

**CERTIFICADO DE CALIDAD**  
**INSPECTION CERTIFICATE**  
(DIN EN 10204 3.1.B - ISO 10474 3.1.B)

Tubos de Acero de México, S.A.  
Km 433.7 Carr. México-Veracruz  
Via Xalapa  
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Vendido A: **TUBOS CONEXIONES Y TANQUES, S.A. DE C.V.**  
Sold to:  
Especificaciones y Grados / Standard or Specification and Steel Grade  
Seamless Fittings according to ASTM/ASME AISA 234 WPB - NACE MR 01.75 ed. 02 -  
Conform to ASME II Ed. 2001

Pedido del cliente No: **6366, 6700**  
Customers Order No:  
Dimensiones y tolerancias / Dimension and tolerances  
ASME B 16.9 and ASME B 16.28 edition 2001

Lista de empaque: **6182**  
Packing List:  
Bocas / Ends  
Biselado / Bevelled ends  
Fecha/Date: **25 de 2003**  
AGOSTO

| 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. RUPTORA TENSILE STRENGTH (MPa) | ELONG. %2" | DUREZA HARDNESS HB | DIMENSIONES SAMPLE DIM (mm)             | 1 Joules | 2 Joules | 3 Joules | PROMEDIO AVERAGE Joules |
| 1  | SVCS             | 528               | CODO R.L. 3 X 90 CED STD  | 345                                 | 498                                 | 34         | 151                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 2  | SVKS             | 50                | CODO 4 X 45 CED XS        | 330                                 | 482                                 | 39         | 137                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 3  | TWHS             | 77                | CODO 6 X 45 CED STD       | 339                                 | 498                                 | 40         | 131                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 4  | TXMS             | 57                | CODO 6 X 45 CED STD       | 343                                 | 505                                 | 38         | 136                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 5  | TYOS             | 5                 | CODO 6 X 45 CED XS        | 278                                 | 486                                 | 42         | 135                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 6  | TXFS             | 24                | CODO 6 X 45 CED XS        | 301                                 | 476                                 | 42         | 140                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 7  | TYYS             | 32                | CODO R.L. 6 X 90 CED STD  | 326                                 | 488                                 | 39         | 136                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 8  | TWHS             | 168               | CODO R.L. 6 X 90 CED STD  | 339                                 | 498                                 | 40         | 131                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |
| 9  | TWKS             | 102               | CODO R.L. 8 X 90 CED STD  | 308                                 | 477                                 | 40         | 135                | N/A                                     | N/A      | N/A      | N/A      | N/A                     |

| 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                                   | SVCS             | 26120                        | 0.3360 | 200 | 0.760 | 0.009 | 0.002 | 0.310 | 0.020 | 0.030 | 0.010 | 0.020 | 0.001 | 0.001 |
| HF                                   | SVKS             | 26013                        | 0.3390 | 180 | 0.830 | 0.010 | 0.001 | 0.310 | 0.040 | 0.050 | 0.030 | 0.040 | 0.001 | 0.001 |
| HF                                   | TWHS             | 11794                        | 0.3480 | 180 | 0.840 | 0.011 | 0.021 | 0.290 | 0.060 | 0.097 | 0.036 | 0.040 | 0.000 | 0.000 |
| HF                                   | TXMS             | 12431                        | 0.3620 | 190 | 0.840 | 0.007 | 0.003 | 0.270 | 0.060 | 0.079 | 0.058 | 0.040 | 0.000 | 0.000 |
| HF                                   | TYOS             | 11195                        | 0.3150 | 180 | 0.690 | 0.011 | 0.002 | 0.310 | 0.040 | 0.065 | 0.024 | 0.040 | 0.000 | 0.000 |
| HF                                   | TXFS             | 11584                        | 0.3010 | 170 | 0.670 | 0.008 | 0.003 | 0.260 | 0.040 | 0.068 | 0.021 | 0.040 | 0.000 | 0.000 |
| HF                                   | TYYS             | 11584                        | 0.3010 | 170 | 0.670 | 0.008 | 0.003 | 0.260 | 0.040 | 0.068 | 0.021 | 0.040 | 0.000 | 0.000 |
| HF                                   | TWHS             | 11794                        | 0.3480 | 180 | 0.840 | 0.011 | 0.021 | 0.290 | 0.060 | 0.097 | 0.036 | 0.040 | 0.000 | 0.000 |
| HF                                   | TWKS             | 11793                        | 0.3100 | 180 | 0.670 | 0.008 | 0.002 | 0.280 | 0.040 | 0.081 | 0.023 | 0.004 | 0.000 | 0.000 |

Notas:  
Formado en caliente a 780°C-940°C, enfriado al aire.  
Formado en frío normalizado a 940°C max.  
Tiempo de permanencia 10'.  
Holding time 10'.  
Visual dimensional check: Satisfactory.  
Visual dimensional check: Satisfactory.  
CF: FORMADO EN CALIENTE/HOT FORMED CF: FORMADO EN FRIO/COLD FORMED

Gerente de Aseguramiento de Calidad:  
Quality Assurance Manager:  
**ING. JOSE MAURITINEZ MACIAS**

CC-008