Tubacero
Ave. Guerrero N° 3729 Nte.
Col. Del Norte
Monterrey N.L. México
C.P. 64500
Tel: (81) 83055555

# CONSTANCIA DE INSPECCION
## INSPECTION CONSTANCY

| | |
|---|---|
| N° CONSTANCIA (CONSTANCY N°): | 141486 |
| CLIENTE (CUSTOMER): | PLESA ANÁHUAC Y CÍAS., S.A. DE C.V. |
| ORDEN DE COMPRA (PURCHASE ORDER): | 19196 |
| DIRECCION (ADDRESS): | AV. VALLE DE LAS ALAMEDAS # 66-O COL. SAN FCO. CHILPAN |
| TULTITLÁN EDO. DE MÉXICO. C.P. 54940 | |

| ORDEN DE PREPARACION (PREPARATION ORDER) | ORDEN DE TRABAJO (JOB ORDER) | DIAMETRO (SPECIFIED OUTSIDE DIAMETER) | ESPESOR (SPECIFIED WALL THICKNESS) | ESPECIFICACION (SPECIFICATION) | GRADO (PIPE GRADE) | CONDICION DE ENTREGA (DELIVERY CONDITION) | PSL (PSL) | TIPO DE TUBO (TYPE OF PIPE) | PROVEEDOR (SUPPLIER) | FECHA (DATE) |
|---|---|---|---|---|---|---|---|---|---|---|
| SB-178-2014 | 33620 | 16.000" | 0.375" | API SPEC 5L 44 TH ED./A.S.T.M. | X-42/B/A53B | - | 1 | HFW/ERW | AHMSA | 17/11/14 |

**ENSAYO DE TENSION (TENSILE TEST)** — UNIDADES (UNITS): PSI; TAMAÑO (SIZE): 14

| N° DE TUBO/ N° DE SERIE QUALIFICATION (PIPE NUMBER) | NUMERO COLADA (NUMBER) (HEAT) | A | B | C | D | (YS) | (TS) | % E | Y.S/T.S. | ENSAYO DOBLEZ GUIADO (GUIDED BEND TESTS) D | * |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 121 | 229594 | - | 1 | T | 4<br>5 | 52700 | 72600<br>66100 | 40 | 0.80 | - | - |
| 315 | 229595 | - | 1 | T | 4<br>5 | 52800 | 74800<br>69600 | 43 | 0.76 | - | - |
| 6 | 229596 | - | 1 | T | 4<br>5 | 53100 | 75900<br>69000 | 40 | 0.77 | - | - |
| 180 | 229600 | - | 1 | T | 4<br>5 | 52500 | 75100<br>68400 | 44 | 0.77 | - | - |
| 86 | 229601 | - | 1 | T | 4<br>5 | 51700 | 72200<br>68700 | 42 | 0.75 | - | - |
| 137 | 229602 | - | 1 | T | 4<br>5 | 52300 | 73900<br>66700 | 38 | 0.78 | - | - |
| CRITERIO DE ACEPTACION (ACCEPTANCE CRITERIA) * MIN | | | | | - | 42100 | 60200 | 28 | - | - | - |
| ** MAX | | | | | - | - | - | - | - | - | - |
| *** | | | | | - | - | - | | | | |

**ENSAYO DE IMPACTO CHARPY (CHARPY IMPACT TEST)** — TEMPERATURA DE ENSAYO (TEST TEMPERATURE): ; TAMAÑO (SIZE): ; ENERGIA (ENERGY): JOULES; TIPO (TYPE): 3
**ENSAYO DWT (DWT TEST)** — TEMPERATURA DE ENSAYO (TEST TEMPERATURE): ; TIPO (TYPE): 2
**ENSAYO DE DUREZA (HARDNESS TEST)**

| N° DE TUBO | Charpy D | 1 | 2 | 3 | PROMEDIO (AVG.) | 1 | 2 | 3 | PROMEDIO (AVG.) | DWT F | D | 1 | 2 | PROMEDIO (AVG.) | C | G | METAL BASE (Base metal) | ZONA AFECTADA (HEAT AFFECTED ZONES) | SOLDADURA (WELD) | ZONA AFECTADA (HEAT AFFECTED ZONES) | METAL BASE (Base metal) | TAMAÑO DE GRANO (GRAIN SIZE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 121 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 315 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 180 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 86 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 137 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MIN | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 8 |
| MAX | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**ANALISIS QUIMICO (%) CHEMICAL ANALYSIS (%)**

