



Tubos de Acero de México, S.A.  
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|  |  |                             |                   |
|--|--|-----------------------------|-------------------|
| <b>CERTIFICADO DE CALIDAD</b><br><b>INSPECTION CERTIFICATE</b><br>(DIN EN 10204:2004E - ISO 10474 3.1.B) |  | Numero:<br>Number:<br>25196 | Pagina/Page:<br>1 |
|--|--|-----------------------------|-------------------|

|   |  |   |  |
|---|--|---|--|
| Vendido a:<br>Sold to:<br><b>TUVANSA</b>  | Pedido del Cliente No:<br>Customers Order No:<br>10882 - 10984 | Lista de Empaque:<br>Packing List:<br>13012                                       | Fecha/Date:<br>14 de Diciembre de 2011 |
| Especificaciones y Grados / Standard or Specification and Steel Grade<br>Seamless Fittings according to ASTM A 234 WPB-07, NACE MR 01.75-2003<br>Conform to ASME II Ed. 2001 ASME SA-234, Grade WPB, NACE MR0103-2003 |  | Dimensiones y tolerancias / Dimension and tolerances<br><b>ASME B 16.9 - 2007</b> |  |
|   |  | Factura/Invoice:<br><b>Bocas / Ends</b><br>Biselado / Bevelled ends               |  |

| DESCRIPCION DE MATERIAL / MATERIAL DESCRIPTION |                  |                   |                               | PRUEBAS MECANICAS / MECHANICAL TEST |                                     |            |                     | PRUEBA DE IMPACTO 0°C / IMPACT TEST 0°C |          |          |          |                         |
|--|------------------|-------------------|-------------------------------|-------------------------------------|-------------------------------------|------------|---------------------|---|----------|----------|----------|-------------------------|
| ART. ITEM                                      | COLADA HEAT CODE | CANTIDAD QUANTITY | DESCRIPCION / DESCRIPTION     | ESF. CEDENCIA YIELD STRENGTH (Mpa)  | ESF. RUPTURA TENSILE STRENGTH (Mpa) | ELONG. %2" | DUREZA HARDNESS HBW | DIMENSIONES SAMPLE DIM mm               | 1 Joules | 2 Joules | 3 Joules | PROMEDIO AVERAGE Joules |
| 1  | T57395           | 144               | CODO 6 X 45° CED-XS           | 323                                 | 479                                 | 44         | 103                 |   |          |          |          |                         |
| 2  | T56077           | 528               | CODO 3 X 90° R.L. CED-STD     | 328                                 | 477                                 | 40         | 120                 |   |          |          |          |                         |
| 3  | T55130           | 1                 | CODO 16 X 90° R.L. CED-XS     | 315                                 | 478                                 | 48         | 120                 |   |          |          |          |                         |
| 4  | T55633           | 2                 | CODO 16 X 90° R.L. CED-XS     | 306                                 | 476                                 | 46         | 120                 |   |          |          |          |                         |
| 5  | T54399           | 275               | TEE 4 CED-STD                 | 311                                 | 477                                 | 40         | 122                 |   |          |          |          |                         |
| 6  | S45402           | 475               | CODO 2 1/2 X 90° R.L. CED-STD | 294                                 | 466                                 | 36         | 135                 |   |          |          |          |                         |
| 7  | T56767           | 72                | CODO 12 X 90° R.L. CED-STD    | 355                                 | 509                                 | 32         | 95                  |   |          |          |          |                         |
| 8  | T55089           | 21                | CODO 10 X 90° R.L. CED-STD    | 315                                 | 492                                 | 40         | 122                 |   |          |          |          |                         |
| 9  | T57065           | 45                | CODO 10 X 90° R.L. CED-STD    | 304                                 | 483                                 | 40         | 118                 |   |          |          |          |                         |
| 10   | T57653           | 54                | CODO 10 X 90° R.L. CED-STD    | 311                                 | 483                                 | 40         | 122                 |   |          |          |          |                         |
| 11   | T51309           | 2                 | CODO 12 X 90° R.L. CED-XS     | 310                                 | 483                                 | 45         | 122                 |   |          |          |          |                         |

