899   | 5,465   |
|              |        |                      |       |       |       |                            | Tensión lb            | 299,533            | 379,409 | 419,346 | 539,160 |
|              |        |                      |       |       |       |                            | Presión Interna psi   | 6,892              | 8,730   | 9,649   | 12,405  |
|              |        |                      |       |       |       |                            | Torsión lb-pie        | 34,582             | 43,804  | 48,414  | 62,247  |

| FLUENCIA    | Kpsi | 75                   | 95   | 105  | 135  |                            |                                      |                    |           |
|-------------|------|----------------------|------|------|------|----------------------------|--------------------------------------|--------------------|-----------|
| RESISTENCIA | Kpsi | 100                  | 105  | 115  | 145  |                            |                                      |                    |           |
| D.E.        | PESO | DIMENSIONES DEL TUBO |      |      |      | DIMENSIONES DE LA CONEXION |                                      |                    |           |
|             |      | CLASE                | ESP. | D.I. | D.E. | AREA TRANS.                | PROPIEDADES MECANICAS                | GRADO DE ACERO API |           |
|             |      |                      | pulg | pulg | pulg | pulg <sup>2</sup>          |                                      | E75                | X95       |
|             |      |                      |      |      |      |                            |                                      | 4                  | 3 3/4     |
|             |      |                      |      |      |      |                            |                                      | 3 1/2              | 3         |
|             |      |                      |      |      |      |                            | ID Conexión pg                       | Drift pg           | 3.875     |
|             |      |                      |      |      |      |                            | Peso ajustado lb/pie                 | 23.78              | 36.25     |
|             |      |                      |      |      |      |                            | Tensión lb                           | 25.38              | 33.75     |
|             |      |                      |      |      |      |                            | 1,265,802                            | 1,448,407          | 1,619,231 |
|             |      |                      |      |      |      |                            |                                      |                    | 1,925,536 |
|             |      |                      |      |      |      |                            | Torsión lb-pie                       | 56,045             | 60,338    |
|             |      |                      |      |      |      |                            |                                      | 72,627             | 87,341    |
|             |      |                      |      |      |      |                            | Nuevo OD Conexión pg                 | 7                  | 7 1/4     |
|             |      |                      |      |      |      |                            | Par de apriete lb-pie                | 33,560             | 37,742    |
|             |      |                      |      |      |      |                            | Premium OD Conexión pg               | 43,490             | 53,302    |
|             |      |                      |      |      |      |                            | Par de apriete lb-pie                | 6 15/32            | 6 5/8     |
|             |      |                      |      |      |      |                            | OD Conexión pg                       | 6 23/32            | 6 15/16   |
|             |      |                      |      |      |      |                            | Par de apriete lb-pie                | 19,172             | 24,412    |
|             |      |                      |      |      |      |                            | 2 <sup>a</sup> Par de apriete lb-pie | 27,645             | 35,446    |
|             |      |                      |      |      |      |                            | OD Conexión pg                       | 6 13/32            | 6 17/32   |
|             |      |                      |      |      |      |                            |                                      | 6 19/32            | 6 13/16   |
|             |      |                      |      |      |      |                            | Par de apriete lb-pie                | 17,127             | 21,246    |
|             |      |                      |      |      |      |                            |                                      |                    | 23,350    |
|             |      |                      |      |      |      |                            |                                      |                    | 30,943    |

FH: Full Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

|             |      |     |     |     |     |
|-------------|------|-----|-----|-----|-----|
| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

|             |      |     |     |     |     |
|-------------|------|-----|-----|-----|-----|
| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |                    |         |         |         |         |
|-------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|--------------------|---------|---------|---------|---------|
|       |       | CLASE                | ESP.  | D.I.  | D.E   | AREA TRANS.       | PROPIEDADES MECANICAS | GRADO DE ACERO API |         |         |         |         |
|       |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       | E75                | X95     | G105    | S135    |         |
| 5 1/2 | 24.70 | Nuevo                | 0.415 | 4.670 | 5.500 | 6.6296            | Colapso               | psi                | 10,464  | 12,933  | 14,013  | 17,023  |
|       |       |                      |       |       |       |                   | Tensión               | lb                 | 497,222 | 629,814 | 696,111 | 894,999 |
|       |       |                      |       |       |       |                   | Presión Interna       | psi                | 9,903   | 12,544  | 13,865  | 17,826  |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie             | 56,574  | 71,660  | 79,204  | 101,833 |
|       |       | Premium              | 0.332 | 4.670 | 5.334 | 5.2171            | Colapso               | psi                | 7,635   | 9,011   | 9,626   | 11,177  |
|       |       |                      |       |       |       |                   | Tensión               | lb                 | 391,285 | 495,627 | 547,799 | 704,313 |
|       |       |                      |       |       |       |                   | Presión Interna       | psi                | 9,055   | 11,469  | 12,676  | 16,298  |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie             | 44,320  | 56,139  | 62,048  | 79,776  |
|       |       | 2 <sup>a</sup>       | 0.290 | 4.670 | 5.251 | 4.5271            | Colapso               | psi                | 6,050   | 6,957   | 7,329   | 8,115   |
|       |       |                      |       |       |       |                   | Tensión               | lb                 | 339,533 | 430,076 | 475,347 | 611,160 |
|       |       |                      |       |       |       |                   | Presión Interna       | psi                | 7,923   | 10,035  | 11,092  | 14,261  |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie             | 38,383  | 48,619  | 53,737  | 69,090  |