| N° DE TUBO | C | C | Mn | P | S | Si | Al | Cu | Cr | Ni | Mo | Ti | Nb | B | V | N | Als | Ca | Pcm | CE | Nb+V | V+Nb+Ti |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 121 | H | 0.17 | 0.81 | 0.014 | 0.008 | 0.113 | 0.046 | 0.014 | 0.017 | 0.012 | 0.006 | - | - | - | - | - | - | - | - | - | - | - |
| | P | 0.19 | 0.84 | 0.015 | 0.009 | 0.147 | 0.044 | 0.018 | 0.021 | 0.015 | 0.005 | 0.002 | 0.003 | 0.0001 | 0.005 | - | - | 0.003 | 0.24 | 0.34 | 0.01 | 0.01 |
| | P | 0.19 | 0.85 | 0.013 | 0.010 | 0.152 | 0.042 | 0.020 | 0.022 | 0.014 | 0.007 | 0.001 | 0.002 | 0.0002 | 0.004 | - | - | 0.002 | 0.24 | 0.34 | 0.01 | 0.01 |
| 315 | H | 0.16 | 0.81 | 0.019 | 0.008 | 0.124 | 0.043 | 0.015 | 0.016 | 0.013 | 0.006 | - | - | - | - | - | - | - | - | - | - | - |
| | P | 0.17 | 0.79 | 0.018 | 0.008 | 0.154 | 0.040 | 0.018 | 0.018 | 0.015 | 0.008 | 0.001 | 0.005 | 0.0002 | 0.003 | - | - | 0.003 | 0.22 | 0.31 | 0.01 | 0.01 |
| | P | 0.19 | 0.78 | 0.019 | 0.007 | 0.148 | 0.039 | 0.020 | 0.019 | 0.017 | 0.009 | 0.002 | 0.006 | 0.0002 | 0.002 | - | - | 0.005 | 0.24 | 0.33 | 0.01 | 0.01 |
| 6 | H | 0.16 | 0.82 | 0.017 | 0.007 | 0.106 | 0.035 | 0.013 | 0.015 | 0.014 | 0.005 | - | - | - | - | - | - | - | - | - | - | - |
| | P | 0.18 | 0.84 | 0.019 | 0.006 | 0.124 | 0.038 | 0.015 | 0.014 | 0.012 | 0.008 | 0.001 | 0.004 | 0.0002 | 0.003 | - | - | 0.004 | 0.23 | 0.33 | 0.01 | 0.01 |
| | P | 0.19 | 0.83 | 0.018 | 0.005 | 0.118 | 0.040 | 0.018 | 0.015 | 0.014 | 0.007 | 0.002 | 0.003 | 0.0001 | 0.004 | - | - | 0.002 | 0.24 | 0.34 | 0.01 | 0.01 |
| 180 | H | 0.16 | 0.82 | 0.021 | 0.008 | 0.128 | 0.041 | 0.014 | 0.018 | 0.013 | 0.005 | - | - | - | - | - | - | - | - | - | - | - |
| | P | 0.17 | 0.86 | 0.022 | 0.010 | 0.134 | 0.037 | 0.016 | 0.020 | 0.015 | 0.006 | 0.003 | 0.004 | 0.0002 | 0.002 | - | - | 0.003 | 0.22 | 0.32 | 0.01 | 0.01 |
| | P | 0.18 | 0.88 | 0.021 | 0.009 | 0.145 | 0.035 | 0.018 | 0.021 | 0.018 | 0.008 | 0.003 | 0.002 | 0.0001 | 0.003 | - | - | 0.002 | 0.23 | 0.34 | 0.01 | 0.01 |
| 86 | H | 0.18 | 0.83 | 0.022 | 0.007 | 0.133 | 0.027 | 0.023 | 0.021 | 0.017 | 0.005 | - | - | - | - | - | - | - | - | - | - | - |
| | P | 0.20 | 0.81 | 0.021 | 0.008 | 0.147 | 0.030 | 0.025 | 0.024 | 0.019 | 0.006 | 0.002 | 0.003 | 0.0001 | 0.002 | - | - | 0.002 | 0.25 | 0.34 | 0.01 | 0.01 |
| | P | 0.19 | 0.80 | 0.021 | 0.007 | 0.151 | 0.032 | 0.027 | 0.026 | 0.020 | 0.007 | 0.003 | 0.004 | 0.0003 | 0.004 | - | - | 0.001 | 0.24 | 0.33 | 0.01 | 0.01 |
| 137 | H | 0.15 | 0.82 | 0.018 | 0.006 | 0.129 | 0.041 | 0.024 | 0.021 | 0.021 | 0.006 | - | - | - | - | - | - | - | - | - | - | - |
| | P | 0.18 | 0.84 | 0.017 | 0.005 | 0.138 | 0.042 | 0.026 | 0.025 | 0.019 | 0.007 | 0.002 | 0.002 | 0.0001 | 0.002 | - | - | 0.001 | 0.23 | 0.33 | 0.00 | 0.00 |
| | P | 0.17 | 0.85 | 0.016 | 0.007 | 0.132 | 0.045 | 0.028 | 0.027 | 0.017 | 0.008 | 0.001 | 0.003 | 0.0002 | 0.004 | - | - | 0.003 | 0.22 | 0.32 | 0.01 | 0.00 |
| MIN | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MAX | | 0.26 | 1.20 | 0.030 | 0.030 | - | - | 0.500 | 0.400 | 0.400 | 0.150 | 0.040 | - | 0.001 | 0.080 | - | - | - | - | - | - | 0.15 |
| *** | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| | | |
|---|---|---|
| PRUEBA HIDROSTATICA (HYDROSTATIC TEST) | PRESION: (PRESSURE): 1680 Psi<br>TIEMPO DE PRUEBA (HOLDING TIME): 5 S | |
| PRUEBA DE ULTRASONIDO (ULTRASONIC TEST) | ESTANDAR DE REFERENCIA (REFERENCE STANDARD): 29 | |
| METODO DE PND EN SOLDADURA (METHOD OF WELD NDE) | SOLDADURA LONGITUDINAL (LONGITUDINAL WELD) | RAYOS X (X RAY) (RT)<br>INDICADOR DE CALIDAD DE IMAGEN (IQI): N/A<br>TIPO Y TAMAÑO (TYPE AND SIZE) |
| | JUNTAS (JOINTERS WELDS) | RAYOS X TIEMPO REAL (X RAY) (RT)<br>INDICADOR DE CALIDAD DE IMAGEN (IQI): N/A<br>TIPO Y TAMAÑO (TYPE AND SIZE) N/A |
| TRATAMIENTO TERMICO SOLDADURA (HEAT TREATMENT WELD) | TEMPERATURA (TEMPERATURE): N/A | |
| PRUEBA DE APLASTAMIENTO (FLATTENING TEST) | 0° OK 90° OK | |