| ANALISIS QUIMICO / CHEMICAL ANALYSIS |                  |                              |       |       |       |       |       |       |       |       |       |       |       |       |
|--------------------------------------|------------------|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| PROCESO PROCESS                      | COLADA HEAT CODE | COLADA/HEAT M.P./MOTHER PIPE | %C.E. | %C    | %Mn   | %P    | %S    | %Si   | %Cr   | %Cu   | %Mo   | %Ni   | %V    | %Nb   |
| HF                                   | T57395           | 57395                        | 0.310 | 0.170 | 0.700 | 0.009 | 0.002 | 0.270 | 0.040 | 0.067 | 0.021 | 0.030 | 0.000 | 0.000 |
| HF                                   | T56077           | 56077                        | 0.300 | 0.170 | 0.690 | 0.014 | 0.001 | 0.280 | 0.040 | 0.048 | 0.011 | 0.030 | 0.000 | 0.000 |
| HF                                   | T55130           | 55130                        | 0.310 | 0.180 | 0.680 | 0.007 | 0.001 | 0.270 | 0.050 | 0.069 | 0.019 | 0.040 | 0.000 | 0.000 |
| HF                                   | T55633           | 55633                        | 0.310 | 0.180 | 0.680 | 0.009 | 0.002 | 0.270 | 0.050 | 0.064 | 0.024 | 0.030 | 0.000 | 0.000 |
| HF                                   | T54399           | 54399                        | 0.300 | 0.170 | 0.680 | 0.010 | 0.001 | 0.280 | 0.050 | 0.063 | 0.015 | 0.030 | 0.000 | 0.000 |
| HF                                   | S45402           | 45402                        | 0.320 | 0.180 | 0.740 | 0.010 | 0.001 | 0.290 | 0.040 | 0.045 | 0.020 | 0.022 | 0.001 | 0.001 |
| HF                                   | T56767           | 56767                        | 0.320 | 0.180 | 0.690 | 0.014 | 0.002 | 0.270 | 0.040 | 0.069 | 0.026 | 0.040 | 0.000 | 0.000 |
| HF                                   | T55089           | 55089                        | 0.310 | 0.180 | 0.680 | 0.009 | 0.002 | 0.280 | 0.040 | 0.056 | 0.012 | 0.030 | 0.000 | 0.000 |
| HF                                   | T57065           | 57065                        | 0.310 | 0.170 | 0.680 | 0.013 | 0.002 | 0.280 | 0.070 | 0.067 | 0.016 | 0.040 | 0.000 | 0.000 |
| HF                                   | T57653           | 57653                        | 0.310 | 0.180 | 0.670 | 0.008 | 0.001 | 0.290 | 0.040 | 0.060 | 0.017 | 0.030 | 0.000 | 0.000 |
| HF                                   | T51309           | 51309                        | 0.300 | 0.170 | 0.660 | 0.012 | 0.001 | 0.280 | 0.050 | 0.051 | 0.017 | 0.030 | 0.000 | 0.000 |

Certificamos que los resultados de los Análisis Químicos y Pruebas Mecánicas son verdaderos o una copia fiel de los certificados enviados por el Fabricante y/o el proveedor de Materia Prima (Tubería Sin Costura) conforme ASTM A106 Grado B con N° de Material. We certify that result of chemical analysis and mechanical test are true and correct copy of the test certificate issued by the manufacturer and/or supplier Raw material (Seamless Pipe) certs conform to ASTM A106 Grade B N°: 11047253 11038748 11023965 11040390 11028775 317311 11039058 11037949 11044003 11053706 10041117

Este material cumple con los requerimientos especificados en la orden.  
 The material of this certificate heat number mentioned above is in compliance with the requirements specified in the order.

Notas:  
 Formado en caliente a 620°C-980°C, enfriado al aire; Formado en frío normalizado a 940°C max.  
 Tiempo de permanencia 10'.  
 Inspección Dimensional: Satisfactoria.  
 HF: FORMADO EN CALIENTE/HOT FORMED

Notes:  
 Hot formed fittings in a range from 620°C to 980°C, cooled in still air.  
 Cold formed normalized at 940°C max.  
 Holding time 10'.  
 Visual dimensional check: Satisfactory  
 CF: FORMADO EN FRIO/COLD FORMED

Quality Manager / Jefe de Calidad:  
 ING. WALDO GALLEGOS GALVAN

The Products described herein were produced in accordance with the above referenced specification and are identified with the "R" which is permanently marked on each fitting. The values of hardness for fittings NPS 2 1/2" and smaller ones obtain from the conversion of hardness Rockwell B to hardness Brinell HBW by means of table WILSON DESK CHART 60. Los valores de dureza para conexiones de NPS de 2 1/2" y menores, se obtienen de la conversión de dureza Rockwell B a dureza Brinell HBW mediante la tabla WILSON DESK CHART 60.

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