| CLASIFICACION  | PROPIEDADES MECANICAS DE LA CONEXION FH | GRADO DE ACERO API |           |           |           |
|----------------|---|--------------------|-----------|-----------|-----------|
|                |   | E75                | X95       | G105      | S135      |
|                | ID Conexión                             | pg                 | 4         | 3 1/2     | 3 1/2     |
|                | Drift                                   | pg                 | 3.875     | 3.375     | 3.375     |
|                | Peso ajustado                           | lb/pie             | 26.30     | 27.85     | 27.85     |
|                | Tensión                                 | lb                 | 1,265,802 | 1,619,231 | 1,619,231 |
|                | Torsión                                 | lb-pie             | 56,045    | 72,627    | 72,627    |
| Nuevo          | OD Conexión                             | pg                 | 7         | 7 1/4     | 7 1/4     |
|                | Par de apriete                          | lb-pie             | 33,560    | 43,490    | 43,490    |
| Premium        | OD Conexión                             | pg                 | 6 9/16    | 6 23/32   | 6 25/32   |
|                | Par de apriete                          | lb-pie             | 22,294    | 27,645    | 29,836    |
| 2 <sup>a</sup> | OD Conexión                             | pg                 | 6 15/32   | 6 19/32   | 6 11/16   |
|                | Par de apriete                          | lb-pie             | 19,172    | 23,350    | 26,560    |

FH: Full Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
**DRILL PIPE**

| FLUENCIA     | Kpsi         | 75                   | 95    | 105   | 135   |                            |                       |                                 |   |
|--------------|--------------|----------------------|-------|-------|-------|----------------------------|-----------------------|---------------------------------|---|
| RESISTENCIA  | Kpsi         | 100                  | 105   | 115   | 145   |                            |                       |                                 |   |
| D.E.         | PESO         | DIMENSIONES DEL TUBO |       |       |       | DIMENSIONES DE LA CONEXION |                       |                                 |   |
|              |              | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.                | PROPIEDADES MECANICAS | GRADO DE ACERO API              |   |
|              |              |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup>          |                       | E75 X95 G105 S135               |   |
| <b>6 5/8</b> | <b>25.20</b> | Nuevo                | 0.330 | 5.965 | 6.625 | 6.5262                     | Colapso psi           | 4,788 5,321 5,500 6,036         |   |
|              |              |                      |       |       |       |                            | Tensión lb            | 489,464 619,988 685,250 881,035 | ID Conexión pg                          |
|              |              |                      |       |       |       |                            | Presión Interna psi   | 6,538 8,281 9,153 11,768        | Drift pg                                |
|              |              |                      |       |       |       |                            | Torsión lb-pie        | 70,580 89,402 98,812 127,044    | Peso ajustado lb/pie                    |
|              |              | Premium              | 0.264 | 5.965 | 6.493 | 5.1662                     | Colapso psi           | 2,931 3,252 3,353 3,429         | Tensión lb                              |
|              |              |                      |       |       |       |                            | Tensión lb            | 387,466 490,790 542,452 697,438 | 1,447,697 1,448,416 1,678,145 2,102,260 |
|              |              |                      |       |       |       |                            | Presión Interna psi   | 5,977 7,571 8,368 10,759        | Torsión lb-pie                          |
|              |              |                      |       |       |       |                            | Torsión lb-pie        | 55,766 71,522 79,050 101,635    | 73,620 73,661 86,237 109,226            |
|              |              | 2 <sup>a</sup>       | 0.231 | 5.965 | 6.427 | 4.4965                     | Colapso psi           | 2,227 2,343 2,346 2,346         | Nuevo OD Conexión pg                    |
|              |              |                      |       |       |       |                            | Tensión lb            | 337,236 427,166 472,131 607,026 | 8 8 8 1/4 8 1/2                         |
|              |              |                      |       |       |       |                            | Presión Interna psi   | 5,230 6,625 7,322 9,414         | Par de apriete lb-pie                   |
|              |              |                      |       |       |       |                            | Torsión lb-pie        | 48,497 61,430 67,896 87,295     | 44,196 44,196 51,742 65,535             |

| FLUENCIA    | Kpsi | 75                   | 95   | 105  | 135  |                       |                    |
|-------------|------|----------------------|------|------|------|-----------------------|--------------------|
| RESISTENCIA | Kpsi | 100                  | 105  | 115  | 145  |                       |                    |
| D.E.        | PESO | DIMENSIONES DEL TUBO |      |      |      |                       |                    |
|             |      | CLASE                | ESP. | D.I. | D.E. |                       |                    |
|             |      |                      | pulg | pulg | pulg |                       |                    |
|             |      |                      |      |      |      | PROPIEDADES MECANICAS | GRADO DE ACERO API |
|             |      |                      |      |      |      | E75 X95 G105 S135     |                    |
|             |      |                      |      |      |      |                       |                    |