**CLAVE (KEY):**

**A. %FACTOR DE EXPANSION PARA TUBERIA EXPANDIDA EN FRIO:**
%( EXPANSION FACTOR FOR COLD-EXPANDED PIPE)

**B. TIPO (TYPE):**
1. MUESTRA EN TIRA (STRIP TEST PIECE)
2. APLANADO (FLATTENED)
3. SIN APLANAR (UNFLATTENED)

**C. FRECUENCIA DE PRUEBA (FREQUENCY OF TEST):**
H. COLADA (HEAT)
P. PRODUCTO (PRODUCT)
R. REMUESTREO (RETESTING)
T. UNIDAD DE PRUEBA (TEST UNIT)

**CRITERIOS DE ACEPTACION (ACEPTANCE CRITERIA):**
* CUALQUIER COLADA (ANY HEAT)
** PROMEDIO DE LAS COLADAS (ALL HEAT AVERAGE)
***PROMEDIO MINIMO DE LAS COLADAS (ALL HEAT AVERAGE MIN.)

**D. LOCALIZACION Y ORIENTACION (ORIENTATION AND LOCATION): (THE SOURCE)**
4 CORDON DE SOLDADURA (SEAM WELD) 1W
5 CUERPO DEL TUBO (PIPE BODY) 1T180
6 CUERPO DEL TUBO (PIPE BODY) 1L90
7 CORDON DE SOLDADURA (SEAM WELD) 3W
8 CUERPO DEL TUBO (PIPE BODY) 3T90
9 CORDON DE SOLDADURA (SEAM WELD) 3 HAZ
10 CUERPO DEL TUBO (PIPE BODY) 2T90
11 2W
12 TRANSVERSAL (TRANSVERSE)
13 LONGITUDINAL (LONGITUDINAL)

**E. SIZE (TAMAÑO)**
14 1.500" X 0.375"
15 CILINDRICA (ROUND BAR) 0.500"
16 CILINDRICA (ROUND BAR) 0.350"
17 FULL SIZE (COMPLETO)
18 3/4"
19 2/3"
20 1/2"

**F: TIPO DE RANURA DWTT (DWTT TYPE OF NOTCH):**
21 CHEVRON (CHEVRON)
22 PRENSADA (PRESSED)

**G: LOCALIZACION (LOCATION):**
23 EXTERIOR (OUTSIDE)
24 INTERIOR (INSIDE)
25 CENTER (CENTRO)

**H: ESTANDAR DE REFERENCIA (REFERENCE STANDARD):**
26 BARRENO (DRILLED HOLE) 1/16"
27 RANURA RECTANGULAR (RECTANGULAR NOTCH N-5)
28 BARRENO 1,2 mm DIAMETER MID-WALL STANDARDIZATION
29 RANURA RECTANGULAR (RECTANGULAR NOTCH) N-10
30 BARRENO (DRILLED HOLE ) 3.2 mm

NOTAS (NOTES):

HACEMOS CONSTAR QUE EL MATERIAL DESCRITO HA SIDO FABRICADO, MUESTREADO, PROBADO E INSPECCIONADO DE ACUERDO CON LA ESPECIFICACION API SPEC 5L 44 TH ED./A.S.T.M. Y QUE LOS RESULTADOS SON COMO APARECEN EN LOS REGISTROS DE LA COMPAÑÍA.

(WE HEREBY VERIFY THAT MATERIAL DESCRIBED HEREIN HAS BEEN MANUFACTURED, SAMPLED TESTED AND INSPECTED IN ACCORDANCE WITH API SPEC 5L 44 TH ED./A.S.T.M. AND THAT THESE TEST RESULT, ARE AS THEY APPER IN RECORDS OF THE COMPANY)

CONTROL DE CALIDAD TUBACERO, S. DE R.L. DE C.V. 04

Ing. Samuel Montoya Laguna
CED. PROF. [illegible]

JEFE DE LABORATORIO
(HEAD OF LABORATORY)

REV.7 Sep.-13

F-TUME-030