FH: Full Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

**TUBO DE PERFORACION**  
DRILL PIPE

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| FLUENCIA    | Kpsi | 75  | 95  | 105 | 135 |
|-------------|------|-----|-----|-----|-----|
| RESISTENCIA | Kpsi | 100 | 105 | 115 | 145 |

| D.E.  | PESO  | DIMENSIONES DEL TUBO |       |       |       |                   |                       |         |                    | DIMENSIONES DE LA CONEXION |         |         |               |   |             |                    |           |           |           |         |
|-------|-------|----------------------|-------|-------|-------|-------------------|-----------------------|---------|--------------------|----------------------------|---------|---------|---------------|---|-------------|--------------------|-----------|-----------|-----------|---------|
|       |       | CLASE                | ESP.  | D.I.  | D.E.  | AREA TRANS.       | PROPIEDADES MECANICAS |         | GRADO DE ACERO API |                            |         |         | CLASIFICACION | PROPIEDADES MECANICAS DE LA CONEXION FH |             | GRADO DE ACERO API |           |           |           |         |
|       |       |                      | pulg  | pulg  | pulg  | pulg <sup>2</sup> |                       |         | E75                | X95                        | G105    | S135    |               |   |             | E75                | X95       | G105      | S135      |         |
| 6 5/8 | 27.70 | Nuevo                | 0.362 | 5.901 | 6.625 | 7.1226            | Colapso               | psi     | 5,894              | 6,755                      | 7,103   | 7,813   |               | ID Conexión                             | pg          | 5                  | 4 3/4     | 4 3/4     | 4 1/4     |         |
|       |       |                      |       |       |       |                   | Tensión               | lb      | 534,199            | 676,651                    | 747,877 | 961,556 |               | Drift                                   | pg          | 4.875              | 4.625     | 4.625     | 4.125     |         |
|       |       |                      |       |       |       |                   | P. Interna            | psi     | 7,172              | 9,084                      | 10,040  | 12,909  |               | Peso ajustado                           | lb/pie      | 29.06              | 30.11     | 30.11     | 31.54     |         |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie  | 76,295             | 96,640                     | 106,813 | 137,330 |               | Tensión                                 | lb          | 1,447,697          | 1,678,145 | 1,678,145 | 2,102,260 |         |
|       |       | Premium              | 0.290 | 5.901 | 6.480 | 5.6322            | Colapso               | psi     | 3,615              | 4,029                      | 4,222   | 4,562   |               | Torsión                                 | lb-pie      | 73,650             | 86,237    | 86,237    | 109,226   |         |
|       |       |                      |       |       |       |                   | Tensión               | lbx1000 | 422,419            | 535,064                    | 591,387 | 760,354 |               | Nuevo                                   | OD Conexión | pg                 | 8         | 8 1/4     | 8 1/4     | 8 1/2   |
|       |       |                      |       |       |       |                   | P. Interna            | psi     | 6,557              | 8,306                      | 9,180   | 11,803  |               | Par de apriete                          | lb-pie      | 44,196             | 51,742    | 51,742    | 65,535    |         |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie  | 60,192             | 77,312                     | 85,450  | 109,864 |               | Premium                                 | OD Conexión | pg                 | 7 1/2     | 7 11/16   | 7 3/4     | 8       |
|       |       | 2 <sup>a</sup>       | 0.253 | 5.901 | 6.408 | 4.8994            | Colapso               | psi     | 2,765              | 3,037                      | 3,113   | 3,148   |               | Par de apriete                          | lb-pie      | 29,552             | 37,983    | 40,860    | 52,714    |         |
|       |       |                      |       |       |       |                   | Tensión               | lbx1000 | 367,455            | 465,443                    | 514,437 | 660,419 |               | 2 <sup>a</sup>                          | OD Conexión | pg                 | 7 13/32   | 7 9/16    | 7 21/32   | 7 27/64 |
|       |       |                      |       |       |       |                   | P. Interna            | psi     | 5,737              | 7,267                      | 8,032   | 10,327  |               | Par de apriete                          | lb-pie      | 25,451             | 32,329    | 36,556    | 45,241    |         |
|       |       |                      |       |       |       |                   | Torsión               | lb-pie  | 52,308             | 66,257                     | 73,231  | 94,155  |               |   |             |                    |           |           |           |         |

FH: Full Hole

Clase Premium - Basada en una reducción del espesor del cuerpo, quedando como remanente un 80% del espesor.

Clase 2 - Basada en una reducción del espesor del cuerpo, quedando como remanente un 70% del espesor.

